Rochester Schools Modernization Program – Phase 2A.1

RCSD John Walton Spencer School 16

321 Post Avenue

Rochester, NY 14619

SED Project Control No. 26-16-00-01-0-016-020

John Walton Spencer School Additions and Alterations A/C, Crawlspace and Site Work Bid Package

Project Manual

Bid Set
May 6, 2020

The design of this project conforms to all applicable provisions of the New York State uniform Fire Prevention and Building Code, the New York State Energy Conservation Code, and the building standards of the New York State Education Department.

ROCHESTER JOINT SCHOOLS CONSTRUCTION BOARD

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SECTION 00 11 13 - ADVERTISEMENT FOR BIDS

Sealed bids will be received until 2:00 p.m. on May 20th, 2020, at the Rochester Schools Modernization Program at 70 Carlson Road, Suite 200, Rochester, NY 14610, by the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"); Attention: Pépin Accilien, Program Director, Tel. 585-512-3820, for the RCSD John Walton Spencer School 16 – Phase 2A.1, at which time and place said bids will be publicly opened and read aloud. Questions during the bidding period must be communicated as described in Section 00 21 13 – INSTRUCTIONS TO BIDDERS.

RCSD John Walton Spencer - School No.16, Rochester, NY, Phase 2A.1 ("Project") includes:

- Bid Package– Renovation and Alterations to John Walton Spencer School 16

PLEASE NOTE THAT THE PROJECT DOES NOT INCLUDE A PROJECT LABOR AGREEMENT (PLA) AS A PART OF THE PROJECT DOCUMENTS/REQUIREMENTS.

Prime Contracts are as follows:

- **General Trades Work Contract #7**
- **Mechanical Work Contract #8**
- **Electrical Work Contract #9**
- **Plumbing Work Contract #10**

The Contract Documents, including the Instruction to Bidders, Form of Contract and Bid Form, may be obtained at the following website:

Dataflow/RSMP Project portal: www.goDataflow.com/RSMP
Dataflow Rochester Office, 320 North Goodman, Suite 200 (Village Gate), Rochester, NY 14607
(585) 271-5730 phone
(585) 271-3752 fax

The following sites will post the Advertisement, Addendums, and a Design Document set:

RSMP News: http://www.rsmpnews.net/

RSMP: https://www.rcsdk12.org/rsmp

The following sites will post the Advertisement and Addendums:

Rochester Builders Exchange, 180 Linden Ave., Suite 100, Rochester, NY 14625
(585) 586-5460

McGraw Hill Construction / Dodge Reports: http://dodge.construction.com

Bidnet site: www.bidnet.com

Complete sets of the Bid Documents may be obtained at the office of Dataflow Rochester Office, 320 North Goodman, Suite 200 (Village Gate), Rochester, NY 14607, upon payment of a deposit of $100 for each set made payable to the RJSCB (or if not picking up in person, add $35 for shipping made payable to Dataflow which is non-refundable). Along with their deposit check, bidders are to provide an active email address, street address (no PO Box Numbers), phone number, fax number, and contact name. Any bidder upon returning such set in GOOD CONDITION to Dataflow Rochester Office within

thirty (30) calendar days after the bid date set for the Bid opening will be refunded their deposit. No partial sets or sections of the Contract Documents will be distributed.

A pre-bid conference will be held by on Tuesday, May 12, 2020 at 9:00 am – 10:00 pm at 321 Post Avenue, Rochester, NY at John Walton Spencer - School 16. Meet at the building's main entrance. Please register via e-mail with Buffalo Construction Consultants at jmancil@buffaloconstruct.com. Bidders must sign in with the CM prior to entering the facility.

When arriving to the school for the pre-bid conference, all attending personnel is required to be bring their own proper PPE to enter the school. Proper PPE to access public spaces should be utilized when attending the pre-bid conference.

The Owner is required to comply with New York State's public bidding and other laws pertaining to public works, to advertise for any and all public work contracts, and to incorporate New York prevailing wage schedules or federal Davis-Bacon wage rate schedules, as applicable, into any contracts which may involve the employment of laborers, workmen or mechanics, whether or not publicly bid.

Sincerely,

Norman Jones, Chair – RJSCB
Pépin Accilien P.E., Program Director – Savin Engineers, P.C.

By order of the Rochester Joint Schools Construction Board

SECTION 00 21 13 - INSTRUCTIONS TO BIDDERS

1.01 RECEIPT AND OPENING OF BIDS: The Rochester Joint Schools Construction Board ("RJSCB"), herein referred to as "Owner," invites bids on the Bid Form attached hereto, all blanks of which must be appropriately filled in. Bids will be received at the time and place described in Section 00 11 13 ADVERTISEMENT FOR BIDS, and then at said time and place publicly opened and read aloud. The envelopes containing the bids must be sealed, addressed to Attention: **Mr. Pépin Accilien P.E., Program Director, 70 Carlson Road – Suite 200, Rochester NY 14610**, and designated as:

- **General Trades Work Contract #7**
- **Mechanical Work Contract #8**
- **Electrical Work Contract #9**
- **Plumbing Work Contract #10**

Bid for–John Walton Spencer School No. 16, Rochester, NY–Phase 2A.1 of the Rochester Schools Modernization Program ("RSMP")

SED Project Control No.:
S.E.D. No. 26-16-00-01-0-016-020

The contract entered into between the Owner and the successful bidder(s) shall be for work associated with implementing RCSD– John Walton Spencer School No.16 – Phase 2A.1 of the RSMP (herein, "Project"), which work shall be set forth in detail in the Contract Documents issued by the Owner.

PLEASE NOTE THAT THE PROJECT DOES NOT INCLUDE A PROJECT LABOR AGREEMENT ("PLA") AS A PART OF THE PROJECT DOCUMENTS/REQUIREMENTS.

1.02 BIDDING CONDITIONS:

1. Owner reserves the right to reject any or all bids received for the Project.

2. INFORMALITIES: The Owner may consider any bid not prepared and submitted in accordance with the provisions hereof to be informal and may waive any informalities in or reject any and all such bids. Conditional bids will not be accepted. Any bid may be withdrawn prior to the above scheduled time for the opening of bids or authorized postponement thereof. No bidder may withdraw a bid within 45 calendar days after the actual date of the opening thereof.

3. BID INTERPRETATIONS: Bid amounts are required to be submitted both in writing and in figures. In the event of conflict, the written amount shall take precedence over the amount expressed in figures.

4. PRICE REGULATIONS; By placing a bid under these instructions, the bidder certifies that the prices therein are in accordance with all New York State and United States laws and regulations.

1.03 LATE BIDS: Formal bids, amendments thereto, or requests for withdrawal of bids received by the Owner after the time specified for bid opening will be date stamped as evidence of late arrival and returned to the bidder unopened. The bidder assumes the risk of any delay in the mail or in the handling of the mail by employees and Consultants of the Owner. Whether sent by mail or by personal delivery, the bidder assumes the responsibility for having the bid submitted on time. *The time clock located in the Rochester Joint Schools Construction Board Room is designated the official timepiece for submission of bids. BIDS MUST BE SUBMITTED at the location defined herein under section 1.01 as the location where sealed bids are to be received. Bids will not be taken or accepted at any other location.*

2.01 PREPARATION OF BIDS: Bids must be submitted on the prescribed form. All applicable blank spaces on the Bid Form shall be legibly filled in using a non-erasable medium. Unless otherwise noted, all bid prices must be expressed in both writing and in figures. In the event of conflict, the written amount shall take precedent over the amount expressed in figures.

1. BID SUBMISSION: All bids must be submitted in sealed envelopes bearing, on the outside, the time bids are to be opened, the type of work, the name and SED Project Control Number of the project and building, and the name and address of the bidder. Facsimile bids will not be accepted.

2. EXAMINATION OF PREMISES: The submission of a bid will be considered as evidence that the bidder has examined the premises and acquainted himself/herself with present conditions under which he/she will be obliged to operate and that will affect in any manner the work to be done. A pre-bid conference will be held as described in Section 00 11 13 – ADVERTISEMENT FOR BIDS. It is the bidder's responsibility to request examination of Rochester City School District (“RCSD”) or Owner documents necessary to allow the bidder to evaluate the premises, including as-built drawings and records showing known asbestos containing building material (“ACBM”). In accordance with Title 2 of the Toxic Substances Control Act (“TSCA”) published at 15 U.S.C. § 2601 *et. seq.,* known as the Asbestos Hazard Emergency Response (“AHERA”), a Management Plan is available for public review at the administrative office of every RCSD building. The expense for emergency cleaning and air testing shall be borne by the Contractor responsible for disturbing ACBM. All proposals shall take into consideration all conditions that may affect the work of the Contract. No allowance will be made subsequently on behalf of the Contractor for any error, omission or negligence on his/her part.

   School 16 has been undergone decontamination/removal of known hazardous material and as such, none are expected to interfere with scoped work. Summary reports are available from RSMP at 70 Carlson Road, Rochester, NY, 141610, 585-512-3820.

3. DE-SCOPE MEETINGS: There will be Prime Contractor de-scope meetings held at the RSMP office for all the apparent lowest and second low bidders. All such bidders need to be available immediately after the bid opening.

All apparent low bidders shall bring to the de-scope meeting the labor hours they have estimated in their bid.

4. SCHEDULING: Please refer to the the milestones and dates as denoted in Section 00 43 83 "Schedules and Milestones." **Bidder shall submit a detailed construction schedule to include critical dates, activities, milestones, and other pertinent information consistent with the Milestone Schedule provided.** It is expected that these costs are included in the base bid.

5. The required DP-1 form, which must be submitted as part of this Bid, must be fully completed indicating that EBE participation, by category, meets the Project's requirements.

3.01 DISCREPANCIES: If any bidder should find any discrepancies, conflicts or omissions in the drawings and/or specifications, these shall be called to the attention of the Program Manager, in writing, not later than seven days before the bids are due. Such items will be reviewed, and if clarification is deemed to be necessary, appropriate addenda will be issued to all bidders. Neither the Owner nor the Owner's Representative(s) will be responsible for any oral instructions given during the bidding period. If inconsistencies and/or discrepancies are not brought to the attention of the Program Manager prior to bid, then the amount of work of greater value, or the product of greater quality, shall be considered applicable to determine the Project requirements at the time of the award of the contract, and thereafter.

4.01 ADDENDA AND INTERPRETATIONS: No interpretations of the meaning of the plans, specifications or other Contract Documents will be made to any bidder orally. Every request for such interpretation should be submitted in writing by e-mail to school16@rjscb.org. To be given consideration, such requests must be received on/or before **12:00 p.m. on May 14, 2020.** Any and all such interpretations and all supplemental instructions will be in the form of written addenda to the Contract Documents and Addenda will be posted and hosted by www.dataflow.com and www.bidnet.com. Any bidder who is preparing a bid based upon the Contract Documents available at various service agencies, is responsible for obtaining the addenda from the hosting service. Each bidder shall acknowledge on the Bid Form, receipt of each addendum by number. Failure of any bidder to receive any such addendum or interpretation shall not relieve any bidder from any obligation under this bid as submitted. All addenda so issued shall become part of the Contract Documents.

5.01 CERTIFICATE OF NON-COLLUSION IN BIDDING: To comply with Section 103-d of the General Municipal Law of the State of New York, all bidders are required to sign a statement regarding non-collusive bidding. This statement has been made a part of the Bid Form (00 41 16).

1. DISCLOSURE: A bid shall not be considered for award nor shall any award be made where (.1), (.2) and (.3) in the Certification of Non-Collusion in Bidding have not been complied with; provided however, that in any case the Bidder cannot make this certification, the Bidder shall so state and shall furnish with the bid a signed statement which sets forth in detail the reasons therefore. Where (.1), (.2) and (.3) have not been complied with, the bid shall not be considered for award nor

shall any award be made unless the Owner determines that such disclosure was not made for the purpose of restricting competition.

2. PRICING INFORMATION: The fact that a bidder, (A) has published price lists, rates or tariffs covering items being procured, (B) has informed prospective customers of proposed pending publication of new or revised price lists of such items being bid, does not constitute without more, a disclosure within the meaning of the required certification.

6.01 RESPONSIBLE BIDDER: The Owner has developed the following guidelines for the determination of public works contract responsibility consistent with the duties of contracting agencies and the court interpretations of State law and regulations governing competitive bidding in the belief that the public interest would be served by the uniform application of these guidelines on Owner public works contracts:

1. In determining the responsibility of a bidder for a public works contract, the Owner shall consider the following items;
   A. Lack of proper certification, adequate expertise, prior experience with comparable projects, or financial resources to perform the work of the contract in a timely, competent and acceptable manner. Evidence of such lack of ability to perform may include, but shall not be limited to, evidence of suspension or revocation for cause of a professional license of any director or officer, or any holder of five percent (5%) or more of the bidders stock or equity; failure to submit satisfactory evidence of insurance, surety bond or financial responsibility; the status of bankruptcy petitions; suspension or debarment by state or federal government; or a history of termination of prior contracts for cause.
   B. Criminal conduct in connection with government contracts or business activities. Evidence of such conduct may include a judgment of conviction or information obtained as a result of formal grant of immunity in connection with criminal prosecution of the bidder, and any director or officer, or holder of five percent (5%) or more of the shares or equity of the bidder, or any affiliate of the bidder.
   C. Violations of safety and/or training standards as evidence by a pattern of OSHA violations or the existence of willful OSHA violations.
   D. Willful non-compliance with the prevailing wage and supplements payment requirements of the Labor Law by the bidder or any affiliate of the bidder.
   E. Any other significant Labor Law violation, including, but not limited to, child labor law violations, failure to pay wages, or unemployment insurance tax delinquencies.
   F. Any significant violation of the Worker's Compensation Law, including, but not limited to the failure of a bidder to provide proof of worker's compensation or disability benefits coverage.
   G. Any criminal conduct involving violations of the Environmental Conservation Law or other federal or state environmental statutes or regulations.
   H. Any criminal conviction concerning formation of, or any business association with, an allegedly false or fraudulent Women's or Minority Business Enterprise (W/MBE), or any denial, de-certification, revocation or forfeiture or W/MBE status by New York State.

I. Any adverse determinations or administrative rulings by the Equal Employment Opportunity Commission and/or the New York State Division of Human Rights that the bidder engaged in unlawful or discriminatory conduct.

J. Any other cause of so serious or compelling a nature that it raises questions about the responsibility of a bidder, including, but not limited to submission to the Owner of a false or misleading statement on a sworn Statement of Bidder Qualifications, or in some other form, in connection with a bid for or award of a contract.

K. In addition to the factors specified above, the Owner may also give due consideration to any other factors considered to bear upon bidder responsibility, including but not limited to, any mitigating factors brought to the Owner's attention by the bidder.

2. A sworn "Statement of Bidder Qualifications" form as attached in Section 00 45 13 shall be completed by all bidders and submitted with his/her bid. The Owner shall use the information contained in the response to the sworn statement in making a determination of bidder responsibility before awarding the Contract. Any untrue representations made on the aforementioned form shall be grounds for rejection of the bidder's bid or immediate termination of the Contract.

6.02 QUALIFICATION OF BIDDERS: A bidder can be judged qualified only for the type of work in which he has demonstrated competence. The Owner will make such investigation it believes necessary to determine the competency of the bidder to perform the work for which he has submitted a bid. The bidder shall furnish promptly all information the Owner requests. The successful bidder will, at minimum, have successfully completed three (3) prior projects of similar size and scope to this Project, and shall respond and include all information set forth in the "Statement of Bidder Qualifications" form attached as Section 00 45 13, which must be signed and submitted with its bid.

6.03 REQUESTED BIDDER INFORMATION: Such information shall consist of the following and shall be included in each bidder's sworn "Statement of Bidder Qualifications" form (see Section 00 45 13), to be submitted with its bid.

1. PROJECTS: A list of a minimum of three completed projects involving work of a similar nature as that for which the bid has been submitted. List the most recent project first, continue with the next most recent and so on. For each project, include the name and address of the owner, the architect or engineer and the date of completion. Information concerning additional projects may be required by the Owner.

2. LOCATION: The address and description of the bidder's place of business; a list of major equipment owned by the bidder.

3. FINANCIAL STATEMENT: A certified or authenticated financial statement dated not more than thirty days prior to its submission. Include liquid assets, bonding capabilities and the banks or financial institutions associated with the business.

4. NON-BANKRUPTCY: Certification that the bidder is not in bankruptcy and that its assets are not subject to receivership.

7.01 BID SECURITY: Each bid must be accompanied by the certified check or bank draft of the bidder made payable to the "Rochester Joint Schools Construction Board," or by a bid bond prepared in the form of Bid Bond attached in Section 00 43 00, duly executed by the bidder as principal, and having as surety thereon a surety company authorized to do business in the State of New York approved by the Owner in an amount not less than five percent (5%) of the amount of the bid. Such checks will be returned by certified mail to all except the three lowest formal bidders within seven (7) business days after the formal opening of bids. All remaining checks will be returned by certified mail to the three lowest bidders within seven (7) business days after the Owner and the accepted bidder have executed the Contract or if no Contract has been so executed, within 45 calendar days after the date of the opening of the bids, upon demand of the bidder at any time thereafter so long as he has not been notified of the acceptance of his bid. Bid bonds are retained in the Owner. Upon request, such bonds will be returned.

8.01 LIQUIDATED DAMAGES FOR FAILURE TO ENTER INTO CONTRACT: The successful bidder, upon his/her failure or refusal to execute and deliver the Contract, bond and/or insurance certificates required within 10 calendar days after he/she has received notice of the acceptance of his/her bid, shall forfeit to the Owner, as liquidated damages for such failure or refusal, the security deposited with his/her bid.

9.01 OBLIGATION OF BIDDER: At the time of the opening of bids, each bidder will be presumed to have inspected the Project site(s) and to have read and to be thoroughly familiar with the Contract Documents, including all addenda. The failure or omission of any bidder to receive or examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

10.01 AWARD OF CONTRACT: This contract will be awarded to that qualified bidder whose base bid and whose prices for the Alternates accepted by the Owner, if any, total the lowest number of dollars.

1. Notice of Award; Within twenty-four (24) hours after award is made by the Owner to the successful bidder, the Owner or the Program Manager will mail to such bidder at the address given by him/her on his/her bid, a notice in writing to the effect that the award has been made to him/her, but the mailing or receipt of such notice shall not be a condition precedent to the right of the Owner to take such lawful action as it deems advisable.

11.01 CONDITIONS OF THE CONTRACT: The General Conditions of the Contract hereinafter fully set forth in Section 00 72 16 of the Project Manual and General Requirements set forth in Division 1 of the Project Manual, as well as all other terms and conditions set forth in the Contract Documents, will be strictly enforced. The Owner's failure to insist on Contractor's performance with regard to any particular term, condition, or requirement of the Contract shall not function as a waiver or preclude the Owner from enforcing such terms, conditions or requirements going forward.

11.02 LOCAL LABOR: The Project will be funded in part through the issuance of tax- exempt bonds by the County of Monroe Industrial Development Agency ("COMIDA"). Pursuant to the terms of the agreement between COMIDA and the Owner, COMIDA requires that the Project use only "Local Labor," subject to certain permitted exceptions and waivers. The term "Local Labor" is defined as laborers residing in Monroe, Genesee, Livingston, Orleans, Ontario, Seneca, Wayne, Wyoming and Yates counties. Further information on

the COMIDA program requirement applicable to the RSMP is available online at http://www.growmonroe.org. For Information only - Non-union bidders are encouraged to contact Dan Kuntz of Laborer's Local 435, at 585-454-5800, to discuss participation in the Local's certified apprenticeship program, PRIOR to submitting a bid. Contractor's participation in a NYS certified apprenticeship program is a requirement of this Project.

11.03 CONTRACTOR SELF-PERFORMANCE REQUIREMENTS: Notwithstanding any other provision of the Contract Documents, at least five percent (5%) of the direct labor, materials, systems or equipment shall be provided by the Contractor. The Contractor shall subcontract **no more than 95%** of the total contract value. Contractors are required to certify, prior to award, that they can and will comply with this subcontracting limitation requirements. The unit measure (dollar value, unit price, schedule of value) utilized to determine the quantities of work, labor and material furnished by the Contractor shall be determined by the Construction Manager and the Architect and shall be appropriate for the scope of work involved. For the purpose of this Section, work performed by supervisory personnel, persons above the level of foreman, or office personnel, all overhead costs, including bonds and certificates, shop drawings and similar items shall not count towards the percentage of Work provided by the Contractor.

12.01 TAX EXEMPTION: Bidders shall not include in their bid the sales and compensating use taxes of the State of New York or of any City or County in the State of New York for any materials which are to be incorporated into the structures or landscape. The New York State Department of Taxation and Finance does not issue tax exemption numbers to government entities. Completion of any type of exempt organization certification form is, therefore, not required. An official Purchase Order issued to the vendor by a government entity is the only evidence required by the state to substantiate an exempt sale to a government purchaser.

12.02 WAGE RATES: The attention of bidders is called to the wage rates applicable to work performed under this Contract, as set forth in the Wage Rate Schedules referenced in Section 00 73 46. The Contractor and every subcontractor shall post in prominent and accessible places on the site of the work legible statements of all wage rates as specified in the Contract to be paid for the various classes of laborers, workmen and mechanics employed on the work.

12.03 STATE LAWS AND REGULATIONS: The bidder's attention is directed to the following instructions and information regarding construction operations, contracts and references to the provisions of law applicable in New York State.

1. COMPLIANCE: The Contractor and each and every subcontractor performing work at the site of the Project to which this Contract relates shall comply with the applicable provisions of the Labor Law, as amended, of the State of New York. Section 222-A of the Labor Law regarding elimination of dust hazard must be observed.

2. HOURS OF WORK: First Shift will be from 7:00 a.m. to 3:30 p.m., and Second Shift will be from 2:00 p.m. to 10:30 p.m.

3. NON-DISCRIMINATION: Contractor must abide by all state, federal and local laws having jurisdiction over the work of this Contract. The Contract may be

canceled or terminated by the Owner for cause upon a violation of the non-discrimination policy or for violation of any applicable laws.

4. EFFECT OF FAILURE TO TESTIFY BEFORE GRAND JURY: Pursuant to the requirements of Section 103-A of the General Municipal Law of the State of New York, the following clause is inserted herein and is made a part of the Contract:

   A. Upon the refusal of a person, when called before a grand jury to testify concerning any transaction or contract had with the state, any political subdivision thereof, or a public authority to sign a waiver of immunity against subsequent criminal prosecution or to answer any relevant question concerning such transaction or contract. Such person, and any firm, partnership, or corporation of which he is a member, partner, director of officer shall be disqualified from thereafter selling to, or submitting bids to, or receiving awards from, or entering into any contracts with any municipal corporation or any public department, agency, or official thereof, for goods, work, or services for a period of five years after such refusal; and any and all contracts made with any municipal corporation or any public department, agency or official thereof, since July 1, 1959, by such person, and by any form, partnership, or corporation of which he is a member, partner, director, or officer, may be cancelled or terminated by the municipal corporation without incurring any penalty or damages on account of such cancellation or termination; but any monies owing by the municipal corporation for goods delivered or work done prior to the cancellation or termination shall be paid.

12.04 WORKFORCE DIVERSITY AND EQUAL EMPLOYMENT OPPORTUNITIES: The Owner recognizes the need to take action to ensure that minority and women-owned business enterprises (W/MBE's), disadvantaged business enterprises (DBE's), small business enterprises (SBE's) and minority and women employees and principals are given the opportunity to participate in the performance of contracts entered into with the Owner. This opportunity for full participation in our free enterprise system by persons traditionally, socially and economically disadvantaged is essential to obtain social and economic equality. Accordingly, the Owner fosters and promotes the participation of such individuals and business firms in contracts with the Owner. Therefore, Contractor and all subcontractors and suppliers must fully comply with the requirements set forth in Section 00 43 31 ("MWBE/DBE/SBE Utilization and Workforce Diversity"), and use good faith efforts to attain the diversity and workforce utilization goals stated therein. Owner reserves the right to revise, adjust and/or modify the stated goals for contracts awarded at a later date as part of the RSMP. Contractor compliance with the requirements of Section 00 43 31 and related obligations will be monitored by Owner's Independent Compliance Officer (ICO). Failure to adequately complete the forms required to be submitted with the bid are grounds for the Owner to reject the bid or disqualify the bidder.

12.05 APPRENTICESHIP REQUIREMENTS – The Phase 2 legislation also requires that Contractors and Subcontractors with construction contracts $1M or more "shall participate in NYS approved apprentice training programs in the trades it employs: that have been approved by not less than three years; have graduated at least one apprentice in last three years; have at least one apprentice currently enrolled in such apprentice training program; and have demonstrated that the program has made significant efforts to attract and retain minority apprentices."

13.01 PERFORMANCE AND LABOR & MATERIAL PAYMENT BONDS:

1. SECURITY FOR FAITHFUL PERFORMANCE: Simultaneously with its delivery of the executed Contract, the successful bidder must deliver to the Owner an executed bond in the amount of one hundred percent (100%) of the accepted bid as security for the faithful performance of the Contract, prepared in the form of Performance Bond attached hereto in Section 00 61 13 and having as surety thereof such surety company or companies as are acceptable on bonds approved by the Owner, and as are authorized to transact business in New York State.

2. SECURITY FOR LABOR & MATERIAL PAYMENT: Simultaneously with its delivery of the executed Contract**,** the successful bidder must deliver to the Owner an executed bond in the amount of one hundred percent (100%) of the accepted bid as security for the payment of all persons performing labor or furnishing materials in connection therewith, prepared in the form of Payment Bond attached hereto in Section 00 61 13 and having as surety thereof such surety company or companies as are acceptable on bonds approved by the Owner, and as are authorized to transact business in this State.

3. POWER OF ATTORNEY: Attorneys in fact who sign Bid Bonds or Performance Bonds must file with each bond a certified copy of their Power of Attorney to sign said bonds.

13.02 COMMENCEMENT OF WORK: No Contractor or Subcontractor shall commence work under this Contract until the Owner has approved the Contractor's payment bond and performance bond offered as security for faithful performance and payment for labor and material on the Project in accordance with paragraph 13.01 hereinabove.

14.01 CONDITIONS OF WORK: Each bidder must become fully informed of the conditions relating to the construction and labor under which the Work is now being or will be performed. Failure to do so will not relieve a successful bidder of his/her obligation to furnish all material and labor necessary to complete the contemplated Work for the consideration set forth in their bid. In so far as possible, the Contractor in the carrying out of its Work must employ such methods or means as will not cause any interruption of, or interference with, the work of any other contractor. Contractor should undertake to perform the Contract in the shortest possible time consistent with good and workmanlike construction.

15.01 EQUIVALENTS: Where, in these specifications, certain kinds, types, brands, or manufacturers of materials are named, they shall be regarded as the required standard of quality. If two or more are named, these are presumed to be qualitatively equal, and the Contractor may select any one of the named items. If the bidder desires to use any kinds, types, brands, or manufacturers of materials other than those named in the specifications, it shall indicate in writing, with its bid or prior to Contract Award, the kind, type, brand or manufacturer presumed as an equivalent in its bid.

1. If proposing an equivalent product or material, the bidder must submit a Request for Equivalent Review Form (Section 00 63 19) with its bid or prior to Contract Award. The Architect will review the product or materials proposed as "equivalent" by the

bidder and make a determination as to whether such product or materials are equivalent to those set forth in the Contract Documents. If not found to be equivalent by the Architect and if the requirement for equivalency is not waived by the Owner, the bidder must indicate in writing prior to the award of contract that it will provide the specified product or materials without any increase in compensation, or the Owner may reject its bid as non-responsive.

2. The burden of proof of the equivalency of the proposed equivalent products or material is upon the bidder. The Architect's decision to approve or disprove a proposed equivalent shall be final.

END OF SECTION 00 21 13

SECTION 00 41 16.01 - BID FORM - GENERAL TRADES WORK CONTRACT #7

1.1 To the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"):

The undersigned proposes to do all the work and furnish all material necessary for RCSD– John Walton Spencer School No.16 **– Phase 2A.1 of the RSMP** (herein, "Project"). (Use only one bid form per contract being bid):

_____

Company Name

1.1.1 In accordance with drawings and specifications therefore and addenda comprising the Contract Documents, for the lump sum of:

Bid (not including Allowances)
$_____

Allowance C-07-01
$_____$35,000.00_____

Allowance C-07-02 $_____$10,000.00_____

TOTAL BASE BID (Including Allowances All inclusive)

$_____
Amount in Figures

_____Dollars
Amount in Writing
herein referred to as the "Base Bid."

1.2 ALLOWANCES

Refer to section 00 43 21 "Allowances" for description of Allowances, where used. **Allowances are to be included in base bid amount and are to be used for items not identified in the contract documents. Unit Price Costs will be used to add or delete scope from allowances when directed by the Owner or Construction Manager.**

1.3 ALTERNATES

Refer to section 00 43 23 "Alternates", for description of Alternate Bids.

The Bidder is responsible for determining the Alternates that influence its Work; the Bidder will enter the cost to be added to or deducted from its Base Bid per the Alternate Bid descriptions.

Any or no entry in the space provided for each Alternate Bid, which does not reflect a change in cost, shall be interpreted as a $0.00 change to the Bidder's Base Bid. An Alternate bid may be an Add or Deduct to the Contract. Failure to recognize change in cost, when Work of an Alternate Bid relates to the Base Bid provided under paragraph one could affect the apparent low bid.

ALTERNATE BIDS

1. Alternate Bid 1 – Additional Foundation Drain:

   Add - _____ Dollars

   ($_____)

2. Alternate Bid 2 – Raised Crosswalk Work on Post Ave.:

   Add - _____ Dollars

   ($_____)

3. Alternate Bid 3 – Playfield Site Drainage:

   Add - _____ Dollars

   ($_____)

   The total Base Bid, together with any approved Alternates, once accepted and awarded by the Owner, shall be referred to as the "Contract Sum." The Contract Sum may be modified in accordance with the General Conditions (Section 00 72 16).

1.4 UNIT PRICES

Refer to Section 00 43 22 "Unit Prices", for description of Unit Prices. For Owner's information and for changing quantities of work items from those indicated by the Contract Drawings, upon written instruction from the Architect or Construction Manager, the Contractor shall submit unit prices (which must include all accessories, hangers, labor, materials, fire stopping, terminations, etc.). Unit prices include mark up, profit and overhead. Changes to the work shall be in accordance with the General Conditions (00 72 16).

Unit Cost #	ITEM NAME	Value	Unit
C-01-UC-01a	Excavate and remove unsuitable soil	$	CY
C-01-UC-02a	Remove masonry, wood and other miscellaneous non-ACM debris located throughout crawl space	$	CY

1.5 PROJECT PHASING AND MILESTONES

If awarded the Contract, the undersigned bidder agrees to complete the entire work on or before the milestones and dates as denoted in Section 00 43 83 "MILESTONE SCHEDULE & CRITICAL SUBMITTALS." This includes working multiple shifts, or overtime, as directed by the Construction Manager to meet milestones.

1.6 ADDENDA

Receipt of the following addenda to the Contract Documents are acknowledged:

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

1.7 Give the name of each person, firm or corporation interested in the above bid. If the undersigned bidder is:

1. An individual, give full name _____.

2. A partnership under an assumed name, give name of each principal: _____.

3. A corporation, give full legal name_____

   _____.

4. Give the name of each person, firm or corporation other than the bidder having an interest in bids of the Contract proposed to be taken _____.

2.1 CERTIFICATION OF NON-COLLUSION IN BIDDING

1. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury that to the best knowledge and belief:

   1. The prices of this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

   2. Unless otherwise required by law, the prices which have been

quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____	BY_____
FULL LEGAL NAME OF FIRM OR CORPORATION	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
_____	_____
CITY, STATE, ZIP CODE	TELEPHONE NUMBER
_____	_____
DATE	E-MAIL ADDRESS

NOTICE TO BIDDERS

3.1 All bid forms shall be signed by the name of the person, firm or corporation submitting the bid, indicating by long-hand signature the person duly authorized to sign in behalf of such person, firm, or corporation and shall contain the business address of the bidder.

3.2 Bidders are required to submit unit prices only if required by the specifications.

3.3 Owner reserves the right to award contract to include any of the Alternates. Accordingly, bidders are required to bid on all Alternates called for in the specifications. However, Owner reserves the right to waive this requirement.

3.4 No bids on different kinds of work may be combined, grouped or added together except to make the lump sum total of work called for under any one contract.

3.5 All items on the bid form shall be filled in as called for, and the completed bid form shall be without interlineation, alteration or erasure; and shall not contain a bid or bids, or form of bid or bids, other than called for.

END OF SECTION 00 41 16.01

SECTION 00 41 16.02 - BID FORM - MECHANICAL WORK CONTRACT #8

1.1 To the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"):

The undersigned proposes to do all the work and furnish all material necessary for RCSD– John Walton Spencer School No. 16 **– Phase 2A.1 of the RSMP** (herein, "Project"). (Use only one bid form per contract being bid):

_____

Company Name

1.1.1 In accordance with drawings and specifications therefore and addenda comprising the Contract Documents, for the lump sum of:

Bid (not including Allowances)
$_____

Allowance C-08-01
$ 25,000.00

TOTAL BASE BID (Including Allowances all inclusive)

$_____
Amount in Figures

_____Dollars
Amount in Writing
, herein referred to as the "Base Bid."

1.2 ALLOWANCES

Refer to section 00 43 21 "Allowances" for description of Allowances, where used. **Allowances are to be included in base bid amount and are to be used for items not identified in the contract documents. Unit Price Costs will be used to add or delete scope from allowances when directed by the Owner or Construction Manager.**

1.3 ALTERNATES

Refer to section 00 43 23 "Alternates", for description of Alternate Bids.

The Bidder is responsible for determining the Alternates that influence its Work; the Bidder will enter the cost to be added to or deducted from its Base Bid per the Alternate Bid descriptions.

Any or no entry in the space provided for each Alternate Bid, which does not reflect a change in cost, shall be interpreted as a $0.00 change to the Bidder's Base Bid. An Alternate bid may be an Add or Deduct to the Contract. Failure to recognize change in cost, when Work of an Alternate Bid relates to the Base Bid provided under paragraph one could affect the apparent low bid.

ALTERNATE BIDS

1. Alternate Bid 1 – Additional Foundation Drain:

   Add - _____ Dollars

   ($_____)

2. Alternate Bid 2 – Raised Crosswalk Work on Post Ave.:

   Add - _____ Dollars

   ($_____)

3. Alternate Bid 3 – Playfield Site Drainage:

   Add - _____ Dollars

   ($_____)

   The total Base Bid, together with any approved Alternates, once accepted and awarded by the Owner, shall be referred to as the "Contract Sum." The Contract Sum may be modified in accordance with the General Conditions (Section 00 72 16).

1.5 PROJECT PHASING AND MILESTONES

If awarded the Contract, the undersigned bidder agrees to complete the entire work on or before the milestones and dates as denoted in Section 00 43 83 "MILESTONE SCHEDULE & CRITICAL SUBMITTALS." This includes working multiple shifts, or overtime, as directed by the Construction Manager to meet milestones.

1.6 ADDENDA

Receipt of the following addenda to the Contract Documents are acknowledged:

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

1.7 Give the name of each person, firm or corporation interested in the above bid. If the undersigned bidder is:

1. An individual, give full name _____.

2. A partnership under an assumed name, give name of each principal: _____.

3. A corporation, give full legal name_____

   _____.

4. Give the name of each person, firm or corporation other than the bidder having an interest in bids of the Contract proposed to be taken _____.

2.1 CERTIFICATION OF NON-COLLUSION IN BIDDING

1. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury that to the best knowledge and belief:

   1. The prices of this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

   2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

   3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____	BY_____
FULL LEGAL NAME OF FIRM OR CORPORATION	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
_____	_____
CITY, STATE, ZIP CODE	TELEPHONE NUMBER
_____	_____

DATE E-MAIL ADDRESS

NOTICE TO BIDDERS

3.1 All bid forms shall be signed by the name of the person, firm or corporation submitting the bid, indicating by long-hand signature the person duly authorized to sign in behalf of such person, firm, or corporation and shall contain the business address of the bidder.

3.2 Bidders are required to submit unit prices only if required by the specifications.

3.3 Owner reserves the right to award contract to include any of the Alternates. Accordingly, bidders are required to bid on all Alternates called for in the specifications. However, Owner reserves the right to waive this requirement.

3.4 No bids on different kinds of work may be combined, grouped or added together except to make the lump sum total of work called for under any one contract.

3.5 All items on the bid form shall be filled in as called for, and the completed bid form shall be without interlineation, alteration or erasure; and shall not contain a bid or bids, or form of bid or bids, other than called for.

END OF SECTION 00 41 16.02

SECTION 00 41 16.03 - BID FORM - ELECTRICAL WORK CONTRACT #9

1.1 To the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"):

The undersigned proposes to do all the work and furnish all material necessary for RCSD– John Walton Spencer School No. 16 **– Phase 2A.1 of the RSMP** (herein, "Project"). (Use only one bid form per contract being bid):

_____

Company Name

1.1.1 In accordance with drawings and specifications therefore and addenda comprising the Contract Documents, for the lump sum of:

Bid (not including Allowances)
$_____

Allowance C-09-01
$ 10,000.00

TOTAL BASE BID (Including Allowances all inclusive)

$_____
Amount in Figures

_____Dollars
Amount in Writing
, herein referred to as the "Base Bid."

1.2 ALLOWANCES

Refer to section 00 43 21 "Allowances" for description of Allowances, where used. **Allowances are to be included in base bid amount and are to be used for items not identified in the contract documents. Unit Price Costs will be used to add or delete scope from allowances when directed by the Owner or Construction Manager.**

1.3 ALTERNATES

Refer to section 00 43 23 "Alternates", for description of Alternate Bids.

The Bidder is responsible for determining the Alternates that influence its Work; the Bidder will enter the cost to be added to or deducted from its Base Bid per the Alternate Bid descriptions.

Any or no entry in the space provided for each Alternate Bid, which does not reflect a change in cost, shall be interpreted as a $0.00 change to the Bidder's Base Bid. An Alternate bid may be an Add or Deduct to the Contract. Failure to recognize change in cost, when Work of an Alternate Bid relates to the Base Bid provided under paragraph one could affect the apparent low bid.

ALTERNATE BIDS

1. Alternate Bid 1 – Additional Foundation Drain:

   Add - _____ Dollars

   ($_____)

2. Alternate Bid 2 – Raised Crosswalk Work on Post Ave.:

   Add - _____ Dollars

   ($_____)

3. Alternate Bid 3 – Playfield Site Drainage:

   Add - _____ Dollars

   ($_____)

   The total Base Bid, together with any approved Alternates, once accepted and awarded by the Owner, shall be referred to as the "Contract Sum." The Contract Sum may be modified in accordance with the General Conditions (Section 00 72 16).

1.5 PROJECT PHASING AND MILESTONES

If awarded the Contract, the undersigned bidder agrees to complete the entire work on or before the milestones and dates as denoted in Section 00 43 83 "MILESTONE SCHEDULE & CRITICAL SUBMITTALS." This includes working multiple shifts, or overtime, as directed by the Construction Manager to meet milestones.

1.6 ADDENDA

Receipt of the following addenda to the Contract Documents are acknowledged:

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

1.7 Give the name of each person, firm or corporation interested in the above bid. If the undersigned bidder is:

1. An individual, give full name _____.

2. A partnership under an assumed name, give name of each principal: _____.

3. A corporation, give full legal name_____

   _____.

4. Give the name of each person, firm or corporation other than the bidder having an interest in bids of the Contract proposed to be taken _____.

2.1 CERTIFICATION OF NON-COLLUSION IN BIDDING

1. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury that to the best knowledge and belief:

   1. The prices of this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

   2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

   3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____	BY_____
FULL LEGAL NAME OF FIRM OR CORPORATION	AUTHORIZED SIGNATURE
_____	_____
ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
_____	_____
CITY, STATE, ZIP CODE	TELEPHONE NUMBER

_____ _____
DATE E-MAIL ADDRESS

NOTICE TO BIDDERS

3.1 All bid forms shall be signed by the name of the person, firm or corporation submitting the bid, indicating by long-hand signature the person duly authorized to sign in behalf of such person, firm, or corporation and shall contain the business address of the bidder.

3.2 Bidders are required to submit unit prices only if required by the specifications.

3.3 Owner reserves the right to award contract to include any of the Alternates. Accordingly, bidders are required to bid on all Alternates called for in the specifications. However, Owner reserves the right to waive this requirement.

3.4 No bids on different kinds of work may be combined, grouped or added together except to make the lump sum total of work called for under any one contract.

3.5 All items on the bid form shall be filled in as called for, and the completed bid form shall be without interlineation, alteration or erasure; and shall not contain a bid or bids, or form of bid or bids, other than called for.

END OF SECTION 00 41 16.03

SECTION 00 41 16.04 - BID FORM - PLUMBING WORK CONTRACT #10

1.1 To the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"):

The undersigned proposes to do all the work and furnish all material necessary for RCSD– John Walton Spencer School No. 16 **– Phase 2A.1 of the RSMP** (herein, "Project"). (Use only one bid form per contract being bid):

_____

Company Name

1.1.1 In accordance with drawings and specifications therefore and addenda comprising the Contract Documents, for the lump sum of:

Bid (not including Allowances)
$_____

Allowance C-10-01
$ 10,000.00

TOTAL BASE BID

$_____
Amount in Figures

_____Dollars
Amount in Writing
, herein referred to as the "Base Bid."

1.2 ALLOWANCES

Refer to section 00 43 21 "Allowances" for description of Allowances, where used. **Allowances are to be included in base bid amount and are to be used for items not identified in the contract documents. Unit Price Costs will be used to add or delete scope from allowances when directed by the Owner or Construction Manager.**

1.3 ALTERNATES

Refer to section 00 43 23 "Alternates", for description of Alternate Bids.

The Bidder is responsible for determining the Alternates that influence its Work; the Bidder will enter the cost to be added to or deducted from its Base Bid per the Alternate Bid descriptions.

Any or no entry in the space provided for each Alternate Bid, which does not reflect a change in cost, shall be interpreted as a $0.00 change to the Bidder's Base Bid. An Alternate bid may be an Add or Deduct to the Contract. Failure to recognize change in cost, when Work of an Alternate Bid relates to the Base Bid provided under paragraph one could affect the apparent low bid.

ALTERNATE BIDS

1. Alternate Bid 1 – Additional Foundation Drain:

   Add - _____ Dollars

   ($_____)

2. Alternate Bid 2 – Raised Crosswalk Work on Post Ave.:

   Add - _____ Dollars

   ($_____)

3. Alternate Bid 3 – Playfield Site Drainage:

   Add - _____ Dollars

   ($_____)

   The total Base Bid, together with any approved Alternates, once accepted and awarded by the Owner, shall be referred to as the "Contract Sum." The Contract Sum may be modified in accordance with the General Conditions (Section 00 72 16).

1.5 PROJECT PHASING AND MILESTONES

If awarded the Contract, the undersigned bidder agrees to complete the entire work on or before the milestones and dates as denoted in Section 00 43 83 "MILESTONE SCHEDULE & CRITICAL SUBMITTALS." This includes working multiple shifts, or overtime, as directed by the Construction Manager to meet milestones.

1.6 ADDENDA

Receipt of the following addenda to the Contract Documents are acknowledged:

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

Addendum No. _____ Date_____

1.7 Give the name of each person, firm or corporation interested in the above bid. If the undersigned bidder is:

1. An individual, give full name _____.

2. A partnership under an assumed name, give name of each principal: _____.

3. A corporation, give full legal name_____

   _____.

4. Give the name of each person, firm or corporation other than the bidder having an interest in bids of the Contract proposed to be taken _____.

2.1 CERTIFICATION OF NON-COLLUSION IN BIDDING

1. By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury that to the best knowledge and belief:

   1. The prices of this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

   2. Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

   3. No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

_____ BY_____
FULL LEGAL NAME OF FIRM OR AUTHORIZED SIGNATURE

CORPORATION

ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
CITY, STATE, ZIP CODE	TELEPHONE NUMBER
DATE	E-MAIL ADDRESS

NOTICE TO BIDDERS

3.1 All bid forms shall be signed by the name of the person, firm or corporation submitting the bid, indicating by long-hand signature the person duly authorized to sign in behalf of such person, firm, or corporation and shall contain the business address of the bidder.

3.2 Bidders are required to submit unit prices only if required by the specifications.

3.3 Owner reserves the right to award contract to include any of the Alternates. Accordingly, bidders are required to bid on all Alternates called for in the specifications. However, Owner reserves the right to waive this requirement.

3.4 No bids on different kinds of work may be combined, grouped or added together except to make the lump sum total of work called for under any one contract.

3.5 All items on the bid form shall be filled in as called for, and the completed bid form shall be without interlineation, alteration or erasure; and shall not contain a bid or bids, or form of bid or bids, other than called for.

END OF SECTION 00 41 16.04

SECTION 00 43 00 - SUPPLEMENTS TO BID FORM

The following attachments to these Supplements to Bid Form must be completed and submitted together with the Bid Form:

1. Form of Bid Bonds

2. Acknowledgement(s) of Principal and Surety

3. Additional Bid Forms:

   Appendix A: Offerer's Affirmation of Understanding of and Agreement Pursuant to State Finance Law §139-j(6)(b)

   Appendix B: Offerer Certification of Compliance with State Finance law §139-k(5)

   Appendix C: Offerer Disclosure of Prior Non-Responsibility Determination

   Appendix D: Certification of Compliance with Iran Divestment Act

The requirements of this Section shall not limit or abrogate the Contractor's responsibility to provide all other required forms and information as specified in the Contract Documents at the time of bidding.

FORM OF BID BONDS

KNOWN ALL MEN BY THESE PRESENTS, that we, the undersigned, _____(*) as Principal; and _____(**) As Surety, are hereby held and firmly bound unto _____ in the penal sum of _____ for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors and assigns.

Signed, this ___ day of _____, 20___

The condition of the above obligation is such that whereas the Principal has submitted to the Rochester Joint Schools Construction Board "RJSCB" of the Rochester City School District and the City of Rochester, New York, a certain Bid, attached hereto and hereby made a party hereof, to enter into a contract in writing, for the _____
_____

NOW THEREFORE,

(a) If said Bid shall be rejected, or, in the alternate

(b) If said Bid shall be accepted and the Principal shall execute and deliver a contract in the Form of Contract attached hereto (properly completed in accordance with said Bid) and shall furnish a bond for his faithful performance of said Contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said Bid,

Then, this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

* Insert Bidder's Name
** Insert Name of Surety

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Principal may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____
Typed Name of Principal

By: _____
Authorized Signature/Principal

_____
Typed Name of Authorized Signatory

_____
Typed Name of Surety

By: _____
Signature of Attorney-In-Fact

_____
Typed Name of Surety

ACKNOWLEDGMENT OF PRINCIPAL, IF A CORPORATION

State of _____)

County of _____) ss.:

City of _____)

On this day ____ day of _____, 20___ before me personally came and appeared _____ to me known, who being by me duly sworn, did depose and say that he resides at _____; that he is the _____ of _____, the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his name thereto by like order.

(SEAL)

_____
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF A FIRM

State of _____)

County of _____) ss.:

City of _____)

On this day ____ day of _____, 20___ before me personally came and appeared _____ to me known and known to me to be one of the members of the firm of _____ described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(SEAL)

_____
Notary Public

ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL

State of _____)

County of _____) ss.:

City of _____)

On this day ____ day of _____, 20___ before me personally came and appeared _____ to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

(SEAL)

_____
Notary Public

SURETY ACKNOWLEDGMENT

State of _____)

County of _____) ss.:

On this day _____ day of _____, 20___, before me personally came _____ to me known, who, being by me duly sworn, did depose and say that he is an attorney-in-fact of _____ the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed the said instrument and affixed the said seal as Attorney-in-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

(SEAL)

_____
Notary Public

ADDITIONAL BID FORMS

APPENDIX A (FORM A)

Offerer's Affirmation of Understanding of and
Agreement Pursuant to State Finance Law §139-j(6)(b)

Background:

State Finance Law §139-j(6)(b) provides that:

> Every Governmental Entity (including, voluntarily, the Rochester Joint Schools Construction Board, the "Board") shall seek written affirmations from all Offerers as to the Offerer's understanding of and agreement to comply with the Board's procedures relating to permissible contracts during a Governmental Procurement pursuant to State Finance Law §139-j(3).

Instructions:

> In connection with all proposals, bids, RFP's, etc., the Board must obtain the following affirmation of understanding and agreement to comply with procedures on procurement lobbying restrictions regarding permissible contacts in the Restricted Period for a Procurement Contract in accordance with State Finance Law §139-j and §139-k:
>
> *Offerer affirms that it understands and agrees to comply with the Rochester Joint Schools Construction Board's Procurement Disclosure Policy, which Policy conforms to the requirements of State Finance Law §139-j (3) and §139-j(6)(b).*

BY

*LEGAL NAME OF FIRM OR CORPORATION	AUTHORIZED SIGNATURE
ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
CITY, STATE, ZIP CODE	TELEPHONE/DATE

*Indicate the complete legal name of your firm or corporation. Do not abbreviate. If a corporation, use name as it appears on corporate seal.

APPENDIX B (Form B)

Offerer Certification of Compliance with
State Finance law §139-k(5)

By signing below, I certify that all information provided to the Rochester Joint Schools Construction Board with respect to State Finance Law §139-k is complete, true and accurate.

BY

*LEGAL NAME OF FIRM OR CORPORATION	AUTHORIZED SIGNATURE
ADDRESS	TYPED NAME OF AUTHORIZED SIGNATURE/TITLE
CITY, STATE, ZIP CODE	TELEPHONE/DATE

*Indicate the complete legal name of your firm or corporation. Do not abbreviate. If a corporation, use name as it appears on corporate seal.

APPENDIX C (Form C)

Offerer Disclosure of
Prior Non-Responsibility Determination

Name of Individual or Entity Seeking to Enter into the Procurement Contract:

_____

Address: _____

Name and Title of Person Submitting this Form:_

Contract Procurement Number:_

Date: _____

1. Has any Government Entity made a finding of non-responsibility regarding the individual or entity seeking to enter into the Procurement Contract in the previous four years? (Please circle):

   No Yes

   If yes, please answer the next questions:

2. Was the basis for the finding of non-responsibility due to a violation of State Finance Law §139-j? (Please circle):

   No Yes

3. Was the basis for the finding of non-responsibility due to the intentional provision of false or incomplete information to a Government Entity? (Please circle):

   No Yes

4. If you answered yes to any of the above questions, please provide details regarding the finding of non-responsibility below.

Governmental Entity: _____

Date of Finding of Non-Responsibility:_____

Basis of Finding of Non-Responsibility:_____

_____
_____
_____
_____
_____

(Add additional pages as necessary)

5. Has any Governmental Entity or other governmental agency terminated or withheld a Procurement Contract with the above-named individual or entity due to the intentional provision of false or incomplete information? (Please circle):

   No Yes

6. If yes, please provide details below:

Governmental Entity: _____

Date of Termination or Withholding of Contract:_

Basis of Termination or Withholding:___

_____
_____
_____
_____
_____
_____
_____

(Add additional pages as necessary)

Offerer certifies that all information provided to the Rochester Joint Schools Construction Board with respect to State Finance Law §139-k is complete, true and accurate.

By: _____ Date:_____

Signature _____

APPENDIX D (Form D)

PROPOSER'S CERTIFICATION OF COMPLIANCE WITH IRAN DIVESTMENT ACT

Pursuant to General Municipal Law §103-g, which generally prohibits the City and the School District from entering into contracts with persons engaged in investment activities in the energy sector of Iran, the proposer submits the following certification to Rochester Joint Schools Construction Board:

[Please Check One]
PROPOSER'S CERTIFICATION

☐ By submission of this proposal, each proposer and each person signing on behalf of any proposer certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief, that each proposer is not on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law.

☐ I am unable to certify that my name and the name of the proposer does not appear on the list created pursuant to paragraph (b) of subdivision 3 of Section 165-a of the State Finance Law. I have attached a signed statement setting forth in detail why I cannot so certify.

Dated: _____, 20___

_____
SIGNATURE

_____
PRINTED NAME

_____
TITLE

_____
FULL BUSINESS NAME

Sworn to before me this
_____ day of _____, 20____
Notary Public

SECTION 00 43 21 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

This Section includes administrative requirements, procedural requirements, and information governing allowances.

a. Certain items are specified in the Contract Documents by allowances. In some cases, these allowances include installation. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Allowance Authorizations and/or Change Order.

b. **ALLOWANCES ARE TO BE INCLUDED IN THE APPROPRIATE CONTRACTOR'S BASE BID AND ONLY USED AS DIRECTED BY THE CONSTRUCTION MANAGER OR OWNER. UNIT PRICE COSTS WILL BE USED TO ADD OR DELETE SCOPE FROM ALLOWANCES.** (Reference 00 43 22 Unit Prices for additional information)

Types of allowances include the following:

a. Lump Sum allowances
b. Unit-cost allowances
c. Quantity allowances

1.3 SELECTION AND PURCHASE

Coordinate first paragraph below with Division 01 Section "Submittal Procedures." Indicate critical dates on both Contractor's Construction Schedule and Submittals Schedule.

At the earliest practical date after award of the Contract, advise the Construction Manager of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

At Construction Manager's request, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

Purchase products and systems selected by the Owner's Representatives from the designated supplier.

Allowances do not include mark ups, overhead or profit, which shall be included in the non-allowance portion of the Base Bid sum.

1.4 SUBMITTALS

Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

1. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP SUM OR QUANTITY ALLOWANCES

Allowance shall include cost to Contractor of specific products and materials under allowance and shall include taxes, freight, and delivery to Project site.

a. All allowance material, equipment, and trucking costs will be verified with receipts and Invoices. Labor will be tracked with daily signed time sheets. Time sheets to be verified with Contractor foreman and Construction Manager Superintendent.
b. If a unit cost was submitted for an item listed below, the allowance will first be used. The cost of the work will be based on the unit price and the term of measurement associated with the unit price. Once the allowance is exhausted, the Construction Manager will direct the Contractor to continue, if necessary, using the unit cost and the Contract Sum shall be adjusted accordingly by Change Order.
c. Request for payment draws on allowance line items must include: copies of purchase orders, sub contracts, invoices, etc. None of which will have added overhead and profit.
d. Unused allowance monies will be credited back to the Owner, without deduction, via a deduct Change Order issued by the Owner.

1.7 UNUSED MATERIALS

Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

a. If requested by Construction Manager, prepare unused material for storage by the Owner when it is not economically practical to return the material for credit. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES:

a. Allowance C-07-01: Unforeseen Conditions

(GC Contract #07) $
35,000.00

b. Allowance C-07-02: Submittal Exchange

(GC Contract #07) $
10,000.00

c. Allowance C-08-01: Unforeseen Conditions

(MC Contract #08) $
25,000.00

d. Allowance C-09-01: Unforeseen Conditions

(EC Contract #09) $
10,000.00

e. Allowance C-10-01: Unforeseen Conditions

(EC Contract #10) $
10,000.00

END OF SECTION 00 43 21

SECTION 00 43 22 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

1.3 DEFINITIONS

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

B. Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in this specification. Mobilization does not include the start of work at a specific area on the project site while the contractor is present at other areas immediately prior to, during or following the work.

1.4 PROCEDURES

A. Unit prices include all necessary supervision, labor, materials, cost for delivery, installation, insurance, overhead and profit.

B. Measurement and Payment: The extent of work associated with unit prices, is to be determined in field by the Contractor and the Construction Manager prior to the commencement of work. Any work not having the prior approval of the Construction Manager will be considered base bid. Field verify all quantities prior to bid.

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 by the Owner’s Representative.

D. List of Unit Prices: A list of unit prices is included in the Bid Form Section and paragraph 3.1 below. 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 – GENERAL TRADES CONTRACT #1

Unit Cost #	ITEM NAME	Value	Unit
C-01-UC-01a	Excavate and remove unsuitable soil		CY
C-01-UC-02a	Remove masonry, wood and other miscellaneous non-ACM debris located throughout crawl space		CY

END OF SECTION 00 43 22

SECTION 004323 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General Conditions and Division 01 Specification sections, apply to work of this section.

1.2 SUMMARY

1. This Section specifies administrative and procedural requirements for Alternates.

2. Definition: An Alternate is an amount proposed by Bidders and stated on the Bid Form for certain construction activities defined in the Bidding Requirements that may be added to or deducted from Base Bid amount if the ~~District~~ Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems or installation methods described in Contract documents. The cost or credit for each Alternate is the net addition to, or deduction from, the Contract Sum to incorporate, or delete, the Alternate into, or from, the Work. No other adjustments are made to the Contract Sum.

3. Bidding Requirements: Bidders for the work of all contracts shall submit lump sum prices for all base bid work of their respective contracts and all required Alternates. All contracts shall be awarded to the qualified bidder with the lowest submitted bid based upon the sum of the base bid and accepted Alternates, if any. In the event that an Alternate is not accepted at the time of contract award, the bidder agrees to hold the price for the Alternate for 60 days after award, at which time the Owner may elect to add the scope of work for the Alternate by Change Order.

4. Coordination: Coordinate related Work and modify or adjust adjacent Work as necessary to ensure that Work affected by each accepted Alternate is complete and fully integrated into the project.

5. Schedule: A "Schedule of Alternates" is included in Section 3.1.

   A. Include as part of each Alternate, miscellaneous devices, accessory objects and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

1. Alternate Bid 1 – Additional Foundation Drain

   The base bid does not include the construction of associated field work and stone drainage on the north side of the 1 story brick addition and as shown in detail 8/L-501.1. The base bid also doesn't include connecting piping to existing inlet.

   This alternate provides all work associated with the construction stone drainage & 6" HDPE perforated piping along building at locations indicated on the drawings. The alternate also includes connecting piping to existing inlet.

2. Alternate Bid 2 – Raised Crosswalk Work on Post Ave.

   The base bid does not include the construction of a raised crosswalk as indicated on C-111.1 along Post Ave.

   This alternate provides all work associated with the construction of a raised crosswalk as indicated on C-111.1 along Post Ave.

3. Alternate Bid 3 – Playfield Site Drainage

   The base bid does not include the construction of associated sitework west of the building and south of the parking lot within lawn area.

   This alternate provides sitework west of the building and south of the parking lot within lawn area as indicated on the drawings and specifications. The work includes, but is not limited to: stripping existing topsoil, removing and disposing of existing underground piping and yard inlets, installing new underground piping and inlets, rototilling and regrading the field, seeding.

END OF SECTION 00 43 23

SECTION 00 43 31 – M/WBE/DBE/SBE UTILIZATION AND WORKFORCE DIVERSITY

I. POLICY STATEMENT

.1 The Rochester Joint Schools Construction Board ("RJSCB") recognizes that the opportunity for the participation in a free enterprise system by persons or groups traditionally, socially, and economically disadvantaged is essential to obtain social and economic equality. As such, the RJSCB acknowledges the need to promote participation by minority-owned and women-owned business enterprises ("M/WBE"), small business enterprises ("SBE") and disadvantaged business enterprises ("DBE") (collectively, "Eligible Business Enterprises" or "EBE") in contracts awarded as part of the Rochester Schools Modernization Program ("RSMP"). The RJSCB further acknowledges the diverse community of the City of Rochester, as reflected in its businesses and workforce labor. The RJSCB strives to support business development and workforce diversification opportunities that the RSMP may create, including the opportunity to encourage participation of these diverse individuals and groups in local projects. Accordingly, through the RSMP Diversity Program, the RJSCB fosters and promotes the participation of EBE's and women and minority laborers in all RSMP contracts.

.2 With respect to RSMP Construction Projects less than One Hundred Thousand dollars ($100,000.00), all contractors are strongly encouraged to meet the designated EBE and women and minority workforce utilization Goals set forth herein. Bidders on all RSMP Contracts to exceed $100,000.00 must adhere to the Goals and other requirements of this Section and submit Forms DP-1, DP-2, DP-3, and DP-3A, the Promise of Non-Discrimination, EBE Assurance Statement, "Good Faith Efforts Checklist," and such other forms as are attached hereto in Section 00 43 31-A, within the time period(s) set forth herein

.3 Contractors are also referred to the Phase II Diversity Plan for reference, a copy of which may be obtained at http://www.rcsdk12.org/rsmp. The Phase II Diversity Plan (the "Diversity Plan") is hereby incorporated by reference and Contractors must comply with all terms and requirements of the Diversity Plan, except as otherwise set forth in this Section 00 43 31.

II. DEFINITIONS: The below terms and phrases employed with respect to the RSMP, as used herein, shall have the meanings set forth in the Diversity Plan at Article 1.03 "Defintiions."

III. WORKFORCE DIVERSITY AND BUSINESS DEVELOPMENT GOALS

.1 The RJSCB is committed to provide women and minorities with equal opportunities to perform work on RSMP projects. All firms or other businesses providing goods or services under a Contract meeting the dollar amount threshold set forth in this Project Manual shall comply with the workforce diversity Goals set forth herein.

Percentage Goals for Workforce Participation: In order to achieve the workforce diversification goals of the Program, each firm or other business providing goods or services shall use its best efforts to ensure that the workforce it engages to perform work for the Program shall demonstrate, in terms of the percentage of actual hours worked under the Contract, and/or contract as amended, participation rates as follows:

- Minority Workforce: 22% of project personnel hours including skilled trades people, trainees, journeymen, apprentices, and supervisory staff.

- Female Workforce: 8% of project personnel hours including skilled trades people, trainees, journeymen, apprentices, and supervisory staff.

Each Contractor, supplier, professional service provider, or other business providing goods and services shall strive to maximize the use of Rochester-based labor, contractors, suppliers, and service providers in performing the Contract.

.2 **Contractors performing labor and services for RSMP projects may not count female or minority home office staff toward the Goals stated above**, and may only count participation of field staff. However, those performing professional services on RSMP projects may count minority and female office staff who perform the relevant professional services (as opposed to administrative or support services), whether performed in the field or in their home office, toward the workforce diversity Goals stated above.

.3 The RJSCB is also committed to the meaningful participation of certified EBE's on RSMP contracts. In order to meet this commitment, all Contractors or other businesses providing goods or services under a Contract meeting the dollar amount threshold set forth in the Diversity Plan shall comply with the business diversity Goals set forth herein.

Percentage Goals for EBE Participation (applicable to the total value of the project):

In order to achieve Diversity Program Goals for EBE business development, each Contractor, supplier, professional service firm or other business providing goods or services shall strive to and use Good Faith Efforts to engage minority-owned, woman-owned, disadvantaged business enterprises, and small business enterprises as follows:

a. MBE: 17% of each Contract or purchase order
b. WBE: 10% of each Contract or purchase order
c. DBE: 3% of each Contract or purchase order
d. SBE: 3% of each Contract or purchase order

.4 Only EBE firms that demonstrate proper Certification may be used to fulfill the above workforce diversity and business development Goals.

.5 COUNTING EBE PARTICIPATION TOWARD GOALS: All bidders, including EBE bidders, shall use Good Faith Efforts to achieve business development Goals through second tier participation (subcontractor work). Methods for counting EBE participation toward Goals of this Contract are set forth in the Diversity Plan at Article 2.02(e)

IV. FORMS AND PROCEDURES

.1 To count toward the RJSCB's Goals, an EBE must be Certified at the time a bid is submitted. The judgment as to whether or not an EBE has the qualifications and experience for the type of work required by the Contract rests with the Contractor, even as to any EBE's as may have been listed by Owner or its ICO as pre-approved or Certified. In addition to general Certification, all SBE's must complete and submit the Small Business Certification Form included in the Attachment to this Section.

.2 As an aid to bidders, the ICO may, as a courtesy, direct bidders to various websites, certifying entities and/or listings identifying Certified EBE firms working in relevant business categories. For any EBE firm proposed by the Bidder or Contractor, whether or not such firm is included in any courtesy information provided by the ICO, Bidder or Contractor must submit acceptable proof of the certification of each EBE firm for the ICO's review to determine whether to accept a proposed EBE Utilization Plan (Form DP-1). Certification does not imply the EBE firm's ability to perform the work required of the Contract, which shall be Contractor's obligation to determine.

.3 **Failure to adequately complete the forms required to be submitted with the bid may be grounds for the RJSCB upon recommendation of the ICO to reject a bid or disqualify a bidder.** The information required by this Section is to be provided on the forms attached as Section 00 43 31-A.

.4 The name, mailing address and title of the bidder's EBE liaison officer should be included along with the forms referenced above.

.5 Any agreement between a bidder/contractor and an EBE in which the EBE promises not to provide subcontracting quotations to another bidder/contractor is prohibited.

.6 The names, scope of work and dollar amounts submitted on the above-referenced forms constitute the bidder's proposed plan for fulfillment of the Goals.

.7 Neither Conduit nor Broker participation, as those terms are defined in the Diversity Plan, shall be counted toward EBE firm participation on this Contract.

8. The RJSCB, ICO or other RJSCB designee shall notify the bidder if one or more of the proposed EBE's do not qualify for the Project. The bidder will be requested, within five (5) days of notification, to provide new Certified EBE's or an alternate plan for fulfilling the Goals. This does not imply that the bidder cannot utilize the proposed EBE, only that doing so will not count toward fulfilling the Goals.

9. It is understood that a Contractor/Bidder may make changes to its DP-1 Form for legitimate and necessary business reasons prior to award of contract. Any such changes must be submitted to the ICO for review and approval, if appropriate. The DP-1 change process does not relieve Contractor/Bidder from compliance with all other requirements of this Section, including contacting EBE firms to seek work

proposals prior to submission of bid.

10. The ICO may request that the Bidder or Contractor supply additional information within a reasonable timeframe to perform a review and assess whether Goals have been adequately stated, met and/or maintained throughout Contract performance.

11. Once a Bidder submits a satisfactory DP-1 form (EBE Utilization Plan), DP-2 form (Letter of Intent to Perform), a signed Promise of Non-Discrimination, and signed EBE Assurance Statement, upon approval of the ICO, these documents will be incorporated into, and made a part of, the Contract. Goals will be considered provisionally met at the award stage, pending Contract completion, including satisfactory submission of Employment Utilization and EBE Utilization reports (Forms DP-3 and DP-3a) to verify that Goals have been adequately met and maintained throughout Contract performance.

    a. If the bid includes Allowances or Alternates, bidder may craft its EBE Utilization Plan (DP-1) to meet the Goals using only the “Base Bid” amount, based on the assumption that work Allowance or Alternate work included in the bid may not be performed as part of the Contract, depending on Project needs. However, should Owner select Alternates or direct contractor to perform work in an Allowance category during the Project, contractor must revise and re-submit its Utilization Plan (DP-1), as well as DP-3 and DP-3a forms, and make Good Faith Efforts to meet and maintain all Goals, in accordance with Parts VIII and IX of this Section.

V. GOOD FAITH EFFORT: RJSCB expects extreme diligence on the part of each Bidder and Contractor to meet and maintain Goals. Bidders must submit with their bids evidence of Good Faith Efforts on the “Good Faith Efforts Checklist” Form, attached in Section 00 43 34A. Good Faith Efforts are defined in the Diversity Plan and outlined therein at Article 2.02(c).

VI. CONTRACTUAL OBLIGATIONS:

.1 The ICO shall review the plan submitted by an apparent low bidder to determine if the bidder is compliant with the Goals set forth in this Section, and will strive to make such determination within 48 hours of notice to the apparent low bidder. In the event the ICO determines a bidder has not met or used Good Faith Efforts to meet the Goals, the ICO may reject the proposed EBE Utilization Plan, and the contract may be awarded to the next lowest responsible bidder who complies with the requirements of this Section.

.2 Appeals of plan acceptance determinations must be made in writing and state the entire basis of the appeal. Appeals are to be delivered to the ICO within three (3) days of notification of decision, and should include sufficient supporting documentation to allow the ICO to perform a meaningful review.

.3 **The successful bidder's final EBE Utilization Plan (Form DP-1) as approved by the ICO shall be incorporated into the Contract upon the award thereof.** This will be referred to as the approved EBE Utilization Plan (DP-1), and will be operative unless and until revised, as set forth herein. If the DP-1 is revised at any time after bid submission, including during Contract performance, Contractor must provide a written rationale to the ICO for the revision, and obtain ICO approval thereof. The subcontractors listed on approved EBE Utilization Plan (DP-1), the dollar amounts shown, and any other relevant documentation will become part of the Contract. Failure to comply with an approved EBE Utilization Plan shall be a material breach of Contractor's obligations under this Section.

.4 **BUSINESS OPPORTUNITY PROGRAM (BOP)**: The RJSCB expects each Prime Contractor to participate in the RSMP's Business Opportunity Program (BOP).

The (BOP) is a partnership designed to assist Greater Rochester EBEs through outreach, training, education and growth potential in the City of Rochester. The BOP is also intended to increase the number of certified M/W/S/DBEs capable of bidding successfully on capacity-appropriate construction contracts, and improve the small contractors' management, organization and skills by teaching them new strategic tools to speed the growth of their businesses.

The BOP will sponsor and facilitate The Instructional Series, a curriculum-based program of training sessions designed to expand business opportunities and assist M/W.D.SBE subcontractors beyond what was formerly available to them. A Mentor-Protégé Program (MPP) will enroll eligible certified M/W/D/SBE's who are designated as subcontractors on Phase 2 projects to be paired with the prime contractor who has listed them on its EBE Utilization Plan (DP-1) or another participating mentor designated by BOP Staff. A Memorandum of Understanding template outlining the basic terms of the MPP is included in this section.

Additionally, a Revolving Loan Program (RLP) was developed through the BOP specifically for assisting EBE subcontractors with Phase 2 contract awards. Bidders interested in the program can fill out a pre-qualification application for submission to the Program Manager, who will forward to the RLP Administrator. If approved, the loan funds available to EBEs can be used to cover payroll, rent equipment or purchase supplies when accompanied by an invoice. The RJSCB will not administer the loan program or approve loans. Additional information will be provided upon request of interested bidders.

VII. PRIOR TO THE COMMENCEMENT OF WORK

.1 Prior to the commencement of any work by an EBE, and no later than ten (10) days after notice of Contract award, the contractor must submit the DP-2 Form "Letter of Intent to Perform." Contractor shall exercise best efforts to execute and submit copies of all EBE subcontracts to the ICO no later than 90 days after the notice of

contract award. This will provide evidence that a written contract is in place, but in no way implies the RJSCB's approval or disapproval of the subcontracts. The RJSCB reserves the right to request a copy of an executed EBE subcontract prior to 90 days if it so chooses or at any time during the Project. If the Contractor fails to provide the executed EBE subcontracts within the 90 day period or upon request as indicated above, the ICO can proceed to request an explanation from the Contractor and request a meeting with the Contractor to review the status and reasons for not submitting the subcontracts. Non-compliance by the Contractor with this section may give the RJSCB cause to withhold payments to the Contractor.

.2 If requested by the RJSCB or ICO, the contractor must attach a construction schedule to the EBE subcontract describing the anticipated time periods that the EBE subcontractor will be utilized on the Project. A copy of the construction schedule, with modifications, should accompany each Form DP-3A.

.3 Failure to submit a written subcontract agreement with a construction schedule upon request may give the RJSCB cause to withhold payments. Any work performed by an EBE without a written subcontract made available to the RJSCB may not be counted toward fulfillment of the Goals.

.4 All subcontractors should be made aware of all modifications to the construction schedule and must be given reasonable opportunity to mobilize their workforces to perform. Notification of less than five (5) days will not be considered reasonable and will not be a basis for determining that the subcontractor was not available to perform on the Project.

VIII. <u>DURING PROGRESS OF WORK</u>: contractor must maintain the Goals at the percentage levels stated above throughout performance of the Contract.

.1 If a contract modification (e.g., a Change Order, Field Order or Construction Change Directive) issues after the ICO's approval of the EBE Utilization Plan, the Contractor must adjust the Utilization Plan accordingly to maintain the appropriate percentage Goals. For example, if a Change Order increases the Contract Sum, the Goals will increase in proportion to the Contract Sum. Similarly, performance of approved Allowance work will increase the Contract Sum for purposes of compliance with EBE Goals. Forms DP-3 and DP 3-A must be submitted monthly and should reflect changes to the Contract Sum due to authorized contract modifications or Allowance work, as well as the resulting increases in EBE, women and minority participation.

.2 Contractors must demonstrate, to the ICO's satisfaction, Good Faith Efforts to meet the modified Goals in the event of a change to the Contract Sum during the progress of Work, including but not limited to retaining additional EBE subcontractors for the work affected by an Allowance or contract modification that increases the Contract Sum.

.3 The ICO may, in its discretion and upon contractor's written request, consider the following factors in determining whether contractor has used Good Faith Efforts to meet the required Goals:

a. If the contract change or Allowance requires contractor to provide additional

materials and/or supplies, as opposed to performing additional labor;

b. If the change Allowance work is the same type of work currently being performed by the contractor under contract with a non-EBE Supplier or subcontractor on the Project;

c. If EBE subcontractors are not capable or available to do the work required by contract change or Allowance;

d. Any other factor impacting contractor's ability to adjust the Goals in accordance with the increased Contract Sum.

.4 The ICO in its discretion may waive the requirement to meet modified Goals if approved contract modifications or authorization to perform Allowance work results in a minor net increase in the Contract Sum (less than $50,000) such that restructuring contracts would be impractical or unduly burdensome to contractor. However, the contractor must otherwise demonstrate compliance with modified percentage Goals to the satisfaction of the ICO.

.5 Should ICO determine that the performance of approved Allowance or change order work, or any other factor during performance of the Contract, has caused contractor to fall out of compliance with applicable percentage Goals, the ICO may call a meeting with contractor to address the issue and discuss steps for the contractor to achieve and maintain compliance with the applicable Goals.

IX. REPORTING AND RECORD-KEEPING: The contractor must keep records and documents to substantiate compliance with the EBE business development and workforce diversity Goals and requirements for three (3) years following completion of this Contract. These records and documents must be made available to the ICO or other authorized RJSCB officials upon request during that time.

.1 All apparent successful bidders who plan to utilize an EBE subcontractor or engage in a Joint Venture with an EBE shall submit to the ICO by the end of the tenth business day following notice of award of contract a "Letter of Intent to Perform" (Form DP-2) in the format attached hereto, signed by both the EBE and bidder.

.2 The contractor must furnish the ICO with Monthly Employment and EBE Utilization Reports (Forms DP-3 and DP-3A) with each monthly request for payment, including but not limited to worforce census and other employment and certified payroll records necessary to verify achievement of the workforce diversity goals. Employee zip code information must be listed on monthly EEO report. Failure to submit the DP-3 and DP-3A Forms with each request for payment will give the RJSCB cause to withhold that payment and the EBE's or workforce utilized shall not be counted toward fulfillment of the Goals.

.3 Records of payment (e.g., copies of checks) for subcontract work, if requested by RJSCB, as well as payrolls and other documents required by any other terms of this contract, must be submitted to the ICO with each monthly request for payment unless otherwise indicated. Attainment of the Goals will be based on actual

payment records and not solely on the stated subcontract amount. Amounts claimed to be attributable to EBE's, but that are not substantiated by actual payment records, will not be counted toward the final Goal. All contractors must provide a certified accounting statement setting forth the total amounts paid to all subcontractors to enable the RJSCB and ICO to verify that percentage Goals were ultimately met.

.4 The contractor must notify the ICO immediately in writing if the contractor changes or cancels an EBE subcontractor or Joint Venture including an EBE whose participation has already been approved as counting toward the applicable Goal.

.5 The ICO or other RJSCB designee shall follow up during the term of Project to evaluate the successful employment of the EBE firms and of women and minorities through review of Forms DP-3 and DP-3A (Monthly Employment and EBE Utilization Reports). This review may be done monthly or when the ICO deems it appropriate.

a. Successful utilization and meeting of Goals will be noted and approved by the ICO.

b. In cases where the contractor fails to meet workforce diversity and business development Goals, the ICO or other RJSCB designee shall obtain from the contractor in writing the reason for the delay and his/her plan to achieve the Goals by project completion.

c. It is the contractor's responsibility to monitor the progress of the EBE and women and minority participation on the Project.

d. In cases where the contractor does not anticipate meeting the Goal or where the contractor wishes to add an EBE firm to those originally designated as contributing toward a business development Goal, the contractor should request a new EBE Utilization Plan (DP-1 form) and inform the ICO thereof. The updated EBE Utilization Plan (DP-1) shall be submitted to the ICO within (3) days of giving notice to the ICO.

e. This revised EBE Utilization Plan (DP-1) shall be approved or rejected by the ICO or other RJSCB designee in accordance with the Goals.

f. Appeals of revised EBE Utilization Plan acceptance determinations shall be made in writing, stating the full basis of the appeal, to the ICO within three (3) days of notification of the initial decision.

X. RETAINAGE: The RJSCB reserves the right to retain, at any time, an amount up to but not exceeding the amount cited in an approved EBE Utilization Plan (DP-1) that has not been paid to any EBE in accordance with the approved EBE Utilization Plan. The RJSCB may retain such amounts as in its reasonable discretion may be necessary to ensure payment to the applicable EBE firm listed in the EBE Utilization Plan.

XI. COMPLIANCE MONITORING: In order to achieve development and diversification in its workforce, and to meet the required EBE utilization Goals set forth herein, each contractor, supplier, professional service firm or other business providing goods or services must:

1. Provide the ICO with a monthly workforce census and other employment and certified payroll records necessary to verify achievement of the workforce diversity Goals and demonstrate compliance with the minimum standards.

2. Provide on-demand access and cooperation to the ICO to review records on-site and/or at work-site premises to validate workforce participation. This may include unannounced visits and on-the-spot interviews that the ICO and its inspectors may hold with workers at the job site or at off-site work premises to verify their work status and claimed job classifications.

3. Submit all other information required on the forms specified herein and attached as Section 00 43 31-A, or such further information as is required at the reasonable request of ICO, at the time of bidding or throughout the Project to ensure compliance with the requirements of this Section.

4. In addition, contractor is strongly encouraged to do the following:

   a. With bid submission, present a proposed written recruiting program directed at attracting candidates to fill positions of employment in order to meet such requirements.

   b. With bid submission, provide a statement committing to training or participation in training programs provided by third parties to train new employees in meaningful ways to succeed in their employment opportunities and to promote long-term employment within the industry or profession.

5. In the event the contractor, supplier, professional service firm or other business providing goods or services fails to maintain minority/women workforce or EBE utilization Goals through the duration of the Project on their Contract or purchase order, the ICO can and shall exercise in a timely manner one or more of the remedies set forth in the Diversity Plan at Article VI at section 6.01.

XII. ENFORCEMENT: In evaluating bids and during performance of the Contract, the Owner and ICO will consider responsive and responsible bidders who can provide the quality goods and services reasonably required for the contract. All bidders must make Good Faith Efforts in seeking to maximize the use of available EBE's for RSMP Projects. The failure of a bidder to demonstrate the mandatory Good Faith Efforts outlined in the Diversity Plan to include EBE's in the procurement process or to maintain percentage Goals throughout the Project will be considered in awarding RSMP Contracts. The RJSCB, through the action of the ICO, shall have the authority and power to enforce the provisions of this Section 00 43 31.

Violations of this Section shall constitute a material breach of contract, and the ICO and/or RJSCB may undtake the measures outlined in the Diversity Plan at Article VI, section 6.03 thereof, to enforce the requirements of this Section 00 43 31.

XIII. COMMERCIALLY USEFUL FUNCTION: Refer to the *Rochester Joint Schools Construction Board Workforce & Business Participation Diversity Plan* for Phase 2 Schools, dated April 2016: EBE suppliers must perform a Commercially Useful Function in order to satisfy business diversity goals in whole or in part. A prime supplier to the Phase 2 Program will not receive credit toward the goals by using an EBE acting merely as a broker or conduit to purchase equipment from a commodity supplier. An EBE whose normal function is selling/distributing equipment as a dealer can be sub-contracted by a prime and use up to 50-percent of their contracted amount toward meeting a diversity goal. If a sub-contracted EBE supplies both labor and material to the prime, the prime may be able to use up to 100-percent of the total contracted fee toward meeting a diversity goal. In all cases, participation of an EBE for purposes of achieving the goals will require approval by the Independent Compliance Officer (ICO).

Contact information for any questions:
Anchin
Jeff Wild
212-840-3456
Jeffrey.Wild@anchin.com

XIV. ATTACHMENTS: Information required by this Section must be submitted on the forms or in the formats specified in the "Diversity Program Forms" found in the Appendix, included as Section 00 43 31-A of the Contract Documents.

ATTACHMENTS TO FOLLOW AS SECTION 00 43 31A

END OF SECTION 00 43 31

SECTION 00 43 31A: DIVERSITY PROGRAM ("DP") FORMS

The attached Diversity Program (DP) Forms will be used by the ICO and Board to monitor Contractor compliance with the Goals of the Diversity Plan. The Board or ICO may modify these forms as appropriate or require additional forms as needed to implement Diversity Plan requirements, in which case, new or updated forms will be provided to Bidder/Contractor.

INSTRUCTIONS FOR USE OF THE ATTACHED DP FORMS:

1. **DP -1: SCHEDULE OF EBE PARTICIPATION** (*Submit with bid*):
   This form is to be completed and submitted with the response to the RFP or Bid. The selected bidder or respondent shall be required to resubmit its final version, signed by the bidder/respondent, showing all those contractors and or vendors it has entered into agreement with to meet the goals for participation by Eligible Business Enterprises ("EBE's"), defined within the RSMP Diversity Plan (e.g., MBE's, WBE's, DBE's and SBE's).

2. **DP -2: EBE LETTER OF INTENT TO PERFORM** (*Submit within 10 days' notice of award of Contract*):
   This form is required of the selected contractor. The contractor must fill these out and secure signatures from all EBE firms proposed as subcontractors on contractor's approved DP-1 form.

3. **DP – 3: MONTHLY EMPLOYMENT UTILIZATION REPORT** (*Submit monthly*):
   This form provides a monthly summary of employment workforce utilization. It is used to track the diversity of a particular contractor's workforce and its responsiveness to the objectives required by the Diversity Plan. The contractor is required to submit this form on a monthly basis.

4. **DP – 3: MONTHLY EBE UTILIZATION REPORT** (*Submit monthly*):
   This form provides a monthly summary of work provided by EBE's listed in the Utilization Plan (DP-1). The contractor is required to submit this form on a monthly basis.

5. **PROMISE OF NON-DISCRIMINATION** (*Submit with bid*)
   Must include signed certification from bidder.

6. **EBE ASSURANCE STATEMENT** (*Submit with bid*).
   This form is to be completed and submitted with the response to the RFP or Bid.

7. **GOOD FAITH EFFORTS CHECKLIST** (*Submit with bid*):

This checklist must be completed to indicate the efforts that Bidder/ Proposer undertook in attempting to meet Diversity Program Goals.

RCSD
SED#:
SED DWT:

EBE UTILIZATION PLAN (DP-1)	**Rochester Schools Modernization Program**
1. Project :	**2. Proposing on Contract No./Contract Description**
3. Proposer Name / Address / Phone No. / Fax No. / FEIN	**4. Proposal Submittal Date (MM/DD/YY)** ☐ **Original DP-1** ☐ **Revised DP-1 Rev. Date:**

Project Goals: MBE – 17% WBE – 10 % DBE – 3 % SBE – 3 %

6. Name/Address/Phone and FEIN of Proposed M/WBE, DBE or SBE	**7. Certified as EBE**	**8. Performance Category**	**9. Scope of Services to be provided**	**10. Proposed Dollar Amount**	**Percent**

The undersigned, being an authorized representative of the proposing company, hereby certifies that the above information is accurate, and that proposer has received a proposal from, or discussed with, each of the M/WBE, SBE or DBE firms listed herein prior to the submission of the accompanying bid. The authorized representative of the firm also hereby certifies the proposal complies with the RSMP diversity section or has engaged the ICO and complied with the appropriate procurement process.

Bidding Company's Official Printed Name and Title: _____

Authorized Signature: _____ Print Name: _____ Title: _____

The ICO may follow up with the EBE firms listed herein to verify that each either submitted a proposal to, or discussed with, the bidder the amounts indicated above.

EBE ASSURANCE STATEMENT

To be submitted with the bid on bidding company's letterhead and signed and dated by bidder's authorized representative. Bidder must submit a separate EBE Assurance Statements for each EBE.

Subject Proposal for_____

The undersigned bidder, having submitted a proposal for the referenced project, if awarded the Contract, agrees that the EBE Utilization Plan (DP-1) submitted with the bid or as thereafter modified and approved by the ICO will be incorporated into the Contract upon submission of the EBE Letter of Intent to Perform. We are committed to ensure EBE participation in the manner indicated below as subcontractors, supplier or in joint venture partnership as follows:

Representation of EBE Status
Name: _____
Address: _____
_____
_____
Phone #: _____
Fax#: _____
Email: _____
FEIN: _____

Work to be performed:
_____
_____
_____
_____.

Dollar amount: _____
Percentage of the Total Bid amount: _____

This subcontractor represents that it *is / is not* a certified MBE/DBE/WBE/SBE (circle the appropriate status).

This subcontractor is a (circle one): Sole proprietorship / individual / corporation / partnership / a joint venture

Contractor/Bidder acknowledgement:
The undersigned contractor/bidder represents that the above information is true and correct to the best of its knowledge:

Name of Contractor/Bidder firm: _____
Authorized representative: _____
Authorized signature: _____ Date: _____, 20__

EBE Assurance Statements must be submitted on bidder's letterhead and signed and dated by bidder.

PROMISE OF NON-DISCRIMINATION

KNOW ALL MEN BY THESE PRESENTS, that I/we, _____, Title(s) _____, Name of Company _____ _____ (hereinafter "Company"), in consideration of the privilege to submit Proposals on contracts funded, in whole or in part, by the Rochester Joint Schools Construction Board (herein, "RJSCB" or "Owner"), hereby consents, covenants and agrees as follows:

(1) No person shall be excluded from participation in, denied the benefit of, or otherwise be discriminated against on the basis of race, color, national origin or gender in connection with any bid submitted to Owner or the performance of any contract resulting from;

(2) That it is and shall be the policy of this Company to provide equal opportunity to all business persons seeking to contract or otherwise interested in contracting with this Company, including various local small business enterprises;

(3) In connection herewith, I/We acknowledge and warrant that this Company has been made aware of, understands and agrees to make Good Faith Efforts to solicit EBE's to do business with this Company;

(4) That the promise of non-discrimination as made and set forth herein shall be continuing in nature and shall remain in full force and effect without interruption;

(5) That the promises of non-discrimination as made and set forth herein shall be and are hereby deemed to be made a part of, and incorporated by reference into, any contract or portion thereof which this Company may hereafter obtain;

(6) That the failure of this Company to satisfactorily discharge any of the promises of non-discrimination or Good Faith Efforts to attain the EBE utilization Goals and reporting requirements, as made and set forth in this Section 00 43 31, shall constitute a material breach of contract entitling the Owner to declare the Contract in default and to exercise any and all applicable rights and remedies, including but not limited to, cancellation of the contract, termination of the contract, suspension and debarment from future contracting opportunities, and withholding and/or forfeiture of compensation due and owing on a contract.

Dated: _____, 20___ By: _____
(Authorized Company Representative Signature)

GOOD FAITH EFFORTS CHECKLIST

The Rochester Joint School's Board (RJSCB) welcomes your participation in the Rochester School's Modernization Program (RSMP). Your participation and support in complying with the goals for diversity set forth in the Diversity Plan is critical to the success of the Program. Pursuant to the requirements set forth in this Section and in consideration of the privilege to submit Proposals on contracts funded, in whole or in part, by RJSCB, WE,_____ by Owner/Principal _____

Attest that we have exercised the following Good Faith Efforts in addition to my /our regular and customary solicitation process:

I/We have delivered written notice to three available certified EBE's for each potential subcontracting or supply category in the Contract AND all potential subcontractors or vendors which requested information on the Contract.

I/We have provided all potential subcontractors or vendors with adequate information as to plans, specifications, relevant terms and conditions of the Contract, bonding requirements, and the last date and time for receipt of price quotations.

I/We have attended a special meeting called to inform business and individuals of subcontracting or supply opportunities.

I/We have, in accordance with normal industry practices, divided the contract into economically feasible segments that can be performed by an EBE.

I/We have provided a written explanation for rejection of any potential subcontractor or vendor to the EBE/, including the name of the firm proposed to be awarded the subcontract or supply agreement, where price competitiveness is not the reason for rejection.

I/We have actively solicited, through sending letters or initiating personal contact, EBE's in all feasible and appropriate categories providing subcontracting opportunities for the contract under consideration.

I/We have utilized the services of available community organizations and associations, contractors' groups, and trade associations known to publicize contracting and procurement opportunities, for the purpose of obtaining assistance in the contacting and recruitment of EBE's for the RJSCB's contract under consideration.

I/We have advertised in publications of general circulation in the Rochester MSA trade publications and other media owned by, or otherwise focused or marketed to EBE's, and the advertisement identifies and describes the specific subcontracting or other opportunity in reasonable detail.

I/We have conducted discussions with interested EBE's in good faith, and provided the same willingness to assist EBE's as has been extended to any other similarly situated subcontractor.

(GOOD FAITH EFFORTS CHECKLIST continued on following page):
(*GOOD FAITH EFFORTS CHECKLIST, page 2*):

I/We have taken steps to ensure that all labor supervisors, superintendents, and other on-site supervisory personnel are aware of and carry out the obligation to maintain a non-discriminatory work environment, free of harassment, intimidation and coercion at all construction sites, offices and other facilities to which employees are assigned to work.

Please identify below all subcontractors, suppliers, or a joint venture partner you invited to participate that declined.

1. Name of subcontractor/Vendor: _____
Phone #: _____
Address:_____
Date of Offer to Participate:_____
Date Offer was declined: _____
Reasons Given for Declining:
_____

Please note all categories of ownership that apply:
____ African American Business Enterprise
____Asian American Business Enterprise
____Hispanic American Business Enterprise
____Majority Enterprise
____ Native American Business Enterprise
____Small Business Enterprise
____ Women-Owned Business Enterprise

2. Name of subcontractor/Vendor: _____
Phone #: _____
Address:_____
Date of Offer to Participate:_____
Date Offer was Declined:_____
Reasons Given for Declining:
_____

Please note all categories of ownership that apply:
____ African American Business Enterprise
____Asian American Business Enterprise
____ Hispanic American Business Enterprise
____Majority Enterprise
____ Native American Business Enterprise
____Small Business Enterprise
____ Women-Owned Business Enterprise

(GOOD FAITH EFFORTS CHECKLIST continued on following page):

(*GOOD FAITH EFFORTS CHECKLIST, page 3*):

3. Name of subcontractor/Vendor: _____
Phone #: _____
Address_____
Date of Offer to Participate:_____
Date Offer was Declined :_____

Reasons Given for Declining:
_____

Please note all categories of ownership that apply:
____ African American Business Enterprise
____Asian American Business Enterprise
____Hispanic American Business Enterprise
____Majority Enterprise
____ Native American Business Enterprise
____Small Business Enterprise
____ Women-Owned Business Enterprise Name of subcontractor/Vendor

4. Name of subcontractor/Vendor: _____
Phone #: _____
Address_____
Date of Offer to Participate: _____
Date Offer was Declined:_____
Reasons Given for Declining:
_____

Please note all categories of ownership that apply:
____ African American Business Enterprise
____Asian American Business Enterprise
____ Hispanic American Business Enterprise
____Majority Enterprise
____ Native American Business Enterprise
____Small Business Enterprise
____ Women-Owned Business Enterprise Name of subcontractor/Vendor

END OF GOOD FAITH EFFORTS CHECKLIST

EBE LETTER OF INTENT TO PERFORM (DP-2)

This form is to be completed and submitted to the ICO by the apparent successful bidder by the end of the tenth day following notice of award of contract.

RSMP PROJECT: _____
PARTICIPANT: _____

The undersigned has agreed to perform work in connection with the above project as:
_____sole proprietorship (individual)
_____a partnership
_____a corporation
_____a joint venture

Detailed description of work items to be performed by EBE:
_____ (indicate labor, supplier, broker, etc.) at the following price: $ _____.

Please note all categories of the subcontractor/joint venture that apply:

____ Disadvantaged Business Enterprise
____ Minority-Owned Business Enterprise
____ Small Business Enterprise
____ Women-Owned Business Enterprise

The total value of EBE participation under this Joint Venture Agreement is $_____.; which is ____% of the total Proposal.

(Type or Print Name of subcontractor/Joint Venture) _____
By: _____ _____
Printed Name: _____
Title: _____
Date: _____

This EBE is currently certified as a MBE, WBE, DBE or SBE in the above-indicated performance category. **As evidence of this fact, attached is a certification letter from the appropriate certifying authority confirming the current MBE, WBE, DBE or SBE status and the applicable performance category. Failure to include said certification letter(s) to the satisfaction of the ICO is grounds for rejection of the proposed EBE.**

Should any revisions to this pending agreement be necessary after the submission of this form, the bidding contractor shall immediately resubmit the necessary revised forms to the attention of the ICO for consideration.

DP-2 Form continued on the following page…

DP-2 Form, page 2:

The undersigned will enter into a written agreement for the work described upon the approval of the ICO and award and execution of a contract with RJSCB to the bidder.

_____	_____
Bidding contractor Company Name	Proposed EBE Company Name
_____	_____
Address	Address
_____	_____
Phone Number	Phone Number
_____	_____
Company Officer Name & Title (Print)	Company Officer Name & Title (Print)
_____ ___ /___ / ___	_____ ___ /___ / ___
Company Officer Signature Date	Company Officer Signature Date

For RJSCB Use Only

_____ _____

Owner Signature Date

_____ _____

ICO Signature Date

Instructions on Completion of the
Monthly Employment Utilization Form (DP-3)

1. *Project:* - name of Project that this form submission is applicable to.

2. *Reporting Period (MMM/YYYY) ____/_____:* indicate the monthly period reporting on, i.e. SEP 2016. Hours reported on this report shall include all hours on the first day of the month through and including the last day of the applicable month.

3. *Reporting contractor Name/Address/Phone No./Fax No.* – name/address/phone/fax of reporting entity.

4a. *Reporting contractor is a ( )1st Tier -or- ( ) Lower Tier contractor:* the reporting entity is to either.

4b. *Only if a lower tier contractor, indicate to whom you are a subcontractor:* only if the reporting entity is other then a first tier contractor, indicate what company/firm you have a direct contractual agreement with relative to this 1st tier Project contract. If you are a first tier contractor leave blank or indicate N/A.

5. *Construction Trade Class.* – indicate in the space(s) provided below this title, the applicable trade classification group, i.e. Electrician, Carpenter, Mason, Laborer, etc, which the reporting entity utilized during this reporting period.

6. *(a) Total All Hours by Trade M (Male) F (Female)* – under the 6a. M - column, infill the total number of
male hours for each trade/grade classification listed, subtotaling at after each trade, for this reporting period. Under the 6a. F - column, infill the total number of female hours for each trade/grade classification listed, subtotaling at after each trade, for this reporting period.

(b – e) Minority Hours by Trade M (Male) F (Female) – under each M – column, infill the total number of male hours for each trade/grade classification and each minority category listed, subtotaling at after each trade, for this reporting period. Under each F – column, infill the total number of female hours for each trade/grade classification and each minority category listed, subtotaling at after each trade, for this reporting period.

7. *Minority % of Total Hours – the percentage of total minority hours of all hours worked, the sum of columns 6b.- 6e. divided by the sum of column 6a. Only one figure for each trade classification. ie ((6b.M + 6b.F + 6c.M +6c.F + 6d.M + 6d.F + 6e.M + 6e.F) / (6a.M + 6a.F)).*

8. *Female % of Total Hours – the percentage of total female hours of all hours worked, the total number reported in 6a.F divided by the sum of total numbers reported in 6a. M and 6a.F. Only one figure for each trade classification. ie (6a.F/(6a.M + 6a.F))*

DP-3 Instructions continued on the following page…

DP-3 Instructions, page 2:

Individuals that qualify in both a minority category and the female category should not be counted in both the minority and female percentage figures, as the above percentage calculation will generate (items 9. & 10.)

9. *Total Number of Employees* – total number of male and total number of female employees utilized in each trade and grade classification, subtotaling at after each trade, for this reporting period.

10. *Total Number of Minority Employees* – total number of male minority and total number of female minority employees utilized in each trade and grade classification, subtotaling at after each trade, for this reporting period.

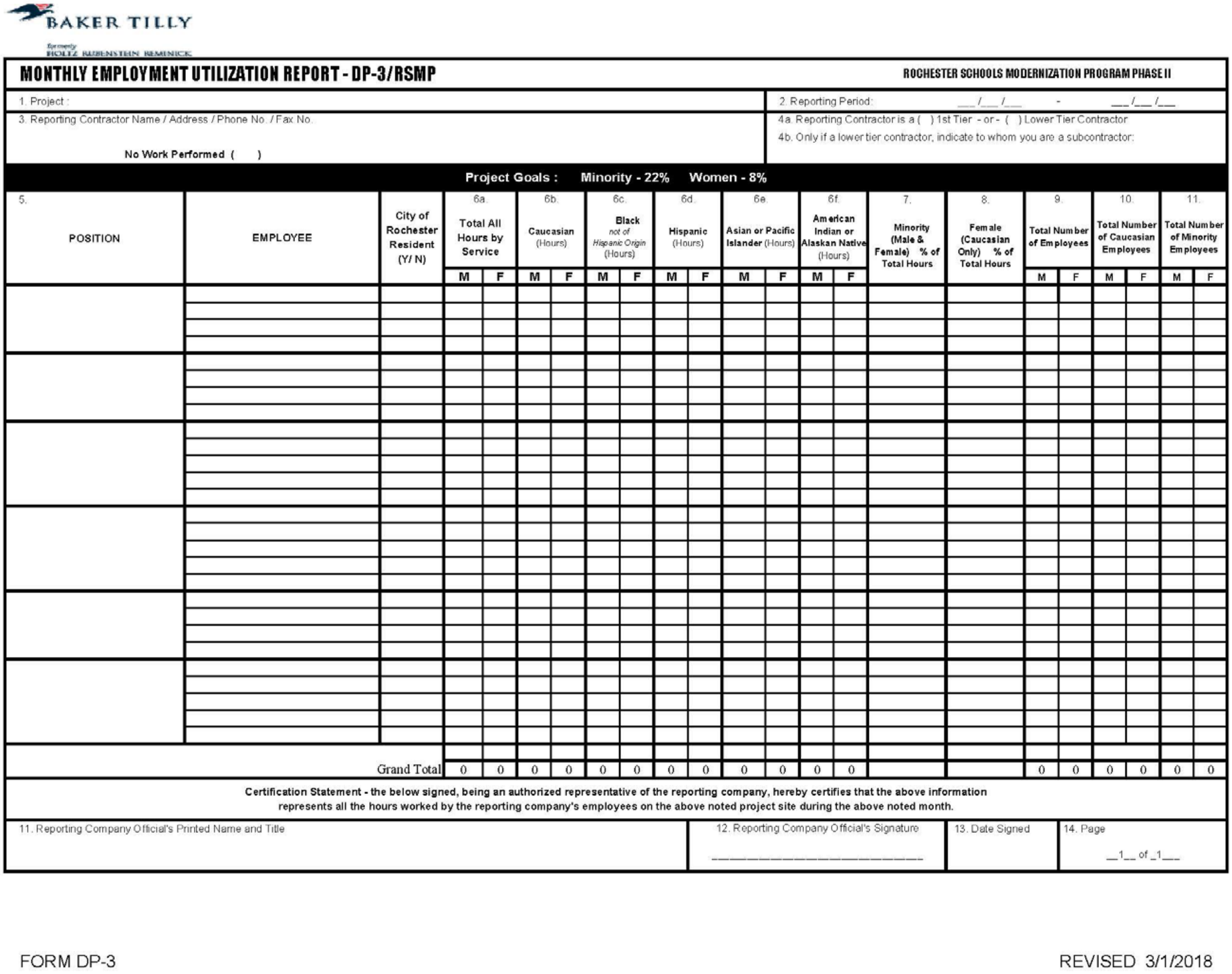
11. *Reporting Company Official's Printed Name and Title* - reporting company official's printed name/ title.

12. *Reporting Company Official's Signature* – reporting company official's original signature. By signing this form, this individual is certifying that the information provided on the MWP-3 has been reviewed prior to its submission and is accurate to the best of his/her knowledge.

13. *Date Signed:* - indicate date signed by reporting company official.

14. *Page:* - indicate page number and total number of pages submitted. Attached as many pages as necessary.

End of Instructions on Completion of the
Monthly Employment Utilization Form (DP-3)



BAKER TILLY
formerly
HOLTZ RUBENSTEIN REMINICK

MONTHLY EMPLOYMENT UTILIZATION REPORT - DP-3/RSMP

ROCHESTER SCHOOLS MODERNIZATION PROGRAM PHASE II

1. Project :

2. Reporting Period: ___/___/___ - ___/___/___

3. Reporting Contractor Name / Address / Phone No. / Fax No.

No Work Performed ( )

4a. Reporting Contractor is a ( ) 1st Tier - or - ( ) Lower Tier Contractor

4b. Only if a lower tier contractor, indicate to whom you are a subcontractor:

Project Goals : Minority - 22% Women - 8%

5. POSITION	EMPLOYEE	City of Rochester Resident (Y/ N)	6a. Total All Hours by Service		6b. Caucasian (Hours)		6c. Black *not of Hispanic Origin* (Hours)		6d. Hispanic (Hours)		6e. Asian or Pacific Islander (Hours)		6f. American Indian or Alaskan Native (Hours)		7. Minority (Male & Female) % of Total Hours	8. Female (Caucasian Only) % of Total Hours	9. Total Number of Employees		10. Total Number of Caucasian Employees		11. Total Number of Minority Employees	
			M	F	M	F	M	F	M	F	M	F	M	F			M	F	M	F	M	F
Grand Total			0	0	0	0	0	0	0	0	0	0	0	0			0	0	0	0	0	0

Certification Statement - the below signed, being an authorized representative of the reporting company, hereby certifies that the above information represents all the hours worked by the reporting company's employees on the above noted project site during the above noted month.

11. Reporting Company Official's Printed Name and Title

12. Reporting Company Official's Signature ________________________

13. Date Signed

14. Page __1__ of _1___

FORM DP-3

REVISED 3/1/2018

INSTRUCTIONS FOR COMPLETING
MONTHLY EBE UTILIZATION REPORT (DP-3a/RSMP) FORM

This form must be submitted on a monthly basis. For the month under consideration, this form must be completed by every contractor/entity providing on-site labor engaged in work associated with the 1st tier contract scope.

For the purposes of completing this form, "on-site labor" is considered to include only labor hours consumed on the Project site in the production of physical work and direct supervision of such on-site work. This would specifically exclude any hours involved in hauling material/equipment deliveries to/from the Project site. The hours involved in the off/on loading of said deliveries would be included only if the personnel involved were not employees of the trucking company.

Example – ABC Contracting is receiving an on-site material delivery from Acme Trucking. Acme's truck driver's hours would not be included on this form, but ABC's personnel who are responsible to unload this delivery would be included. If Acme personnel were responsible to unload this delivery, these hours would be excluded.

For the month under consideration, each 1st tier contractor must submit a completed DP-3/RSMP form for each entity that has provided on-site labor engaged in work associated with the scope of the 1st tier contract. This submission shall be made as part of the monthly payment requisition package and to the ICO. If after the start and prior to the completion of the 1st tier contractor's scope, the 1st tier contractor does not submit a monthly payment requisition package, the 1st tier contractor shall either 1) forward a ("No-Labor") notice advising that there was no on-site labor utilized under its contract scope for the month under consideration or 2) shall forward completed DP-3/RSMP forms for the month under consideration. Whether submitting a monthly payment requisition package or not, DP-3/RSMP forms or "No-Labor" notice must be forwarded to the ICO.

In addition to required submissions noted above, the same submissions must be made by the 1st tier contractor directly to the ICO no later than the 5th day of the following month. (i.e. October 2016DP-3's/RSMP or No-Labor Notice(s) must be received by November 5, 2016.)

END OF INSTRUCTIONS FOR COMPLETION DP-3A

DP-3A
MBE/WBE/DBE/SBE MONTHLY UTILIZATION REPORT
Rochester Schools Modernization Program

_____/_____
Month Year

Project Name: _____

Contract No.: _____

Contractor Name: _____

Address: _____

Phone No.: _____

Fax No.: _____

Change Orders to Date: _____

Original Contract:_____

Current Contract: _____

MBE % of Current Contract:_____

WBE % of Current Contract:_____

DBE % of Current Contract:_____

SBE % of Current Contract:_____

Subcontractor Name	1. MWBE DBE/SBE	Original Subcontract	Change Orders to Date	Total Current Subcontract to MWBE/DBE/SBE	Amount Paid to Date to MWBE/DBE/SBE	Total Amnt of Invoices Submitted to Date	Cancelled Checks Submitted to Date

1. DP-3A is to be submitted monthly.
2. List all M/WBE/DBE/SBE subcontractors, even after their work is substantially complete.
3. When adding a subcontractor, attach a revised DP-1 and DP-2 to this form.
4. Attach invoices and cancelled checks to this form, if requested.

By: _____
Contractor Representative Signature

Print: _____

Rochester Schools Modernization Program
Certification of Eligible Business Enterprise (EBE) Financial Status

This Certification must be completed in full by any business intending to qualify as a certified Eligible Business Enterprise ("EBE ") to provide labor, services and/or materials for any contract awarded under the Rochester Schools Modernization Program ("RSMP"), and submitted with the bid, proposal, or at such other time as permitted by the contract documents. Failure to timely provide a complete Certification, or to provide any back-up documentation as the Rochester Joint Schools Construction Board ("RJSCB ") may reasonably require, may be grounds for disqualification from award of RSMP contracts.

I, _____ certify that _____ (herein, "Company")

Owner/ Authorized Agent (print) **Company Name (print)**

meets the requirements of the Rochester Schools Modernization Program (RSMP) definition of an Eligible Business Enterprise ("EBE") in the following category (see page 2 for additional categories):

(Please check box if applicable)

☐ "Small Business Enterprise (SBE)" shall mean a business concern which, together with its affiliates has no more than 15 employees and average annual receipts that do not exceed $2 million. Annual receipts shall be calculated in accord with the standard established under 13 CFR 121.104. Number of employees shall be calculated in accord with the standards established under 13 CFR 121.106. Affiliates shall be determined in accord with the standards set forth under 13 CFR 121.103.

NOTE: *RSMP can only accept this application for consideration of Certification status in the Small Business Enterprise (SBE) category. Firms whose annual receipts over the last 3 years exceed $2,000,000.00 are not eligible to be a certified Small Business Enterprise (SBE).*

I certify that I am familiar with the annual receipts for Company, including affiliates, as calculated in accordance with the standards established under 13 CFR 121.104;

I further certify as follows (please check the appropriate boxes below).

☐ Company has been in business three (3) complete fiscal years or more.

☐ Company has been in business less than three (3) complete fiscal years:

I can confirm that total receipts for the period the Company has been in business divided by the number of weeks Company has been in business, multiplied by 52, yields the following amount of total receipts:

☐ Less than $2,000,000.00;

Please check the box for any existing certifications held by Company.

NOTE: *Certification for the following three (3) categories is acquired by application and approval for M/W/DBE status by the State of New York (ESD), City of New York (NYCSBS), Dormitory Authority of the State of New York (DASNY), Port Authority of New York & New Jersey (PANYNJ) or U.S Department of Transportation (USDOT). RSMP does not award certification for the following categories. **

☐ "Minority-Owned Business Enterprise (MBE)" shall mean an independent concern that is at least 51% owned, operated and controlled by a minority who is a citizen of the United States, or a permanent resident of the United States.

☐ "Woman-Owned Business Enterprise (WBE)" shall mean an independent concern that is at least 51% owned, operated and controlled by female member(s) who are citizens of the United States or permanent residents of the United States.

☐ "Disadvantaged Business Enterprise (DBE)" shall mean a business enterprise where the majority ownership is by a disadvantaged individual citizen of permanent resident of the United States meeting the certification requirements for a disadvantaged business enterprise in New York.

** ***Firms certified in multiple EBE categories must select one category for purposes of each contract.***

Please indicate which trades, services or commodities your business performs or offers:

_____ _____

_____ _____

By signing below, I certify that I am the owner, principal, or other authorized agent of Company. I will notify Rochester Schools Modernization Program's Independent Compliance Officer (ICO), if there are any changes that would alter the content of this Certification, within 30 days of such change occurring.

By: _____
(Sign)

Name: _____
(Print)

\Title: _____
(Print)

Sworn to before me this _____ day of _____ , 20__

Notary Public: _____

State: _____

Registration Number: _____

My commission expires: _____

END OF "SBE CERTIFICATION FORM"

MEMORANDUM OF UNDERSTANDING
CONCERNING BOP MENTOR/PROTÉGÉ PROGRAM

THIS MEMORANDUM OF UNDERSTANDING CONCERNING BOP MENTOR/PROTÉGÉ PROGRAM (the "**Memorandum**") is entered into by and between _____ ("**Mentor**") and _____ ("**Protégé**"). Mentor and Protégé are sometimes collectively referred to herein as the "**Parties**" and each individually as a "**Party**."

WHEREAS, Chapter 416, Laws of the State of New York 2007, as amended by Chapter 553, Laws of New York 2014 (the "**Act**"), created the Rochester Joint Schools Construction Board ("**RJSCB**") to implement a facilities modernization program for the Rochester City Schools, known as the Rochester Schools Modernization Program ("**RSMP**"); and

WHEREAS, pursuant to a Program Management Agreement dated December 15, 2015, by and between the RJSCB and Savin Engineers, P.C. ("**Savin**") , Savin is acting as program manager for Phase 2 of the RSMP; and

WHEREAS, as part of its Business Opportunities Program, Savin has developed a Mentor/Protégé Program (the "Program") that is designed to provide Eligible Business Enterprises ("EBEs") with access to resources and training in business, management and technical expertise, and to provide opportunities for growth, expansion and increased participation in economic development; and

WHEREAS, under the Program, mentor are companies compensated via the capped allowance provided in their respective contracts with the RJSCB to assist protégé firms by providing guidance, technical support, as well as the benefit of the mentor companies' expertise and experience, which is designed to enhance the protégé companies' business, management and technical abilities, and improve its ability to successfully compete for contracts consistent with the goals of the Program; and

WHEREAS, Mentor desires to provide Protégé a variety of assistance, services, recommendations and advice relating to various facets of Protégé's business, without any cost to Protégé; and

WHEREAS, Protégé desires to obtain the assistance, services, recommendations and advice from Mentor and understands that Mentor would not be willing to provide such assistance, services, recommendations and advice without the execution of this Memorandum by Protégé; and

WHEREAS, Protégé acknowledges that the Program and the assistance, services, recommendation and advice from Mentor is intended only to provide an informational resource to Protégé, and Protégé is solely responsible for its business decisions; and

WHEREAS, the applicable terms and conditions governing the Parties' participation in the Program are provided in the Business Opportunities Program Mentor/Protégé Program Guidelines ("**Program Guidelines**"), a copy of which is attached hereto as **Exhibit A** and incorporated herein by reference.

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. RELATIONSHIPS. The relationship between Mentor and Protégé is voluntary. The Parties will foster open, collegial and timely communications for mutual business benefit. This Memorandum, in and of itself, does not constitute, create or give effect to or otherwise establish a joint venture, partnership or any other business or organization between or among the Parties.

2. DEVELOPMENTAL ASSISTANCE PLAN. Mentor and Protégé shall work together to develop, and thereafter implement, a written Mentor-Protégé Development Plan specific to Protégé's needs and circumstances with identified forms of developmental assistance and appropriate milestones, all in accordance with the Program Guidelines.

3. COMMITMENTS. Mentor is committed to providing an adequate amount of time to help Protégé achieve the agreed upon goals. The Protégé is committed to keeping Mentor fully informed on its progress towards the agreed upon goals. Mentor and Protégé will use their good faith efforts to comply with the current requirements of the Program as set forth in the Program Guidelines or otherwise established by Savin. Savin is committed to coordinating, facilitating and evaluating the Program.

4. INDEPENDENCE. The Parties agree that Mentor shall not assume managerial or administrative control of the Protégé during or following the period of engagement in the Program. The Parties further agree that Protégé is solely responsible for its business decisions. Protégé shall participate in the Program without fee or charge, and Mentor shall hold no claim against Protégé for compensation for services that it provides in connection with its participation in the Program.

5. CONFIDENTIALITY. In carrying out the terms of this Memorandum and the Program, it may be necessary for the Parties to provide proprietary data or information to one another. To the extent that such data or information is so identified in writing by the disclosing party at the time of the exchange, the receiving party agrees to hold such proprietary information in the strictest confidence for a period of three (3) years from the date of this Memorandum, and further agrees that, within that period of time, it will not use any such proprietary data or information, except in connection with the Program, and will not disclose any such proprietary data or information to any third party, unless authorized in writing by the disclosing party or required by law.

6. DURATION AND TERMINATION. Mentor and Protégé agree that the period of their Mentor-Protégé relationship shall be as established in the Developmental Assistance Plan but in no circumstances shall it be less than six (6) months. Mentor and Protégé shall strictly abide by the termination requirements and procedures set forth in the Program Guidelines. The termination of this Memorandum and the Mentor-Protégé relationship, however, shall not impair the obligations of the Mentor to perform its contractual obligations pursuant to RSMP prime contracts being performed with the Protégé. Likewise, termination of this Memorandum and the Mentor-Protégé relationship shall not impair the obligations of the Protégé to perform its contractual obligations under any current contract or subcontracts between Mentor and Protégé.

7. RELEASE. Protégé, for and behalf of itself, as well as all corporations, partnerships, persons, firms or entities affiliated with or related to Protégé, releases Mentor, Savin, the RJSCB, the City of Rochester (the "City"), and the Rochester City School District (the "RCSD") from any and all liabilities, claims, suits, losses, damages, costs and expenses arising from, by reason of or connected with the Program or the assistance, services, recommendation and advice from Mentor

or by reason of any action, or alleged action taken or omitted, by Mentor in connection with its provision of assistance, services, recommendations and advice.

8. INDEMNIFICATION.

(a) To the fullest extent permitted by law, Protégé, for and on behalf of itself, as well as all corporations, partnerships, persons, firms or entities affiliated with or related to Protégé, shall indemnify, defend and hold harmless Mentor, Savin, the RJSCB, the City and the RCSD from and against any and all liabilities, claims, suits, losses, damages, costs and expenses arising from, by reason of or in connection with Protégé's participation in the Program or by reason of any action, or alleged action taken or omitted, by Protégé in connection with the Program.

(b) To the fullest extent permitted by law, Mentor, for and on behalf of itself, as well as all corporations, partnerships, persons, firms or entities affiliated with or related to Mentor, shall indemnify, defend and hold harmless Savin, the RJSCB, the City and the RCSD from and against any and all liabilities, claims, suits, losses, damages, costs and expenses arising from, by reason of or in connection with Mentor's participation in the Program or by reason of any action, or alleged action taken or omitted, by Mentor in connection with its provision of assistance, services, recommendations and advice to Protégé.

9. NOTICES AND POINTS OF CONTACT. The following individuals shall serve as the points of contact for the Program and are authorized to receive all notices under this Memorandum:

Mentor	Protégé
Name/Title	Name/Title
Address	Address
Tel	Tel.
Fax	Fax
Email	Email

10. COMPLIANCE WITH LAWS. The Parties shall comply at all times with all applicable laws, rules, regulations, orders, directives and requirements of any kind imposed by any federal, state or local government or any agency or instrumentality of any such government.

11. ASSIGNMENT. The rights granted hereunder are personal to the Parties and shall not be assigned, and any purported assignment in violation of this Paragraph shall be void.

12. GOVERNING LAW. This Memorandum shall be governed by the laws of the State of New York.

13. ENTIRE AGREEMENT. This Memorandum reflects the entire agreement between the Parties concerning the specific rights granted herein and may not be modified except in a writing signed by the Parties.

14. COUNTERPARTS. This Memorandum may be executed in any number of counterparts, each of which shall be deemed an original, but all shall together constitute one and the same.

IN WITNESS WHEREOF, the Parties hereto have executed this Memorandum as of the Effective Date.

_____ ("PROTÉGÉ")	**_____ ("MENTOR")**
By: _____	By: _____
Name: _____	Name: _____
Title: _____	Title: _____
Date: _____	Date: _____

Sworn to before me this _____ day of _____ , 20__

Notary Public: _____

State: _____

Registration Number: _____

My commission expires: _____

END OF BOP MENTOR/PROTÉGÉ MOU

THIRD-PARTY CONSULTING SERVICES AGREEMENT
CONCERNING BOP MENTOR/PROTÉGÉ PROGRAM

THIS THIRD-PARTY CONSULTING AGREEMENT (the "**Agreement**") is entered into by and among _____ ("**Mentor**"), _____ ("**Protégé**"), and _____ ("**Consultant**"). Mentor, Protégé, and Consultant are sometimes collectively referred to herein as the "**Parties**" and each individually as a "**Party**."

WHEREAS, Chapter 416, Laws of the State of New York 2007, as amended by Chapter 553, Laws of New York 2014 (the "**Act**"), created the Rochester Joint Schools Construction Board ("**RJSCB**") to implement a facilities modernization program for the Rochester City Schools, known as the Rochester Schools Modernization Program ("**RSMP**"); and

WHEREAS, pursuant to a Program Management Agreement dated December 15, 2015, by and between the RJSCB and Savin Engineers, P.C. ("**Savin**"), Savin is acting as program manager for Phase 2 of the RSMP; and

WHEREAS, as part of the RSMP Business Opportunities Program, the Mentor/Protégé Program (the "**Program**") was developed to provide Eligible Business Enterprises ("**EBEs**") with access to resources and training in business, management and technical expertise, and to provide opportunities for growth, expansion and increased participation in economic development; and

WHEREAS, pursuant to the Mentor-Protégé Development Plan developed by Mentor and Protégé as part of the Program and pursuant to a Memorandum of Understanding entered into by Mentor and Protégé, Mentor and Protégé have determined that Protégé would benefit from knowledge, experience, and/or specific expertise in the area of [DESCRIBE THIRD-PARTY CONSULTANT'S AREA OF EXPERTISE]; and

WHEREAS, Mentor and Protégé desire to retain Consultant to provide assistance, services, recommendations and/or advice in the area of [INSERT AREA OF EXPERTISE] ("**Consulting Services**") and Consultant desires to provide such Consulting Services to Protégé pursuant to the terms and conditions of this Agreement; and

NOW THEREFORE, for good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. CONSULTING SERVICES. The Consulting Services are expected to include, but shall not be limited to, providing Protégé with educational information, expertise, experience-based insight, and advice in the area of [INSERT AREA OF EXPERTISE]. Consultant shall perform the Consulting Services in a diligent manner and agrees to be reasonably available and responsive to Protégé. The Consultant may provide the Consulting Services via telephone, written or electronic means, or in person as determined by the Parties.

2. COMPENSATION. Using the BOP Allowance funds allocated to Mentor pursuant to Mentor's RSMP contract with the RJSCB, Mentor shall pay the Consultant on an hourly basis at the rate of [INSERT AGREED-UPON HOURLY RATE] per hour for the Consulting Services provided. Mentor shall pay the Consultant monthly upon receipt of an invoice from the Consultant detailing the hours of Consulting Services provided to Protégé at the rate outlined above. Along

with each such invoice, Consultant shall also provide Protégé, Mentor and Savin with a copy of a time log of all Consulting Services provided that month, substantially in the form attached hereto as **Exhibit A**. Protégé will be expected to confirm the accuracy of Consultant's time log. Mentor shall pay Consultant within thirty (30) days of receipt of an accurate invoice and time log. Unless otherwise agreed to by the Parties, the Consultant may not bill, in the aggregate, more than [INSERT MAXIMUM NUMBER OF HOURS] hours for Consulting Services during the term of this Agreement. Protégé participates in the Program without fee or charge, and Consultant shall hold no claim against Protégé for compensation for services that it provides in connection with the Consulting Services rendered as set forth herein.

3. DURATION AND TERMINATION. A Party may terminate this Agreement upon not less than thirty (30) days' written notice to the other Parties for its convenience and without cause. In the event of a termination not the fault of the Consultant, the Consultant shall be compensated for services performed prior to termination.

4. INDEPENDENCE. The Parties agree that Consultant shall not assume managerial or administrative control of the Protégé during or following the term of this Agreement. The Parties further agree that Protégé is solely responsible for its business decisions.

5. RELATIONSHIP OF PARTIES. In performing the Consulting Services under this Agreement, the Consultant shall be in all respects an independent contractor. Nothing herein shall be construed to create an employer/employee relationship between the Consultant and/or the Protégé and/or the Mentor and/or Savin and/or the RJSCB. The relationship between Mentor and Protégé is voluntary. The Parties will foster open, collegial and timely communications for mutual business benefit. This Agreement, in and of itself, does not constitute, create or give effect to or otherwise establish a joint venture, partnership or any other business or organization between or among the Parties.

6. CONFIDENTIALITY. In carrying out the terms of this Agreement and the Program, it may be necessary for the Parties to provide proprietary data or information to one another. To the extent that such data or information is so identified in writing by the disclosing party at the time of the exchange, the receiving party agrees to hold such proprietary information in the strictest confidence for a period of three (3) years from the date of this Agreement, and further agrees that, within that period of time, it will not use any such proprietary data or information, except in connection with the Program, and will not disclose any such proprietary data or information to any third party, unless authorized in writing by the disclosing party or required by law.

7. RELEASE. Protégé, for and behalf of itself, as well as all corporations, partnerships, persons, firms or entities affiliated with or related to Protégé, releases Consultant, Mentor, Savin, the RJSCB, the City of Rochester (the "City"), and the Rochester City School District (the "RCSD") from any and all liabilities, claims, suits, losses, damages, costs and expenses arising from, by reason of or connected with the provision of Consulting Services or by reason of any action, or alleged action taken or omitted, by Consultant in connection with its provision of assistance, services, recommendations and advice.

8. INDEMNIFICATION. To the fullest extent permitted by law, Consultant, for and on behalf of itself, as well as all corporations, partnerships, persons, firms or entities affiliated with or related to Consultant, shall indemnify, defend and hold harmless the RJSCB, the City, the RCSD, and Savin from and against any and all liabilities, claims, suits, losses, damages, costs and

expenses arising from, by reason of or in connection with the Consulting Services or by reason of any action, or alleged action taken or omitted, by Consultant in connection with the Consulting Services.

9. COMPLIANCE WITH LAWS. The Parties shall comply at all times with all applicable laws, rules, regulations, orders, directives and requirements of any kind imposed by any federal, state or local government or any agency or instrumentality of any such government.

10. ASSIGNMENT. The rights granted hereunder are personal to the Parties and shall not be assigned, and any purported assignment in violation of this Paragraph shall be void.

11. GOVERNING LAW. This Agreement shall be governed by the laws of the State of New York.

12. ENTIRE AGREEMENT. This Agreement reflects the entire agreement between the Parties concerning the specific rights granted herein and may not be modified except in a writing signed by the Parties.

13. COUNTERPARTS. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, but all shall together constitute one and the same.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement as of the Effective Date.

CONSULTANT

Signed: _____

Name (Print): _____

Date: _____

Title: _____

MENTOR

Signed: _____

Name (Print): _____

Date: _____

Title: _____

PROTÉGÉ

Signed: _____

Name (Print): _____

Date: _____

Title: _____

EXHIBIT A

TIME LOG

Date	**Description of Consulting Services**	**Total Time** **(to nearest ¼ hour)**
	TOTAL HOURS:	

Signature: _____ Date Submitted: _____

Name (Printed): _____

END OF BOP MENTOR/PROTÉGÉ THIRD PARTY CONSULTANT MOU

END OF SECTION 00 43 31A

SECTION 00 43 83 - MILESTONE SCHEDULE AND CRITICAL SUBMITTALS

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.

B. Related Work Described Elsewhere:

1. Agreement, Section CA, General Conditions

1.2 SUMMARY

A. The work specified in this section includes the requirement to prepare, maintain, and update all detailed schedules as described in this section using the Critical Path Method (CPM). The CPM Schedules shall be prepared in such a manner as to permit the orderly planning, organization, and execution of the Work and be sufficiently detailed to accurately depict all the Work required by the Contract, including all Milestones as described in other sections of the Specifications, or elsewhere in the Contract Documents.

1.3 DEFINITIONS

A. Contract Float: The number of working days between Contractor's anticipated completion date for early completion of the Work and the corresponding Contract Time.

B. Expanded Project Schedule Update: expanded detail of a Project Schedule Update in order to further explain the construction sequence or other details.

C. Look-Ahead Schedule: A schedule that shows planned Work over the next six weeks.

D. Original Baseline Schedule: The first approved revision 0, Project Schedule.

E. Guideline Schedule: The schedule included with the contract documents is intended as a guide for bidding purposes. Schedule durations may change from this schedule to depict the actual work flow, but the start, finish and milestone dates will remain the same.

F. Preliminary Schedule: The Contractor's construction schedule showing the planned Work over the first 120 days following Notice to Proceed.

G. Project Schedule: The Project Schedule shall represent the Contractor's best judgment and intended plan for the completion of the Work in compliance with the Contract Documents. It represents the Contractor's first schedule covering the complete duration of Contract Time submitted for review and approval of the CM. Upon approval by the CM, the Project Schedule shall

become the Original Baseline Schedule. Subsequent revisions of the Project Schedule shall be Revised Baseline Schedules.

H. Total Float: The number of working days by which a part of the Work in the Baseline Schedule may be delayed from its early finish dates without extending the Contract Time.

I. Project Schedule Update: The latest Baseline Schedule updated monthly to reflect actual Work performed, but not logic changes in the Baseline Schedule.

J. Revised Baseline Schedule: The latest approved Baseline Schedule that reflects logic changes and all approved change orders.

1.4 SUBMITTALS

A. Project Schedule: Discuss with and obtain the Construction Managers acceptance of the proposed coding, activity-numbering system, screen layout, graphics used to generate the networks and bar charts, and exceptions to the size of the network printed sheets, all prior to submitting the Project Schedule.

1. Submit to the Construction Manager a detailed Project Schedule within **10 calendar days after receipt of the Notice to Proceed** using the CPM format, and in both hard copy and electronic format.

2. The Project Schedule shall supersede the Preliminary Schedule upon the Construction Manager acceptance of the Project Schedule.

3. The Project Schedule shall include a written narrative that explains all Work activity durations and describes the plan and approach for meeting interim and final completion milestones. Include as a minimum all: bases and assumptions used in preparing submittals, crew sizes, equipment requirements, anticipated delivery dates, restraints, critical path activities, production rates, production and maintenance shifts, time contingencies to account for weather conditions, permits, long-lead time items, and coordination issues with Construction Manager, Owner, utilities, other contractors or other third-parties. The narrative shall discuss the Contractor's plan for management of the site (e.g., laydown, staging, traffic, etc), and buildup of trade labor.

4. A meeting will be held with all prime contractors upon receipt of the individual Project schedules to coordinate each schedule into one combined Project Schedule. All prime contractors will sign off agreeing to combined Project Schedule.

5. Contractors are required to include on their Schedule of Values costs allocated for second shift, and this will align in detail with the milestone schedule which must be approved by the Construction Manager and Program Manager prior to first billing.

6. A separate superintendent must be assigned for all 2nd shift work, and each prime contractor is required to provide a resume to be reviewed and approved by the Construction Manager and Program Manager prior to that person starting work.

7. All prospective winning prime contractors will be required to bring to the de-scope meeting the labor hours they have estimated in their bid.

8. Work force plan must be provided as a submittal and as a part of each prime contractor's first application for payment.

B. Project Schedule Update and Progress Report: Submit the following on the first working day of each month, updated as of the 25th calendar day of the previous month:

1. Project Schedule Update

2. Monthly-to-date Progress Report Comprising:

a. A narrative of all Work performed that includes the following.
b. Work completed since the last update.
c. Description of the current critical path, including any changes to the critical path since the last update and an identification of the reasons for the changes.
d. Description of problem areas.
e. Current and anticipated delays. Include causes thereof and impacts to other activities, milestones, and completion dates. Identify all activities where progress has slipped more than 5 working days since the last schedule update and discuss the cause of the delay or interruption.
f. Pending items, such as permits, change orders, and time adjustments, and status.

3. Contract completion date status. Include the number of days ahead of, or behind all milestone dates and the contract completion date, and the reason(s) for any change(s).

C. Submit a Project Schedule Update and month-to-date Progress Report in accordance with the foregoing requirements upon submitting any proposed Revised Baseline Schedule. Use a cut-off date for the Project Schedule Update that corresponds to the effective date for the proposed Revised Baseline Schedule.

D. Look-Ahead Schedule: Submit the two-week look-ahead schedule at least 24 hours prior to the progress meetings, with number of copies submitted, layout, and format acceptable to the Construction Manager.

E. Time Impact Analysis: Submit in accordance with, and when required by the General Conditions of the Agreement.

F. All submittals, within the time provided herein and in a form acceptable to the Construction Manager, of schedules, monthly progress reports, schedule updates, and revisions of the Project Schedule are conditions precedent for the Contractor to receive the full amount of each progress payment, less retention and other adjustments. Should the Contractor fail to submit timely, acceptable reports, schedules, updates, or revisions, the Construction Manager may withhold the amount designated in the Schedule of Values from each monthly partial payment estimate. Should the Contractor continue to fail to submit the above mentioned submittals the Construction Manager may, in addition to other retentions or remedies provided by the Contract or by applicable law, withhold 25 percent of each monthly partial payment estimate until acceptable submittals have been received.

1.5 QUALIFICATIONS

A. The Contractor shall perform the work covered in this section with personnel having at least three (3) years experience in using computer based scheduling on construction projects of the magnitude and complexity of this project.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 SUMMARY

A. The Schedule shall be constructed, and the work performed in accordance with the milestone dates set forth and the coordinated project schedule. Any additional costs for overtime, shift work and/or additional manpower, required to maintain these milestones, will be at each Contractor’s expense.

3.2 PROJECT SCHEDULE

A. Furnish a Project Schedule and participate with the Construction Manager in its review, evaluation and coordination. Such joint review and coordination shall not relieve the Contractor of the sole responsibility for scheduling the Work. Furnish a Project Schedule demonstrating adequate planning and execution of all phases of the Work and which enables the Construction Manager to evaluate progress of the Work. Maintain such Project Schedule so that it shall, at all times, represent the Contractor's planned means, methods, and sequences for performing the Work required under this Contract within the Contract Time specified. Show the following schedule elements in detail:

1. The start and completion of all items of the Work, their major components and milestone completion dates, including Contract milestones.

2. Mobilization

3. Submittals and approval of submittals including shop drawings, permits and steps required to obtain permits, safety plans, temporary facilities and utilities, record documents, and operators and maintenance manuals.

   a. Critical submittals shall be tracked independently and include but are not limited to the following:

13 34 10	**Acoustic Barrier Panel System**
23 21 23	**Pumps**
23 64 26.20	**Air Cooled Scroll Compressor Packaged Chiller**
23 81 26.11	**Ductless Split System Air Conditioner**

   All construction activities, including the fabrication and delivery of materials or equipment incorporated into the Work, adjacent Work done by others and Work area changes.

   As time is of the essence, all packages listed above need to be submitted to the Engineer for approval by 06/19/2020; 10 days of NTP.

4. The number of working days required for completion of each activity and all the Work.

5. Commissioning, punch list and close out.

B. The Contractor's key personnel involved in preparing the Project Schedule shall initiate and attend one or more meetings upon direction of the Construction Manager to present to, and coordinate with the other prime contractors. Personnel shall be competent and prepared to discuss:

1. The planned logic, content, form, and layout of the activity table (spreadsheet).

2. The bar chart format.

3. Activity identification and coding. Number the initial activity identifications (IDs) by 10s or 100s to allow for the insertion of any future required activities that enhance detail.

4. Presentation and printouts of the Project Schedule.

The Construction Manager will review the proposed Project Schedule and meet with the Contractor's key personnel performing the scheduling to

discuss the proposed construction schedule within 21 calendar days of its submission.

C. The Construction Manager acceptance of the Project Schedule shall not:

1. Imply that the Construction Manager has conducted an exhaustive review or evaluation of the sequencing, logic, or duration of all activities contained therein.

2. Constitute a warranty of its feasibility, suitability, reasonableness, or completeness.

3. Provide a basis for claims occasioned by any future revisions required in the schedule to conform to the Contract requirements.

4. Relieve the Contractor of the sole responsibility for scheduling and performing the work.

5. Relieve the Contractor of sole responsibility for means, methods, and techniques of construction employed.

D. The Project Schedule initially accepted by the Construction Manager shall be designated as the Original Baseline Schedule. The accepted Original Baseline Schedule shall not be updated, revised, or changed over the Project duration, but shall be used for comparison with the current updated schedule, until a Revised Baseline Schedule is accepted by the Construction Manager.

E. An activity shall be defined as an element of Work that is measurable and definable and that is necessary to accomplish in order to incrementally achieve progress of the Work as a whole. At any time, the Construction Manager may require additional detail to that previously provided. Float shall not be an activity.

1. Carefully analyze activities comprising the Project Schedule to determine activity durations in units of project working days. Base durations on the labor crews, crafts, equipment, and materials required to perform each activity. Unless supplemented with a detailed linear schedule to indicate production progress, split activities with durations greater than 30 working days into activities no longer than 20 working days, except for summary activities and non-construction activities such as submittal preparation and review, material procurement, and equipment delivery, or as allowed by the Construction Manager.

2. Clearly identify the critical path on the Project Schedule.

3. Identify the following as lag activities and include full lag time associated therewith in the duration of the activity. Do not schedule negative lag time.

a. Start-to-start and finish-to-finish lag times greater than 1 working day.

b. Finish-to-start lag times greater than 1 day.
c. Start-to- finish lag times of any kind.

3.3 LIQUIDATED DAMAGES

A. Critical submittals shall carry liquidated damages of the value listed in 00 72 16 General Conditions.

3.4 DEFINITIONS OF CONTRACT MILESTONES

A. SUBSTANTIAL COMPLETION:

As determined by the Construction Manager, all work and systems are complete, operational, tested and ready for facility operations and certificate of occupancy. All closeout documentation required by the "Closeout Procedures," including warranties, certifications, record or 'as-built' documents, and operation and maintenance manuals, etc., must be submitted and satisfactory. Substantial Completion will not be recognized by Owner until all Closeout Documents and Submittals are received in full and are satisfactory to Owner's Representatives.

B. FINAL COMPLETION:

As determined by the Construction Manager, all punch list work is complete; and closeout documentation, warranties, certifications, record documents, and operation and maintenance manuals are approved.

3.5 MILESTONE SCHEDULE

A. **In order to meet the Substantial Completion dates, all overtime costs for extended work hours, Saturdays (and Sundays when required) must be included in the contractor's bid; no special consideration will be given to any contractor that fails to include said costs in his/her bid. Extended workdays and/or hours will be required to make up lost time due to weather and other unforeseen occurrences.**

B. A guideline schedule is included in herein as an illustration setting forth goals for milestone activities for the Project and anticipated completion dates. The annexed guideline is for bidding purposes only and may be modified during the course of the Contract. Contractors must complete all Work in a coordinated manner to achieve timely completion. Failure to act in accordance with coordination requirements of the Contract shall subject the responsible Contractor to liquidated damages as specified in the General Conditions and sustained failure to perform as required may be grounds for termination of its Contract.

The following schedule reflects anticipated milestones for the Bid Period:

Contract Award:	06/08/20

The following schedule reflects anticipated milestones before Mobilization:

List of Subcontractors (inc. Sub Tier) Submitted by:	06/15/2020
Bid Breakdown Leveling Sheets:	06/15/2020
Acquire Approved Prime Contractor Bonds, Insurances & Signed Contracts by:	06/15/2020

The following schedule reflects anticipated milestones for Critical Submittals:

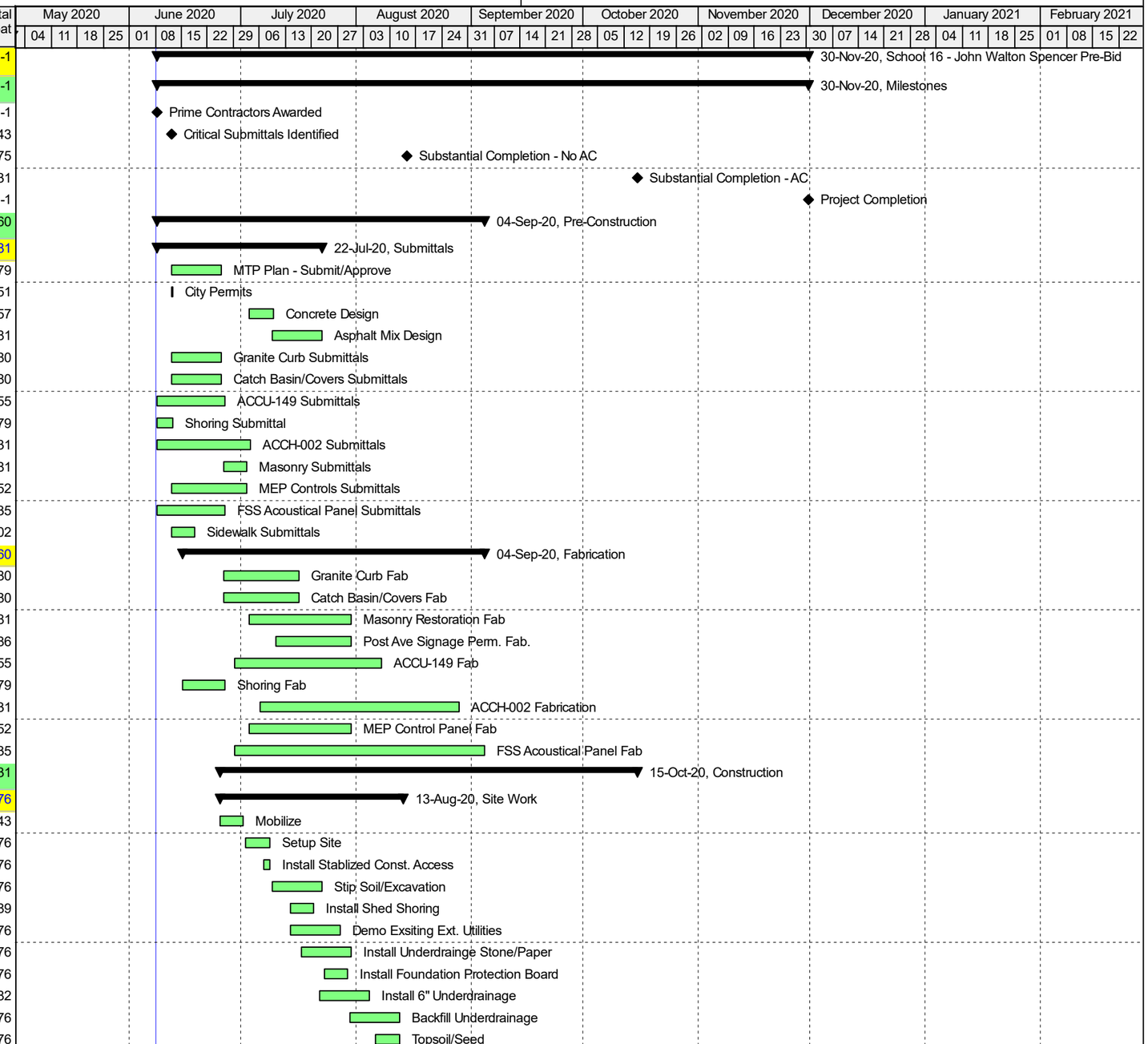
Critical Submittals as Identified:	06/09/2020
Critical Submittals submitted by:	06/19/2020

The following schedule reflects anticipated milestone dates (date task to be completed by) for the construction period. **All primes should anticipate that double shift, premium, and second shift work will be required for coordination with the other trades to meet the project milestone dates. All Primes need to understand that this is a fast track project and Time is of the Essence for any and all aspects of this project.**

Mobilize to Site:	06/25/2020
Substantial Completion Date for all Work except air conditioning:	08/16/2020
Substantial Completion Date for air conditioning Work:	10/16/2020
Final Completion Date:	11/30/2020
Warranty Period:	**2 years**

END OF SECTION 00 43 83

Activity ID	Activity Name	Orig. Dur.	Rem. Dur.	% Comp.	Start	Finish	Total Float
School 16 - John Walton Spencer P		126	126	0%	08-Jun-20	30-Nov-20	-1
Milestones		126	126	0%	08-Jun-20	30-Nov-20	-1
A1000	Prime Contractors Awarded	0	0	0%	08-Jun-20		-1
A1010	Critical Submittals Identified	0	0	0%	12-Jun-20		43
A1020	Substantial Completion - No AC	0	0	0%		14-Aug-20	75
A1030	Substantial Completion - AC	0	0	0%		15-Oct-20	31
A1040	Project Completion	0	0	0%		30-Nov-20	-1
Pre-Construction		65	65	0%	08-Jun-20	04-Sep-20	60
Submittals		33	33	0%	08-Jun-20	22-Jul-20	81
A1041	MTP Plan - Submit/Approve	10	10	0%	12-Jun-20	25-Jun-20	79
A1042	City Permits	1	1	0%	12-Jun-20	12-Jun-20	51
A1043	Concrete Design	5	5	0%	03-Jul-20	09-Jul-20	57
A1044	Asphalt Mix Design	10	10	0%	09-Jul-20	22-Jul-20	81
A1045	Granite Curb Submittals	10	10	0%	12-Jun-20	25-Jun-20	80
A1047	Catch Basin/Covers Submittals	10	10	0%	12-Jun-20	25-Jun-20	80
A1052	ACCU-149 Submittals	15	15	0%	08-Jun-20	26-Jun-20	55
A1054	Shoring Submittal	5	5	0%	08-Jun-20	12-Jun-20	79
A1058	ACCH-002 Submittals	20	20	0%	08-Jun-20	03-Jul-20	31
A1064	Masonry Submittals	5	5	0%	26-Jun-20	02-Jul-20	81
A1070	MEP Controls Submittals	15	15	0%	12-Jun-20	02-Jul-20	52
A1075	FSS Acoustical Panel Submittals	15	15	0%	08-Jun-20	26-Jun-20	35
A1077	Sidewalk Submittals	5	5	0%	12-Jun-20	18-Jun-20	102
Fabrication		60	60	0%	15-Jun-20	04-Sep-20	60
A1046	Granite Curb Fab	15	15	0%	26-Jun-20	16-Jul-20	80
A1048	Catch Basin/Covers Fab	15	15	0%	26-Jun-20	16-Jul-20	80
A1049	Masonry Restoration Fab	20	20	0%	03-Jul-20	30-Jul-20	81
A1051	Post Ave Signage Perm. Fab.	15	15	0%	10-Jul-20	30-Jul-20	86
A1053	ACCU-149 Fab	30	30	0%	29-Jun-20	07-Aug-20	55
A1055	Shoring Fab	10	10	0%	15-Jun-20	26-Jun-20	79
A1059	ACCH-002 Fabrication	40	40	0%	06-Jul-20	28-Aug-20	31
A1071	MEP Control Panel Fab	20	20	0%	03-Jul-20	30-Jul-20	52
A1076	FSS Acoustical Panel Fab	50	50	0%	29-Jun-20	04-Sep-20	35
Construction		81	81	0%	25-Jun-20	15-Oct-20	31
Site Work		36	36	0%	25-Jun-20	13-Aug-20	76
A1100	Mobilize	5	5	0%	25-Jun-20	01-Jul-20	43
A1110	Setup Site	5	5	0%	02-Jul-20	08-Jul-20	76
A1130	Install Stablized Const. Access	2	2	0%	07-Jul-20	08-Jul-20	76
A1140	Stip Soil/Excavation	10	10	0%	09-Jul-20	22-Jul-20	76
A1141	Install Shed Shoring	5	5	0%	14-Jul-20	20-Jul-20	89
A1150	Demo Exsiting Ext. Utilities	10	10	0%	14-Jul-20	27-Jul-20	76
A1200	Install Underdrainge Stone/Paper	10	10	0%	17-Jul-20	30-Jul-20	76
A1205	Install Foundation Protection Boar	5	5	0%	23-Jul-20	29-Jul-20	76
A1210	Install 6" Underdrainage	10	10	0%	22-Jul-20	04-Aug-20	82
A1220	Backfill Underdrainage	10	10	0%	30-Jul-20	12-Aug-20	76
A1230	Topsoil/Seed	5	5	0%	06-Aug-20	12-Aug-20	76



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

Activity ID	Activity Name	Orig. Dur.	Rem. Dur.	% Comp.	Start	Finish	Total Float
A1240	Site Punchlist	5	5	0%	07-Aug-20	13-Aug-20	76
Crawl Space		31	31	0%	02-Jul-20	13-Aug-20	76
A1300	Install Crawl Space Shoring	10	10	0%	02-Jul-20	15-Jul-20	76
A1310	Demolish CS Utilities	3	3	0%	07-Jul-20	09-Jul-20	76
A1320	Excavate/Install Basin	5	5	0%	10-Jul-20	16-Jul-20	76
A1330	Excavate CS Drainage Pipe	10	10	0%	10-Jul-20	23-Jul-20	78
A1340	Install CS 4" Drainage Pipe	3	3	0%	21-Jul-20	23-Jul-20	78
A1350	Backfill CS Drainage Pipe	10	10	0%	24-Jul-20	06-Aug-20	78
A1360	Install CS Sump Pumps	3	3	0%	24-Jul-20	28-Jul-20	83
A1370	Install CS Control Panel/Pump Wiri	15	15	0%	17-Jul-20	06-Aug-20	76
A1380	Remove Shoring/Masonry Restora	5	5	0%	05-Aug-20	11-Aug-20	78
A1390	CS Punclist	5	5	0%	07-Aug-20	13-Aug-20	76
Post Ave Crosswalk		32	32	0%	02-Jul-20	14-Aug-20	75
A1400	Setup MTP	3	3	0%	02-Jul-20	06-Jul-20	75
A1410	Demo Existing Sidewalks/Lawn	5	5	0%	07-Jul-20	13-Jul-20	75
A1420	Demo Existing Curb/Catch Basin	5	5	0%	07-Jul-20	13-Jul-20	75
A1430	Remove Asphalt	5	5	0%	14-Jul-20	20-Jul-20	75
A1431	Set Curbs	5	5	0%	21-Jul-20	27-Jul-20	78
A1432	Install Catch Basin/Covers	5	5	0%	21-Jul-20	27-Jul-20	78
A1434	Install Sidwalk Subbase/Forms	5	5	0%	21-Jul-20	27-Jul-20	75
A1440	Place Sidewalks	3	3	0%	28-Jul-20	30-Jul-20	75
A1441	Set Sidewalk Detectable Strip	1	1	0%	28-Jul-20	28-Jul-20	83
A1450	Asphalt Replacement	3	3	0%	31-Jul-20	04-Aug-20	75
A1455	Install New Singage	5	5	0%	31-Jul-20	06-Aug-20	76
A1470	Install Crosswalk Strips	3	3	0%	05-Aug-20	07-Aug-20	75
A1480	Post Ave Punchlist	5	5	0%	10-Aug-20	14-Aug-20	75
A/C Chiller Related Work		76	76	0%	02-Jul-20	15-Oct-20	31
A1500	Remove Ceiling Panels	5	5	0%	02-Jul-20	08-Jul-20	43
A1510	Cap MEP Components	10	10	0%	09-Jul-20	22-Jul-20	92
A1520	Cap Fire Supression System	10	10	0%	09-Jul-20	22-Jul-20	92
A1521	Install ACCH-002 Pumps	10	10	0%	03-Aug-20	14-Aug-20	41
A1522	Install MEP ACCH-002 Piping	15	15	0%	23-Jul-20	12-Aug-20	43
A1523	Install MEP ACCU-149 Piping	15	15	0%	23-Jul-20	12-Aug-20	72
A1526	Install MEP Controls Panels	10	10	0%	31-Jul-20	13-Aug-20	52
A1527	MEP Roof Penetrations	5	5	0%	30-Jul-20	05-Aug-20	77
A1528	Install ACCU-149 - 2nd Shift	10	10	0%	10-Aug-20	21-Aug-20	55
A1529	Install MEP ACCH-002 Wiring	15	15	0%	13-Aug-20	02-Sep-20	43
A1533	Install MEP ACCU-149 Wiring	5	5	0%	13-Aug-20	19-Aug-20	72
A1540	Reinstall Above Ceiling MEP Comp	10	10	0%	24-Aug-20	04-Sep-20	55
A1545	Roof Penetrations for Steel - 2nd S	3	3	0%	10-Sep-20	14-Sep-20	31
A1550	Install AC Soundscreen - 2nd Shift	15	15	0%	11-Sep-20	01-Oct-20	31
A1560	Waterproof Roof at Steel - 2nd Shi	3	3	0%	11-Sep-20	15-Sep-20	48
A1590	Install ACCH-002 - 2nd Shift	15	15	0%	31-Aug-20	18-Sep-20	31
A1670	MEP ACCH-002 Lighting - 2nd Shi	5	5	0%	02-Oct-20	08-Oct-20	31
A1710	Chiller Start up/Testing - 2nd Shift	5	5	0%	02-Oct-20	08-Oct-20	31
A1750	MEP Punchlist	5	5	0%	09-Oct-20	15-Oct-20	31

Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

SECTION 00 43 93 - BID SUBMITTAL CHECKLIST

This "Bid Submittal Checklist" is provided only as a general overview, and shall not relieve bidders of their obligation to provide all information, forms and certifications required to be submitted with their bids as set forth more fully in the Contract Documents.

A. Bid Form completed (Section 00 41 16) with Base Bid amount (*and allowances, if applicable*)
   1) Addenda acknowledged on Bid Form
   2) Certification of Non-Collusion in Bidding – on Bid Form
   3) Completed alternates –on Bid Form

B. Supplementary Bid Information (00 43 00):
   1) Form of Bid Bond, with completed acknowledgements
   2) Appendices A, B, C and, D signed and acknowledged:
      a) Offeror's Affirmation of Understanding and Agreement Pursuant to State Finance Law § 139-j(6)(b)
      b) Offeror Certification of Compliance with State Finance Law § 139-k(5)
      c) Offeror Disclosure of Prior Non-Responsibility Determination
      d) Iran Divestment Act Compliance Certification

C. Statement of Bidder's Qualifications (Section 00 45 13) including:
   1) Certified financial statement
   2) Completed certification (including non-bankruptcy certification)
   3) List of prior projects and references, attached to Statement

D. All documentation required under Section 00 43 31, "MWBE/DBE/SBE Utilization and Workforce Diversity"
   1) EBE Utilization Plan (DP-1)
   2) EBE Assurance Statement
   3) Promise of Non-Discrimination
   4) Good Faith Effort Checklist
   5) EBE Letter of Intent to Perform (DP-2) (*within 10 days of notice of award)*
   6) Small Business Enterprise (SBE) Certification Form, *if applicable*

E. Equivalent Review Form (Section 00 63 19), *if applicable*

F. Unit Prices (Section 00 43 22), *only if requested on Bid Form*

END OF SECTION 00 43 93

SECTION 00 45 13 - STATEMENT OF BIDDER QUALIFICATIONS

Bidders may be judged qualified only for the type of work in which they demonstrate competence. Owner will make such investigation it feels necessary to determine the competency of the Bidder to perform the Work. The Bidder shall furnish promptly all information the Owner requests for Owner to investigate as it deems appropriate. Bidders must have, at minimum, successfully completed three (3) prior projects of similar size and scope to the Work of the Contract.

The Bidder bears the sole responsibility for any subcontractors it may employ for any part of the Work. Bidder is advised to utilize similar qualification standards against which it will be judged when using the services of any subcontractors or suppliers. Bidders must verify that any subcontractor or suppliers are in good standing and have not been previously debarred or found not to be qualified for performance of any RSMP Contract.

1. *Name of Bidder:* _____

2. *Type of Business:* (e.g. corporation, partnership, etc.)

   : Date of formation: _____
   Place of formation: _____

3. *How many years has the Bidder done business under its present name?* _____years

4. *List the names of the persons who are directors, officers, owners, managerial employees or partners in the Bidder's business:*

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

5. *Have any of the persons in No. 4 owned, operated, or been shareholders in any other companies?*

   Yes No

If Yes, list the names of said persons and the names of their previous affiliations:

Names _____ Names _____
_____ _____
_____ _____
_____ _____

6. *Does the Bidder have a Sexual Harassment Policy with planned Annual Training?*

Yes No Last Date of Training: _____

7. *Has any director, officer, owner or managerial employee had any professional license suspended or revoked?*

Yes No

If Yes, please indicate their names, license previously held, whether it was revoked or suspended and the date:

Name	License Held	Revoked	Suspended	Date

8. *Please list in reverse chronological order all projects completed in the past five years involving work of a similar nature to this Contract, including a minimum of three projects. For each, provide the project name, date, location, dollar amount, brief description, and references with names and telephone numbers, and the name(s) of the architect/engineer.* ***Attach additional sheets as needed.***

Project: Location/Owner: Date: Price: Description:

_____
_____
_____

9. *During the five-year period preceding the submission of this Bid, has the Bidder been found guilty of any OSHA violations?*

Yes No

If Yes, please describe the nature of the OSHA violation(s) and indicate the remediation or other steps taken regarding such violations(s):

Violation	Remediation

10. *During the five-year period preceding the submission of this Bid, has the Bidder been charged with any claims pertaining to unlawful intimidation or discrimination against any employee by reason of race, creed, color, disability, sex or national origins and/or violations of an employee's civil rights or equal employment opportunities?*

    Yes No

If Yes, please list the names of persons making such claim, a description of the claim, the status of the claim and what disposition, if any, has been made regarding such claim:

Name	Claim	Status	Disposition

11. *During the five-year period preceding the submission of this Bid, has the Bidder been named as a party in any lawsuit in an action involving a claim for personal injury or wrongful death arising from performance of work related to any project in which it has been engaged?*

Yes No

Lawsuit	Index Number	Disposition

12. *During the five-year period preceding the submission of this Bid, has the Bidder been the subject of proceedings before the Department of Labor for alleged violations of the Labor Law as it relates to the payment of prevailing wages and/or supplemental payment requirements?*

Yes No

If Yes, please list each instance of the commencement of a Department of Labor proceeding, the project to which it related, and the status or resolution thereof through Bid submission:

Proceeding	Project	Disposition

13. *During the five-year period preceding the submission of this Bid, has the Bidder been the subject of proceedings involving allegation that it violated the Workers' Compensation Law including but not limited to the failure to provide proof of worker's compensation or disability coverage and/or any lapses thereof?*

Yes No

If Yes, please list each instance of the claimed violation and the status of the claim at the time of submission of this Bid:

Violation	Remediation

14. *During the five-year period preceding the submission of this Bid, has the Bidder been the subject of proceedings before the Department of Labor for alleged violations of the Labor Law as it relates to the payment of prevailing wages and/or supplemental payment requirements?*

Yes No

If Yes, please list each instance of the commencement of a Department of Labor proceeding, the project for which it was commenced, and the status of the proceeding at the time of submission of this Bid:

Proceeding	Project	Disposition

15. *During the five-year period preceding the submission of this Bid, have the Bidder, its officers, directors, owner, and/or managerial employees been the subject of a criminal indictment?*

Yes No

If Yes, please list the name of the person(s) indicted or convicted, the charge against the individual and the disposition of the charge:

Name	Charge	Disposition

16. *During the five-year period preceding the submission of this Bid, has the Bidder been charged with and/or found guilty of any violations of federal, state, municipal, environmental, and/or health laws, codes, rules and/or regulations?*

Yes *No*

If Yes, please list the charge against the Bidder, the date of the charge, and the status of the charge at the time of submission of this Bid:

17. *Has the Bidder submitted bids on any other projects or contracts aside from the instant Bid?*

Yes No

If Yes, please list the projects bid upon, the expected or actual date of commencement of work and, if no award has been made, whether the Bidder was the lowest monetary Bidder:

Project Bid	Start Date	Low Bidder

18. *Does the Bidder have any projects ongoing at the time of submission of this Bid?*

Yes No

If Yes, please list the projects (or attach) on which the Bidder is currently working, the percentag complete, and the expected date of completion of the work:

Project	Construction Cost	Percent Complete	Completion Date

19. *Has the Bidder, or any company sharing a director, officer, shareholder or principal or Bidder, ever been terminated from a contract or project by any owner?*

Yes No

If Yes, please list the projects on which the Bidder was terminated, the reason for termination (convenience, suspension, for cause), and the date of termination:

Project Bid	Reason	Date

20. *Has the Bidder completed and attached the list of at* ***least three (3) references****?* Bidders must indicate at minimum: job name, location, brief description, dollar amount, and reference names with telephone numbers of the Owner and the Engineer or Architect. This Statement must be signed and submitted with the Bid to be considered responsive

Yes No

SWORN STATEMENT OF BIDDER:

By signing below, the Bidder named above acknowledges that all information supplied in response to this Statement of Bidder's Qualifications, including all attachments, is complete and accurate to the best of Bidder's knowledge. Bidder further represents that it has not filed and does not presently anticipate filing for bankruptcy, and that Bidder's assets are not in receivership. Bidder further certifies that it is not, nor are any of its Subcontractors included in its Bid, a party that has been previously debarred, suspended or found non-responsive or ineligible to participate in RSMP projects, nor does Bidder or any Subcontractor share one or more officers, directors, shareholders or principals with a debarred, suspended, or otherwise ineligible party.

By:
Authorized Name (print):
_____
Title (print):
_____
Authorized Signature:
_____

Sworn to before me this Day of 2020

_____
Notary Public

END OF SECTION 00 45 13

SECTION 00 52 12 – FORM OF CONTRACT

This Contract made and executed in duplicate the ___ day of _____ in the year **2020**, by and between the Rochester Joint Schools Construction Board ("RJSCB"), hereinafter called the "Owner", party of the first part, and (<**Insert Contractor Name Here**> Prime Contractor), hereinafter designated as the "Contractor," party of the second part.

WITNESSETH that in consideration of the mutual covenants and Contracts, herein contained the parties hereto covenant, promise and agree, each with the other, as follows:

1.1 WORK TO BE DONE: The Contractor shall and will make and construct and sufficiently perform and finish in a good substantial, and workmanlike manner, under the direction and to the satisfaction of the Owner, acting as agent to the Rochester City School District and the City of Rochester, and the Owner's Representatives, all the work included in the plans, specifications, addenda, and other items forming the Contract Documents for

<Insert Contract Name and Number Here>

Bid for John Walton Spencer School No. 16
Phase 2A.1 of the Rochester Schools Modernization Program ("RSMP")

SED Project Control No. 26-16-00-01-0-016-020

Addendum No. 1 – Dated _____
Addendum No. 2 – Dated _____

in all respects according thereto and in conformity with the Contract, and to furnish and provide for such work and materials of suitable and workmanlike quality as is set forth in the Contract Documents.

2.1 CONTRACT AND CONTRACT DOCUMENTS: The Contract Documents consist of this Contract, the Plans, Specifications, Drawings, and other documents included in the Project Manual setting forth the Work and requirements for performing same, as well as the Addenda hereinbefore enumerated and any written document executed or amended after execution of this Contract, all of which form the Contract and are as fully part of the Contract as if attached to this Contract or repeated herein. The Contract represents the entire and integrated Contract between the parties hereto and supersedes prior negotiations, representations or Contracts, either written or oral. The table of contents, titles, headings, headlines, and marginal notes contained herein and in the Contract Documents are solely to facilitate reference to various provisions thereof and in no way affect, limit, or dictate the interpretation of the provisions to which they may refer. In case of any conflict or inconsistency between the provisions of this Contract and those of the other Contract Documents, the provisions of this Contract shall govern.

2.2 All obligations of the Owner and the Contractor are fully set forth and described in the Contract Documents. All parts of the Contract Documents are correlative and

complementary, and any work required, or reasonably inferable, by one part and not mentioned in another shall be performed to the same extent and purposes as required by all parts. The Contractor is to provide for the Work enumerated in the Contract Documents, and all Work that is reasonably inferable from the Contract Documents, to be fully completed in every detail for the purpose designed, and the Contractor agrees to furnish anything and everything necessary for such purpose and the misplacement, addition or omission of any word or character shall not change the intent or any part of the Contract Documents from that set forth by the Contract Documents as interpreted by the Owner.

2.3 Local Labor; The Project will be funded in part through the issuance of tax-exempt bonds by the County of Monroe Industrial Development Agency ("COMIDA"). Pursuant to the terms of the Contract between COMIDA and the Owner, COMIDA will require that the Project use only "Local Labor", subject to certain permitted exceptions and waivers. The term "Local Labor" is defined as laborers residing in Monroe, Genesee, Livingston, Orleans, Ontario, Seneca, Wayne, Wyoming, and Yates counties. Those providing labor to the Project must use best efforts to achieve compliance with the COMIDA Local Labor requirement. Further information on the COMIDA program requirements applicable to the RSMP is available online at http://www.growmonroe.org.

3.1 TERMS

3.1.1 WORK; as used herein, refers to work at the site of the Project as described in the Contract Documents, and includes all plant, labor, materials, supplies, equipment and other facilities and things necessary or proper for or incidental to the carrying out and completion of the terms of this Contract, including Contractor's provision of material delivered to and suitably stored at the site of the Project with approval of the Owner's Representative.

3.1.2 EXTRA WORK; as used herein, refers to and includes work required by the Owner that in the judgment of the Owner's Representative(s) involves changes in or additions to that required by the Contract Documents.

3.1.3 CONTRACTOR, SUBCONTRACTOR; The terms "Contractor," "Subcontractor," as used herein, means a person, firm or corporation supplying labor and materials or labor for work at the site of the Project.

3.1.4 OWNER'S REPRESENTATIVE; The Owner's Program Manager (Savin Engineers P.C. and Gilbane Building Company "Savin/Gilbane"), in conjunction with Owner's Architect (SWBR) and Owner's Construction Manager (Buffalo Construction Consultants) shall be designated the "Owner's Representative" for the purpose of this Contract.

3.1.5 NOTICE; as used herein, shall mean and include written notice. Written notice shall be deemed to have been duly served when delivered to or at the last known address of the person, or entity for whom intended, or to his, their, or its duly authorized agent, representative or officer; or when enclosed in a postage prepaid wrapper or envelope addressed to such person or entity at his, their, or its known business address and deposited in a United States mail box.

3.1.6 DIRECTED/REQUIRED/APPROVED/ACCEPTABLE; Whenever they refer to the Work or its performance, "directed", "required", "permitted", "ordered",

"designated", "prescribed", and words of like import shall imply the direction, requirement, permission, order, designation, or prescription of the Owner's Representative(s); and "approved", "acceptable", "satisfactory", "in the judgment of" and words of like import shall mean approved by or acceptable to or satisfactory to or in the judgment of the Owner's Representative(s).

3.1.7 PROJECT, refers to RCSD John Walton Spencer School 16 - Phase 2A.1 of the Rochester Schools Modernization Program, and all required Work and other obligations under the Contract relating thereto.

3.1.8 PROJECT MANUAL, refers to the document of that name issued for the Project at the time of bidding by the Owner or Owner's Representative(s) and includes all specifications, drawings, bidding requirements, forms, closeout documents, general and special conditions, and all other documents included therein, together with any Addenda thereto. The Project Manual is incorporated by reference into this Contract, constitutes a Contract Document and is binding upon the parties hereto.

4.1 SCOPE OF THE WORK: The Contractor will furnish all plant, labor, materials, supplies, equipment and other facilities and things necessary or proper for or incidental to the Work contemplated by the Contract as required by and in strict accordance with the Contract Documents, and/or as required by and in strict accordance with such changes as are ordered and approved pursuant to the Contract, and will perform all other obligations imposed by the Contract.

4.2 WORK PROGRESS AND REPAIRS. Under the Contract, the Contractor shall fully execute the Work as is enumerated under the Contract Documents or reasonably inferable by the Contractor as necessary to produce the results intended by the Contract Documents. In addition thereto, the Contractor shall protect all the adjoining property and to repair and replace any such properties damaged or destroyed by it or its employees through construction operations at or near the Project site. The Contractor shall have the sole continuing responsibility to install materials, protect them, maintain them in proper condition and forthwith repair, replace or make good any damages thereto without cost to the Owner until such time as the Work covered by the Contract is fully accepted by the Owner.

5.1 COMPENSATION TO BE PAID TO THE CONTRACTOR

5.1.1 The Owner shall pay the Contractor in current funds for the Contractor's performance of the Contract the Contract Sum of _____Dollars and _____Cents ($_____.__), subject to additions and deductions as provided in the Contract Documents.

5.1.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

No Alternates were associated with this Contract.

5.1.3 The Contractor shall pay all laborers and mechanics providing services to the Project in accordance with the appropriate New York State Prevailing Wage Rate or federal Davis-Bacon Wage Rate Schedule, as applicable, pursuant to

Section 00 73 46 of the Project Manual.

5.1.4 Unit prices, as set forth in Section 00 43 22 of the Project Manual, are as follows:

Unit Price _____.

5.1.5 The Owner is exempt from payment of sales and compensating use taxes of the State of New York and of cities and counties on all materials pursuant to this Contract. This exemption does not, however, apply to tools, machinery, equipment or other property purchased by, leased by or to the Contractor or a subcontractor or to supplies or materials not incorporated into the completed Project. The Contractor and its subcontractors shall be responsible for and to pay any and all applicable taxes, including sales and compensating use taxes, on such tools, machinery, equipment or other property or such unincorporated supplies and materials.

6.1 TIME OF ESSENCE: The provisions of the Contract relating to the time for performance and completion of the Work are of the essence of the Contract. Accordingly, time is of the essence respecting the Contract Documents and all obligations thereunder. The Owner will be entitled to seek liquidated damages for failure to timely achieve Substantial Completion as set forth in the General Conditions.

7.1 COMMENCEMENT OF WORK: The dates of commencement of and Substantial Completion of the Work of the Contract shall be in accordance with the "Schedules and Milestones" Section of the Project Manual (00 43 83). As such, the Contractor will commence Work on the date therein specified for commencement of the Work, and shall fully complete the Work by the dates specified in, or calculated by reference to, Section 00 43 83 (herein, the "Contract Time") as the time for completion of the Contract, unless such period shall be extended as provided in the Contract Documents.

8.1 WARRANTIES. The Contractor represents and warrants the following to the Owner (in addition to any other representations and warranties contained in the Contract Documents) as an inducement to the Owner to execute the Contract, which representations and warranties shall survive the execution and delivery of the Contract, any termination of the Contract and the final completion of the Work that:

1. it and its Subcontractors are financially solvent, able to pay all debts as they mature and possessed of sufficient working capital to complete the Work and perform all obligations hereunder;

2. it is capable of furnishing the tools, materials, supplies, equipment and labor required to complete the Work and perform its obligations hereunder;

3. it is authorized to do business in the State of New York and the United States and properly qualified and licensed by all necessary governmental and public authorities having jurisdiction over it, the Work and the Project; its execution of the Contract and its performance thereof is within its duly authorized powers;

4. its duly authorized representative has visited the site of the Project, is

familiar with the local and special conditions under which the Work is to be performed and has correlated on-site observations with the requirements of the Contact Documents; and

5. it possesses a suitable level of experience and expertise in the business administration, construction, construction management and superintendence of projects of the size, complexity and nature of this particular Project to complete the Project successfully and on schedule, and that it will perform all Work with the care, skill and diligence of a contractor of reasonable skill and experience in performing the obligations of the Contract.

The foregoing warranties are in addition to, and not in lieu of, any and all other liability imposed upon the Contractor by law with respect to the Contractor's duties, obligations and performance hereunder. The Contractor's liability hereunder shall survive the Owner's final acceptance of and payment for the Work. All representations and warranties set forth in the Contract, including without limitation, this Paragraph 8.1, shall survive the final completion of the Work or the earlier termination of the Contract. The Contractor acknowledges that the Owner is relying upon the Contractor's skill and experience in connection with the Work called for hereunder.

Upon the execution of this Contract, the Contractor shall, upon request, provide the Owner with copies of all contracts entered into between the Contractor and subcontractors or material suppliers. The Contractor’s obligation to provide the Owner with said contracts shall continue for the duration of the Project.

9.1 LIST OF EXHIBITS

Refer to the Table of Contents to the Project Manual for enumeration of all Sections of the Contract Documents (Specifications and Drawings List), which are incorporated herein.

10.1 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds in accordance with the requirements of the Contract Documents, including Sections 00 61 13 and 00 73 16 of the Project Manual and the General Conditions.

11.1 AUTHORIZED SIGNATURES

This Contract is entered into as of the day and year first written.

FOR CONTRACTOR:

(COMPANY SEAL) ("Contractor")

_____ _____
Witness Print legal name of firm or corporation

By_____

Title_____

FOR OWNER:

_____ Rochester Joint Schools Construction Board ("Owner")
Witness

By_____
Norman H. Jones, Chair of the RJSCB

Accepted as to form only By_____
Edward Hourihan, Partner - Bond Schoeneck and King,
RJSCB General Counsel

SECTION 00 61 13: BONDS AND CERTIFICATES

Prior to execution of the Contract, the successful bidder shall furnish bonds covering the faithful performance of the Contract ("Performance Bond") and the prompt payment of moneys that are due to all persons furnishing labor and materials under the Contract ("Labor and Material Payment Bond"). The Performance Bond and Labor and Material Payment Bond (herein, "Bonds") shall conform to the provisions of section 103-f of the New York General Municipal Law and must be delivered prior to the commencement of the work. A copy of such performance and payment bonds shall be kept by the Owner at is offices, and shall be open to public inspection. See Section 00 61 31 "Bonds and Certificates" for acceptable forms for the Bonds.

Bond premiums will be paid by the Contractor and are included as part of the Contract Sum. Each Bond shall be in a sum equal to one-hundred (100%) percent of the Lump Sum Value of the work to be performed in a form satisfactory to the Owner and the Architect and shall be underwritten by a surety company authorized to do business in the State of New York with a minimum AM Best rating of "A-" or "Secure". For this Project, the bonded amount shall be the full Contract Sum.

The Performance Bond shall extend and remain in effect two (2) years after Substantial Completion of the Project. However, the period of time required for the Contractor to perform warranty Work may be longer, as set forth in the General Conditions or elsewhere in the Contract Documents (Manufacturers warranties may exceed a one-year warranty period for various Project components, e.g.. roofs, boilers, major equipment and systems).

The Bonds shall include a rider with the following provisions/modifications:

Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, extension of time or other modification of the Contract Documents. Any addition, alteration, omission, change, extension of or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety from its obligations hereunder and notice to the Surety of such matters is hereby waived.

The Surety and Contractor shall be liable for the additional costs and expenses incurred by the Owner in relation to the default of the Contractor, i.e., architectural, engineering and/or consultants' fees and disbursements.

Surety also agrees that it is obligated under the Bonds to any successor, grantee or assignee of the Owner. The Surety shall promptly provide the Owner with a copy of any notice it receives from a claimant, pursuant to section four of the Payment Bond.

All provisions of the laws of the State of New York applicable to public improvement projects by the Owner and claims relating thereto shall apply to the Project, the Contract and the Bonds.

Acceptable forms of PERFORMANCE BOND and PAYMENT BOND for the Project are included on the following pages.

PERFORMANCE BOND

Bond #_____

KNOW ALL MEN BY THESE PRESENTS, That we _____ of _____, as Principal (hereinafter called the "Contractor"), and _____ a corporation created and existing under the laws of the State of _____ and authorized to do business in the State of New York and having its principal office at _____, as "Surety," are held and firmly bound unto the Rochester Joint Schools Construction Board "RJSCB," as Obligee (hereinafter, the "Owner"), in the penal sum of _____dollars, _____cents ($_____) lawful money of the United States of America, for the payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, all jointly and severally, firmly by these presents.

WHEREAS, said Contractor has entered into a certain written contract with said Owner dated as of the _____ day of _____ 20_____, (hereinafter called the "Contract") for Work to be performed on the Project of the Obligee, described as follows: _____. A copy of the Contract is hereto annexed and hereby made a part of this performance bond (hereinafter, the "Bond") as if herein set forth in full.

NOW, THEREFORE, the Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Contract, including any subsequent written modification thereof entered into by the Contractor and Owner that does not materially change the fundamental nature of the initial Contract work, which shall be become part of the Contract, which Contract is incorporated herein by reference. The nature and scope of this obligation under the Bond is further described as follows:

1. If the Contractor performs the Contract, including any modifications made in writing thereto, the Surety and Contractor shall have no obligation under this Bond, except when applicable to participate in a conference provided in Section 2.

2. If there is no Owner Default under the Contract, the Surety's obligation under this Bond shall arise after:

2.1. The Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default, which notice shall indicate whether the Owner is requesting a conference among the Principal, Owner and Surety to discuss the Contractor's performance. If the Owner does not request a conference the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 2.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;

2.2. the Owner declares a Contractor Default, terminates the Contract and notifies the Surety; and

2.3. the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Contract to the Surety or to a contractor selected to perform the Contract.

3. Failure on the part of the Owner to comply with the notice requirement in Section 2.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

4. When the Owner has satisfied the conditions of Section 2, the Surety shall promptly and at the Surety's expense take one of the following actions:

4.1. Arrange for the Contractor, with the consent of the Owner, to perform and complete the Contract;

4.2. Undertake to perform and complete the Contract itself, through its agents or independent contractors;

4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to the Owner the amount of damages as described in Section 6 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

4.4.1. After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or

4.4.2. Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

5. If the Surety does not proceed as provided in Section 4 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 4.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

6. If the Surety elects to act under Section 4.1, 4.2 or 4.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

6.1. the responsibilities of the Contractor for correction of defective work and completion of the Contract;

6.2. additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 4; and

6.3. liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of the Contractor.

7. If the Surety elects to act under Section 4.1, 4.3 or 4.4, the Surety's liability is limited to the amount of this Bond.

8. The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

9. The Surety hereby waives notice of any change, including changes of time, to the Contract or to related subcontracts, purchase orders and other obligations.

10. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

11. Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

12. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted here from and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

13. Definitions

13.1. Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Contract.

13.2. Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

13.3. Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Contract.

13.4. Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Contract or to perform and complete or comply with the other material terms of the Contract.

13.5. Contract Documents**.** All the documents that comprise the agreement between the Owner and Contractor.

14. If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

15. Modifications to this bond are as follows:

15.1. Surety hereby agrees that it consents to and waives notice of any addition, alteration, omission, change, extension of time or other modification of the Contract Documents. Any addition, alteration, omission, change, extension of or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety from its obligations hereunder and notice to the Surety of such matters is hereby waived.

15.2. Surety further agrees that, in the event of any claimed default by the Owner in the performance of the Owner's obligations to the Contractor under the Contract, the Contractor or Surety shall cause written notice of such default (specifying said default in detail) to be given to the Owner and the Owner shall have thirty (30) days from the date of the receipt of such notice within which to cure such default, or such additional reasonable period of time as may be required if the nature of such default is such that it cannot be cured within thirty (30) days.

15.3. Notice of Default shall be sent by the Owner by certified or registered U.S. mail, return receipt requested, postage prepaid. Any provision or condition in the Bonds to the contrary notwithstanding, the time period for the Owner to commence any action or proceeding, legal or equitable, under the Bonds, in a Court of competent jurisdiction in the jurisdiction in which the Project is located, shall be two (2) years from the date on which the Owner receives specific written notice that the Surety declines to perform any of its obligations or denies any claim made by the Owner, pursuant to the Bonds.

15.4. The Surety and Contractor shall be liable for the additional costs and expenses incurred by the Owner in relation to the Contractor Default, i.e., architectural, engineering and/or Consultants fees and disbursements.

15.5. Surety also agrees that it is obligated under the Bonds to any successor, grantee or assignee of the Owner. The Surety shall promptly provide the Owner with a copy of any notice it receives from a claimant, pursuant to section six of the Payment Bond.

15.6. All provisions of the laws of the State of New York applicable to public improvement projects, claims against subdivisions of the state of New York and Bonds shall apply to the Project, the Contract and the Bonds

Signed and sealed this _____ day of _____, 20____

(SEAL) _____
Principal

By_____

_____
Title

(SEAL) _____
Surety

By_____

_____
Title

If the Contractor (Principal) is a partnership, the bond should be signed by one of the individuals who are partners.

If the Contractor (Principal) is a corporation, the bond should be signed in its correct corporate name by a duly authorized officer, agent, or attorney-in-fact.

Each executed bond should be accompanied by (a) appropriate acknowledgements of the respective parties; (b) appropriate duly certified copy of Power of Attorney or other certificate of authority where bond is executed by agent, officer or other representative of Principal or Surety; (c) a duly certified extract from By-Laws or resolutions of Surety under which Power of Attorney or other certificate of authority of its agent, officer or representative was issued, and (d) duly certified copy of latest published financial statement of assets and liabilities of Surety.

ACKNOWLEDGMENT OF CONTRACTOR, IF AN INDIVIDUAL

State of _____

County of _____ ss.:

City of _____

On this _____ day of _____, 20___,
before me personally came and appeared _____, to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

[SEAL] _____
Notary Public

ACKNOWLEDGMENT OF CONTRACTOR, IF A FIRM

State of _____
County of _____ ss.:
City of _____

On this _____day of _____, 20___,
before me personally came and appeared_____, to me known and known to me to be one of the members of the firm of

_____, described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

[SEAL] _____
Notary Public

ACKNOWLEDGMENT OF CONTRACTOR, IF A CORPORATION

State of _____
County of _____ ss.:
City of _____

On this _____day of _____, 20___,
before me personally came and appeared_____, to me known, who, being by me duly sworn, did depose and say that he resides at
_____; that
he is the _____ of _____
_____, the corporation described in and which executed the foregoing instrument; that he knows the seal of said corporation; that one of the seals affixed to said instrument is such seal; that it was so affixed by order of the directors of said corporation, and that he signed his/her name thereto by like order.

[SEAL] _____
Notary Public

SURETY ACKNOWLEDGMENT

State of _____
ss.:
County of _____

On this _____ day of _____, 20_____, before me personally came and appeared_____, to me known, who, being by me duly sworn, did depose and say that he is an attorney-in-fact of _____, the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is such corporate seal, and that he signed the said instrument and affixed the said seal as Attorney-in-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

[SEAL] _____
Notary Public

LABOR AND MATERIAL PAYMENT BOND

Bond #_____

KNOW ALL MEN BY THESE PRESENTS:

That _____ as Principal, hereinafter called "Contractor," and _____, a corporation organized and existing under the laws of the state of _____ and authorized to do business in the State of New York, as Surety, hereinafter called "Surety," are held and firmly bound unto Rochester Joint Schools Construction Board as Obligee, hereinafter called "Owner," for the use and benefit of claimants as herein defined, in the amount of _____dollars, _____cents ($_____), for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated the _____ day of _____ 20_____, entered into a contract with Owner for (hereinafter called the "Contract") for Work to be performed in favor of the Owner, and particularly described as follows:_____ in accordance with drawings and specifications prepared by the Owner of its consultants, as may be supplemented, modified or otherwise amended in writing by Contractor and Owner, which Contract is by reference made a part hereof, and is hereinafter referred to as the "Contract."

NOW, THEREFORE, the Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Contract, which is incorporated herein by reference, subject, however, to the following terms and conditions:

1. If the Contractor promptly makes payment of all sums due to Claimants (as herein defined), and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Contract, then the Surety and Contractor shall have no obligation under this Bond.

2. If there is no Owner Default under the Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 12) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

3. When the Owner has satisfied the conditions in Section 2, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

4. The Surety's obligations to a Claimant under this Bond shall arise after the following:

4.1. Claimants, who do not have a direct contract with the Contractor,

4.1.1. have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within one hundred twenty (120) days after having last performed labor or last furnished materials or equipment included in the Claim; and

4.1.2. have sent a Claim to the Surety (at the address described in Section 12).

4.2. Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 12).

5. If a notice of non-payment required by Section 4.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 4.1.1.

6. When a Claimant has satisfied the conditions of Sections 4.1 or 4.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

6.1. Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

6.2. Pay or arrange for payment of any undisputed amounts.

6.3. The Surety's failure to discharge its obligations under Section 6.1 or Section 6.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 6.1 or Section 6.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

7. The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 6.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

8. Amounts owed by the Owner to the Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

9. The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

10. The Surety hereby consents to and waives notice of any addition, alteration, omission, change, extension of time or other modification of the Contract or Contract Documents, including any related subcontracts or purchase orders. Any addition, alteration, omission, change, extension of or other modification of the Contract Documents, or a forbearance on the part of either the Owner or the Contractor to the other, shall not release the Surety from its obligations hereunder and notice to the Surety of such matters is hereby waived.

11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the State of New York, County of Monroe or after the expiration of one year from the date final payment on Claimant's subcontract became due, provided Claimants not in direct contract with the Contractor furnishing the Bond have furnished the notice required in paragraph 4. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

12. Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

13. When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

14. Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

15. **Definitions**

15.1. **Claim.** A written statement by the Claimant including at a minimum:

15.1.1. the name of the Claimant;

15.1.2. the name of the person for whom the labor was done, or materials or equipment furnished;

15.1.3. a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Contract;

15.1.4. a brief description of the labor, materials or equipment furnished;

15.1.5. the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Contract;

15.1.6. the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;

15.1.7. the total amount of previous payments received by the Claimant; and

15.1.8. the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

15.2. **Claimant.** An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Contract and who has not been paid in full therefor before the expiration of ninety (90) days after the day the last of the labor was performed or material was furnished by him for which a Claim is made. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

15.3. **Contract.** The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

15.4. **Owner Default.** Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Contract or to perform and complete or comply with the other material terms of the Contract.

15.5. **Contract Documents.** All the documents that comprise the agreement between the Owner and Contractor.

16. If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

17. The Surety and Contractor shall be liable for the additional costs and expenses incurred by the Owner in relation to the Contractor Default, i.e., architectural, engineering and/or Consultants fees and disbursements.

18. Surety also agrees that it is obligated under the Bonds to any successor, grantee or assignee of the Owner. The Surety shall promptly provide the Owner with a copy of any notice it receives from a claimant, pursuant to section six of the Payment Bond.

19. All provisions of the laws of the State of New York applicable to public improvement projects, claims against subdivisions of the state of New York and Bonds shall apply to the Project, the Contract and the Bonds.

Signed and sealed this _____ day of_____, 20_____.

(SEAL) _____
Principal

By_____

_____
Title

(SEAL) _____
Surety

By_____

_____
Title

INDIVIDUAL ACKNOWLEDGMENT

State of_____
County of_____ ss.:
City of_____

On this _____ day of _____, 20__,
before me personally appeared the within named _____,
to me known to be the individual described in, and who executed the same.

[SEAL] _____
Notary Public

1.

2. PARTNERSHIP ACKNOWLEDGMENT

State of_____
County of_____ ss.:
City of_____

On this _____ day of _____, 20__,
personally came _____ to me known and known to me to be a member of the firm of_____, the firm described in, and which executed the foregoing instrument and said
_____acknowledged that
he executed the foregoing instrument for and in behalf of said firm.

[SEAL] _____
Notary Public

CORPORATE ACKNOWLEDGMENT

State of_____
County of_____ ss.:
City of_____

On this _____ day of _____, 20__, before me personally came and appeared_____, to me known, who, being by me duly sworn, did depose and say that he resides in _____, that he is the _____ of _____ _____, the corporation described in and which executed the above instrument; that he knows the seal of said corporation; that the seal affixed to said instrument is such corporate seal; that it was so affixed by order of the Board of Directors of said corporation, and that he signed his/her name thereto by like order.

[SEAL] _____
Notary Public

SURETY ACKNOWLEDGMENT

State of_____
ss:
County of_____

On this _____ day of _____, 20__, before me personally came and appeared_____, to me known, who, being by me duly sworn, did depose and say that he is an attorney-in-fact of _____, the corporation described in and which executed the within instrument; that he knows the corporate seal of said corporation; that the seal affixed to the within instrument is said corporate seal, and that he signed the said instrument and affixed the said seal as Attorney-In-Fact by authority of the Board of Directors of said corporation and by authority of this office under the Standing Resolutions thereof.

[SEAL] _____
Notary Public

SECTION 00 62 11 – SUBMITTAL COVER SHEET

SUBMITTAL COVER SHEET

PROJECT: RCSD John Walton Spencer School No. 16 ADDITIONS AND ALTERATIONS BID PACKAGE (PHASE 2A.1) ARCHITECT: SWBR	ARCHITECT'S PROJECT NO. 16158.00
SUBMITTAL NAME:	SUBMITTAL NO.: DATE:

SUBMITTAL TYPE

ACTION SUBMITTAL:	☐ PRODUCT DATA	☐ SHOP DRAWING	☐ SAMPLE
INFORMATIONAL SUBMITTAL:	☐ COORDINATION DRAWING	☐ QUALIFICATION DATA	☐ CERTIFICATES
☐ TEST REPORTS	☐ MAINTENANCE DATA	☐ OTHER _____	

SPECIFICATION SECTION NUMBER AND TITLE:

DRAWING NUMBER AND DETAIL REFERENCES:

☐ NAMED PRODUCT	DEVIATIONS: ☐ EQUIVALENT (PRIOR TO AWARD)	☐ SUBSTITUTION (AFTER AWARD)

CONTRACTOR:

SUB-CONTRACTOR:

SUPPLIER:

MANUFACTURER:

CONTRACTORS REVIEW & APPROVAL **This submittal has been reviewed, checked and approved for compliance with the Contract Documents.** CONTRACTOR: BY: DATE:	ARCHITECT'S REVIEW STAMP

SECTION 00 63 19 - REQUEST FOR EQUIVALENT REVIEW FORM

Note: Use separate form for each material, product or equipment item submitted for review.

Date: _____ Request No.: _____

Project:

_____

Location:_____

Name of material, product or equipment item submitted as an equivalent:

_____

Name of material, product or equipment item specified:

_____

Specification Section_____, Article_____, Paragraph_____

Qualities that differ from specified product or system, if any:

_____

_____

_____

_____

_____
Name of Manufacturer / Fabricator

_____
Address

_____
City State Zip Code

Phone: _____ E-mail: _____

_____
Name of Vendor / Supplier

_____
Address

_____
City State Zip Code

Phone: _____ E-mail: _____

Reason for requesting consideration of proposed equivalent:

_____

_____

_____

_____

Proposed equivalent will affect other materials or systems, such as dimensional revisions, redesign of structure, or modifications to other work:

_____No

_____Yes, describe requirements:

_____

_____

_____

_____

Savings or credit to Contract Sum for accepting proposed equivalent, if any:

_____

_____ ($_____)
Dollars Amount in words Amount in Figures

The attached data is furnished herewith for evaluation of the proposed equivalent:

Product Data _____, Drawings _____, Samples _____, Tests _____, Reports _____

Other Information:

_____

_____

_____

_____

_____

_____

The undersigned hereby certifies:

1. The proposed equivalent has been fully investigated and is considered equal or superior to specified brand, material, product or equipment item.

2. The same or better warranty will be furnished for proposed equivalent as for specified brand, material, product or equipment.

3. All changes in the work resulting from the use of this equivalent, if approved, will be coordinated and completed in all respects and all costs, including, but not limited to, those for additional services rendered by the Architect are the responsibility of this Contractor at no additional compensation under the Contract.

_____ _____
Contractor Signed by

_____
Address

_____
City State Zip Code

Phone: _____ E-mail: _____

END OF SECTION 00 63 19

SECTION 00 72 16 – GENERAL CONDITIONS

1. INDEX TO GENERAL CONDITIONS:

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ATTACHMENT A: Part 5 of Title 29 of the U.S. Code of Federal Regulations. The terms of "Attachment A" are incorporated by reference into these General Condtiions, where applicable.

2. DEFINITIONS: The following terms as used in this Contract are respectively defined as follows:

1. "ADDENDA": Written or graphic instruments issued prior to the execution of the Contract which modify or interpret the bidding documents, including the drawings and Specifications, by additions, deletions, clarification, corrections, or supplementary information.

2. "ALTERNATE": Variation in Contract requirements on which a separate price is to be received by the Owner as part of the bid. If the Alternate is accepted in writing by the Owner, the variation is then a part of the Contract and the amount of money quoted be added to or deleted from the base bid is taken into account in determining the Contract Sum."

3. "ARCHITECT/ENGINEER": The design professional appointed by the Owner who prepared or contributed to the Contract Documents for the particular Project site at issue. The term "Architect" as used in the Contract Documents is interchangeable with the term "Engineer," unless otherwise specified. They will bear similar responsibilities, and their authorized representatives will have equal authority relative to any duties or activities when referred to in the Contract Documents or in executing any field responsibilities.

4. "CHANGE ORDER": A written order or directive to the Contractor from Owner's Representative requiring or approving a change to the Work, including any resulting adjustment to the Contract Sum or Contract Time, as further described in Section 4, "Changes."

5. "COMIDA": County of Monroe Industrial Development Agency, created under Article 18A of the General Municipal Law of New York State for the purpose of promoting local workforce development in Monroe County and the surrounding areas.

6. "CONSTRUCTION MANAGER": The Construction Manager designated by the Owner for the Project shall serve as the Contractor's primary contact for, and Owner's authorized agent on, the Project.

7. "CONTRACT DOCUMENTS": The plans, Specifications, drawings, Form of Contract, and other documents included in the "Project Manual" issued for bid on this Project, setting forth the Work of the Project and requirements for performing same, as well as any Addenda issued in accordance with the procedures provided for in the Contract.

8. "CONTRACT SUM": The price for which Contractor agrees to perform the Work and denominated by the Contract as such. The Contract Sum shall include Owner-approved Alternates.

9. "CONTRACT TIME": The time in which Contractor must perform all obligations under the Contract as set forth in the Contract Documents "Schedule and Milestones" and as may be modified from time to time as provided for in these General Conditions.

10. "CONTRACTOR": The contractor named as such having entered into this Contract with the Owner. The term "Contractor" shall also include the Contractor, its officers, employees, agents, contractees, and Subcontractors of any tier.

11. "DISTRICT" or "RCSD": The Rochester City School District.

12. "EXTRA WORK": Work not included in the Contract Documents that is nonetheless required to be completed to achieve the purpose of the Project. Contractor must notify Construction manager of such "Extra Work " and follow procedures in Section 4 prior to performing same.

13. "FURNISH": shall mean purchasing and/or fabricate and deliver to the Project site or other location when so designated.

14. "INSTALL": shall mean build-in, mount in position, connect or apply the specified object(s) and, where applicable, adjust and start-in operation.

15. "KNOWLEDGE," and similar terms used in reference to the Contractor, shall mean that which the Contractor knows, recognizes or discovers (or should reasonably know, recognize, or discover) in exercising the care, skill, and diligence required by the Contract Documents or by applicable law, including anything reasonably inferable by Contractor.

16. "OWNER": Owner means Rochester Joint Schools Construction Board" and "RJSCB," as the legally authorized agent of the Rochester City School District ("RCSD") and the City of Rochester.

17. "OWNER'S REPRESENTATIVE": Owner's Representative may refer herein to the Architect/Engineer, Construction Manager or Program Manager, the relative roles of which are defined more specifically in the Contract Documents.

18. "PROGRAM MANAGER": Owner's Representative and authorized agent of Owner for the Project, Savin Engineers P.C. and Gilbane Building Company ("Savin/Gilbane").

19. "PROJECT": the John Walton Spencer School No. 16 (Phase 2A) of the Rochester Schools Modernization Program (RSMP), and all required Work and other obligations under this Contract relating thereto.

20. "PROVIDE": When the word "provide" (including derivatives thereof) is used, it shall mean to properly fabricate, complete, transport, deliver, install, erect, construct, test and furnish all labor, materials, equipment, apparatus, appurtenances, and all items and expenses necessary to properly complete in place ready for operation or use under the terms of the Contract Documents."

21. "RCSD DESIGN GROUP": the Rochester City School District Facilities Department.

22. "ROCHESTER JOINT SCHOOLS CONSTRUCTION BOARD" or "RJSCB": See definition of "Owner," *supra*.

23. "SPECIFICATIONS": This term refers to the written Specifications of the Project as identified by number in the Project Manual issued at the time of bidding for this Contract, as may be amended from time to time in accordance herewith. When used in the singular or with reference to a particular number, this term shall refer to the particular Specification so referenced.

24. "SUBCONTRACTOR": A person, firm or corporation supplying labor and materials or labor for work at the site of the Project by agreement with the Contractor. This term may be used to refer to "Subcontractors" of any tier, unless specified otherwise herein.

25. "TECHNOLOGY CONSULTANT": Authorized agent of Owner for technology and networking components of the Owner's District-Wide Technology ("DWT") Project.

26. "TRUSTEE": The bank or financial agency serving as trustee under the Indenture of Trust entered into with the Owner relating to financing of the Project.

27. "WORK": Work to be performed, including work normally done, at the location of the Project, pursuant to the Contract Documents.

3. EXTENSION OF CONTRACT TIME: If the Contractor is delayed in the completion of its Work by reason of unforeseeable causes beyond its control and without its fault or negligence, including, but not restricted to, acts of God or of the public enemy, active Owner interference, acts of neglect of any other Contractor, fires, floods, epidemics, quarantines, strikes, riots, civil commotion, or freight embargoes, the period herein specified for completion of the Work (herein, the "Contract Time") shall be extended by such time as shall be fixed by the Owner. Other extensions of time requested by Contractor shall be addressed in accordance with Section 4 of these General Conditions and Section 01 26 39 of the Contract Documents ("Change Order Procedures").

   1. NO WAIVER: No such extension of the Contract Time shall be deemed a waiver by the Owner of its right to terminate the Contract for abandonment or delay by the Contractor as herein provided or relieve the Contractor from full responsibility for performance of its obligations of the Contract.

4. CHANGES:

   1. EXTRA WORK: If Contractor identifies any work or material not required under the Contract Documents, but for which it will seek to perform and request payment, it must immediately notify the Construction Manager and follow the procedures for Change Orders as set forth in Section 01 26 39 of the Contract Documents ("Change Order Procedures"). No payment shall issue for performance of "Extra Work" before it is approved by authorized Change Order.

   2. CHANGE ORDERS: The Owner shall have the right to require by written order of the Architect, Construction Manager or Program Manager ("Change Order"), and without written notice to the Contractor's sureties, changes in, additions to, or deductions from

Work; provided that if changes, additions, or deductions are made, the general character of the Work as a whole is not substantially changed thereby. Adjustment in the Contract Sum, if any, because of any Change Order shall be determined as provided in this Section, and any claim for extension of Contract Time shall be adjusted at the time of issuing the Change Order. No claim for change, addition, or deduction, or adjustment of the Contract Sum, or extension of Contract Time, shall be made or allowed unless done pursuant to an authorized Change Order. Plans without an authorized Change Order shall not be construed as authorizing a particular change to the Work or extension of Contract Time. The Contractor shall give written notice of any claims arising from a proposed Change Order to the Construction Manager before the commencement of the work required by such Change Order. The Construction Manager shall inform the Program Manager of such written notice received from the Contractor. No course of conduct or dealings between the parties, nor express or implied acceptance of conduct or dealings between the parties, nor express or implied acceptance of alterations or additions to the Work, and no claim that the Owner has been unjustly enriched by any alteration or addition to the Work, whether or not there is, in fact, any unjust enrichment owing to the Work, shall be the basis of any claim to an increase in any amounts due under the Contract Documents or a change in any time period provided for in the Contract Documents. Where an authorized Change Order diminishes the quantity of Work to be done, it shall not constitute a basis for a claim for damages or anticipated profits on Work that may be dispensed with.

1. EFFECT OF CHANGE: It shall be understood and agreed that authorized Change Orders shall in no way invalidate the Contract and shall not affect or discharge the bond furnished by the Contractor.

2. NECESSARY ADJUSTMENTS: The Contractor, without charge, shall make such slight alterations to the site or equipment, fixtures or machinery thereupon located as may be necessary to make adjustable parts fit to fixed parts, leaving all complete and in proper order when done.

3. DETERMINING CHANGES IN COST OF THE WORK: Adjustments, if any, in the Contract Sum by reason of an authorized Change Order shall be limited to the amount specified therein. Adjustments to the Contract Sum, if any, shall be determined by one of the following methods, the Owner reserving the right to select the method or methods at the time the written Change Order is issued.

   1. UNIT PRICES: The unit prices are those fixed by the Contract as set forth in the Schedule of Unit Prices at Section 00 43 22 of the Project Manual, or as may be submitted and approved by the Construction Manager upon issuance of a written Change Order. If the deletion, addition or alteration implicates Work that is measured by a Unit Price, as determined by the Construction Manager, the Contract Sum shall be increased or decreased in accordance with the appropriate Unit Price.

   2. COST-PLUS or “TIME AND MATERIALS”: As herein used, cost refers to the actual and necessary costs incurred by the Contractor by reasons of the change in the Work for:

      1. LABOR: Labor costs shall be the amount shown on the Contractor's payrolls in compliance with the Wage Rate Schedule (Section 00 73 46),

or time sheets attributable to the particular work required by the Change Order. Contractor is obligated to keep time sheets sufficient for Owner's Representative to accurately determine labor costs arising from a Change Order.

2. MATERIALS: Material cost shall be the net price paid for material delivered to the Project. The Contractor must keep tickets for all materials and equipment used in a form acceptable to the Owner's Representative when performing Change Order work. If any material previously required is deleted by the written order of the Owner after it has been delivered or tendered by the Contractor and consequently will not retain its full value for other uses, the Contractor shall be allowed the actual cost of the omitted material less a fair market value of material, as determined by the Architect and Owner's Representatives.

3. EQUIPMENT RENTAL: Equipment rental shall be the actual additional cost incurred for necessary equipment to perform the Work. Contractor must document its equipment costs in a form acceptable to Owner's Representative to receive payment for Change Order work, and shall not duplicate costs for equipment already on site or required to be on site for performance of ongoing Project Work. Costs shall not be allowed in excess of usual rentals charged in the Rochester area for similar equipment of like size and condition as determined by the Construction Manager, including the costs of necessary supplies and repairs for operating the equipment.

3. "PLUS": As herein used is defined as a percentage to be added to the above "cost" items to cover project management, superintendence, use of ordinary tools, bond, warranty, insurance premiums (other than Worker's Compensation Insurance), overhead expenses, and profit. This percentage shall be mutually agreed upon but not more than fifteen percentum (15%) of the cost items set forth above.

4. RECORDS: The Contractor shall keep complete and accurate daily records of all costs for performance of Change Order work, and shall present such information in such form and at such time as the Owner's Representatives may direct. Refer to Section 01 26 39, "Change Order Procedures," for further information regarding procedures for Changes in the Work.

5. PERFORMANCE AND LABOR AND MATERIAL PAYMENT BONDS: The Contractor shall furnish surety bonds in the forms set forth in the Contract Documents (Section 00 61 13) in an amount at least equal to one hundred percent (100%) of the Contract Sum as security for faithful performance of this Contract ("Performance Bond") and for the payment of all persons performing labor and furnishing materials in connection with this Contract ("Labor and Material Payment Bond"). No Contractor may commence Work under this Contract unless and until the tendered Performance Bond and Labor and Material Payment Bond have been approved by Owner.

6. **CONTRACTOR'S INSURANCE: Before commencing Work under the Contract, the Contractor shall obtain at its own expense and cost all the insurance required by and specified in Section 00 73 16, and shall provide to the Owner, for the Owner's**

approval, certificates of insurance evidencing that the coverage, coverage extensions, policy endorsements and waivers of subrogation required by and specified in Section 00 73 16 are maintained in force.

7. INDEMNIFICATION: The Rochester Joint Schools Construction Board ("RJSCB" or "Owner") is an entity created by special authorizing legislation of the State of New York to serve as an agent for the Rochester City School District ("RCSD") and the City of Rochester ("City'") for purposes of administering the Rochester School Modernization Program ("RSMP"). RSMP Projects are funded in part through bonds available through COMIDA, and governed by the Indenture of Trust from the Trustee bank, U.S. Bank National Association (the "Trustee").

   1. To the fullest extent permitted by law, regardless of whether or not a lawsuit has actually commenced, upon initial notice of any claim or potential claim received by Contractor, RJSCB, RCSD or the City, Contractor agrees to indemnify, defend and hold harmless the Owner (RJSCB), the RCSD, the City, COMIDA, the Trustee, Program Manager, Architect/Engineer(s), Technology Consultant (if any), Construction Manager(s), and each of such parties' respective affiliates, subsidiaries, directors, trustees, officers, board members, employees and agents (collectively, the "Indemnitees"), from and against any and all liabilities, obligations, claims, damages, demands, causes of action, losses and expenses (including, without limitation, reasonable attorneys' fees and costs of suit) directly or indirectly relating to, arising from or in connection with: (a) any actual or alleged negligent act or omission or willful misconduct of Contractor or any of its agents, employees or subcontractors, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable; (b) any breach by Contractor of any of its representations, warranties, covenants or obligations set forth in this Contract; (c) injury to person or property (including death) to the extent arising out of or resulting from violation of any state, federal, or local law, rule or regulation by Contractor or any of its agents, employees or subcontractors, or anyone directly or indirectly employed by them or anyone for whose acts they may be liable; or (d) any actual or alleged injuries to person or property (including death) suffered by any of Contractor's agents, employees or subcontractors, or any employees or agents of Contractor's agents or subcontractors in the course of their performance or completion of any Work or other obligations arising under or pursuant to the Contract, or upon any premises owned, leased or controlled by the Indemnitees, or any Project site. Nothing herein shall be construed as requiring the Contractor to indemnify the Indemnitees or any of them for any claim for damage or loss of any kind to the extent such loss or damage is caused by the negligence or willful misconduct of the Indemnitees or any of them. Contractor shall include in each Subcontractor agreement for the Project a provision substantially similar to this indemnification provision.

   2. In claims against any person or entity to be indemnified under the above Section 7.1 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligations set forth in Section 7.1 shall not be limited by any limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under any applicable worker's compensation laws, disability benefit laws, or other employee benefit laws or regulations.

8. CONTRACT BENEFICIARIES: No obligation of the Architect/Engineer and/or Owner's Representatives to the Owner, whether expressed by agreement or implied by law, shall be construed as intended for the benefit of the Contractor. Nothing in the Contract Documents nor in any aspect of the Architect/Engineer/Owner's representatives' relationship with the Owner shall create or give rise to any duty whatsoever on the part of the Architect/Engineer/Owner's Representatives to the Contractor.

9. QUALIFICATIONS FOR EMPLOYMENT: Qualifications for employment of persons performing Work under this Contract shall comply with applicable federal and New York State laws and regulations.

10. HOURS OF WORK: First Shift is to be from 7:00 a.m. to 3:30 p.m., and Second Shift is to be from 2:00 p.m. to 10:30 p.m.

11. WAGE RATES: Each employee engaged in work on the Project shall be compensated as set forth in accordance with the wage rates required by New York State and federal laws and regulations as set forth in the Wage Rate Schedule (Section 00 73 46).

    1. To the extent that Contractor may be required by state or federal law or regulation to pay at a higher rate than that payable at the time of Contract award due to post-award changes to the published U.S. Davis-Bacon or New York State prevailing wage rates, such rate increase(s) shall not constitute a basis for an increase in the Contract Sum.

    2. The Contractor shall post at conspicuous points on the site of the Project a schedule showing all current wage rates and all authorized deductions, if any, from unpaid wages actually earned.

12. LOCAL LABOR: The Project will be funded in part through the issuance of tax-exempt bonds by the County of Monroe Industrial Development Agency ("COMIDA"). Pursuant to the terms of the agreement between COMIDA and the Owner, COMIDA requires that the Project use only "Local Labor," subject to certain permitted exceptions and waivers. The term "Local Labor" is defined as laborers residing in Monroe, Genesee, Livingston, Orleans, Ontario, Seneca, Wayne, Wyoming and Yates counties. Those providing labor to the Project must use best efforts to achieve compliance with the Local Labor requirement. Further information on the COMIDA program requirements applicable to the RSMP is available online at http://www.growmonroe.org.

13. CONTRACTOR SELF-PERFORMANCE REQUIREMENTS: Notwithstanding any other provision of the Contract Documents, at least five percent (5%) of the direct labor, materials, systems or equipment shall be provided by the Contractor. The Contractor shall subcontract **no more than 95%** of the total contract value. Contractors are required to certify, prior to award, that they can and will comply with this subcontracting limitation requirements. The unit measure (dollar value, unit price, schedule of value) utilized to determine the quantities of work, labor and material furnished by the Contractor shall be determined by the Construction Manager and the Architect and shall be appropriate for the scope of work involved. For the purpose of this Section, work performed by supervisory personnel, persons above the level of foreman, or office personnel, all overhead costs, including bonds and certificates, shop drawings and similar items shall not count towards the percentage of Work provided by the Contractor.

14. PAYMENT OF EMPLOYEES: The Contractor and each Subcontractor shall pay each of their employees engaged in work on the Project under this Contract according to the terms of the NYS Department of Labor.

15. SAFETY AND CONTRACTOR CONTROL:

    1. The Contractor shall be responsible for compliance with all state and federal laws, rules and regulations as may be applicable to the Work or Project, as well as for initiating and adhering to all safety precautions and programs in connection with the performance of the Work as more fully set forth in Section 01 35 23, "Project Safety Standards."

    2. Contractor shall supervise and direct the Work using its best skill and attention, and shall be solely responsible for, and have control over, all construction means, methods, techniques, sequences and procedures and for coordinating the Work. Should the Contract Documents give specific instructions as to any of the foregoing categories, Contractor shall be solely responsible for the safety thereof unless it shall give timely written notice to Owner's Representative that such instructions are not sufficiently safe, in which event Contractor shall await specific instructions from Owner's Representative before proceeding with the Work. If Contractor is instructed to proceed with the instructions of the Contract Documents or other method prescribed by Owner over Contractor's objection, Contractor shall not be liable for any resulting loss or damage arising solely from said instructions.

    3. Contractor shall immediately notify the Construction Manager in writing, with a copy of such notice being sent simultaneously to the Owner, of any accident or other occurrence impacting the health or safety of any laborer working on the Project, or resulting in personal injury, death, or property damage arising from the Work. Such notice shall be provided within twenty-four (24) hours of the accident or occurrence to which it relates and shall reasonably identify and describe the laborer(s) affected, by whom such person(s) were employed or hired, the date, time, location and circumstances of the accident or occurrence, the action taken to address the accident or occurrence, and names and contact information for any witnesses or observers thereof. Contractor's failure to timely report accidents and incidents as set forth herein may be grounds for termination or suspension of the Contract, or grounds for deeming Contractor ineligible for the award of any future RSMP contracts.

16. REQUISITION FOR PAYMENT:

    1. Prior to submission of first application for payment, the Contractor shall submit to the Construction Manager a schedule of values of the various portions of its Work. The schedule of values approved by the Construction Manager shall be the basis for all requests for payment as determined from the progress of Work to be verified and approved by the Architect.

    2. All applications for monthly and/or final payment shall be submitted in triplicate on forms furnished by the Owner's Representative.

    3. All applications for monthly and/or final payment must include certified payroll records for each week included in that payment period. Contractors, and subcontractors of every tier, must maintain the full social security number and current addresses of each

person performing any part of the Project Work. Contractor, and every subcontractor, shall submit this information to Owner prior to commencement of any Work, and shall update this information in writing to the Owner as changes are made (e.g., upon the hiring of an additional laborer or change to existing addresses). Contractors and subcontractors must include the full address for each laborer with each weekly certified payroll application, and at least the last four digits of that laborers' social security number. Providing complete certified payroll information is a condition of processing monthly payment requisitions, and failure to do so could delay payment. Contractor shall provide, and require its subcontractors to provide, such additional information as Owner may reasonably request to ensure that the requirements of certified payroll records are met.

4. In addition to the above, forms required in accordance with Section 00 43 31 ("MWBE/DBE/SBE Utilization and Workforce Diversity") shall also be included with each payment application. In addition, Owner shall require submission of an Interim Lien Waiver, included in the Project Manual at Section 01 29 76 ("Progress Payment Procedures") with each payment application, together with such additional forms or information as Owner may reasonably require. Failure to submit required forms or information may result in non-payment or delayed payment to the Contractor. Contractors and Subcontractors are required to keep original payroll records or transcripts for a period of three years from date of final payment.

17. PAYMENT AND RETAINAGE BY OWNER:

1. The Owner will make payment to the Contractor based upon a duly certified and approved estimate of the work performed by the Contractor, but the Owner will retain five percent (5%) of the amount of each such estimate until final completion and acceptance of all Work covered by this Contract.

2. The Contractor shall pay:

    1. for all transportation and utility services not later than the 15th day of the calendar month following that in which such services were rendered;

    2. for all materials, tools and other expendable equipment to the extent of 95 percent of the cost thereof, not later than the 15th day of the calendar month following that in which such materials, tools and equipment are delivered at the site the Project, and the balance of the cost thereof not later than the 30th day following the completion of that part of the work in or on which such materials, tools and equipment are incorporated or used;

    3. to each Subcontractor, not later than the 15th day following each payment to the Contractor, the respective amounts allowed the Contractor on account of the work performed by its Subcontractors, to the extent of each such Subcontractor's interest therein; and

    4. in accordance with all state and federal laws, rules and regulations as may apply to the Work and payment for same.

18. SUBSTITUTIONS:

1. SUBSTITUTIONS: After award of the Contract, the Owner at its option may permit substitutions of material or products named in the Contract Documents. If Contractor proposes to use products or material differing from the brand, type, kind or manufacturer listed in the Contract Documents, a list of proposed substitutions must be submitted to the Construction Manager on the Equivalent Review Form (Section 00 63 19) under a Submittal Cover Form (Section 00 62 11) within three days of the award of Contract, or in such time as will permit review by the Architect without impacting the Project schedule.

2. The Contractor must submit all required back-up data for each proposed substitution through the Construction Manager, including such additional back-up as may be requested by Architect. All requests for substution shall be posted to the Submittal Exchange web site.

3. No additional substitutions will be considered after this initial process unless substitution is required due to a specified material, product or equipment being unavailable in the market place, or if the Owner may realize a credit or reduction in the Contract Sum. Upon such circumstances, additional substitutions will be considered by the Architect if submitted in accordance with the above requirements.

4. Substitutions shall comply with the following requirements:

   i) The materials, products and equipment described in the Contract Documents establish the standard of required quality, function, dimension and appearance expected. Substitution requests will be considered only if these standards are met, or exceeded, and the Architect and Owner subsequently approve the substitutions.

   ii) Each request for substitution shall include:
      i. The name of the material, product or equipment item for which substitution is requested and a complete description of the proposed substitute, including drawings, cuts, performance and test data, and any other information necessary for a complete evaluation.
      ii. A statement setting, forth any changes in other materials, products, equipment or other Work that incorporation of the substitution would require.

5. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final and will be set forth in writing.

6. If any of the following conditions occur due to substitutions, the Contractor making the substitution shall bear the cost of such conditions, including payment for services rendered by the Architect:

   a. Redesign required for any of the Work.
   b. Material or quantity changes for any of the Work.
   c. Delays in any of the Work.

d. Requests for Information (RFI's) required due to substitutions or substitution requests.

7. All material and workmanship shall, in every respect, be in accordance with what, in the opinion of the Owner's Representative, is in conformity with approved modern practice.

8. In all cases, new materials shall be used unless this provision is waived by written notice from the Owner's Representative.

19. INSPECTION AND TESTS: All material and workmanship (if not otherwise designated by the Contract Documents) shall be subject to inspection, examination and test by the Construction Manager or other Owner's Representatives, at any and all times during manufacture and/or construction and at any and all places where such manufacture and/or construction are carried on.

1. Without additional charge, the Contractor shall furnish promptly all reasonable facilities, labor and materials necessary to make tests so required safe and convenient.

2. Special, full-size and performance tests shall be as described in the Specifications.

3. If at any time before final acceptance of the entire Work, the Construction Manager considers necessary or advisable an examination of any portion of the Work already completed by removing or tearing out the same, the Contractor shall upon request furnish promptly all necessary facilities, labor and materials.

4. If such work is found to be defective in any material respect, due to fault of the Contractor or any Subcontractor, or if any work shall be covered over without the approval or consent of the Architect or Construction Manager (whether or not the same shall be defective), the Contractor shall be liable for the expenses of such examination and of satisfactory reconstruction.

5. If, however, such approval and consent shall have been given and such work is found to meet the requirements of the Contract, the Contractor shall be recompensed for the expenses of such examination and reconstruction in a manner herein provided for the payment of Change Orders.

6. The selection of bureaus, laboratories and/or agencies for the inspection and tests of supplies, materials or equipment, where required by the Contract Documents, shall be subject to the approval of the Owner. Satisfactory documentary evidence that the material has passed the required inspection and tests must be furnished to the Owner by the Contractor prior to the incorporation of the material into the Project.

7. Rejected work shall be removed from the site of the Project.

20. PROTECTION OF WORK AND PROPERTY. The Contractor shall at all times safely guard the Owner's property from injury or loss in connection with this Contract. Contractor shall at all times safely guard and protect its own Work; and any adjacent property or work provided by others thereupon, from damage. The Contractor shall replace or make good any such damage, loss or injury unless such be caused directly by errors contained in the

Contract Documents or by the Owner or Owner's Representatives. All passageways, guard fences, lights or other facilities required for protection by local authorities, local conditions, or by local, state or federal law or regulation must be provided and properly maintained. In carrying out the foregoing obligations, Contractor shall comply with the Project Safety Standards set forth in Section 01 35 23.

21. PROTECTION OF PERSONS AND PROPERTY: In the event of a situation that threatens loss or injury of property, and/or safety of life, the Contractor shall notify the Construction Manager immediately and shall comply with the Project Safety Standards set forth in Section 01 35 23. Accidents or occurrences on the Project that have or may have resulted in personal injury, property damage or death must be reported immediately, as set forth in paragraph 14 hereinabove.

22. FINAL PAYMENT: Within thirty (30) days after the filing of a certificate of completion and delivery of all close-out materials required by the Contract Documents, and upon approval of the Owner's Representatives, Owner shall pay to the Contractor the balance of the Contract Sum as set forth in Contractor's final payment application. All prior estimates and payments including those relating to Change Orders shall be subject to correction by this payment, referred to herein as the "Final Payment."

23. ACCEPTANCE OF FINAL PAYMENTS CONSTITUTES RELEASE: The acceptance by the Contractor of the Final Payment shall operate as a release to the Owner of all claims and of all liability to the Contractor for all things done or furnished in connection with this Work and for every act and neglect of the Owner and others relating to or arising out of this Work, excepting the Contractor's claim for interest upon the Final Payment, if this payment be improperly delayed. No payment, final or otherwise, shall operate to release the Contractor or its sureties from any obligations under this Contract or any bonds issued in compliance herewith.

24. ADDITIONAL OR SUBSTITUTE BOND: If at any time the Owner shall be or become dissatisfied with any surety or sureties then upon the Contractor's Performance Bond or Labor and Material Payment Bond provided in accordance with Contract Documents, Section 00 61 13 "Bond and Certificates," or if for any other reason such Bonds shall cease to be adequate security to the Owner, the Contractor shall within five (5) days after notice from the Owner so to do, substitute an acceptable bond in such form and sum signed by such other sureties as may be satisfactory to the Owner. The premiums on such bond shall be paid by the Contractor. No further payments shall be deemed due nor shall be made until the new sureties shall have qualified.

25. PLANS AND SPECIFICATIONS: The Contractor shall keep at the site of the Work one copy of the Contract Documents and shall, at all times, give the Architect and Owner's Representatives access thereto. Anything shown on the plans or drawings and not mentioned in the specifications, or mentioned in the specifications and not shown on the plans or drawings, shall have the same effect as if shown or mentioned, respectively, in both. In case of any conflict or inconsistency between the plans/drawings and specifications, Contractor shall notify Construction Manager using the procedures set forth with in other Sections of these specification. Any decision or response to Request for Information ("RFI") by the Architect as to such conflict or inconsistency shall be conclusive.

26. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS: The Contractor may be furnished additional instructions and detail drawings to carry out the Work. The additional

drawings and instructions thus supplied will become part of the Contract Documents. Unless the Contractor promptly objects in writing to the additional drawings due to an inconsistency or alleged change in the Work, the determination of which shall be made by the Architect, the Contractor shall carry out the Work in accordance with the additional detail drawings and instructions.

1. Contractor and the Construction Manager will jointly prepare, with other contractors providing labor or material to the Project: (i) a schedule, fixing the dates at which special detail drawings will be required and by whom they will be made, such drawings, if any, to be furnished by the Construction Manager in accordance with said schedule, and (ii) a schedule fixing the respective dates for the submission of shop or required submittals, the beginning of manufacture, testing and installation of materials, supplies and equipment and the completion of the various parts of the Work, each such schedule to be subject to change from time to time in accordance with the progress of the Work.

27. SUBMITTALS: Submittals consist of shop drawings, samples and manuals. Submittals of shop drawings and samples are required to establish conformance of selected portions of the Work with the Contract Documents and are either approved by the Architect/Engineer or not approved. Regardless of such approval, the responsibility for correct dimensions, installation and performance remains with the Contractor.

    1. Shop drawings include drawings, diagrams, illustrations, schedules, charts and other product data prepared to show how specific portions of the work shall be fabricated and/or installed.

    2. Samples are physical examples of materials, products or units of work.

    3. Manuals are operating or maintenance instructions relating to certain portions of the work.

    4. Submittal procedures are described in Section 01 32 19. Items for which submittals are required are listed in the various technical sections of the Project Manual in which they occur.

28. SUBSURFACE CONDITIONS: Should the Contractor encounter subsurface and/or latent conditions at the site materially differing from those shown on or referenced in the Contract Documents, Contractor shall immediately give written notice to the Construction Manager of such conditions, before they are disturbed. Should Contractor disturb such conditions prior to notifying the Construction Manager, Contractor (or Subcontractors) shall not be entitled to an adjustment to the Contract Sum or Contract Time.

29. CONTRACTOR'S TITLE TO MATERIALS: No materials or supplies for the Work shall be purchased by the Contractor or by any subcontractor subject to any chattel mortgage or under a conditional sale or other agreement by which an interest is retained by the seller. The Contractor warrants that it has good title to all materials and supplies it plans to use in the Work on the Project.

30. SUPERINTENDENCE BY CONTRACTOR: At the site of the Work, the Contractor shall employ a full time Construction Superintendent, who shall be present any time work is being performed, and have full authority to act for the Contractor. Such Superintendent

shall be reasonably acceptable to the Construction Manager. The Superintendent shall be present at all progress meetings and shall continue in its capacity as Superintendent for the duration of the Project.

31. REPRESENTATIONS OF CONTRACTOR: The Contractor represents and warrants that:

    1. it is financially solvent and is experienced in and competent to perform the type of labor or to furnish the plant, materials, supplies or equipment, to be so performed or furnished under the Contract;

    2. it is familiar with all federal, state, and local laws, ordinances, rules and regulations, which may in any way affect the Work or those employed therein, including but not limited to, any special acts relating to the Work or to the Project of which it is a part;

    3. such temporary and permanent Work required by the Contract Documents can be satisfactorily constructed and used for the purpose for which it is intended, and that such construction will not injure any person or damage any property; and

    4. it has carefully examined the Contract Documents and the site of the Work, has confirmed all relevant dimensions, and that from its own investigations, it is satisfied as to the nature and location of the Work, the character, quality and quantity of surface and sub-surface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, the general and local conditions, and all other factors which may in any way affect its Work or its performance under this Contract.

32. SEPARATE CONTRACTS: The Owner plans to award other contracts for portions of the RSMP, which will proceed simultaneously with this Contract. The Contractor shall coordinate its operations and cooperate with those of other contractors performing work on the Project or site thereof. Cooperation will be required in the arrangement for the storage of materials and in the detailed execution of the Work. The Contractor shall remain informed of the progress and the detail work of other contractors and shall notify the Construction Manager immediately of lack of progress or defective workmanship on the part of other contractors, where such delay or such defective workmanship will interfere with Contractor's own operations. Failure of the Contractor to keep informed of the work progressing on the site or to give notice of lack of progress or defective workmanship by others shall be construed as acceptance of the progress of work and coordination with Contractor's own Work. Contractor shall cooperate with the Owner, Program Manager, Architect, Engineer, Construction Manager, and other Contractors on the Project, making every reasonable effort to reduce the Contract Time.

33. PATENT RIGHTS: Contractor, without any additional compensation or adjustment in the Contract Sum, will pay for all patent fees or royalties required in respect of the Work or any part thereof and will fully indemnify the Owner for any loss on account of infringement of any patent rights unless, prior to using a particular process or a product of a particular manufacturer for the Work, Contractor notifies the Owner in writing that such process or product is an infringement of a patent.

34. SURVEYS, PERMITS AND REGULATIONS: Unless otherwise expressly provided for in the Contract Documents, the Owner will furnish to the Contractor all surveys necessary for the execution of the Work.

1. The Contractor shall procure and pay for all permits and licenses necessary for the execution of its Work and the use of such Work when completed.

2. Owner or Owner's Representative will obtain the building permits or approvals required by the New York State Department of Education. Contractor shall procure and maintain such permits, licenses, or approvals as are required to conduct its operations.

3. The Contractor shall comply with all federal, state and local laws, ordinances, rules and regulations relating to the performance of the Work, the protection of adjacent property, and the maintenance of passageways, guard fences or other protective facilities in place or required to be in place at the site of the Project.

35. CORRECTION OF WORK: All labor and materials, and processes of manufacture to be incorporated in the Project shall be at all times subject to the inspection by the Architect and Construction Manager. The Architect shall be the final judge of the quality and suitability of the labor, materials, processes of manufacture, for the purposes for which they are to be used and, should they fail to meet Architect's approval, they shall be forthwith reconstructed, made good, replaced and/or corrected, as the case may be, by the Contractor at its own expense, in accordance with the Architect's direction. Contractor shall also be responsible for any resulting costs for additional services required by the Architect/Engineer, additional third-party inspection costs required to ensure conformity to the Contract Documents, or other direct costs incurred by the Owner resulting from rejected Work, which shall be charged to the Contractor by a Change Order or Construction Change Directive. Rejected Work shall immediately be removed from the site. Acceptance of material and workmanship by the Architect and the Construction Manager shall not relieve the Contractor from its obligation to adhere to the requirements for material and workmanship set forth in the Contract Documents.

1. If in the opinion of the Architect and the Construction Manager it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the Work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor hereunder shall be reduced by such amount as in the judgment of the Architect and the Construction Manager will appropriately compensate Owner.

2. Neither the acceptance of the completed work nor payment therefor shall operate to release the Contractor or its sureties from any obligations under or upon this Contract or the performance or payment bonds, or other security provided in accordance with this Contract.

36. DELIVERY OF STATEMENTS REQUIRED BY OWNER: Prior to commencement of work, or anytime during Contractor's performance thereof, Owner may require submission of information as in the Owner's reasonable judgment is necessary to ensure compliance with the terms of this Contract. Such information may include, but is not limited to, copies of all subcontract agreements held by any Contractor for any part of the Project work; certified payroll forms; forms required to satisfy the workforce diversity goals set forth in Section 00 43 31 of the Project Manual; Interim Lien Waivers (Section 01 29 76), and other forms or information. Neither Final Payment nor any retained percentages shall become due until Contractor submits to Owner's Representative: (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which Owner or Owner's property might be responsible or encumbered (less

amounts withheld by Owner) have been paid or otherwise satisfied; (2) a certificate that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to Owner; (3) a written statement that Contractor knows or no substantial reasons that the insurance will not be renewable to cover the period required by the Contract Documents; (4) consent of surety, if any, to final payment; and (5) if required by Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by Owner. If a Subcontractor refuses to furnish a release or waiver required by Owner, the Contractor may furnish a bond satisfactory to Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, Contractor shall refund to Owner all money that Owner may be compelled to pay discharging such lien, including all costs and reasonable attorneys' fees.

37. OWNER'S RIGHT TO WITHHOLD PAYMENTS: The Owner may withhold from the Contractor so much of any approved payments due as may in the judgment of the Owner be necessary so as to:

    1. assure the payment of just claims then due and unpaid of any persons supplying labor or materials for the Work;

    2. protect the Owner from loss due to defective work not remedied;

    3. protect the Owner from loss due to delay or delays in performance of Work; or

    4. protect the Owner from loss due to injury to persons or damage to the work or property of other contractors, subcontractors, or others caused by the act or neglect of the Contractor of any of its Subcontractors. The Owner shall have the right to apply any such amounts so withheld in such manner as the Owner may deem proper to satisfy such claims or to secure such protection. Such application of money shall be deemed payments for the account of the Contractor.

    5. ensure timely and complete submission of all forms and information required by this Contract.

38. CONTRACTOR'S OBLIGATION TO COMPLETE CONTRACT: The Contractor shall start and complete this Contract on the dates specified in the Construction Schedule of Section 00 43 83, with any permitted adjustments thereto as are made in accordance with these General Conditions. Failure to complete Work in such time period shall entitle the Owner to damages as provided herein.

39. OWNER'S RIGHT TO TERMINATE CONTRACT FOR CAUSE OR STOP WORK: Subject to the terms of any Performance Bond and Labor or Material Payment Bond provided by Contractor under Section 00 61 13 *("Bonds and Certificates"), once accepted by the Owner, the Owner may exercise any of the following rights upon providing such notice as is set forth herein:

    1. If the Contractor shall refuse or fail, after being notified by the Construction Manager, to supply enough properly skilled workmen or proper materials; or

2. the Contractor shall refuse or fail to prosecute the Work or any part thereof with such diligence as will insure its completion within the period herein specified (or any duly authorized extension thereof) or shall fail to complete the Work within said period; or

3. the Contractor shall fail to make prompt payment to persons supplying labor or materials for the Work; or

4. the Contractor shall fail or refuse to regard laws, ordinances, rules, or regulations of any local, state or federal governmental authority or administrative body having jurisdiction over the Project or Work, or the instructions of the Owner's Representatives, or otherwise be guilty of a substantial violation of any provision of this Contract;

5. when any of the above reasons exist, the Owner, without prejudice to any other rights or remedy it may have, may by three days' written notice mailed or delivered to the Contractor, exclude Contractor from the Project site and take possession of all materials, equipment, tools, and machinery thereupon owned by Contractor and provide any such Work or part thereof, and deduct the cost thereof from any money then due or thereafter to become due to the Contractor under this Contract, or the Owner may by seven days' written notice mailed or delivered to the Contractor, and any notice required to Contractor's Surety by the terms of Contractor's Performance Bond, if any, terminate the employment of the Contractor and his right to proceed, either as to the entire Work or (at the option of the Owner) as to any portion thereof as to which delay shall have occurred and may take possession of the Work and complete the Work as the Owner may deem expedient.

6. In case of termination for any reasons set forth in this Section, the Contractor shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the compensation to be paid the Contractor hereunder shall exceed the expense of so completing the work (including compensation for additional managerial administrative, inspection services and any damages resulting from a Contractor-caused delay), such excess shall be paid to the Contractor. If such expense shall exceed such unpaid balance, the Contractor and/or its sureties shall be liable to the Owner for such excess. If the right of the Contractor to proceed with the Work is so terminated, the Owner may take possession of and utilize in completing the Work such materials, appliances, supplies, plant and equipment as may be on the site of the Work and necessary therefor.

40. OWNER'S RIGHT TO TERMINATE OR SUSPEND CONTRACT FOR CONVENIENCE:

1. The Owner may, with or without cause, order Contractor in writing to suspend, delay or interrupt its Work in whole or part for such period of time as the Owner may determine, provided that should such period of delay, suspension or interruption exceed ninety days, Contractor may terminate Contract in accordance with Section 41 herein. No adjustment to the Contract Sum shall be given for any delay, suspension of interruption which would have arisen by another cause for which Contractor was responsible. Any adjustment to the Contract Sum or time for completion of Work arising from Owner's suspension of the Work shall be made in accordance with Section 4 herein, "Changes." Contractor shall not be entitled to damages for lost profits or earning opportunity, or for consequential damages arising from such suspension or delay.

2. The Owner may at any time terminate the Contract for Owner's convenience and without cause. Upon receipt of written notice from Owner of such termination, Contractor shall (i) cease operations as directed by Owner in the notice; (ii) take actions necessary, or that Owner may direct, for protection and preservation of the Work; and (iii) except for Work to be performed prior to the effective date of termination of the Contract, terminate all existing subcontracts, purchase orders, and like commitments, and enter into no further commitments with respect to ordering or supplying labor, material, machinery, equipment, supplies or fixtures for performance of the Work. In the event of such termination for convenience, Contractor shall be entitled to receive payment for Work executed and costs incurred by reason of such termination, with reasonable overhead and profit on such Work executed. However, Contractor shall not be entitled to receive overhead or profit on any Work not executed, nor shall termination or suspension under this paragraph entitle Contractor to any other compensation or claim for damages including, without limitation, consequential damages, lost opportunity costs, impact costs, or similar claims.

41. CONTRACTOR'S RIGHT TO STOP WORK OR TERMINATE CONTRACT: If the Work shall be stopped by a suspension by the Owner as set forth in Section 40, or by order of a court of law or any other legal authority having jurisdiction over the Project or parties to the Contract for a period of three months, without act or fault of the Contractor or any of his agents, servants, employees, or Subcontractors, the Contractor may, upon ten days' written notice to the Owner, discontinue its performance of the Work and/or terminate the Contract, in which event the liability of the Owner to the Contractor shall be determined as provided in the paragraphs immediately preceding, except that the Contractor shall not be obligated to pay to the Owner any excess of the expense of completing the Work over the unpaid balance of the compensation to be paid the Contractor hereunder.

42. USES OF PREMISES AND REMOVAL OF DEBRIS: The Contractor expressly undertakes at its own expense to:

1. take every precaution against injuries to persons or damages to property;

2. store its apparatus, materials, supplies, and equipment in such orderly fashion at the Project site as will not unduly interfere with the progress of its Work or the work of any other contractor;

3. to place upon the Work or any part thereof only such loads as are consistent with the safety of that portion of the Work;

4. clean up all refuse, rubbish, scrap materials, and debris caused by its operations, to the end that at all times the site of the Work shall present a neat, orderly, and workman-like appearance;

5. remove all surplus material, temporary structures, including foundations thereof, plant of any description, and debris of every nature resulting from its operation and to put the site in a neat orderly condition prior to issuance of final payment; and

6. effect all cutting, fitting, or patching of its Work required to make the same conform to the Contract Documents, and, except with the consent of the Construction Manager, not to cut or otherwise alter the work of any other contractor.

43. WEATHER CONDITIONS: In the event of inclement weather or whenever the Construction Manager shall direct a temporary delay in the Work, the Contractor will and will cause its Subcontractors to protect carefully all Work, or materials or implements used to perform same, against damage or injury from the weather. If, in the opinion of the Construction Manager any Work or materials shall have been damaged or injured by reason of failure on the part of the Contractor or of any Subcontractor to provide adequate protections, such Work and materials shall be removed and replaced at the expense of the Contractor. This paragraph shall not affect Contractor's obligations with regard to acquiring insurance as specified in Section 00 73 16.

44. ARCHITECT DISCRETION: The Contractor shall employ no plant, equipment, materials, methods or laborers to which the Architect reasonably objects, and shall remove no plant, materials, equipment or other facilities from the site of the Work without Architect's permission. Upon request, the Architect through the Construction Manager shall confirm in writing any oral order, direction, requirement, or determination.

45. OWNER'S REPRESENTATIVES' DISCRETION: The discretion of the Owner's Representatives shall not be limited by the enumeration herein or elsewhere in the Contract Documents of particular instances in which the opinion, judgment, discretion or determination of such parties is permitted or required.

46. PROVISIONS REQUIRED BY LAW DEEMED INSERTED: Each and every provision of law and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted or is not correctly inserted, then upon the application of either party, the Contract shall forthwith be physically amended to make such insertion. Those terms and provisions set forth in Part 5 of Title 29 of the U.S. Code of Federal Regulations, attached to these General Conditions as "Attachment A," are expressly incorporated into the Contract.

47. SUBLETTING, SUCCESSOR AND ASSIGNS: The Contractor shall not sublet or assign any part of the Work under this Contract, nor assign any monies due hereunder, without first obtaining the written consent of the Owner. This Contract shall inure to the benefit of and shall be binding upon the parties hereto and upon their respective successors and assigns; but neither party hereto shall assign or transfer its interest herein in whole or in part without the consent of the other.

48. GUARANTEE:

    1. All Work to be done under this Contract, including all work required by authorized Change Orders, shall be guaranteed for a period of **TWO YEARS**, unless stated otherwise in any specialty warranty required by the Contract Documents, from the date of Final Payment, exclusive of reserves or retained percentages, to serve the purpose for which it is made or constructed, and forthwith on written notice the Contractor must make any repairs, replacement or service required by the Owner without extra charge when such repairs, replacement or service are made necessary, in the judgment of the Architect and the Construction Manager, by reason of any faulty or defective workmanship or materials.

    2. Neither Final Payment nor any provisions in the Contract Documents nor partial or entire occupancy of Project site by the Owner shall constitute acceptance of Work not

performed in accordance with the Contract Documents or relieve the Contractor of liability in respect to any express warranties or responsibility for faulty materials or workmanship. Work not conforming to these requirements, including substitutions not properly approved and authorized may be considered defective. Upon written notice from the Construction Manager, the Contractor shall remedy any faults or defects in the Work, and pay for any damage to other Work resulting therefrom, which shall appear within a period of one year, unless a longer period is specified in the Contract Documents, from date of Final Payment.

3. Except as otherwise noted below, the Contractor agrees to provide for all necessary repairs, replacement or service within three (3) days after receipt of notification of such faults or defects from the Construction Manager. The Contractor further agrees, at its own expense, to provide all necessary repairs, replacement or service within twenty four (24) hours after receipt of notification from the Construction Manager that Contractor caused disruption to any of critical systems or services, including but not limited to the following: Telephone Systems, Direct Digital Control Systems, Elevators, Fire Suppression; Fire Alarm; Security Alarm, Public Address System, Heating/Ventilating/Air Conditioning Systems, Boilers, Roofing (leaks), and any other defects that would in the opinion of the Owner's Representatives or Architect, or by operation of law or regulation, interfere with the standard operation of the building, result in a threat to the health and safety of the occupants, cause further non-repairable damage to property, or specifically requiring immediate repair, replacement or service elsewhere in the Contract Documents. If the Contractor does not respond within the allocated timeframe, the Owner may, without waiving any rights, remedies or implied warranties, provide the repairs, replacement or services or to hire third parties to do so, and to charge the Contractor for the cost thereof.

49. LIQUIDATED DAMAGES: It is critical to Owner's operations that Contractor achieve Substantial Completion in the time set forth in Section 00 43 83 "Schedules and Milestones," adjusting for approved extensions of Contract Time (if any). Owner's losses resulting from Contractor failure to achieve on time Substantial Completion are difficult to ascertain. Owner may charge liquidated damages in the amounts shown below depending on the Contract Sum, after adjusting for any increases by authorized Change Orders. The below schedule of liquidated damages are reasonable approximations of Owner's losses and are not intended as penalties.

Contract Sum			**Liquidated Damages Per Calendar Day**
$0	-	$499,999	$2,000/Day
$500,000	-	$15,000,000	$5,000/Day
Over $15,000,000			$10,000/Day

Contracts over $15,000,000 shall be assessed liquidated damages at the rate of $10,000 per day.

50. RECORD DOCUMENTS & AUDITS: Refer to Close-Out Procedures at Section 01 77 00.

51. GOVERNING LAW: The Contract shall be governed by the laws of the State of New York and the laws and regulations of the United States, where applicable.

52. CLAIMS AND DISPUTES:

1. CLAIMS: A "Claim" is a demand or assertion that payment, money, or other relief is due with respect to the terms of the Contract, as well as any other disputes arising between Owner and Contractor out of or relating to the Contract.

2. NOTICE OF CLAIMS: Claims by the Contractor must be initiated by written notice to the Owner's Representative. The Architect shall serve as the initial decision maker with respect to such Claim. Notice of Claims must be given in this manner within 21 days after the occurrence giving rise to a Claim, or within 21 days after the claimant first recognizes or should have recognized the condition giving rise to the Claim, whichever is later. The Architect shall render an initial decision within thirty days of submission of the Claim, or after submission by the parties of any supporting documentation requested in connection therewith.

3. CONTINUING PERFORMANCE: Pending final resolution of a Claim, except as otherwise agreed in writing or upon termination or suspension of the Contract as provided for herein, Contractor shall proceed diligently with its Work and Owner shall make payments in accordance with the Contract Documents. The Architect/Engineer will prepare change orders in accordance with the Architect's decision.

4. MEDIATION: If either party disagrees with the decision reached by the Architect with respect to any given Claim, the parties may by mutual assent agree to attend a non-binding mediated settlement conference before a neutral of their mutual selection, with each party contributing 50% of the neutral's fee. Absent agreement to conduct mediation or in the event that mediation fails to settle the Claim or dispute, either party may upon ten (10) days' written notice to the other party commence an action in a court of appropriate jurisdiction.

5. VENUE: Venue for mediation or for litigation any Claims or other disputes arising under this Contract shall be in the City of Rochester, County of Monroe, State of New York and must be brought within the statutory limitations period, or such shorter period as is prescribed herein, and before a court of competent jurisdiction to hear such Claim or dispute.

6. LABOR HARMONY: The Contractor shall be responsible for labor peace on the Project and shall at all times exert its best efforts and judgement as an experienced contractor to adopt and implement policies and practices designed to avoid work stoppages, slowdowns, disputes or strikes where reasonably possible and practical under the circumstances and shall, at all times, maintain Project wide labor harmony. The Contractor shall be liable to the Owner for all damages suffered by the Owner occurring as a result of work stoppages, slowdowns, disputes or strikes except as specifically provided for elsewhere in these General Conditions.

53. APPRENTICESHIP REQUIREMENTS: The Phase 2 legislation also requires that Contractors and Subcontractors with construction contracts in excess of one million dollars ($1,000,000) "shall participate in apprentice training programs in the trades it employs that: have been approved for not less than three years by the state department of labor; have graduated at least one apprentice in the last 3 years; have at least one apprentice currently enrolled in such apprentice training program; and have demonstrated that the program has made significant efforts to attract and retain minority apprentices."

54. SEXUAL HARRASSMENT POLICY: All New York employers were required to have a sexual harassment prevention policy in place by October 9, 2018. The policy must meet certain minimum requirements identified by the state. This includes contractors doing buisness with the Rochester Joint Schools Construction Board.

All New York employers are also required to have annual sexual harassment prevention training for all employees on an annual basis. The first training must occur by October 9, 2019. New employees must be trained as soon as practicable after hire. The training must meet certain minimum requirements identified by the state.

The state has provided a model policy and training program, as well as more information about the minimum requirements, on the following website:

www.ny.gov/combating-sexual-harassment-workplace/employers

Bidders are required to submit with their bids a copy of their firm's Sexual Harrassment Policy, along with their training activity schedule. The following form should be filled-out and submitted by each contractor:

Statement of Sexual Harassment Certification

In accordance with New York State Finance Law §139-l

In accordance with State Finance Law §139-l, which generally prohibits the Rochester Joint Schools Construction Board from entering into contracts pursuant to the bid process with persons who fail to submit a certification affirming compliance with New York Labor Law §201-g, the bidder submits the following certification under the penalty of perjury:

> By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that the bidder has and has implemented a written policy addressing sexual harassment prevention in the workplace and provides annual sexual harassment prevention training to all of its employees. Such policy shall, at a minimum, meet the requirements of Section 201-g of the Labor Law.

Date _____, 20___

_____, New York

_____
Name of Bidder

_____
Signature of Authorized Official

_____
Printed or Typed Name of Official and Title

Sworn to before me this

____day of_____, 20_____

_____

(Notary Public)

ATTACHMENT A

Part 5 of Title 29 of the U.S. Code of Federal Regulations

§ 5.5 Contract provisions and related matters.

(a) The Agency head shall cause or require the contracting officer to insert in full in any contract in excess of $2,000 which is entered into for the actual construction, alteration and/or repair, including painting and decorating, of a public building or public work, or building or work financed in whole or in part from Federal funds or in accordance with guarantees of a Federal agency or financed from funds obtained by pledge of any contract of a Federal agency to make a loan, grant or annual contribution (except where a different meaning is expressly indicated), and which is subject to the labor standards provisions of any of the acts listed in §5.1, the following clauses (or any modifications thereof to meet the particular needs of the agency, *Provided,* That such modifications are first approved by the Department of Labor):

(1) *Minimum wages.* (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in §5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: *Provided,* That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH–1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(*1*) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(*2*) The classification is utilized in the area by the construction industry; and

(*3*) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *Provided,* That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) *Withholding.* The (write in name of Federal Agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the

full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the (Agency) may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) *Payrolls and basic records.* (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit the payrolls to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency). The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead the payrolls shall only need to include an individually identifying number for each employee (*e.g.* , the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH–347 is available for this purpose from the Wage and Hour Division Web site at *http://www.dol.gov/esa/whd/forms/wh347instr.htm* or its successor site. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the (write in name of appropriate federal agency) if the agency is a party to the contract, but if the agency is not such a party, the contractor will submit them to the applicant, sponsor, or owner, as the case may be, for transmission to the (write in name of agency), the contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(*1*) That the payroll for the payroll period contains the information required to be provided under §5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under §5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(*2*) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(*3*) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH–347 shall satisfy the requirement for submission of the “Statement of Compliance” required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the (write the name of the agency) or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) *Apprentices and trainees* —(i) *Apprentices.* Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the

applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) *Trainees.* Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) *Equal employment opportunity.* The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) *Compliance with Copeland Act requirements.* The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the (write in the name of the Federal agency) may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) *Contract termination: debarment.* A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) *Compliance with Davis-Bacon and Related Act requirements.* All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) *Disputes concerning labor standards.* Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) *Certification of eligibility.* (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) *Contract Work Hours and Safety Standards Act.* The Agency Head shall cause or require the contracting officer to insert the following clauses set forth in paragraphs (b)(1), (2), (3), and (4) of this section in full in any contract in an amount in excess of $100,000 and subject to the overtime provisions of the Contract Work Hours and Safety Standards Act. These clauses shall be inserted in addition to the clauses required by §5.5(a) or 4.6 of part 4 of this title. As used in this paragraph, the terms *laborers* and *mechanics* include watchmen and guards.

(1) *Overtime requirements.* No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) *Violation; liability for unpaid wages; liquidated damages.* In the event of any violation of the clause set forth in paragraph (b)(1) of this section the contractor and any subcontractor

responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) *Withholding for unpaid wages and liquidated damages.* The (write in the name of the Federal agency or the loan or grant recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) *Subcontracts.* The contractor or subcontractor shall insert in any subcontracts the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

(c) In addition to the clauses contained in paragraph (b), in any contract subject only to the Contract Work Hours and Safety Standards Act and not to any of the other statutes cited in §5.1, the Agency Head shall cause or require the contracting officer to insert a clause requiring that the contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the contract for all laborers and mechanics, including guards and watchmen, working on the contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. Further, the Agency Head shall cause or require the contracting officer to insert in any such contract a clause providing that the records to be maintained under this paragraph shall be made available by the contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the (write the name of agency) and the Department of Labor, and the contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

END OF SECTION 00 72 16

SECTION 00 73 16 - INSURANCE REQUIREMENTS

Contractor shall obtain at its own cost and expense all the insurance described below (the "Required Insurance") that will protect Contractor from claims that may arise out of or result from Contractor's operations and completed operations under the Contract and for which Contractor may be legally liable, whether such operations be by Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable. Before commencing the Work under the Contract, Contractor shall provide to Owner, for Owner's approval, Contractor's certificate of insurance provided in accordance with this Section and thereafter upon renewal or replacement of each policy of Required Insurance. The Required Insurance must be purchased from an insurer that is licensed, admitted, and authorized to write insurance in New York State, and is A.M. Best Rated "A-" or "Better". The provision by Contractor of the insurance coverage and limits required in this Section shall not limit Contractor's liability in any way.

The Rochester Joint Schools Construction Board ("RJSCB" or "Owner") is an entity created by special authorizing legislation of the State of New York to serve as an agent for the Rochester City School District ("RCSD") and City of Rochester ("City") for purposes of administering the Rochester School Modernization Program ("RSMP"). RSMP projects are funded in part through bonds made available by the County of Monroe Industrial Development Agency ("COMIDA" or "Agency"). Each of the RJSCB, RCSD, City, COMIDA, U.S. Bank National Association, the Trustee under the Indenture of Trust relating to the financing of the Project ("Trustee"), Savin Engineers, P.C., Gilbane Building Company, Buffalo Construction Consultants ("Construction Manager"), and SWBR ("Architect") (collectively, the "Additional Insureds") shall be named as **Additional Insureds on a Primary and Non-Contributory basis** for all Required Insurance (other than Workers' Compensation and Employer's Liability Insurance). Contractor shall require each of its Subcontractors, in any written agreements with its Subcontractors, to add the foregoing Additional Insureds on a Primary and Non-Contributory basis for all Required Insurance (other than Workers' Compensation, Employer's Liability and Umbrella (Excess) Liability Insurance policies). Contractor shall provide proof of additional insured status through ISO endorsement CG 2010 11 85 or an equivalent endorsement acceptable to Owner; provided, however, that if endorsement CG 2010 11 85 is not available, then GC 20-37 07 04 shall also be required.

Required Insurance shall be written on an occurrence basis and maintained without interruption from the date of commencement of the Work until the date of final payment or such longer period for which any Required Insurance is required to be maintained under the Contract.

General Liability coverage is to remain in place for one (1) year after the Certificate of Occupancy is issued by the New York State Education Department.

Each of the policies or binders evidencing the Required Insurance shall:

(i) provide that there shall be no recourse against the Additional Insureds for the payment of premiums or commissions or (if such policies or binders provide for the payment thereof) additional premiums or assessments;

(ii) provide that in respect of the interests of the Additional Insureds in

such policies, the insurance shall not be invalidated by any action or inaction of the Additional Insureds and shall insure the Additional Insureds regardless of, and any losses shall be payable notwithstanding, any such action or inaction;

(iii) provide that such insurance shall be primary insurance without any right of contribution from any other insurance carried by or provided to the Additional Insureds to the extent that such other insurance provides any Additional Insured with contingent and/or excess liability insurance with respect to its interest as such in the facility;

(iv) provide that if the insurers cancel such insurance for any reason whatsoever, including the insured's failure to pay any accrued premium, or the same is allowed to lapse or expire, or there be any reduction in amount, or any material change is made in the coverage, such cancellation, lapse, expiration, reduction or change shall not be effective as to the Additional Insureds until at least thirty (30) days after receipt by the Additional Insureds of written notice by such insurers of such cancellation, lapse, expiration, reduction or change; and

(v) waive any right of subrogation of the insurers thereunder against any person insured under such policy, and waive any right of the insurers to any setoff or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of any person insured under such policy.

Prior to the commencement of any Work (and at such other times as Owner may request), Contractor shall deliver or cause to be delivered to Owner duplicate copies of insurance policies, with all endorsements or exclusions, that are obtained by Contractor hereunder, and/or binders evidencing compliance with the insurance requirements set forth herein. In addition, Contractor shall provide Owner with copies of CG2010 and CG2037 and of any endorsements subsequently issued amending coverage or limits. If any change shall be made in any such insurance, a description and written notice of such change shall be furnished to Owner thirty (30) days in advance of such change. At least thirty (30) days prior to the expiration of any insurance policy required hereunder, Contractor shall furnish Owner with evidence that such policy has been renewed or replaced or is no longer required hereunder. In the event Contractor fails to timely renew or pay any of the renewal premiums for any expiring Required Insurance policies, Owner shall have the right (but not the obligation) to (i) make such payments; and/or (ii) acquire replacement coverage, and thereafter set off the amount(s) or costs thereof against the next payment(s) coming due to Contractor under the Contract. Owner may withhold any payments due to Contractor from this Project unless certificates for current insurance are on file.

The Required Insurance is as follows:

1. Workers' Compensation, New York State Disability and Employer's Liability Insurance:

Contractor shall maintain workers' compensation insurance and employer's liability insurance and such other forms of insurance which Contractor is required by law to provide covering loss resulting from injury, sickness, disability or death of the employees of Contractor. Contractor shall require each of its Subcontractors of any tier to maintain workers' compensation insurance, employer's liability insurance and such other forms of insurance which Subcontractor

is required by law to provide covering loss resulting from injury, sickness, disability or death of the employees of Subcontractor. Contractor must maintain proof that each Subcontractor performing work under this Contract secured and maintains such coverage.

2. Commercial General Liability (including Products & Completed Operations, Personal Liability, and damages to rented premises on a per project basis): Contractor shall maintain commercial public general liability insurance with coverage amounts of no less than the following:

Contractor required minimum policy limits:
$1,000,000 per occurrence / $2,000,000 general aggregate (per project)
$1,000,000 per occurrence / $2,000,000 Products & Completed Operations Aggregate
$1,000,000 per occurrence for personal liability
$50,000 Fire Damage Legal Liability
$5,000 Medical Expense Limit

a. Coverage must include but shall not be limited to: premises/operations; explosion, collapse and underground coverage; products and completed operations; contractual liability; independent contractors; broad form property damage; personal injury; and elevators.

b. Products and Complete Operations Aggregate shall be maintained for a period of two years after final acceptance of Owner.

c. The General Aggregate must apply on a per project basis.

d. Coverage must be written on CG0001 form or its equivalent and must not contain any endorsements reducing or excluding coverage for contractual liability or injuries to employees or independent contractors.

e. No coverage exclusion or limitation for work performed on your behalf by a Subcontractor.

f. Coverage must include ISO CG 00 01 12 07 Contractual Liability coverage or its equivalent, with no exclusion or limitation to the Separation of Insureds clause contained in Section V – Commercial General Liability policy conditions.

g. Coverage must contain a waiver of subrogation in favor of the Additional Insureds.

3. Automobile Insurance:

Contractor shall maintain Comprehensive Automobile Liability Insurance on owned, hired, or non-owned vehicle in amounts not less than $1,000,000 Combined Single Limit each occurrence. If hauling of hazardous waste is part of the Work, Contractor shall maintain Automobile Liability Insurance with a $1,000,000 combined single limit each occurrence for bodily injury and property damage applicable to all hazardous waste hauling vehicles, and including MCS 90 endorsement and the ISO Form CA 99 48.

4. Pollution Liability Insurance (*required when asbestos or other hazardous material abatement is included in the Contract*): Contractor shall maintain Pollution Liability Insurance for services

rendered to Owner, including but not limited to, removal, replacement enclosure, encapsulation and/or disposal of asbestos, or any other hazardous material, along with any related pollution events, including coverage for third-party liability claims for bodily injury, property damage and clean-up costs. The Pollution Liability Insurance shall have a minimum limit per occurrence of $5,000,000 and a minimum aggregate specific to the project of $5,000,000. In the event Contractor elects to engage a Subcontractor to perform any abatement, said Subcontractor must timely obtain and maintain the same Pollution Liability insurance coverage as set forth above.

5. Umbrella (Excess) Liability: Contractor shall maintain Umbrella or Excess Liability Insurance, providing coverage in excess of the amounts covered by the Comprehensive General Liability, Automobile Liability, Employer's Liability policies, with limits of not less than $5,000,000 per occurrence and $5,000,000 aggregate (per project). Self-Insured retention limit is $10,000 per occurrence. Contractor acknowledges that it shall provide Umbrella Liability coverage on behalf of the Additional Insureds, that such insurance shall be as broad as that provided for the named insured Contractor, and that such insurance shall be primary and noncontributory and will be subject to vertical exhaustion before any other primary, umbrella or any other insurance obtained by the Additional Insureds will be triggered.

6. Contractor's Contingent Liability: Contractor shall procure and maintain such insurance as will protect Contractor from its contingent liability for damages and for injury to the person or property of another which may arise from the operations of all Subcontractors under this Contract.

7. Contractor's and Employee's Equipment: Contractor assumes responsibility for all injury or destruction of Contractor's materials, tools, machinery, equipment, appliances, shoring, scaffolding, false and form work, and personal property of Contractor's employees, from whatever causes. Any policy of insurance secured by Contractor or any Subcontractor and insuring Contractor or any Subcontractor against physical loss or damage to such property shall include an endorsement waiving the right of subrogation against Owner for any loss or damage to such property.

8. Subcontractors: Contractor shall include all Subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the certificates of insurance provided by each Subcontractor. Subcontractors shall be subject to all of the requirements stated herein, except as those requirements are modified below:

Workers' Compensation and Employer's Liability:	Statutory
Commercial General Liability:	General Aggregate: $2,000,000 (per project); Products/Completed Operations Aggregate $2,000,000; and each occurrence $1,000,000 per claim.
Business Automobile Liability	$1,000,000 Combined Single Limit each occurrence
Umbrella Liability:	In excess of Employer's Liability, Commercial General Liability and Automobile Liability with limits of $2,000,000 per occurrence and in the aggregate.

Contractor shall require each of its Subcontractors to name the Additional Insureds as additional insureds on a primary noncontributory basis on all insurance policies required of such Subcontractor. Owner reserves the right to request copies of Subcontractors' certificates of insurance at any time. If Contractor does not verify Subcontractors' insurance as described above, Owner has the right to withhold payments to Contractor until the requirements have been met. Contractor shall require that its Subcontractors of any tier waive any right of subrogation of the insurers thereunder against the Additional Insureds, and waive any right of the insurers to any setoff or counterclaim or any other deduction, whether by attachment or otherwise, in respect of any liability of the Additional Insureds.

9. Builder's Risk Insurance: Owner has purchased and shall maintain during the performance of the Work property insurance written on a builder's risk "all risk" or equivalent policy form. This insurance includes the interests of Owner, Contractor and Subcontractors of any tier on the Project. If the Builder's Risk Insurance policy requires a deductible, the Contractor shall pay any costs not covered because of the deductible. Owner shall not be obligated to pay the costs not covered because of the insurance deductibles.

10. Indemnity for Failure to Comply with Insurance Requirements: To the fullest extent permitted by law, Contractor agrees to fully defend, indemnify and hold harmless Owner and the other Additional Insureds from and against any and all claims, losses, expenses, costs, liabilities and damages of any nature whatsoever, including reasonable attorney's fees actually incurred, arising out of and/or relating to any failure of Contractor to obtain, furnish and maintain as required herein insurance complying with the provisions of this Section or any other failure of Contractor to comply with the provisions of this Section.

END OF SECTION 00 73 16

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/14/18

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER

CONTACT NAME

PHONE (A/C No. Ext) | FAX A/C No:

EMAIL ADDRESS

PRODUCER CUSTOMER ID #:

INSURED

GC/Prime Contractors
Name and Address

INSURER(S) AFFORDING COVERAGE		NAIC #
INSURER A:	XYZ Insurance Carrier Licensed,	
INSURER B:	Admitted & Authorized to write	
INSURER C:	Insurance in NYS and Rated A- or	
INSURER D:	Better by AM Best	
INSURER E:		
INSURER F:		

COVERAGES **CERTIFICATE NUMBER:** **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO T E INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY T E POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	**GENERAL LIABILITY** ☑ COMMERCIAL GENERAL LIABILITY ☐ CLAIMS-MADE ☑ OCCUR ☑ xcu, contractual ☑ Primary/Non Contributing GEN'L AGGREGATE LIMIT APPLIES PER: ☐ POLICY ☑ PRO-JECT ☐ LOC	X	X	Policy Number and Effective & Expiration Dates			EACH OCCURRENCE	$ 1,000,000
							DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 50,000
							MED EXP (Any one person)	$ 10,000
							PERSONAL & ADV INJURY	$ 1,000,000
							GENERAL AGGREGATE	$ 2,000,000
							PRODUCTS COMP/OP AGG	$ 2,000,000
								$
A	**AUTOMOBILE LIABILITY** ☑ ANY AUTO ☐ ALL OWNED AUTOS ☑ SCHEDULED AUTOS ☑ HIRED AUTOS ☐ NON-OWNED AUTOS ☐	X	X	Policy Number and Effective & Expiration Dates			COMBINED SINGLE LIMIT (Ea accident)	$ 2,000,000
							BODILY INJURY (Per person)	$
							BODILY INJURY (Per accident)	$
							PROPERTY DAMAGE (Per accident)	$
								$
								$
A	☑ UMBRELLA LIAB ☑ OCCUR ☐ EXCESS LIAB ☐ CLAIMS-MADE ☐ DEDUCTIBLE ☐ RETENTION $	X	X	Policy Number and Effective & Expiration Dates			EACH OCCURRENCE	$ 5,000,000
							AGGREGATE	$ 5,000,000
							Primary/Non Contr	$
								$
A	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICE/MEMBER EXCLUDED? Y/N n **(Mandatory in NH)** If yes describe under DESCRIPTION OF OPERATIONS below	N/A	X	Policy Number and Effective & Expiration Dates Proof of NYS Disability required			☑ WC STATUTORY LIMITS- ☐ OTHER-	$
							E.L. EACH ACCIDENT	$ 100,000
							E.L. DISEASE - EA EMPLOYEE	$ 100,000
							E.L.DISEASE - POLICY LIMIT	$ 500,000
A	Pollution (if necessary)		X	Policy Number and Effective & Expiration Dates				$5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

RE: Rochester Schools Modernization Program (RSMP)

see attached

CERTIFICATE HOLDER

Rochester Joint Schools Construction Board
70 Carlson Road, Suite 200
Rochester, NY 14610

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

AGENCY CUSTOMER ID: _____

LOC #: _____

ADDITIONAL REMARKS SCHEDULE

AGENCY		NAMED INSURED
		GC/Prime Sample Certificate
POLICY NUMBER		
CARRIER	NAIC CODE	EFFECTIVE DATE:

ADDITIONAL REMARKS

THIS ADDITIONAL REMARKS FORM IS A SCHEDULE TO ACORD FORM,

FORM NUMBER: _____ FORM TITLE: _____

All liability policies (excluding workers compensation and professional) shall include the following as additional insured on a primary & non contributory basis: Rochester Joint School Construction Board (RJSCB); the City of Rochester; the Rochester City School District (RCSD); Savin Engineers PC; Gilbane Building Company; County of Monroe Industrial Development Agency (COMIDA); US Bank National Association, the Trustee under Indenture of Trust relating to the financing of the project; and LPCiminelli Inc and SWBR Architects.

A waiver of subrogation in favor of Rochester Joint School Construction Board (RJSCB); the City of Rochester; the Rochester City School District (RCSD); Savin Engineers PC; Gilbane Building Company; County of Monroe Industrial Development Agency (COMIDA); US Bank National Association, the Trustee under Indenture of Trust relating to the financing of the project; LPCiminelli Inc and SWBR Architects. applies to general liability, automobile liability; umbrella; workers compensation and builders risk.

(GL additional insured, ongoing & completed operations, form CG2010 1185 or equivalent - to be attached to certificate. GC2033 no longer acceptable)

Copies of all applicable additional insured; waiver of subrogation; primary/non contributory; per project aggregate and 30 day notice of cancellation must be attached to certificate of insurance when submitted

Workers Comp written through the State Insurance Fund will require separately issued certificates with a waiver of subrogation for each of the following parties: Rochester Joint School Construction Board (RJSCB); the City of Rochester; the Rochester City School District (RCSD); Savin Engineers PC; Gilbane Building Company; County of Monroe Industrial Development Agency (COMIDA); US Bank National Association, the Trustee under Indenture of Trust relating to the financing of the project; XXXX, Construction Manager; and XXXX, Architect.

Policies shall include a 30 day notice of cancellation to Rochester Joint School Construction Board (RJSCB)copies of endorsements to be attached to the certificate

RSMP Insurance Requirements Roadmap

RSMP Requirements for CM's	RSMP Requirements for GC's/Primes	RSMP Requirements for Lower Tiers / Subcontractors	RSMP Requirements for Professional Services	RSMP Requirements for Professional Services Lower Tier and/or Subconsultants
General Liability	General Liability (including Contractual & XCU)	General Liability	General Liability	General Liability
Per Occurrence Limit: $1,000,000	Per Occurrence Limit: $1,000,000	Per Occurrence Limit: $1,000,000	Per Occurrence Limit: $1,000,000	Per Occurrence Limit: $1,000,000
Personal Injury Limit: $1,000,000	Personal Injury Limit: $1,000,000	Personal Injury Limit: $1,000,000	Personal Injury Limit: $1,000,000	Personal Injury Limit: $1,000,000
Fire Damage Limit: $300,000	Fire Damage Limit:$50,000	Fire Damage Limit $50,000 only if subcontractor owns/rents a business location	Fire Damage Limit: $300,000	Fire Damage Limit: $300,000
Products/Completed Operations Aggregate Limit: $2,000,000	Products/Completed Operations Aggregate Limit: $2,000,000	Products/Completed Operations Aggregate Limit: $2,000,000	Products/Completed Operations Aggregate Limit: $2,000,000	Products/Completed Operations Aggregate Limit: $2,000,000
General Aggregate Limit: $2,000,000	General Aggregate Limit: $2,000,000 – Per project aggregate endorsement required	General Aggregate Limit: $2,000,000 per project aggregate endorsement required	General Aggregate Limit: $2,000,000	General Aggregate Limit: $2,000,000
Medical Expense: $10,000	Medical Expense: $10,000	Medical Expense $5000	Medical Expense: $10,000	Medical Expense: $10,000
Professional Liability	Professional Liability – N/A	Professional Liability – N/A	Professional Liability	Professional Liability
Per Claim/Aggregate limit: $1m/$3m			Per Claim/Aggregate limit: $2m/$3m	Per Claim/Aggregate limit: $1m/$2m
Automobile	Automobile	Automobile	Automobile	Automobile
Combined Single Limit: $1,000,000	Combined Single Limit: $2,000,000	Combined Single Limit: $1,000,000 if employing W-2 employees	Combined Single Limit: $1,000,000 if employing W-2 employees	Combined Single Limit: $1,000,000 if employing W-2 employees
Workers Compensation/Employers Liability	Workers Compensation/Employers Liability	Workers Compensation/Employers Liability if employing W-2 employees	Workers Compensation/Employers Liability if employing W-2 employees	Workers Compensation/Employers Liability if employing W-2 employees
Employers Liability Limit: $500,000	Employers Liability Limit: Statutory	Employers Liability Limit: Statutory	Employers Liability Limit: $500,000	Employers Liability Limit: $500,000
NYS Disability - Statutory	NYS Disability – Statutory	NYS Disability – Statutory	NYS Disability - Statutory	NYS Disability - Statutory
Umbrella/Excess	Umbrella/Excess	Umbrella/Excess	Umbrella/Excess	Umbrella/Excess
Occurrence/Aggregate Limit: $5,000,000	Occurrence/Aggregate Limit: $5,000,000	Occurrence/Aggregate Limit: $2,000,000	Occurrence/Aggregate Limit: $5,000,000	Occurrence/Aggregate Limit: $2,000,000
N/A	Pollution Liability - $5,000,000 (when contract involves abatement)	Pollution Liability - $5,000,000 (only when lower tier's contract involves them doing abatement)	N/A	N/A
Additional Items:	Additional Items:	Additional Items:	Additional Items:	Additional Items:
GL Additional insured endorsement to be used: CG2010 1185 or equivalent (CG2033 no longer acceptable)	GL Additional insured endorsement to be used: CG2010 1185 or equivalent (CG2033 no longer acceptable)	GL Additional insured endorsement to be used: CG2010 1185 or equivalent (CG2033 no longer acceptable)	GL Additional insured endorsement to be used: CG2010 1185 or equivalent (CG2033 no longer acceptable)	GL Additional insured endorsement to be used: CG2010 1185 or equivalent (CG2033 no longer acceptable)
Primary/Non Contributory-GL & Umb	Primary/Non Contributory-GL & Umb	Primary/Non Contributory-GL & Umb	Primary/Non Contributory-GL Only	Primary/Non Contributory-GL Only
Waiver of subrogation on all liability policies and workers compensation	Waiver of subrogation on all liability policies and workers compensation	Waiver of subrogation on all liability policies and workers compensation	Waiver of subrogation on all liability policies and workers compensation	Waiver of subrogation on all liability policies and workers compensation
30 day notice of cancellation to RJSCB on all policies	30 day notice of cancellation to RJSCB on all policies	30 day notice of cancellation to RJSCB on all policies	30 day notice of cancellation to RJSCB on all policies	30 day notice of cancellation to RJSCB on all policies
Coverage for ALL POLICIES shall NOT contain any provision, definition, or endorsement that would serve to eliminate 240/241 labor law or third- party action over claims specifically for work performed in New York State	***Coverage for ALL POLICIES shall NOT contain any provision, definition, or endorsement that would serve to eliminate 240/241 labor law or third- party action over claims specifically for work performed in New York State***	***Coverage for ALL POLICIES shall NOT contain any provision, definition, or endorsement that would serve to eliminate 240/241 labor law or third- party action over claims specifically for work performed in New York State***	***Coverage for ALL POLICIES shall NOT contain any provision, definition, or endorsement that would serve to eliminate 240/241 labor law or third- party action over claims specifically for work performed in New York State***	***Coverage for ALL POLICIES shall NOT contain any provision, definition, or endorsement that would serve to eliminate 240/241 labor law or third- party action over claims specifically for work performed in New York State***

Notes - Refer to Specification Section 00 73 16 or applicable Request for Proposal:

(1) Copies of all applicable additional insured; waiver of subrogation; primary/non contributory; per project aggregate and 30 day notice of cancellation must be attached to certificate of insurance when submitted.

Any certificate submitted without endorsements will automatically be rejected without a review.

(2) The minimum list of Indemnitees is defined as: the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"); the City of Rochester, the Rochester City School District, County of Monroe Industrial Development Agency ("COMIDA"); U.S. Bank National Association, the Trustee under the Indenture of Trust relating to the financing of the Project ("Trustee"); Gilbane Building Company, Savin Engineers P.C. ("Program Manager"), and their respective affiliates, subsidiaries, trustees, officers, board members, directors, employees and agents (collectively, the "Indemnified Parties").

(3) The minimum to be listed as Additional Insureds on a Primary and Non-Contributory basis for such insurance (other than Workers' Compensation and Employer's Liability Insurance): the Rochester Joint Schools Construction Board ("RJSCB" or "Owner"); Rochester City School District ("RCSD"); the City of Rochester ("City"); County of Monroe Industrial Development Agency ("COMIDA"); U.S. Bank National Association, the Trustee under the Indenture of Trust relating to the financing of the Project ("Trustee"); Gilbane Building Company and Savin Engineers P.C. ("Program Manager").

(4) A waiver of subrogation must be provided to all Indemnitees.

(5) Certificate Holder for a Subcontractor to a Prime is the Prime.

SECTION 00 73 20 – HEALTH AND SAFETY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes provisions as required by the Regulations of the Commissioner of Education, Part 155.5 “Uniform Safety Standards for School Construction and Maintenance Projects” (8 NYCRR 155).

1.3 UNIFORM SAFETY STANDARDS FOR SCHOOL CONSTRUCTION AND MAINTENANCE PROJECTS

A. Each contractor shall fully comply with all project specific safety and loss prevention procedures, and appoint a full time Safety Representative for the project to implement and coordinate safety efforts, provide appropriate employee safety training and protective equipment, and fully cooperate with the Architect, the Owner, and other project contractors.

1. This Safety Representative shall participate, upon request, in the Owner's Health and Safety Committee to monitor the safety of the school at all times during the construction project.

B. Certificate of Occupancy:

1. 8 NYCCR 155.5(a): The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.

   a. Do not obstruct required exitways unless alternative exitways satisfactory to the authority having jurisdiction are available. Contractor shall propose any necessary plans detailing affected exiting and ventilation

C. General safety and security standards for construction projects:

1. 8 NYCCR 155.5(e)(1): All construction materials shall be stored in a safe and secure manner.

2. 8 NYCCR 155.5(e)(2): Fences around construction supplies or debris shall be maintained.

3. 8 NYCCR 155.5(e)(3): Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
4. 8 NYCCR 155.5(e)(4): During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
5. 8 NYCCR 155.5(e)(5): Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.

D. Separation of construction areas from occupied spaces. Construction areas which are under the control of a contractor and therefore not occupied by district staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy duty plastic sheeting may be used only for a vapor, fine dust or air infiltration barrier, and shall not be used to separate occupied spaces from construction areas.

1. 8 NYCCR 155.5(f)(1): A specific stairwell and/or elevator should be assigned for construction worker use during work hours. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
2. 8 NYCCR 155.5(f)(2): Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No material shall be dropped or thrown outside the walls of the building.
3. 8 NYCCR 155.5(f)(3): All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times that classes are in session.

E. Maintaining exiting and ventilation during school construction projects.

1. 8 NYCCR 155.5(g)(1): Contractor shall provide a plan detailing how exiting required by the applicable building code will be maintained during construction. The plan shall indicate temporary construction required isolating construction equipment, materials, people, dust, fumes, odors, and noise during the construction period. Temporary construction details shall meet code-required fire ratings for separation and corridor enclosure. At a minimum, required exits, temporary stairs, ramps, exit signs, and door hardware shall be provided at all times.
2. 8 NYCCR 155.5(g)(2): Contractor shall provide a plan detailing how adequate ventilation will be maintained during construction. The plan shall indicate ductwork which must be rerouted, disconnected, or capped in order to prevent contaminants from the construction area from entering the occupied areas of the building. The plan shall also indicate how required ventilation to occupied spaces affected by construction will be maintained during the project.

F. Fire and hazard prevention. Areas of buildings under construction that are to remain occupied shall maintain a certificate of occupancy. In addition, the following shall be strictly enforced:

1. 8 NYCCR 155.5(h)(1): No smoking is allowed on public school property, including construction areas.
2. 8 NYCCR 155.5(h)(2): During construction daily inspections of district occupied areas shall be conducted by school district personnel to assure that construction materials, equipment or debris not block fire exits or emergency egress windows.
3. 8 NYCCR 155.5(h)(3): Proper operation of fire extinguishers, fire alarm, and smoke/fire detection systems shall be maintained throughout the project.

G. Noise abatement during construction and maintenance activities.

1. 8 NYCCR 155.5(i): Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces or shall be scheduled for times when the building or affected building spaces are not occupied or acoustical abatement measures shall be taken. Noise level measurements (dba) shall be taken with a type 2 sound level meter in the occupied space in a location closest to the source of the noise. Complaints regarding excessive noise shall be addressed through the health and safety committee. The district should anticipate those times when construction noise is unacceptable and incorporate "no work" periods into the bid specifications.

H. Control of chemical fumes, gases, and other contaminants during construction and maintenance projects.

1. 8 NYCCR 155.5(j)(1): Building materials or furnishings which off-gas chemical fumes, gases, or other contaminants shall be aired out in a well ventilated heated warehouse before it is brought to the project for installation or the manufacturer's recommended off-gassing periods must be scheduled between installation and use of the space. If the work will generate toxic gases that cannot be contained in an isolated area, the work must be done when school classes and programs are not in session. The building must be properly ventilated and the material must be given proper time to cure or off- gas before re-occupancy.
2. 8 NYCCR 155.5(j)(2): Manufacturer's material safety data sheets (MSD) shall be maintained at the site for all products used in the project. MSDS must be provided to anyone who requests them. MSDS indicate chemicals used in the product, product toxicity, typical side effects of exposure to the product and safe procedures for use of the product.
3. The contractor shall be responsible to ensure that activities and materials which result in "offgassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured, or ventilated in accordance with manufacturer's recommendations before a space can be occupied.
   a. For all product to be incorporated into the finished work containing volatile organic compounds(VOC’s), the contractor shall submit written statements from the manufacturers of such materials defining the precautions to be taken, including, if required, a period of time for off-gassing of these materials prior to safe occupancy of all spaces incorporating these

materials. The manufacturer shall define the specific criteria used in making their recommendations, including actual testing for residual volatility that may negatively affect the health of the public. This shall be presented for review with the initial product/system submittal.

b. This shall include all products with field or factory applied materials containing VOCs, including: Paint, wall covering and adhesive; carpeting and vinyl composition floor tile and all associated adhesives; cabinets, countertops (all particle boards and adhesives); glues; furniture and draperies; and any duct lining material and associated adhesives.

I. Asbestos abatement protocols.

1. 8 NYCCR 155.5(k): All asbestos abatement projects shall comply with all applicable Federal and State laws including but not limited to the New York State Department of Labor industrial code rule 56 (12 NYCRR 56), and the Federal Asbestos Hazard Emergency Response Act (AHERA), 40 CFR part 763 (Code of Federal Regulations, 1998 Edition, Superintendent of Public Documents, U.S. Government Printing Office, Washington, DC 20402; 1998; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234).

a. Large and small asbestos projects as defined by 12 NYCRR 56 shall not be performed while the building is occupied.

1) The term "building", as referenced in this section, means a wing or major section of a building that can be completely isolated from the rest of the building and sealed non combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier.

b. Minor asbestos projects defined by 12 NYCRR 56 as an asbestos project involving the removal, disturbance, repair, encapsulation, enclosure or handling of 10 square feet or less of asbestos or asbestos material, or 25 linear feet or less of asbestos or asbestos material may be performed in unoccupied areas of an occupied building in accordance with the above referenced regulations.

c. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required, and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.

J. Lead paint.

1. 8 NYCCR 155.5(l): Any construction or maintenance operations which will disturb lead based paint will require abatement of those areas pursuant to protocols detailed in the "Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing" (June 1995; U.S. Department of Housing and Urban Development, Washington, D.C. 20410; available at the Office of Facilities Planning, Education Building Annex, Room 1060, State Education Department, Albany, NY 12234). All areas scheduled for construction as well as areas of

flaking and peeling paint shall be tested for the presence of lead and abated or encapsulated in accordance with the above noted guidelines.

a. Prime Contractor is advised that lead and lead-containing materials are required to be disturbed or removed as part of this project.

b. If materials suspected to contain lead above 1.0 mg/sq.cm. or above 0.5% that are not included in Project or identified in Contract Documents are encountered during construction, Prime Contractor shall immediately notify Owner and take applicable precautions to avoid disturbing materials until directed by Owner.

K. There is no smoking on any School property.

1. 8 NYCCR 155.5(m):

L. Pre-construction testing and planning for construction projects.

1. 8 NYCCR 155.5(c)(1): All school areas to be disturbed during renovation or demolition shall be tested for lead and asbestos.

a. Asbestos and Asbestos-Containing Materials (ACBM)

1) Prime Contractor is advised that asbestos and asbestos-containing materials are required to be abated as part of this project.

a) The extent of asbestos to be abated as part of the Project is clearly indicated on drawings included in the Contract Documents.

b) Prior to beginning Work of their Prime Contract, Prime Contractor shall review Owner's "Asbestos Management Plan" to ensure asbestos or asbestos-containing materials identified in that document are not disturbed. Contact Owner's Representative identified in Instructions to Bidders for access to Owner's "Asbestos Management Plan".

2) Prime Contractor is advised that if materials suspected to be asbestos, or to contain asbestos, that are not included in the Project and not identified in the Contract Documents are encountered during construction, he shall immediately notify Owner and take precautions as required to avoid disturbing materials until directed by Owner.

3) Transmission Electron Microscopy (TEM): All asbestos abatement work that requires clearance air sampling in accordance with NYS Industrial Code Rule 56 shall have clearance air samples collected and analyzed using Transmission Electron Microscopy as per the Asbestos Hazard Emergency Response Act (40 CFR 763).

M. Lead and Lead-Containing Materials

1. Contractors are advised that a lead inspection has been performed as required by New York State Education Department and a copy of the lead inspection report is available at the Owner's offices.

2. Disposal of Lead Abatement Waste

a. Test all debris from lead abatement activities to determine whether it is hazardous or nonhazardous waste.

b. Transport and dispose of debris determined to be hazardous waste in accordance with applicable regulations.

c. Package, label, and mark all hazardous waste materials in accordance with applicable requirements of 49 CFR 173, 178 and 179.

d. Maintain hazardous waste manifest from date of transport until date of disposal, destruction or recycling.

e. Return fully executed hazardous waste manifests to Owner within 60 days after date waste accepted by initial transporter.

f. Dispose of material determined to be construction and demolition debris in accordance with 6 NYCRR 360 and 364. Provide trip tickets or other documentation clearly identifying generating site, Owner, transporter, disposal site and amount of material removed from site, transported to and disposed of at disposal site.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

Not Used.

END OF SECTION 00 73 20

SECTION 00 73 46 - PREVAILING WAGE RATES

PART 1 – GENERAL

1.1 Both the New York State Prevailing Wage and the Davis-Bacon Wage schedules apply to this Project.

1.2 The wage schedule can be obtained from the New York State Department of Labor prior to bid.

1.3 The Davis-Bacon wage rate schedule can be obtained online at http://www.wdol.gov/wdol/scafiles/davisbacon/ny10.dvb.

1.4 The NYS prevailing wage rate schedule for this project can be obtained at the following WEB link:
https://apps.labor.ny.gov/wpp/doFindProject.do

The Prevailing Rate Case number is PRC# 2017000965.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 Contractor is required to pay wages that are equal to or greater than the higher of either NY State Prevailing Wages or Davis-Bacon Rate.

3.2 Contractor is responsible to track modifications or changes to the NY State Prevailing Wage and/or Davis-Bacon Rate, and modify wages accordingly.

3.3 Any changes to either wage rate between bid submission and project closeout is the responsibility of the contractor and will not result in a change to the Contract Sum, nor will Owner be required to pay difference.

END OF SECTION 00 73 46

Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Roch Joint School Const Board

Steve Rebholz, Project Manager
SWBR Architects
387 East Main Street
Rochester NY 14604

Schedule Year	2019 through 2020
Date Requested	01/30/2017
PRC#	2017000965

Location	321 Post Avenue
Project ID#	
Project Type	Abatement and Selective Demolition

PREVAILING WAGE SCHEDULE FOR ARTICLE 8 PUBLIC WORK PROJECT

Attached is the current schedule(s) of the prevailing wage rates and prevailing hourly supplements for the project referenced above. A unique Prevailing Wage Case Number (PRC#) has been assigned to the schedule(s) for your project.

The schedule is effective from July 2019 through June 2020. All updates, corrections, posted on the 1st business day of each month, and future copies of the annual determination are available on the Department's website www.labor.ny.gov. Updated PDF copies of your schedule can be accessed by entering your assigned PRC# at the proper location on the website.

It is the responsibility of the contracting agency or its agent to annex and make part, the attached schedule, to the specifications for this project, when it is advertised for bids and /or to forward said schedules to the successful bidder(s), immediately upon receipt, in order to insure the proper payment of wages.

Please refer to the "General Provisions of Laws Covering Workers on Public Work Contracts" provided with this schedule, for the specific details relating to other responsibilities of the Department of Jurisdiction.

Upon completion or cancellation of this project, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

NOTICE OF COMPLETION / CANCELLATION OF PROJECT

Date Completed: _____ Date Cancelled: _____

Name & Title of Representative: _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

General Provisions of Laws Covering Workers on Article 8 Public Work Contracts

Introduction

The Labor Law requires public work contractors and subcontractors to pay laborers, workers, or mechanics employed in the performance of a public work contract not less than the prevailing rate of wage and supplements (fringe benefits) in the locality where the work is performed.

Responsibilities of the Department of Jurisdiction

A Department of Jurisdiction (Contracting Agency) includes a state department, agency, board or commission: a county, city, town or village; a school district, board of education or board of cooperative educational services; a sewer, water, fire, improvement and other district corporation; a public benefit corporation; and a public authority awarding a public work contract.

The Department of Jurisdiction (Contracting Agency) awarding a public work contract MUST obtain a Prevailing Rate Schedule listing the hourly rates of wages and supplements due the workers to be employed on a public work project. This schedule may be obtained by completing and forwarding a "Request for wage and Supplement Information" form (PW 39) to the Bureau of Public Work. The Prevailing Rate Schedule MUST be included in the specifications for the contract to be awarded and is deemed part of the public work contract.

Upon the awarding of the contract, the law requires that the Department of Jurisdiction (Contracting Agency) furnish the following information to the Bureau: the name and address of the contractor, the date the contract was let and the approximate dollar value of the contract. To facilitate compliance with this provision of the Labor Law, a copy of the Department's "Notice of Contract Award" form (PW 16) is provided with the original Prevailing Rate Schedule.

The Department of Jurisdiction (Contracting Agency) is required to notify the Bureau of the completion or cancellation of any public work project. The Department's PW 200 form is provided for that purpose.

Both the PW 16 and PW 200 forms are available for completion online.

Hours

No laborer, worker, or mechanic in the employ of a contractor or subcontractor engaged in the performance of any public work project shall be permitted to work more than eight hours in any day or more than five days in any week, except in cases of extraordinary emergency. The contractor and the Department of Jurisdiction (Contracting Agency) may apply to the Bureau of Public Work for a dispensation permitting workers to work additional hours or days per week on a particular public work project.

There are very few exceptions to this rule. Complete information regarding these exceptions is available on the "4 Day / 10 Hour Work Schedule" form (PW 30.1).

Wages and Supplements

The wages and supplements to be paid and/or provided to laborers, workers, and mechanics employed on a public work project shall be not less than those listed in the current Prevailing Rate Schedule for the locality where the work is performed. If a prime contractor on a public work project has not been provided with a Prevailing Rate Schedule, the contractor must notify the Department of Jurisdiction (Contracting Agency) who in turn must request an original Prevailing Rate Schedule form the Bureau of Public Work. Requests may be submitted by: mail to NYSDOL, Bureau of Public Work, State Office Bldg. Campus, Bldg. 12, Rm. 130, Albany, NY 12240; Fax to Bureau of Public Work (518) 485-1870; or electronically at the NYSDOL website www.labor.ny.gov.

Upon receiving the original schedule, the Department of Jurisdiction (Contracting Agency) is REQUIRED to provide complete copies to all prime contractors who in turn MUST, by law, provide copies of all applicable county schedules to each subcontractor and obtain from each subcontractor, an affidavit certifying such schedules were received. If the original schedule expired, the contractor may obtain a copy of the new annual determination from the NYSDOL website www.labor.ny.gov.

The Commissioner of Labor makes an annual determination of the prevailing rates. This determination is in effect from July 1st through June 30th of the following year. The annual determination is available on the NYSDOL website www.labor.ny.gov.

Payrolls and Payroll Records

Every contractor and subcontractor MUST keep original payrolls or transcripts subscribed and affirmed as true under penalty of perjury. Payrolls must be maintained for at least three (3) years from the project's date of completion. At a minimum, payrolls must show the following information for each person employed on a public work project: Name, Address, Last 4 Digits of Social Security Number, Classification(s) in which the worker was employed, Hourly wage rate(s) paid, Supplements paid or provided, and Daily and weekly number of hours worked in each classification.

The filing of payrolls to the Department of Jurisdiction is a condition of payment.Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury. The Department of Jurisdiction (Contracting Agency) shall collect, review for facial validity, and maintain such payrolls.

In addition, the Commissioner of Labor may require contractors to furnish, with ten (10) days of a request, payroll records sworn to as their validity and accuracy for public work and private work. Payroll records include, by are not limited to time cards, work description sheets, proof that supplements were provided, cancelled payroll checks and payrolls. Failure to provide the requested information within the allotted ten (10) days will result in the withholding of up to 25% of the contract, not to exceed $100,000.00. If the contractor or subcontractor does not maintain a place of business in New York State and the amount of the contract exceeds $25,000.00, payroll records and certifications must be kept on the project worksite.

The prime contractor is responsible for any underpayments of prevailing wages or supplements by any subcontractor.

All contractors or their subcontractors shall provide to their subcontractors a copy of the Prevailing Rate Schedule specified in the public work contract as well as any subsequently issued schedules. A failure to provide these schedules by a contractor or subcontractor is a violation of Article 8, Section 220-a of the Labor Law.

All subcontractors engaged by a public work project contractor or its subcontractor, upon receipt of the original schedule and any subsequently issued schedules, shall provide to such contractor a verified statement attesting that the subcontractor has received the Prevailing Rate Schedule and will pay or provide the applicable rates of wages and supplements specified therein. (See NYS Labor Laws, Article 8 . Section 220-a).

Determination of Prevailing Wage and Supplement Rate Updates Applicable to All Counties

The wages and supplements contained in the annual determination become effective July 1st whether or not the new determination has been received by a given contractor. Care should be taken to review the rates for obvious errors. Any corrections should be brought to the Department's attention immediately. It is the responsibility of the public work contractor to use the proper rates. If there is a question on the proper classification to be used, please call the district office located nearest the project. Any errors in the annual determination will be corrected and posted to the NYSDOL website on the first business day of each month. Contractors are responsible for paying these updated rates as well, retroactive to July 1st.

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. To the extent possible, the Department posts rates in its possession that cover periods of time beyond the July 1st to June 30th time frame covered by a particular annual determination. Rates that extend beyond that instant time period are informational ONLY and may be updated in future annual determinations that actually cover the then appropriate July 1st to June 30th time period.

Withholding of Payments

When a complaint is filed with the Commissioner of Labor alleging the failure of a contractor or subcontractor to pay or provide the prevailing wages or supplements, or when the Commissioner of Labor believes that unpaid wages or supplements may be due, payments on the public work contract shall be withheld from the prime contractor in a sufficient amount to satisfy the alleged unpaid wages and supplements, including interest and civil penalty, pending a final determination.

When the Bureau of Public Work finds that a contractor or subcontractor on a public work project failed to pay or provide the requisite prevailing wages or supplements, the Bureau is authorized by Sections 220-b and 235.2 of the Labor Law to so notify the financial officer of the Department of Jurisdiction (Contracting Agency) that awarded the public work contract. Such officer MUST then withhold or cause to be withheld from any payment due the prime contractor on account of such contract the amount indicated by the Bureau as sufficient to satisfy the unpaid wages and supplements, including interest and any civil penalty that may be assessed by the Commissioner of Labor. The withholding continues until there is a final determination of the underpayment by the Commissioner of Labor or by the court in the event a legal proceeding is instituted for review of the determination of the Commissioner of Labor.

The Department of Jurisdiction (Contracting Agency) shall comply with this order of the Commissioner of Labor or of the court with respect to the release of the funds so withheld.

Summary of Notice Posting Requirements

The current Prevailing Rate Schedule must be posted in a prominent and accessible place on the site of the public work project. The prevailing wage schedule must be encased in, or constructed of, materials capable of withstanding adverse weather conditions and be titled "PREVAILING RATE OF WAGES" in letters no smaller than two (2) inches by two (2) inches.

The "Public Work Project" notice must be posted at the beginning of the performance of every public work contract, on each job site.

Every employer providing workers. compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers. Compensation Board in a conspicuous place on the jobsite.

Every employer subject to the NYS Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers, notices furnished by the State Division of Human Rights.

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the NYS Department of Labor.

Apprentices

Employees cannot be paid apprentice rates unless they are individually registered in a program registered with the NYS Commissioner of Labor. The allowable ratio of apprentices to journeyworkers in any craft classification can be no greater than the statewide building trade ratios promulgated by the Department of Labor and included with the Prevailing Rate Schedule. An employee listed on a payroll as an apprentice who is not registered as above or is performing work outside the classification of work for which the apprentice is indentured, must be paid the prevailing journeyworker's wage rate for the classification of work the employee is actually performing.

NYSDOL Labor Law, Article 8, Section 220-3, require that only apprentices individually registered with the NYS Department of Labor may be paid apprenticeship rates on a public work project. No other Federal or State Agency of office registers apprentices in New York State.

Persons wishing to verify the apprentice registration of any person must do so in writing by mail, to the NYSDOL Office of Employability Development / Apprenticeship Training, State Office Bldg. Campus, Bldg. 12, Albany, NY 12240 or by Fax to NYSDOL Apprenticeship Training (518) 457-7154. All requests for verification must include the name and social security number of the person for whom the information is requested.

The only conclusive proof of individual apprentice registration is written verification from the NYSDOL Apprenticeship Training Albany Central office. Neither Federal nor State Apprenticeship Training offices outside of Albany can provide conclusive registration information.

It should be noted that the existence of a registered apprenticeship program is not conclusive proof that any person is registered in that program. Furthermore, the existence or possession of wallet cards, identification cards, or copies of state forms is not conclusive proof of the registration of any person as an apprentice.

Interest and Penalties

In the event that an underpayment of wages and/or supplements is found:

- Interest shall be assessed at the rate then in effect as prescribed by the Superintendent of Banks pursuant to section 14-a of the Banking Law, per annum from the date of underpayment to the date restitution is made.
- A Civil Penalty may also be assessed, not to exceed 25% of the total of wages, supplements, and interest due.

Debarment

Any contractor or subcontractor and/or its successor shall be ineligible to submit a bid on or be awarded any public work contract or subcontract with any state, municipal corporation or public body for a period of five (5) years when:

- Two (2) willful determinations have been rendered against that contractor or subcontractor and/or its successor within any consecutive six (6) year period.
- There is any willful determination that involves the falsification of payroll records or the kickback of wages or supplements.

Criminal Sanctions

Willful violations of the Prevailing Wage Law (Article 8 of the Labor Law) may be a felony punishable by fine or imprisonment of up to 15 years, or both.

Discrimination

No employee or applicant for employment may be discriminated against on account of age, race, creed, color, national origin, sex, disability or marital status.

No contractor, subcontractor nor any person acting on its behalf, shall by reason of race, creed, color, disability, sex or national origin discriminate against any citizen of the State of New York who is qualified and available to perform the work to which the employment relates (NYS Labor Law, Article 8, Section 220-e(a)).

No contractor, subcontractor, nor any person acting on its behalf, shall in any manner, discriminate against or intimidate any employee on account of race, creed, color, disability, sex, or national origin (NYS Labor Law, Article 8, Section 220-

e(b)).

The Human Rights Law also prohibits discrimination in employment because of age, marital status, or religion.

There may be deducted from the amount payable to the contractor under the contract a penalty of $50.00 for each calendar day during which such person was discriminated against or intimidated in violation of the provision of the contract (NYS Labor Law, Article 8, Section 220-e(c)).

The contract may be cancelled or terminated by the State or municipality. All monies due or to become due thereunder may be forfeited for a second or any subsequent violation of the terms or conditions of the anti-discrimination sections of the contract (NYS Labor Law, Article 8, Section 220-e(d)).

Every employer subject to the New York State Human Rights Law must conspicuously post at its offices, places of employment, or employment training centers notices furnished by the State Division of Human Rights.

Workers' Compensation

In accordance with Section 142 of the State Finance Law, the contractor shall maintain coverage during the life of the contract for the benefit of such employees as required by the provisions of the New York State Workers' Compensation Law.

A contractor who is awarded a public work contract must provide proof of workers' compensation coverage prior to being allowed to begin work.

The insurance policy must be issued by a company authorized to provide workers' compensation coverage in New York State. Proof of coverage must be on form C-105.2 (Certificate of Workers' Compensation Insurance) and must name this agency as a certificate holder.

If New York State coverage is added to an existing out-of-state policy, it can only be added to a policy from a company authorized to write workers' compensation coverage in this state. The coverage must be listed under item 3A of the information page.

The contractor must maintain proof that subcontractors doing work covered under this contract secured and maintained a workers' compensation policy for all employees working in New York State.

Every employer providing worker's compensation insurance and disability benefits must post notices of such coverage in the format prescribed by the Workers' Compensation Board in a conspicuous place on the jobsite.

Unemployment Insurance

Employers liable for contributions under the Unemployment Insurance Law must conspicuously post on the jobsite notices furnished by the New York State Department of Labor.

Andrew M. Cuomo, Governor

Roberta Reardon, Commissioner

Roch Joint School Const Board

Steve Rebholz, Project Manager
SWBR Architects
387 East Main Street
Rochester NY 14604

Schedule Year 2019 through 2020
Date Requested 01/30/2017
PRC# 2017000965

Location 321 Post Avenue
Project ID#
Project Type Abatement and Selective Demolition

Notice of Contract Award

New York State Labor Law, Article 8, Section 220.3a requires that certain information regarding the awarding of public work contracts, be furnished to the Commissioner of Labor. One "Notice of Contract Award" (PW 16, which may be photocopied), **MUST** be completed for **EACH** prime contractor on the above referenced project.

Upon notifying the successful bidder(s) of this contract, enter the required information and mail **OR** fax this form to the office shown at the bottom of this notice, **OR** fill out the electronic version via the NYSDOL website.

Contractor Information

All information must be supplied

Federal Employer Identification Number: _____

Name: _____

Address: _____

_____

City: _____ State: _____ Zip: _____

Amount of Contract: $_____

Approximate Starting Date: ____/____/____

Approximate Completion Date: ____/____/____

Contract Type:

[ ] (01) General Construction
[ ] (02) Heating/Ventilation
[ ] (03) Electrical
[ ] (04) Plumbing
[ ] (05) Other : _____

Phone: (518) 457-5589 Fax: (518) 485-1870
W. Averell Harriman State Office Campus, Bldg. 12, Room 130, Albany, NY 12240

IMPORTANT NOTICE

FOR

CONTRACTORS & CONTRACTING AGENCIES

Social Security Numbers on Certified Payrolls

The Department of Labor is cognizant of the concerns of the potential for misuse or inadvertent disclosure of social security numbers. Identity theft is a growing problem and we are sympathetic to contractors' concerns with regard to inclusion of this information on payrolls if another identifier will suffice.

For these reasons, ***the substitution of the use of the last four digits of the social security number on certified payrolls submitted to contracting agencies on public work projects is now acceptable to the Department of Labor.***

NOTE: This change does not affect the Department's ability to request and receive the entire social security number from employers during the course of its public work / prevailing wage investigations.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

Budget Policy & Reporting Manual

B-610

Public Work Enforcement Fund

effective date December 7, 2005

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1. Purpose and Scope:

This Item describes the Public Work Enforcement Fund (the Fund, PWEF) and its relevance to State agencies and public benefit corporations engaged in construction or reconstruction contracts, maintenance and repair, and announces the recently-enacted increase to the percentage of the dollar value of such contracts that must be deposited into the Fund. This item also describes the roles of the following entities with respect to the Fund:

- New York State Department of Labor (DOL),
- The Office of the State of Comptroller (OSC), and
- State agencies and public benefit corporations.

2. Background and Statutory References:

DOL uses the Fund to enforce the State's Labor Law as it relates to contracts for construction or reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law. State agencies and public benefit corporations participating in such contracts are required to make payments to the Fund.

Chapter 511 of the Laws of 1995 (as amended by Chapter 513 of the Laws of 1997, Chapter 655 of the Laws of 1999, Chapter 376 of the Laws of 2003 and Chapter 407 of the Laws of 2005) established the Fund.

3. Procedures and Agency Responsibilities:

The Fund is supported by transfers and deposits based on the value of contracts for construction and reconstruction, maintenance and repair, as defined in subdivision two of Section 220 of the Labor Law, into which all State agencies and public benefit corporations enter.

Chapter 407 of the Laws of 2005 increased the amount required to be provided to this fund to .10 of one-percent of the total cost of each such contract, to be calculated at the time agencies or public benefit corporations enter into a new contract or if a contract is amended. The provisions of this bill became effective August 2, 2005.

To all State Departments, Agency Heads and Public Benefit Corporations
IMPORTANT NOTICE REGARDING PUBLIC WORK ENFORCEMENT FUND

OSC will report to DOL on all construction-related ("D") contracts approved during the month, including contract amendments, and then DOL will bill agencies the appropriate assessment monthly. An agency may then make a determination if any of the billed contracts are exempt and so note on the bill submitted back to DOL. For any instance where an agency is unsure if a contract is or is not exempt, they can call the Bureau of Public Work at the number noted below for a determination. Payment by check or journal voucher is due to DOL within thirty days from the date of the billing. DOL will verify the amounts and forward them to OSC for processing.

For those contracts which are not approved or administered by the Comptroller, monthly reports and payments for deposit into the Public Work Enforcement Fund must be provided to the Administrative Finance Bureau at the DOL within 30 days of the end of each month or on a payment schedule mutually agreed upon with DOL.

Reports should contain the following information:

- Name and billing address of State agency or public benefit corporation;
- State agency or public benefit corporation contact and phone number;
- Name and address of contractor receiving the award;
- Contract number and effective dates;
- Contract amount and PWEF assessment charge (if contract amount has been amended, reflect increase or decrease to original contract and the adjustment in the PWEF charge); and
- Brief description of the work to be performed under each contract.

Checks and Journal Vouchers, payable to the "New York State Department of Labor" should be sent to:

Department of Labor
Administrative Finance Bureau-PWEF Unit
Building 12, Room 464
State Office Campus
Albany, NY 12240

Any questions regarding billing should be directed to NYSDOL's Administrative Finance Bureau-PWEF Unit at (518) 457-3624 and any questions regarding Public Work Contracts should be directed to the Bureau of Public Work at (518) 457-5589.

Required Notice under Article 25-B of the Labor Law

Attention All Employees, Contractors and Subcontractors: You are Covered by the Construction Industry Fair Play Act

The law says that you are an employee unless:

- You are free from direction and control in performing your job, **and**
- You perform work that is not part of the usual work done by the business that hired you, **and**
- You have an independently established business.

Your employer cannot consider you to be an independent contractor unless all three of these facts apply to your work.

It is against the law for an employer to misclassify employees as independent contractors or pay employees off the books.

Employee Rights: If you are an employee, you are entitled to state and federal worker protections. These include:

- Unemployment Insurance benefits, if you are unemployed through no fault of your own, able to work, and otherwise qualified,
- Workers' compensation benefits for on-the-job injuries,
- Payment for wages earned, minimum wage, and overtime (under certain conditions),
- Prevailing wages on public work projects,
- The provisions of the National Labor Relations Act, and
- A safe work environment.

It is a violation of this law for employers to retaliate against anyone who asserts their rights under the law. Retaliation subjects an employer to civil penalties, a private lawsuit or both.

Independent Contractors: If you are an independent contractor**, you must pay all taxes and Unemployment Insurance contributions required by New York State and Federal Law.**

Penalties for paying workers off the books or improperly treating employees as independent contractors:

- **Civil Penalty** — First offense: Up to $2,500 per employee

  Subsequent offense(s): Up to $5,000 per employee

- **Criminal Penalty** — First offense: Misdemeanor - up to 30 days in jail, up to a $25,000 fine and debarment from performing public work for up to one year.

  Subsequent offense(s): Misdemeanor - up to 60 days in jail or up to a $50,000 fine and debarment from performing public work for up to 5 years.

If you have questions about your employment status or believe that your employer may have violated your rights and you want to file a complaint, call the Department of Labor at (866) 435-1499 or send an email to dol.misclassified@labor.ny.gov. All complaints of fraud and violations are taken seriously. You can remain anonymous.

Employer Name:

New York State Department of Labor
Bureau of Public Work

Attention Employees

THIS IS A:

PUBLIC WORK PROJECT

If you are employed on this project as a **worker, laborer, or mechanic** you are entitled to receive the **prevailing wage and supplements rate** for the classification at which you are working.

Chapter 629 of the Labor Laws of 2007:

These wages are set by law and must be posted at the work site. They can also be found at: www.labor.ny.gov

If you feel that you have not received proper wages or benefits, please call our nearest office.*

Albany	(518) 457-2744	Patchogue	(631) 687-4882
Binghamton	(607) 721-8005	Rochester	(585) 258-4505
Buffalo	(716) 847-7159	Syracuse	(315) 428-4056
Garden City	(516) 228-3915	Utica	(315) 793-2314
New York City	(212) 932-2419	White Plains	(914) 997-9507
Newburgh	(845) 568-5156		

* For New York City government agency construction projects, please contact the Office of the NYC Comptroller at (212) 669-4443, or www.comptroller.nyc.gov – click on Bureau of Labor Law.

Contractor Name: _____

Project Location: _____

Requirements for OSHA 10 Compliance

Chapter 282 of the Laws of 2007, codified as Labor Law 220-h took effect on July 18, 2008. The statute provides as follows:

The advertised specifications for every contract for public work of $250,000.00 or more must contain a provision requiring that every worker employed in the performance of a public work contract shall be certified as having completed an OSHA 10 safety training course. The clear intent of this provision is to require that all employees of public work contractors, required to be paid prevailing rates, receive such training "prior to the performing any work on the project."

The Bureau will enforce the statute as follows:

All contractors and sub contractors must attach a copy of proof of completion of the OSHA 10 course to the first certified payroll submitted to the contracting agency and on each succeeding payroll where any new or additional employee is first listed.

Proof of completion may include but is not limited to:

- Copies of bona fide course completion card (*Note: Completion cards do not have an expiration date.*)
- Training roster, attendance record of other documentation from the certified trainer pending the issuance of the card.
- Other valid proof

**A certification by the employer attesting that all employees have completed such a course is not sufficient proof that the course has been completed.

Any questions regarding this statute may be directed to the New York State Department of Labor, Bureau of Public Work at 518-485-5696.

Introduction to the Prevailing Rate Schedule

Information About Prevailing Rate Schedule

This information is provided to assist you in the interpretation of particular requirements for each classification of worker contained in the attached Schedule of Prevailing Rates.

Classification

It is the duty of the Commissioner of Labor to make the proper classification of workers taking into account whether the work is heavy and highway, building, sewer and water, tunnel work, or residential, and to make a determination of wages and supplements to be paid or provided. It is the responsibility of the public work contractor to use the proper rate. If there is a question on the proper classification to be used, please call the district office located nearest the project. District office locations and phone numbers are listed below.

Prevailing Wage Schedules are issued separately for "General Construction Projects" and "Residential Construction Projects" on a county-by-county basis.

General Construction Rates apply to projects such as: Buildings, Heavy & Highway, and Tunnel and Water & Sewer rates.

Residential Construction Rates generally apply to construction, reconstruction, repair, alteration, or demolition of one family, two family, row housing, or rental type units intended for residential use.

Some rates listed in the Residential Construction Rate Schedule have a very limited applicability listed along with the rate. Rates for occupations or locations not shown on the residential schedule must be obtained from the General Construction Rate Schedule. Please contact the local Bureau of Public Work office before using Residential Rate Schedules, to ensure that the project meets the required criteria.

Payrolls and Payroll Records

Contractors and subcontractors are required to establish, maintain, and preserve for not less that six (6) years, contemporaneous, true, and accurate payroll records.

Every contractor and subcontractor shall submit to the Department of Jurisdiction (Contracting Agency), within thirty (30) days after issuance of its first payroll and every thirty (30) days thereafter, a transcript of the original payrolls, subscribed and affirmed as true under penalty of perjury.

Paid Holidays

Paid Holidays are days for which an eligible employee receives a regular day's pay, but is not required to perform work. If an employee works on a day listed as a paid holiday, this remuneration is in addition to payment of the required prevailing rate for the work actually performed.

Overtime

At a minimum, all work performed on a public work project in excess of eight hours in any one day or more than five days in any workweek is overtime. However, the specific overtime requirements for each trade or occupation on a public work project may differ. Specific overtime requirements for each trade or occupation are contained in the prevailing rate schedules.

Overtime holiday pay is the premium pay that is required for work performed on specified holidays. It is only required where the employee actually performs work on such holidays.

The applicable holidays are listed under HOLIDAYS: OVERTIME. The required rate of pay for these covered holidays can be found in the OVERTIME PAY section listings for each classification.

Supplemental Benefits

Particular attention should be given to the supplemental benefit requirements. Although in most cases the payment or provision of supplements is straight time for all hours worked, some classifications require the payment or provision of supplements, or a portion of the supplements, to be paid or provided at a premium rate for premium hours worked. Supplements may also be required to be paid or provided on paid holidays, regardless of whether the day is worked. The Overtime Codes and Notes listed on the particular wage classification will indicate these conditions as required.

Effective Dates

When you review the schedule for a particular occupation, your attention should be directed to the dates above the column of rates. These are the dates for which a given set of rates is effective. The rate listed is valid until the next effective rate change or until the new annual determination which takes effect on July 1 of each year. All contractors and subcontractors are required to pay the current prevailing rates of wages and supplements. If you have any questions please contact the Bureau of Public Work or visit the New York State Department of Labor website (www.labor.ny.gov) for current wage rate information.

Apprentice Training Ratios

The following are the allowable ratios of registered Apprentices to Journey-workers.

For example, the ratio 1:1,1:3 indicates the allowable initial ratio is one Apprentice to one Journeyworker. The Journeyworker must be in place on the project before an Apprentice is allowed. Then three additional Journeyworkers are needed before a second Apprentice is allowed. The last ratio repeats indefinitely. Therefore, three more Journeyworkers must be present before a third Apprentice can be hired, and so on.

Please call Apprentice Training Central Office at (518) 457-6820 if you have any questions.

Title (Trade)	Ratio
Boilermaker (Construction)	1:1,1:4
Boilermaker (Shop)	1:1,1:3
Carpenter (Bldg.,H&H, Pile Driver/Dockbuilder)	1:1,1:4
Carpenter (Residential)	1:1,1:3
Electrical (Outside) Lineman	1:1,1:2
Electrician (Inside)	1:1,1:3
Elevator/Escalator Construction & Modernizer	1:1,1:2
Glazier	1:1,1:3
Insulation & Asbestos Worker	1:1,1:3
Iron Worker	1:1,1:4
Laborer	1:1,1:3
Mason	1:1,1:4
Millwright	1:1,1:4
Op Engineer	1:1,1:5
Painter	1:1,1:3
Plumber & Steamfitter	1:1,1:3
Roofer	1:1,1:2
Sheet Metal Worker	1:1,1:3
Sprinkler Fitter	1:1,1:2

If you have any questions concerning the attached schedule or would like additional information, please contact the nearest BUREAU of PUBLIC WORK District Office or write to:

New York State Department of Labor
Bureau of Public Work
State Office Campus, Bldg. 12
Albany, NY 12240

District Office Locations:	Telephone #	FAX #
Bureau of Public Work - Albany	518-457-2744	518-485-0240
Bureau of Public Work - Binghamton	607-721-8005	607-721-8004
Bureau of Public Work - Buffalo	716-847-7159	716-847-7650
Bureau of Public Work - Garden City	516-228-3915	516-794-3518
Bureau of Public Work - Newburgh	845-568-5287	845-568-5332
Bureau of Public Work - New York City	212-932-2419	212-775-3579
Bureau of Public Work - Patchogue	631-687-4882	631-687-4902
Bureau of Public Work - Rochester	585-258-4505	585-258-4708
Bureau of Public Work - Syracuse	315-428-4056	315-428-4671
Bureau of Public Work - Utica	315-793-2314	315-793-2514
Bureau of Public Work - White Plains	914-997-9507	914-997-9523
Bureau of Public Work - Central Office	518-457-5589	518-485-1870

SECTION 00 95 00 – TAX EXEMPT LETTER FROM NYS COVERSHEET

New York State Department of
TAXATION and FINANCE
OTPA Sales Tax Exempt Organizations Unit
Building 9 Room 154
W.A. Harriman Campus
Albany, NY 12227

January 26, 2012

Rochester Joint Schools Construction Board
175 Martin Street, Suite 421
Rochester, New York 14605

Dear Sir or Madam:

The Tax Law exempts New York State governmental entities such as your organization, Rochester Joint Schools Construction Board, from the payment of New York State sales and use taxes on their purchases. In order to make tax exempt purchases, a New York State governmental entity must present vendors with the entity's official purchase order or other documentation (e.g., payment voucher, contract of sale, Form AC 946, *Tax Exemption Certificate*, Form ST-129, *Exemption Certificate - Tax on occupancy of hotel rooms*, etc.) which indicates that the purchaser is a New York State governmental entity.

Tax exemption numbers and Form ST-119.1, *Exempt Organization Exempt Purchase Certificate*, are not issued to New York State governmental entities. If a vendor requests a tax exemption number or Form ST-119.1, *Exempt Organization Exempt Purchase Certificate* from you, the Rochester Joint Schools Construction Board may give the vendor a copy of this letter. This will assure the vendor that a governmental purchase order, or other evidence that the Rochester Joint Schools Construction Board is the purchaser, is the only documentation the vendor needs in order to not collect sales tax.

For additional information, please refer to Publication 843, *A Guide to Sales Tax in New York State for Exempt Organizations*, which is available on the New York State Tax Department website at nystax.gov

New York State Department of Taxation and Finance
OTPA-Taxpayer Guidance Division
Sales Tax Exempt Organizations Unit
Building 9 Room 154
W A Harriman Campus
Albany NY 12227

SECTION 01 00 10 - REFERENCE STANDARDS

PART 1 – GENERAL

1.1 "Reference Standards" are documents or publications, which include requirements, set by authority, custom or general consent and establishes accepted criterion.

1.2 "Reference Standards" are incorporated into the Contract Documents by reference and each reference shall mean the latest edition at date of the Project Manual, including amendments and supplements. Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 When requested, deliver to the Owner's Representative, an affidavit or certificate properly signed by manufacturer or supplier indicating that the material furnished conforms to the specified standards.

1.4 Reference to manufacturer's printed Specifications for specified products shall mean most current Specification on date of this Project Manual. 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 part of the Contract Documents by reference.

Part 2 - PRODUCTS (Not Used)

Part 3 - EXECUTION (Not Used)

END OF SECTION 010010

SECTION 01 00 20 - ABBREVIATIONS AND ACRONYMS

1.1 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabc.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800
AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	American Concrete Institute www.concrete.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHA	American Hardboard Association	

	www.domensino.com/AHA	(847) 934-8800
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700
AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(607) 256-3313
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA EWS	APA - The Engineered Wood Association; Engineered Wood Systems (See APA - The Engineered Wood Association)	
API	American Petroleum Institute www.api.org	(202) 682-8000
ARHI	Air-Conditioning, Heating & Refrigeration Institute www.arhinet.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers	(800) 548-2723

	www.asce.org	(703) 295-6300
ASCE/SEI	American Society of Civil Engineers/Structural Engineering Institute (See ASCE)	
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9500
AWCI	AWCI International (Association of the Wall and Ceiling Industry International) www.awci.org	(703) 538-1600
AWCMA	American Window Covering Manufacturers Association (Now WCSC)	
AWI	Architectural Woodwork Institute www.awinet.org	(571) 323-3636
AWPA	American Wood Protection Association www.awpa.com	(205) 733-4077
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353
AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	Building Industry Consulting Service International www.bicsi.org	(800) 242-7405 (813) 979-1991
BIFMA	BIFMA International (Business and Institutional Furniture Manufacturer's Association International) www.bifma.org	(616) 285-3963

BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(610) 527-3880
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CFFA	Chemical Fabrics & Film Association, Inc. www.chemicalfabricsandfilm.com	(216) 241-7333
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CRRC	Cool Roof Rating Council www.coolroofs.org	(866) 465-2523 (510) 485-7175
CPA	Composite Panel Association www.pbmdf.com	(866) 426-6767 (703) 724-1128
CPPA	Corrugated Polyethylene Pipe Association (See PPI – Plastics Pipe Institute)	
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSA	Canadian Standards Association www.csa.ca	(800) 463-6727 (416) 747-4000

CSA	CSA International (Formerly: IAS - International Approval Services) www.csa-international.org	(866) 797-4272 (416) 747-2661
CSI	Cast Stone Institute www.caststone.org	(717) 272-3744
CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute (Formerly: Cooling Tower Institute) www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462
EJCDC	Engineers Joint Contract Documents Committee www.ejcdc.org	
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
E-rate	Education Rate (Universal Service Fund) www.universalservice.org/sl	
ESD	Electrostatic Discharge Association www.esda.org	(315) 339-6937
FIBA	Federation Internationale de Basketball (The International Basketball Federation) www.fiba.com	41 22 545 00 00
FM Approvals	FM Approvals www.fmglobal.com	(781) 762-4300
FM Global	FM Global (Formerly: FMG - FM Global) www.fmglobal.com	(401) 275-3000
FMRC	Factory Mutual Research (Now FM Global)	

FRSA	Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc. www.floridaroof.com	(407) 671-3772
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(301) 277-8686
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GRI	(Now GSI)	
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700
HI	Hydronics Institute (Now Part of AHRI)	
HMMA	Hollow Metal Manufacturers Association (Part of NAAMM)	
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IAS	International Approval Services (Now CSA International)	
IBF	International Badminton Federation www.internationalbadminton.org	(603) 9283-7155
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrical Congress www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The)	(212) 419-7900

	www.ieee.org	
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 981-0100
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
ISFA	International Surface Fabricators Association www.isfanow.org	(877) 464-7732 (801) 341-7360
ITS	Intertek Testing Service NA www.intertek.com	(800) 967-5352
ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association, Inc. www.metalframingmfg.org	(312) 644-6610
MH	Material Handling (Now MHIA)	

MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937 (604) 298-7578
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(630) 942-6591
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAGWS	National Association for Girls and Women in Sport www.aahperd.org/nagws/	(703) 476-3452
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848
NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 222-2300
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200

NETA	InterNational Electrical Testing Association www.netaworld.org	(888) 300-6382 (269) 488-6382
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	National Fire Protection Association www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	National Oak Flooring Manufacturers Association (Now NWFA)	
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070
NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	National Sanitation Foundation International www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NTRMA	National Tile Roofing Manufacturers Association (Now TRI)	
NWFA	National Wood Flooring Association www.nwfa.org	(800) 422-4556 (636) 519-9663
NWWDA	National Wood Window and Door Association (Now WDMA)	
OPL	Omega Point Laboratories, Inc. (Now ITS)	
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300

PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.cee.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network (Formerly: ACLA - Associated Landscape Contractors of America) www.landcarenetwork.org	(800) 395-2522 (703) 736-9666
PTI	Post-Tensioning Institute www.post-tensioning.org	(248) 848-3180
RCSC	Research Council on Structural Connections www.boltcouncil.org	
RFCI	Resilient Floor Covering Institute www.rfci.com	(706) 882-3833
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(877) 294-5424 (516) 294-5424
SEI/ASCE	Structural Engineering Institute/American Society of Civil Engineers (See ASCE)	
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(866) 817-8888 (703) 683-2075
SIGMA	Sealed Insulating Glass Manufacturers Association (Now IGMA)	
SJI	Steel Joist Institute www.steeljoist.org	(843) 293-1995
SMA	Screen Manufacturers Association	(561) 533-0991

	www.smainfo.org	
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SPFA	Spray Polyurethane Foam Alliance (Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray Polyurethane Foam Division) www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI/SPFA	Steel Tank Institute/Steel Plate Fabricators Association www.steeltank.com	(847) 438-8265
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974
TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc.	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrasssod.org	(800) 405-8873 (847) 649-5555

TRI	Tile Roofing Institute www.tileroofing.org	(312) 670-4177
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USGBC	U.S. Green Building Council www.usgbc.org	(800) 795-1747 (202) 742-3792
USITT	United States Institute for Theatre Technology, Inc. www.usitt.org	(800) 938-7488 (315) 463-6463
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCLIB	West Coast Lumber Inspection Bureau www.wclib.org	(800) 283-1486 (503) 639-0651
WCMA	Window Covering Manufacturers Association (Now WCSC)	
WCSC	Window Covering Safety Council (Formerly: WCMA) www.windowcoverings.org	(800) 506-4636 (212) 297-2100
WDMA	Window & Door Manufacturers Association (Formerly: NWWDA) www.wdma.com	(800) 223-2301 (312) 321-6802
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930

B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543

NEC	National Electric Code www.nec.com	

C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	(202) 761-0011
CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
DOC	US Department of Commerce www.commerce.gov	(202) 482-2000
DOD	US Department of Defense www.defense.gov	(703) 571-5131
DOE	US Department of Energy www.energy.gov	(202) 586-5000
EPA	US Environmental Protection Agency www.epa.gov	(202) 272-0167
FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
FDA	US Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	US General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478

OSHA	US Department of Labor; Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	US Department of Health & Human Services; Office of Public Health and Science www.hhs.gov/ophs/	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	US Department of State www.state.gov	(202) 647-4000
TRB	Transportation Research Board http://gulliver.trb.org	(202) 334-2934
USDA	US Department of Agriculture www.usda.gov	(202) 720-2791
USPS	US Postal Service	(800) 275-8777
	www.usps.com	(202) 268-2000

D. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from United States Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FED-STD	Federal Standard (See FS)	
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dsp.dla.mil	(215) 697-2664

	Available from General Services Administration www.gsa.gov	(202) 619-8925
	Available from National Institute of Building Sciences www.wbdg.org/ccb	(202) 289-7800
FTMS	Federal Test Method Standard (See FS)	
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

E. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

NYBFU	New York Board of Fire Underwriters www.nybfuinstitute.org	(212) 227-3700 1-800-227-2761
NYSDEC	New York State Department of Environmental Conservation www.dec..ny.gov	(518) 402-8651
SPDES	NYSDEC – State Pollution Discharge Elimination System http://www.dec.ny.gov/permits/6054.html	(518) 402-8109
NYSDOL	New York State Department of Labor www.labor.state.ny.us	(518) 457-9000
NYSDOS	New York Department of State Division of Code Enforcement and Administration www.dos.state.ny.us	(518) 474-4073
NYSDOT	New York State Department of Transportation www.nysdot.gov	(518) 457-6195
NYSDOH	New York State Department of Health www.health.state.ny.us	
NYSED	New York State Education Department Office of Facilities Planning http://www.emsc.nysed.gov/facplan/	(518) 474-3906
NYSUFPBC	New York State Uniform Fire Protection and Building Code 1. BCNYS – Building Code of New York State 2. ECNYS – Energy Conservation Construction Code of New York State 3. FCNYS – Fire Code of New York State 4. FGNYS – Fuel Gas Code of New York State 5. MCNYS – Mechanical Code of New York State	

6. PCNYS – Plumbing Code of NEW York State
7. PMCNYS – Property Maintenance Code of New York State
8. RCNYS – Residential Code of New York State

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 00 20

SECTION 01 00 30 - DEFINITIONS

Project-specific definitions are included in the General Conditions of the Contract for Construction (Section 00 72 16). Additional terms that may be applicable to the Project are included herein. In the event of a conflict, definitions set forth in the General Conditions shall govern.

1.1 PROVIDE:

A. Where the term "provide" is used it shall be understood to mean "furnish" and "install."

1.2 PROJECT MANUAL:

A. The term "Project Manual" describes the written document, of one or more volumes, which includes the Instructions to Bidders, Form of Contract, General Conditions, List of Drawings, Amendments, Supplements, Sample Forms, and the Technical Specifications as set forth more specifically in the Table of Contents.

1.3 PRODUCT:

A. The term "product" shall be deemed to mean all natural and manufactured materials, fixtures, equipment, devices and furnishings to be incorporated into the Work.

1.4 LANGUAGE OF PROJECT MANUAL:

A. The language of the Project Manual is of the abbreviated or streamlines type and includes incomplete sentences.

B. Omitted words or phrases shall be supplied by inference in the same manner as they are when a "note" occurs on the Drawings, the words "shall be" or "shall", will be supplied by inference.

C. Wherever the words "approved," "satisfactory", "directed", "submitted", "inspected" or similar words, or phases, are used; it shall be assured that the word "Architect" or ”Owner’s Representative” follows the verb as the object of the clause, such as "approved by the Architect," or the appropriate party as may be inferred from the context thereof.

1.5 CONSTRUCTION SCHEDULE

A. Wherever the words “work schedule,” “work plan,” or similar words or phrases are used, it shall be deemed to mean “construction schedule” as specified in Section 00 43 83 “Schedules and Milestones.”

1.6 DEMOLITION

A. The systematic destruction of the existing building(s) including every element within such structure to include trees, pavers, glass, mechanical components, plumbing fixtures, electrical fixtures, cables, concrete, foundation, roofing, lockers, asbestos removal, etc., and disposed of in a lawful manner.

1.7 TERMS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": Terms such as "directed," ‘accepted,’ ‘deleted,’ ‘permitted,’ ‘requested,’ ‘required,’ and ‘selected’ mean, unless otherwise explained, ‘accepted by the Architect,’ ‘directed by the Architect,’ ‘permitted by the Architect, ‘requested by the Architect,’ ‘required by the Architect,’ and ‘selected by the Architect.’ However, no such implied meaning will be interpreted to extend the Architect’s responsibility into the Contractor’s area of construction supervision.

D. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on Drawings; or to other paragraphs or schedules in 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.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work form of incorporation into the Project, and maintained ready for use. Supply and deliver products requiring additional or supplemental fitting, assembly, fabrication, or incorporation into other elements of the Project directly to the fabricator, installer or manufacturer as required.

F. "Furnish": The term "furnish" means to supply and deliver to Project site, or other designated location ready for unloading, unpacking, storing assembly, installation, application, erection, or other form of incorporation into the Project, and maintained ready for use. Supply and deliver products requiring additional or supplemental fitting, assembly, fabrication or incorporation into other elements of the Project directly to the fabricator, installer or manufacturer as required.

G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations required to properly incorporate work into the project.

H. "Provide": Furnish and install, complete and ready for the intended use. Note: the lack of a modifier in any technical note is to have the inferred meaning of "provide"

I. "Project Site": is the space available for performing construction activities, either exclusively or in conjunction with others performing other work as part of Project. The extent of Project site is shown on the Drawings and may or may not be identical with the description of the land on which Project is to be built.

J. "Installer": An installer is Contractor or another entity engaged by Contractor, as an employee, subcontractor, or contractor of lower tier, to perform a particular construction operation, including installation, erection, application, and similar operations.

K. 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.

L. The term 'replace' means remove designated, damaged, rejected, defective, unacceptable, or nonconforming work from the Project and provide new work meeting the requirements of the Contract Documents in place thereof.

M. "Include": The words 'include,' in any form other than inclusive,' is non-limiting and is not intended to mean all-inclusive."

N. "Custom Color" is a special color that is not available from the manufactures standard colors and will require a once in a lifetime color match as selected by the Architect.

O. "Standard color" is a minimum of 8 standard colors that the manufacture commonly offers for their product.

P. "Match existing" is to match the existing material system including but not limited to: color, texture, size, and edge treatment (including the systems grout/mortar color, texture, size, shape and reveal)

Q. "Concealed" where used in connection with insulation, painting of piping, piping, conduit, ducts, and accessories shall mean that they are hidden from sight as in trenches, chases, shafts, furred spaces, walls, slabs, or hung ceilings; also where they are not hidden from sight in the following locations: in partly excavated spaces or crawl spaces, or in service tunnels and used solely for repairs or maintenance.

R. “Exposed” where used in connection with insulation, painting of piping, piping, conduit, ducts, accessories shall mean that they are not “concealed” as defined herein above.

S. “Piping” includes in addition to pipe, also fittings, valves, hangers, and other accessories that comprise system.

T. “Below Grade” includes all areas below the finished grade line and below the finished floor, where the finished floor system is supported on earth and gravel systems.

U. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

V. Salvage: Detach items from existing construction and deliver them to Owner ready for reuse or safely store in a controlled environment and reinstall where indicated.

W. Reinstall: Prepare for reuse, clean, replace missing or damaged accessories, and reinstall them where indicated.

X. Existing: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, salvaged, or removed and reinstalled.

END OF SECTION 01 00 30

SECTION 01 10 00 - SUMMARY OF WORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General Conditions of the Contract for Construction, Division 00 and Division 01 Specifications sections, apply to Work of this section.

B. Section 00 73 46 Wage Rates. Davis Bacon Wage Determination updated at the time of award. Post-award changes to published New York State Prevailing Wage Rate or Davis Bacon Wage Rate shall not constitute basis for Contract Sum increase.

C. Milestone Schedule and Critical Submittals Section 00 43 83.

1.2 DESCRIPTION OF WORK

A. The Contractor shall submit lump sum information prices attached to Bid Form Section 00 41 16. The Work of this Project is described more completely elsewhere in the Contract Documents and compliments the following list. Contractors shall attend all meetings and comply fully with the detailed specifications and drawings that are part of this Contract. See Unit Price Section 00 43 22 for Unit Price items.

B. The Work includes all labor, materials, equipment and transportation necessary to complete the project as specified and as indicated in the Contract Documents.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Information

1. **Project Location**: 321 Post Avenue, Rochester, NY 14619
2. **Project Description**: The project consists of Additions and Alterations work at the John Walton Spencer School 16 Additions and Alterations work
3. **Owner Identification:** Rochester Joint Schools Construction Board (RJSCB) (herein, “Owner”) as represented by its Executive Director. Owner is agent for; Rochester City School District (RCSD); and City of Rochester for purposes of the Rochester School Modernization Program (RSMP).
4. **Program Manager Identification:** The Owner has engaged Gilban/Savin Engineers P.C. as Program Manager for this Project to serve as an advisor to

Owner and to provide assistance in administering the Contracts for Design and Construction between Owner and each Consultant/Contractor, according to a separate contract between Owner and Program Manager.

5. **Construction Manager Identification**: The Owner has engaged Buffalo Construction Consultants, as Construction Managers. The particular Construction Manager designated by contract with the Owner for that particular Project site shall serve as the Contractor's primary contact for, and Owner's authorized agent of, the Project with regard to that site to serve as an advisor to Owner and the Program Manager to provide assistance in administering the Contract for Construction between Owner and each Contractor, according to its separate contract with Owner.

6. **Architect/Engineer Identification:** Owner has engaged SWBR Architects as the Architect of record. SWBR has engaged various professional engineers and/or consultants as part of their design team. SWBR is retained under separate agreement with Owner, and shall be identified as the Architect/Engineer for the Project.

B. Contract Documents dated January 30, 2020, prepared by SWBR Architects, 387 East Main Street, Rochester, NY 14604.

C. Protection of existing utilities under the existing structures and site is considered part of this Work scope.

D. Work will be constructed under a Multiple Prime Contracts.

E. Prime Contracts are separate contracts between the Owner and separate contractors, representing significant construction activities. This Prime contract is performed concurrently with and closely related to construction activities performed on the project and closely coordinated with construction activities performed on the project under prime contracts Prime Contracts for this project include:

1. Prime Contract: **General Trades Contract #7**
2. Prime Contract: **Mechanical Work Contract #8**
3. Prime Contract: **Electrical Work Contract #9**
4. Prime Contract: **Plumbing Work Contract #10**

1.4 CONTRACT METHOD

A. Construct the Work under a Lump Sum fixed price Contract for each Prime Contract.

B. Construction Work is being accomplished by utilizing a sequentially phased, multiple Prime Contract procedure.

PART 2 -

2.1 PRIME CONTRACT SUMMARY OF WORK

A. The following documents are hereby defined as Contract Documents and are specifically included and defined as integral to Each Prime Contract.

1. The Contract Documents consist of: Drawings and Specifications

a. List of Specifications: See Project Manual Specification Index in Table of Contents

b. List of Drawings: See Project Manual Drawing Index in Table of Contents – All Drawings included in the Project Drawing Index is integral to each Prime Contract.

2.2 SECURITY REQUIREMENTS

A. Work zones and material / equipment staging zones shall remain locked at all times, except when a Worker is present to prevent unauthorized entry.

B. All construction Workers shall be required to wear photo identification badges at all times. The Construction Manager/District will issue security badges to each Worker prior to the Worker entering the project site.

C. Contractors are reminded that all Workers will be required to act in a manner consistent with a school environment. Each Contractor will be responsible to ensure that all Workers act appropriately. Any individual acting in a manner not acceptable to any school representative, the Owner or Construction Manager, will be directed to surrender his/her badge and to leave the premises immediately. The offending individual will be prohibited from future Work on this Project.

D. The City of Rochester Police Department reserves the right to inspect any packages or deliveries throughout the course of the Project.

E. The City of Rochester Police Department, at their discretion, reserves the right to inspect the Work areas.

2.3 PROTECTION OF NEW AND EXISTING WORK

A. Each Contractor shall be wholly responsible for the protection of their finish Work as well as that of others.

B. All finished surfaces shall be protected if there is any possibility of damage resulting from the Work of other trades. This includes protection of the jambs and soffits of all openings used as passageways, or through which materials will be handled.

C. All finished surfaces, including factory finished surfaces, shall be cleaned and not marked upon delivery to the project. The Contractor shall, without extra compensation, refinish and/or replace all damaged surfaces to the satisfaction of the Architect/Engineer.

D. The finishes sequence of all areas will be as follows:

1. Prime coat and first finish coat on walls.
2. Install ceiling grid, ceiling tile border (i.e., cuts and specials), and ceiling tiles required for the installation of items listed in Item “c” below.
3. Install ceiling mounted electrical devices, light fixtures, diffusers, grilles, registers, and specialties.
4. Install casework, millwork, and ceramic tile.
5. Install resilient flooring, carpet, toilet fixtures and accessories.
6. Paint second finish coat on walls.
7. Install wall base, ceiling tile, and wall-mounted electrical devices and cover plates.
8. Apply final finish coat of paint to door frames after installation of FF&E.
9. Contractors will use this sequence to reduce minor damages to finishes at the end of each completed phase.

E. Each Contractor shall be responsible for the protection of all existing finished surfaces, i.e., walls, doors, window and door frames, casework, jambs, soffits, etc., called out to remain. Contractors shall, without extra compensation, refinish and /or replace all existing surfaces damaged, during construction, to the satisfaction of the Architect/Engineer.

F. Prior to any materials being stored on finished floor surfaces, the Contractor shall obtain approval from the Construction Manager. If required, each Contractor shall install a protective barrier deemed acceptable by the CM over these finished surfaces at no cost to owner or project. Wheelbarrow, carts, dollies, etc., if used in such areas, shall be non-marking rubber tires.

G. Roof surfaces and plaster ceilings shall not be subjected to construction traffic, nor shall they be used for the storage of materials. Where activity must take place in order to carry out the Work of the Contract, the Contractor shall provide the Construction Manager with a protection plan, including but not limited to the following:

1. The type of Work to be performed.
2. The area where the Work will be performed.
3. Traffic patterns to be used for access/egress to/from the Work area.
4. Material and methods to be used as protection.

H. The plan shall be submitted to the Construction Manager no less than two (2) weeks prior to performing the Work to allow time for review of the plan.

I. Under no condition shall any Work take place in these areas without the Construction Manager's prior authorization. Damage to the aforementioned surfaces shall be repaired at the expense of the Contractor who is deemed responsible for such damage, in the sole judgment of the Construction Manager.

2.4 SCOPE OF WORK – ALL CONTRACTS

Each Contractor shall provide all labor, material, plant, tools, equipment, and supervision, including safety supervision, related to or necessarily involved with the performance of the Work, as defined in this section, as indicated on any drawing in the Enumeration of Contract Documents, and as described in the following sections from the Project Manual:

A. DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

Each Contractor shall include all Work and comply with all provisions of each of the following Specification Sections, complete:

1. 00 01 10 Table of Contents – Project Manual
2. 00 01 15 List of Drawings
3. 00 11 13 Advertisement for Bids
4. 00 21 13 Instructions to Bidders
5. 00 25 00 Hazardous Material Information

a. School 16 has been undergone decontamination/removal of known hazardous material and as such, none are expected to interfere with scoped work. Summary reports are available from RSMP at 70 Carlson Road, Rochester, NY, 141610, 585-512-3820.

b. Each Contractor shall assess the data provided in this Section and shall be responsible for performing the Work of their Contract according to the data provided in Section 00 25 00A and the requirements of Section 02 83 00 Working with Lead Containing Materials. Each Contractor that disturbs existing building materials that contain lead paint shall take the necessary measures specified in Section 02 83 00 Working with Lead Containing Materials.

c. EPA has issued a rule requiring the use of lead safe practices and other actions aimed at preventing lead poisoning. Under the rule, beginning in April 2010, contractors performing renovation, repair and painting projects that disturb lead-based paint in homes, childcare facilities and schools built before 1978 must be certified and must follow specific Work practices to prevent lead contamination. Information from EPA 40 CFR Part 745.8 Subpart E has been incorporated into Section 02 83 00. All Contractors are responsible for understanding and following all the requirements set forth in this regulation as it relates to their Work.

d. Any suspected material uncovered during construction shall be immediately reported to the Construction Manager. Removal of any material found to contain

asbestos shall be only be performed by a NYSDOL licensed firm with certified Workers.

e. Any suspect mold uncovered during construction shall be immediately reported to the Construction Manager. Removal of any mold shall only be performed by a Contractor licensed to remediate mold.

6. 00 41 16.01 Bid Form- General Trades Work Contract #7
7. 00 41 16.02 Bid Form- Mechanical Work Contract #8
8. 00 41 16.03 Bid Form- Electrical Work Contract #9
9. 00 41 16.04 Bid Form- Plumbing Work Contract #10
10. 00 43 00 Supplements to Bid Form
11. 00 43 21 Allowances
12. 00 43 22 Unit Prices
13. 00 43 23 Alternates
14. 00 43 31 MWBE/DBE/SBE Utilization and Workforce Diversity
15. 00 43 31A Diversity Programs “DP” Forms
16. 00 43 83 Milestone Schedule and Critical Submittals
17. 00 43 83A Schedule Attachment
18. 00 43 93 Bid Submittal Checklist
19. 00 45 13 Statement of Bidder Qualifications
20. 00 52 12 Form of Contract
21. 00 61 13 Bonds and Certificates
22. 00 62 11 Submittal Cover Sheet
23. 00 62 11A Submittal Cover Attachment
24. 00 63 19 Request for Equivalent Review Form
25. 00 72 16 Index to General Conditions
26. 00 73 16 Insurance Requirements
27. 00 73 20 Health and Safety Requirements
28. 00 73 46 Prevailing Wage Rates
29. 00 95 00 Tax Exempt Letter from New York State Coversheet
30. 00 95 00A Tax Exempt Letter from New York State Attachment

2.5 DIVISION 01 – GENERAL REQUIREMENTS

Each Contractor shall include all Work and comply with all provisions of each of the following Specification Sections, complete:

1. 01 00 20 Abbreviations and Acronyms
2. 01 00 30 Definitions
3. 01 10 00 Summary of Work
4. 01 14 19 Use of Site
5. 01 25 00 Substitution Procedures
6. 01 25 10 RFI Form
7. 01 26 39 Field Orders
8. 01 26 43 Change Order Requests
   a. Each Prime Contractor and their Sub-contractors are required to submit labor rate breakdown sheets for each trade within 10 days of contract award. Labor rates are to be broken out as outlined in specification section 01 26 53A. Refer to specification section 01 26 43A for cost proposal breakdown sheets to be used as backup breakdown on all cost proposals for this project. No cost proposals will be reviewed unless submitted on these forms.
9. 01 26 43A Change Order Form with formulas
10. 01 26 53 Labor Rate Worksheet Coversheet
11. 01 26 53A Labor Rate Worksheet
12. 01 29 75 Revolving Loan Program and Procedures
13. 01 29 75A Application for RSMP Revolving Loan Fund
14. 01 29 75B Revolving Loan Program Procedure
15. 01 29 76 Progress Payment Procedures
16. 01 29 76B Payment Application Checklist
17. 01 29 76C Interim Waiver of Lien and Claim
18. 01 29 76D Final Waiver of Lien and Claim
19. 01 30 00 Construction Procedures and Controls and as further clarified:
    a. Owner will retain the services of an independent testing laboratory for asbestos, concrete testing, compaction and gradation for the use of backfill/site fill, asphalt, fireproofing, steel and masonry testing. All other required testing associated with their scope of Work shall be the responsibility of each Prime Contractor.
    b. The Construction Manager will receive copies of all Prime Contractors daily reports no later than noon the following Workday, listing daily activities and

listing daily manpower by trade, failure to do so will result in payment applications being withheld until compliance is fulfilled.

c. **Each Prime Contractor** shall provide full time, non-Working, on-site supervision from commencement of their Work and their Subcontractors Work activities until such time all Work activities have been completed or as determined by the Construction Manager. Furnishing items for job site does not constitute the commencement of Work activities. If supervision is reduced or terminated without consent of the Construction Manager, the Construction Manager will appoint an individual to manage Work under this a Prime Contract with all associated cost borne by the Prime Contractor. The Prime Contractor shall assume all responsibilities for the individuals and Work of this Contract.

20. 01 31 13 Contract Coordination

21. 01 32 16 Contractor's Construction Schedule and as further clarified:

a. All Contractors shall have a project manager and foreman participate in weekly work planning sessions starting the week before their Work commences and continuing through to substantial completion of their Contract. These meetings are intended to give each participating Contractor a voice in the project sequencing. Following these weekly sessions, the Construction Manager will issue a Weekly Work Plan (WWP) that documents the meeting.

b. All Contractors shall submit a constraint identification sheet prior to or during the Pull Planning session. The constraint identification sheet shall list any item that will prevent work from advancing as originally planned, who is responsible for resolving these items, and when the responsible party has committed to resolution of each item. Contractors shall come prepared to all planning meetings with a full understanding of their work plan and details of their manpower, equipment and material requirements.

c. All Contractors shall have a foreman participate in "daily huddles", which will be held from 7:00 am – 7:30 am each work day (or another time as agreed). These meetings are intended to quickly recap the Weekly Work Plan (WWP) schedules, adjust to circumstances, review the day ahead, and discuss opportunities to help each other as needed.

22. 01 32 19 Submittal Procedures and as further clarified:

a. A submittal schedule will be created by the Construction Manager. The required submittal dates established by the Construction Manager shall be reviewed by the Contractor and confirmed within 1 week after award of bid. It will be required by each Prime Contractor to incorporate the submittal dates into the project schedule relating to delivery of materials in relationship to the scheduling of Work. All submittals shall be provided for review based on the approved submittal schedule. All submittals will be uploaded to Newforma Website by the Prime Contractor to the Construction Manager, and returned through Newforma. **Refer to specification section 00 43 83, for critical submittals schedule.**

23. 01 32 26 Construction Progress Reports

24. 01 35 00 Electronic Document Transfer

25. 01 35 00A Electronic File Transfer Agreement

26. 01 35 23 Project Safety Standards, and as further clarified:

    a. Each contractor should note that it is a requirement that ALL employees of a contractor who are Working on a public project MUST have taken at least the OSHA ten (10) hour course, prior to being accepted onto the Work site. A copy of each contractor's employee's OSHA ten (10) hour course card will be requested and will be kept on file with the construction manager.

    b. Proof of OSHA 10/30-hour training **within five (5) years** of signing Contract. Ensure employees have completed OSHA required training, including but not limited to OSHA 10/30 Construction Industry Training. Proof of additional training may be required by OSHA relative to the Contractors scope of Work.

    c. Contractor/Subcontractor tools, PPE, etc. involved in an accident/incident / near miss shall become the property of BCC. Written notice of replacement is required from the respective Contractor/Subcontractor. Heavy equipment, motor vehicles, ATV's etc. involved in an accident /incident /near miss may be required, at the sole discretion of BCC, to be inspected by a qualified 3rd party provided by the affected Contractor/Subcontractor. 3rd party inspector must be approved by BCC and the Contractor/Subcontractor shall bear all costs associated with any/all third-party inspections and repairs.

    d. One hundred (100) percent Ground Fault Circuit Interrupter (GFCI) use is mandatory throughout the Project. Assured grounding program cannot be used in the lieu of GFCI protection. Contractors/Subcontractors are to provide portable GFCI "pigtails" for use with extension cords plugged into permanent/existing outlets.

    e. Contractors/Subcontractors that are working off a ladder at a height of ten feet or greater shall be required to utilize a self-retracting lanyard.

    f. No wooden, metal or "job built" ladders are permitted on this project. Fiberglass ladders will be the only type of ladder allowed to be used on site. Fiberglass ladders will be inspected daily and discarded immediately if deemed unsafe.

    g. A 3rd party (non-hydraulic crane) inspection is required to be performed by the Contractors/Subcontractors and/or Owner/Operator after crane assembly at the cost of the Contractors/Subcontractors and/or Owner/Operator. 3rd party inspectors are required on any/all cranes involved in an accident, incident or near miss caused by human error or mechanical failure at the cost of the Contractor/Subcontractor owning, operating, renting or leasing the crane at the time of the aforementioned incident.

    h. All contractors must obey by NYSED Uniform Safety Standards.

27. 01 35 23A Project Safety Forms

28. 01 35 46 Indoor Air Quality Requirements

29. 01 43 39 Mock-Up Requirements

30. 01 45 00 Quality Control

31. 01 50 00 Temporary Facilities & Controls, and as further clarified:

a. Temporary Utilities:

1) **Electrical Work Contract #9** shall provide all work in section 3.2 B. Temporary Electrical Service.

2) **Electrical Work Contract #9** shall provide, maintain and remove the temporary power system and construction lighting per NEC and OSHA regulations in all construction areas.

3) **Electrical Work Contract #9** shall provide all permits and inspections as required by the local authority having jurisdiction prior to energizing the systems. Submit a copy of the inspection certificate to the Construction Manager.

4) **Electrical Work Contract #9** shall provide all earthwork as required for the installation of the temporary power systems. No Work shall be performed without direction / approval of the Construction Manager. Depth of trenches shall be as required by the NEC and as further described by these specifications.

5) Temporary underground feeders shall be installed direct buried in schedule 80 PVC conduits with detection tape. Conductors can be aluminum with sizes adjusted for the required ampacities.

6) **Electrical Work Contract #9** shall provide all grounding as required.

7) **Electrical Work Contract #9** shall provide, maintain and remove the temporary power and lighting as required for the duration of the project.

8) **Electrical Work Contract #9** shall rework and/or relocate temporary lighting and power system as required for the progress of the Work.

9) **Electrical Work Contract #9** shall maintain temporary fire alarm system as required for the duration of the project. This may require notifying fire department at beginning and end of workday, putting system in bypass, temporarily covering or disconnecting and reconnecting devices as necessary to perform their scope of Work.

10) **Electrical Work Contract #9 9** shall rework and/or relocate temporary fire alarm system as required for the progress of the Work.

11) **Electrical Work Contract #9** shall remove all temporary power, lighting, fire alarm and security system in their entirety only after the building wiring system has been tested and energized. Repair damage caused by the installation or from the removal of the temporary systems, and restore to specified or original condition, including but not limited to the patching of all walls and ceilings to match adjacent surface/finish.

12) All Contractors will not be permitted to use the phone, fax and data lines of the Owner, or Construction Manager. Each Contractor shall be responsible for providing and maintaining their own phone and data services.

b. All Contractors shall include provisions in their bids for temporary electric power system as follows:

1) Contractors requiring power for their office trailers shall arrange for a separate electrical service. All costs associated with their temporary electric connection shall be included in their bid.

2) Each Contractor shall provide their own extension cords required for the performance of their Work. Extension cords shall be OSHA compliant.

3) Connection of electric resistive heating to the temporary electrical system will not be permitted.

4) Any Contractor, who requires power or lighting more than what is specified under Section “a” above, shall bear all costs associated with same.

5) Any Contractor requiring temporary power and lights to be energized outside of the normal Work hours shall bear all costs associated with same.

6) Each Contractor shall provide the necessary generators to complete their Work prior to completion of temporary power.

7) Temporary power and light standby requirements, before and after hours described above will be at expense of the respective Contractor who requires same.

c. Temporary Water and as further clarified:

1) Each Contractor that requires water for the Work of their Contract shall provide and maintain sufficient back flow devices, hoses, with shut-off nozzles as required by local code and as required for conveying water to the Work sites. All hoses shall be maintained daily to prevent leakage and wasteful usage. Each Contractor shall be responsible to ensure that the water service to their hoses is turned off at the end of each Workday. Contractors shall be responsible for all damage and/or additional water usage costs resulting from not maintaining hoses and/or leaving the water service on after hours. Each Contractor shall provide drinking water for their Workforce.

2) **Plumbing Work Contract #10** shall install, maintain and remove temporary water lines and hose bibs as needed.

3) **Plumbing Work Contract #10** shall rework and/or relocate temporary water system as required for the progress of the Work.

4) **Plumbing Work Contract #10** shall provide all required back flow prevention devices on the temporary water piping to protect the public water supply.

5) **Plumbing Work Contract #10** shall provide the temporary water service, all required water meters and all measures required to prevent freezing of the temporary water service including by not limited to a hot box, heat tracing ect.

d. Temporary Sanitary Facilities and as further clarified:

1) **General Trades Work Contract #7** shall provide portable chemical toilets for the duration of all Work of their Contract. Contractors shall not use toilet rooms in the existing School facilities at any time.

2) **General Trades Work Contract #7** shall provide a minimum of one (1) portable chemical toilet for every ten (10) Workers or more as directed by the Construction Manager or as required for women Workers. The portable toilets shall be cleaned a minimum of three (3) times a week.

e. Temporary Heating/Ventilation/Cooling and as further clarified:

1) **General Trades Work Contract #7** shall provide, maintain and remove temporary heat and climate control to all work areas.

2) **General Trades Work Contract #7** shall provide, maintain and remove a complete temporary heating system including but not limited to all required temporary power and natural gas piping or terminations. When directed by the Construction Manager **General Trades Work Contract #7** shall remove the temporary heat systems complete.

3) **General Trades Work Contract #7** shall maintain temperatures of no less than 60 degrees Fahrenheit and a constant humidity of no more than 60%.

4) **General Trades Work Contract #7** shall provide daily written reports with the temperature and humidity levels to the Construction Manager. Locations that will require recording of temperature will be identified by the Construction Manager. The system shall include proper air circulation to ensure that the required temperatures are maintained throughout all areas of the building.

5) **General Trades Work Contract #7** shall submit their temporary heating and ventilation plan for review by the Construction Manager prior to the start of Work. The plan shall include the following information: temporary equipment and systems will be utilized for the temporary heating; how the systems will be maintained and how the systems will be controlled. Use of the new systems and/or equipment for the temporary heat will not be allowed.

6) **General Trades Work Contract #7** shall provide supplemental heating measures to facilitate their Work according to the project schedule, including the thawing of subgrades, the heating of isolated pour areas, the protection of cast-in-place concrete, etc.

7) Any Subcontractor, who requires temporary heat in excess of what is specified above, shall bear all costs associated with same.

f. Temporary Fire Protection and as further clarified:

1) Each Contractor shall provide and maintain fire extinguishers as required by OSHA for the Work of their Contract. Contractors shall be aware that all “spark-producing” activities require a Hot Work permit (reference Project Safety Plan for permit requirements) as well as fully charged fire extinguishers within ten (10) feet of the “spark-producing” activity. A fire watch must continue for a minimum of thirty (30) minutes after the Hot Work operation is complete.

2) All Contractors shall maintain and provide clear unobstructed access routes for emergency vehicles to access the site and Work areas.

g. Temporary Construction:

Each Contractor shall provide, maintain and remove barricades and excavation protection, including OSHA compliant access and egress, warning signs and lights, etc. as required for the Work of their Contract and as directed by the Construction Manager.

Each Contractor who creates a fall hazard by the installation of the Work of their Contract shall install OSHA-compliant fall protection for the safety of all construction employees. Each Contractor who removes fall protection for the installation of Work of their Contract shall immediately re-install OSHA-compliant fall protection for the safety of all construction employees. Note: Prior to removing fall protection each Contractor shall ensure alternate fall measures are available and used by their employees.

1) **General Trades Work Contract #7** shall provide all temporary floor protection at all new and existing floor openings. The temporary floor protection shall be secured to both sides of the opening and painted orange.

2) **General Trades Work Contract #7** shall provide, maintain and remove all temporary enclosures necessary to close in sections of the buildings.

3) Any Prime Contractor who requires removal of the temporary enclosure for access to their work shall be responsible to remove and reinstall the enclosure at their own expense.

4) **General Trades Work Contract #7** shall provide, maintain and remove temporary watertight roof enclosures where new roof openings have been established and the equipment has not yet been installed. New roof openings by all all contractors shall be coordinated with the Contract #7 prior to making openings.

5) **General Trades Work Contract #7** shall provide, maintain and remove temporary weather tight, secure construction entrances/doors, locations as directed by construction manager.

6) In addition to the temporary perimeter protection and / or barricades indicated to be provided above, each Contractor shall provide additional temporary perimeter protection, tie off points, rails, toe boards etc., as required for the Work of their Contract.

7) If the Work of a Contractor requires the removal of temporary barricades as defined above the Contractor shall provide all Work as required to maintain an OSHA compliant Work area and provide all Work as required to restore the temporary barricades to its original condition.

8) Contractors shall reference Section 01 35 23 – Project Safety Standards for additional project safety guidelines.

9) **General Trades Work Contract #7** shall be responsible throughout the duration of the project to insure at the end of each work shift that all exterior windows and door permanent and/or temporary are closed,

locked, secured and weathertight. **General Trades Work Contract #7** shall designate an individual responsible for this for each work shift.

10) **General Trades Work Contract #7** shall be responsible throughout the duration of the project to insure at the end of each work shift that all temporary and/or permanent fence gate is closed at locked. **General Trades Work Contract #7** shall designate an individual responsible for this for each work shift.

h. Temporary Support Facilities:

1) Each Prime Contractor shall provide his or her own temporary offices and storage sheds, as approved by CM. Each trailer must be properly secured to the ground. Quantity and location of the Contractors' field offices shall be subject to approval of the Construction Manager. Each Contractor who requires power, water, sanitary, gas, phone, data etc., shall provide and remove at their own for their temporary offices at their sole expense.

2) Each Contractor shall be responsible for providing adequate protection of their material and/or equipment furnished for this project. All deliveries of material and/or equipment will be scheduled with the Construction Manager, and specific locations with time restrictions are allocated for staging, storage trailers, materials, equipment, etc. Each Contractor shall obtain the necessary approval, permits and fees for temporary offices, if required by the authority having jurisdiction. Contractors are advised that there is minimum on-site storage space and all cost of off-site material storage, if required, shall be included in the Contractor's price. Contractors are advised that at various times during the project, storage trailers or stored materials within the building or on site may require relocation or removal as directed by the Construction Manager. If any material and/or equipment stored at the project, with or without consent of the Construction Manager at any time obstruct the performance of any portion of this project, these materials shall be removed and relocated by the Contractor at no additional cost. In the event a Contractor fails or refuses to comply with this Article within a reasonable time, but not more than twenty-four (24) hours, the Construction Manager will reserve the right to have those materials and/or equipment removed, and all costs will be charged against the Contractor involved.

3) **General Trades Work Contract #7** shall include relocating Construction Manager Office furniture, Xerox WorkCenter WC 7835 copier, all furnishing and supplies for turn over to district. This shall include loading, delivery and unloading to another Rochester City School property; location will be within the City of Rochester.

4) **Electrical Work Contract #9** shall include internet and phone services from NTP to November 30st, 2020 unless directed by Construction Manager to remove prior to this date.

5) **Electrical Work Contract #9** shall include the monthly charges for these services in their base bid.

6) **Electrical Work Contract #9** shall include removal of internet and phone service

7) **General Trades Work Contract #7** shall include cleaning of Construction Manager Office on a weekly basis from Notice to Proceed through November 30st, 2020. Cleaning shall include but not limited to general broom, clean prior to washing of floors; wet mopping of all floors; cleaning and vacuuming of all walk-off mats; comprehensive cleaning of toilet facilities; emptying of trash cans and removal of same to dumpster, and replacing trash can bags.

8) **General Trades Work Contract #7** shall provide all necessary supplies required for cleaning the office and to keep paper towels, liquid soap, and hand sanitizer and toilet paper stocked.

9) **General Trades Work Contract #7** shall provide bottled water for water cooler and monthly coffee on a weekly basis from Notice to Proceed to November 30st, 2020. Two reserve bottles shall be on hand at all times. Disposable cups and a sanitary dispenser shall be provided and maintained.

10) **General Trades Work Contract #7** shall supply all washroom disposables for the duration of the project.

32. 01 55 00 Access Roads, Parking, and Staging

a. Refer to Section 01 50 00A, Site Logistics Plan for site logistics plan.

1) **General Trades Work Contract #7** shall provide all Work to install and remove temporary construction entrance and staging areas as detailed by project documents.

2) **General Trades Work Contract #7** shall provide all site restoration in accordance to new site drawings, including providing 18” minimum of new topsoil, hydroseeding or sod as necessary to meet landscape specifications and new grades on civil drawings. Topsoil to be per specifications.

3) Where work occurs along or within the public roads or sidewalks, responsible Contractor shall provide a NYSDOT Maintenance and Protection Plan indicating temporary fencing, barricades, lighting, signage, shoring, road plates, flagmen, and related protection in accordance with local, state and federal regulations.

4) **General Trades Work Contract #7** shall install, maintain, relocate and remove all temporary chain link fence, gates and driven posts to complete work. Installation shall follow specifications and drawings on project documents.

5) **General Trades Work Contract #7** shall maintain a secured site at all times.

6) **General Trades Work Contract #7** shall provide ten (5) locks, (5) 2’ steel chains and 5 keys for temporary locks to construction manager. All locks to be keyed alike.

b. First-Aid Equipment:

1) Each Contractor shall provide OSHA-compliant first-aid kits for use by their employees and their lower tier Contractor’s employees.

c. Protection of Adjacent Property:

1) Each Contractor shall prevent any damage to surrounding property and if any damage occurs the Contractor that caused the damage shall provide all necessary repairs immediately upon notification by the Construction Manager.

d. Temporary Material and Hoisting and as further clarified:

1) Ladders: Each Contractor shall provide adequate ladders as required to allow their employees to access the Work. The Contractor providing the ladders shall be fully responsible for OSHA compliance of the ladders.

2) Hoisting – Contractors shall be responsible for all hoisting as required for the Work of their Contract.

e. Project Identification and Temporary Sign and as further clarified:

1) **General Trades Work Contract #7** shall provide (8) and remove eight temporary signs as per 01 50 00 requirements, locations as directed by CM.

f. Collection of Disposal of Waste and as further clarified:

1) Dumpsters shall be provided by the **General Trades Work Contract #7** for use by all contractors.

2) Each Prime Contractor is responsible for the removal and disposal of any hazardous or toxic wastes, removal must comply with any regulation governing the disposal of that waste.

3) Each Prime Contractor shall be responsible for the proper disposal of their excavation spoils and excess concrete and mortar resulting from the Work of their Subcontract. No excavation spoils, excess mortar or concrete shall be placed in the dumpsters provided **General Trades Work Contract #7.**

4) Each Prime Contractor is responsible for the removal of any item of debris exceeding one cubic yard in overall dimensions. Such large pieces of waste products are not to be placed in the dumpster but must be removed from the site by the Prime Contractor responsible for the debris.

g. Rodents and Pest Control and as further clarified:

1) **General Trades Work Contract #7** shall provide rodent and pest control for the duration of the project.

h. Access Roads, Parking, and Staging Areas and as further clarified:

1) **General Trades Work Contract #7** shall provide and maintain ramps, curb cuts and temporary site-work at all site entrances to allow access from the street. If a public sidewalk crosses the temporary entrance **General Trades Work Contract #7** shall provide all Work as required to maintain the walk in a level and safe condition.

2) **General Trades Work Contract #7** shall provide snow and ice removal seven (7) days a week, Monday through Sunday, as required (after a fresh snowfall that exceed 3" or as directed by the Construction Manager) and shall be completed no later than 6:30 am and maintained through the working day and through 2nd shift work for the following areas: staging areas, all paved areas including temporary parking lot and service entrance from Post Ave, all gated entrances to site, all sidewalks (including sidewalk outside the temporary fence at Post Ave),and pathways to all exterior doors.

3) Snow and ice removal is defined by removal through chemical and physical means including appropriate application of Magnesium Chloride Hexahydate to provide safe and secure passage for all employees and equipment. **General Trades Work Contract #7** shall provide an owner approved ice melt product at staging areas, entrances and pathways as required to maintain safe roads and walkways for construction workers and visitors access to and from the project site. **General Trades Work Contract #7** shall use Magnesium Chloride or equal as approved by the Owner representative for removal of ice.

i. Cleaning of Trucks and as further clarified:

1) Each Contractor shall provide all Work as required to clean all trucks related to the work of their contract prior to them leaving the site to prevent the tracking of mud, stones etc. on to the public roads and sidewalks. Contractors who fail to clean their trucks shall be responsible for all costs associated with, but not limited to, cleaning the public roads, DEC fines, etc.

j. Protection of Installed Construction and as further clarified:

1) Each Contractor shall be responsible to protect the work of their contract through substantial completion/turnover to the Owner.

k. Erosion and Sediment Control and as further clarified:

1) **General Trades Work Contract #7** shall provide, maintain and remove erosion control measure as identified in the contract documents and as required for the Scope of their Work.

33. 01 55 00A Site Logistics Plan and as further clarified:

    1) Reference Site Logistic Plan, **General Trades Work Contract #7** shall install, maintain and remove all required material for contractor staging area as indicated in project documents. **General Trades Work Contract #7** shall restore site with approved materials to final grade as detailed by project documents.

    2) All Prime Contractors to reference for staging area. Parking is limited to Prime Contractor foremen on site and all other workers and visitors will need to utilize off street parking.

    3) All contractors shall maintain site contractors staging yard and shall return the area to owner as existing conditions prior to start of contract. Pre-construction photos by **General Trades Work Contract #7** and approved by the CM will document the staging area prior to contractors mobilizing. Any and all repairs will be covered by responsible contractors with no cost to the owner.

34. 01 56 10 Noise Control

    1) All contractors are responsible to maintain a safe work environment as required by all applicable local, state and federal regulations.

    2) Noise shall always be mitigated to limit disturbance to surrounding community and public, all required methods to mitigate noise to acceptable levels, deemed by the CM, shall be included in each primes cost. No additional changes will be awarded to implement mitigation.

35. 01 56 90 Construction Cleaning and as further clarified:

    1) Each day, each Contractor shall remove associated debris resulting from the work of their Contract from the work area and deposit it in the dumpster provided by **General Trades Work Contract #7**.

    2) **General Trades Work Contract # SHALL MAINTAIN <u>ALL</u> WORK AREAS IN A BROOM-CLEAN CONDITION ON A DAILY BASIS FOR THE DURATION OF THE PROJECT.** In the event that a Contractor fails to remove debris on a daily basis or upon direction of the Construction Manager, the Construction Manager shall designate another Contractor who shall remove the debris and the cost thereof shall be deducted from any amounts payable to the offending Contractor. Such determination of responsibility shall be at the sole discretion of the Construction Manager.

    3) Every Friday for the duration of the project, **All Prime Contractors** shall provide one worker from 2 pm to 3 pm to clean the project site this includes removal of debris and/or cleaning as directed by Construction Manager.

    4) All Contractors shall utilize sweeping compound when sweeping indoors.

    5) **General Trades Work Contract #7** shall maintain the dumpster area in a clean and orderly fashion on a daily basis and shall provide dust control as directed by the Construction Manager.

6) **General Trades Work Contract #7** shall consolidate all masonry debris on a daily basis and remove same from the project site on a weekly basis. All masonry debris shall be removed from the project site.

7) **Concealed** Spaces: **General Trades Work Contract #7** shall remove and dispose of all debris from concealed spaces before spaces are enclosed. This includes the crawl space.

8) Waste Disposal: Burying or burning of waste materials on site is prohibited. Washing waste materials into sewers or into waterways is prohibited.

9) Any Contractor performing work in an occupied section of a facility during the unoccupied hours shall provide all clean up as necessary to leave the work areas as clean as it was before work started. This clean up shall include vacuuming, dusting, sweeping, mopping and any other clean-up procedures as required.

10) **General Trades Work Contract #7** shall provide cleaning of fenced area, streets, sidewalks, school roads, parking areas, etc. of all mud, dust, stone, debris, etc. resulting from the work of this project on a daily basis or as directed by the Construction Manager..

11) **General Trades Work Contract #7** shall provide a final site cleaning prior to Substantial Completion and/or as directed by the Program Provider. All trash and debris shall be deposited in project dumpster.

12) **General Trades Work Contract #7** shall sweep and power wash all sidewalks, curbs and paved areas as directed by the Construction Manager

13) **General Trades Work Contract #7** shall from the Notice to Proceed to substantial completion provide a general cleanup, every friday or as directed by the Construction Manager, of the site located within the project limit lines and along the outside of the temporary construction fence. Cleanup shall include the removal of all trash and debris.

14) **General Trades Work Contract #7** shall provide 30-40 gallon trash receptacles with wheels, within the work areas and shall empty same into dumpster on a weekly basis or more often as required. Each Contractor shall deposit minor trash items into trash receptacles (no material scrap or demo debris).

15) Each Contractor is responsible for removing their own material scraps, debris, packaging materials, trash, etc., from the building and placing them in the proper dumpsters.

16) Each Contractor shall crush all boxes and consolidate all trash prior to placing it in the dumpster.

36. 01 60 00 Product Requirements

1) Not required on this contract.

37. 01 71 16 Acceptance of Existing Conditions

1) As documented in photographs and video provide to CM prior to mobilization. Documents to be timed stamped and approved by CM.

38. 01 72 00 Execution and as further clarified:

    1) All Prime Contractors performing sub grade Work shall request public utility underground location stakeout immediately upon award of Contract. **A private Underground Utility Locating Contractor shall be hired by the Prime Contractor performing sub grade Work to locate private underground utilities within the Work area. Contractors shall be responsible for maintaining these stakeout location marks throughout construction and submitting as-built drawings locating all underground utilities, whether public or private, at the end of construction.**

    2) Backfilling and compaction of excavations required to perform subgrade work shall be the responsibility of the Contractor requiring the excavation. Coordinate backfilling and compaction with testing agent to assure proper scheduling of required testing.

    3) Construction Layout and as further clarified:

        1) Each Contractor, working from the established control points, shall provide all survey and layout required for the Work of their Contract.

39. 01 73 29 Cutting and Patching and as further clarified:

    1. Each Contractor shall include all Work complete, and comply with all provisions specified in this Specification Section, as further clarified and assigned below:

        a. **Each Contractor shall provide cutting, repair and patching of existing materials and finishes as required by the work of their Contracts unless otherwise indicated in the Scope of Work.**

40. 01 74 19 Construction Waste Manager and Disposal

    1) Not applicable; refer to previous sections.

41. 01 74 23 Final Cleaning and as further clarified:

    1) Each Contract shall be responsible for final cleaning specified in the respective Specification Sections assigned to each Contractor.

    2) **General Trades Work Contract #7** shall provide “punchlist cleaning” at the completion of work and prior to punchlist. Punchlist cleaning shall include removal of dust and debris from hard surfaces. VCT and hard surface floors are to be brush swept, carpet and similar soft surfaces are to be vacuumed to remove dust and debris. Punchlist cleaning shall be assumed to be in multiple phases as areas are completed.

3) **General Trades Work Contract #7** will provide (1) final cleaning of the interior of the Building after punchlist work is complete and the building is ready for occupancy.

4) **General Trades Work Contract #7** shall provide all final cleaning as indicated in Specification Section 01 74 23, and as further clarified:

1) All contractors shall remove labels that are not permanent, touch up and otherwise repair marred exposed finishes and replace parts subject to unusual operating conditions.

2) **General Trades Work Contract #7** shall clean all new and existing transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable vision obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch.

3) **Mechanical Work Contract #8** shall replace disposable air filters, clean permanent air filters, exposed surfaces of diffusers, registers and grilles. **Mechanical Work Contract #8** shall clean ducts, blowers and coils if units were operated without filters during construction.

4) **Electrical Work Contract #9** shall clean light fixtures, lamps, globes and reflectors. Replace burned out bulbs and those noticeable dimmed by hours of use and defective noisy starters.

5) At the time of substantial completion or when directed by the Program Provider, **General Trades Work Contract #7** shall provide all work required to clean the glass, both inside and out, at all new and existing exterior windows; including all storm windows, aluminum entrances, storefronts, curtain walls, skylights, etc.

6) **General Trades Work Contract #7** shall provide one (1) final cleaning and power washing of all site roads, sidewalks, and site improvements at Substantial Completion of their contract or as directed by the Construction Manager.

42. 01 77 00 Closeout Procedures and as further clarified:

1) Contractors are required to turn in O&M, warranties, guarantees, as - built drawings, training sign-in sheets and test reports (as per Contract) within fifteen (15) Working days of substantial completion or the Construction Manager reserves the right to refuse to review pencil copies and withhold payment. In addition to the 3 Ring Binders, these closeout documents are to be submitted electronically as required by Owner/CM.

2) Any original deficiency list or punch list distributed by the Construction Manager or the Architect must be returned showing completion of each item within 15 Working days of receipt of such list. Any deficiency or punch list re-distributed due to incompletion or not done to owner's

satisfaction must be corrected and returned with 10 Working days or the Construction Manager reserves the right to refuse to review pencil copies and withhold payment.

43. 01 78 39 Project Record Documentation
    1) Record Drawings
        1) Each Contractor shall submit Project Record Documents to the Construction Manager for review at 75% and 90% completion for interim approval. Contractors who's Project Record Documents are not maintained in accordance with Specification Section 01 78 39 may have their monthly progress payments withheld until such time as the record documents are brought into conformance.
44. 01 79 00 Demonstration and Training
45. 01 83 16 Air Barrier System
46. 01 84 00 Maintenance Products
47. 01 91 13 General Commissioning Requirements

END OF SCOPE OF WORK – ALL CONTRACTS

B. Scope of Work – **General Trades Work Contract #7**

General Trades Work Contract #7 shall provide labor, material, plant, tools, equipment and supervision related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for **Contract #7** is generally described as **General Trades** and more specifically described in this Scope of Work.

1. DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

   This Contractor shall include all Work in Division 00 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

2. DIVISION 01 – GENERAL REQUIREMENTS

   This Contractor shall include all Work in Division 01 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

3. 02 41 19 Selective Demolition

   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section, as required for the Work of this Contract.

4. 04 20 00 Unit Masonry

   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section

5. 05 12 00.03 Structural Steel Framing
   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section
6. 05 50 00 Metal Fabrications
   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section
7. 07 13 26 Self-Adhering Sheet Waterproofing
   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section
8. 09 91 23 Interior Painting
   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
9. 09 96 00 High Performance Coatings
   a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
10. 13 34 10 Acoustic Barrier Panel System
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
11. 31 10 00 Site Clearing
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
12. 31 20 00 Earth Moving
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section
13. 32 12 16 Asphalt Paving
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
14. 32 13 13 Concrete Paving
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.
15. 32 13 14 Granite Curbs
    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.

16. 32 91 13 Soil Preparation

    a. **General Trades Work Contract #7** shall provide all Work, complete, as specified in this Specification Section.

17. 33 41 00 Storm Utility Drainage Piping

    a. **General Trades Work Contract #7** shall provide all Work as specified in this Specification Section.

18. 33 46 00 Subdrainage

    a. **General Trades Work Contract #7** shall provide all Work as specified in this Specification Section.

19. OTHER WORK OF **GENERAL TRADES WORK CONTRACT #7**

    a. Reference all Contract Drawings:

        1) **General Trades Work Contract #7** shall provide all Work complete as indicated and as further clarified:

            1) **General Trades Work Contract #7** shall provide all Work required to re-support any temporary lighting, fire alarm or power that is left unsupported as a result of the removals provided by this Contract.

            2) **General Trades Work Contract #7** is to provide all supplementary lighting required to perform the required finish Work under this section.

            3) **General Trades Work Contract #7** shall visit the site to verify and review existing conditions before estimating the cost of the project.

    b. **General Trades Work Contract #7** shall provide dewatering and erosion control as required for the Work of this Contract.

    c. **General Trades Work Contract #7** shall commit to providing sequenced submittals and shop drawings for critical submittals listed under specification 00 43 83 related to the scope of Work within **ten (10) days** of Notice to Proceed.

    d. **General Trades Work Contract #7** shall commit to providing sequenced submittals and shop drawings for all products and materials related to the scope of Work with **three (3) weeks** from receipt of Notice to Proceed.

    e. **General Trades Work Contract #7** shall protect existing gas and electric services throughout the duration of their subcontract. **General Trades Work Contract #7** shall locate and protect gas and electric service as required for the Work of this contract. **General Trades Work Contract #7** shall assume electric and gas service shall remain for duration of work associated with this contract.

    f. **General Trades Work Contract #7** shall provide clean backfill as required for the Work of this Subcontract. For purposes of this Subcontract “Clean” fill is defined as material that when buried has no adverse effects on human health or the environment health or environment.

g. **General Trades Work Contract #7** shall provide proof of material source generation and may be required to provide analytical data which documents that proposed material meets criteria set forth in NYSDEC part 375 Residential SCOs.

h. **General Trades Work Contract #7** shall remove all excess excavated material, spoils, etc. from the site as necessary for the Scope of their Work

i. **General Trades Work Contract #7** shall provide, maintain and remove all temporary erosion control measures as indicated on contract documents from Notice to Proceed through completion of project.

20. Any original Architects/Engineers field reports, deficiency list or punch listed distributed by the Construction Manager or the Architect must be returned showing completions within 15 working days of receipt of such list or Construction Manager reserves the right to refuse review of pencil copies and withhold payment.

21. Upon substantial completion of the work, the Construction Manager in conjunction with the Owner and Architect, shall review the areas of Work for excessive damage and/or removals. All other areas where it is determined that excessive damage have occurred and/or removals for new openings are in excess of that required for the new Work, the Construction Manager will have the patching or infill completed by others with all costs back charged against **General Trades Work Contract #7.**

22. Associated work required for the installation of roof-top equipment furnished by **Mechanical Work Contract #8** shall be clarified as follows:

1) **Mechanical Work Contract #8** shall provide all prefabricated curbs and equipment supports, as required for the work of **Mechanical Work Contract #8.**

2) **General Trades Work Contract #7** shall provide all support framing as indicated on the Structural and Architectural Drawings; all other required support framing shall be provided by **Mechanical Work Contract #8**.

3) **Mechanical Work Contract #8** shall layout the curb and equipment support locations. **General Trades Work Contract #7** shall cut and remove the roof deck and provide all required rough carpentry. Prior to making penetrations into roof, all work shall be coordinated with **General Trades Work Contract #7** for water tightness.

4) **General Trades Work Contract #7** shall provide all flashing where units are indicated on the roof plan of the project documents. **General Trades Work Contract #7** shall provide and maintain temporary weather tight enclosures at all roof openings either where existing equipment has been removed or where new roof openings have been established and the equipment has not yet been installed. **General Trades Work Contract #7** shall provide “pitch pockets” within roof as necessary.

5) **Refer to Drawings A-101.1, A-120, S-101.1 General Trades Work Contract #7** shall provide All Work, complete for Sound Barrier walls (and framing), and door around roof top located Chiller. **General Trades Work Contract #1** shall coordinate with **Mechanical Work Contract #8** for dimension and door location.

b. Penetrations at New and Existing Roof Areas: **General Trades Work Contract #7** shall maintain roof warranty at all times during execution of this contract. At the completion of awarded contract, **General Trades Work Contract #7** shall present the Owner with a Warranty on the roof. All coordination required to maintain and provide warranty is the responsibility of the **General Trades Work Contract #7.**

c. **General Trades Work #7** shall provide all cutting, removals, rough carpentry, steel support angles, etc., required for the roof openings that are required for the work of this Contract, not indicated on the structural or architectural drawings. **Layout to be completed and coordinated by trade/contract installing unit requiring penetrations.**

d. **General Trades Work Contract #7** shall provide flashing work for this Contract as indicated on the roofing plans. **Mechanical Work Contract #8** shall review the roofing plans and compensate **General Trades Work Contract #7** for roofing work required for the work of this Contract, but not indicated on the roofing plans.

e. **General Trades Work Contract #7** shall provide and maintain temporary weather tight enclosure at all roof openings either where the existing equipment has been removed or where new roof openings have been established and the equipment has not yet been installed. All temporary weather tightness shall maintain integrity of the roof and associated warranty.

f. **General Trades Work Contract #7** shall provide painting of all exposed piping and ductwork. Exposed piping and ductwork located in mechanical areas, attic and/or crawl spaces will not be required to be painting unless required per MEP specifications.

g. **General Trades Work Contract #7** shall provide painting of all exposed electrical equipment and conduit. Exposed electrical equipment and conduit located in mechanical areas, attic and/or crawl spaces will not be required to be painting unless required per MEP specifications.

h. **General Trades Work Contract #7** shall provide, maintain and remove Masonite board with taped seams (or equal) as flooring protection in all areas including corridors to protect new flooring.

i. **General Trades Work Contract #7** shall provide replacement of 5% of total installed ceiling tiles due to possible damages prior to final turn over of building to district. This shall include labor and material to replace installed ceiling tiles.

23. **General Trades Work Contract #7** shall visit the site to verify and review existing conditions before estimating the cost of the project.

24. **General Trades Work Contract #7** shall provide and remove crane pad as required per OSHA regulations and as necessary for Scope of their Work.

END OF SCOPE OF WORK GENERAL TRADES WORK CONTRACT #7

C. Scope of Work – **Mechanical Work Contract #8**

Mechanical Work Contract #8 shall provide labor, material, plant, tools, equipment and supervision related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for **Contract #8** is generally described as Mechanical and more specifically described in this Scope of Work.

1. DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

   This Contractor shall include all Work in Division 00 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

2. DIVISION 01 – GENERAL REQUIREMENTS

   This Contractor shall include all Work in Division 01 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

3. 02 41 19 Selective Demolition

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section, as required for the Work of this Contract

4. 21 13 13 Wet-Pipe Sprinkler System

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

5. 23 05 00 Basic Mechanical Requirements

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

6. 23 05 04 Electric Wiring

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

7. 23 05 13 Motors

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

8. 23 05 19 Gauges and Thermometers

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

9. 23 05 23 Valves

   a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

10. 23 05 30 Roof Curbs

    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.

11. 23 05 50 Wind Restraint for HVAC Systems
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
12. 23 05 53 Mechanical Identification
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
13. 23 05 93 Testing, Adjusting and Balancing
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
14. 23 07 10 Insulation
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
15. 23 09 23 Building Management System - Electronic DDC Logic
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
16. 23 20 10 Piping Systems and Accessories
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
17. 23 21 10 Water Systems Specialties
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
18. 23 21 23 Pumps
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
19. 23 64 26.20 Air Cooled Scroll Compressor Packaged Chiller
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
20. 23 81 26.11 Ductless Split System Air Conditioner
    a. **Mechanical Work Contract #8** shall provide all Work, complete, as specified in this Specification Section.
21. OTHER WORK OF **Mechanical Work Contract #8**:
    a. Reference all Contract Drawings:
        1) **Mechanical Work Contract #8** shall provide all Work complete as indicated and as further clarified:
        2) **Mechanical Work Contract #8** shall provide all Work required to re-support any temporary lighting, fire alarm or power that is left unsupported as a result of the removals provided by this Contract.
        3) **Mechanical Work Contract #8** is to provide all supplementary lighting required to perform the required finish Work under this section.

4) **Mechanical Work Contract #8** shall visit the site to verify and review existing conditions before estimating the cost of the project.

5) **Mechanical Work Contract #8** shall provide all cutting and patching required and/or resulting from the work of this Contract **unless otherwise indicated in the Scope of Work.** All patching shall be completed prior to final finishes.

b. The work required for the installation of roof-top equipment furnished by **Mechanical Work Contract #8** shall be clarified as follows:

1) **Mechanical Work Contract #8** shall provide all prefabricated curbs and equipment supports, as required for the work of **Mechanical Work Contract #8.**

2) **General Trades Work Contract #7** shall provide all support framing as indicated on the Structural and Architectural Drawings; all other required support framing shall be provided by **Mechanical Work Contract #8**.

3) **Mechanical Work Contract #8** shall layout the curb and equipment support locations, cut and remove the roof deck and provide all required rough carpentry, curbs and equipment supports.

4) **General Trades Work Contract #7** shall provide all flashing where units are indicated on the roof plan of the Architectural Drawings. **General Trades Work Contract #7** shall provide and maintain temporary weather tight enclosures at all roof openings either where existing equipment has been removed or where new roof openings have been established and the equipment has not yet been installed. All work shall maintain the warranty of roof.

5) **Refer to Drawings A-101.1, A-120, S-101.1, General Trades Work Contract #7** shall provide All Work, complete for Sound Barrier walls (and framing), and door around roof top located Chiller. **Mechanical Work Contract #8** shall coordinate with **Mechanical Work Contract #8** for dimension and door location.

c. <u>Penetrations at New and Existing Roof Areas:</u>

1) **General Trades Work Contract #7** shall provide all cutting, removals, rough carpentry, steel support angles, etc., required for the roof openings that are required for the work of this Contract, not indicated on the structural or architectural drawings.

2) **General Trades Work Contract #7** shall provide all cutting, removals, rough carpentry, steel support angles, etc., required for the roof openings that are required for the work of this Contract, not indicated on the structural or architectural drawings. **Layout to be completed and coordinated by trade/contract requiring penetrations.**

3) **General Trades Work Contract #7** shall provide and maintain temporary weather tight enclosure at all roof openings either where the existing equipment has been removed or where new roof openings have been established and the equipment has not yet been installed.

4) **Mechanical Work Contract #8** shall provide all cost and required resources for new mechanical components and equipment

d. **Mechanical Work Contract #8** shall provide, maintain and remove, as required and as directed by the Construction Manager, temporary enclosures at all air inlets and outlets that are located in construction areas. The enclosures shall be constructed so as to prevent the infiltration of dust, dirt, debris, etc., into the new ductwork and shall be installed so as to allow for the completion of the work of other Contracts. **Mechanical Work Contract #8** shall provide patching as required of all finishes damaged as a result of the installation and removal of the temporary enclosures.

e. **Mechanical Work Contract #8** shall commit to providing sequenced submittals and shop drawings for all products and materials related to the scope of Work with **three (3) weeks** from receipt of Notice to Proceed. **This includes but not limited to all long lead mechanical equipment.**

22. **Mechanical Work Contract #8** shall visit the site to verify and review existing conditions before estimating the cost of the project

23. **Mechanical Work Contract #8** shall provide and remove crane pad as required per OSHA regulations and as necessary for Scope of their Work.

END OF SCOPE OF WORK MECHANICAL WORK CONTRACT #8

D. Scope of Work – Electrical Work Contract #9

Electrical Work Contract #9 shall provide labor, material, plant, tools, equipment and supervision related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for **Contract #9** is generally described as Electrical and more specifically described in this Scope of Work.

1. DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

   This Contractor shall include all Work in Division 00 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

2. DIVISION 01 – GENERAL REQUIREMENTS

   This Contractor shall include all Work in Division 01 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

3. 02 41 19 Selective Demolition
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section, as required for the Work of this Contract
4. 26 05 00 Basic Electrical Requirements
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
5. 26 05 01 Basic Materials and Methods
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
6. 26 05 26 Grounding
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
7. 26 09 36 Lighting Control
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
8. 26 20 00 Electric Distribution
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
9. 26 50 00 Lighting
   a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
10. 27 05 10 Communications, General
    a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.

11. 27 10 00 Local Area Network Wiring System
    a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
12. 27 21 00 Local Area Network System
    a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
13. 27 32 00 Paging and Intercom System
    a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
14. 28 31 02 Analog Addressable Fire Alarm System
    a. **Electrical Work Contract #9** shall provide all Work, complete, as specified in this Specification Section.
15. OTHER WORK OF **ELECTRICAL WORK CONTRACT #9**
    a. Reference all Contract Drawings:
        1) **Electrical Work Contract #9** shall provide all Work complete as indicated and as further clarified:
            1) **Electrical Work Contract #9** shall provide all Work required to re-support any temporary lighting, fire alarm or power that is left unsupported as a result of the removals provided by this Contract.
            2) **Electrical Work Contract #9** is to provide all supplementary lighting required to perform the required finish Work under this section.
            3) **Electrical Work Contract #9** shall visit the site to verify and review existing conditions before estimating the cost of the project.
    b. **Electrical Work Contract #9** shall provide and remove crane pad as required per OSHA regulations and as necessary for Scope of their Work.
    c. **Electrical Work Contract #9** shall not shut down any existing utilities, services, systems, etc., without the written approval of the Construction Manager. **Electrical Work Contract #9** shall provide a minimum of seventy-two (72) hours' notice of any shut down and shall indicate in writing what services is intended to be shut down, the duration of the shut down, and the area of the building that will be affected by the shutdown. All shutdowns shall be continuously manned until such service is fully restored.
16. **Electrical Work Contract #9** shall visit the site to verify and review existing conditions before estimating the cost of the project

END OF SCOPE OF WORK ELECTRICAL WORK CONTRACT #9

E. Scope of Work – **Plumbing Work Contract #10**

Plumbing Work Contract #10 shall provide labor, material, plant, tools, equipment and supervision related to and/or necessarily involved with the performance of the Work, as indicated on all the Drawings, Specifications and/or Project Manual, and as set forth below. Work for **Contract #10** is generally described as Plumbing and Fire Protection and more specifically described in this Scope of Work.

1. DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

   This Contractor shall include all Work in Division 00 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

2. DIVISION 01 – GENERAL REQUIREMENTS

   This Contractor shall include all Work in Division 01 as assigned in the SCOPE OF WORK – ALL CONTRACTS in this Summary of Work.

3. 02 41 19 Selective Demolition

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section, as required for the Work of this Contract

4. 22 05 00 Common Work Results for Plumbing

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

5. 22 05 13 Common Motor Requirements for Plumbing Equipment

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

6. 22 05 23 General-Duty Valves for Plumbing Piping

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

7. 22 05 29 Hangers and Supports for Plumbing Piping and Equipment

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

8. 22 05 53 Identification for Plumbing Piping and Equipment

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

9. 22 14 13 Facility Storm Drainage Piping

   a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

10. 22 14 23 Storm Drainage Piping Specialties

    a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

11. 22 14 29 Sump Pumps

    a. **Plumbing Work Contract #10** shall provide all Work, complete, as specified in this Specification Section.

12. OTHER WORK OF **PLUMBING WORK CONTRACT #10**

    a. Reference all Contract Drawings:

        1) **Plumbing Work Contract #10** shall provide all Work complete as indicated and as further clarified:

            1) **Plumbing Work Contract #10** shall provide all Work required to re-support any temporary lighting, fire alarm or power that is left unsupported as a result of the removals provided by this Contract.

            2) **Plumbing Work Contract #10** is to provide all supplementary lighting required to perform the required finish Work under this section.

            3) **Plumbing Work Contract #10** shall visit the site to verify and review existing conditions before estimating the cost of the project.

    b. **Plumbing Work Contract #10** shall provide all cutting and patching required and/or resulting from the work of this Contract **unless otherwise indicated in the Scope of Work.** All patching shall be completed prior to final finishes.

13. **Electrical Work Contract #9** shall visit the site to verify and review existing conditions before estimating the cost of the project

14. **Plumbing Work Contract #10** shall provide and remove crane pad as required per OSHA regulations and as necessary for Scope of their Work.

END OF SCOPE OF WORK PLUMBING WORK CONTRACT #10

2.6 WORK SEQUENCE

A. The Work will be conducted in accordance with the approved and coordinated project schedule prepared by the Construction Manager from the Schedules submitted to the Construction Manager by each Prime Contractor involved in the process. The initial schedules are required from each **10 Working Days after award of the contract**. The following phasing will be considered the milestones for this project and must be maintained. Any additional costs for overtime, shift Work and/or additional manpower, required to maintain these milestones, will be at each Contractor's expense.

Refer to the construction schedule specifically outlining second shift and required Saturday work. Each Prime Contractor is required to work second shift and Saturdays must have at a minimum of half the size crew of the 1st shift or more as directed by the CM. Any variations must be directed by the Construction Manager. Proper allocation of manpower will be a prerequisite to proper payment. Productivity loss, extra cost associated with having a General Foreman, Foreman, etc. on site for the 2nd shift must be incorporated within bid price. Each subcontractor is responsible for providing all shift work as required at no additional cost to Owner / CM. Below are specific milestone dates that must be met:

Construct Work in strict accordance with the project schedule as indicated in specification section 00 43 83 and the coordinated overall project schedule.

2.7 CONTRACTOR'S USE OF PREMISES

A. Coordinate use of the premises under the direction of the Construction Manager.

1. Use of the site: Limit the use of the premises to Work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which Work is indicated. Each Contractor's use of premises is limited only by Owner's right to perform Work or to retain other contractors on portions of Project.
2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the other contractors and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment in-site.

2.8 OWNER OCCUPANCY

A. The Owner will occupy the building during construction.

2.9 WORK UNDER OTHER CONTRACTS

A. Separate Contract: Owner will award separate contracts for performance of certain construction operations at Project site. Those operations will be conducted simultaneously with Work under this Contract.

B. Cooperate fully with separate contractors so Work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract.

2.10 PRODUCTS ORDERED IN ADVANCE

A. Not Applicable

2.11 OWNER FURNISHED PRODUCTS

A. Not Applicable

2.12 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the CSI/CSC's "Master Format" 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.

B. Specification Content: The Specifications use certain conventions for the style of language and the intended meanings 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 inferred, as the sense

requires. Singular words shall be interpreted as plural and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by 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.

END OF SECTION 01 10 00

SECTION 01 10 00.A - CONSTRUCTION MANAGER OFFICE REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes providing and maintenance of the Construction Managers office. In addition, this section shall include all operating expenses and use charges associated with the modular office structure (as required).

B. The material associated with the Construction Manager Office structure shall be ready for occupancy within **15 DAYS** following the notice to proceed and shall be maintained until **October 30th 2021**, at which time the responsibilities and associated services shall transfer to others or be completed as directed by the CM.

1.02 SUBMITTALS

A. Not applicable

PART 2 - PRODUCTS

2.01 CONSTRUCTION MANAGER'S FIELD OFFICE

A. Modular Office Structure

1. **General Trades Contract #7.** shall provide all Work as required to maintain the Construction Manager's office and related services from the Notice to Proceed through to October 31, 2020.

2. The CM's office shall be maintained in accordance with all federal, state and local codes, standards and regulation.

B. Phone/Data

1. **Electrical Trades Contract #9** shall provide phone service to the Construction Manager's Office as required. Included but not limited to: minimum of five (5) phone lines and interior phone system, including control panel, eight (8) data jacks, multiple switching port, one (1) fax line and one (1) Cable Internet Connection of a minimum of 10/10 mb up and down speeds connection for 5 end-users and Wi-Fi connection. Review with cm prior to order/setup.

2. **Electrical Trades Contract #9.** shall provide and maintain the data and telephone service to the CM office from Notice to Proceed through to **October 31st, 2020**.

3. **Electrical Trades Contract #9.** shall pay all charges for internet, all local and long-distance telephone calls made from the CM Office as required.

C. Plumbing Systems

1. **General Trades Contract #7** to provide CM (1) one chemical toilet for duration of project with separate lock and key.

2. **General Trades Contract #7** will maintain the temporary facility as detailed in accordance with specification 01 50 00 Temporary Facilities & Controls.

D. HVAC Systems

1. None required under this contract.

E. Furnishings, Fixtures and Equipment

1. **General Trades Contract #7.** shall provide furnishings, fixtures and equipment in accordance with the following schedule. **General Trades Contract #7. shall review the list of items with the Construction Manager prior to ordering or purchase**. All equipment and furnishings shall become the property of the Owner.

Item	**Description**	**Features**	**Units**
Desk Chairs	Managerial mid-back chairs by Allsteel (or equal)	Rolling, swivel, with adjustable height and back	2
Plan Table	36" x 72" 4-post with heavy gauge steel base by Safeco (or equal)	1" thick non-glare top	1
Miscellaneous Chairs	Padded folding chairs by HON (or equal)		5
File Cabinets	4-drawer lateral, legal size, 1 hour rated fire resistant cabinets with locks by HON (or equal)	Color to match desks	2 – 4 drawers
Plan Rack	Mobile stand by Safeco (or equal)		1
Hanging Drawing Clamps	30" hanging clamps by Safeco (or equal)	6 per carton	3
Bookcases	36: x 60" steel units by HON (or equal		1
Portable Water	refrigerated unit - hot and cold water	Provide weekly/monthly water bottle service	1
First Aid Kit	100 person		1 each
Ear Protection	Ear plugs		1 box of 100 (min.)
Bulletin Board	24" x 36"		1

White Board	24" x 36"		1
Waste Paper Baskets			2
Refrigerator	4.3 cubic feet refrigerator/freezer		1
Microwave	1.2 cubic feet		1
Coffee Maker	12 cup with auto shut off	Monthly coffee service	1
Printer/Scanner/Copier/Fax	Xerox WorkCentre WC 7835	Fax capabilities, double sided printing, staples, speed 35ppm, max resolution 600dpi etc., with color copying abilities	1
Computers	Lenovo ThinkPad P50 20EN – 15.6” – Core i7 6700HQ – 16GB SSD Tablet, Port Replicators, 2 year replace support		1
Work table for copier and fax machine 2’X4’			1
Portable Table	30” x 6’		3 – 6’
Rolls of Paper Towels and toilet paper			As needed
File Folders			250
Hanging Folders			250
Avery File Folder labels			250
Shipping Tape with dispenser			1
3 Ring Binders 'D" ring	4” 3” 2” 1 ½”		5 5 6 6
Packages Avery Clean Label Dividers 5 sets of 8 tabs in each package			100
Cases of 8-1/2" x 11 copy Paper (compatible with Xerox copier) delivered as needed			As needed, start with 1

Item	Description	Features	Units
Cases of 11” x 17” copy paper			As needed, start with 1
Packages of yellow writing pads	Regular		2
Tape dispensers			1
Rolls of scotch tape			3
Assorted Sharpie Pen-styled Hi-Liter (packages)			2
Black Pens (Vision Uni-ball Micro 0.5mm)			12
Blue Pens (Vision Uni-ball Micro 0.5mm)			12
Black Sharpie Markers (Ultra Fine Point/Super)			1 box of Ultra Fine 1 box of Super
AAA batteries	Alkaline Duracell		24
AA batteries	Alkaline Duracell		24
Staplers			1
Boxes of staples for staplers			4
Staple pullers			1
Boxes of assorted rubber bands			1
Dozen binder Clips (small)			2
Dozen binder Clips (medium)			2
Dozen binder Clips (large)			2
Dozen of Pos-it Pads 3” X3”			2
Paper clips (small)			100
Boxes of push pins			2
3-hole punch Heavy Duty			1
Bottles Windex			2
Flash lights			1
Clipboards			2
Uvex Safety Glasses			12

PART 3 - EXECUTION

3.01 INSTALLATION AND MAINTENANCE

A. No trailer is required under this contract, maintenance of CM Office to be maintained by **General Trades Contract #7.**

C. Bottled water shall be provided for the water cooler identified in the furnishing and equipment schedule. Two reserve bottles shall be on hand at all times. Disposable

cups and a sanitary dispenser shall be provided and maintained. **General Trades Contract #7** shall supply all washroom disposables for the duration of the project and monthly coffee service.

E. **General Trades Contract #7** shall always maintain project site and snow removal for duration of project.

F. Equipment and furnishings shall be maintained and repaired and/or replaced as necessary or when directed by the project representative.

END OF SECTION 01 10 00.A

SECTION 01 14 19 - USE OF SITE

PART 1 - GENERAL

1.01. START OF THE WORK

1. The work of this Project shall be started when notified to proceed by the Owner. The Contractor shall inform the Construction Manager as to the actual date he/she will start to work at the site.

1.02. CONSTRUCTION SCHEDULE AND COMPLETION

1. All work on this project shall be completed in accordance with the Section 00 43 83 "Schedules and Milestones." The Contractor shall be required to take all measures to minimize the duration of the Project. It is of the utmost importance to adhere to the construction schedule for this project and meet the date set for Substantial and Final Completion. If additional staff or shifts are required to meet any schedule item, the Contractor shall include this work at no additional cost to the Owner. It is the responsibility of the Contractor to enforce the schedule with their subcontractors.
2. The Contractor shall confirm in writing that they will be able to complete their work as indicated on the schedule. Work operations and scheduling other than those indicated, must be approved by the Project Construction Manager prior to commencement of such work.
3. Coordination with other trades and contracts shall be a consideration to determine anticipated construction schedules. Construction schedule bar charts shall be submitted for approval one week after the pre-construction meeting.
4. In the event that any of the work to be completed falls behind schedule, based on the Owner's discretion, the responsible Contractor shall within two (2) working days start a full second shift of work until such time that the Project is back on schedule. All additional security/custodial costs and approved extra work claims by other Contractors arising from a delay shall be chargeable to the responsible Contractor. Contractors shall hold the Owner and Owner's Representatives harmless against all losses or damages due to delays of a third party.
5. If lack of workers, equipment, materials, etc., at necessary stages, delays or slows the schedule or usability of a space, the applicable Contractor will be responsible for additional temporary or final work (or other costs) necessary to continue the work so that the schedule is maintained. The Owner reserves the right to postpone work not capable of being completed on time. All costs of delays incurred shall be borne by the Contractor causing the delay.
6. Final Completion; All work scheduled shall be substantially completed in its entirety or in a usable, safe manner on or before the completion dates listed in Section 00 43 83 "Schedules and Milestones."
7. On-Site Work Hours: Limit work in the building to normal business working hours of 7:00a.m. To 3:30 p.m., Monday through Friday, unless otherwise indicated.

a. Weekend Hours: Only with Owners prior approval coordinated through the Construction Manager.

b. Early Morning Hours: Please reference code regulations for the City of Rochester having jurisdiction for restrictions on noisy work "No person shall engage in or permit any person to be engaged in construction activities which creates excessive noise at the property limits of the construction site between the hours of 10:00 p.m. of one day and 7:00 a.m. of the following day on any day of the week".

c. Hours for Utility Shutdowns: coordinated with the Construction Manager with Owners approval.

8. Work of any contract that includes burn-off, system start-up system cut-over or staff training shall not be done one week prior to and one week after the commencement of school except upon approval by the Construction Manager.

9. PROJECT LOGISTICS

A. GENERAL

1) "Project Logistics" is provided for reference by all Contractors, lower tier Contractors and suppliers. All Contractors and lower tier Contractors are responsible for following the requirements for deliveries, staging, storage trailers, office trailers, temporary utilities and parking at the project site.

2) The intent of the Site Use Information is for the Construction Manager to control the logistical operations of all Contractors and their personnel in an organized manner, for the benefit of facility operations, and for the efficiency of the overall project. The Construction Manager and the Architect will, at various stages of the Project, modify the site use requirements to accommodate current job-site conditions.

3) Locations for equipment, including but not necessarily limited to cranes, back hoes, excavators, compressors, generators, masonry saws and mixers must be approved by the Construction Manager prior to their utilization on this Project. No gas powered tools will be allowed to be utilized within enclosed buildings unless approved by the Construction Manager.

4) There shall be no obstructions placed in the roads at any time, which may prevent access to the site or occupied properties adjacent to the site. Any type of road closure must be scheduled with the Construction Manager three weeks prior to the scheduled closing.

5) Contractor's commercial signage is strictly prohibited on the Project site, except as specifically approved in writing by the Construction Manager.

B. PROJECT SPECIFIC

1) Trailers:

a. Refer to Section 01 55 00.A Site Logistics Plan: Specific locations will be designed for construction staging, storage trailers, office trailers, etc. Before trailers or materials are placed on site, the Construction Manager must approve the exact locations. Contractors are advised that at various times during the project, storage trailers or office trailers may require relocation as directed by the Construction Manager. Costs for same shall be borne by Contractor.

2) Deliveries:

a. Contractors and lower tier Contractors shall coordinate material and equipment deliveries with the Construction Manager and other Contractors to ensure that materials can be off-loaded efficiently and that site use operations are maintained in an orderly fashion. All major deliveries shall be scheduled with the Construction Manager one (1) week in advance of the delivery. The Construction Manager shall be provided with the scheduled date and time of the delivery; the product and the anticipated duration required for unloading. Deliveries and or hoisting of equipment or materials that directly affect construction or Owner operations shall be scheduled during off hours.

b. Any delivery not going directly to an isolated area of the building or site under construction must be dropped off within a fenced-in, contained staging area. Under no circumstances will deliveries be dropped off anywhere else on the site, unless specifically approved by the Construction Manager.

3) Parking

a. All Contractors are required to park in designated areas as indicated in Section 01 55 00.A Site Logistics Plan LPC SK-01A.

4) Sanitary Facilities

a. Defacing sanitary facilities in any manner will result in the cleanup and/or removal costs to be borne by all Contractors prorated based upon employee count.

5) Material Storage

a. The Contractors shall provide adequate off-site storage for materials and schedule their deliveries to allow for the immediate hoisting and/or installation of these materials when they arrive at the site. Cost of said off-site materials storage, if required, shall be included in the Contractor's price. The Construction Manager may, at their sole discretion, allow a limited amount of on-site storage. If any material and/or equipment stored at the project, at any time obstructs the performance of the project, the materials shall be removed and relocated by the Contractor at no additional cost. In the event a Contractor fails or refuses to comply with this Article within a reasonable time, but not more than twenty-four (24) hours, the Construction Manager will reserve the right to have those materials removed, and all costs will be charged against the Contractor involved.

b. Contractor staging of materials and equipment shall occur in the designated staging area as indicated in Section 01 55 00.A Site Logistics Plan, unless otherwise authorized by the Construction Manager in writing.

c. If petroleum products are brought on site in stationary containers of 55-gallons or larger, the Contractor shall provide a certification to the Construction Manager, stamped by a Professional Engineer currently licensed in New York State, that product storage, spill prevention, training, testing, inspections, handling and dispensing methods are in compliance with all applicable Federal and State rules and regulations, including EPA rule 40 C.F.R. Part 112. The Owner may add the Contractor's certification(s) to their oil spill prevention control and counter measure (SPCC) plan as an amendment. This certification shall be provided to the Construction Manager two (2) weeks ahead of any product or container(s) delivery and the Construction Manager shall be notified promptly of the removal of any container(s). Contractors shall provide all protection, fire extinguishers and signage in accordance with OSHA regulations.

6) Utility Shutdowns and Cutovers

a. Each Contractor is responsible for submitting to the Construction Manager, for their approval, a proposed schedule of all utility shutdowns and cutovers of all types which will be required to complete the Project; said schedule should contain a minimum of two (2) week's advance notice

prior to the time of the proposed shutdown and cutover so as not to impact construction and/or owner activities. The contract consideration is deemed to include all necessary overtime and all premium time, if any, that is required by the Contractor to complete the shutdowns or cutovers.

b. In the event the Contractor disrupts any existing services, the Contractor shall immediately make a temporary connection to place such service back into operation and maintain the temporary connection until the Contractor makes the permanent connection. All Work must be acceptable to the Construction Manager, the Owner and the Authority having jurisdiction.

7) Site Use Plans

a. Contractors are advised that the Site Use Plans for Rochester Public School #16 is for reference and use by all Contractors, Contractors and suppliers. Refer to Section 01 10 00 Summary of Work and Section 01 50 00 Temporary Facilities and Controls for specific requirements regarding Temporary Facilities and Controls. All Contractors and Contractors are responsible for following the requirements for deliveries, staging, storage trailers, office trailers, and parking identified on Section 01 55 00.A Site Logistics Plan.

b. The intent of the Site Use Information is for the Construction Manager to control the logistical operations of all Contractors and their personnel in an organized manner, for the benefit of school operations, and for the efficiency of the overall project.

c. Specific locations will be designated for construction staging, storage trailers, office trailers, etc. Before trailers or materials are placed on site, the Construction Manager must approve the exact locations. Contractors are advised that at various times during the project, storage trailers or office trailers may require relocation as directed by the Construction Manager.

d. Contractors and subcontractors shall coordinate material and equipment deliveries with the Construction Manager and other Contractors to ensure that materials can be off-loaded efficiently and that site use operations are maintained in an orderly fashion.

1.03. WORK IN OCCUPIED SCHOOL BUILDINGS

1. Not Used

1.04 PROGRESS MEETINGS

1. Refer to Section 01 31 13 “Contract Coordination” In addition, each entity involved in planning, coordination or performance of work shall be properly represented at each meeting.

1.05 CONFIRMED DELIVERY DATES

1. Within thirty calendar days after the execution of the Contract, the Contractors shall submit to the Construction Manager a copy of the confirmed delivery date for each required material or product.

END OF SECTION 01 14 19

SECTION 01 25 00 - SUBSTITUTION PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS:

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

1.2 SUMMARY:

A. This Section includes:
   1. Procedures for handling requests for substitutions made after award of the Contract.

1.3 DEFINITIONS:

A. Definitions used below are not intended to change or modify the meaning of other terms used in the Contract Documents.

B. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the Contractor after award of the Contract are considered requests for "substitutions". The following are not considered substitutions:
   1. Substitutions requested by Bidders during the bidding period, and accepted prior to award of Contract, are considered as included in the Contract Documents and are not subject to requirements specified in this Section for substitutions.
   2. Revisions to Contract Documents requested by the Owner or Architect.
   3. Specified options of products and construction methods included in Contract Documents.
   4. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities.

1.4 SUBMITTALS:

A. Substitution Request Submittal:
   1. Requests for substitution will be considered if received within **45 days after Notice to Proceed**. Requests received more than **45 days after Notice to Proceed** of the Work may be considered or rejected at the discretion of the Architect.
   2. Submit 3 copies of each request for substitution for consideration. Submit requests on the “Request for Equivalent Review Form” located in Division 00, Section 00 63 19.
   3. Identify the product, or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawings numbers.
   4. Provide complete documentation showing compliance with the requirements for substitutions, and the following information, as appropriate:
      a. Statement indication why specified material or product cannot be provided.

b. Product data, including Drawings and descriptions of products, fabrication and installation procedures.
c. Samples, where applicable or requested.
d. A detailed comparison of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements such as performance, size, weight, durability, visual effect, specific features and requirements indicated.
e. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate Contractors, that will become necessary to accommodate the proposed substitution.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of the net change, if any in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Include the Contractor's waiver of rights to additional payment or extension of time, that may subsequently become necessary because of the failure of the substitution to perform adequately.

B. Architect's Action:
1. Within one week of receipt of the request for substitution, the Architect will request additional information or documentation necessary for evaluation of the request.
2. Within 2 weeks of receipt of the request, or one week of receipt of the additional information or documentation, whichever is later, the Architect will notify the Contractor of acceptance or rejection of the proposed substitution.
3. Comply with requirements in Division 01 Section 01 32 19 "Submittal Procedures." Show compliance with requirements.
4. If a decision on use of a proposed substitute cannot be made or obtained within the time allocated, use the product specified by name.
5. Acceptance will be in the form of a Change Order.

1.5 REIMBURSEMENT OF ARCHITECT'S COSTS:

A. In the event substitutions are proposed to the Architect after the Contract has been awarded, the Architect will record time used by the Architect and the Architect's consultants in evaluating each such proposed substitution.

B. Whether or not the Architect approves a proposed substitution, the Architect will invoice the Owner for time spent in evaluating the proposed substitution. The Owner will, in turn, pass this cost on to the Contractor and require a "deduct" Change Order due to the Owner.

PART 2 – PRODUCTS

2.1 SUBSTITUTIONS:

A. Timing: Architect will consider requests for substitution if received within **45 days after the Notice to Proceed**. Requests received after that time may be considered or rejected at discretion of Architect.

B. The Contractor's substitution request will be received and considered by the Architect when one or more of the following conditions are satisfied, as determined by the Architect, otherwise requests will be returned without action except to record noncompliance with these requirements.
   1. Extensive revisions to Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of Contract Documents.
   3. The request is timely, fully documented and properly submitted.
   4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
   5. The specified product or method of construction cannot be provided within the Contract Time.
      a. The request will not be considered if the product or method cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
   6. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
   7. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit, after deducting offsetting responsibilities the Owner may be required to bear.
      a. Additional responsibilities for the Owner may include additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or separate contractors, and similar considerations.
   8. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
   9. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
   10. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provides the required warranty.

C. The Substitution request shall comply with the following requirements are met:
   1. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as

performance, weight, size, durability, visual effect, and specific features and requirements indicated.

2. Evidence that proposed product provides specified warranty.
3. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
4. Samples, if requested.

D. The Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptable or valid request for substitution, nor does it constitute approval.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 25 00

REQUEST FOR INFORMATION FORM

DATE: _____

PROJECT: RCSD John Walton Spencer School No. 16

TO: SWBR Architects

RE: _____

REQUESTED BY: _____

REQUIRES RESPONSE BY: _____

SECTION: _____ **REFERENCE NO.:** _____

REMARKS: _____

INQUIRY:

SIGNED: _____

ANSWER:

SIGNED: _____

SECTION 01 26 39 – FIELD ORDERS

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. Field Orders/Change Issues are an interpretation of the Contract Documents or an order to do minor changes in the Work. Architect will issue through the Construction Manager supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time. Since time is of the essence, Contractor shall promptly complete the Work directed in the Field Order/Change Issue.

1.3 CHANGE ORDER PROCEDURES

A. No changes in work will be allowed without prior approval from the Owner and Architect. No additional costs will be accepted or authorized without prior written approval from the Owner and Architect. Failure to acquire approval will not entitle the Prime Contractor to reimbursement or payment for unauthorized changes. Likewise changes in work, without written approval, are subject to rejection and removal.

B. Upon the Owner's approval of a Contractor’s Cost Proposal, as initiated by the Proposal Request, the Construction Manager will issue a Change Order for signatures of the Owner, Construction Manager, Architect and the Contractor on AIA Form G701/CM.

1.4 MINOR CHANGES IN THE WORK

A. Architect will issue through the Construction Manager, supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions." If a Contractor determines that an “Architect’s Supplemental Instructions” will impact the Contract Sum or the Contract Time, that Contractor shall notify the Construction Manager immediately with a written explanation to substantiate the claim and a complete and detailed cost breakdown as required under paragraph 1.5 Proposal Requests.

1.5 PROPOSAL REQUESTS

A. Architect-Initiated Proposal Requests: The Architect through the Construction Manager will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by the Architect through the Construction Manager are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change, unless specifically indicated to do so by the Architect and the Construction Manager.
2. Within the time specified in Proposal Request after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

   a. Include a complete detailed material, equipment, and labor break down to substantiate the proposed costs.
   b. 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.
   c. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
   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 before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to the Construction Manager.

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 and the Contract Time.
2. Include a complete detailed material, equipment, and labor breakdown to substantiate the claim.
3. 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.
4. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
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 before requesting an extension of the Contract Time.
6. Comply with requirements in Division 01 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified

C. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.6 CHANGE ORDER PROCEDURES

A. Upon approval of a Proposal, the Construction Manager will issue a Change Order for signatures of the Contractor and Construction Manager.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: A Construction Change Directive (CCD) is a written order to be used in the field to expedite work in advance of an agreement between the owner and contractor in regards to an approved change order. The Construction Change Directive instructs the Contractor to proceed with a change in the Work, pending subsequent final determination of a Change Order by the Architect, Construction Manager, and Program Manager. The Construction Change Directive may be issued by the Construction Manager or Architect, without invalidating the Contract, to order changes in the Work consisting of additions, deletions or other revisions. The Executive Director or Board Chair or designee of the RJSCB is authorized to approve work done under Construction Change Directives (CCD). Such approval by the Executive Director or Board Chair or designee is subject to prior CCD approval by the CM, Architect, and PM.

1. The Construction Change Directive (CCD) contains a complete description of change in the Work. It also designates the method to be followed to determine the change in the Contract Sum. Once a CCD is approved, Owner is obligated to pay for work done under a CCD. However, billing and payment for the CCD work must be done following Owner approval of the Change Order that includes the work authorized by the CCD.

B. Documentation: Maintain detailed records on a time and material basis or Contractor's Cost Proposal 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.

2. Construction Change Directives are not change orders. No acceptance in whole, or in part, is implied by construction change directives.

Markups:

Prime Contractor Overhead = 15%

On Sub-Ccontractor work:
Prime Contractor Overhead = 5%
Sub-Contractor = 10%

A maximum of 15% Overhead and Profit is allowed regardless of the amount of tiers of sub-contractors under the Prime Contract

Prime Contractor Bond = 2%

- The bond rate of 2% will be applied to both added work and credited work.

END OF SECTION 01 26 39

SECTION 01 26 43 - CHANGE ORDER REQUESTS

Refer to the General Conditions (00 72 16) and Field Orders (01 26 39) for any and all provisions governing additional work and/or changes to the work.

In order to facilitate checking of quotations for extras or credits, all proposals, shall be accompanied by a complete itemization of costs including labor, materials, equipment and sub-contracts. All proposals without such itemization will be returned to the Contractor for resubmission, and Owner may issue a Construction Change Directive in lieu thereof.

All Prime Contractor and subcontractors labor rates are to be broken down on the attached labor rate breakdown sheet.

Submission of Change Orders will go through the Construction Manager.

Markups:

Prime Contractor Overhead = 15%

On Sub-~~c~~Contractor work:
Prime Contractor Overhead = 5%
Sub-Contractor = 10%

A maximum of 15% Overhead and Profit is allowed regardless of the ~~amount~~number of sub-contractors under the Prime Contract

Prime Contractor Bond = 2%

- The bond rate of 2% will be applied to both added work and credited work.

END OF SECTION 01 26 43

CHANGE ORDER REQUESTS **Contractor Name:**

Refer to the General Conditions for any and all provisions governing additional work and/or changes to the work.

In order to facilitate checking of quotations for extras or credits, all proposals, shall be accompanied by a complete itemization of costs including labor, materials and sub-contracts. Labor and materials shall be itemized in the manner prescribed below. Where major cost items are sub-contracts, they shall be itemized also. All proposals without such itemization will be returned to the Contractor for resubmission, and Owner may issue a Construction Change Directive in lieu thereof.

1	**Materials (Itemized Breakdown)**	_____
2	**Rental of Equipment (Itemized Breakdown)**	_____
3	**Subtotal (Add Lines 1-2)**	_____
4	**Overhead & Profit (15% x line 3)**	_____
5	**Subtotal (Add lines 3-4)**	_____
6	**Labor (Itemized Breakdown)**	_____
7	**Insurance on Labor (Worker's Comp., etc.)**	_____
8	**Subtotal (Add lines 6 and 7)**	_____
9	**Overhead and Profit (15% x line 8)**	_____
10	**Subtotal (Add lines 8 and 9)**	_____
11	**Sub-Contract Work (Include Itemized Breakdown. Sub-contractor's overhead and profit allowed is 10%).**	_____
12	**Prime Contractor Overhead and Profit (5% x line 11)**	_____
13	**Subtotal (Add lines 11 and 12)**	_____
14	**Subtotal (Add line 5, 10 and 13)**	_____
15	**Bond charges (2% x line 14)**	_____
16	**TOTAL CHANGE ORDER PROPOSED (Add lines 14 and 15)**	_____

SECTION 01 26 53 – LABOR RATE WORKSHEET COVERSHEET

See attached (Hourly) Labor Rate Breakdown.

Provide Breakdown with every submission of a Change Order Request.

LABOR RATE WORKSHEET

Contractor _____ Project : RCSD John Walton Spencer School No.16

Address _____ Bid Set – 05/06/2020

_____

Telephone _____

Trade Classification _____

Local Union # _____

Effective Date: From _____ To _____

	(%)	($) Straight Time	($) Over Time	($) Premium Time
Base Rate		_____	_____	_____
	_____	_____	_____	_____
F.I.C.A.	_____	_____	_____	_____
Federal Unemployment Tax	_____	_____	_____	_____
State Unemployment Tax	_____	_____	_____	_____
Welfare Fund	_____	_____	_____	_____
Pension Fund	_____	_____	_____	_____
Vaction Fund	_____	_____	_____	_____
Association Dues	_____	_____	_____	_____
Paid Holidays	_____	_____	_____	_____
Workman's Compensation	_____	_____	_____	_____
Liability (Bodily Injury Ins.)	_____	_____	_____	_____
Property Damage Insurance	_____	_____	_____	_____
Other _____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
Total Charge per hour	_____	_____	_____	_____

_____

Signature

SECTION 01 29 75 – REVOLVING LOAN PROGRAM AND PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

1. Drawings, General Conditions, Divisions 00 and 01 Specification sections, apply to this section.

2. Section 01 29 76 – Progress Payment Procedures

3. Section 01 29 75a – Application for RSMP Revolving Loan Fund

1.02 SUBCONTRACTOR REVOLVING LOAN FUND

1. The Rochester Joint Schools Construction Board ("RJSCB") has established a Revolving Loan Program ("RLP") to provide financial assistance to eligible Subcontractors that cannot wait for a full pay cycle to meet certain obligations. The intent of the RLP is to elevate the quality of life for Rochester residents, students, businesses, and Eligible Business Enterprise (EBE) participants in the Rochester Schools Modernization Program ("RSMP"). The program supports the RJSCB's effort to remove barriers and promote business growth in the City of Rochester.

2. Loans up to $10,000 will be made available to applicants who perform work, or provide materials in connection with Phase 2 of the Rochester Schools Modernization Program ("RSMP"). Loans are subject to discretionary approval of a loan committee, qualifications of the borrower, and availability of funds.

3. A fully completed Revolving Loan Program (RLP) short-form application (Section 01 29 75a) is required in order to provide a loan assistance to RSMP Subcontractors with working capital for job related payroll, supplies, and job related machinery and equipment costs.

4. The Executive Director or RJSCB Designee, after receiving an approved application from the Loan Committee, will issue a Loan Voucher authorizing the release of a loan check to the applicant. This Loan Voucher will be signed by a Loan Committee member and the Executive Director or RJSCB Designee. The Loan Voucher will include the following: the name of the Prime, the name of the loan recipient, the exact amount and the payee for the loan check, the date the loan check is required, the project(s) the applicant is working on, the total amount of the Prime contract, the nature of the subcontract (scope of work), and the expected repayment time frame by the Subcontractor/applicant (not to exceed ninety (90) days).

1.03 LOAN REPAYMENT

1. Two separate checks will be issued at the time the next monthly payment to the Prime contractor is processed encompassing the work performed by the subcontractor related to the work covered by an outstanding loan. A Payment Voucher will be initiated and signed by the individual designated by the Executive Director or the Board's designate to authorize the split payment. The Payment Voucher will include: the name of the Prime contractor, the name of the subcontractor, the exact amount of the loan being repaid by the split payment.

2. Program Manager will notify the Prime contractor and the Construction Manager of the split payment. One check from the RJSCB Trustee will be issued directly to the Prime contractor for all items not related to the loan provided to the subcontractor (this may include some portion of payment to the subcontractor not associated with the loan amount which will be paid to the subcontractor by the Prime). A second, two-party check will be issued by the RJSCB Trustee for the amount of the Loan taken by the subcontractor. This dual-party check will be sent directly to the Program office and must be signed by the Prime and the Subcontractor prior to deposit into the Account holding the Revolving Loan Fund.

END OF SECTION 01 29 75

RSMP

T: (585) 512-3820 http://www.rjscb.org

"Every child is a work of art. Create a masterpiece."

APPLICATION FOR RSMP LOAN FUND

(SHORT-FORM)

BUSINESS CONTACT INFORMATION

Name of Company: EIN #:

Name of Owner: Title:

Phone: Fax: E-mail:

Current Business Address:

City: State: ZIP Code:

Date Business Commenced: EBE Certification Status: *(MBE, WBE, DBE, or SBE)*

Sole Proprietorship: ☐ Partnership: ☐ Corporation: ☐ Other: ☐

LOAN REQUEST

Purpose of Loan: *(e.g. payroll for week(s) ending xx/xx/xx; rental of crane for XX school for work performed xx/xx/xx, etc.)*

Date of Request: Amount of Request:

BUSINESS AND CREDIT INFORMATION

Bank Name:

Bank Address: Phone:

City: State: ZIP Code:

Business Account Number(s):

Checking ☐ Savings ☐ Other ☐

Checking ☐ Savings ☐ Other ☐

FINANCIAL AND INCOME STATEMENT SUMMARY

Total Assets	$	Total Income	$
Total Liabilities	$	Total Annual Expenses	$
Net Worth	$	Net Annual Cash Flow	$

BUSINESS/TRADE REFERENCES

Company Name:

Address:

City: State: ZIP Code:

Phone: Fax: E-mail:

Company Name:

Address:

City: State: ZIP Code:

Phone: Fax: E-mail:

Company Name:

Address:

City: State: ZIP Code:

Phone: Fax: E-mail:

City of Rochester, N
Lovely A. Warren, May
Rochester City Coun

ROCHESTER CITY SCHOOL DISTRICT

BUSINESS OPPORTUNITIES PROGRAM

SAVIN
Savin Engineers, P.C.

RSMP

T: (585) 512-3820 http://www.rjscb.org

"Every child is a work of art. Create a masterpiece."

REQUIRED LOAN APPLICATION DOCUMENTS
1. Copy of the executed subcontract between the Applicant and Prime contractor and Prime Contractor Statement of Eligibility.
2. Purpose and use of funds documentation (e.g. lease agreements, purchase invoice, payroll log)
3. List of suppliers
4. Liability insurance
5. Workers compensation insurance
6. Financial statements and/or declaration by Applicant that other personal resources are not available

REPRESENTATIONS, AGREEMENTS AND CERTIFICATION OF APPLICANT
Applicant represents and agrees as follows:
• Proceeds from the RSMP Revolving Loan Program (RLP) fund will only be used for the labor and materials to complete RSMP work.
• If either Applicant or the RSMP determines that the loan proceeds will not be used for the purposes described herein, Applicant will immediately repay the loan in full. Applicant acknowledges that Applicant shall have no further interest, right, or claim to such repaid loan proceeds or against the RSMP.
• The RSMP shall be entitled to confirm or verify any of the information contained in this Application from any source named herein or other person or entity having knowledge of the same. RSMP reserves the right to request additional information, if necessary, to process this request.
• The Application shall be subject to the Program Criteria and Procedures.
• This Application, and any loan from the RSMP to Applicant, shall be subject to any loan criteria and policies in effect regarding the RLP.
• The RSMP has made no representation or warranty with respect to the Applicant's compliance with applicable laws and regulations, or the ability of Applicant to obtain any necessary governmental approvals and permits

Applicant certifies that all information in this Application, and all information furnished in support of this Application, is true and correct and is given for the sole purpose of obtaining a bridge (gap) loan from the RLP. Applicant gives permission for any authorized RJSCB Representatives, the ICO, or RSMP Staff to verify any statement made by Applicant.

Signature of Applicant: _____ Date: _____

FOR RSMP USE ONLY	
Approved Amount $	
APPROVED BY	APPROVED BY
Name:	Name:
Title: RJSCB Committee Member	Title: Executive Director or Designee
Date:	Date:
APPROVED BY	APPROVED BY
Name:	Name:
Title: RJSCB Independent Compliance Officer	Title: REDCO Board Member
Date:	Date:

Application #:		Application Date:	

☐ **Approved** ☐ **Denied**

City of Rochester, N
Lovely A. Warren, May
Rochester City Coun

ROCHESTER CITY SCHOOL DISTRICT

BUSINESS OPPORTUNITIES PROGRAM

SAVIN Savin Engineers, P.C.

RSMP

T: (585) 512-3820 http://www.rjscb.org

"Every child is a work of art. Create a masterpiece."

PRIME CONTRACTOR STATEMENT OF ELIGIBILITY

NOTE TO PRIME: THESE LOAN PROCEEEDS WILL BE DEDUCTED FROM THE PAY APP INDICATED BELOW

PRIME CONTRACTOR NAME:		PRIME CONTRACTOR PHONE NUMBER:	
PRIME CONTRACTOR ADDRESS:		PRIME CONTRACTOR EMAIL ADDRESS:	

PROJECT NAME:	

SUBCONTRACTOR NAME:	

CONSTRUCTION MANAGER NAME:	

SCOPE OF WORK:	

ORIGINAL CONTRACT AMOUNT:		AMOUNT OF CONTRACT PAID TO DATE:
BALANCE OF CONTRACT TO BE PAID:		

Signature of Prime: _____ Date: _____

Title: _____ Date of Pay App for Loan Repayment _____

City of Rochester, N
Lovely A. Warren, May
Rochester City Coun

ROCHESTER CITY SCHOOL DISTRICT

BUSINESS OPPORTUNITIES PROGRAM

SAVIN
Savin Engineers, P.C.

January 2017

Dear RSMP Loan Applicant,

The RJSCB, through its many endeavors, continues to work arduously with the City and the School District to elevate the quality of life for Rochester residents, students, businesses, and Eligible Business Enterprise (EBE) participants in its multi-year/multi-phase School Facilities Modernization Program. The program supports the RJSCB's effort to remove barriers and promote business growth in the City of Rochester.

Attached is a Revolving Loan Program (RLP) application that is structured to provide assistance to RSMP Subcontractors with working capital for job related payroll, supplies, and job related machinery and equipment costs. This short form application is intended to make the loan process easy to implement and navigate. This application includes a procedure with all requirements necessary to apply for a loan.

We encourage applicants to work closely with the RJSCB's Executive Director, RSMP staff and the ICO during the loan process to make the program a success for eligible loan applicants as well as the RSMP.

Thank you for your interest in the Revolving Loan Program ("the RLP") offered by the Rochester Schools Modernization Program ("the RSMP").

Sincerely,

_____ _____

RJSCB Chair RJSCB Executive Director

REVOLVING LOAN FUND PROCEDURE
FOR THE ROCHESTER SCHOOLS MODERNIZATION PROGRAM

PURPOSE:

The Rochester Joint Schools Construction Board ("RJSCB") wishes to establish a Revolving Loan Program ("RLP") to provide financial assistance to eligible Contractors/Subcontractors who perform work, or provide materials in connection with Phase 2 of the Rochester Schools Modernization Program ("RSMP"). The Program Manager will contribute $100,000 as "seed" money into this Revolving Loan Fund ("Fund") for the RLP. In order to assist as many small businesses as possible, the RLP will need additional funds from "strategic partners" to support the program. "Strategic Partners," such as financial institutions, private businesses, and philanthropic foundations, include those with a vested or general interest in seeing small businesses succeed. All applicants for loan from the RLP shall be subject to the loan process set forth in this document. Loans are subject to discretionary approval of a loan committee, qualifications of the borrower, and availability of funds.

ELIGIBILITY, ROLES, PROCESS

Revolving Loan Program Committee

The RLP Committee ("Loan Committee") will be established to review the loan applications and will consist of four members:

- One RJSCB Finance Committee Member
- RSMP Executive Director ("Executive Director") or Designee of the RJSCB
- Independent Compliance Officer (ICO)
- One Rochester Economic Development Corporation (REDCO) Board Member

The Loan Committee will approve or decline completed loan applications within three (3) business days following review.

Loan Administration

The Program Manager or its designee will assist the Loan Committee in administering the RLP by:

- Processing loan application and payments;
- Answering inquiries from applicants or borrowers; and
- Providing a monthly report to RLP Committee and an annual report to the RJSCB.

Eligibility

Applications will be provided only to:

a) Phase II Subcontractors

and

b) Business Opportunities Program Participants who:

- Are enrolled and active members of the Instructional series (Regular or sufficient attendance) or hold a Certificate of Completion

  or

- Are enrolled as a member in the Mentor-Protégé Program based on a prime/subcontractor relationship or hold a Certificate of Completion

Application Process

1. Applicant submits a completed application requesting a loan of up to $10,000.

2. Application is reviewed by the Loan Committee to confirm that all eligibility requirements of the RLP have been met.

3. Notification:

- Approved Application – The Committee sends official commitment letter outlining method of disbursement and repayment terms.

- Declined Application – The Committee sends official declination letter stating rationale for decision.

Loan Authorization and Issuance

The Executive Director, after receiving an approved application from the Committee, will issue a Loan Voucher authorizing the release of a loan check to the applicant. This Loan Voucher will be signed by a Committee member and the Executive Director. The Loan Voucher will include the following: the name of the Prime, the name of the loan recipient, the exact amount and the payee for the loan check, the date the loan check is required, the project(s) the applicant is working on, the total amount of the Prime contract, the nature of the subcontract (scope of work), and the expected repayment time frame (not to exceed ninety (90) days).

Security and Repayment of the Loan

The RJSCB Trustee (US Bank National Association) will be directed to create and issue two separate checks at the time the next monthly payment to the Prime contractor is processed encompassing the work performed by the subcontractor related to the work covered by this loan. A Payment Voucher will be initiated and signed by the individual designated by the Executive Director or the Board's designate to authorize the split payment. The Payment Voucher will include: the name of the Prime

contractor, the name of the subcontractor, the exact amount of the loan being repaid by the split payment.

Program Manager will also notify the Prime contractor and the Construction Manager of the split payment. One check from the Trustee will be issued directly to the Prime contractor for all items not related to the loan provided to the subcontractor (this may include some portion of payment to the subcontractor not associated with the loan amount which will be paid to the subcontractor by the Prime). A second, two-party check will be issued by the Trustee for the amount of the Loan taken by the subcontractor. This dual-party check will be sent directly to the Program office and must be signed by the Prime and the subcontractor prior to deposit at the financial institution/strategic partner.

The financial institution/strategic partner will provide the Executive Director and the Program Manager with a monthly report that will indicate the amount of money remaining in the fund, all disbursements to applicants made from the fund, all receipts of payments credited to each subcontractor, any fees that the financial institution/strategic partner have levied against the fund, and any outstanding loans.

External Assistance:

The RLP Committee will work with the strategic partner in preparing the loan application and necessary documentation to streamline the loan process. Costs associated with application and/or administration fees by the Strategic Partner will be drawn from the Fund.

The RLP Loan Committee may waive requirements, or make exceptions to the foregoing criteria and procedures, with a finding that the goals of this program will be furthered by such waiver or exception. The Executive Director will prepare a written statement regarding any waiver or exception and shall maintain such waiver or exception in the RJSCB minutes and in the loan file.

Applicants may be asked to acknowledge the Strategic Partner’s contributions or assistance in printed materials describing the program, including but not limited to: 1) brochures, flyers, printed materials and signage; 2) interviews with press organizations; 3) descriptions of RSMP projects in newspapers, mass emails, advertisements, and case studies; 4) on websites in which the RSMP and the RLP are discussed or described.

SECTION 01 29 76 - PROGRESS PAYMENT PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of Contract, including General Conditions and Division 01 Specification sections, apply to work of this section.

2. Section 01 29 75 – Revolving Loan Program

1.02 REQUIRED SCHEDULE OF VALUES

1. The Contract shall submit a schedule of values prior to his/her first application. Refer to Section 00 72 16 - General Conditions. Itemize schedule of values per separate SED Control Numbers, and by Additions and Reconstruction when applicable.

2. The schedule of values (updated and revised) shall be submitted on AIA G-732 / 703 CMa forms. The Contractor and each Subcontractor shall prepare a trade payment breakdown for the Work for which each is responsible, such breakdown shall be divided in detail sufficient to exhibit areas, floors and/or sections of the Work, and/or by convenient units and shall be updated as required by either the Owner or the Architect as necessary to reflect (1) description of Work (listing labor and material separately in some instances), (2) total value, (3) percent of the Work completed to date, (4) value of Work completed to date, (5) percent of previous amount billed, (6) previous amount billed, (7) current percent completed and (8) value of work completed to date. Any trade breakdown which fails to include sufficient detail, is unbalanced or exhibits “front loading” of the value of the Work shall be rejected. If trade breakdown had been initially approved and subsequently used, but later found improper for any reason, sufficient funds shall be withheld from future Applications for Payment to ensure an adequate reserve (exclusive of normal retainage) to complete the Work. Breakdown shall include multiple construction site, multiple locations within each site, additions versus renovation work, etc. as required to satisfy NY State Education Department requirements.

1.03 PAYMENTS

1. All applications for partial or final payment shall be submitted, through the Construction Manager to RJSCB in triplicate, on AIA G-732 / 703 CMa and other forms furnished by the RJSCB and the Independent Compliance Officer, and submission schedule provided by the Program Manager, and in compliance with forms acceptable to the Owner, Owner’s lender, and Architect. Contractor shall supply such additional documentation and information as Owner’s lender or the Construction Manager shall request in connection with each disbursement to Contractor.

2. All applications for monthly and/or final payment must include certified payroll records for each week included in that payment period for all contractors and subcontractors. MWBE/DBE/SBE forms required by Section 00 43 31 of the project Manual shall also be included with each payment application and must be approved by the ICO as set forth in that Section. Contractors and subcontractors are required to keep original payroll records or transcripts for a period of three years from date of final payment, or as required by New York State and U.S. Departments of Labor.

3. All applications for partial payment submitted for approval that include stored materials shall include a Certificate of Stored Materials indicating an itemized value of the materials stored, the location the materials are stored at and referring to the project name and date of inventory. Materials stored off site must be either in a bonded warehouse or a storage facility owned by the Contractor. A rider from the Contractor's insurance company to cover off-site material is also required. Submit along with the payment request evidence of adequate insurance. Refer also to Section 007216 “General Conditions,” the terms of which shall prevail in the event they conflict with the provisions set forth in this Section 01 29 76.

3. Payments by Owner and Contractor shall be in accordance with Section 00 72 16 - General Conditions. Contractors must include an Interim Lien Waiver in the form included in this Section, or such updated form as may from time to time be provided by the Owner or Construction Manager. In addition, Contractor must provide subcontractor back-up invoices upon request of Owner.

5. Initial Application for Payment: Approved administrative actions and approved submittals that must precede or coincide with submittal of first Application of Payment as a condition of payment include but are not necessarily limited to the following:

    1. List of Subcontractors.
    2. Schedule of Values.
    3. Contractor's Construction Schedule.
    4. Submittal Schedule.
    5. List of long lead time material.
    6. Certificates of insurance (Contractor and Subcontractors)
    7. Performance and payment bonds.
    8. Log of Tradesmen’s OSHA 10 certificates.
    9. MWBE/DBE/SBE Section 00 43 31 DP-1, Letter of Intent to Perform, and forms cited therein.

6. Progress Application for Payment: Administrative actions and submittals that must be included with submittal of initial or subsequent Progress Applications for Payment include, but are not limited to the following:

    1. MWBE/DBE/SBE Section 00 43 31 monthly progress reporting forms.
    2. Certified Payroll Reports.
    3. Monthly Safety Report.
    4. Construction Progress Reports.
    5. Progress Construction Schedule (original schedule versus actual).
    6. Submittal Schedule.

7. Interim Lien Waivers (from Prime, sub, sub-subs, suppliers).
8. Subcontractor back-up invoices.
~~9. Rochester Careers in Construction (15 cent) letter~~
~~10.~~9. Stored material documentation (Bill of lading, photos, insurance)
~~11.~~10. Updated Log of Tradesmen's OSHA 10 certificates
~~12.~~11. Updated Log of Hot Work permits

7. Submit along with the final payment request all required documentation as set forth above, including Final Lien Waivers and Releases, Warranty Agreements, No-Asbestos Statement, Operating and Maintenance Manuals, Consent of Surety, Contractor's Certification and Subcontractor's Certifications, and all other close-out documentation reasonably requested by Owner.

END OF SECTION 01 29 76

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INTERIM WAIVER OF LIEN AND CLAIM

To: _____
(Owner)

From: _____
(Name of Contractor or Supplier Company)

_____
(Address of Contractor or Supplier Company)

_____

Project: _____
(the "Project")

The undersigned Subcontractor or Supplier company (hereinafter "Contractor"), for and in consideration of the sum of $_____, such amount being payment for all work performed, services rendered and/or materials furnished by Contractor to Owner on the Project during the time period covered from Contractor's prior submitted payment requisition (or if the first, from the date of commencement of its work on the Project), through the following date: **_____,** 20___ ("Current Period") under all contracts, orders and instructions, including extras, change orders, construction change directives, and other directives whether written or verbal, and for other goods and valuable consideration paid by Owner, the sufficiency of which is hereby acknowledged, hereby covenants and warrants:

1. Contractor hereby waives, releases, and relinquishes all claims, demands and rights of lien ("Liens and Claims") to the extent of the amount shown hereon immediately upon receipt of the payment amount set forth above for all work, labor, materials, machinery or other goods, equipment or services done, performed or furnished for the Project (the "Work") and represents that all subcontractors, suppliers, or other parties performing any part of the Work will be paid out of the above amount once received as payment for the Current Period.

2. Contractor warrants that it has not been delayed in the performance of its Work to date and that it has incurred no extra costs in connection therewith. Contractor specifically waives, relinquishes, and releases any and all Liens and Claims incurred or alleged in connection with its Work to date except only those claims, if any, previously denominated as claims. Contractor further warrants and represents that any and all valid labor and/or materials and equipment bills, now due and payable, on the Project have been paid in full to the date of this waiver, including amounts covered in any prior payment applications. Contractor unconditionally waives all Liens and Claims for Work performed and payment applications submitted prior to the Current Period, receipt of payment for which is hereby acknowledged.

3. Contractor hereby agrees to indemnify and defend the Owner, Program Manager and Construction Manager, and to hold them free and harmless from any and all losses, claims, damages, costs and expenses, including but not limited to attorney's fees whether arising directly or indirectly from any inaccuracy recited in the facts herein, and from any failure of the Contractor to pay in full all sums due its laborers, subcontractors, materialmen, and suppliers on the Project, or from any liens against the Project property or Project monies filed by any such laborers, subcontractors, materialmen, or suppliers of Contractor.

Total Contract: $_____

Due on Total Contract after above payment: $_____

Contractor:_____ Sworn to before me this ____Day of _____, 20__.

By: _____ Notary Public: _____

Signature:_____ My Commission Expires: _____

Title: _____

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FINAL WAIVER OF LIEN AND CLAIM

To: _____
(Owner)

From: _____
(Name of Contractor or Supplier Company)

_____
(Address of Contractor or Supplier Company)

_____

Project: _____
(the "Project")

The undersigned Subcontractor or Supplier company (hereinafter "Contractor"), for and in consideration of the sum of $_____, such amount being payment for all work performed, services rendered and/or materials furnished by Contractor to Owner on the Project during the time period covered from Contractor's prior submitted payment requisition (or if the first, from the date of commencement of its work on the Project), through the following date: _____**,** 20___ ("Current Period") under all contracts, orders and instructions, including extras, change orders, construction change directives, and other directives whether written or verbal, and for other goods and valuable consideration paid by Owner, the sufficiency of which is hereby acknowledged, hereby covenants and warrants:

1. Contractor hereby waives, releases, and relinquishes all claims, demands and rights of lien ("Liens and Claims") to the extent of the amount shown hereon immediately upon receipt of the payment amount set forth above for all work, labor, materials, machinery or other goods, equipment or services done, performed or furnished for the Project (the "Work") and represents that all subcontractors, suppliers, or other parties performing any part of the Work will be paid out of the above amount once received as payment for the Current Period.

2. Contractor warrants that it has not been delayed in the performance of its Work to date and that it has incurred no extra costs in connection therewith. Contractor specifically waives, relinquishes, and releases any and all Liens and Claims incurred or alleged in connection with its Work to date except only those claims, if any, previously denominated as claims. Contractor further warrants and represents that any and all valid labor and/or materials and equipment bills, now due and payable, on the Project have been paid in full to the date of this waiver, including amounts covered in any prior payment applications. Contractor unconditionally waives all Liens and Claims for Work performed and payment applications submitted prior to the Current Period, receipt of payment for which is hereby acknowledged.

3. Contractor hereby agrees to indemnify and defend the Owner, Program Manager and Construction Manager, and to hold them free and harmless from any and all losses, claims, damages, costs and expenses, including but not limited to attorney's fees whether arising directly or indirectly from any inaccuracy recited in the facts herein, and from any failure of the Contractor to pay in full all sums due its laborers, subcontractors, materialmen, and suppliers on the Project, or from any liens against the Project property or Project monies filed by any such laborers, subcontractors, materialmen, or suppliers of Contractor.

Total Contract: $_____

Due on Total Contract after above payment: $_____

Contractor:_____ Sworn to before me this ____Day of _____, 20__.

By: _____ Notary Public: _____

Signature:_____ My Commission Expires: _____

Title: _____

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SECTION 01 30 00 - CONSTRUCTION PROCEDURES AND CONTROLS

PART 1 – GENERAL

Where the requirements of this Section 01 30 00 differ from the requirements set forth in Section 01 35 23, Contractor is to comply with the more stringent requirement in performance of the Work.

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specifications sections, apply to work of this section.

1.02 QUALITY OF MATERIALS AND WORKMANSHIP

1. Applicable industry standards are made part of the Contract Documents by reference and have the same force and effect as if the actual standards were physically bound into the Contract Documents.

1.03 REFERENCED STANDARDS

1. Referenced standards, those standards either referenced directly in the Contract Documents or referenced in governing regulations, have precedence over non-referenced standards which are recognized in the construction industry as being applicable to the work.

1.04 NON-REFERENCED STANDARDS

1. Non-referenced standards are those standards not directly referenced in the Contract Documents nor referenced in governing regulations, but are recognized in the construction industry, except as otherwise limited in the Contract Documents, as having direct application to the work and will be so enforced.

1.05 DATES OF STANDARDS

1. Where compliance with a standard is required, comply with that standard in effect on the date the Contract Documents are issued, unless otherwise indicated.

PART 2 - PRODUCTS

2.01 SOURCE OF INDUSTRY STANDARDS

1. The following is a partial list of organizations that have established standards of quality and workmanship.

   ANSI - American National Standards Institute
   ASTM - American Society of Testing Materials
   FMS - Factory Mutual System
   NEC - National Electric Code

NFPA - National Fire Protection Association
UL - Underwriters Laboratories Inc.

2.02 SYSTEMS AND RATED CONSTRUCTION IDENTIFICATION

1. Generally mechanical/electrical equipment systems shall be minimally labeled by each trade for identification and future maintenance use to minimally identify: Type of system (i.e. fire alarm, power, steam, H.W., etc.); and specific sub branch (i.e. circuits 12, 14, 16 – LP-2/7; dishwasher steam; etc.); direction of energy/signal flow with arrows, and operating directions (i.e. start up of dishwasher, HVAC operation, elevator emergency alarms, etc).

2. Terminal units/major equipment (electric panels, control panels, fan units, pumps, etc.) shall be minimally labeled with permanent, engraved, dual colored rigid plastic plates, mechanically attached.

3. Distribution systems shall be minimally labeled (so each sub system can be identified within 50') as follows:
   1. Insulated/un-insulated pipe/ducts/etc. (plumbing, HVAC, fire systems) shall have taped marker systems per applicable specification division (or at least painted (stenciled) labels, if not otherwise specified.
   2. Conduit/wiring distribution systems shall be minimally marked at each junction/distribution box with neat, ½" high hand lettered, permanent wide tip magic markers. Indication shall be on inside of box where box is in finished space or concealed/ buried, and on the outside where box semi-concealed such as above lay-in ceilings, or mechanical spaces such as crawl spaces.
   3. Distribution systems with receptacle type terminations at each end or flexible connection possibilities such as telephone or computer distribution systems shall have each receptacle and/or tie-in point labeled with specific distribution I.D. such as "Room No." plus additional I.D. breakdown as required (i.e. room number "101" plus #3 computer line = "101-3c").
   4. Existing systems disturbed by this contract shall be labeled/ relabeled similar to new work, by the Contractor responsible for that type of system.
4. Each new (or renovated existing) "Rated" wall construction shall be labeled. Labels to be "2 Hour Rated Wall" (or 1 hour, or ¾ hour), and shall be on each side. In mechanical spaces locate about 8' A.F.F. and mid point of length of wall unless a more visible location is possible. In "finished" rooms with suspended ceilings, locate just above ceiling level, in location most likely to be seen by maintenance personnel. Labels to be painted stencils 3" to 6" high applied after all finish painting is done, in a contrasting color. For existing walls in renovated areas, the applicable contractor shall also label these applicable walls.

2.03 MISCELLANEOUS DEFINITIONS

1. The term "product" as used herein in term contractions and unless specifically noted otherwise is to mean materials, systems and equipment.

2. The term "Project Manual" is used herein in term contractions and unless specifically noted otherwise is to mean the bidding requirements, Contract, Drawings and the Specifications.

3. The term "install" or "furnish all labor" are used herein as term contractions and unless specifically noted otherwise are to mean perform all operations connected with installation of work including unloading materials to be installed, supplying all necessary equipment and rigs to do the work, test, place in operation and service.

4. The terms "furnish" or "furnish all material" are used herein as term contractions and unless specifically noted otherwise are to mean "supply and deliver to the job site all materials and/or equipment so specified".

5. The word "provide" is used herein as a term contraction and unless otherwise specifically noted is to mean "furnish, install, connect up complete, test, place in operation and service".

6. The terms "approved", "equal", "proper" and words of similar meaning are understood to mean "in the opinion of the RCSD Design Group".

7. The word "replace" is used herein as a term contraction and unless otherwise specifically noted is to mean "remove any existing and provide new".

8. The word “relocate” is used herein to mean “disassemble, disconnect, transport to new location, store during process, clean, test and install, ready for use similar to new work including providing any misc. adjustments, accessories, etc. required. It includes removing all materials, equipment, etc. made obsolete by this relocation and patching original remaining area. It does not include repairing any not functioning equipment.

9. The terms “finished area” or “finished room” is a normally finished (painted) and occupied/used space such as classrooms, offices and related storage space, corridors, stairways, etc. Generally it does not include mechanical spaces/rooms, plenum spaces, drawl spaces, etc. unless those spaces are specifically indicated to be painted.

10. The term “repair” (in reference to construction assemblies, not to repair of equipment) is essentially the same as “patching” a system.

11. The terms “general scope”, “diagrammatic”, and “schematic” are used to establish overall sizes, quantities, scope, etc. of a particular system, or sub-system as set out by the drawings. The intent is to establish the required work to which a “nominal” quantity of additions/deletions or work may be necessary to fit to existing as built conditions and/or field conditions.

12. The term “nominal” is used to define an additional or lesser amount of work that is expected to be part of the scope of work with no change in cost.

13. The term “applicable contractor” (or similar wording) is to mean the contractor which has responsibility under his contract for the items/ trades involved in that

particular use of the term. (i.e. it is the “Plumbing Contractor” if the discussion involved work related to “gas” piping. It is the Electrical Contractor if the discussion involves electric device boxes).

PART 3 - EXECUTION

3.01 PRESENT BUILDING OPERATION

1. The particular attention of the Contractor is directed to the requirement that the school must continue to function during the normal school year. Occupants and related personnel must have safe access, at all times, to those portions of the present school building being used by the school. Close cooperation with the occupants of the school is essential. The use of roofs, corridors, stair towers or exits as work areas or as storage areas for material, equipment or tools is prohibited.

3.02 LAYING OUT WORK

1. The Contractor employed on this project shall lay out all work included in his Contract as shown on the drawings and/or called for in these specifications. Take all required measurements and order all materials promptly. The Contractor will be held responsible for all damage or expense caused by inaccuracy on his part in laying out work.

2. Installer of each major unit of work is required to inspect substrate to receive work and to report in writing to the Contractor, Construction Manager and Architect/ Engineer unsatisfactory conditions. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.03 COORDINATION AND COOPERATION

1. Contractor Contact; The Contractor and all of the Contractor's workers will be prohibited from any contact with the school's student or staff population. Contact with the Owner will primarily be made through the Construction Manager. In case of emergency, notification shall be made to the school principal and head custodian in addition to the Construction Manager.

2. Coordination and Cooperation; The Contractor shall be responsible for the work of this project among his employees and subcontractors and for the coordination and cooperation between his employees, all other Contractors that are engaged on this project, their employees, subcontractors and the Owner.

3. Supervision: A full time superintendent is required when contract amount exceeds $50,000. Supervision includes coordination of work with the Owner and other contractors as well as providing direction to the contractor's workers, sub-contractors and suppliers. The superintendent shall be present at all project progress meetings. A change in supervisory personnel after the commencement of work shall be permitted only upon approval of the Inspector.

3.04 EXISTING ALARM SYSTEMS

1. All systems are slated for demolition. Setup and maintenance of a temporary fire alarm system is required utilizing the existing fire alarm panel.

3.05 EMERGENCY PROCEDURES

1. Emergencies requiring the evacuation of the school building are indicated by the ringing of the fire alarm bells. The Contractor and all his workmen, subcontractors and vendors must leave the building promptly and in an orderly manner. Do not re-enter the building until permission is given by the Principal. The Contractor shall enforce the strict compliance of these required emergency procedures by all his workmen, subcontractors and vendors.

3.06 SMOKING

1. Smoking shall be prohibited in school buildings, school grounds, public areas and work sites of all Owner's and RCSD's property, as well as any area immediately outside building entrances in accordance with Article 13-E of the New York State Public Health Law, as amended and Article VII of the Monroe County Sanitary Code. The Contractor will be held responsible for all damage resulting from failure on his part to enforce this ruling among all his respective employees and vendors.

3.07 PROTECTION OF BUILDINGS AND GROUNDS

1. The Contractor shall take all necessary steps to protect the grounds, the building and its equipment. Where materials are brought into the building and wherever the work is done in the building, protect all finished surfaces. Any damage resulting from the work of the Contract shall be repaired at no cost to the Owner.

2. The Contractor shall provide secure barriers at all the work areas and staging areas. The Owner, RCSD, or Owner's Representatives shall not be responsible for theft or vandalism of materials, equipment, or work in progress until completion of project. The Contractor shall be responsible to provide security of site and all work. Barriers shall be located in such a manner that all egress and exits are maintained.

3. The Contractor shall provide temporary enclosures of the building at all locations where either new or existing openings are required. Enclosures shall be secure, weather tight and provide the least disturbance of the existing construction that is to remain. Upon removal of enclosures, restore all work to existing or new conditions. Submit data for approval by the Construction Manager and the Architect/ Engineer prior to commencement of work. Work that involves temporary removal of building openings for purposes of work area exhaust or to facilitate work in progress shall necessitate temporary security to prevent damage to building from theft or vandalism.

4. Parking on playing fields and in staff parking areas while school is in session is not permitted. During the last week of August, all paved parking areas shall be turned over to the Owner.

5. Prior to commencement of work and in the presence of the Construction Manager, complete the attached Building Systems Status form. This form shall be submitted prior to the first application for payment. At the completion of the project, a walk-through with the Inspector will be done, verifying building system status after construction. If the contractor fails to perform pre and post inspections, and building systems are found to be damaged or defective at completion of construction, the Owner will assume that the Contractor is responsible for all cost required to restore system(s).

3.08 STAGING AREAS FOR DEMOLITION AND CONSTRUCTION

1. Staging areas for demolition and construction shall be approved by the Construction Manager and the Architect/Engineer prior to start of work. The use of roofs, corridors, stair towers or exits as work areas or as storage areas is prohibited.

2. Store all flammable and combustible materials in a locked fire rated enclosure. Paint shall be stored in a paint locker.

3.09 WORKING WITH AN OPEN FLAME

1. The Contractor shall comply with the City of Rochester Fire Department – Fire Safety Division's requirements for open flame use such as welding, asphalt kettle burners, etc., and shall acquire a permit for such use from the Permits Clerk of the Fire Safety Office, 150 Plymouth Avenue, "Public Safety Building" Room 300 (phone 585-428-7037). A copy of this permit is to be provided to the Owner. The following is a brief listing of the minimum requirements during use of an open flame. Additionally, all policies established by the City Fire Department shall be complied with.
    1. Any combustible materials near the work area that may be accessible to spark, flame, heat or hot metal, that may cause ignition, are to be protected by non-combustible shields or covers.
    2. A minimum of two (2) 20 pound dry chemical or carbon dioxide fire extinguishers shall be provided by the contractor, immediately available at the work area.
    3. A fire watch shall be provided to watch for fires, make use of portable fire extinguishers and perform similar fire prevention and protection duties. The fire watch shall remain for at least 30 minutes after the use of any flame to insure no fire exists.
    4. Fuel gas tanks (oxygen, acetylene, liquid petroleum, hydrogen, natural gas, etc.) shall be securely held upright, away from all exits, windows and combustible materials, provide full air circulation to prevent exposure to high heat, and removed from premise at end of each day.
    5. The building is not to be occupied by students or staff during any open flame tasks.

3.10 Lockout/Tagout Procedure

1. The contractor must adhere and strictly follow either the Project Lockout and Tagout requirements, the owner's requirements or the contractors own requirements, whichever is the most stringent.
2. Electrical work (e.g. tie-ins, panel maintenance) shall be conducted only on de-energized (locked out and tagged out) systems.
3. All circuit disconnects must be locked in the open position or otherwise appropriately identified with affixed tags stating "DANGER - DO NOT ENERGIZE" or other equivalent wording prior to working on the system or equipment.
4. Employees are not permitted to work on any energized circuits unless conditions mandate and written approval is obtained from the Regional Safety Manager.
5. The pre-task planning for all work on energized systems must be submitted for review.
6. Work practices must conform to all applicable owner, state and federal requirements including the NEC and the most recent version of NFPA 70E.

Lockout Devices

1. Only individually keyed padlocks shall be used. Padlocks are to be painted per the craft color code for easier detection and craft identification.
2. A lockout device of the standard scissor type that will allow the placing of more than one padlock is required, when more than one individual is working on a circuit or mechanical process.
3. A piece of chain or cable may be necessary to complete a lockout on some valves or controls and shall be used wherever needed.

Danger Tags

1. 'Danger Tags' are not 'Danger Signs', and shall not be used where a sign is needed.
2. Two standardized Danger Tags shall be used on this project. They are described as follows:
    a. "DANGER - DO NOT USE": This tag must be attached to each padlock on a lockout.
    b. "UNSAFE - DO NOT USE": This tag does not require an attachment to a padlock, but may be used if needed. This tag shall be used to identify tools, equipment, vehicles, etc.

Procedure

1. If device, valve, switch, or piece of equipment is locked out, a "Danger Tag" shall be attached.
2. No device, valve, switch or piece of equipment shall be operated with a "Danger Tag" and/or lockout attached regardless of circumstances! ! !
3. Systems consisting of electrical components will be checked, locked and tagged first by electrical craft employee working on the circuit.
4. The electrical craft will be the first lock on, and the last lock off.

5. Where placing of lock is not feasible, the circuit conductor will be disconnected from the breaker and tagged out.
6. The panel cover must be of the type that will cover all breakers when closed and must be equipped with a hasp in order to secure a lock to prevent the panel door from being opened.
7. If panel cover is of a type that cannot be locked closed, a cover must be secured over the panel cover and be locked closed and tagged while any work is being performed on any of those circuits.
8. If the above cannot be accomplished, each circuit will be tagged out as prescribed and an electrician will stand by the panel board to prevent breakers from being tampered with. This physical presence will continue daily until the work is complete.
9. All "Danger Tags" must be dated and signed. Also on tag, must be the intended work and equipment for which tag has been placed.
10. If employees of more than one craft or crew are to work on a system, circuit, machinery, or component, the supervisor from that craft shall place his individual lock and tag; and verify that the system, circuit, machinery or component being tagged, is indeed the system that is to be worked on.
11. Only the person that placed the lock and tag shall remove it without special authorization from the Project Manager, Construction Manager or Craft Superintendent.
12. Padlocks, Lockout Devices and "Danger Tags" shall be made available as specified above.
13. Padlocks shall be color coded for craft identification and shall only be used by that craft for lockout purposes, i.e. valves, switches, electrical components, etc.
14. Padlocks shall be issued from the contractor responsible where a sign in/out log will be maintained. Locks and tags shall be issued to the foremen or supervisor responsible for the craft performing the work.
15. The contractor of each craft discipline will be responsible for assuring all padlocks are personally identified, that will be used for lock and tag purposes.
16. The Contractor Superintendent(s) will be responsible for ordering their own craft's padlock. A master key will also be provided.
17. Any employee(s) or person(s) found to have removed another's lock and/or tag will be subject to disciplinary action up to and including dismissal from the project.

Special Situations

1. When due to the nature of work, a supervisor who has employees assigned to work on systems that are between construction and client turnover that is to be locked and tagged out in order to perform work, the below shall be applied:
2. Prior to the electrical foreman de-energizing the system, the foreman will ascertain whether system or device has been turned over and accepted by the client; If system is signed off, the client shall assume responsibility for de-energizing system and becoming the tagging authority.
3. Contractor Electrical foreman/craft journeyman places lock and tag and tries to engage the equipment.
4. The electrical journeyman or lead man will meter the tagged equipment to verify that it is de-energized.

3.11 HOT WORK

1. Before engaging in hot work i.e. gas welding/cutting, soldering, grinding, utility shutdowns and crossovers submit Hot Work Permit Forms for approval and use.

Electric Arc Welding

1. A suitable, approved fire extinguisher shall be ready for instant use in any location where welding is done.
2. Screens, shields, or other safeguards should be provided for the protection of men or materials, below or otherwise exposed to sparks, slab, falling objects, or the direct rays of the arc.
3. A dedicated fire watch shall be present at all welding operations and remain for at least 1 hour after the hot work has halted.
4. The welder shall wear approved eye and head protection.
5. Trades assisting the welder shall also wear protective glasses, head protection and protective clothing.
6. Adequate exhaust ventilation shall be maintained at all welding and cutting work areas.
7. Electric welding equipment, including cables, shall meet the requirements of the National Electric Code.
8. All arc welding and cutting cables shall be of the completely insulated flexible type capable of handling the maximum current requirements of the work.
9. Cables in need of repair shall not be used.
10. The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable connecting the circuit connector or through a separate wire which is grounded at the source of the current.
11. All ground connections shall be inspected to insure that they are mechanically strong and electrically adequate for the required current.
12. Welding practices shall comply with all applicable regulations.

Gas Welding or Cutting

1. When gas cylinders are stored, moved, or transported, the valve protection cap shall be in place.
2. When cylinders are hoisted, they shall be secured in an approved cage or basket. The valve cap shall never be used for hoisting.
3. All cylinders shall be stored, transported, and used in an upright position. If the cylinder is not equipped with a valve wheel, a key shall be kept on the valve stem while in use.
4. At the end of each work day or if work is suspended for a substantial period of time, compressed gas cylinder valves must be closed, regulators removed and properly stored.
5. Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.
6. Cylinders containing oxygen or acetylene or other fuel gas shall be stored in designated areas outside the structure as approved by the CM.
7. No one shall use a cylinder's contents for purposes other than those intended by the supplier.
8. All hose used for carrying acetylene, oxygen or other fuel gas shall be inspected at the beginning of each working shift.
9. Defective hose shall be removed from service.
10. Oxygen cylinders and fittings shall be kept away from oil and grease.
11. Oxygen shall not be directed at oily surfaces, greasy clothes or hands.
12. Regulators, gauges, backflow check valves, and torches shall be kept in proper working order.
13. An approved fire extinguisher shall be readily available.
14. Flash arrestors are required on the oxygen and acetylene hoses, at the regulators.
15. Appropriate personal protective equipment, such as burning glasses, shields, and/or gloves shall be used.
16. Adequate exhaust ventilation shall be maintained at all welding and cutting work areas.
17. Work permits shall be obtained daily, prior to any burning or cutting operations on the site.

<u>Work Permit Procedures</u>

General Procedures

1. A copy of this section of the Project Safety Plan will be issued to all Contractors, and will serve as notice by the CM that a work permit as specified by the CM is necessary before starting any hazardous work activity.
2. The work permit shall be obtained from the CM before starting each day's work.
3. The procedures for initiating a hazardous work permit are listed on the permit application

appropriate to the type of work.

4. Hazardous work Permits include, but are not limited to the following activities: Hot Work, Confined space entry, Guardrail removal, Line Breaks, after Hours work, Trenching and excavation, Crane use and Barricade installation.
5. Additional job-specific hazardous work permits may be required, due to special project conditions, to be incorporated into the project safety plan. These will also be considered as a contract commitment.

Hot Work

1. Hot work is defined as a process or procedure, which could result in a fire if not properly controlled. Common types of hot work are welding, burning, cutting, brazing, soldering.
2. Hot work will usually be permitted only during normal working hours.
3. Permits will be issued the day before work is to be accomplished, and the work area will be inspected to verify that adequate control has been established.
4. A copy of the permit will be available at the point of work.
5. An adequate number of fire extinguishers will be available within 50-feet of the point of work for which a permit is issued.
6. The Contractor will take the necessary precautions when welding or burning above walls to assure that protection is maintained on both sides of the wall and areas below are protected on multilevel buildings.

END OF SECTION 01 30 00

SECTION 01 31 13 – CONTRACT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. Coordination Drawings.
2. Administrative and supervisory personnel.
3. Project meetings.
4. Requests for Information (RFIs).

B. Each contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific contractor.

C. Related Sections include the following:

1. Division 01 Section "Summary of Work" for a description of the division of Work and responsibility for coordination activities not in this Section.
2. Division 00 Section "Milestone Schedule and Critical Submittals" for preparing and submitting Contractor's Construction Schedule.
3. Division 01 Section "Use of Site" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
4. Division 01 Section "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

A. RFI: Request for information from Contractor seeking interpretation or clarification of the Contract Documents.

1.4 COORDINATION

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

B. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in 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 with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.
4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for maintenance, service and repair.

C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities of each Contract include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.

   a.) Contractor for Abatement Demolition to prepare initial Construction Schedule, get durations and finalize for submission to Architect and Construction Manager.

2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.
9. Training

E. Conservation: Coordinate construction activities to ensure 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 into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 SUBMITTALS

A. Product Data, Shop Drawings, Coordination Drawings, Color Samples, etc. will all be submitted for Architect Approval. This project will utilize Master Library".

B. Coordination Drawings: Separate prime Contracts to coordinate and prepare Coordination Drawings for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

1. DRAWINGS FOR MECHANICAL, PLUMBING FIRE PROTECTION AND ELECTRICAL WORK

a. Drawings contain diagrammatic layouts and indicate general arrangement of systems, piping conduit, etc.
b. Prior to installation of material and equipment, review and coordinate work with Architectural and Structural Drawings for exact space conditions, where not readily discernible request information from Architect before proceeding.
c. Check Drawings of all other trades to verify extent of material and equipment to be installed in spaces available and consider layout alternatives so that all requirements can be accommodated.
d. Maintain maximum headroom at all locations without finished ceilings.
e. Maintain finished ceiling heights as indicated.
f. Coordinate installations with other trades to prevent conflict with work of other trades and cooperate in making reasonable modifications in layout as needed.
g. Where conflicts occur with placement of mechanical and electrical materials as they relate to placement of other building materials, the Field Architect and Construction Manager shall be consulted for assistance in coordination of the available space to accommodate all trades.

2. PRIORITY OF CONSTRUCTION SPACE

a. Following is the Order of Priority for Construction Space:
Not Applicable

3. COORDINATION DRAWINGS

a. The ductwork contractor/subcontractor shall prepare a complete set of drawings at scale of minimum 1/4" equals 1'-0".
1) The construction documents in their original, copies or electronic file form are the Architect's instrument of service and are protected under copyright laws.
2) The reproduction of these documents for use as coordination drawings or shop drawings is prohibited without the Architect's written consent and authorization.
3) Each contractor shall prepare a coordination drawing indicating their work, with appropriate elevations and grid dimensions.
4) Each contractor shall sign and date the Coordination Drawing after the addition of his information.
5) Fabrication shall not start until receipt of completed coordination drawings is acknowledged by the Construction Manager in writing to the Architect.

6) Contractors and Specialty Trades (including, but not limited to):
   a) Masonry and Precast
   b) Structural Steel
   c) Ductwork
   d) Fire protection piping
   e) Other piping
   f) Electrical

7) Coordination Drawings required for all corridors, rooms, horizontal exits from duct shafts, crossovers and any other areas where congestion of work may occur.

8) They shall incorporate the following line color pattern:
   a) Fire Protection – Red
   b) Electrical – Blue
   c) Plumbing – Green
   d) Duct Work – Lavender
   e) Reflected Ceiling – Light Green
   f) Walls – Black and Shaded
   g) HVAC - Orange

9) Coordination Meetings: Conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences.

a) Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
b) Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to Combined Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
c) Schedule Updating: Revise Combined Contractor's Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

4. ADDITIONAL CONTENT FOR COORDINATION DRAWINGS

Project-specific information, drawn accurately to scale. Do not base Coordination Drawings on reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:

a) Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b) Indicate required installation sequences.
c) Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for

resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

5. SHEET SIZE: 24 by 36 inches.

6. Number of Copies: Submit (8) opaque copies of each submittal, as required. Architect will return one copy.

a. Submit four copies where Coordination Drawings are required for operation and maintenance manuals. Architect will retain one copy; remainder will be returned. Mark up and retain one returned copy as a Project Record Drawing.

7. Reference Section 23 05 00 1.11 and Section 26 05 00 1.14 for additional information.

C. Key Personnel Names: Within fifteen (15) business days before starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.6 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1. Include special personnel required for coordination of operations with other contractors.

1.7 CONTRACTOR'S MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated. If attendance by the Architect, Construction Manager, Program Manager, Technology Consultant, or Owner is necessary or desired then coordinate the time and location of the meeting with the appropriate parties.

1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Construction Manager and Architect of scheduled meeting dates and times, even if attendance by same is not required.
2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) business days of the meeting.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner, Architect and Construction Manager, but

no later than fifteen (15) business days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Attendees: Authorized representatives of Owner, Architect, Construction Manager and their consultants (Technology Consultant/Program Manager); prime Contractors and their superintendents; major subcontractors; suppliers; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

    a. Tentative construction schedule.
    b. Phasing.
    c. Critical work sequencing and long-lead items.
    d. Designation of key personnel and their duties.
    e. Procedures for processing field decisions and Change Orders.
    f. Procedures for RFIs.
    g. Procedures for testing and inspecting.
    h. Procedures for processing Applications for Payment.
    i. Distribution of the Contract Documents.
    j. Submittal procedures.
    k. Preparation of Record Documents.
    l. Use of the premises and existing building.
    m. Work restrictions.
    n. Owner's occupancy requirements.
    o. Responsibility for temporary facilities and controls.
    p. Construction waste management and recycling.
    q. Parking availability.
    r. Office, work, and storage areas.
    s. Equipment deliveries and priorities.
    t. First aid.
    u. Security.
    v. Progress cleaning.
    w. Working hours.
    x. Owner’s health and safety requirements.
    y. Agree upon a schedule for regular meetings.

3. Minutes: Construction Manager will record and distribute meeting minutes.

C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect and Construction Manager of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. The Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Review of mockups.
i. Possible conflicts.
j. Compatibility problems.
k. Time schedules.
l. Weather limitations.
m. Manufacturer's written recommendations.
n. Warranty requirements.
o. Compatibility of materials.
p. Acceptability of substrates.
q. Temporary facilities and controls.
r. Space and access limitations.
s. Regulations of authorities having jurisdiction.
t. Testing and inspecting requirements.
u. Installation procedures.
v. Coordination with other work.
w. Required performance results.
x. Protection of adjacent work.
y. Protection of construction and personnel.

3. Minutes: Construction Manager will record and distribute meeting minutes.
   a. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
   b. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: The Construction Manager shall conduct progress meetings at weekly intervals. Coordinate dates of meetings with preparation of payment requests.

1. Attendees: In addition to representatives of Owner,, Construction Manager, and Architect each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

   a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or

behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site utilization.
8) Temporary facilities and controls.
9) Work hours.
10) Hazards and risks.
11) Progress cleaning.
12) Quality and work standards.
13) Status of correction of deficient items.
14) Field observations.
15) RFIs.
16) Status of proposal requests.
17) Pending changes.
18) Status of Change Orders.
19) Pending claims and disputes.
20) Documentation of information for payment requests.

3. Minutes: Construction Manager will record and distribute the meeting minutes to Owner, Architect, and Contractors.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 REQUESTS FOR INFORMATION (RFIs)

A. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and if not possible to request interpretation at Project meeting, prepare and submit an RFI using the form specified.

1. RFIs shall originate with the Prime Contractor. RFIs submitted by entities other than the Prime Contractor will not be responded to.

2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

3. RFIs will be processed via the submittal submission procedures established for this project utilizing Submittal Exchange.

4. Prime Contractor will fill in all applicable fields of the Request for Information form established for this Project and is available for Contractors' use from the submittal procedures established for this project. A copy of this form is included in this Project Manual in Division 00 "Request of Information"

5. The format for naming the electronic version of the RFI shall be:
   a. Contract Number – RFI number
      1) The Contract number is the same as the number on the Bid Form.
      2) The RFI number shall be sequential starting with #001.

6. RFIs shall be prepared electronically using a computer program capable of reading, field filling, and saving the completed form as a PDF (Portable Document Format) computer file:
   a. Internet Service and Equipment Requirements:
      1) Email address and Internet access at Contractor's main office.
      2) *Adobe Acrobat* (www.adobe.com), or other similar PDF review software for applying electronic stamps and form filling.

7. Contractor shall upload the RFI to the appropriate category on the project website established for this project, or other submission procedures established.

8. The Contractor shall be notified by the Construction Manager via e-mail once the response from the Architect has been made available.

9. Contractor shall bear responsibility for the Architect/Engineer's time for unnecessary or frivolous RFI's.

B. Content of the RFI: Include a detailed, legible description of item needing interpretation and the following on the project form established for this Project:

1. Project name.
2. Date.
3. Name of Contractor.
4. Name of Architect.
5. Contract Number.
6. RFI number, numbered sequentially.
7. Name/Location of Project Work Site (if Contract involves multiple addresses).
8. Specification Section number and title and related paragraphs, as appropriate.
9. Drawing number and detail references, as appropriate.
10. Field dimensions and conditions, as appropriate.
11. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
12. Contractor's signature.

13. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation.

    a. Supplementary drawings prepared by Contractor shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

C. Hard-Copy RFIs: RFI Form is attached in Project Manual.

    1. Identify each page of attachments with the RFI number and sequential page number.

D. Software-Generated RFIs: Software-generated form with substantially the same content as indicated above.

    1. Attachments shall be electronic files in Adobe Acrobat PDF format.

E. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow seven working days for Architect's response for each RFI. RFIs received after 3:00 p.m. will be considered as received the following working day.

    1. The following RFIs will be returned without action:

        a. Requests for approval of submittals.
        b. Requests for approval of substitutions.
        c. Requests for coordination information already indicated in the Contract Documents.
        d. Requests for adjustments in the Contract Time or the Contract Sum.
        e. Requests for interpretation of Architect's actions on submittals.
        f. Incomplete RFIs or RFIs with numerous errors.

    2. Architect's action may include a request for additional information, in which case Architect's time for response will start again.
    3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 01 26 43 "Change Order Requests."

        a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five (5) business days of receipt of the RFI response.

F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within five (5) business days if Contractor disagrees with response.

G. RFI Log: Each Contract to prepare, maintain, and submit a tabular log of RFIs organized by the RFI number bi-weekly; log to include the following:

    1. Project name.
    2. Name and address of Contractor.
    3. Name and address of Architect.

4. RFI number including RFIs that were dropped and not submitted.
5. RFI description.
6. Date the RFI was submitted.
7. Date Architect's response was received.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 MAINTENANCE OF ON-SITE DOCUMENTS

A. Contractor shall maintain all Construction Documents, and changes to them, in an orderly manner at each Work Site and shall immediately make them accessible to the Owner, Architect, or Construction Manager upon request. Documents of this type include, but are not limited to:

1. Construction drawings with posted addenda.
2. Project Manual with posted addenda.
3. Construction Progress Drawings (as-builts).
4. Approved submittals.
5. Updated construction schedules.
6. Requests for Information.
7. Changes to the work.
8. Architect’s Supplementary Instructions
9. Insurances and Bonds.
10. MSDS sheets.

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SECTION 01 32 16 - CONTRACTOR'S CONSTRUCTION SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Preliminary Construction Schedule.
2. Contractor's Construction Schedule.
3. Submittals Schedule.

B. Related Sections include the following:

1. Division 01 Section "Summary of Work" for preparing a combined Contractor's Construction Schedule.
2. Division 01 Section "Construction Procedures and Control" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 01 Section "Quality Control" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical activities are activities on the critical path. They must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. Cost Loading: The allocation of the Schedule of Values for the completion of an activity as scheduled. The sum of costs for all activities must equal the total Contract Sum, unless otherwise approved by Architect.

C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

E. Event: The starting or ending point of an activity.

F. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

G. Fragment: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

H. Major Area: A story of construction, a separate building, or a similar significant construction element.

I. Milestone: A key or critical point in time for reference or measurement.

J. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.

K. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.

1.4 SUBMITTALS

A. Submittals Schedule: Refer to Division 01 Section “Submittal Procedures”.

B. Preliminary Construction Schedule: Submit two (2) opaque copies.

1. Approval of cost-loaded preliminary construction schedule will not constitute approval of Schedule of Values for cost-loaded activities.

C. Contractor's Construction Schedule: Submit two (2) opaque copies of initial schedule, large enough to show entire schedule for entire construction period.

D. Construction Reports: Submit two (2) copies at weekly intervals.

E. Field Condition Reports: Submit two (2) copies at time of discovery of differing conditions.

1.5 QUALITY ASSURANCE

A. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Construction Procedures and Control." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Discuss constraints, including phasing work stages, area separations, interim milestones, and partial Owner occupancy.
2. Review time required for review of submittals and re-submittals.
3. Review requirements for tests and inspections by independent testing and inspecting agencies.
4. Review time required for completion and startup procedures.
5. Review and finalize list of construction activities to be included in schedule.
6. Review submittal requirements and procedures.
7. Review procedures for updating schedule.

1.6 COORDINATION

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

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Refer to Division 01 Section “Submittal Procedures”.

B. CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

C. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

D. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Final Completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

E. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than thirty (30) days, unless specifically allowed by Architect.
2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and re-submittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
4. Startup and Testing Time: Include not less than twenty-one (21) days for startup and testing.
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's and Construction Manager's administrative procedures necessary for certification of Substantial Completion.

F. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work under More Than One Contract: Include a separate activity for each contract.
3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 01 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
4. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Limitations of continued occupancies.
    c. Uninterruptible services.
    d. Partial occupancy before Substantial Completion.
    e. Use of premises restrictions.
    f. Seasonal variations.
    g. Environmental control.

5. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:

    a. Subcontract awards.
    b. Submittals.
    c. Purchases.
    d. Mockups.

e. Fabrication.
f. Sample testing.
g. Deliveries.
h. Installation.
i. Tests and inspections.
j. Adjusting.
k. Curing.
l. Startup and placement into final use and operation.

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

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

2.2 PRELIMINARY CONSTRUCTION SCHEDULE

A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven (7) days of date established for the Notice to Proceed.

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

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

A. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, time-scaled CPM network analysis diagram for the Work.

1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than thirty (30) days after date established for the Notice to Proceed.

   a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.

2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.

B. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:

   a. Preparation and processing of submittals.
   b. Mobilization and demobilization.
   c. Purchase of materials.
   d. Delivery.
   e. Fabrication.
   f. Installation.
   g. Testing.

2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.

C. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:

1. Identification of activities that have changed.
2. Changes in early and late start dates.
3. Changes in early and late finish dates.
4. Changes in activity durations in workdays.
5. Changes in the critical path.
6. Changes in total float or slack time.
7. Authorized changes in the Contract Time.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one (1) week before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.

2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate Actual Completion percentage for each activity.

B. Distribution: Distribute copies of approved schedule to Architect, Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

END OF SECTION 01 32 16

SECTION 01 32 19 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

1. Drawings and general provisions of Contract apply to work of this section.

1.02 CERTIFICATE OF CAPITAL IMPROVEMENT

1. A Certificate of Capital Improvement will be supplied to the Contractors by the School District.

1.03 PERFORMANCE AND LABOR AND MATERIALS PAYMENT BOND

1. Simultaneously with his delivery of the executed contract, the successful bidder must deliver to the Board all Performance and Labor and Materials Payment Bonds and Insurances in accordance with Section 00 73 16 “Insurance and Bonds Requirements.”

1.04 ADDITIONAL SURETY

1. The Contractor shall furnish an additional surety bond in an amount at least equal to one hundred percent~~um~~ (100%) of the cost of any adjustment in the contract price, by reason of an authorized change in the work, as security for faithful performance of the additional work and for the additional payment of all persons performing labor and furnishing materials in connection with this contract.

PART 2 - PRODUCTS

2.01 SUBMITTALS – (All to be submitted electronically through ~~Newforma~~Submittal Exchange.)

1. Permits and Certificates

1. Provide the District with a copy of all required permits such as “Right-of-Way Permits”, “Plumbing Permits”, “Open Flame Permits”, “Highway Work Permits”, “Electrical Underwriters Certificate”, “Department of Health Permit and Certificates”, etc. if such permits are required for the specific tasks on the project. (Typically “Building Permit” is issued to the District directly by the New York State Education Department and is not the responsibility of the Contractor to acquire).

2. Shop Drawings

1. The Prime Contractor shall submit via ~~Newforma~~ Submittal Exchange all submittals including product data, shop drawings and samples. Detailed requirements for shop drawings relating to certain portions of the work are stated in the drawings and various sections of these specifications. Refer to individual sections. Shop drawings furnished by sub-contractors or material vendors shall be submitted only by the Prime Contractor via ~~Newforma~~Submittal Exchange. All manufactured products shall be identified by the name of the manufacturer and catalog number. Each copy of shop drawings shall be clearly marked with the title of the job and the Contractor's name. The Contractor shall indicate on the shop drawing submittal the factory delivery date and/or lead time. Refer to Section 00 72 16 - General Conditions.

2. Equipment layout shop drawings shall indicate dimensioned layout, rough-in and connection data for mechanical/electrical. Each roughing-in location shall be dimensioned accurately from the building walls.

3. Shop drawings of custom-fabricated and/or field installed material/equipment/systems, etc. shall show equipment under this contract, indicating all reinforcement, as well as details for the installation and relation to adjoining and related work which requires cutting and close fitting, anchoring, etc. Layouts shall provide the fine-tuned coordination with other systems, equipment, structure, ceiling layouts, heights, existing conditions, etc. and shall include necessary adjustments so work can be properly installed.

4. All shop drawings and product submittals shall minimally reference equipment, materials, etc. to identification system used in specifications and/or drawings, dates, project field dimensions, applicable standards, etc..

5. All shop drawings shall coordinate with existing/new adjacent conditions and make adjustments in the work within the general intent of the project.

6. By submitting shop drawings, the Contractor represents that he/she has determined and verified materials, field measurements, field conditions and has checked/coordinated that information within such submittals with the requirements of the work and the contract documents.

3. Manufacturer's Affidavit

1. The Contractor, if requested, shall furnish affidavit from manufacturer, certifying that materials or products delivered to the job meet requirements specified. However, such certifications shall not relieve Contractor from responsibility of complying with any added requirements specified herein.

4. Samples and Mock Ups

    1. The Contractor shall submit a sufficient number of samples for approval and per the Architect/Engineer's request plus one for retention by the Construction Manager for each item requiring sample submission. When it is necessary to retain a sample at the construction site for comparative purposes such as a workmanship sample, the Contractor shall submit one additional sample. Refer to individual sections and Section 00 72 16 - General Conditions. When mock-ups ("constructed on site" samples) are required, the complete requirements are specified in the individual section involved.
    2. A pre-installation meeting will be required to review mock up and to certify the installation will be acceptable.
    3. Mock ups will be required on this project. Refer to individual Specification Section for mock up requirements.

5. Substitutions/Equivalents

    1. All requests for equivalents must be submitted prior to award of contract in conformance with the “Equivalents” procedures set forth in the Instructions to Bidders (Section 00 21 13). Any request for substitutions the Contractor wishes to make after contract award shall be governed by the “Substitution” procedures in the General Conditions (Section 00 72 16).

6. Operating and Maintenance Manuals (Also refer to Closeout Submission Requirements of Section 01 77 00 and to O and M Manuals and Data of Section 01 78 23).

    1. Detailed requirements for operating and maintenance manuals relating to certain portions of the work are stated in the various sections of these specifications. <u>The Contractor shall submit ten (10) complete copies of each required manual to the Architect/Engineer on flash drive, along with two (2) hard copies, for review prior to final payment</u>. Once approved, manual will be submitted to the Construction Manager for recordkeeping. The operating manual shall list all products and assemblies, warranties and manufacturer’s instructions. <u>It shall also include all diagnostics, schematics and software passwords necessary for service and maintenance.</u> Detailed requirements for operating and maintenance manuals relating to certain portions of the work are stated in the various sections of these specifications. Refer to individual sections and Section 00 72 16 - General Conditions.

2. Organize operating and maintenance manual information into suitable sets of manageable size, and bind into individual binders properly identified and indexed (thumb tabbed). Include emergency instructions, spare parts listing, copies of warranties, wiring diagrams, recommended "turn-around" cycles, inspection procedures, shop drawings, product data and similar applicable information. Bind each manual of each set in a heavy-duty 3-ring binder and include pocket folders for folded sheet information. Mark identification on both front and spine of each binder, including identification of school and dates of work.

7. Warranties Manual

1. All Contractors shall submit to the Architect/Engineer two copies of a manual of all manufacturer's and builder's warranties and bonds, as required by the contract documents. Include in this manual the project title, an index of warranties and the initial warranty date. Refer to Article 2.1.6 of this section. All warranties shall be effective, unless stated otherwise, from the date of final payment. Refer to Section 00 72 16 - General Conditions.

8. No ACBM Statement

1. No Asbestos Containing Building Material (ACBM) shall be used on this project. Prior to the application of final payment, the Contractor shall submit to the Construction Manager, a signed statement on the Contractor's corporate letterhead identifying the project name, date of project issue and contract number, to the effect that no work of this project involved the application, installation or provision of known or suspected asbestos containing building material (ACBM).

9. As-Built Documents

1. The Contractor shall maintain at the site one record copy of the drawings, specifications, addenda, approved shop drawings, product data, samples, change orders, etc. in good order and clearly marked to record field changes and selections made during construction that are not otherwise documented.
2. As-Built Documents shall include but not be limited to;
    1. Building Construction; All wall relocations, detail changes, structural changes, etc.
    2. In-Ground Buried Work; All distribution line locations, dimensioned from prominent building lines, so as to completely locate line including jogs, direction changes, etc.
    3. Concealed Building Construction Work; All horizontal and vertical distribution lines. This includes all systems distribution even if small sizes (i.e. fire alarm conduits, small gas distribution lines, hot water re-circulation loops, etc.). Where work is concealed locate by dimension. If exposed (includes within ceiling plenums) only generate scalable locations as necessary.

4. Locations of Equipment; All valves, unions, dampers, equipment requiring maintenance, etc. if different form original drawings, or not indicated.
5. Existing Distribution Systems; All encountered as it relates to this contract's work.
6. General Sizes and Materials; If not otherwise indicated on contract drawings.
7. Where the original drawing is substantially correct the Contractor shall indicate so by clearly marked check (□) over each distribution and branch point, equipment location, etc. Where original drawing incorrectly locates installed work, the Contractor shall erase or 'neatly' "X" out continuously those lines.
8. Prior to application for final payment, the Contractor shall submit three (3) flash drives, each containing a full set of as-built documents, drawn to scale, in PDF format, indicating actual installed conditions, including change order work, to the Construction Manager for approval as record documents.
9. The Contractor shall bear all expenses incurred to record and reproduce record documents that reflect drawing corrections and clarifications relative to found field conditions, and field changes that were induced by, or as a result of the Contractor. Change Order requests, and drawing changes prepared by the Architect/Engineer, shall be so documented on the original drawing by the Architect/Engineer.

10. Receipts and Invoices

    1. Provide prompt submittal of itemized invoices and/or receipts for the purchase and installation of all devices, fixtures and equipment, at the Construction Manager's request. Provide a complete description of items indicated on submittal.

11. Energy Rebate Items

    1. For all equipment proposed for installation that will result in a decreased electrical demand, i.e. high efficiency lighting, ballasts, motors, etc., the Contractor shall submit two (2) copies of sales receipts or purchase orders to the Construction Manager. Such documentation shall state date of purchase, dealer's name and address, equipment or product manufacturer, model numbers, quantity purchased and cost per item. Submittal of documentation shall be made to the Construction Manager within 30 days of purchase.

PART 3 – SUBMITTAL SCHEDULE

Submittal Schedule: Each Contractor shall input the date that each submittal to be uploaded onto ~~Newforma~~Submittal Exchange. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by

Architect and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.

2. Initial Submittal Schedule: Submit concurrently with startup construction schedule. Include submittals required during the first thirty (30) days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.

   a. All curtain wall, window, door submittals, etc. will be due within 20 days of award of contract or as needed in order to get work completed per the schedule.

3. Format: Arrange the following information in a tabular format:

   a. Scheduled date for first submittal.
   b. Specification Section number and title.
   c. Submittal category: Action; informational.
   d. Name of subcontractor.
   e. Description of the Work covered.
   f. Scheduled date for Architect's final release or approval.
   g. Scheduled date of fabrication.
   h. Scheduled dates for purchasing.
   i. Scheduled dates for installation.
   j. Activity or event number.

4. The submittal schedule shall indicate that all action submittals are to be sent to the Architect within thirty (30) days after the execution of the Owner/Contractor Agreement.

   a. If a submittal cannot be sent to the Architect within the specified time period, then the Contractor shall provide an explanation for the additional time.

5. Within thirty (30) calendar days after the execution of the Contract, the Contractors shall submit, to the Project Construction Manager, a copy of the confirmed delivery date for each required material or product.

6. See below chart for a sample submittal schedule:

	DATA		DRAWINGS		WARRANTY
ITEM/SECTION	RECEIVED	APPROVED	RECEIVED	APPROVED	PERIOD
	DATE	DATE	DATE	DATE	
Bonds and Insurance					
Project Schedule					
Submittal Schedule					
Schedule of Values					
Coordination Schedule					
Other					
Other					
Other					
Other					
Other					
Other					
Preliminary Punch List					
Test Reports					
O & M Manuals					
Other Closeouts					

PART 4 – ADMINISTRATIVE REQUIREMENTS

B. Architect's Digital Data Files: Refer to Section 01 35 00 Electronic Document Transfer.

A. Electronic Submittal Requirement: All action and informational submittals shall be submitted as PDF formatted.

1. Use a submittal number assigned by the Architect or Construction Manager.

2. All submittals will be returned to the prime contractors.

3. Internet Service and Equipment Requirements:
   a. Email address and Internet access at Contractor's main office.
   b. *Adobe Acrobat* (www.adobe.com), or other similar PDF review software for applying electronic stamps and comments.

B. Submittal package: Assemble each submittal and re-submittal individually and appropriately for transmittal and handling.

1. Provide a completed "Submittal Cover" form with each submittal, found in Section 00 62 11, as the first page of every submittal.
   a. Every submittal shall be accompanied by a fully executed copy of the Submittal Cover sheet and set forth the following:
      1) Contract number.
      2) Contract for: School Name/Number and SED Project Control Number.
      3) Contractors' name.
      4) Sub-contractor and suppliers name.
      5) Submission number and the date for each initial submittal and re-submittal.

6) Shop drawings name and number.
7) Contents.
8) Name of manufacturer.
9) Specification section paragraph number(s) showing product being submitted on.
10) Signature of contractor indicating approval of the submittal with date of approval and all applicable check boxes marked.

C. 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.

3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

4. 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.

D. Processing Time: Allow time for submittal review, including time for re-submittals, as follows. Time for review shall commence upon 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 re-submittals.

1. It is the Contractor’s responsibility to provide required submittals complete with enough information to show conformance with the construction documents in a time frame that will not affect the construction schedule. The construction schedule will not be extended due to the Architects’ “RETURNED WITHOUT ACTION”, “REJECTED” or “REVISE AND RESUBMIT” action on a submittal when the submittal is found to be lacking adequate information showing conformance with the contract documents and/or does not conform to the contract document requirements.

2. The Architect will review a maximum of two submittals for any single item requiring a submission at no cost to the Contractor. Upon request by the Architect, the Contractor will compensate the Owner, via back charge for all further submissions to the Architect and/or Owner due to submissions that do not provided enough data to prove compliance with the specifications, or that in the opinion of the Architect do not meet the project specifications. Compensation will be computed by the additional hours needed to perform the review and correspondence multiplied by the Architect’s normal billing rate.

3. Initial Review: Allow five (5) 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.

4. Re-submittal Review: Allow five (5) working days for review of each re-submittal.

E. Options: Identify options requiring selection by Architect.

F. Deviations and Additional Information: On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.

G. Re-submittals: Make re-submittals 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 with approval notation from Architect's action stamp that indicates “NO EXCEPTION TAKEN”, or “MAKE CORRECTIONS NOTED”.

H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

I. Use for Construction: Retain complete printed copies of all approved action submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

J. Inspection of Documents: Construction progress drawings (as-builts), approved submittals, updated construction schedule.

1.2 EXECUTION SUBMITTAL PROCEDURES

A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Submit electronic submittals as PDF electronic files.

a. After their review, the Architect will post the annotated file to the Project’s website. The Contractor will then be notified via e-mail that the submittal has been reviewed, and may download the submittal file.
b. The Contractor is responsible for printing hard copies of electronic submittals for their own use.

2. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

    a. Provide a digital signature with digital certificate on electronically submitted certificates and certifications where indicated.
    b. Provide a notarized statement on original paper copy certificates and certifications where indicated.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

1. Clearly mark each copy of each submittal in bold marking of contrasting color to show which products and options are applicable.

2. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

3. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams showing factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

4. Submit Product Data before or concurrent with Samples.

5. Submit Product Data in the following format:

    a. PDF electronic file.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Identification of products.
    b. Schedules.
    c. Compliance with specified standards.
    d. Notation of coordination requirements.
    e. Notation of dimensions established by field measurement.
    f. Relationship and attachment to adjoining construction clearly indicated.
    g. Seal and signature of professional engineer if specified.

2. PDF Format Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than *24 by 36* inches (750 by 1067 mm).

3. Submit Shop Drawings in the following format:

   a. PDF electronic file.

D. Samples: 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.

   a. Transmit samples via hand delivery, currier, or mail service to the Architect's Office.
   b. Forward a copy of the transmittal to the Construction Manager.

2. Identification: Attach label on unexposed side of Samples that includes the following:

   a. Project name and site name, if Project involves multiple site locations.
   b. Submittal number assigned per submittal schedule.
   c. Generic description of Sample.
   d. Product name and name of manufacturer.
   e. Sample source.
   f. Number and title of applicable Specification Section.
   g. Specification paragraph number and generic name of each item.

3. For projects where electronic submittals are required, also provide corresponding electronic submittal of the completed Submittal Cover, a digital image file illustrating the Sample's characteristics, and identification information for record.

   a. Transmit printed copies of the above along with the physical Sample in the same quantity as required for the Samples.

4. Disposition: Sample sets may be used to determine final acceptance of construction associated with each set.

   a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
   b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

5. 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 (3) full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect, through Construction Manager, will return one (1) submittal with options selected.

6. 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 minimum Four (4) sets of Samples. Architect and Construction Manager will retain Three (3) Sample sets; remainder will be returned.

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 (3) sets of paired units that show approximate limits of variations.

E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.
5. Submit product schedule in the following format:
   a. PDF electronic file.

F. Contractor's Construction Schedule: Comply with requirements specified in Division 01 Section "Construction Progress Reports."

G. Application for Payment and Schedule of Values: Comply with requirements specified in the General Conditions of the Contract.

H. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Division 01 Section "Quality Control."

I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01 Section "Closeout Procedures."

J. Maintenance Data: Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of

Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

M. Installer Certificates: Submit 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.

N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

Q. Material Test Reports: Submit 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.

R. Product Test Reports: Submit written reports indicating that 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.

S. Research Reports: Submit 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.

T. Preconstruction Test Reports: Submit 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.

U. Compatibility Test Reports: Submit 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.

V. Field Test Reports: Submit written reports 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.

W. Design Data: Prepare and submit 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.

X. Construction Photographs: Provide photos of progress on a weekly or monthly basis for each phase and area of work. Any areas of conflict will be documented with photos as well as air tests and other monitored activities. All underground and “to be concealed” areas will be documented with photos as required to properly document as build conditions.

Y. Material Safety Data Sheets (MSDS): Contractor shall provide and maintain a hard copy of all MSDS sheets at each Project Site as per OSHA requirements. Do not submit MSDS sheets to the Architect or Construction Manager.

1.3 DELEGATED-DESIGN SERVICES

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 Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF electronic file and three (3) paper copies of certificate, 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.

1.4 CONTRACTOR'S REVIEW

A. Action and Informational Submittals: 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.

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.

1.5 ARCHITECT'S ACTION

A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or revisions required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

1. No Exception Taken – Submittal is approved and released for fabrication and can be incorporated into the work.
2. Make Corrections Noted - Submittal is approved and released for fabrication and can be incorporated into the work with the modifications as noted.
3. Revise & Resubmit – Submittal is not approved and resubmission is required per the Architect's comments. Such products cannot be purchased nor incorporated into the work.
4. Rejected – Submittal is not approved and submission does not meet requirements of the Project. Resubmit products that conform to the Contract Documents.

B. 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.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.

D. Submittals not required by the Contract Documents may be returned by the Architect without action.

E. Submittals that do not follow the protocol that is outlined in the applicable Specification Section, or this Section, of the Project Manual may be returned to the Contractor without action by the Architect.

F. Submittal packages received from sources other than the Contractor, or other than from the Contractor via the Construction Manager, will be discarded by the Architect.

END OF SECTION 01 32 19

SECTION 01 32 26 - CONSTRUCTION PROGRESS REPORTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
   1. Submittals Schedule.
   2. Daily construction reports.
   3. Field condition reports.

B. Related Sections include the following:
   1. Division 01 Section "Construction Procedures and Control" for submitting and distributing meeting and conference minutes.
   2. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
   3. Division 01 Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

A. Submittals Schedule: Refer to “Submittal Procedures” section of Project Manual.

B. Construction Reports: Submit one (1) copy daily. Reports need to be submitted by 9:00 a.m. of the day following the day of the report.

C. Field Condition Reports: Submit two (2) copies at time of discovery of differing conditions.

1.4 QUALITY ASSURANCE

A. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Construction Procedures and Control."
   1. Review time required for review of submittals and re-submittals.
   2. Review requirements for tests and inspections by independent testing and inspecting agencies.
   3. Review time required for completion and startup procedures.

1.5 COORDINATION

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

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from parties involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Refer to Division 01 Section “Submittal Procedures”.

2.2 REPORTS

A. Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:

1. List of subcontractors at Project site.
2. List of separate contractors 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.
12. Emergency procedures.
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 a request for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

END OF SECTION 01 32 26

SECTION 01 35 00 - ELECTRONIC DOCUMENT TRANSFER

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Work of this Section shall be performed in accordance with the requirements of the Contract Documents, including but not limited to Instructions to Bidders, Agreement and General Conditions and General Requirements

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the request and transfer of electronic documents from the Architect/Engineer to the Contractor, Subcontractors and the associated Equipment Vendors.

B. Electronic Documents include, but are not limited to, the following:
   1. Drawings in .pdf and AutoCAD .dwg format
   2. Specifications and printed documents in .pdf format.

C. Transfer of documents includes, but is limited to, the following:
   1. E-mail attachments.
   2. A/E's FTP site.

D. All drawings, specifications or other documents of any kind prepared by the Architect/Engineer or its subconsultants, whether in hard copy or any electronic or machine readable format, including Electronic Documents are, and shall remain, instruments of their services. These Instruments of Services were prepared solely for use in connection with this Project. The Architect/Engineer and its subconsultants retain all common law, statutory and other reserved rights, including the copyright.

E. The Electronic Documents are provided as a convenience to the Contractor for informational purposes only in connection with the Contractor's performance of its responsibilities and obligations relating to the Project. The Electronic Documents do not replace or supplement the paper copies of the Drawings and Specifications which are, and remain, the Contract Documents for the Project or the paper copies of any other document prepared by the Architect/Engineer or its subconsultants.

F. If any differences exist between printed Instruments of Services and the Electronic Documents, the information contained in the printed documents shall be presumed to be correct and shall take precedence over the Electronic Documents.

G. Contractor agrees and understands that field conditions may alter or modify the configuration, products, materials, and installation of the information shown on the electronic documents. Contractor shall be fully responsible to verify all field conditions and if applicable to modify the electronic documents to the actual conditions prior to use of the documents. These documents are provided as a convenience only, and do not change the responsibility of the Contractor as outlined in the Drawings and Specifications.

H. Architect/Engineer will not be responsible for, or required to provide assistance to the Contractor in the plotting or printing of any documents.

1.3 ELECTRONIC DOCUMENT TRANSFER PROCEDURES

A. Coordination: Coordinate transfer requests with performance of construction activities. Transmit each request to the CM and A/E sufficiently in advance of scheduled needs to avoid delay.
   1. Processing: To avoid the need to delay installation as a result of the time required to process document transfers:
      a. Allow 10 working days for the A/E's processing of each request, after receipt of a written request and the required processing fee.
      b. The A/E will not authorize an extension of time because of the Contractor's failure to transmit requests and fees to the A/E sufficiently in advance of the Work to permit processing.

B. Electronic Document Transfer Requests: Contractor shall submit a written request for any transfer consisting of the following:
   1. Signed, completed copy of the attached "Electronic Document Transfer Agreement".
   2. List of drawing numbers and titles requested.

END OF SECTION 01 35 00

SWBR

Electronic Document Transfer Agreement

This Agreement is made this _____ day of _____, 20_____ (the "Agreement"), between _____ SWBR (the "Architect") and _____ (the "Contractor") relating to the use by the Contractor of CAD data concerning the project described and set forth in the agreement between the Owner and Contractor dated _____.

The Contractor agrees as set forth below:

1. The CAD files are to be transferred from the Architect for this Project. The CAD files are not to be considered Contract Documents, but reasonable facsimiles thereof, and are provided by SWBR as a convenience to the Contractor for the project described above. In accepting and utilizing any designs, drawings or other data on any form of electronic media generated and provided by SWBR, the Contractor covenants and agrees that all such drawings and data are instruments of service of SWBR, who shall be deemed the author of the depicted design, drawings and data, and shall retain all common law, statutory law, and other rights, including copyrights.
2. The Contractor further agrees not to use these drawings and data, in whole or in part, for any purpose or project other than the project contained in the electronic media. The Contractor agrees to waive all claims against SWBR resulting in any way from any unauthorized changes or reuse of the drawings and data for any other project by anyone other than SWBR.
3. In addition, the Contractor agrees, to the fullest extent permitted by law, to indemnify and hold SWBR harmless from any damage, liability or cost, including reasonable attorney's fees and costs of defense, arising from any changes made by anyone other than SWBR or from any reuse of the designs, drawings and data without written consent of SWBR.
4. Under no circumstances shall transfer of the drawings and other instruments of service on electronic media for use by the Contractor and Users be deemed a sale by SWBR and SWBR makes no warranties, either express or implied, of merchantability and fitness for any particular purpose.
5. The terms and conditions set forth above are not intended to supersede the terms and conditions of the aforementioned agreement between the Owner and SWBR, but rather this Agreement is intended to supplement that agreement.
6. This Agreement is entered into as of the date and year first written above.

SWBR	CONTRACTOR
By:	By:
Title:	Title:

SWBR Template 5/2017

Project Safety Standards

for

Rochester Schools Modernization Program

Date: January 31, 2017

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See Specification Section 01 35 23 A For All Safety Forms.

DEFINITIONS: The following definitions shall apply herein.

ANSI (American National Standards Institute): A professional organization chartered to promote and facilitate voluntary consensus standards and conformity assessment systems, and safeguarding their integrity.

Authorized Person: A person approved or assigned by their employer to perform a specific type of duty or duties or at a specific location on the Project.

Competent Person: A person who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

National Electrical Code (NEC): The National Electric Code is a set of electrical safety standards that is a subset of the national fire codes set forth by the National Fire Protection Agency. The NEC has been adopted by nearly every area within the United States as a guideline for safe electrical installation.

National Fire Protection Agency (NFPA): A United States organization charged with creating and maintaining minimum standards and requirements for fire prevention and suppression activities, training, and equipment, as well as other life-safety codes and standards. This includes everything from building codes to the personal protective equipment utilized by firefighters while extinguishing a blaze.

OSHA (Occupational Health and Safety Administration): The U.S. federal agency charged with developing and enforcing regulations designed to protect the workforce.

Qualified Person: A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrate their ability to solve or resolve problems relating to the work or the Project.

PROJECT INTRODUCTION

John Walton Spencer School No. 16 ("Project")

ADMINISTRATION

Policy Statement

It is the Owner's intention that all contractors commit to maintaining an accident-free workplace. There is never an acceptable reason for compromising safety. Contractors must provide a safe place to work at all times and to conduct all operations in a manner as to provide protection for all individuals who might come into contact with these operations. By law, every contractor is obligated to conform to the requirements of the Federal Occupational Safety and Health Act of 1970 (OSHA) and all additions and revisions thereto, as well as other applicable federal, state and local requirements. In addition, and when not in conflict with the foregoing legal standards, all contractors, must comply with the minimum safety standards and protocol set forth in this "Project Safety Standards." **All supervisory employees of contractors must accept responsibility for the prevention of accidents and for conducting all operations under their direction in a safe and efficient manner.** The collective goal should be to achieve accident-free work that conforms to all Contract Document requirements. With the cooperation, dedication and assistance of every contractor, this will be a successful and safe Project.

Statement of Final Authority

- All persons who enter the work area for any reason during construction will be required to comply with the minimum standards set forth in this Section in addition to all applicable legal requirements.
- Each contractor must submit a site-specific safety program ("Safety Program") upon award of a Contract, prior to commencing any work. The Safety Program must implement all requirements of OSHA as well as the minimum standards set forth in this Section.
- If the Construction Manager finds areas of work or individuals that are not in noncompliance with OSHA requirements, or any other applicable law or regulations, or the minimum standards set forth herein, the Construction Manager shall have the authority to order immediate correction and cessation of the non-compliant occurrence or condition.
- **Non-compliance, if not immediately corrected, will be grounds for Contractor dismissal and/or denial of access to the Project site**. All costs of correction shall be borne by the non-compliant Contractor.
- Nothing contained herein, however, shall serve to relieve a contractor of its liabilities and/or obligations required by OSHA as well as all other applicable law, or the minimum standards of this Section.

Responsibilities

Construction Manager (CM)

- Audit the Contractor's Safety Program to determine if it conforms to the above requirements, provided that any failure by the Construction Manager to determine non-conformity herewith shall not relieve contractor of its obligations set forth in this Section.
- Provide weekly, written site inspections of the job site, notify the Contractors of any unsafe practices and conditions for which they are responsible, and counsel them on the appropriate corrective actions when necessary. Site inspections shall be reviewed and discussed with the construction team.
- Provide all new Contractors and their subcontractors with a safety orientation before they start working on the Project site. The orientation shall include at least a list of work rules, identification of hazardous areas, and the location of MSDS sheets. This orientation will inform the contractor of hazards specific to the site operations. After the orientation is complete, contractor's employees shall be required to sign a statement and complete an exam in order to confirm that they received and understood the training.
- Identify the location where MSDS sheets provided from the contractors can be found for the Project.
- Maintain required records and accident prevention materials at the job site so that an adequate history is maintained for the Project.
- Monitor the entrance and exit to and from the job site.
- Review injury and first aid records during the Project to identify injury trends to take positive action to reduce or eliminate such injuries from occurring.
- Examine and become familiar with the job site and adjacent areas from the standpoint of access and facilities regarding safety.
- Evaluate any difficulties that might be encountered in complete execution of the work safely. Make frequent inspections of the site so as to initiate corrective measures to eliminate unsafe practices and conditions.
- Immediately investigate all accidents or near miss accidents and take corrective actions to help prevent reoccurrence.
- Appoint a Project Manager to perform the duties set forth below.

CM's Project Manager

- Direct and administer the Safety Program. All reports, surveys, accident reports and other information relating to safety are to be submitted in a timely manner to the Project Manager.
- Establish a safety organization to assure the involvement of all personnel in the safety effort and to provide for their participation.
- Appoint the Project Superintendent as the CM's representative to monitor safety activities on the site.
- Evaluates contractor's safety performance for compliance with all applicable laws and regulations, as well as with the standards set forth in this Section.

CM's Project Superintendent

- Oversee compliance with the requirements of the Project Safety Standards.
- Plan and require all work to be done in compliance with the Project Safety Standards.
- Perform and document weekly inspections relating to safety.

Contractors

- The name of and résumé for each Contractor's Safety Plan coordinator will be provided to the CM for review prior to starting work on the site.
- Contractors with a staff and crew of 20 or more on site (including subcontractors of all tiers) shall appoint a full time safety representative. Contractors with a staff and crew on site of less than 20 shall anticipate that the safety aspects of this position will encompass substantial time during the work week and may occasionally require fulltime attention. For this reason, serious consideration shall be given to the ability of a superintendent or foreman to simultaneously meet the responsibilities of both positions.
- Each safety coordinator will meet the following criteria:
    - A minimum of an OSHA 30-hour construction hazard recognition certification; be certified as a competent person in the type of work being performed; First Aid and CPR-certified; experienced in the construction industry in the type of work being performed.
    - Each Safety coordinator has the right and authority to stop any and all hazardous work being performed by their employer whenever imminent danger to life and health exists.
    - Conduct regular and frequent inspections for the Contractor's work areas.
    - Take immediate action to eliminate unsafe acts and/or conditions.
    - Ensure that prior to the start of any work activity; every foreman has reviewed each task assignment with every affected employee to assure a comprehensive understanding of the safety requirements and precautions to be taken while performing this work.
    - Ensure that appropriate personal protective equipment is provided and its use enforced.
- Each safety coordinator shall participate in accident and incident investigation involving their work and employees and those of their subcontractors.
- Each safety coordinator shall attend safety meetings as scheduled by the CM.
- Contractor shall instruct each employee on Project site in the recognition and avoidance of unsafe acts and/or conditions applicable to its work environment to control or eliminate injury or illness.
- Contractor is responsible for providing and requiring the use of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions. All records shall be maintained at a location accessible to the CM.

- Contractor is responsible for notifying the CM of any hazardous chemicals or substances that are brought or cause to have been brought on Project site. Contractor shall provide the CM with a copy of Contractor's Hazardous Communication Program, Chemical information list, and Material Safety Data Sheet(s) (MSDS) for the chemical(s) or substance(s) intended for use on the site. The CM will provide a centrally located place for this information. Contractor is responsible for maintaining a copy of Contractor's Hazard Communication Program, Chemical Information List, and Material Safety Data Sheet(s) on site for Contractor's own reference and employee training. The proper storage, use and disposal of wastes of any hazardous chemicals or substances are the responsibility of Contractor.
- Contractor is responsible for conforming to OSHA and NFPA standards of fire protection and prevention practices. Contractor shall also comply with all fire and safety rules and regulations established on the Project.
- If Contractor fails to correct safety violations, the CM will issue the Contractor written notification, outlining safety violations. Failure of the Contractor to abate may result in the removal of the Contractor from the Project site, and the CM's approved bidders list, or other appropriate measures.
- Compliance with Federal, State, Local Laws and regulations is the contractual obligation of Contractors working on this Project. Conflicts between current laws or contractual requirements shall be resolved by adhering to the more stringent requirement. Any Project requirement of this Section which exceeds the minimum standards established by OSHA, shall be incorporated in Contractor's Safety Program.
- The Contractor shall ensure that its supervisors are aware of their responsibilities, which include:
    - Become familiar with the requirements of all accident prevention standards and safety rules pertaining to their job.
    - Be responsible for carrying out the procedures required by the Project Safety Standards.
    - Ensure that each employee under their supervision has received the initial Project safety orientation provided by the CM.
    - Explain to all employees applicable safe practice rules and regulations under their direct supervision.
    - Supervise the instruction and training of new employees either personally or through delegated experienced persons until the new employee satisfactorily demonstrates their ability to perform the work in a safe and efficient manner.
    - Be responsible for continuous housekeeping in their area and for the use and maintenance of all personal protective devices, equipment, and safeguards.
    - Notify their direct supervisor and/or the Contractor's safety representative concerning work areas where they believe protective devices are required. Such safety devices will include, but not be limited to, the following: Machine guards, operational shields, exhaust vent hoods and systems, welding shields, approved personal protective equipment, automatic stops and controls, barricades, railings, etc.
    - Report to their own direct supervisor all cases of employees who, in their opinion, are not qualified for the work to which they have been assigned or who engages in unsafe practices.
    - Attend and participate in all supervisors' safety meetings.
    - Conduct or arrange for weekly "toolbox" safety meetings for all employees under their supervision as required. Minutes of "toolbox" meetings are to be maintained and a copy of each is to be given to the CM before end-of -shift the day given.
- Each Contractor shall complete a "Safety Task Assignment Process" form each day for all work crews, discuss with each work crew on a daily basis or when non-routine tasks occur and provide a copy to the CM at the end of the work day with their daily report.
- Report immediately, all accidents in which personal injury, property damage or a near-hit occurs.

- Should an accident occur involving a Contractor's employee, the Principal/Owner of the Contractor shall attend a "Principals" meeting at the Project location to review the incident. The CM will conduct this meeting.
- Assist in accident investigation and submit a report promptly on required forms. Lessons learned from such investigations shall be incorporated into all future daily activities and plans of the Contractor.
- In the event Contractor utilizes employees whose primary language is not English, the contractor shall provide for appropriate interpretation to assure complete comprehension.
- Periodically analyze work methods in detail for the purpose of job simplification and for the establishment of safe work methods.
- Site safety inspections are to be an ongoing process and documented at least weekly. Contractors should document inspections on the "Site Audit Checklist" or approved Contractor's form and submit to the CM.
- Ensure that all hazards created in an area as a result of work activities are addressed before the crew leaves the area, including breaks or lunch.
- Contractor's supervisors (i.e., Project Manager, superintendents, foremen) will be required to attend a Supervisor Skills Workshop when offered by the CM. The training will consist of 2 (two)- 4 (four) hour sessions and be taught by a designated CM employee.

Employees

- No employee shall be required or knowingly permitted to work in an unsafe environment except for the purpose of making safety corrections and then only after proper precautions have been taken for their protection.
- Each employee is responsible for learning and abiding by those rules and regulations which are applicable to the assigned tasks and for reporting observed or anticipated hazards to their immediate Supervisor. If the hazard is not immediately corrected, the affected employee will report the hazard to the CM.
- All employees shall observe the following rules of conduct:
    - **Courtesy**: Employees shall observe standards of behavior and conduct their work in a manner to avoid offending any Owner employees or visitors. Each individual on this Project must be given the courtesy that would be extended to one's family or best friend.
    - **Personal Protective Equipment**: all persons on the site will wear hard hats, eye protection, gloves and work boots with substantial soles. All other personal protective equipment, including respirators or eye protection, as appropriate to assigned tasks, shall be utilized in the proper manner at all times while there is exposure to the hazards.
    - **Clothing**: Clothing suitable for the weather and your work shall be worn. Torn or loose clothing, cuffs or neckwear, which may be a hazard, are not allowed. Shirts must be worn and have short sleeves. Pants must have legs (no shorts allowed). Clothing shall be maintained in a clean, neat and repaired fashion
    - **Vehicles**: Employees shall park their vehicles in designated areas. There will be no on-site parking provided for this Project. Operation of vehicles on the Project site shall conform to all local traffic laws. The maximum speed limit on the Project site is 10 miles per hour.
    - **Smoking**: Smoking or use of tobacco products in any form is not permitted anywhere on the Project site.

- **Intoxicants**: Consumption of alcoholic beverages or controlled substances is not allowed on the Project. All workers who are taking physician-prescribed or over-the-counter medication must be fit for work. **All employees are specifically directed to the "Drug Policy" which is a part of this Project Safety Standards.**
- **Accidents**: All employees must immediately advise their Supervisor of any injury on the Project or any non-injury accident that involves damage to property or equipment.
- **Personal Conduct**: Practical jokes, horseplay, scuffling, wrestling or fighting is prohibited.
- **Good Housekeeping**: Good housekeeping on the Project is mandatory and every employee must do their part daily to minimize dust and to clean up their work area to keep the Project clean for safety and efficiency. Controls shall be observed which keep dirt from being tracked into areas outside the workspace. Clean-up methods shall follow prescribed techniques to minimize the distribution of dust into the air.
- **Authorized Access**: Employees shall confine their activities to the areas designated as the work site. The employee's Supervisor shall obtain permission from the appropriate Owner representative prior to entry into any areas outside the work site.
- **Fire Protection**: Employees shall adhere to all fire protection regulations, and shall conduct their work in a manner to preserve the fire safety integrity of the building.
- **Entertainment Devices**: No televisions, radios, CD/cassette/digital music players, gaming systems, or other entertainment devices are allowed to be used while work is being performed.
- **Cell Phones**: Cell phones on the Project are only permitted for the furtherance of Project-related business. At no time shall cell phones be used while operating equipment or machinery or while exposed to hazards created by equipment or machinery.

Accident Investigation

- For all injuries or near-hits that risk injury to person or property, the CM is to be notified immediately. Copies of ALL accident reports must be filed with CM immediately.
- Any accident or incident resulting in a lost-time injury, fatality, damage to property or equipment exceeding U.S. $1,000, a serious "near-hit" or the recognition of a potential hazard to health and environment is to be investigated by a committee comprised of the following, as appointed by the CM: CM Project Manager, the CM Project Superintendent, and Contractor's Supervisor, or anyone familiar with the practices involved in the incident who can contribute to its analysis and recommend actions to prevent a reoccurrence.
- The investigation shall begin promptly after the incident. Results of the investigation and recommendations for preventive action shall be documented within five (5) workdays of the incident.
- With the Owner's permission, a brief news release may be posted, for the information of workers, covering fatalities and serious occurrences.
- The occurrences are also to be discussed at the regular or special safety meetings.
- This investigation and report shall be made immediately, but release may await any similar investigation and reports required by governmental regulations.
- The CM shall also review first aid injuries to establish trends and practices that deviate from work standards and shall report and take corrective actions.
- The CM shall provide for the Owner, in the Monthly Progress Report, a safety report covering safety activities for the preceding month. The report shall include:
    - The accident experience, recordable, lost time, first-aid and near-hit incidents for the month.

- The relationship of the accident experience to the number of people employed using a recognized national standard for recordable injuries and lost time injuries.
- A review and summary of the safety activities, problem areas, and contemplated action, including fire hazards and environmental hazards.

Discipline - Enforcement

- All contractors shall conform to the requirements of these Project Safety Standards.
- Should an Imminent dangerous condition be discovered, all work in the area of danger will be stopped until corrections are effected.
- Should the CM find contractor areas of work or individuals in non-compliance with OSHA or the Project Safety Standards, the CM shall have the authority to order immediate correction of the non-compliance.
- All costs of correction shall be borne by the contractor(s) deemed responsible.
- Nothing contained herein, however, shall serve to relieve a contractor of its liabilities and/or obligations under OSHA as well as other applicable laws or regulations, or of these Project Safety Standards.
- The CM may withhold payment of any sums due contractors for failure to follow these Project Safety Standards. The CM will issue a written, 24-hour notice in this regard requiring immediate response by the contractor.
- Repeated violations or lack of cooperation with regard to the Project Safety Standards by employees of a contractor will indicate non-compliance with provisions included in the contract and may be reason for the employee being barred from the Project site and/or for termination of the contractor's contract.
- At orientation, new employees are given their first warning: If an employee fails to follow the rules, the CM may issue a notice of violation.
- **1st Notice of Violation**: Notice is sent to employer. Employee must come in and see the CM to review violation so there is an assurance the employee knows how serious this citation is and what corrective action must be taken.
- **2nd Notice of Violation**: The individual will be removed from the property and banned from further access to the site.
- **"Immediate removal from the property" Violations** will result when:
  - Any employee, supervisor or manager exposes themselves or other employees to imminent loss of life or substantial and unjustified risk of bodily harm.
  - Any employee, supervisor or manager openly exhibits disregard, defiance or disrespect for the requirements of these Project Safety Standards.
  - Any employee, supervisor or manager knowingly falsifies any investigative document or testimony involved in an investigation.
  - Violent physical encounters (fighting) occur. All individuals involved in the incident are subject to removal.
  - Threats are made against any personnel performing their duties.
  - Theft or destruction of property occurs.
  - Any employee, supervisor or manager consumes, possesses, distributes or is under the influence of alcohol/drugs. Reference is made to the "Drug Policy," herein below.
  - Other Citations: Violations of safety, traffic, housekeeping or material storage rules

Hazard Analysis

- Prior to beginning work, each contractor shall prepare a hazard analysis that defines the activities to be performed and identifies the sequence of the work, the specific hazards, and the methods to be used to eliminate or minimize each hazard.
- The hazard analysis shall be submitted prior to, and will be reviewed during the pre-construction meeting by the CM, and the contractor's supervisors and safety representative. The hazard analysis shall be written in a form acceptable to the CM.
- Hazard Analysis shall be done when the scope of the work or conditions change.
- Each contractor's Foreman will inform his/her work crew of the Hazard Analysis for their work activity each day prior to start of work or when conditions change.
- Each contractor shall submit for review by the CM a site specific safety program which addresses all the elements of this safety plan as they will be implemented by the contractor, its contractors, vendors and suppliers.
- The Hazard Analysis will be included as an appendix to the contractor's site-specific Safety Program.

Inspection and Auditing

Purpose and Scope

- To establish a basic inspection/audit program for the elimination of unsafe practices by employees and to establish a hazard free work environment for all employees on the Project.

Objectives

- To reaffirm the Contractor's basic responsibility for the actions of the employees as originally assigned under OSHA.
- The exercise of these responsibilities by all contractors will be the effective deterrent to accidents arising from unsafe practices and physical conditions, which will materially enhance the construction efficiency of this Project.

Procedures

- Control will be achieved only when each trade contractor fulfills their contractual and statutory responsibilities and applies all practical steps to maintain safe and healthful work practices and conditions.

Project Controls

- Continued monitoring/audit of the performance of the Contractor and their supervision under this Section will be made by both the CM and the Contractors' supervisory staff.
- Contractors will be notified of any unsafe practices observed.
- The Contractor's safety supervisor, the Project Safety representative and the Construction Manager's field staff shall utilize a nationally recognized inspection form.

Supervisory Control

Contractor

Contractor will be responsible for conducting continuous daily surveys of their operations to insure they are aware of the probable sources of potential injury or loss due to unsafe acts of procedures.

Planning

Contractors must extensively plan the procedures to be followed for each operation using Hazard Analysis procedures and submit such plans to the CM. Personnel chosen to perform any such planned operation shall be thoroughly briefed in all aspects of the procedure, including emergency actions to be taken in the event of a mishap.

Inspections

In addition to inspections conducted by the CM, Insurance Representatives, and each Contractor, construction activities are subject to periodic inspection by OSHA Compliance Officers.

Each Contractor is required to notify the CM in writing prior to starting work if they, by their Company policy, they will require a warrant for OSHA to inspect their work. The CM does not require a warrant.

Contractors shall forward copies of any and all inspection reports and/or citations received by the Contractor from OSHA to the CM. All information will remain confidential.

In the event that an OSHA Compliance Officer visits the site, he/she will be directed to the CM office. The appropriate Contractors will then be notified so that an Opening Conference may be conducted. The CM will organize an inspection party, consisting of both employer and employee representatives.

Notification of Hazards

Each Contractor shall notify the CM verbally or in writing of the existence of any hazardous conditions, property, or equipment at the work site, which are not under the Contractor's control. However, it is the Contractor's responsibility to take all necessary precautions against injury until corrected by the responsible party.

Equipment and Facilities

All Contractors operating equipment and facilities used shall be inspected, and maintained as directed by this manual; as dictated by the applicable Federal and State safety and health regulations. In the event of conflict, the more stringent requirement will take precedence.

Meetings

Meeting - Pre-construction

- The Contractor, before starting work at the Project site, shall attend a pre-construction meeting with the CM to understand the Project conditions and safety requirements.
- A Project site tour shall be made to confirm the Contractor's awareness of potential safety hazards.
- Contractor, to assure a safe work place, shall provide appropriate methods, equipment, devices and material.
- Contractor shall provide or develop its own Project specific Safety Program and submit it to the CM for review prior to starting work at the Project site.
- Such review shall not relieve Contractor of responsibility for safety, nor shall such reviews be construed as limiting in any manner the CM's authority to enforce the provisions of this Section.
- It is the Contractor's obligation to undertake any action as may be required to establish and maintain safe working conditions at the Project site.

Meetings - During Construction

- A Project start safety conference will be held with the superintendent(s), safety coordinator and Foremen of each new Contractor prior to coming on the site.
- The CM will issue the Project start package information and will issue special instructions to the Contractors in support of the Project Safety Standards when needed.
- The CM will conduct regularly scheduled meetings with the Supervisors of new Contractors coming on the site and explain safety goals, contents of this manual and otherwise provide site orientation, safety activities and information. All Supervisors will be required to attend this orientation after coming on the site.
- Contractor meetings will be held as necessary and as directed by the CM. All Contractors actually working on the Project will have a representative at the safety meeting to maintain all safety requirements for their trade.
- The CM will conduct safety Meetings on a regularly scheduled basis. Minutes of the meeting will be a topic of all scheduling and progress meetings.
- All Contractors are required to hold weekly 10-15 minutes **"Tool Box" safety meetings** for all employees. Topics related to work assigned, and current safety problems will be discussed. Monthly meetings for supervisory and clerical employees will be held. The CM will monitor these "Tool Box" meetings through personal attendance or by reviewing a copy of the meeting report.
- Prior to starting any major operation, which would involve locking/tagging procedures, a meeting must be set up involving the CM, and every Contractor Superintendent and every Contractor Safety representative affected by the work.
- Specific procedures must be adopted and reviewed by all concerned with the operation prior to commencement of the work.
- Daily, or more often if the craft crews' task should change, a documented meeting shall be held between the crew foreperson or superintendent and the crew to discuss the assigned task referred to as a **Safety Task Assignment (STA) or Task Hazard Analysis (THA)**. The agenda for this meeting shall include a description of the assigned task, the hazards posed for the crew and the Project by virtue of performing the task, the control measures to be implemented to mitigate the hazards, required personal protective equipment, tools and equipment, environmental and logistical considerations, individual crew member assignments, and fitness for duty of the crew members. See the Appendices for a sample form to document the STA/THA meeting.

OSHA / State

OSHA Required Training

- Instruction and training of employees is a requirement of OSHA and will be enforced on this Project.
- Training of contractor personnel is the responsibility of the contractor.
- All Contractor personnel must attend the CM 's "New Employee Orientation" prior to their starting work on their first day on the Project.

OSHA - Inspection

- It is the CM's policy to allow OSHA to conduct an inspection of the Project (subject to review by the CM, if necessary). If a contractor wishes to assert their rights under the U.S. Constitution regarding inspection by OSHA, then it must so notify OSHA prior to the start of any such inspection.

- The CM will accompany the OSHA inspection party at all times and will make arrangements for the necessary meetings between OSHA, contractors and organized labor representatives (if any). The CM does not assume liability or responsibility for the presence of any alleged hazards or their correction.
- Contractors will inform the CM of the issuance of any OSHA citations and provide a copy when requested.

Project - Code of Safe Practices

Each individual working on this Project will be required to attend a safety orientation meeting at the start of their assignment. At the conclusion of the meeting, each will be required to sign a Code of Safe Practices indicating their agreement to follow that Code while on the Project. This does not relieve the trade contractor of any responsibility to properly orient and train their employees for the specifics of their work.

Project Safety Rules

- All personnel on this Project, including the employees of Contractor, will be required to comply with these rules. Contractor shall ensure and indicate that all its employees have read these rules and understood its contents. The employee must sign a declaration, which shall then be retained by Contractor with the employee's personnel file. In addition, Contractor shall comply with the following:
- Long or short sleeve shirts shall be worn at all times. All shirts shall be tucked in trousers at all times. All shirts shall be hemmed at neck, sleeve and tail. “Muscle Shirts” are prohibited.
- Long pants are required. “Shorts” are prohibited.
- A well-constructed boot/shoe that provides ankle protection with a substantial, flexible sole shall be worn. Exposure to hazard dictates whether or not a protective toe guard will be required. Sandals, tennis shoes, or any other street type shoes (even if equipped with ANSI toe protection), will not be permitted.
- Loose fitting clothes or dangling jewelry shall not be worn around moving machinery, grinding operations, welding, or other hazardous operations.
- Hair, which could come in contact with, or be caught in machinery, shall be protected by a hardhat or hair net, as appropriate.
- Approved hard hats meeting specifications contained in the most current addition of the American National Standards Institute (ANSI), Z89.1 and/or Z89.2 are required. “Cowboy-type” hard hats are not allowed. Baseball caps and other soft headwear are not allowed under the Hard Hat suspension.
- All contractors’ means of ingress and egress shall be adequately marked and kept clear of stored material, debris and equipment.
- No firearms are allowed on the Project site.
- Practical jokes, horseplay, scuffling, wrestling and/or fighting are prohibited and may be grounds for immediate dismissal.
- Reflective vests or clothing shall be worn by all personnel exposed to equipment during the site work and excavation phases of the Project or when deemed necessary by the CM.
- Stilts may only be used where allowed by local regulation and then only where the floor is clean and free of debris and obstructions, there are no uncovered floor holes, where there are no pipe- stub-ups and all guardrails are raised to provide adequate fall protection.
- Drinking and/or possession of intoxicants on The Owner's property is forbidden. The use of narcotics, unless authorized by a physician, and notification provided to the Project Manager/Superintendent is forbidden. Violation(s) of the above will result in immediate dismissal.

Protection of the Public

Access to the Site

- No work shall be performed in any area occupied by the public unless specifically reviewed and permitted by the CM. In that the Project interfaces with the public, precautions to be taken include, but are not limited to:
    - Each Contractor shall take such necessary action as is needed to protect and maintain public use of sidewalks, entrances to buildings, lobbies, corridors, aisles, doors, exits and vehicular roadways. The Contractor shall protect the public with appropriate sidewalk sheds, canopies, catch platforms, fences, guardrails, barricades, shields, and adequate visibility as required by laws and regulations of governing authorities.
    - Such protection shall guard against flying materials, falling or moving materials and equipment, hot or poisonous materials, flammable or toxic liquids and gases, open flames, energized electric circuits or other harmful exposures.
    - Guardrails shall be made of rigid materials complying with the requirements for standard guardrails as defined by OSHA and the Project Safety Standards.
    - Temporary sidewalks, ramps or stairs shall be provided with guardrails on both sides whenever permanent sidewalks, ramps or stairs are obstructed by the work.
    - The CM may authorize barricades, secured against accidental displacement, meeting the requirements of local authorities, where fences, sheds, walkways and/or guardrails are impractical. During the period when any barricade, fence, shed, walkway, or guardrail is removed for the purpose of work, a watchman shall be placed at all openings.
    - Appropriate warnings, signs and instructional safety signs shall be conspicuously posted where necessary.
    - A signalman shall control the moving of motorized equipment in areas where the public might be endangered.
    - Warning lights, including lantern, torches, flares and electric lights, meeting the requirements of governing authorities shall be provided and maintained from dusk to sunrise along guardrails, barricades, temporary sidewalks and at every obstruction to the public.
    - These warning signs and lights shall be placed at both ends of such protection or obstruction and not over 20 feet apart alongside of such protection or obstructions.
- With respect to operations being performed on public roadways, all New York State or U.S. Department of Transportation (DOT) and municipal requirements doe public safety will be strictly observed.
- Access to the site is limited to the entrance designated for construction traffic as indicated on the site plans issued with the construction documents.
- At no time is Contractor personnel or vehicles to obstruct traffic on public streets or Owner entry driveways.
- All material deliveries shall be scheduled in advance with the Project Superintendent and shall be completed within the time segment allocated for the specific delivery.
- The above shall be implemented only where allowed by the governing authority. Where the owner of the property specifically prohibits such protective devices, rules and regulations of the governing authority shall apply.

Authorized Visitors

- All visitors to the site are required to register with the CM upon arrival. Each Contractor will be

expected to regulate their visitors accordingly.
- All visitor passes expire upon departure from the site and are to be surrendered to the gate security guard.

Parking

- Parking shall be in designated areas only.
- All vehicles delivering materials to the Project shall be authorized to do so by the CM.
- Unauthorized vehicles may be removed at the direction of the CM and all towing charges will be the responsibility of the vehicle Owner.
- Fire hydrants and all designated fire lanes shall remain clear at all times for the use of emergency vehicles.

Employee Identification

- Where required, all Project site employees will be issued an identification badge and hardhat sticker upon completion of their initial safety orientation and after having passed their alcohol and drug test.
- All persons without a hardhat identification sticker shall report to the CM s office for verification of employment status, attendance at an orientation session, or issuance of a single day visitor pass.
- This identification badge will remain the property of the CM and the Owner. The identification badge shall be maintained in good condition and on the person to whom it is issued.
- The identification badge shall be returned to the CM or the Owner when employment on the Project is terminated or when requested by the CM, or other authorized and designated person.
- All lost or stolen identification cards shall be immediately reported to the CM or the Owner.

Tours

- It is of the utmost importance that a high degree of protection be afforded all persons touring the Project site.
- The following guidelines shall be complied with by personnel who are responsible for the organization, direction and safe conduct of the tours:
- All group tours will be cleared through the Owner's representative and the CM, allowing for maximum notice.
- All tours will be coordinated by the CM to accommodate the Project schedule, to make necessary preparations, and to assure safety precautions are observed.
- The CM will review the following items with the person requesting the tour:

Number of visitors

Individual tour groups in non-hazardous areas should be limited to no more than 10 persons per tour guide (i.e,. a tour group of 20 will require at least two tour guides).

Clothing

Tour groups will be required to wear appropriate clothing (i.e., slack and low-heeled, solid-soled shoes).

Children

Children under the age of 12 will not be permitted to accompany tours. An adult must accompany each child age 12 to 15, although the CM at its discretion may prohibit access to minors. No one under the age of 18 years shall be permitted to work on the Project.

Personal Protective equipment

Hard hats, boots, raincoats, eye protection, etc., will be supplied as required.

Release and Hold Harmless

Each visitor will be required to sign this form prior to the start of the tour. In the case of children, an adult must sign for them, preferably a parent.

Immediately prior to entering the Project site, all visitors shall be briefed about the need for careful and orderly conduct, including mention of any special hazards, which may be encountered.

Technical and official visitor tours will be conducted in accordance with the above safety precautions. Since technical tours are often conducted through areas of more hazardous work, it is recommended that the number of people on such tours be proportionate to the degree of hazard involved.

Substance Abuse Policy – Minimum

Purpose

The owner and the CM have a commitment to protect people and property and to provide a safe working environment. The purpose of this policy is to establish a drug-free work environment for each worker.

Policy

- The use possession, distribution, or sale on the Project site, facilities, or work places of any of the following is strictly prohibited: alcoholic beverages, intoxicants, non-prescription drugs, and related drug paraphernalia.
- Workers must not report for duty or perform work while under the influence of any alcoholic beverage, intoxicant, illegal or non-prescription drugs, or any other substance which may impair a worker's physical or mental abilities.
- Workers on the Project site will be subject to search as provided herein. Applicants and workers will be required to consent to drug testing as provided herein.
- This policy will apply where state law or regulation and/ or collective bargaining agreements allow.

Definitions

The following definitions shall apply to terms used in this "Substance Abuse Policy – Minimum

Accident - Any event resulting in injury to a person or property to which a worker contributed as a direct or indirect cause.

Alcohol - Ethyl (Ethanol). References to use or possession of alcohol include the use of any beverage, mixture, or preparation containing alcohol.

Applicant - Any individual who is referred or makes application for employment on the Project site.

Contraband - Substances including but not limited to the following: drugs, alcohol, and drug paraphernalia.

Controlling Employer - Any individual or firm that provides Workers to perform work on the Project site and is responsible for their hiring, advancement, payment, discipline, and termination.

Drug - Any substance (other than alcohol) including prescription drugs which may impair mental or motor function; including, but not limited to, any psychoactive substance, controlled substance, marijuana, or designer or simulated drugs. This definition does not apply to prescription drugs that have been disclosed to the CM and the Controlling Employer by the worker and are approved for use within prescription limits.

Drug Paraphernalia - Any article intended for the use, storage, or sale of illegal drugs.

Employee - Any individual, salaried or hourly, who actually performs work for a Controlling Employer on the Project site.

Incident - Any event that the CM determines has the attributes of an accident, except that no harm was

caused to personnel or property.

Project Site - All part of any office, work site, or other Project location, including parking lots under the control of the Owner and/or the CM.

Testing Facilities - A laboratory where a specimen can be tested for drugs and alcohol within threshold limits according to standards established by the U.S. Department of Transportation (DOT) and is certified by the U.S. Department of Health and Human Services (HHS) under the National Laboratory Certification Program (NLCP) or in the case of a foreign laboratory is approved for participation by the U.S. DOT with respect to Part 40.

Tobacco Products - Any article containing tobacco, including but not limited to cigars, cigarettes, pipe tobacco, snuff, and chewing tobacco.

Worker(s) – Any individual, salaried or hourly, of any employer who will be performing work on the Project site.

Drug Detection Thresholds

Drug Detection Thresholds will be in accordance with U.S. DOT.

- All confirmatory drug testing shall be done in NLCP-certified facility

Prescription Drugs

- Any worker using a prescription drug, which may impair mental or motor function, shall, as soon as possible, notify their employer who is to notify the CM and/or the Controlling Employer.
- For the safety of all workers, the CM may direct the Controlling Employer to not permit the worker on the Project site until released as fit for duty by the prescribing physician.
- The CM reserves the right to obtain a confirming medical opinion before allowing the worker to return to duty.

Worker Pre-Assignment Testing (per applicable laws)

- All workers, salaried or hourly, who are hired, transferred or temporarily assigned to the Project site shall be required to consent to drug testing in accordance with applicable laws prior to assuming Project responsibilities.
- Controlling Employers shall certify to the CM in writing on company letterhead signed by an officer of the employer that their current workers have passed a drug test ***immediately prior*** to assignment to working on the Project site.

Post- Accident Testing (per applicable laws)

- After an accident or incident, the CM will ask the Controlling Employer to test all those involved.

Reasonable Suspicion Testing (per applicable laws)

- The CM will also ask the Controlling Employer to test workers when a reasonable suspicion exists that the worker has been using drugs or alcohol.
- The maximum level of alcohol blood content shall not exceed 0.08 g/100 ml blood or equivalent.

Random Testing (per applicable laws)

- Urine and/or blood drug screening analysis of workers and others on the Project site may be conducted on a random basis at periodic, unannounced intervals during the construction of the Project, in accordance with applicable laws.

- A minimum of 12% of active employees on site will be selected, at random, for drug screening, or as required per Regional Substance Abuse Program Consortium. Controlling Employers must certify negative test results to the CM; otherwise worker shall not be permitted to return to the Project site.

Discipline and Rehabilitation

- Unless a Project-specific Substance Abuse Policy by the CM or Owner is in effect, each Controlling Employer shall certify that they have a Substance Abuse Policy which incorporates as a minimum the following requirements:
    - When an applicant submits to pre-assignment testing and passes the required test, s/he will be eligible for further employment consideration.
    - If the applicant fails the required test, s/he may reapply for employment consideration after a period of no less than sixty (60) calendar days have elapsed. The CM may waive this sixty-day waiting period if the applicant completes an acceptable drug/alcohol rehabilitation program and presents acceptable proof of completion of the program to the CM. An applicant who fails the second test will not be considered for employment at the Project site for a period of no less than one year.
    - All workers who refuse to submit to a drug and alcohol test, or who fail to pass a drug and alcohol test will be removed from the Project site by the Controlling Employer and will be referred to their personnel management for disciplinary action.
    - A worker on the Project site, facility, or work place in possession of contraband is subject to disciplinary action, up to and including barring from the site by the CM and immediate termination by the Controlling Employer. Contractors and/or workers who are in possession of contraband are subject to removal and denial of future access to the Project site.

Financial Obligation of the Controlling Employer

- The Controlling Employer will bear the cost of time, transportation, and testing for workers who are being given drug and alcohol tests.

Confidentiality

- The CM will take steps to maintain the confidentiality of information generated by the implementation and enforcement of this policy and these procedures.
- Disclosure will be made only in appropriate circumstances. The Controlling Employer shall be responsible for maintaining the confidentiality of all information generated by the implementation and enforcement of this policy and these procedures for their own workers.
- The CM shall have the right to audit compliance with this policy and these procedures by the Controlling Employer, which shall include access to this confidential information.

Training

- Supervisors and management personnel will be trained to recognize appropriate symptoms and to administer the policy in a consistent, confidential, and intelligent manner.

Contractors and Suppliers

- The CM and all Controlling employers will include the provisions of this policy and these procedures, in their contracts with subcontractors, suppliers, consultants, agents, and others involved in providing goods or services on the Project site, and will require that they do the same with respect to their lower-tier contractors, suppliers, etc.

Posting and Distribution

- Significant sections of this policy and these procedures will be given to each applicant and worker upon request.
- A warning notice will be posted in a conspicuous location on the Project site.
- This Substance Abuse Policy will be included in each pre-bid and pre-construction meeting as well as an integral part of the Project Safety Standards and contract documents.
- The CM may revise and amend this policy and these procedures as required.

Procedures for Examination Post-Accident Screening When Required By the CM

- A Controlling Employer supervisor is to accompany an injured employee or those employees involved in the accident or incident involving a worker to the clinic or medical facility.
- Controlling Employers shall certify any worker(s) involved in an accident or incident tested negative for drugs and alcohol prior to allowing them to return to the Project site.
- If the injured worker refuses to give a specimen of body fluid, the Controlling contractor supervisor is to notify the CM. The worker is to be advised, again, that the refusal to submit to drug screening is a violation of the Project Safety Standards, and that refusal will result in removal from the site.
- Results of all drug screenings and analyses must remain strictly confidential.
- Workers must report all injuries immediately to their supervisor, whether the injury requires medical treatment or first aid only.

Random Testing Policy

- Drug screening analysis of workers and others on the Project site may be conducted on a random basis at periodic, unannounced intervals during the construction of the Project, in accordance with applicable laws.
- Controlling Employers shall advise their employee immediately prior to selection for random testing and shall ensure workers submit to drug screening as soon as possible, and no longer than 1 hour from being notified.
- Controlling Employers must certify negative test results to the CM; otherwise, the worker shall not be permitted to return to the Project site.

Third Party Inspections

- In addition to visits and safety inspections by its own corporate or insurance representatives, Contractor is advised that authorized third parties may inspect the Project from time to time. Among others so authorized are Owner's Representatives, insurance companies and OSHA.
- Upon their proper identification and clearance through security, they are entitled to access and courteous consideration.
- The CM must be made aware of their presence upon arrival, and in any case as soon as possible, of the purpose and results of such visits which relate to safety.

Tool Box Training

- Instruction and training of employees is an OSHA requirement and, as such, will be required on this Project. Examples of such required training to be provided by Contractor are:
    - Newly employed, promoted and/or transferred personnel shall be verbally instructed in the safety practices required by their work assignments.
- All work assignments must include specific attention to safety. "Follow-up" monitoring is required in order to prevent accidents.

- OSHA requires that employees performing specific non-routine tasks or operating specific equipment be trained in its usage.
- Training of contractor personnel is the responsibility of the contractor.
- Conduct Tool Box safety meetings for all employees at least once a week.
- Maintain an attendance record by having employees sign the reverse side of the Toolbox Safety Meeting Report, or equivalent form.
- Complete the Report and submit it to the CM Office within 24 hours after each meeting.
- File all toolbox meeting reports and summaries so that they are available for review at any time during Project operations or for a period of five years following termination of the Project.
- It is the responsibility of Contractor to explain the hazards involved in an assignment to all employees, either individually or in a group before they actually begin an assigned task. This task may only require a few words, but in many cases it will require the actual demonstration of how the Project can be done safely and the pointing out of the hazards that may be or will be encountered in any task.

Environmental

Environmental - Asbestos

- OSHA regulations have been promulgated to protect workers from exposure to airborne asbestos fibers.
- Under the Asbestos Control and Licensing Act, a contractor must be licensed by the Department of Labor and the state in which the work is being performed in order to remove asbestos.

Notification

- Before starting asbestos removal work, the United States Environmental Protection Agency (EPA) and the Local Department of Environmental Management must be notified in writing by the contractor and appropriate permits must be on file. The CM and/or its agent will verify this information by way of contract requirements.

Training

- Employees of the contractor must be appropriately trained and licensed prior to the removal of any asbestos contaminated material.
- Any contractor's employees who may be exposed to Asbestos must be trained in the recognition of hazards and appropriate controls.

Posting

- The asbestos material removal area shall be cordoned-off to discourage entry.
- Appropriately worded caution signs must be posted at all approaches to the area at such interval to allow individuals to take any necessary protective steps before entering the removal area.

Asbestos Handling

- The encapsulation, removal and/or disposal of ACM shall be performed by a Contractor licensed to do such work in which the work is being performed and in accordance with all applicable laws and regulations and per approved abatement plans.

Work Practices

- Asbestos containing materials shall be worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the permissible exposure limits.
- Work areas are to be adequately protected, through appropriate type enclosures, so as to ensure that no asbestos contaminated material will be permitted to leave the controlled area.

Personal Protective Equipment

- In instances where re-usable clothing is used, the following precautions must be followed:
  - Contaminated clothes must be appropriately bagged and labeled. Notification and transportation to authorized laundries and haulers.
  - All employees working in asbestos removal areas shall wear appropriate personal protective equipment.

Cleanup

- There shall be no dry sweeping of asbestos material. Use floor coverings to prevent debris from falling to lower floors and to speed up house-keeping.

Labeling and Waste Disposal

- Appropriately worded labels must be affixed to all materials, waste, debris, etc., containing asbestos friable materials. Asbestos waste and/or asbestos contaminated material must be collected and discarded in sealed, labeled, impervious containers by contractor.
- The following label content is acceptable to both the EPA and OSHA:

CAUTION

CONTAINS ASBESTOS FIBERS

AVOID CREATING DUST

BREATHING ASBESTOS DUST MAY

CAUSE SERIOUS BODILY HARM

- The CM shall be provided with copies of all air monitoring reports and certified disposal receipts prior to final payment.

Environmental - Lead

Lead Painted Components

- Lead based paint can possibly be identified on numerous surfaces throughout these facilities. In keeping with the requirements of the OSHA's Lead Exposure in the Construction Industry Standard (29 CFR 1926.62) (OSHA Standdard), every painted surface shall be considered a potential lead hazard.
- A potential source of lead emission is the disturbing of painted surfaces of structures and components within these facilities. Typical activities that would significantly disturb a painted surface include the following:
  - Removal of all or part of the paint by hand or power tools
  - Removal of all or part of the paint by blast cleaning
  - Removal of all or part of the paint by other means such as the use of chemical strippers or a heat gun
  - Structural work to the surface such as welding, burning, cutting, or drilling
  - Manual demolition of buildings, portions of buildings, or the building components.
- The primary consideration when specifying work methods shall be the requirement to protect workers from exposure to lead above the Permissible Exposure Limit (PEL). Further considerations when specifying work methods shall be the effort to reduce the release of lead into the air, water and soil, and to reduce to a minimum the generation of debris.
- At all times when activities which disturb paint are in process, the Competent Person for lead shall have unrestricted access to the work area for inspection, and shall have the authority to stop work when the control measures being utilized are not as specified in this section or the OSHA Standard, if the control measures are not adequately controlling exposures or if other hazards are identified which require work to be stopped.

- All air monitoring conducted by a Competent Person for lead or other qualified representative shall be performed in accordance with the OSHA Standard.
- Detailed and accurate records of all monitoring and other relevant data used in conducting employee exposure assessments shall be kept and maintained in accordance with the OSHA Standard.
- Signs shall be posted in each work area where work on painted surfaces disturbs the paint in such a way so as to expose personnel to lead contaminated dust, debris, or lead fumes. At minimum they shall read:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

- All worker protection requirements will, at minimum, meet the current OSHA Standard. These requirements include but are not limited to:
  - Signage, Barriers & Access
  - Exposure Monitoring
  - Respiratory Protection
  - Medical Surveillance & Records
  - Education & Training
  - Decontamination & Clearance
- All work involving lead removal or re-coating shall be conducted in a manner that minimizes the release of lead and lead containing materials into the air, water, and soil.
- All lead containing hazardous wastes that are generated shall be contained, collected, segregated, labeled and held at a location
- Designated or approved by the Owner or the CM pending the appropriate disposition.
- Contractor shall provide for proper disposal of waste, including EPA identification number, notification, certification, manifest, etc.
- All waste containers must be leak proof and capable of being securely covered.
- **All waste containers shall be clearly labeled with weather resistant labels using indelible ink to identify the type of waste they contain.**

Environmental - On-site Hazards

- Material that is designated as a hazardous substance requires special attention by the Contractor and workers to minimize the exposure.
- A plan addressing the proper handling, storage and disposal of hazardous material must be developed.
- The CM and the Owner must be immediately notified of any hazardous material leak or spill.
- Any Contractor-caused oil spills must be reported immediately to the CM.

Environmental - Silica

- Contractors shall submit their silica protection program for review by the CM prior to the pre-construction conference.

- As a minimum the contractor's silica protection program shall comply with OSHA regulations and shall address the following items:
  - Statement of the contractor's commitment to prevent silicosis and to comply with OSHA's standards.
  - Description of air monitoring to determine the silica levels generated by tasks to provide a basis for:
    - Selecting engineering controls,
    - Selecting respiratory protection,
    - Selecting work practices to reduce dust, and
    - Determining if a medical surveillance program is necessary.
  - Description of engineering controls which are proposed for the Project to eliminate or reduce the amount of silica in the air and the build-up of dust on equipment and surfaces.
  - Description of less hazardous materials than crystalline silica which are proposed for abrasive blasting and automatic blast cleaning machines or tools to be utilized.
  - Description of high-efficiency particulate air filter vacuums to be used by employees and work practices to vacuum, hose down, or wet clean work areas and equipment.
  - Description of warning signs and other barriers proposed to identify work areas where respirable silica may be present and to limit access to only authorized employees.
  - Description of personal protective equipment and clothing to be provided to employees and changing facilities if necessitated by the level of silica dust exposure.
  - Certification of training provided to employees about health effects of silica exposure, engineering controls and work practices that reduce dust, the importance of maintenance and good housekeeping, as well as the proper type and fitting of respirators; and include a statement that the employee is or is not enrolled in a medical surveillance program.

Environmental - Powered Equipment

- If internal combustion engines are used on powered equipment in enclosed areas, the contractor is responsible for monitoring the quality of breathing air for harmful contaminants and adequate oxygen and is responsible for providing adequate ventilation.

Emergency Action Plans and Procedures

Emergency Procedures - Medical Services

Contractor's Responsibilities

- Prior to commencement of work, provisions must be made for prompt medical attention in case of serious injury.
- Each contractor shall have a minimum of one First Aid/CPR trained individual on the Project and inform the CM of their name.
- Ensure that adequate first aid supplies shall be easily accessible when required.
- Provide proper equipment for prompt transportation of the injured person to a physician or hospital, or a communication system for contacting necessary ambulance service.

- Telephone numbers and addresses of the physicians, hospital and ambulance shall be conspicuously posted.
- Contractor shall complete and provide to the CM an "Employer's First Report of Injury" within 24 hours of any/all incidents involving work activities associated with the Project. Contractors are advised to maintain their own OSHA 300 Log as an OSHA requirement.
- Contractor shall ensure that each of its lower-tier contractors meet these medical requirements.
- If the injured employee is released by the doctor for light or restricted work duty, the Contractor shall make available restricted duty work for the injured employee.
- Each occupational illness or injury shall be reported immediately by Contractor's employee to Contractor's first aid attendant and the CM.
- Contractor's first aid attendant or other competent person shall treat the injured employee as often as necessary to ensure complete recovery, or until a decision is made to seek medical treatment.
- Contractor must provide for the prompt transportation of the injured person to a hospital or other emergency facility.
- A representative of the Contractor shall drive the injured employee to the medical facility and remain at the facility until the employee is ready to return.
- Contractor's representative shall carry necessary forms; i.e., authorization slips, return to work notices to the medical facility.
- If it is necessary for the Contractor's first aid attendant to accompany the injured employee, provisions must be made by Contractor to have another employee, properly trained and certified in first aid, available to render same during the absence of the regular first aid attendant.
- If the employee is able to return to the Project site the same day, he/she must return with a statement from the doctor stating same and containing such information as date, employee's name, date of return to regular or restricted duty, date he/she is to return to doctor, diagnosis, signature and address of doctor.
- If the injured employee is unable to return to the Project site the same day, the employee who transported him/her should bring this information back to the Project site and report it to the CM.
- If it is necessary to call the outside medical facility, this call should be made by the CM Project Manager while the injured employee is being transported.
- Medical cases requiring ambulance services would be such cases as severe head injuries, amputations, heart attacks, severe bleeding, stopped breathing, etc.
- Should ambulance service be necessary, the following procedures should be taken immediately:
    - Contact Contractor first aid attendant or nearest employee properly trained and certified in first aid.
    - While first aid is being administered, contact the CM immediately.

Emergency Procedures - Alarms, Fire, Bomb, Weather, Environmental, Public Demonstration

- In order that necessary emergency services may be supplied promptly, each contractor shall post in a conspicuous place a list of emergency telephone numbers along with the type of information to be transmitted for each emergency situation.
- All accidents are to be handled by the ranking person present, with whoever is available to assist.
- The ranking person shall direct someone to notify first-aid personnel, and to call for emergency services as necessary.

- The CM Project Superintendent is to be notified as soon as this can be done without delaying assistance to the injured. He/she will then take appropriate action.
- In accidents resulting in injury to personnel, individuals qualified to administer first-aid will assist the injured, will stabilize their condition, and will arrange for transportation to a hospital if further treatment is required.
- Except when necessary to avoid further injury, or to prevent additional damage to the work, equipment will not be moved, or the position of items, parts, pieces, controls, etc. will not be changed until photographs have been made and notes taken by the CM Project Superintendent or the person designated to make the investigation and report.
- As soon as the CM Project Superintendent can release the area from this constraint, contractors concerned will clean up and make repairs to return to a normal situation.
- Where a specific procedure has not been established, reasonable judgment should be used in determining what course to follow.

Alarms

- The CM shall be notified of all emergencies and notify the appropriate emergency service of the incident and initiate appropriate action.
- Fire alarms within the area of new construction will consist of three short blasts on an air horn or other suitable alarm located at the means of egress, stairway, ladder, or building entry.
- Telephone notification of the fire department will be initiated immediately after sounding the air horn alarm.
- Telephones are available in the Project site office.
- Radio contact with the Project site office and the CM shall be used to inform all concerned regarding the fire.
- A continuous long blast on the air horn may be used to summon first aid assistance in the event of an accident.

Fire

- The following procedures are established in the event of a fire. "RACE"

  R **R**escue... anyone in immediate danger.

  A **A**larm... activate pull station; go to phone and dial 911.

  C **C**ontain... close doors and windows, isolate the fire.

  E **E**xtinguish... use correct extinguisher.

Accident Involving Serious Injury or Death

- The following procedures are established in the event of an accident involving serious injury or death to employees, workers, or members of the general public.
  - Individuals qualified to administer first-aid will assist the injured, will stabilize their condition, and will arrange for transportation to the hospital emergency room if further treatment is required.
  - The CM is to be notified immediately. Immediate notification (within 8 hours) of the local OSHA office is required in the event of a fatality or serious injuries that may lead to a fatality.
  - All non-essential personnel shall be removed and/or kept back from the area.
  - Rescue personnel shall be provided assistance as requested.
  - No comments shall be made. All inquiries shall be referred to the CM Project Manager.

- No on-site photographs are to be taken without the specific approval of the CM Project Manager and the CM Project Superintendent.
- The CM shall make a full investigation and file an Accident/Injury Report within twenty-four (24) hours of the occurrence.
- Within the immediate area of the accident scene, nothing is to be disturbed nor removed after proper evacuation of the injured personnel.
- Except when necessary to avoid further injury, equipment will not be moved, or the position of items, parts, pieces, controls, etc. will not be changed until photographs have been made and notes taken by the CM Project Superintendent or other person designated to make the investigation and report.
- As soon as the CM can release the area from the above constraint, contractors concerned will clean up and make repairs to return to a normal situation.

Property Damage Accidents

- The following procedures are established in the event of accident involving property damage.
  - The CM is to be notified as soon as this can be done without delaying efforts to prevent further damage. He will take appropriate action and direct other personnel to assist as necessary.
  - Efforts shall be taken to protect against further damage where possible.
  - All non-essential personnel shall be removed and/or kept back from the area.
  - No comments shall be made. All inquiries shall be referred the CM.
  - No on-site photographs are to be taken without the specific approval of the CM
  - The CM shall make a full investigation and file an Accident/Injury Report within twenty-four (24) hours of the occurrence.
  - Within the immediate area of the accident scene, nothing is to be disturbed nor removed after proper evacuation of the injured personnel.
  - Except when necessary to avoid further injury, equipment will not be moved, or the position of items, parts, pieces, controls, etc. will not be changed until photographs have been made and notes taken by the CM.
  - As soon as the CM can release the area from the above constraint, contractors concerned will clean up and make repairs to return to a normal situation.

Severe Weather

- The following procedures are intended to prepare the Project site in the event of severe weather conditions.
  - Since severe weather may occur during the Project without advance warning, all work activities and Project site conditions must be planned with a concern for emergency preparations.
  - Each contractor, at the time of mobilization, shall deliver to the CM a complete list of the contractor's supervisors with the complete after-hours telephone numbers. The list shall be kept current and shall be updated accordingly.
  - Each contractor shall insure that his field trailers and his sub-tier contractors' field trailers are anchored in at least three locations.
  - Upon notification of a Severe Weather Watch by the U. S. Weather Bureau, the following actions are to be initiated:
    - Each contractor having on-site, fuel-powered generators are requested to notify the CM of the numbers and wattage. Generators may be needed to provide temporary power for rescue or clean-up activities.

- All materials shall be secured to prevent them from becoming air borne during high winds. Particular attention needs to be given to picking up scrap materials and hauling or covering trash containers.
- Crawler and mobile cranes shall have booms lowered at the end of the shift.
- Cranes not capable of lowering booms shall be permitted to weathervane or free swing. Check to assure that swinging booms will not contact other objects such as power lines, structures, etc.
- Sufficient flashlights, batteries, and bulbs shall be provided to assigned emergency response personnel. A supply of fresh batteries shall be maintained at the Project for use in an emergency response.

Other Major Catastrophe

- Examples of other major catastrophes include, but are not limited to, the following:
  - Major fire.
  - Collapse of large portions of structures or large sections of scaffolds.
  - Heavy damage by wind or floods.
- Local authorities will be provided with an emergency call list to summon the CM's and the contractor's personnel to the site in the event of a major catastrophe outside working hours, on Saturdays or Sundays, etc.
  - The CM Project Superintendent or his best-qualified alternate will cooperate fully with the directives of the local emergency authorities in the event of a major catastrophe. S/he will take any or all of the following actions, as appropriate.
    - Initiate fire fighting, tie down building, etc.
    - Call for assistance from outside: fire trucks, ambulances, electricians, life flight helicopters, Civil Defense Support, police.
    - Stop work.
    - Call for site evacuation, to clear site access roads.
    - Issue instructions to supervisors and to others as necessary.
    - Set up security control at the disaster area.
    - Set up communications center in site trailers: radio/telephone.
    - Call in operators for heavy equipment such as front loaders, cranes, etc.
    - Other actions considered necessary in the particular situation.

Bomb Threat

- When a bomb threat is received or if a suspicious article is found, the CM will take the following actions.
  - Work shall be stopped immediately and the Project and office shall be evacuated of all personnel.
  - A count will be made to assure that all are present.
  - Local police, fire or bomb disposal authorities shall be notified.
  - A search of the site will be made as directed by appropriate authorities.
  - If a suspicious article is found, DO NOT TOUCH IT. Notify the appropriate authorities.
  - Do not allow anyone except authorized personnel to re-enter the area.
  - If necessary to stop or detour traffic away from the affected area, local police or flagmen shall

be utilized.

- No comments shall be made. All inquiries shall be referred to the CM.
- No on-site photographs are to be taken without the specific approval of the CM
- The CM shall make a full investigation and file a report within twenty-four (24) hours of the occurrence.
- If repeated threats occur within a short period of time, the CM will evaluate the situation and take appropriate action. This action may include shutting down the Project site for that day.

Environmental Spill

- In the event of a spill of environmentally damaging materials, immediate response is required to prevent or minimize the impact this event will have upon the environment and the public welfare.
- All personnel shall continue to observe standard precautions for handling the materials as detailed in the manufacturer's product Material Safety Data Sheet (MSDS), including the use of personal protective equipment.
- Where conditions warrant, the contractor shall have emergency spill containment supplies available for immediate use.
- The following general procedures apply to the immediate response which must be initiated:
  - Immediately, all personnel in the immediate area of the release shall be alerted to the hazardous material and the nature of the immediate danger to themselves and the environment.
  - As soon as possible, the CM shall be notified and requested to initiate emergency containment and clean up procedures.
  - The Local Fire Department shall be notified to mobilize their hazardous materials response units and shall be given the necessary information regarding the materials, which were released.
  - If safe to do so, every effort shall be made to contain the materials within berms, by absorbent materials, or through other appropriate means, until proper handling and disposal personnel may be mobilized at the site.
  - Particular attention needs to be taken to avoid contamination of surface water, storm sewers, sanitary sewers, ground, plants and animals.
  - All non-essential personnel shall be removed and kept back from the area.
  - No comments shall be made. All inquiries shall be referred to the CM Project Manager.
  - No on-site photographs are to be taken without the specific approval of the CM Project Manager and the Project Superintendent.
  - The CM shall make a full investigation and file an Accident/Injury Report within twenty-four (24) hours of the occurrence.
  - Within the immediate area of the accident scene, nothing is to be disturbed nor removed after proper evacuation of the injured personnel.
  - Except when necessary to avoid further injury, equipment will not be moved, or the position of items, parts, pieces, controls, etc. will not be changed until photographs have been made and notes taken by the Project Superintendent or other person designated to make the investigation and report.
  - The Owner’s or Rochester City School District (RSCD)’s environmental official shall be notified to initiate the response of available environmental remediation contractors who are under standby contract.
  - As soon as the environmental remediation contractor has cleared the site, the Project

Superintendent will release the area for contractors concerned to clean up and make necessary repairs to return to a normal situation.

Public Demonstrations

- When a public demonstration is expected or occurs, the CM will take the following actions.
  - Work on the Project site shall continue where not encumbered by the public demonstration; however work in the immediate area shall be stopped and all Project employees shall be evacuated.
  - A count will be made to assure that all are present.
  - Local police shall be notified, and all employees shall cooperate fully with the law enforcement authorities.
  - Do not allow anyone except authorized personnel to enter the Project site.
  - All visitor passes are revoked and all visitors shall be escorted from the Project site.
  - If necessary to stop or detour traffic away from the affected area, local police or flagmen shall be utilized.
  - No comments shall be made. All inquiries shall be referred to the Project Manager.
  - No on-site photographs are to be taken without the specific approval of the CM.
  - The CM shall make a full investigation and file a report within twenty-four (24) hours of the occurrence.
  - If repeated public demonstrations occur within a short period of time, the CM will evaluate the situation and take appropriate action. This action may include shutting down the Project site for that day or obtaining a judicial restraining order.

Work Practices

Concrete (Cast-in-place)

- All equipment and materials used in concrete construction and masonry work shall meet the applicable requirements as prescribed in ANSI-A10.9-most recent version, "Safety Requirements for Concrete Construction and Masonry Work."

Confined Space Entry

- Contractor shall develop an entry procedure to be used when Contractor's employees are required to enter confined areas or spaces.
- Confined Space entry procedures will conform to OSHA 1910.146 and the owner’s requirements.
- A confined space entry permit must be completed and posted at the entrance to the confined area.
- Documentation of appropriate formal training for all involved in the confined space activity (entrants, attendants, supervisor, and rescue personnel) shall be submitted to the CM for approval prior to any entry.

Crane Safety and Rigging

- The Contractor shall conform to the more stringent of Federal, State, local, client or CM safety policy.
- Contractors whose activities require the use of cranes shall be responsible for their proper set up and operation and shall advise the CM prior to the arrival on-site.

- The contractor shall supply the CM with documented evidence of their competent person's training, and of their 'qualified persons', as required by 1926.1404, 1926.27, 1926.1428, and where specified in 1926.1400, including the Operators, Riggers, Signal Persons, and 'Assembly/Disassembly Director.
- The Assembly/Disassembly Director shall be responsible to ensure that all provisions of safety as specified in 1926.1404 are met including but not limited to: adequate site and ground bearing conditions, proper blocking and cribbing, knowing load weights and center of gravity, equipment capacity, support of booms and counterweights, rigging of boom and suspension systems, determination of safe wind speeds, etc.

Inspection

- Inspections are required pre- and post-assembly in the configuration that the crane will be used, as well as in severe service and after adjustment or repair, for each piece of equipment.
- Contractors shall provide the CM evidence of annual inspection by a third-party inspection agency not under the control or ownership of the crane owner and approved by the CM Safety Manager.
- All repairs and adjustments noted on the inspection shall be corrected prior to next use. 'Temporary alternative measures' as specified within OSHA regulations will not be accepted.
- This applies to power-operated equipment used in construction that can hoist, lower and horizontally move a suspended load, as specified in 1926.1400.
    - Such equipment includes, but is not limited to: articulating cranes (such as knuckle-boom cranes); crawler cranes; floating cranes; cranes on barges; locomotive cranes; mobile cranes (such as wheel-mounted, rough-terrain, all-terrain, commercial truck-mounted, and boom truck cranes); multi-purpose machines when configured to hoist and lower (by means of a winch or hook) and horizontally move a suspended load; industrial cranes (such as carry-deck cranes); dedicated pile drivers; service/ mechanic trucks with a hoisting device; a crane on a monorail; tower cranes (such as fixed jib ("hammerhead boom"), luffing boom and self-erecting); pedestal cranes; portal cranes; overhead and gantry cranes; straddle cranes; side-boom tractors; derricks; and variations of such equipment.
- Inspections shall be performed by a qualified person designated by the contractor in accordance with 1926.1412, 1926.1413, and the manufacturer's recommendation and ANSI B30 Standard for the type of crane being inspected and the most current version.
- This inspection shall be completed prior to each shift starting work, as well as when equipment is modified, repaired or adjusted, post assembly, monthly, annually and in conditions of severe service.

Operation

- This certification will be for each crane and lifting device and associated rigging equipment brought onto the site.
- At least every 12 months, or if the crane or its associated rigging has sustained any incident which may have resulted in damage, in cases of severe service, or after if any repair or modification the crane and its associated rigging shall be fully re-inspected by a qualified person in accordance with OSHA regulations, with proof of inspection provided to the CM.
- No work shall proceed without evidence of a current annual inspection meeting the CM's requirements.
- No claims will be accepted for losses sustained by the contractor for delays caused by failure to comply with these requirements.
- Temporary alternative measures for safety devices or operational aids will not be accepted.
- Safety devices, including but not limited to: crane level indicator, boom and jib stops, foot pedal locks, check valves on hydraulic outrigger and stabilizer jacks, and horns, must be in proper working order before equipment operations can begin- temporary alternative measures are not permitted to be used.
- Operational Aids, including but not limited to: boom hoist limiting device, boom angle indicator, load radius indicator, luffing jib limiting device, anti two-blocking device, load weighing device (such as a

load moment indicator), and outrigger stabilizer position monitor must be in proper working order-temporary alternative measures are not permitted to be used.

Special Procedures

- A lift procedure shall be developed by the Contractor's qualified person, and overseen by the Contractors qualified and competent Assembly/disassembly director for the following and submitted to the CM prior to the lift taking place:
    - Critical Lift (defined as when lifting a load where the weights are at or over 75% of the rated capacity of the crane and rigging as determined by the manufacturer).
    - Multi-Crane Lift.
    - 100 Tons or greater Lift.
    - Any application that deviates from the manufacturers recommendations.
    - When special or unique hazards are under or adjacent to the load at any time during the lift.
    - When the CM determines such a procedure is necessary.
- The Lift Procedure will include a Hazard Analysis developed by the Contractor and submitted to the CM along with Pre-Lift meetings, which shall be held at 30 days prior to the lift, the day prior to the lift and immediately prior to the lift with the actual workforce doing the lift.
- All concerned parties must be present for the meetings with minutes of the meeting recorded by the CM.
- The Lift Procedure will include documentation of calculations which incorporates weight deductions of all rigging equipment, a load chart for the crane(s) that will be used, a site plan and layout sheet which will include the path of travel of the load, swing radius protection and any other necessary factors.

Record Keeping

- All records pertaining to crane inspections shall be kept with the crane or in the trade contractor's site field office in accordance with applicable OSHA regulations.
- If during any safety inspection, the operator or supervisor cannot produce the required crane inspection sheets, the crane shall be shut down as soon as possible and shall be inspected.
- Where crane operators are required to be licensed by the State where the Project is being built they shall have a current license and provide a copy to the CM when requested.
- Duplicates of Certification records shall be maintained on Project site by Contractor and made available to the CM upon request.
- The contractor shall provide evidence of competency of the operator to the CM.

Rigging

- Only qualified riggers shall perform rigging operations.
- A Competent Person appointed by the Contractor shall inspect all rigging equipment. Inspection shall be done and documented prior to each shift starting work, monthly and annually in accordance with 1926.1413. If there are any deficiencies in equipment, it shall be removed from service and corrected or replaced per manufacturer's criteria.
- All rigging equipment that is defective or damaged shall be immediately removed for the Project site.
- Chain slings are not permitted to be used for any lifting operation unless specifically designed for a unique application.
- Wire rope slings shall bear a legible manufacturers capacity tag.
- Tag lines shall be used on all loads.

- All hooks used for overhead lifting shall be equipped with safety latches or alternate lifting methods such as clamps will be used. Shake-out/sorting hooks may only be used for unloading materials from trucks and will not be used for overhead lifting.

Signals

- The contractor shall appoint a qualified and trained signal person that meets the definition of 1926.1428 c and 1926.1430
- When hand signals are used, only the standard method for signals shall be used 1926.1400 App A.
- Operator and signal person shall meet prior to hoisting lifts to confirm understanding of signals.

Operator Qualifications

- The crane operator(s) shall be proficient in the operation of the crane(s) and licensed in the State/City where the operation is being performed, or—outside of NYC—certified by an accredited crane operator testing organization, such as the National Commission for the Certification of Crane Operators (NCCO), or by an audited employer program developed by an accredited crane operator testing organization and audited by a third party qualified auditor.

Power line Safety

- Crane and rigging operations are not permitted within 20 ft of power lines unless the power lines are de-energized and confirmed by a qualified utility company representative.
- Where encroachment is required within 20 ft from power lines in accordance with 1926.1408, Table A
    - A planning meeting shall be conducted with the assembly/Disassembly director, operator, crew and other workers in the area to review steps to prevent encroachment
    - Tag lines must be non-conductive
    - Dedicated spotters shall be used
    - Proximity alarms or range control warning device shall be used

Demobilization

- The Project Superintendent and each contractor shall organize and schedule the orderly removal of their Project site offices and trailer facilities, the termination of temporary utility services, the transfer of telephone services to their offices, and the forwarding of mail.
- The site shall be left in the conditions specified by the contract documents.
- The Project Superintendent shall inspect the site with the Owner to verify that all permanent security and safety devices are in place and performing their intended function.

Demolition

Structural Demolition

- An engineering survey shall be completed before the start of demolition.
- All structural shoring shall have stamped drawing and calculations by a registered Professional Engineer.
- Areas being demolished must be secured by means of barricades to prevent unauthorized personnel from entering the area.
- Subcontractors must submit, prior to the start of construction, a detailed demolition plan to include, means and methods, related drawings, and other relevant safety plans.

Dust & Infection Control

- All debris containers must be covered before being removed from the construction area.
- All temporary partitions that are installed must have a fire rating equal to that which they are replacing and at least 2-hours in all cases.
- All temporary partitions shall be installed deck-to-deck and taped to prevent dust transmission.
- Construction areas must maintain negative air pressure. To accomplish this, the use of portable HEPA-filtered air machines may be used. When using the Projects ventilation system, approval from the CM is required.
- Routes shall be established for the removal of debris and movement of materials through occupied areas of Project.
- Walk-off mats or other means shall be used at construction entrances to prevent dust and other foreign matter from being tracked throughout the Project.
- Doors and entrances shall have bottom floor-sweeps installed.
- Where solid partitions of plywood or drywall are not possible, fire resistant polyethylene shall be used or fire-resistant tarps. All seams will be duct taped and dust proof entrances used.
- Appropriate signage will be posted at construction entrances.
- Powered hand tools shall be of the dust collecting type.
- All concrete and block shall be wet cut.
- Housekeeping must be performed on a continuous basis.
- Eating and smoking are not allowed inside the construction work areas.
- Temporary toilet facilities must be provided with adequate hand washing facilities equipped with towels and hand soap.

Interim Life Safety Measures

- Interim life safety measures shall be coordinated with the school before construction starts.
- This should include re-routing of fire escapes, signage requirements, fire exits, area mapping, and local fire marshal approval of the plan.
- Fire protection plan shall include – Hot work permits, fire watch, provisions for protection when sprinklers, smoke, and heat detectors are inactive, storage of compressed gas cylinders.

Electric - Temporary

- All electrical work, installation and wire capacities shall be in accordance with the pertinent provisions of the National Electrical Code (most current version), ANSI and OSHA Standards.
- All 120 volt, single phase, 15 & 20 amp temporary power circuits (with the exception of temporary lighting) shall have ground fault circuit interrupters installed.
- In addition all tools, cords and power sets shall have an assured equipment inspection program maintained on quarterly basis.
- The color codes used for identifying inspected & tested equipment on this Project are:

▪ January, February, March	▪ White
▪ April, May, June	▪ Green
▪ July, August, September	▪ Red

- October, November, December
- Orange

- (NOTE: The cycle of colors is repeated for the next year)
- Portable tools will have the appropriate color code affixed to the male (plug) end following inspection.
- Extension cords will have the appropriate color code affixed to both ends (plug & receptacle). The previous quarter's color code will be removed to avoid confusion.
- When using permanent power, once established in new construction or in renovation work, Ground Fault Circuit Interrupters must be used in conjunction with the AEGC inspections.
- All necessary open wiring must be made inaccessible to unauthorized employees or visitors and not be subject to damage.
- Open wiring is NOT acceptable for temporary lighting circuits.
- Lighting on barricades, fences, or sidewalk coverings shall be encased in metal raceway.
- Temporary lighting must have guards to prevent accidental contact with the bulb except where the bulb is deeply recessed in the reflector.
- Temporary lights shall not be suspended by the cord unless the fixture was specifically designed in that manner.
- Portable electric lighting used in moist or other hazardous locations such as drums, tanks, vessels, bins, bunkers, etc., shall be operated at a maximum of 12 volts (non-explosive).
- All shop lighting and portable task lighting shall have a cover and guard installed when in use or available for use.
- Extension cords used with portable tools must be of a heavy-duty 3-wire type. Flat extension cords are prohibited.
- Damaged electrical cords shall not be used.
- All extension cords will be suspended seven feet (7') above finish floor or work platform. Extension cords will not be fastened with staples, hung from nails, or suspended by non-insulated wire.
- All non-current carrying parts of electrical equipment must be grounded or have an approved double-insulated setup.
- Grounded circuits must have enough capability to carry all currents likely to be imposed on it.
- Contractor shall determine before operations start if there is any energized equipment or electrical circuit in the work area, which might have risk to the worker.
- Equipment and conductors that must be de-energized shall be identified to the CM who will arrange to de-energize the equipment under the Lockout and Tagging procedure/system.
- Contractor shall use the Project Lockout/Tagout procedure and strictly adhere to the use of this requirement. CM will monitor adherence to the procedure on a regular basis.
- All temporary power panels shall have covers installed at all times. All open or exposed breaker spaces shall be adequately covered, and labeled.
- All electrical equipment and wiring in hazardous locations must conform to the National Electrical Code standards.
- The frames of all cutting, welding (arc, heli-arc, gas-plasma-arc) machines shall be grounded.
- Fish tapes or lines made of metal or any other conductive medium are prohibited. Nonconductive tapes and lines will be used in their place.
- All temporary wiring shall be effectively grounded in accordance with the National Electrical Code (Articles 305 and 310).
- All wiring used for temporary lighting shall be in accordance with the most recent NEC.

- Defective Electrical Tools and Equipment - All electrical tools and extension cords found to be defective (Examples: missing or broken ground pins, exposed internal conductors) will immediately be rendered in-operative by cutting off the plug end or by immediately removing from the Project.
- Electrical work (e.g. tie-ins, panel maintenance) shall be conducted only on de-energized (locked out and tagged out) systems.
- All circuit disconnects must be locked in the open position or otherwise appropriately identified with affixed tags stating "DANGER - DO NOT ENERGIZE" or other equivalent wording prior to working on the system or equipment.
- Employees are not permitted to work on any energized circuits unless conditions mandate and written approval is obtained from the Regional Safety Manager.
- The pre-task planning for all work on energized systems must be submitted for review.
- Additionally, work practices must conform to all applicable owner, state and federal requirements including the NEC and the most recent version of NFPA 70E.

Elevated Work (Other than Fall Protection)

Ladders

- Manufactured ladders on the Project shall comply with the regulations of ANSI-A14.1-1968 (or most recent version), Safety Code for Portable Wood Ladders or ANSI-A14.2-1972 (or most recent version), as required by OSHA.
- All ladders shall be used in the manner and for the purposes for which they were designed and constructed.
- The side rails or extension shall extend 36 inches above the landing. When this is not possible, grab rails shall be installed.
- All ladders in use shall be tied, blocked, stabilized by a second worker or otherwise secured to prevent accidental displacement.
- When working on/from a ladder at elevations greater than six (6') feet or more above the work surface, all ladders (including stepladders) must be tied, blocked, stabilized by a second worker or otherwise secured against accidental displacement.
- Where adequate anchorages are available, workers shall tie off using a Personal Fall Arrest System or utilize a different means of gaining access (i.e., scissor lift, scaffold, etc.).
- Portable metal ladders shall not be used.

Scaffolding

- All employees erecting, using and dismantling scaffolds shall be trained in the hazards present and the safe procedures to be followed to eliminate exposure to those hazards and shall be provided with fall protection when 6-feet or more above the next lower level.

Concrete and Masonry

- All equipment and materials used in concrete construction and masonry work shall meet the applicable requirements as prescribed in ANSI-A10.9-1970 (or most recent version)"Safety Requirements for Concrete Construction and Masonry Work."

Stairways

- Upon delivery to the Project site all office trailers and material storage trailers shall be provided with stairway access to all doorways and shall have landings with railings which allow for at least 20 inches

of clearance in front of any door swing.

- Stairway placement shall follow placement of the upper floor deck as soon as practical.

Hoists and Elevators

- Temporary personnel elevators and material hoists shall be constructed, installed and maintained in compliance with the manufacturer's instructions and the provisions of applicable statutes and regulations of governing authorities.
- No elevators or hoists are to be used for the movement of materials and personnel until the devices have been certified and licensed by a third party inspector qualified to approve the equipment.
- No person shall be allowed to ride on a material hoist except for the purposes of inspections and maintenance.

Elevated Work - Fall Protection

- A Fall Protection Plan must be developed by the contractor for all work with a fall exposure greater than 6-feet with a copy provided to the CM prior to start of work.
- “Controlled Access Zones”, “Safety Monitoring”, and “warning Lines” are not permitted.
- Personal Fall Arrest systems shall be worn and used by all workers when working six (6') feet or more above the ground/floor or whenever working in a precarious position, unless other adequate fall protection such as guardrails or safety nets are provided.
- All lanyards are to be as short as possible, but in no event longer than six (6') feet. Shock absorbing lanyards must be used unless a Self-Retracting Lanyard is in use. Wire rope lanyards are prohibited unless approved by the CM.
- Personal Fall Arrest System shall also be worn and attached to the manufacturer’s approved anchorage when working in aerial lifts and to vertical drop lines when working from suspended scaffolding.
- Only one individual shall use a vertical safety lines at a time.
- When wire rope is used as a guardrail providing fall protection, *please refer to the* ‘Perimeter Protection’ section within this Safety plan for design and installation details
- When wire rope is used as a horizontal lifeline, it shall be designed by a registered Professional engineer and installed and maintained by a competent person. It shall be designed, installed and maintained to meet, at a minimum, the requirements of OSHA as contained in 29 CFR 1926.502.
- To eliminate the potential of a fall when working on a flat roof or deck, a warning barrier meeting the following requirements may be used 15 feet from the fall hazard. If a worker is between the warning barrier and the fall hazard, a positive means of fall protection must be used.
    - Warning tape is not allowed as a warning barrier.
    - Warning barriers shall consist of ropes, wires, or chains, and supporting stanchions erected as follows:
    - The warning barrier rope, wire, or chain shall be flagged at not more than 6-foot (1.8 m) intervals with high-visibility material;
    - The warning barrier rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.9 m) from the walking/working surface and its highest point is no more than 39 inches (1.0 m) from the walking/working surface;
    - After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 N) applied horizontally against the stanchion, 30 inches (.8 m) above the walking/working surface, perpendicular to the warning line, and in the direction of the floor, roof, or platform edge;

  - The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (2.22 kN), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions as prescribed in paragraph (f)(2)(iii) of this section; and
  - The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.
- Steel Erection - Refer to Section entitled “Steel Erection”.
- Precast/Prestressed Concrete - Refer to Section entitled “Architectural Precast Concrete”.

Elevator Safety

- Contractor shall comply with all applicable provisions of OSHA, and ANSI, as well as the National Elevator Industry Inc., Field Employees Safety handbook.

Excavation

- The contractor must designate a competent person trained in soil classification and the recognition of trenching and excavation hazards. This person must be on-site when excavating or trenching is being done.
- Appropriate documentation to meet the OSHA trenching and excavation standards is to be maintained on site.
- Where protective systems as defined in 29 CFR 1926.650-652 are designed by a licensed Professional Engineer, who is not a regular CM employee, the resulting design documents must be reviewed by the CM prior to the commencement of the work to assure that the documents set forth the accurate and complete assumptions (as set forth in the current applicable contract specifications) upon which the design is based.
- Prior to opening any excavation or trench an excavation permit from the CM is required. Contractor shall notify necessary personnel to determine whether under-ground installations; i.e. sewer, telephone, fuel, electric lines, etc., may be encountered and where they are located.
- Excavation permits shall be required on a daily basis while the excavation is open.
- Trenches 4 feet and over in depth or presenting a hazard to the worker shall be shored or walls cut back to protect employees from cave-in.
- All trenches and excavations shall be properly barricaded to prevent persons from walking into them.
- When an excavation will remain open longer than one work shift, a barrier sufficient to protect people from falling into the excavation or erected at a minimum of 6-feet from the excavation in order to warn of the fall hazard must be erected and maintained for the time duration that the excavation remains open.
- Excavation contractors will provide a spill kit for use on site in the event of a hazardous material spill.
- Drilled caissons will have fall protection provided both during and upon completion of the drilling by use of personal fall protection, guardrails or use of casing extending a minimum of 42 inches above the ground.

Personal Protective Equipment

- All job hazard analyses designed to meet the contractors’ scope of work and included in the contractors’ site specific safety plan or additions thereto shall include a description of all required personal protective equipment for each crew member of every task identified. This list of required

personal protective equipment shall be updated or modified based on a review of the Daily Safety Task Assignment by the crew and its' supervisor to mitigate exposure to previously unidentified hazards.

- Appropriate eye protection meeting the requirements of ANSI Z87 (most recent version) with side shields are required to be worn in a manner to protect the eyes while in construction areas at all times.
- In addition, approved eye and face protection is required as follows:
- Goggles, welding hoods and shields, or face shields will be required to be properly worn at all times when in the area of operations, such as when welding, burning, grinding, chipping, chemical handling, corrosive liquids or molten materials, drilling, sawing, driving nails, power actuated tools, concrete pouring, tampers and gasoline fueled hand operated equipment (i.e. chain saws). This section will also apply to those employees of Contractors who are assisting any worker as an apprentice or helper.
- Prescription glasses must meet the requirements of ANSI Z87 (most recent version), or be covered with over-the-glass safety glasses or face shield.
- Hard hats must have the suspension aligned with the user's head as designed by the manufacturer and may not be worn over other hats or caps such as baseball caps.
- When exposed to welding radiation, appropriate eye shade protection attached to the hard hat is required for the welder. Welding operations shall provide for the protection of others from unintentional exposure to radiation by strategically locating welding shields..
- Chaps designed for use while using a chain saw as well as hearing protection, appropriate gloves, and face shields are required for any work involving chain saws.
- Hand Protection.
    - Gloves of appropriate design and construction are a requirement whenever exposure to hand injuries and/or lacerations is likely to exist.
    - Typical hazards include but are not limited to chemical skin absorption, heat/cold, laceration, punctures, biological contaminants and/or irritants, abrasion, and chemical burns.
    - The contractor will review all relevant MSDS, past injury experience, professional industry organizations' recommendations and publications, vendors' literature, best practices, and their own job hazard analyses to determine exactly which glove is correct protection for the hazard identified and require their use whenever an employee is exposed to the hazard.
    - General requirements. Employers shall select and require employees to use appropriate hand protection when employees' hands are exposed to hazards such as those from skin absorption of harmful substances; severe cuts or lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.
    - Selection. Employers shall base the selection of the appropriate hand protection on an evaluation of the performance characteristics of the hand protection relative to the task(s) to be performed, conditions present, duration of use, and the hazards and potential hazards identified.

Fire Protection

- Contractor shall be responsible for fire protection in its work and operational areas, including offices, tool rooms, and storage areas twenty four (24) hours per day, seven days per week through the duration of this Contract.
- The contractor, as required by OSHA and the local fire protection code, must provide appropriate fire suppression equipment.
- The contractor will provide for a fire watch trained in the use of fire extinguishers throughout the hot work and at least one half hour after the hot work has ceased.

- Additional fire watches may be required if the possibility exists for sparks, slag, embers, etc. to travel to adjacent rooms or floors below the hot work.
- At a minimum 20 pound multi-purpose ABC extinguishers are allowed on the Project.
- Only safety containers approved by UL and the local Fire Marshall, and properly labeled as to their contents, are to be used for handling and/or storage of flammable liquids in quantities more than one gallon.
- All tarpaulins and plastic used for temporary covers shall be of fire resistant manufacture.

Hazard Communication Program

- The Occupational Safety and Health Act (OSHA) requires that each employee potentially exposed to hazardous chemicals be advised of the potential hazards and how to guard against those hazards.
- Each contractor whose employees are potentially exposed to hazardous chemicals must develop a list of all such chemicals used on the Project; gather material safety data sheets (MSDSs) for those materials; develop a labeling system for all materials; and train all potentially exposed personnel in the hazards and their controls for all listed compounds.
- These steps are outlined in detail in the following material.
- Employee training for this requirement will be documented and acknowledged by signatures following each session.

Material Safety Data Sheets (MSDS)

- Every contractor will be responsible for development and maintenance of a list of hazardous chemicals utilized within the Project operations and will be further responsible for obtaining and maintaining MSDS's for all such hazardous chemicals.
- Employees will be allowed access to this information and the specific MSDS for chemicals utilized in their work areas.
- All questions relating to the program should be directed to the contractor's superintendent or safety representative.
- A copy of each MSDS will be delivered to the CM prior to work starting involving that substance.

Employee Information and Training

- All new and present employees will be given information regarding the requirements of the Chemical Hazard Communication Program; the hazardous chemicals present in their work place; and the physical and health risks of these chemicals.
- This training may be met through orientation sessions for new employees, and refreshers for all during toolbox talks. The information and training will also include the following elements:
    - The symptoms of overexposure to the chemicals.
    - How to determine the hazardous presence or release of a chemical in the work place.
    - Methods to reduce or prevent the exposure to hazardous chemicals, such as control procedures, work practices, or personal protective equipment.
    - Procedures to follow in the event of an exposure to hazardous chemicals. The location of the log containing the MSDS's, which apply to their work place and the location of the written Chemical Hazard Communication Program.
    - How to review MSDS's to obtain the hazard information for the chemical, and how to read the labels, which are required on the chemical containers. When a new hazardous chemical is obtained for use, each employee who could be exposed will be given the information and

training as described above, and a copy of the MSDS's for the chemical will be obtained and distributed to those who actually use the chemical in the work place. The MSDS's will be available to all employees during each work shift.

- Proper disposal procedures of waste materials shall be enforced. Labeling of waste containers and disposal of all hazardous materials by a licensed disposal facility is required.

Container Labeling

- All chemical containers at the site must be clearly labeled as to the contents, the hazards involved, and the name and address of the manufacturer.
- All secondary containers of hazardous chemicals are to be clearly labeled with the same information as the original container.
- Each contractor's superintendent or safety representative shall perform the above responsibilities for all their materials.

Hazardous Non-Routine Tasks and Nearby Work

- In the event an employee is assigned to perform, or is assigned to work in an area where a hazardous task, non-routine to their work, the employee will be given the additional information and training related to the hazardous chemicals which may be encountered in the non-routine task.
- The first-line foreman, contractor superintendent, or contractor safety representative will provide this information and training.
- The information will include the specific chemical hazards of the task, the controls and protective measures required, the types of personal protective equipment required, how to use the equipment, the nature of other work being performed in or near the non-routine task, and what emergency procedures are involved with the task.

Demolition

- To the best of the Owner's knowledge, there is no asbestos, lead, polychlorinated biphenyl (PCB), or hazardous materials anywhere in the designated work areas. AIA-A201 Subparagraph 10.1.2 applies: Contractor shall stop the Work if material reasonably believed to be asbestos, lead, polychlorinated biphenyl (PCB), or hazardous materials is encountered in the Work area.

Chemicals in Unlabeled Pipes, Vessels and Containers

- To ensure that employees who work on unlabeled pipes, vessels or containers have been informed as to the hazardous materials contained within, the following policy has been established:
- Prior to starting work on unlabeled pipes, vessels or containers, employees are to contact their foreman for the following information:
  - Type of chemical in the pipe, vessel or container.
  - Potential hazards.
  - Safety precautions which should be taken.

Audit and Review

- It will be the responsibility of each contractor's superintendent and safety representative to review the entire Hazard Communication Program, and to revise and update the material contained herein to reflect all changes in the purchase, use, storage, and handling of hazardous chemicals at the Project site.

- It will be the further responsibility of the superintendent and safety representative to periodically audit that procedures in the use of the hazardous chemicals meet the requirements as set forth in the MSDS's.

Housekeeping

- **On a daily basis**, all debris and scrap material shall be removed from the work area.
- Debris and other loose materials shall not be allowed to accumulate in stairwells.
- Containers shall be provided for the collection and separation of waste, trash, oily and used rags and other refuse. Metal (dumpster type) containers must be used and emptied promptly.
- Garbage and other waste shall be disposed of at frequent or more regular intervals in a manner approved by the CM.
- Contractor shall notify the CM of any hazardous waste it will generate during performance of the Work.
    - Contractor has the direct responsibility of maintaining proper storage of these wastes while on site and will verify to the CM in writing that the wastes have been disposed of in a legal manner.
    - A copy of the haulers manifest must be provided to the CM.
- Contractor shall not pour, bury, burn, nor in any way dispose of a chemical on the work Project site.
- Contractor shall clear all combustible debris to a solid waste disposal Project site properly licensed under the laws of the State having jurisdiction.
- NO OPEN BURNING OF DEBRIS, OR RUBBISH WILL BE PERMITTED ANYWHERE ON THE PROJECT SITE.
- NO SMOKING OR TABACCO PRODUCT USE ON CONSTRUCITON SITE.
- Materials and supplies shall be stored in locations, which will not block access-ways, and arranged to permit easy cleaning of the area.
- In areas where equipment might drip oil or cause other damage to the floor surface, a protective cover of heavy gauge, flame resistant, oil proof sheeting shall be provided between the equipment and the floor surface sheeting so that no oil or grease contacts the concrete. This requirement is applicable to both finished and unfinished floors.
- All hoses, cables, extension cords, and similar materials shall be located, arranged and grouped so that they will not block any access-way and will permit easy cleaning and maintenance.

Interim Life Safety Matters for Occupied Facilities

Specific Measures

- Whenever construction affects the facility's ability to accommodate occupants (either because of disruption of services, interruption of normal operations, or when hazards are present), it will become necessary to implement interim life safety measures, as follows:
    - Ensure that all exits are clear. This includes areas directly affected as well as all other exits.
    - Ensure that there is free access to emergency services, that vehicles, material, etc. are not blocking the access route.
- Disabling of fire protection systems. A small disaster could escalate if the fire protection system is not functional. Care should be given to provide an alternate system while the primary system is off-line. This includes scheduled maintenance, upgrade, repairs, or adding of coverage resulting in disabling system, and disabling system to allow maintenance or repairs to be completed on other systems (e.g.

hot work).

- Fire alarm, detection, and suppression systems must not be impaired. A temporary (but equivalent) system shall be used if the system is impaired. These temporary systems must be tested monthly.
- Temporary construction partitions shall be smoke tight and noncombustible. Adequate signage shall discourage casual observers from opening or entering the partitions.
- Additional (double) fire-fighting equipment must be provided, as well as personnel trained in its use.
- Smoking is prohibited on this Project in and adjacent to all construction areas. Strict enforcement must occur.
- Construction site shall be kept clean and orderly. This includes material piles, debris, platforms, and break areas.
- Hazard surveillance of sites shall be increased and documented. Attention is to be given to evacuation routes, construction areas, storage, office/lunch areas, and fuel storage.
- Whenever the safety of an adjacent area is compromised because of construction, staff shall be informed. Alternate exit routes shall be identified.
- Facility-wide education programs are conducted explaining interim life safety matters and current life safety deficiencies.
- The construction site must be restricted from all but authorized staff. Adequate signage shall be provided.
- Alternate access must be provided for public and emergency traffic whenever disruption occurs.
- Policy and procedures must ensure that roads and pathways are clear of mud, debris, materials, etc.
- Proper notification must be made to local authorities (fire, police, other) whenever life safety is diminished.
- Governing body shall be kept apprised of status of life safety during Project.
- Construction workers must be made aware of egress routes.
- Construction workers' egress routes must be inspected daily to ensure no obstacles.
- Effective storage, housekeeping, and debris-removal policies and procedures must be in place to reduce collection of combustibles in construction areas.
- Whenever fire zones are altered, the owner's staff will be informed in regard to new or different life safety measures regarding their changed configuration and fire safety.

Line Break

- This section refers to any entry into an operating Process System under installation, testing, or operating conditions and is subject to the procedures for "line breaking".
- All employees are to be informed of the inherent dangers of working on operating process systems.
- Entries can be made only with approval of the Owner and the CM.
- Added hazard potential exists when cooling occurs, vacuums, which may be holding liquids in pockets often break without warning and liquid is released to run to the lowest point. Plugs (particularly solidified process materials) can move and release materials after the first connection is broken.
- The Owner and the CM must agree on the location of first breaks
- All systems must be considered as having the potential to discharge contained energy/material from open ends of lines or broken flanges at any time even after the line has been drained and vented.
- No Contractor may enter an operating piping system or equipment until the requirements of this procedure are met. Systems activated for testing purposes fall under this procedure.

- Under no circumstances will any line/system be violated other than via the lock and tag procedure.

Lockout/Tagout Procedures

- The contractor must adhere and strictly follow either the Project Lockout and Tagout requirements, the Owner or CM's requirements, if any, or the contractors own requirements, whichever is the most stringent.
- Electrical work (e.g. tie-ins, panel maintenance) shall be conducted only on de-energized (locked out and tagged out) systems.
- All circuit disconnects must be locked in the open position or otherwise appropriately identified with affixed tags stating "DANGER - DO NOT ENERGIZE" or other equivalent wording prior to working on the system or equipment.
- Employees are not permitted to work on any energized circuits unless conditions mandate and written approval is obtained from the Regional Safety Manager.
- The pre-task planning for all work on energized systems must be submitted for review.
- Work practices must conform to all applicable owner, state and federal requirements including the NEC and the most recent version of NFPA 70E.

Lockout Devices

- Only individually keyed padlocks shall be used. Padlocks are to be painted per the craft color code for easier detection and craft identification.
- A lockout device of the standard scissor type that will allow the placing of more than one padlock is required, when more than one individual is working on a circuit or mechanical process.
- A piece of chain or cable may be necessary to complete a lockout on some valves or controls and shall be used wherever needed.

Danger Tags

- 'Danger Tags' are not 'Danger Signs', and shall not be used where a sign is needed.
- Two standardized Danger Tags shall be used on this Project. They are described as follows:
  - "DANGER - DO NOT USE": This tag must be attached to each padlock on a lockout.
  - "UNSAFE - DO NOT USE": This tag does not require an attachment to a padlock, but may be used if needed. This tag shall be used to identify tools, equipment, vehicles, etc.

Procedure

- If device, valve, switch, or piece of equipment is locked out, a "Danger Tag" shall be attached.
- No device, valve, switch or piece of equipment shall be operated with a "Danger Tag" and/or lockout attached regardless of circumstances! ! !
- Systems consisting of electrical components will be checked, locked and tagged first by electrical craft employee working on the circuit.
- The electrical craft will be the first lock on, and the last lock off.
- Where placing of lock is not feasible, the circuit conductor will be disconnected from the breaker and tagged out.
- The panel cover must be of the type that will cover all breakers when closed and must be equipped with a hasp in order to secure a lock to prevent the panel door from being opened.
- If panel cover is of a type that cannot be locked closed, a cover must be secured over the panel cover and be locked closed and tagged while any work is being performed on any of those circuits.

- If the above cannot be accomplished, each circuit will be tagged out as prescribed and an electrician will stand by the panel board to prevent breakers from being tampered with. This physical presence will continue daily until the work is complete.
- All "Danger Tags" must be dated and signed. Also on tag, must be the intended work and equipment for which tag has been placed.
- If employees of more than one craft or crew are to work on a system, circuit, machinery, or component, the supervisor from that craft shall place his individual lock and tag; and verify that the system, circuit, machinery or component being tagged, is indeed the system that is to be worked on.
- Only the person that placed the lock and tag shall remove it without special authorization from the Project Manager, Construction Manager or Craft Superintendent.
- Padlocks, Lockout Devices and "Danger Tags" shall be made available as specified above.
- Padlocks shall be color coded for craft identification and shall only be used by that craft for lockout purposes, i.e. valves, switches, electrical components, etc.
- Padlocks shall be issued from the contractor responsible where a sign in/out log will be maintained. Locks and tags shall be issued to the foremen or supervisor responsible for the craft performing the work.
- The contractor of each craft discipline will be responsible for assuring all padlocks are personally identified, that will be used for lock and tag purposes.
- The Contractor Superintendent(s) will be responsible for ordering their own craft's padlock. A master key will also be provided.
- Any employee(s) or person(s) found to have removed another's lock and/or tag will be subject to disciplinary action up to and including dismissal from the Project.

Special Situations

- When due to the nature of work, a supervisor who has employees assigned to work on systems that are between construction and client turnover that is to be locked and tagged out in order to perform work, the below shall be applied:
- Prior to the electrical foreman de-energizing the system, the foreman will ascertain whether system or device has been turned over and accepted by the client; If system is signed off, the client shall assume responsibility for de-energizing system and becoming the tagging authority.
- Contractor Electrical foreman/craft journeyman places lock and tag and tries to engage the equipment.
- The electrical journeyman or lead man will meter the tagged equipment to verify that it is de-energized.

Operating Facilities and Equipment

- All systems covered under this section whether electrical, mechanical or others are considered those systems where no future construction activity is warranted.

Electrically Operated Systems

- Client representative or designee de-energizes system demonstrating accuracy to construction electrical supervisor, then locks and tags.
- Construction electrical foreman/journeyman ascertains that fuses, breakers or throws have been removed, when applicable; tags, locks and tries system.
- Electrical foreman/journeyman, meters the side of the system to be worked on to verify it is de-energized and safe.

- Upon completion of work, the journeyman removes their lock/tag and advises the construction electrical supervisor.
- Client representative or designee clears system, removes lock and tag and re-energizes if necessary.

Other Systems

- Plant engineer or designee de-energizes system and makes system safe.
- Client mechanics or designee(s) makes first break in flanges, places blanks, blinds or valves, and demonstrates that the system is empty and decontaminated.
- Construction (Client) Coordinator or designee verifies that the system is de-energized and tagged.
- Construction Craft supervisor locks, tags and tries system, surrenders the key to the journeyman who will then perform the assigned task.
- Upon completion of work, the journeyman will return the key to the assigned supervisor and tag and lock are removed.
- Construction (Client) Coordinator or designee assures that system is clear, and then removes lock and tag.
- Client mechanics or designee(s) re-energize system.

Construction

- All systems under this section whether electrical, mechanical or others, are considered those systems that are still in the construction phase.
- Equipment or circuits that are de-energized shall be maintained inoperative at their main power source and shall have locks and tags attached to prevent accidental turn on.
- A staff member shall be designated from the electrical department (Superintendent or General Foreman), to assume the responsibility, for the removal of locks and tags, and activation of power from the main switchgear through end line component.

Masonry

- In addition to the requirements contained in OSHA 29 CFR 1926. 706, the following is required:
  - A person, appointed by the Masonry Contractor, who meets the OSHA definition of Qualified Person, will prepare a Hazard Analysis. The Hazard analysis will be reviewed with the CM Project Safety Manager and CM Project Superintendent prior to start of work.
  - The Mason's qualified person shall approve all changes in the Hazard Analysis.
  - A copy of the Hazard Analysis shall be maintained at the Project site showing all approved changes with a copy provided to the CM.
  - The implementation of the Hazard Analysis shall be by a person appointed by the Masonry contractor who meets the OSHA definition of Competent.
  - The Hazard Analysis shall be reviewed with each person working on the masonry wall each day prior to starting work.
  - A safe means of access to the level being worked shall be maintained.
  - There shall be protection provided to prevent tools and material from striking any person below the work/storage level.
  - A tag line shall be used to control all loads.
  - When loads are being hoisted, all personnel are to be prevented from walking under the load.
  - No one shall be permitted to ride a load under any circumstances.

- A measuring device to accurately determine wind speed shall be provided by the masonry contractor with observations made available to the CM upon request.

Masonry Wall Bracing

- The masonry contractor shall provide the CM a design, prepared by a Professional Engineer, meeting the requirements of OSHA 29 CFR 1926.706 (b) and the Standard Practice for Bracing Masonry Walls under Construction as developed by the Council for Masonry Wall Bracing.
- No one shall be permitted within the limited access zone of an unbraced or braced wall subjected to winds of more than 35 mph (20 mph if during the initial period of construction).
- A DANGER sign shall be placed on every unsupported masonry wall that is more than 6 feet in height, braced or unbraced, and 50 feet or less in length. The sign shall be placed at each end of the wall and at intervals of not more than 100 feet along each side of the wall. The sign shall contain the words *DANGER* and *THIS UNSUPPORTED WALL IS UNSTABLE IN WINDY CONDITIONS.*

Fall Protection (See Elevated Work - Fall Protection)

- All employees engaged in masonry work, including overhand laying or any other activity that exposes them to a fall of 6 feet or greater shall be provided with and use fall protection. This protection shall be either a personal fall arrest system consisting of a full-body harness, double, shock-absorbing lanyard, and anchorage or a safety net or a guardrail. “Controlled Access Zones” are not permitted.
- Fall protection requirements shall be rigorously enforced with any observed violation cause for removal from the Project.
- Body belts are not permitted as part of a fall restraint system. Only full body harnesses will be used as part of a personal fall arrest system.

Perimeter Protection

- A guardrail system will be constructed in accordance with OSHA 29 CFR 1926.500. or alternative fall protection consisting of safety nets or personal fall arrest equipment provided.

Motor Vehicles and Equipment

- All equipment must be inspected daily before use by Contractor's operator.
- Contractor must also make documented and complete inspections at 30-day intervals with proper documentation maintained at the Project site by Contractor and copies shall be made available to the CM upon request.
- Defective equipment shall be repaired or removed from service immediately.
- All Contractors’ operators of construction equipment should be properly licensed and certified by a competent person.
- Copies of the certifications shall be maintained on Project site by Contractor and made available to the CM upon request.
- Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried and all passengers shall be properly seated with seat belt used.
- Standing/kneeling on the back of moving vehicles is prohibited.
- Locations for storage of all fuels, lubricants, starting fluids, etc., shall be reviewed by the CM prior to use by Contractor for storage and shall conform to the requirements of the NFPA as well as the local Fire Marshal.
- Where required, contractors shall provide equipment diapers to protect from environmental spills.

- Drivers of motor vehicles shall have a valid state drivers license (CDL when applicable) and be instructed to exercise judgment as well as observe posted speed limits.
- All contractors' means of ingress and egress shall be adequately marked and kept clear of stored material, debris and equipment.
- Pedestrians always have right-of-way over motorized traffic.
- Horns shall be sounded at blind corners, when passing, and/or for warning.
- Established hand signals or turn signals are to be used.
- Reckless driving or other non-observance of these instructions will be cause for withdrawal of driving privileges on the Project.
- Any ATV's used on the Project shall be "four"- wheeled, not three-wheeled.
- All vehicles permitted access to the site must display an appropriate vehicle identification badge from the rear view mirror or other conspicuous location at all times while on the Project.
- Seat belts shall be worn by all employees operating motor vehicles and any equipment with rollover protection structures during performance of work.
- Properly trained and equipped flag persons shall be used whenever construction traffic accesses or exits from public highways as well as when construction traffic and deliveries interfere with the planned flow of traffic on public highways.

Precast/Prestressed Concrete

- Fall Protection for all employees engaged in work with a fall exposure of 6 feet or greater above a lower level shall be either a guardrail system, a safety net system or personal fall arrest system.
- The use of "Safety Monitoring" and "Warning Line System" and "Controlled Access Zones" are not permitted.
- Refer to the Section "Elevated Work Fall Protection" for additional requirements.
- A pre-construction meeting between the CM, the Fabricator and the Erector must be held to discuss the following topics:
    - Sequence of erection;
    - Schedule of delivery by load list;
    - Crane capacities;
    - Crane lift plan with calculations based on load and crane location;
    - Anchor bolt certification;
    - Review of the structural plans and details;
    - Stabilization plans for the structure during all phases of erection;
    - Temporary bracing and guying procedures and equipment for deck members, columns and wall panels.
- The Erector is to provide the CM the following:
    - Written erection plan prepared by a Company Officer or Professional Engineer indicating complete details of all phases of erection that shall include at least the following:
    - Crane lift plans with load calculation based on the cranes to be used and various setup locations,
    - Written stabilization plans for all phases including the use of temporary guying and bracing for columns and wall panels,
    - Written documentation of temporary connection details for use until permanent connections are completed including capabilities of workers doing the installation, types of welds or adequacy of bolted connections.

- Listing of competent persons for fall protection, crane operation and erection along with phone numbers for emergency contact.
- Fall protection plan in accordance with the CM Safety Plan including Leading Edge protection both during installation and after. Sequencing breaks and end of workday protective measures will also be detailed. Interior floor hole protection must be provided per OSHA Subpart M greater than 2 inches in the least dimension.
- Custody of Guardrail cables following completion of precast erection. Erector to present a plan detailing how the cables will be safely removed utilizing Personal Fall Arrest Systems; or safety nets.
- Silica protection of workers during cutting of concrete.
- Hazard Analysis of all operations, presented to all workers prior to each shift on hazards specific to the day's operation.
- Proof of training for all erection crewmembers.
- Delivery locations for trailers including adequate ground preparation and plan for unloading.
- Wind loading considerations including when operations will be suspended due to high winds.
- Any proposed field modifications to the approved Erection Plan shall be approved by a Company Officer or the Professional Engineer of Record, added to the plan, which shall be available at the jobsite. A copy must be submitted to the CM prior to any change.
- Lifting inserts, which are embedded or otherwise attached to precast concrete members, shall be capable of supporting at least four times the maximum intended load applied or transmitted to them, and shall be used in accordance with the manufacturer's recommendations.
- Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.
- Adjustment of precast members, after initial placement, which requires the lifting of the members in any manner, shall not be made unless wire rope safety tiebacks are used or the members are attached to the crane load line.
- Chains are not permitted to be used as slings. Chain "come-along" are permitted with proof of required inspections and certification.

Pressure Testing Safety Requirements

- Pressure testing involves hazards, such as the release of hazardous energy, being struck by loose fittings or burst pipe. In addition, if an inert gas, such as nitrogen is used, it can displace oxygen and can create an oxygen-deficient atmosphere, which can be harmful or fatal. If flammable gas is used, it can cause an explosion if there is an ignition source. Contractors shall develop a site/task specific Job hazard Analysis (JHA), (STA) or (THA), as well as their own procedures for safely pressure testing pipe, and review with the CM prior to starting this activity.
- Contractors shall develop a site/task specific Job Hazard Analysis (JHA) as well as their own procedures for safely pressure testing pipe and review with the CM prior to starting this activity.
- The following procedure shall set forth the minimum requirements to ensure that pressure testing is performed safely.
  - Contractor performing pressure testing shall barricade area off and place signage restricting access to only authorized personnel.
  - Authorized personnel shall wear appropriate PPE consistent with the contractors JHA. (examples should include: hard hat, safety glasses, face shield, gloves, etc in accordance with the MSDS for testing medium).
  - All mechanical devices, such as valves and blinds used to isolate the system shall have a lock and tag affixed by the contractor to prevent accident pressure release.

- Contractor and authorized personnel shall walk down the system and check the integrity of all connections, caps, seals and fittings within the system to be tested to ensure they are secure.
- Contractor shall install additional supports on piping necessary for increased pressure or weight of testing medium.
- Test equipment and gauges shall be inspected by the contractor and confirmed to be in proper working order before testing is begun.
- Maximum test pressure and duration of the test shall be communicated to the contractor's authorized testing personnel and the CM.
- Contractor to develop a Venting procedure for dissipating inert gas safely.
- Contractor shall develop a Drain procedure to drain water or other fluids safely, without polluting drains or creating slippery conditions.
- Contractor shall review the JHA with all authorized personnel prior to the test.
- Testing shall be performed under the supervision of the contractor supervisor.
- Testing shall be conducted in accordance with pipe and testing equipment manufacturers precautions and specifications.
- Test pressure shall not exceed the maximum allowable test pressure for any vessel, pumps, valves, or other components in the system.
- All repairs or adjustments to the system being tested shall be done only after the system pressure is safely and completely relieved and the test gauges indicate 0 psig pressure.
- Only mechanical devices, such as gate or ball valves shall be used for incremental release of flow in depressurizing systems.
- The opening or 'breaking' of flanges shall never be used as a means of depressurizing a tested system.
- Upon acceptance of the pressure test, pressure in the system shall be completely relieved so that the test gauges indicate 0 psig, and verified by contractors supervisor.
- Contractor shall conduct all testing in accordance with applicable laws, codes, and ASME B31, B16 and related standards.

Sanitation

Housekeeping

- The site, work areas, and all site occupied by the CM and contractor's personnel will be maintained in a clean, healthy and sanitary condition.
- Work areas, passageways and stairs, in and around buildings and structures, shall be kept clear of debris.
- Construction materials shall be stored in an orderly manner.
- Storage areas and walkways on the site shall be maintained free of dangerous depressions, obstructions, and debris.
- Construction equipment shall be stored or placed in an orderly manner.
- Good housekeeping on the Project is mandatory and every employee must do his part daily to minimize dust and to clean up his work area to keep the Project clean for safety and efficiency.
- Controls shall be observed which keep dirt from being tracked into areas outside the workspace.
- Immediate cleanup is required when dust, dirt or debris may affect the owner's operations.
- Eating within the construction Project shall be confined to areas designated by the CM for such purposes.
- Employees shall properly dispose of all lunch refuse and drink containers in trash receptacles

- Failure to maintain adequate housekeeping and to perform daily clean-up will result in the following actions:
- Written Notice: Upon receipt, the contractor shall take immediate action to perform housekeeping and clean up.
- If having been given sufficient notice, the contractor fails to clean up; the work will be performed by others, and the errant contractor back-charged for all related costs.
- Daily and final clean up must be performed in accordance with contract documents.

Facilities

- The locations of lunch areas and employee toilet facilities will be designated by the CM and approved by the Owner.

Refuse and Garbage

- Each contractor will provide an adequate number of covered garbage containers. The site will be cleaned and garbage and refuse will be collected at least daily and removed from the building.

Potable Water

- Each contractor shall provide potable water at the work site and test it at least weekly if delivery is from other than municipal supplies.
- Sanitary facilities shall be provided for personal hygiene.

Scaffold

- The Contractor's designated Competent Person shall inspect all scaffolds prior to each work shift with written documentation provided to the CM on a daily basis.
- All scaffolds shall bear a tag, signed and dated by the contractor's competent person, denoting that the scaffold has been inspected and is safe to use prior to any employee utilizing that scaffold that day.
- Any contractor using scaffolding shall provide the CM with the name of their Competent Person along with the content of the Competent Person's training program and proof of Scaffold User Training for all employees who may work on scaffolding.
- Ladder Jack scaffold are not permitted on this Project.
- Scaffolds with a width less than 60 inches must have guardrails (top, mid and toe) installed when the work platform is in excess of 48 inches above the floor or lower work area.
- Scaffold cross bracing is not permitted to be used as a substitute for guardrails. Swing gates will be provided at all ladder or stair access points.
- Where material is being landed on a scaffold, the outrigger extension will not be used to support the material unless it is deemed adequate by the manufacturer and a factor of safety of 4 is provided.
- All non-mobile scaffold frames shall have base plates installed.
- All mobile scaffolds will have wheels locked when in use and stationary.
- Nominal grade lumber is not allowed as scaffold planking.
- All individuals who are in scissor lifts shall wear a full body harness and be tied off by a lanyard to a manufacturer's approved anchorage point within the scissor lift.
- Standing on guardrails is not allowed.
- Only approved anchorages shall be used for fall arrest anchorage points.

- A mast climbing elevating work platform that may be adjustable by manual or powered means must meet the requirements of ANSI Standard ANSI/SIA A92.9-1993, American National Standard for Mast-Climbing Work Platforms.

Stair Scaffolds

- 'System' scaffold stairs shall be erected as early as possible during the building construction to facilitate safe access to all working levels, once the steel erector has released the floor/level to the CM.
- Scaffold stairs shall remain in place until the permanent stairs are constructed and made available for use by the CM.
- Stair scaffolds shall be constructed in accordance with manufacturer's instructions by trained and qualified workers under the direction of a competent person.
- Stair scaffolds shall be inspected daily by a competent person, authorized by the CM, at the beginning of each shift.
- The competent person shall date and initial a Scaffold tag, and place the tag at the entrance to the stair scaffold.
- Stairs used during winter months shall be enclosed to prevent ice and snow from creating slippery conditions.
- Temporary lighting in accordance with OSHA requirements shall be installed on all enclosed stair scaffolds.

Steel Erection

Erection Plan

- An erection plan will be prepared by the Steel Erector's Qualified Person and reviewed with the CM Project Safety Manager and/or the CM Project Superintendent prior to start of work. Refer to OSHA 1926, Subpart R, Appendix A.
- The erection contractor's qualified person shall approve all changes in the safety erection plan.
- A copy of the erection plan shall be maintained at the Project site showing all approved changes with a copy provided to the CM.
- The implementation of the erection plan shall be under the supervision of a competent person.
- A safe means of access to the level being worked shall be maintained. Climbing and sliding on columns or diagonals, is not allowed.
- Containers, such as buckets or bags, shall be provided for storing or carrying bolts or rivets.
- When bolts, drift pins, or rivet heads are being removed, a means shall be provided to prevent accidental displacement.
- Tools shall be secured in such a manner to prevent their falling.
- Fall protection provisions, such as lifeline attachments, dynamic fall restraints and other such devices shall be considered during shop drawing preparation, shall be incorporated in fabricated pieces, and shall have safety lines or devices attached prior to erection wherever possible.
- A tag line shall be used to control all loads.
- For the protection of other crafts on the Project, signs shall be posted in the erection area by the erection contractor reading, "*Danger Men Working Overhead*" and only ironworkers allowed in this area. This will include shakeout areas, erection areas and the load travel path from the storage area to the erection area.

- When loads are being hoisted, all personnel are to be prevented from walking under the load.
- No one shall be permitted to ride a load under any circumstances.
- Crane personnel platforms will not be used for any purpose without the written approval of the CM.
- Material shall not be hoisted to a structure unless it is ready to be put into place and secured.
- Bundles of metal decking or small material shall be so secured as to prevent their falling out from the rigging.
- Christmas treeing (multiple lifts) is not allowed unless exception approved by the CM
- All workers engaged in steel erection activities including connecting, bolting-up, decking, welding or any other activity that exposes them to a fall of 6 feet or greater shall be provided with and use fall protection.
- This fall protection shall be either a personal fall arrest system consisting of a full-body harness, double, shock-absorbing lanyard, and anchorage or a safety net or a guardrail. Nether “Controlled Decking Zones” nor “Safety-monitor systems” are permitted. Metal deck is not considered a form of fall protection.
- Fall protection requirements shall be rigorously enforced during steel erection with any observed violation cause for removal from the Project.
- Body belts are not permitted as part of a fall restraint system. Only full body harnesses will be used as part of a personal fall protection system.

Perimeter Protection

- When wire rope is used as a guardrail providing fall protection it shall be designed at all elevations where a fall of 6’ or greater is possible.
- To be in compliance the perimeter fall protection system shall be comprised of four 3/8 inch diameter wire rope cables installed at 60”, 42”, 21”, and 0” above the deck or floor with non-combustible mesh fabric having openings of ½” or less and capable of withstanding 50 pounds force without damage or displacement.
- The mesh fabric shall be secured to the wire rope adequately to withstand wind load and/or to prevent materials from passing beyond the perimeter protection.
- Wire ropes shall be installed to prevent deflection beyond 3” when 200# of force is applied in a downward direction.
- All splices of wire rope shall be loop type with a minimum of 3 wire rope clamps. No straight splices shall be used.
- Turnbuckles shall be installed at all changes of direction and at straight runs of 60’ or greater to provide for cable tightening.
- Wire rope guardrails shall be tensioned to 2,400 pounds of force, initially, and maintained to comply with OSHA fall protection requirements.
- Wire rope guardrails shall be installed immediately following the erection of beams and columns. The length of cable shall not exceed 60 feet without being terminated. Cables shall be terminated at all 90 degree turns and shall be ‘looped’ connections with 3 wire rope clips used at all connections (line splicing is not permitted). All sequence breaks will require a two (2)-cable assembly.
- Turnbuckles shall be installed on top and mid-rail wire rope cables at each perimeter side, and at intervals not to exceed 60 feet, or as directed by the CM. Loading bays shall have separate guardrail and turnbuckle assemblies installed.

Interior Protection

- Installation of guardrails at interior floor openings, i.e. stair or mechanical shafts, shall conform to one, or a combination of the following:

  Option 1

  - Install 3/8" galvanized air craft cable through stanchions at 60", 42", 21", and 0" above the deck or floor with non-combustible mesh fabric having openings of ½" or less and capable of withstanding 50 pounds force without damage or displacement. Terminate cables at 90 degree turns.

  Option 2

  - Bolt 2 ½" x 2 ½"x ¼"steel angles onto stanchions. A mid-stanchion / post is required for spans greater than 8 feet.

  Option 3

  - Secure 2"x 4" construction grade lumber to steel stanchions. A mid-stanchion / post is required every 8'
    - Guardrails shall not be used as a horizontal lifeline as part of a personal fall arrest system unless designed by a licensed Professional Engineer and installed under the supervision of the steel erector's competent person.
    - Top and Midrail cables, as outlined above, shall also be used at all sequence breaks.

Signs, Signals, Barricades and Lights (Motor Vehicle Exposure)

- Signs, signals and barricades shall be visible at all times where a hazard exists and will be in compliance with ANSI D6.1 (most recent version), Uniform Manual of Traffic Control or regulations promulgated by the local authority.

Temporary Heat

- No open flame heaters are allowed.

Welding, Cutting and Burning – Hot-work

Electric Arc Welding

- A suitable, approved fire extinguisher shall be ready for instant use in any location where welding is done.
- Screens, shields, or other safeguards should be provided for the protection of men or materials, below or otherwise exposed to sparks, slab, falling objects, or the direct rays of the arc.
- A dedicated fire watch shall be present at all welding operations and remain for at least 1 hour after the hot work has halted.
- The welder shall wear approved eye and head protection.
- Trades assisting the welder shall also wear protective glasses, head protection and protective clothing.
- Adequate exhaust ventilation shall be maintained at all welding and cutting work areas.
- Electric welding equipment, including cables, shall meet the requirements of the NEC.
- All arc welding and cutting cables shall be of the completely insulated flexible type capable of handling the maximum current requirements of the work.
- Cables in need of repair shall not be used.

- The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable connecting the circuit connector or through a separate wire which is grounded at the source of the current.
- All ground connections shall be inspected to insure that they are mechanically strong and electrically adequate for the required current.
- Welding practices shall comply with all applicable regulations.

Gas Welding or Cutting

- When gas cylinders are stored, moved, or transported, the valve protection cap shall be in place.
- When cylinders are hoisted, they shall be secured in an approved cage or basket. The valve cap shall never be used for hoisting.
- All cylinders shall be stored, transported, and used in an upright position. If the cylinder is not equipped with a valve wheel, a key shall be kept on the valve stem while in use.
- At the end of each work day or if work is suspended for a substantial period of time, compressed gas cylinder valves must be closed, regulators removed and properly stored.
- Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.
- Cylinders containing oxygen or acetylene or other fuel gas shall be stored in designated areas outside the structure as approved by the CM.
- No one shall use a cylinder's contents for purposes other than those intended by the supplier.
- All hose used for carrying acetylene, oxygen or other fuel gas shall be inspected at the beginning of each working shift.
- Defective hose shall be removed from service.
- Oxygen cylinders and fittings shall be kept away from oil and grease.
- Oxygen shall not be directed at oily surfaces, greasy clothes or hands.
- Regulators, gauges, backflow check valves, and torches shall be kept in proper working order.
- An approved fire extinguisher shall be readily available.
- Flash arrestors are required on the oxygen and acetylene hoses, at the regulators.
- Appropriate personal protective equipment, such as burning glasses, shields, and/or gloves shall be used.
- Adequate exhaust ventilation shall be maintained at all welding and cutting work areas.
- Work permits shall be obtained daily, prior to any burning or cutting operations on the site.

Work Permit Procedures

General Procedures

- A copy of this section of the Project Safety Standards will be issued to all Contractors, and will serve as notice by the CM that a work permit as specified by the CM is necessary before starting any hazardous work activity.
- The work permit shall be obtained from the CM before starting each day's work.
- The procedures for initiating a hazardous work permit are listed on the permit application appropriate to the type of work.
- Hazardous work Permits include, but are not limited to the following activities: Hot Work, Confined space entry, Guardrail removal, Line Breaks, after Hours work, Trenching and excavation, Crane use and Barricade installation.

- Additional job-specific hazardous work permits may be required, due to special Project conditions, to be incorporated into the Project Safety Standards. These will also be considered a contract commitment.

Hot Work

- Hot work is defined as a process or procedure, which could result in a fire if not properly controlled. Common types of hot work are welding, burning, cutting, brazing, soldering.
- Hot work will usually be permitted only during normal working hours.
- Permits will be issued the day before work is to be accomplished, and the work area will be inspected to verify that adequate control has been established.
- A copy of the permit will be available at the point of work.
- An adequate number of fire extinguishers will be available within 50-feet of the point of work for which a permit is issued.

The Contractor will take the necessary precautions when welding or burning above walls to assure that protection is maintained on both sides of the wall and that areas below are protected on multilevel buildings.

Confined Space

- When work in confined spaces is scheduled, such as a caisson, boiler, deep excavations, etc., consideration must be given to two major known and recognized hazards:
- The possibility of fire or explosion, flammable gases, fumes, vehicle fumes, vapors, or dusts.
- The possibility of injury to the worker (or loss of consciousness) as a result of inhalation or absorption through the skin of toxic materials or from oxygen deficiency.
- For work in a confined space, the responsibility for recognition and advance notification is the Contractor's.
- The Project Superintendent and the Project Safety Coordinator will be notified and will evaluate the situation, issuing a work permit in those cases for which he considers it necessary.
- The Contractor will be responsible for providing equipment and special instructions for the worker, such as ventilating units, respirators, safety belts and life lines, etc., and for conformance to all applicable OSHA standards.
- It is required that the "buddy system be used and that an observer will tend all workers in a confined space.
- Rescue procedures must be agreed upon beforehand.

Guard Rail Opening

- The Project Superintendent and the Regional Safety Manager may approve work, which requires the opening of guardrails or the removal of holes covers to be performed, in advance.
- Particular attention shall be given to the alternate means of fall protection, which will be required to safely perform the work and protect other workers in the vicinity of the fall exposure.
- Specific plans for providing alternate fall protection shall be described in the request for the work permit.

Off-Hours Work

- The Project Superintendent and the Project Safety Coordinator shall approve work, which is required to be performed outside normal working hours established at the site, in advance.

- Any work occurring within the existing Owner facility shall be at the convenience of the Owner. All off – hour work shall comply with all conditions imposed by the contract specifications and the work permit issued by the Project Safety Coordinator or other persons identified by the Owner.

END OF SECTION 01 35 23

SECTION 01 35 23A
SAFETY FORMS

SUMMARY OF FORMS

Code of Safe Practices-Safety Orientation	SAF 001
Fall Prevention Plan	SAF 002
Job Safety Analysis (JSA)	SAF 003
Disciplinary Action Form	SAF 004
Hot Work Permit	SAF 005
Trenching and Excavation Permit	SAF 006
Contractor Safety & Competent Person Contact	SAF 014
Confined Space Entry Evaluation	SAF 018 A
Permit-Required Confined Space Entry Permit	SAF 018
Project Safety Appraisal Checklist	SAF 019
Limited Access Authorization	SAF 020

CONTRACTOR/SUBCONTRACTOR INSTRUCTIONS FOR FORMS

A. BCC will maintain a file for each contractor/subcontractor at the jobsite.

B. Signatures are required on each form prior to commencing work.

Safety Orientation – SAF 001

1. Employees and visitors entering the project will attend a site orientation.

2. Reviewed with an BCC representative, info filled out and signed. Photo ID and/or an orientation sticker will be provided. The photo ID/sticker must be displayed on hard hat. NO ID = NO WORK.

Fall Prevention Plan – SAF 002

1. Completed by each contractor/subcontractor competent person prior to starting an activity requiring fall prevention.

2. Reviewed with BCC prior to commencing work

3. Contractor/subcontractor to review with workers prior to starting – proof of documented review (Attendee list with signatures)

4. Copy of completed document to BCC.

Job Safety Analysis – SAF 003

1. Completed by the contractor/subcontractor competent person prior to starting a major activity

2. Reviewed with BCC prior to commencing work

3. Contractor/subcontractor to review with workers prior to starting – proof of documented review (Attendee list with signatures)

4. Copy of completed document to BCC

Disciplinary Action Form – SAF 004

1. Completed by BCC when a safety procedure/ policy has been violated by a contractor/subcontractor employee

2. A copy shall be given to the contractor/subcontractor's supervisor and employee.

3. Lack of employee signature is cause for immediate removal from site.

4. Contractor/subcontractor to provide a copy of their disciplinary action form for the file

Hot Work Permit – SAF 005

1. Completed by contractor/subcontractor competent person before performing hot work and/or spark-producing activity.

2. BCC review with contractor/subcontractor prior to work starting to ensure precautions have been taken. Copy of permit given to contractor/subcontractor to post in work area

3. BCC reserves the right to determine if certain activities (i.e. grinding) are exempt from a fire watch.

4. After hot work has been completed and a 30-minute fire watch has taken place, the contractor/subcontractor competent person is to sign the form and return it to BCC

Trenching and Excavation Permit – SAF 006

1. Completed and signed by contractor/subcontractor competent person before any trenching/excavation work can start.

2. Reviewed with BCC prior to commencing work. Copy to BCC

Safety & Competent Person Site Contact List – SAF 014

1. Completed by competent person and updated

2. BCC will maintain a file of each contractor/subcontractor Competent Personnel at the project site.

Confined Space Evaluation /Confined Space Entry Permit – SAF 018/SAF 018A

1. Completed by the contractor/subcontractor competent person prior to commencing work

2. Reviewed with BCC prior to commencing work

3. Contractor/subcontractor to review with workers prior to starting – proof of documented review (Attendee list with signatures)

4. Copy of completed document to BCC prior to commencing work

Note: Minimally the Confined Space Entry Evaluation Form is required for crawl spaces/attics as well as other confined/enclosed spaces. A Confined Space Entry Permit may be required per OSHA 1910.146 based on the completion of the evaluation form.

Construction Site Safety Appraisal Checklist – SAF 019

Completed by contractor/subcontractor competent person and submitted two times per month (bi-

weekly). Complete applicable areas of the form.

Note: Must be submitted in order for pay application to be processed & reviewed

Limited Access Turnover – SAF 020

1. Complete this form in conjunction with BCC and each affected contractor/subcontractor Superintendent/Foreman/Competent person.

2. This form shall be reviewed and signed by BCC and affected contractors/subcontractors superintendent/foreman releasing a work zone at the project.

Code of Safe Practices – Safety Orientation – SAF 001

Rochester Schools Modernization Program – Phase 2d

Project Name: Edison Tech

Employee Name (PRINTED)**:** _____

Company: _____

I agree to abide by the following Code of Safe practices while on this Project:

1. To assist the Project in being incident and injury free, I have granted permission to the Construction Manager to discuss all aspects of working safely with me. Likewise I have the right to discuss safety issues with the Construction Manager, other trades (regardless of trade jurisdiction or craft) and to stop work at any time I feel there is an unsafe condition to me or others.
2. I understand there are requirements for this Project in excess of OSHA as set forth in the Project Safety Standards. I will abide by those "above-OSHA" requirements of the Project Safety Standards.
3. I will work in a safe manner, protecting others, and myself and will report observed hazards to my supervisor. If not addressed, I will further report these hazards to the Construction Manager's Superintendent.
4. I will dress properly for the project, wearing a long or short-sleeved shirt, long pants and work boots with ankle protection and substantial soles.
5. I will use personal protective equipment as required by my trade, and will wear my hard hat and safety glasses at all times.
6. I will abide by the six-foot fall protection rules, including the use of a harness where required.
7. I will park only in designated areas and observe a ten mile per hour speed limit on site.
8. I understand there is a policy prohibiting the use of tobacco products in any form on the Project site.
9. I will eat only in designated areas and dispose of trash in proper containers.
10. I will not use any intoxicants or other controlled substances on the Project.
11. I will report all injuries and accidents involving persons or property.
12. I will not bring any weapons, including knives with blades over 4 inches, onto the site.
13. I will conduct myself in a professional manner and not engage in any violence, horseplay, practical jokes, or other behavior obnoxious to the general public. I will not bring, write, or draw any sexually explicit materials on site.
14. I will not use headset type radios, music players, personal televisions, or other personal entertainment devices on site.
15. I will not use my cell phone in work areas, around heavy equipment, or while engaged in work activities. If I must use a cell phone, I will do so in safe areas, and only conduct jobsite business, or for a personal emergency.
16. I will comply with the security procedures established throughout the Project, for entrance to the site.

Signed: _____

Today's Date: _____

Code of Safe Practices – Safety Orientation – SAF 001

SAFETY ORIENTATION SAF 001

The following provisions, which may be stricter than federal, state, or local safety, fire, and environmental laws, rules, and regulations, will apply. These policies shall be followed and enforced by each contractor/subcontractor. Violators are subject to disciplinary action up to dismissal at the discretion of Buffalo Construction Consultants.

- Work hours are subject to owner's requirements. Anticipated work hours for this project are 7:00 AM to 3:30 PM during summer hours and school breaks, and 3:00PM -11:00PM while school is in session. Earlier start times will not be permitted unless authorized in writing by BCC.
- Suppliers, consultants, agents, and visitors shall not be permitted on site unless they have signed in with BCC. Visitors will observe and comply with site safety procedures and policies of the Project.
- Personnel are required to wear proper PPE while working or walking throughout the construction site. Hard hats, safety glasses with side shields, and are High visibility apparel with reflective stripes is required at all times.
- Suitable clothing for construction will be worn on this project. (No shorts, tennis shoes, or tank tops will be allowed). Shirts will be worn at all times and have a minimum of 4" sleeve, extend to the belt and have no offensive messages. Full-length pants are required to the ankle with no low rise or excessive bagging and/or sagging.
- Work shoes protecting your ankle and with a substantial flexible sole are required.
- Familiarize yourself with the location of fire extinguishers, first aid kits, and Safety Data Sheets.
- All contractor employees and visitors shall leave the building during a fire alarm, regardless of the incident. All contractor employees and visitors shall meet at the designated meeting area be accounted for by your superintendent/foremen.
- **Tobacco use is NOT permitted on campus at all.**
- **NO alcoholic beverages** or use of controlled substances on project grounds, nor shall any personnel arrive to work under the influence of these substances.
- Accidents/incidents/hazards shall be reported immediately to your Supervisor/foreman. The supervisor/foreman shall report all accidents/incidents/hazards within 1 hour to BCC.
- Submittal to post-accident alcohol and drug testing is required. Failure to do so may result in immediate removal from the site.
- **NO firearms**, crossbows, bow and arrows or knives shall be allowed on project grounds.
- Use of cell phones is restricted to supervisor/foreman only and must not be used during operation of equipment and/or machinery.
- No riders on machinery, equipment, pick-up truck beds, etc. except in designated operator or passenger positions. Seat belts must be work on equipment where such protection is required.
- Lock out Tag out procedures as defined by OSHA and is required, including while changing bits, blades, discs, cut-off wheels, etc on any power tool – de-energize first.
- The use of ground fault circuit interrupter (GFCI) on power sources is mandatory – permanent power in the building is temporary power for construction – no exceptions! Any missing ground pins, or exposed parts of temporary power cords shall be unplugged and cut up or thrown away.
- Work is not permitted in areas with inadequate lighting. Contractors are to provide task-specific lighting as necessary (i.e. above ceiling, in closets, etc.).
- Hazardous or regulated materials shall be handled, utilized, stored, and disposed of according to EPA and OSHA regulations.
- Entry into a confined space is prohibited until the employer's competent person has completed and reviewed the Confined Space Entry Evaluation Form SAF 018. OSHA Standards and LPC procedures are to be followed. Personnel air monitoring and air movement will be a minimum requirement in all crawl spaces.
- Only qualified personnel with proper training are to operate heavy equipment.
- Personnel handling and working with compressed gas cylinders shall ensure proper storage and handling.
- 100% fall protection against falls from elevations of 6' or more is required, except when working from ladders designed

Code of Safe Practices – Safety Orientation – SAF 001

to be less than 10' in height.

- No painter's scaffolds shall be used on site.
- Roped/ribboned-off areas are considered potential hazard zones and shall be respected as such. Passing through such areas is prohibited except to those employees specifically designated to work within the area. Contractors are advised to use RED tape to prevent entry into ribboned-off areas.
- Any barricade, hole cover, handrail, or mid-rail system removed from any opening, floor opening, covered pit, or confined space, requires the system to be immediately restored prior to leaving the area unattended. Please note personal fall protection equipment may be required prior to removing any of the aforementioned systems.
- The use of metal, job built, broken, or unsecured ladders are prohibited. Ladder usage shall be in accordance with applicable standards
- There shall be no work performed from the top of or top step of any stepladder.
- A-frame (step) ladders are only to be used in an open position with spreaders locked.
- Work is not permitted on a scaffold system that has not been inspected prior to use and/or has been constructed by a competent person.
- Scaffolding shall be protected against unauthorized access during non-working hours.
- The use of a full-body harness and lanyard is required at all times while moving/working in an aerial lift by all occupants.
- Only scissor lifts that have a legible manufacturer's inspection plate and instructions are permitted for use. Each lift shall have a guardrail system, and a visible, valid annual inspection certificate.
- Contractors/subcontractors are responsible to maintain housekeeping in all of their work areas. BCC may, at the contractor/subcontractors' expense, order the removal of debris, rubbish, or other materials determined to be a hazard/potential hazard within 8 hours of written notice. Housekeeping in all areas accessible to the public will be maintained to the highest standard. A "clean as you work" policy will be maintained.
- Each contractor shall maintain sufficient trash cans in their work/lunch/break areas and empty daily
- Work is not permitted in areas where means of egress is obstructed therefore materials are not to be stored or placed in a doorway or blocking an aisle.
- Spark-producing activities require a Hot Work Permit SAF 005, fire extinguishers within 10 feet of the work, and in most cases, a 30-minute fire watch after the Hot Work operation is complete. BCC reserves the right to determine if certain activities (i.e. grinding) are exempt from a fire watch.
- Professional and courteous conduct is expected while working at the project site. "Wandering the project" is not permitted.
- Sexual harassment, harassment and obscene language will not be tolerated on the project site.
- Workers are to use temporary toilets provided at the job site
- Observe speed limits on school grounds
- Be cognizant of school activities – school is full during 2nd shift for after school activities.
- CLOSE WINDOWS AFTER YOU LEAVE THE ROOM!

Code of Safe Practices – Safety Orientation – SAF 001

I have read the Safety Orientation and will abide by all requirements contained herein.
(PRINT ALL INFORMATION)

Name (Print): _____

Company: _____

Subcontractor to: _____

Designation: ☐ PM ☐ Foreman/Superintendent ☐ Visitor ☐ Worker

Job Classification (Trade): _____

Emergency Contact Name: _____

Emergency Contact Phone Number:_____

(Your) Address: _____

Town/City:_____State: _____

Signature:_____Date:_____

BCC Provided Badge/Sticker ID #_____

Fall Prevention Plan SAF 002

Project Name: Edison Tech	Contractor Name:	Date: …./…./….
Completed By:	Competent Person:	Date(s) Covered by Plan: …./…./…. - …./…./….

Description of work: *(What scope of work is being performed under this plan?)*

Description of fall exposure: *(How high is working surface and how will access be gained?)*

Describe walking or working surface and how tools/equipment will be carried:

Environmental factors present?

Heat ☐ Yes ☐ No	Cold ☐ Yes ☐ No	Ice/snow ☐ Yes ☐ No
Slippery/wet ☐ Yes ☐ No	Wind ☐ Yes ☐ No	Glare ☐ Yes ☐ No

If yes describe any precautions you will take:

What steps if any are needed to protect workers below: (*controlled access, barricades, covers)*

What protection method(s) have you selected?

Guard Rail/Toe Boards ☐	Fall Arrest ☐	Warning Line ☐
Fall Restraint ☐	Safety Monitor ☐	Safety Net ☐

If Fall Arrest System will be used complete the following:

Is a rated 5000 lb anchorage point available? Yes ☐ No ☐

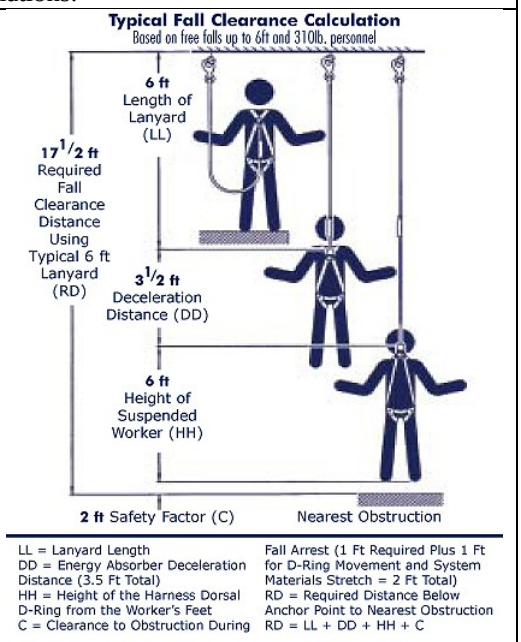
If there is no current anchorage point, what will you use?

1. Anchorage connector for concrete ☐ 2. Anchorage connector for steel ☐
3. Anchorage connector for roof ☐ 4. Horizontal life line ☐
5. Other _____

Length/type of lanyard/SRL to be used: (Maximum length is 6 ft, must have energy absorber for fall arrest)

_____

_____

Fall Protection Calculations:	
Do you have adequate clearance: Yes ☐ No ☐ Length of lanyard:_____Ft Deceleration distance + 3/1/2 feet Height of worker +_____ Safety factor _____+2 feet Required minimum fall clearance=_____ *Note: All employees assigned to work on this job scope must be instructed in the fall protection measures designated for this work. After instruction, each employee shall sign on the backside of this sheet signifying that he/she has been instructed in the fall protection measures to be utilized on this work.*	

Are there any hazards below? (Protrusions, impale hazards, equipment, electrical wires, etc.)
If so what protection measures will you take?

_____

_____

Are there any swing fall hazards? If so what protection measures will you take?

_____

_____

Describe your rescue plan to ensure rescue within 10 minutes of fall:

_____

Competent Person Signature_____ _____

BCC Reviewer_____

Job Safety Analysis SAF003

Contractor Competent Person shall submit prior to commencing a major work activity

SECTION 1: IDENTIFICATION OF WORK

Job Name:	**Date:**
Contractor:	**Competent Person:**
Description & Location of the Work:	

SECTION 2: SAFETY PRECAUTIONS/EQUIPMENT REQUIRED

A	Fire Extinguisher (Type)	J	Standby/Spotter
B	Fire Shield/Curtain	K	Lockout/Tagout
C	Hot Work Permit	L	Gas/Oxygen Detection
D	Gloves (Type)	M	Warning Signs
E	Safety Glasses/Face Shield	N	Barricade Type:
F	Body Protection (Type)	O	Moving Construction Equipment
G	Hearing Protection	P	Spill Containment
H	Fall Protection – See SAF 002	Q	Energized Electrical Permit
I	Respiratory Protection (Type)	R	Other:

Sequence Of Job Steps	Potential Hazards	Choose Recommended Controls from Above (List by Letter)

Comments: _____

_____

_____

SECTION 3: REVIEWED BY (Requires at least 2 signatures)

BCC Representative: _____

Contractor Competent Person: _____

Disciplinary Action Form SAF 004

Violation of any safety procedure or policy could result in permanent removal from the project at the discretion of LPC

Date: _____

Contractor: _____

Address: _____

Contractor Employee: _____

Job Classification: _____

Location: _____

_____

Violation: _____

_____

_____

Disposition: _____

_____

_____

Note: Please sign and print names

Signature: _____
Contractor employee

Signature: _____
Contractor Supervisor

Signature: _____
BCC Representative

Hot Work Permit SAF005

Contractor:_____ Date: _____

Specific Work Location-: _____

Describe Work Process: _____

_____

Hot Work Competent Person: _____

ATTENTION

Before implementing any hot work permit, the safety representative or his appointee shall inspect the work area and confirm that precautions have been taken.

Precautions:

_ Cutting and welding equipment in good working condition _____

_ Sprinkler system in service _____

Local fire department phone number posted _____

Combustibles moved away from other side of wall

Within 35 Feet of Work:

_ Floors swept clean of combustible material ____

_ Combustible floors wet down and/or shielded ____

_ No flammable materials stored near work area

Wall and floor openings covered

Covers suspended beneath work to collect sparks

Within Confined Spaces:

_____ Confined space permit

Fire Watch:

_ Provided during and 30 minutes after work process finished _____

Fire Extinguisher_____N/A

Special Precautions: _____

The location where this work is to be done has been examined, necessary precautions taken, and permission is granted for this work.

Permit Issue Date:_____ Expire Per Shift: _____

BCC Representative: _____

Contractor Competent Person:_____

FINAL CHECK

Final Check-Up Required: To be made 30 minutes after completion of any operation unless a formal designated fire watch is assigned. Work area and adjacent areas to which sparks and heat may have spread were inspected 30 minutes after the work was completed.

Signed: _____

Contractor Competent Person

Trenching and Excavation Permit SAF006

This permit shall be completed and signed before excavation work can begin.

Date: _____

Contractor: _____

Specified Work Area: _____

Specified Work Process: _____

One Call Confirmation #: _____
(copies of fax responses from Dig Safety required)

Review of As-Build and Project Drawings Performed: ⌋yes; ⌋no; ⌋not available

Depth: _____

Soil Classification: _____

Method of Protecting Employees:

Sloping _____

Shoring _____

Benching _____

Shield _____

Other _____

Access Ladders _____

Spoil Piles/Materials 2' From Edge _____

Ramp _____

Atmospheric Testing _____

Reviewed By:

_____
Contractor Competent Person

_____
BCC Representative

Contractor / Subcontractor
Safety & Competent Person Site Contact List
SAF014

Completed by the contractor/subcontractor's project team and updated as required

Contractor's Name:_____**Date:** _____

Onsite Designated Safety Representative: _____

Title:_____**Phone/Cell Number:** _____

Contractor's Corporate Safety Representative: _____

Title:_____**Phone/Cell Number:** _____

Competent person(s) as applicable:

Weekly Jobsite Inspections: _____
Name *Number*

Excavation/Trench: _____
Name *Number*

Hoisting & Rigging: _____
Name *Number*

Fall Protection: _____
Name *Number*

Hot Work Permit: _____
Name *Number*

Scaffolding Erection & Inspections: _____
Name *Number*

Confined Space: _____
Name *Number*

LOTO and Electrical Energized Work: _____
Name *Number*

Submitted by:_____Title: _____

Each applicable line should be complete with the appropriate contact names and phone numbers for this site-specific job location and returned to BCC Project Team before mobilization.

Confined Space Entry Evaluation SAF018

Contractor:_____
Space to be entered:_____
Duration of Permit:_____to
Reviewed By: _____

Permit No:

_____

Definition: 1910.146 (b)
Confined space means a space that:
- Is large enough and so configured that an employee can bodily enter and perform assigned work; and
- Has limited or restricted means for entry or exit; and
- Is not designed for continuous employee occupancy

Is Space Large Enough And So Configured That An Employee Can Bodily Enter And Perform Work?

No → This is Not Confined Space

YES

Does The Space Have Restricted Means For Entry Or Exit?

No → This is Not Confined Space

YES

Is Space Designed For Continuous Employee Occupancy?

No → This is a Confined Space

Go To Permit Required Confined Space Evaluation Form
(Next)

YES

This is Not Confined Space

PERMIT REQUIRED CONFINED SPACE EVALUATION

Does Confined Space Have The Potential To Contain A Hazardous Atmosphere?

Flammable Gas, Vapor Or Mist > 10% LEL
Airborne Combustible Dust ≈ LFL
Oxygen Concentration <19.5% Or > 23%
Exposure To Hazardous Chemicals > 50% of OEL

YES → **This Space is a Permit Required Confined Space Proceed to Form SAF 018 prior to work commencement.**

NO ↓

Does Confined Space Contain A Material That Has The Potential To Engulf The Entrant?

YES → **This Space is a Permit Required Confined Space Proceed to Form SAF 018 prior to work commencement.**

NO ↓

Is The Confined Space Configured Such That The Entrant Could Be Trapped Or Asphyxiated By Sloping Walls Or Floor?

YES → **This Space is a Permit Required Confined Space Proceed to Form SAF 018 prior to work commencement.**

NO ↓

<u>If this space does not contain any other recognized serious safety or health hazards, then this is not an OSHA permit required confined space.</u>

Contractor Competent Person:_____Date:_____

BCC Representative:_____Date:_____

Confined Space Entry Permit SAF018A

Space to be entered: _____

Authorized duration of permit:_____Time:_____to _____

Reviewed by:_____**(Permit is valid for one shift)**

Permit Space Hazards
(Indicate specific hazards with initials)

_____Oxygen deficiency (less than 19.5%)
_____Oxygen enrichment (greater than 23.5%)
_____Flammable gases/vapors (greater than 10% of LFL)
_____Airborne combustible dust (meets exceeds LFL)
_____Toxic gases or vapors (greater than PEL))
_____Mechanical hazards
_____Electrical shock
_____Materials harmful to skin
_____Other: _____

Equipment Required For Entry and Work
(Specify as required)

{ } Hardhat
{ } Safety Glasses
{ } Goggles
{ } Face Shield
{ } Gloves
{ } Other _____

Respiratory protection: _____

Atmospheric testing/monitoring: _____

Communication:_____

Rescue Equipment: _____

Preparation for Entry
(Check after steps have been taken)

_____Notification of affected departments of service interruption

_____Isolation methods

{ } Lockout/tagout
{ } Blank/blind
{ } Purge/clean
{ } Inert
{ } Barriers
{ } Ventilate
{ } Atmospheric Test
{ } Other _____

_____Personal awareness

{ } Pre-entry briefing on specific hazards & control methods
{ } Notify contractors of permit & hazard conditions
{ } Other: _____
{ } Hotwork
{ } Line breaking
{ } Other: _____

Communication Procedures
(To be used by attendants and entrants)

_____

_____

Supervisor(s)
(List by name)

_____

_____

Authorized Entrants
(List by name or attach roster)

_____

_____

Emergency Services

Name of Service	Phone Number	Method of Contact

Authorized Attendants
(List by name)

_____

_____

Testing Record

	Acceptable Conditions	Result ___:____ AM/PM	Result ___:____ AM/PM	Result ___:____ AM/PM	Result ___:____ AM/PM	Result ___:____ AM/PM	Result ___:____ AM/PM
Oxygen-min.	> 19.5% - < 23.5%						
Flammability	<10% LEL/LFL						
H2S	<10ppm						
Toxic (specify)	<ARL						
CO	<35ppm						
Other (list below)							
Heat	°F/°C						
Tester Initials							

Comments:_____

_____

_____

Authorization By Entry Supervisors: Authorization below indicates that the appropriate steps have been taken to minimize the risk associated with confined space entry.

_____	_____	_____
_____	_____	_____
Printed Name	**Signature**	**Date/Time**

Construction Site Safety Appraisal Checklist
SAF019

Contractor/Subcontractor shall submit two times per month

Date & Time: _____

Company: _____

Inspected By: _____

Description	Yes	No	N/A	Comments
A. Jobsite Office				
1. OSHA Poster				
2. OSHA Form 300				
3. Emergency telephone #'s				
4. First-Aid Kit				
B. Hazard Communication				
1. Material Safety Data Sheets (MSDS)				
2. Written program on file				
C. Public Protection				
1. Warning signs, flagging in place				
2. Trenches/excavations demarcated				
3. Drop-offs protected				
4. Ladders Lowered/Secured				
5. Hazard Lights if necessary				
D. Housekeeping (Material Storage)				
1. Near ladders, stairs, ramps & machinery				
2. Trash cans, dumpsters emptied often				
3. Nails, boards, debris removed				
E. Personal Protection Equipment				
1. Hardhats				
2. Shoes/boots (no tennis shoes or similar)				
3. Shirts and long pants				
4. Eye/face protection				
5. Safety belts/lanyards /Fall Protection Plan				
6. Hearing protection				
7. Respirators				
F. Barricades or Covers Installed				
1. Floor openings				
2. Holes 2" or more				
3. Elevator Shafts				

Description	Yes	No	N/A	Comments
4. Stairwells and stairways				
5. Wall openings				
6. Elevation changes				
G. Scaffolds/Ladders				
1. Mudsills & base plates secured				
2. Level				
3. Guardrails in place 6-feet or more				
4. Proper decking materials and width				
5. Wheels locked on mobile scaffolds				
6. Access ladders available				
7. Inspection by competent person				
H. Excavation/Trenching				
1. Excavation plan completed & filed				
2. Inspected daily, more as required				
3. 2-feet – Spoils from edge				
4. 3-feet – Ladder above excavation				
5. 4-feet – Ladder provided every 25-feet				
6. 5-feet – Employee protection (Shield, sloped, benched)				
7. 6-feet – Fall protection provided				
8. Greater than 20-feet, engineer designed				
9. Inspected daily, more as required				
10. Underground/Overhead utilities marked				
I. Electrical				
1. Electrical energized work request/plan				
2. Path to ground complete				
3. Frayed cords, broken plugs				
4. Panels secured and GFCI's working				
5. Temporary lighting with cages				
6. GFCI's in use				
7. No openings in panel boxes				
8. Energized outlets, plugs with cover plates				
9. Permanent power & GFCI's used				
10. Extension cords not trip hazards				

Description	Yes	No	N/A	Comments
11. Cords not run over by lifts/machines				
12. 3-wire cords, no 16, 18 or higher gauge				
J. Fire Protection				
1. Hot works permit on file				
2. One extinguisher, 2AS rating, for each 3,000 sq. ft. of protected area				
3. One extinguisher or more, 2A rating, for each floor, adjacent to each stairway				
4. Inspected				
5. Welders/roofers have extinguishers nearby				
6. Fire alarm available/fire evacuation plan				
K. Flammable Liquids/Materials				
1. Only approved containers (safety cans)				
2. Labeled				
L. Compressed Gas Cylinders (Oxygen/Acetylene)				
1. Only approved containers (safety cans)				
2. Away from heat				
3. Secured				
4. Fire extinguisher in proximity				
5. Properly stored oxygen bottles stored 20-feet from acetylene bottles or 1/2 hour fire barrier installed between them				
6. Gauges/valves/hoses				
a. Good condition				
b. Fire arresters installed (both hoses)				
7. Eye protection available				
8. Ventilation				
M. Electric Welders				
1. Insulated grips on electric holders				
2. Cable and connectors (ck condition)				
a. Insulated				
b. Flexible				
c. Splices insulated and prohibited within 10-feet of holder				
d. Welding machine frame				

Description	Yes	No	N/A	Comments
grounded				
3. Shielding in place				
4. Proper eye protection				
5. Proper ventilation				
N. Hoists – Material or Personnel				
1. Material hoists				
a. Designed by licensed professional engineer, installed per manufacturers recommendations				
2. Competent person assigned to inspect				
O. Demolition				
1. Engineering survey performed prior to				
2. Jobsite meeting held				
3. All signs, warning signals, protective equipment in place				
4. Non-essentials removed from area				
5. Utilities secured and verified disconnected				
6. Adjacent buildings, windows and walls secured, braces and limited accesses				
P. Fall Protection				
1. 6-foot fall rule project-wide				
2. Plan written & reviewed prior to work				
3. Guardrail systems in place				
4. Personal fall arrest system				
5. Covers secured & labeled				
6. Wall openings guarded				
7. Top rail – 42” plus/minus 3”				
8. Midrail installed midway between toprail & walking working surface				
9. Fall protection provided when guardrails removed to receive materials/supplies				

Limited Access Zones Authorization SAF020

On behalf of Buffalo Construction Consultants, the following Limited Access Zone (LAZ) Areas have been released by the attending Contractor for generic site work activities. This documentation includes, but is not limited to, Steel Erection Zones, Masonry Wall Zones and Roofing Work Zones.

Each LAZ area must be signed off by the releasing contractor/subcontractor's competent person and an BCC representative BEFORE the area is opened up to generic site usage.

Only those areas that are necessary for another work group's activities are to be released. For example, if a full bay of previous steel erection activities is available but the requesting contractor only needs a portion of that bay, then only that necessary portion will be released.

Date **Location/Area** **Comments/Conditions**

BCC Representative: _____

Contractor/Subcontractor's Competent Person: _____

Contractor/Subcontractor's Company: _____

Date: _____

Original Copy to be returned to BCC site office for filing: copies distributed as necessary.

SECTION 01 35 46 - INDOOR AIR QUALITY REQUIREMENTS

PART 1 – GENERAL

1.01 SUMMARY

1. Work in this section includes but is not limited to the following:
    1. The abatement of asbestos containing building material (ACBM).
    2. The abatement of lead-based paint.
    3. The abatement of PCBs

1.02 SUBMITTALS

1. The Contractor shall submit all notices, records, receipts, and all other information as may be required by the Board.

2. The Contractor shall submit all required notices, licenses, certifications and work practice methods, including approved variance, as required by the appropriate agency. The Contractor shall also submit all records pertaining to worker monitoring data and waste manifests as required for job specific recordkeeping.

PART 2 – PRODUCTS
(not applicable)

PART 3 – EXECUTION

3.01 GENERAL REQUIREMENTS

1. Work of this section shall be done in compliance with, but not limited to, the following;
    1. 29 CFR 1910 and 1926 - OSHA Construction Standard
    2. 40 CFR 61 - National Emissions Standards for Hazardous Air Pollutants (NESHAP)
    3. 40 CFR 763 - Asbestos Hazard Emergency Response Act (AHERA)
    4. 12 NYCRR 56 - Code Rule 56 and applicable variances
    5. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing (HUD)
    6. 40 CFR Part 745 - EPA lead abatement regulations

2. Additional conditions and requirements regarding Work of this section will be elaborated in the event that unanticipated ACBM and/or lead-based paint is discovered and is determined to effect the progress of the Work. No work will proceed without authorization from the Construction Manager.

3. Work in this section shall be executed in such a manner so as to prevent undue and unnecessary delays in the progress of the project.

END OF SECTION 01 35 46

SECTION 01 43 39 – MOCK-UP REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Build each of the indicated mock-ups on site for review and approval before proceeding with any construction that may be affected by the construction represented by the mock-up.

1.02 PROCEDURE FOR MOCK-UP CONSTRUCTION

A. Extent, size, form and primary components are indicated on the drawings or in the specification section pertaining to the corresponding work.
B. Mock-up shall be located where indicated on the drawings or, if not indicated, shall be located where directed by the Owner/Architect.
C. Mock-up shall not be provided until corresponding product data, shop drawings, samples and other preparatory submittals are approved.
D. Mock-up shall be rebuilt as necessary until approved by Owner/Architect.
E. After approval, mock-up shall remain and serve as the standard for judging the acceptance or rejection of the appearance characteristics and workmanship of corresponding product data, shop drawings, samples and other preparatory submittals are approved.
F. Mock-up shall be rebuilt as necessary until approved by Owner/Architect.
G. After approval, mock-up shall remain and serve as the standard for judging the acceptance or rejection of the appearance characteristics and workmanship of corresponding construction.
H. After completion and acceptance of the corresponding construction, mock-up shall be removed when directed by the Architect unless approved mock-up has been incorporated as part of the permanent construction.
I. The General Contractor shall coordinate with necessary trades to construct mock-up to reflect actual construction.

1.03 DEFINITIONS

A. Mock-ups (General): Full-size physical assemblies that are constructed on-site. Mock-ups are constructed to verify selections made under sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances.

1. Mock-ups are not samples.
2. Unless otherwise indicated, approved mock-ups establish the standard by which the work will be judged.

B. Integrated Exterior Mock-ups: Mock-ups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.

C. Room Mock-ups: Mock-ups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings, equipment, and lighting, complete to final cleaning.

1.04 QUALITY ASSURANCE

A. Pre-Construction Conference: Prior to the construction of the mock-up, a conference will be called by the Prime Contractor requiring meeting at the Site for the purpose of reviewing the requirements, and intent of mock-up. The conference shall be attended by the Construction Manager, Prime Contractor, A/E and person supervising this phase of the Work for each sub trade.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Materials used in the initial mock-up construction shall comply as specified in the applicable sections for the work and as approved by submittal reviews.
B. Materials may be modified only to the extent required for mock-up approval by the Architect.
1. Modified materails shall comply with the specified requirements.
C. Materials used in the construction of approved mock-up construction shall be used in the corresponding permanent construction upon final approval and acceptance.

PART 3 – EXECUTION

3.01 INSTALLATION

A. Before installing portions of the Work requiring mock-ups, build mock-ups for each form of construction and finish as directed.
1. Build mock-ups in location and of size and profile indicated or, as directed by the Architect's representative.
2. Notify the Architect's representative a minimum of 14 days in advance of dates and times when mock-ups will be constructed and able to be inspected.
3. Employ supervisory personnel to oversee mock-up construction. Employ same workers that will be employed during the construction of the project.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Commence the Work after mock-up has been inspected and approved in writing by Architects Representative.
6. The mock-up will establish the standard of quality of workmanship by which the work will be judged.
7. Maintain mock-ups during construction in an undisturbed condition as a standard for judging the completed work. Failure to maintain the mock-up, until directed, will be cause for rejection of the work.
8. Demolish and remove mock-ups when directed unless otherwise indicated.

B. Mock-up Types: Construct mock-up in accordance with approved shop drawings, project manual, and Contract Drawings, using exact materials and methods approved for the Project, including required accessories.

1. Brick masonry with mortar joints and accessories, including wall copings
2. Pre-cast concrete profiles and finish.
3. Rubbed concrete finish.
4. Roof system terminations, including parapet wall cladding, flashings, and wall copings
5. Epoxy crack injection.
6. Gypsum board.

Coordinate this list with Section 013219 2.01 4.

END OF SECTION 014339

SECTION 01 45 00 - QUALITY CONTROL

PART 1 - GENERAL

1.1 Special Inspections is the monitoring of materials and workmanship that are critical to the integrity of the building structure. It is typically the review of the work of the General Construction Contractor as required by Section 1704 of the New York State Building Code (BC-NYS), to assure that the approved drawings and specifications are being followed and that relevant code and reference standards are being observed. The Special Inspection process is in addition to the inspections conducted by the Owner's Construction Manager and the design professional as part of structural observations. These inspections will be provided by the Owner by a separate independent Special Inspections Contractor.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

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

1. Specific quality-assurance and -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 tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.
   a. All Prime Contracts: Verify all Specification Sections for testing requirements in addition to the following:
      1) Testing done for the convenience of the Prime Contractor or their Sub-Contractors.
      2) Testing related to remedial operations or possible defects.

C. Related Requirements:

1. Division 01 Section “Cutting and Patching” for repair and restoration of construction disturbed by testing and inspection activities,
2. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.4 DEFINITIONS

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

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

C. Mockups: Full-size physical assemblies that are constructed on-site. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1. Laboratory Mockups: Full-size physical assemblies constructed at testing facility to verify performance characteristics.
2. Integrated Exterior Mockups: Mockups of the exterior envelope erected separately from the building but on Project site, consisting of multiple products, assemblies, and subassemblies.
3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes, doors, windows, millwork, casework, specialties, furnishings and equipment, and lighting.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.

E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.

G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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

I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.

1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

J. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

1.5 CONSTRUCTION TESTING

A. Prime Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, each Prime Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. Costs for these services are to be included in the Contract Sum.

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are Prime Contractor's responsibility, Prime Contractor shall employ and pay a qualified independent testing agency to perform quality-control services.

2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing agency to perform those services.

a. Where the Owner has engaged a testing agency and Prime Contractor is also required to engage an entity for the same or related element, the Prime Contractor shall not employ the entity engaged by the Owner, unless agreed to in writing by the Owner.

B. Retesting: Prime 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 Prime Contractor's responsibility.

1. Cost of retesting construction, revised or replaced by Prime Contractor, is Prime Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements.

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. Ladders.
4. Provide facilities for storage and curing of test samples.
5. Delivery of samples to testing laboratories.
6. Provide design mix documentation.
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 Construction Manager and Prime Contractor 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, Construction Manager and Prime Contractor 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 Prime 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. Each Prime Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities through the Construction Manager.

1.6 CONFLICTING REQUIREMENTS

A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.7 ACTION SUBMITTALS

A. Shop Drawings: For integrated exterior mockups, provide plans, sections, and elevations, indicating materials and size of mockup construction.

1. Indicate manufacturer and model number of individual components.
2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.8 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:

1. Seismic-force-resisting system, designated seismic system, or component listed in the designated seismic system quality-assurance plan prepared by Architect.
2. Main wind-force-resisting system or a wind-resisting component listed in the wind-force-resisting system quality-assurance plan prepared by Architect.

B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

C. Schedule of Tests and Inspections: Prepare in tabular form and include the following:

1. Specification Section number and title.
2. Entity responsible for performing tests and inspections.
3. Description of test and inspection.
4. Identification of applicable standards.
5. Identification of test and inspection methods.
6. Number of tests and inspections required.
7. Time schedule or time span for tests and inspections.
8. Requirements for obtaining samples.
9. Unique characteristics of each quality-control service.

1.9 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

1. Date of issue.
2. Project title and number.

3. Name, address, and telephone number of testing agency or inspecting agency.
4. Dates and locations of samples and tests or inspections.
5. Names of individuals making tests and inspections.
6. Description of the Work and test and inspection methods, citing ASTM reference standard used.
7. Identification of product and Specification Section.
8. Complete test or inspection data.
9. Test and inspection results and an interpretation of test results.
10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
12. Name and signature of laboratory inspector.
13. Recommendations on re-testing and re-inspecting.

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of technical 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.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

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

1.10 QUALITY ASSURANCE

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

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

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

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

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

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

1. Each independent inspection and testing agency engaged shall be authorized by jurisdiction to operate in the state where Project is located.

2. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.

3. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

4. Testing agency qualifications must be approved by the Architect prior to proceeding with work.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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

J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

a. Provide test specimens representative of proposed products and construction.
b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

K. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, through Construction Manager, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

L. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:

1. Build mockups in location and of size indicated or, if not indicated, as directed by Architect.
a. Construct mockups complete, including work of all trades required in finished Project.

2. Notify Architect and Construction Manager seven (7) calendar days in advance of dates and times when mockups will be constructed.

3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction at Project.

4. Demonstrate the proposed range of aesthetic effects and workmanship.

5. Obtain Architect's approval of mockups before starting work, fabrication, or construction.
   a. Allow seven (7) calendar days for initial review and each re-review of each mockup.

6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

7. Demolish and remove mockups when directed unless otherwise indicated.

M. Integrated Exterior Mockups: Construct integrated exterior mockup as indicated on Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials.

N. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections in Divisions 02 through 33.

1.11 QUALITY CONTROL

A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.

1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.

2. Costs for re-testing and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.

B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.

1. Unless otherwise indicated, provide quality-control services specified.

2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
   a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.

3. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspecting will be performed.

4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in triplicate, of each quality-control service.

5. Contractor shall furnish to the Laboratory such samples of materials as may be necessary for testing purposes.

6. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.

7. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in pre-installation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

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

F. Testing Agency and Special Inspector Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect, Construction Manager, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.

3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.

5. Does not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.

6. Do not perform any duties of the Contractor.

7. Submit reports to the Architect, Construction Manager, and Contractor within seven (7) calendar days of the test.

G. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

1. Provide safe access to items to be tested. This includes sheeting and ladders for deep excavation; scaffolding and ladders for inspection and testing of superstructure items. Incidental labor and facilities necessary to facilitate tests and inspections.
2. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
3. Facilities for storage and field curing of test samples.
4. Delivery of samples to testing agencies.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspecting equipment at Project site.

H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule. Update as the Work progresses.

1. Distribution: Distribute schedule to Owner, Architect, Construction Manager, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
2. Provide and maintain, for the sole use of the Testing Agency, adequate facilities for safe storage and proper curing of concrete test cylinders on the project site for the first 24 hours as required by ASTM C31-69.

1.12 SPECIAL TESTS AND INSPECTIONS

A. General: Special Inspections and Structural Testing shall be in accordance with Chapter 17 of the *Building Code of New York State (BC-NYS).*

B. Special Tests and Inspections: Owner will engage a qualified special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work. The General Construction Contractor shall provide adequate documentation as requested by the design professional to determine that the off-site fabrication of structural members and assemblies is in compliance with the intent of Section 1704.2-1704.2.2 of the BC-NYS. The fabricator of said components must demonstrate an established quality control program with quality control personnel conducting regular inspections to verify that the work is in

conformance with the requirements of the BC-NYS and applicable reference standards.

2. Notifying Architect, Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect, through Construction Manager, with copy to Contractor and to authorities having jurisdiction. The Special Inspections Contractor will furnish copies of all test and Special Inspection reports as follows;
   .1 Construction Manager – 2 copies
   .2 Design Professional – 1 copy
   .3 Prime Contractor – 1 copy

3. Submitting a final report of special tests and inspections at Substantial Completion, which shall include a list of unresolved deficiencies.

4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.

5. Re-testing and re-inspecting corrected work.

C. Qualifications: The Special Inspector shall be a Professional Engineer licensed in New York State.

1. The Testing Agency shall meet all the qualifications stated elsewhere in this Section and shall be approved by the Architect.

2. Inspectors: Special Inspections shall be performed by inspectors who are either Professional Engineers licensed to practice in the State of New York, or Engineers-In-Training (EIT) with an education and background in structural engineering except as indicated below:

   a. Special Inspection of soils and foundations may be conducted by Professional Engineers or EIT's with an education and background in geotechnical engineering.
   b. Technicians conducting tests of concrete shall be an ACI certified Concrete Field Technician – Grade 1 or higher.
   c. Personnel conducting inspections of concrete work may be an ACI certified Concrete Construction Inspector or other qualified individuals designated and supervised by the Special Inspector, with experience inspecting concrete work.
   d. Personnel conducting inspections of other work including but not limited to masonry, wood framing, and steel framing, may be individuals with experience inspecting such work, and designated and supervised by the Special Inspector.
   e. Technicians conducting tests or inspections of welds shall be AWS Certified Welding Inspectors. Technicians conducting ultrasonic testing shall also be certified as an ASNT-TC Level II or Level III technician.
   f. Technicians performing standard tests described by specific ASTM Standards shall have training in the performance of such tests and must be able to demonstrate either by oral or written examination competence for the test being conducted. Such Technicians shall not evaluate test results.

g. Technicians of Testing/Inspecting Agencies for smoke control shall have experience in fire-protection engineering, mechanical engineering, and shall have certification as air balancers.

3. Submittals: The Special Inspector and Testing/Inspecting Agency shall submit to the Architect for review, a copy of their qualifications which shall include the names and qualifications of each of the individual inspectors and technicians who will be performing same.

4. Conflicts of Interest: The Special Inspector and Testing/Inspecting Agency shall disclose any past or present business relationship or potential conflict of interest with the Contractors or Sub-contractors whose work will be inspected or tested.

D. Owner Responsibilities: The Owner will Contract with and pay for the services of the Special Inspector.

1. Contract Documents: The Owner will provide the Special Inspector with a complete set of Contract Documents, sealed by the Architect and approved by the Authorities Having Jurisdiction (AHJ).

E. Contractor's Responsibilities for Special Inspections: The Contractor will cooperate with the Special Inspector and their agents so that the Special Inspections and Testing may be performed without hindrance.

1. Notification: The Contractor shall notify the Special Inspector and Testing agency at least forty-eight (48) hours in advance of a required inspection or test as indicated in the Schedule of Special Inspections.

2. Access: The Contractor shall provide incidental labor and facilities to provide safe access for the Special Inspector or their agents to the work to be inspected or tested;

a. To obtain and handle samples at the site or at the source of products to be tested,
b. To facilitate tests and inspections,
c. To storage and curing of test samples on site.

3. Distant Fabricators: If any material(s) or fabricator(s) that require Special Inspections are fabricated in a plant over 200 miles away from the Project Site and the Special Inspector is required to visit the plant, then the Contractor shall be responsible for reimbursing the Special Inspector for mileage and travel expenses incurred beyond that distance limitation.

4. Re-testing/Re-inspection: The Contractor will be responsible for the cost of any retesting or re-inspection of work which fails to comply with the requirements of the Contract Documents.

5. The Contractor shall allow the Special Inspectors or their agent's use of current, updated Construction Documents showing changes to the Work, including but not limited to submittals and shop drawings that have been approved by the Architect.

F. Limitations of Special Inspector's Authority: The Special Inspector shall not:

1. …release, revoke, alter, or enlarge on the requirements of the Contract Documents.
2. …have control over the Contractor's means and methods of construction.
3. …be responsible for construction site safety.
4. …have the authority to stop work.

G. Testing/Inspecting Agency Responsibilities to the Special Inspector: After the work requiring special inspections is complete, each testing/inspecting agency shall provide an "Agent's Final Report of Special Inspections" to the Special Inspector, stating that testing was completed in substantial conformance with the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
   1. Date test or inspection was conducted.
   2. Description of the Work tested or inspected.
   3. Date test or inspection results were transmitted to Architect.
   4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
   1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Division 01 Section 01 73 29.

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

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

3.3 FINAL REPORT OF SPECIAL INSPECTIONS

A. The Final Report of Special Inspections shall be completed by the Special Inspector and submitted to the Architect and Owner prior to issuance of a Certificate of Occupancy.

B. Use *Form 102-2001* published by the Council of American Structural Engineers, or other similar form.

1. The Final Report of Special Inspections shall state that required inspections have been performed and shall itemize any discrepancies which were not corrected nor resolved.

3.4 SCHEDULE OF SPECIAL INSPECTIONS

The following schedule indicates those special inspections that will be performed on this project. This schedule will updated by the Architect/Engineer for each Project site, as applicable.

TYPE OF INSPECTION	QUANTITY OF SPECIAL INSPECTIONS
1. SOILS - EXCAVATION & FILL	
A) Visual inspection to confirm proper site prep and/or extent or continuation of excavation due to poor soil conditions.	*One inspection near completion of excavation.*
B) Visual inspection to confirm proper installation procedures of fill/backfill operations (greater than 12").	*One inspection during second half of backfilling (concurrent with sieve analysis & proctor).*
C) Sieve analysis testing of fill materials (ROB, stone, sand, etc) being used at site.	*One sieve test of fill material during second half of backfilling process.*
D) Modified proctor of cohesive soils for Moisture-Density Relations using 10 lb. hammer & 18" drop (D1557).	*One proctor test during second half of backfilling process.*
E) Density by Nuclear Gauge.	*Not Required.*

2. CONCRETE CONSTRUCTION

A)	Visual inspection of reinforcing steel and anchor bolts for placement, bar laps, spacing, size, bends, etc. and forms for stability, design conformance, releasing agents, snap-ties, etc. prior to and during concrete placement to confirm proper installation procedures (ACI 318: 3.5, 7.1-7.7).	*One inspection of strip footing forms & rebar at beginning of pour (concurrent with pour sampling). One inspection of foundation wall forms & rebar at beginning of pour (concurrent with placement inspection & pour sampling).*
B)	Visual inspection of concrete being placed and vibration to confirm proper installation procedures (ACI 318: 5.9 - 5.10). (Typically concurrent with sample collection)	*One placement inspection during pour of foundation walls (concurrent with concrete sampling).*
C)	Concrete sampling includes; Sampling (ASTM C172), Slump Test (ASTM C143), Air Content (ASTM C173) and (5) Compressive Strength Cylinders (ASTM C31 or C192).	*One test set during pour of footings. One test set during pour of foundation wall.*
D)	Compressive Strength on Concrete Cylinders - Includes capping, curing, cylinder molds (ASTM C31 and C39). Scheduled breaks (unless directed otherwise): 1 @ 7-day, 3 @ 28-day and 1 @ 56-day. If the first 2 of the 3 @ 28-day breaks are low, hold the third 28-day break for an additional 56-day break.	*One test set for footings. One test set for foundation wall.*
E)	Visual inspection for maintenance of specified curing temperature and technique (ACI 318: 5.11-5.13).	*Not Required.*
F)	Visual inspection of the erection of precast concrete members for placement, reinforcement, connections, grouting, etc. (ACI 318: ch 16).	*One site inspection during erection. One site inspection during grouting.*

3. MASONRY CONSTRUCTION

A)	Visual inspection of masonry including placement of units and mortar joints (ACI 530.1: art 2.6A); placement, size and location of reinforcement, type of connectors and anchorage (ACI 530. art 2.4 & 3.4); clear grout space (ACI 530.1: art 3.2D); proportions of site prepared grout (ACI 530.1: art 2.6B); placement of grout (ACI 530.1: art 3.5) to confirm proper installation procedures.	*One site inspection of cmu & reinforcing during first third of masonry erection including grout review. One site inspection during second third of masonry erection (concurrent with mortar sample). One site inspection during grouting operation (concurrent with grout sample).*
B)	Visual inspection for maintenance of specified curing temperature and technique during hot or cold weather (ACI 503.1: art 1.8).	*Not Required.*
C)	Preparing grout and/or mortar specimen prisms (ACI 530.1: art 1.4).	*One mortar specimen. One grout specimen.*
D)	Grout specimen compression test (4"x4"x8").	*One grout compression test.*
E)	Mortar cube compression test (2"x2"x2").	*One mortar compression test.*

4. STEEL CONSTRUCTION

A)	Visual inspection of structural steel for component verification in conformance with ASTM standards including steel frame joint details (ASTM A6 or A568).	*One site inspection at completion of steel erection (concurrent with weld inspection).*
B)	Visual and torque inspection of bolted connections (AISC LRFD)	*Not Required.*
C)	Visual inspection of welds by AWS methods and standards (AWS D1.1 or D1.3)	*One site inspection at completion of steel erection.*
D)	Butt welds for structural steel testing by Ultrasonic inspection (AWS Method).	*Not Required.*

E) Fillet welds for structural steel inspection by Magnetic Particle inspection (AWS Method). *Not Required.*

PART 4 - PRODUCTS

(Not applicable)

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SECTION 01 50 00 - TEMPORARY FACILITIES & CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions of the contract for construction and other Division 0 and 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary facilities and controls, including temporary utilities, construction, support facilities, and security and protection.

B. Temporary utilities include, but are not limited to, the following:

1. Heating, Cooling and Ventilation
2. Gas
3. Water
4. Waste Piping / Sewers
5. Temporary Sanitary Facilities
6. Telephone
7. Data / Internet
8. Electric Power and Lighting

C. Temporary Construction includes, but is not limited to, the following:

1. Temporary Site Entrance, Parking and Staging Areas
2. Temporary enclosures
3. Construction aids and miscellaneous services and facilities.

D. Support facilities include, but are not limited to, the following:

1. Field Offices and Storage Sheds.
2. Hoists and temporary elevator use.
3. Temporary project identification signs and bulletin boards.
4. Waste disposal services.
5. Rodent and pest control.

E. Security and protection facilities include, but are not limited to, the following:

1. Temporary fire protection.
2. Barricades, guard rails, warning signs, and lights.
3. Environmental protection.

1.3 DIVISION OF RESPONSIBILITIES

A. **Permanent Enclosure:** As determined by Architect, permanent or temporary roofing is complete, insulated and water-tight; exterior walls are insulated and water-tight; and all openings are closed with permanent construction or substantial temporary closures.

B. Refer to Section 00 10 00 Summary of Work, for the specific assignment of responsibility for Temporary Facilities and Controls. Each Prime Contractor is responsible for the following:

1. Installation, operation, maintenance and removal of each temporary facility and control considered as its own normal construction activity.
2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
3. Its own storage and fabrication sheds.
4. Hoisting requirements, including hoisting loads in excess of 2 tons, hoisting material or equipment into spaces below grade, and hoisting requirements outside the building enclosure.
5. Collection and disposal of its own hazardous, dangerous, unsanitary or other harmful waste material.
6. Secure lockup of its own tools, materials, and equipment.
7. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.
8. Smoking ban on Rochester City School District property - Contractor's employees are strictly forbidden to use any tobacco product on site. Being caught on district property with tobacco products will result in immediate and permanent dismissal from district property.
9. Clean up around dumpsters and legally disposal of all debris.
10. Firearms, tobacco products, pornography, drugs and alcohol are strictly forbidden. Anyone caught in possession of any of these items is subject to immediate and permanent dismissal from the project.

1.4 USE CHARGE

A. **General:** Each Prime contractor is responsible to maintain existing utility services at all times during construction providing continuation and connection of all utilities. Each Prime contractor is responsible for all temporary usage charges to maintain existing building services and utilities during shutdowns, disruption of services, etc. Likewise the Contractor responsible for the shutdown is also responsible for all costs associated with providing labor and material for the continuation and connection of the disrupted service. All labor, material and equipment necessary to provide and maintain all other temporary utilities will be provided by each Prime contractor per base bid and as described in Section 01 50 00 “Temporary Facilities and Controls” and Section 01 10 00 Summary of Work.

B. **Water Service and Sewer:** The Owner shall provide water and sewer from the Owner's existing service. The existing (metered) service shall remain operational until the new service is connected. The Owner will pay costs of water consumed for normal construction operations. The Contractor shall take measures to conserve usage. Any need beyond that provided by the existing service is the responsibility of each Prime Contractor to furnish and install for its use including all associated costs. Additionally, the responsible contractor causing abuse, vandalism, etc. to existing services will be responsible for its repair. Each Prime contractor is to provide temporary water and sewer for all areas under construction for shutdowns and disruptions caused by that contractor.

C. **Electric Power Service:** The Owner shall provide electric from the Owner's existing service. The existing (metered) service shall remain operational until the temporary electric service is operational. The temporary electric service shall then remain operational until the new service is connected. The Owner will pay costs of electric use and consumption provided metering is provided meeting the requirements of the Utility Company and the Rochester City School District. Any need beyond what the buildings provide is the responsibility of each Prime Contractor to furnish and install for its use including all associated costs. Additionally the responsible contractor causing abuse, vandalism etc. to existing services will be responsible for its repair. Each Prime contractor is to provide temporary electric power for all areas under construction for shutdowns and disruptions caused by that contractor.

D. **Gas Service:** The Owner shall provide gas from the Owner's existing services. The existing (metered) service shall remain operational until the temporary gas service is operational. The temporary gas service shall then remain operational until the new service is connected. The Owner will pay costs of electric use and consumption provided metering is provided meeting the requirements of the Utility Company and the Rochester City School District. Any need beyond what the buildings provide is the responsibility of each Prime Contractor to furnish and install for its use including all associated costs. Additionally the responsible contractor causing abuse, vandalism etc. to existing services will be responsible for its repair. Each Prime contractor is to provide temporary gas services for all areas under construction for shutdowns and disruptions caused by that contractor.

E. Other entities using existing and temporary services and facilities include, but are not limited to, the following:

1. The Construction Manager.
2. Other non-prime Contractors.
3. The Owner's work forces.
4. Occupants of the Project.
5. The Architect, Engineers, or other Design Consultants.
6. Testing or inspection agencies.
7. Personnel of government agencies.

8. Other Prime Contractors.
9. The School District and authorized personnel.

1.5 SUBMITTALS

A. **Temporary Facilities:** Each Prime Contractor shall submit a plan for the implementation of all temporary facilities and utilities for the project.

B. Each Prime Contractor shall immediately apply to local, town, or the utility company, for necessary permits and services and pay all fees as may be required.

C. Each Prime Contractor shall submit a detailed plan for temporary facilities and controls.

D. Each Prime Contractor shall submit reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.

E. **Implementation and Termination Schedule:** Within fifteen (15) days of the date established for submittal of the Contractor's Construction Schedule, each Prime Contractor shall submit a schedule indicating implementation and termination of each temporary utility for which the Contractor is responsible.

1.6 QUALITY ASSURANCE

A. **Regulation:** Comply with industry standards and with applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. State Education Department.
3. Health and safety regulations.
4. Utility company regulations.
5. Police, fire department and rescue squad rules.
6. Environmental protection regulations.

B. **Standards:** Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI-A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with the normal application of trade regulations and union jurisdictions but merely to assign responsibility to a Prime Contractor.

2. Electrical Service: Comply with NEMA, NECA and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

C. **Inspections:** Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits and pay all associated fees. Submit a copy of all certification and permits to the Construction Manager.

D. **Uniform Safety Standards for School Construction and Maintenance projects:** (refer to Section 01 10 00 Summary of Work for designation of specific responsibilities associated with the following standards):

1. The occupied portion of any school building shall always comply with the minimum requirements necessary to maintain a certificate of occupancy.
2. Provide documentation that all school areas to be disturbed during renovation or demolition have been or will be tested for lead and asbestos. Note: The project folder should contain a letter regarding the presence of asbestos.
3. The following are general safety and security standards for construction projects:
   a. All construction materials shall be stored in a safe and secure manner.
   b. Fences around construction supplies or debris shall be maintained.
   c. Gates shall always be locked unless a worker is in attendance to prevent unauthorized entry.
   d. During exterior renovation work, overhead protection shall be provided for any sidewalks or areas immediately beneath the work site or such areas shall be fenced off and provided with warning signs to prevent entry.
   e. Workers shall be required to wear photo identification badges at all times for identification and security purposes while working at occupied sites.
4. Separation of construction areas from occupied spaces. Construction areas under the control of a contractor and therefore not occupied by District staff or students shall be separated from occupied areas. Provisions shall be made to prevent the passage of dust and contaminants into occupied parts of the building. Periodic inspection and repairs of the containment barriers must be made to prevent exposure to dust or contaminants. Gypsum board must be used in exit ways or other areas that require fire rated separation. Heavy-duty plastic sheeting may be used only for a vapor, fine dust or infiltration barrier, and shall not be used to separate occupied spaces from construction areas.
   a. In general, workers may not use corridors, stairs or elevators designated for students or school staff.
   b. Large amounts of debris must be removed by using enclosed chutes or a similar sealed system. There shall be no movement of debris through halls of occupied spaces of the building. No

material shall be dropped or thrown outside the walls of the building.

c. All occupied parts of the building affected by renovation activity shall be cleaned at the close of each workday. School buildings occupied during a construction project shall maintain required health, safety and educational capabilities at all times when classes are in session.

5. Provide a plan detailing how exiting required by the applicable building code will be maintained.
6. Provide a plan detailing how adequate ventilation will be maintained during construction.
7. Construction and maintenance operations shall not produce noise in excess of 60 dba in occupied spaces. Otherwise, Work shall be scheduled for times when the building or affected building spaces are not occupied, or acoustical abatement measures shall be taken.
8. Each Prime Contractor shall be responsible for the control of chemical fumes, gases, and other contaminates produced by welding, gasoline or diesel engines, roofing, paving, painting, etc., to ensure they do not enter occupied portions of the building or air intakes. **All diesel engines shall be equipped with catalytic converters to minimize smoke and fumes.**
9. Each Prime Contractor shall be responsible to ensure that activities and materials which result in "off-gassing" of volatile organic compounds such as glues, paints, furniture, carpeting, wall covering, drapery, etc. are scheduled, cured or ventilated in accordance with manufactures recommendations before a space can be occupied.
10. Large and small asbestos projects as defined by 12NYCRR56 shall not be performed while the building is occupied. It is New York State interpretation that the term "building" as referenced in this section means a wing or major section of a building that can be completely isolated from the rest of the building with sealed non-combustible construction. The isolated portion of the building must contain exits that do not pass through the occupied portion and ventilation systems must be physically separated and sealed at the isolation barrier. If so isolated and unoccupied the abatement project may proceed in the building.
11. Exterior work such as roofing, flashing, siding, or soffit work may be performed on occupied buildings provided proper variances are in place as required and complete isolation of ventilation systems and at windows is provided. Care must be taken to schedule work so that classes are not disrupted by noise or visual distraction.
12. Surfaces that will be disturbed by reconstruction must have a determination made as to the presence of lead. Projects which disturb surfaces that contain lead shall have in the specifications a plan prepared by a certified Lead Risk Assessor or Supervisor which details provisions for occupant protection, worksite preparation, work methods, cleaning and clearance testing which are in general accordance with the HUD guidelines and EPA and OSHA regulations.

1.7 PROJECT CONDITIONS

A. **Temporary Utilities:** Each Prime Contractor shall prepare a schedule indicating dates for implementation and termination of each temporary utility for which the Contractor is responsible. At the earliest feasible time, when acceptable to the Owner, change over from use of temporary service to use of permanent service.

B. **Conditions of Use:** Each Prime Contractor shall 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. **Temporary Use of Permanent Facilities:** The Owner reserves the right, in the best interest of the project, to utilize permanent building components as temporary methods to continue the construction process. Not unlike other components of the project, upon installation, the permanent components become the property of the Owner and shall not be controlled by any one Contractor. The Installer of each permanent service shall assume responsibility for its operation, maintenance, and protection during use as a construction facility prior to the Owner's acceptance, regardless of previously assigned responsibilities, without voiding any warranty / guarantee.

PART 2 - PRODUCTS

2.1 MATERIALS

A. **General:** Each Prime Contractor shall provide new materials. If acceptable to the Architect, undamaged, previously used materials in serviceable condition may be used. Provide materials suitable for use intended.

B. **Lumber and Plywood:** Comply with requirements in Division 6 Section "Rough Carpentry."

1. For job-built temporary offices, shops, and sheds within the construction area, provide UL-labeled, fire-treated lumber and plywood for framing, sheathing, and siding.
2. For signs and directory boards, provide exterior-type, Grade B-B high-density concrete form overlay plywood of sizes and thickness indicated.
3. For fences and vision barriers, provide minimum 3/8-inch- (9.5-mm-) thick exterior plywood.

C. **Gypsum Wallboard:** Provide gypsum wallboard on interior walls of temporary offices.

D. **Roofing Materials:** Provide UL Class A standard-weight asphalt shingles or UL Class C mineral-surfaced roll roofing on roofs of job-built temporary offices, shops, and sheds.

E. **Paint:** Comply with requirements of Division 9 Section "Painting."

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 applied graphics, provide exterior-grade alkyd gloss enamel over exterior primer.
3. For interior walls of temporary offices, provide 2 coats interior latex-flat wall paint.

F. **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.

G. **Water:** Each Prime Contractor shall provide potable water approved by local health authorities for their employees and personnel.

H. **Construction Fencing:** 6'-0" high driven temporary construction fencing exists as installed by Contract #C-07. Maintain fence, gates and locks in good condition.

I. **Safety Fencing:** Each Prime Contractor shall provide orange plastic safety fencing with a 10-gauge wire between posts to prevent any sagging. For purposes of safety and warning, comply with all OSHA regulations.

2.2 EQUIPMENT

A. **General:** Each Prime Contractor shall provide new equipment. If acceptable to the Architect, undamaged, previously used equipment in serviceable condition may be used. Provide equipment suitable for use intended, where and if required.

B. **Water Hoses:** Provide 3/4-inch (19-mm) heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet (30 m) 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-V 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. Provide exterior fixtures where exposed to moisture.

F. **Heating Units:** Provide temporary heating units that have been tested and labeled by UL, FM, or another recognized trade association related to the type of fuel being consumed. Provide gas piping in compliance with the fuel gas code of New York State.

G. **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. Relocate as directed by the Construction Manager. Modify facilities as required at no additional cost to the owner.

B. Each Prime Contractor shall provide each facility ready for use when needed to avoid delay to the Project. Maintain, modify and relocate as required at no addition cost. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. **General:** Engage the appropriate local utility company to install temporary service, or connect to existing service if necessary and applicable. Where the company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with the 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.

B. **Temporary Electric Service and Lighting:**

1. **Electrical Work Contract #9** shall provide and maintain temporary electric service consisting of main power hook-up, power service to temporary field offices, staging areas, and work areas in new construction, additions and renovation areas, panel boards, switchboards, temporary lighting for site and renovations and new buildings, power to temporary heating & ventilation equipment, temporary equipment, and branch circuit wiring. The staging areas and building construction and renovation may require separate services. Services for each area shall be minimum 400 amp, 3-phase, unless otherwise authorized by the Construction Manager. Temporary service shall be operational seven (7) days a week, 24 hours per day, maintained during all work periods, and shall comply with all codes and regulations. System shall be modified as required or as directed by the Construction Manager as work progresses.
2. All temporary electrical systems shall, as a minimum, conform to OSHA Standards. In addition, minimum light levels in all building work areas shall be maintained at twenty (20) foot candles. Provide time clocks and one (1) lighting control contactor for every fifteen thousand (15,000) square feet of building construction area.
3. The temporary power to the buildings and staging areas shall be continuous. Lighting in the new building and additions shall be energized daily from 6:00 AM to 11:00 PM as a minimum duration and shall accommodate all second and third shift work including weekends. Provide lamp replacement to maintain required lighting levels.
4. **Electrical Work Contract #9** shall provide continuous operation of the building fire alarm system(s), whether temporary or permanent. Replace existing smoke heads with heat detectors to avoid false alarms from dust. Reinstall at project completion.
5. **Electrical Work Contract #9** shall provide a minimum of 1,000 LF of additional temporary lighting in corridors or where located by the Construction Manager and conforming to OSHA Standards. Temporary lighting must meet the minimum OSHA requirement.
6. **Electrical Work Contract #9** shall provide the temporary electrical service required for the construction operation.
7. This specification applies to all temporary wiring for lighting, power and systems to be provided by the **Electrical Work Contract #9**
8. All temporary wiring and equipment shall be in conformity with the National Electric Code.

9. The **Electrical Work Contract #9** shall provide and maintain temporary power to existing Panels as required in the existing building and new panels within the new additions.
10. All wiring shall ensure safety from electrical shock and fire hazards.
11. Temporary wiring for construction work is to be turned off at its source when not in use and promptly removed when no longer required.
12. All temporary services shall meet applicable code requirements.
13. Proper circuit protection devices, conductor sizes, grounding practices, clamping and securing of equipment shall be adhered to.
14. The **Electrical Work Contract #9** shall provide service(s) sized sufficiently for building construction and office trailer locations.
15. The **Electrical Work Contract #9** shall pay all charges, costs, and expenses associated with the installation, removal, and restoration of the temporary and permanent electrical services including metering equipment.
16. Temporary electrical wiring in hazardous areas shall conform to the electrical classification of the area.
17. All motor and machine frames, control, starter, switch cabinets and other metal parts housing electrical equipment shall be grounded before energizing the electric equipment. Ground connections shall be secure and consistent with the current carrying connections.
18. Disconnect switches of devices shall be positioned in obvious and accessible locations. When more than one device is required, they shall be grouped together in one location.
19. Wires, conduits and cables shall be arranged neatly and located as far out of the way as practical. They are to be supported and confined so as to prevent hazards.
20. Supply lines and other similar connecting runs may be in conduit, wire ways and approved cable assembly or flexible conduit. The cable shall include a grounding conductor.
21. Temporary electrical wiring shall meet the requirements of all area environmental conditions (water, oil temperature, etc.) and comply with the latest applicable codes and OSHA requirements.
22. Each Contractor shall provide its own extension cords and other equipment. Welding equipment shall run from generator trucks.
23. The number of temporary light strands on each lighting circuit (2-wire plus ground) is not to exceed 10 and will be compliant with the current NEC and OSHA requirements.
24. Protective devices shall not exceed 20 amperes.
25. Lamps shall be inside-frosted, rough-service, medium screw-base, 150-watt, 120-volt. Insulated lamp guards shall be used.
26. The minimum temporary lighting to be provided is at the rate of one-quarter watt per square foot and is to be maintained in each room and changed as required when interior walls are being erected. The required temporary lighting must be maintained for twenty-four (24) hours a day and seven (7) days a week at all stair levels and in all corridors below ground; in all other spaces temporary lighting is to be maintained only during working hours. The temporary power and lighting to the staging

areas shall be continuous. Maintenance of the temporary lighting, including lamp replacement, shall be the responsibility of the **Electrical Work Contract #9** .

27. The Electrical Contractor will maintain lighting and make routine repairs as well as modify the systems to meet changing construction needs as required by all codes. This work will be performed only after notification to and approval (in writing) from the Owner/Construction Manager.
28. Temporary Power (120-volt) for Portable Hand Tools
    a. Separate 3-wire extension cords shall be provided for portable hand tools by the Contractor requiring use of power for tools.
    b. Protective devices shall not exceed 20 amperes.
    c. Electrical Receptacles: **Electrical Work Contract #9** shall provide receptacles with proper NEMA configurations for voltages used. Receptacles outlets shall be equipped with ground fault circuit interrupters, reset buttons and pilot light, for connection of power tools and equipment. Portable electric tools that are used with an extension cord, but connected to a permanent receptacle inside or outside, shall also require GFCI's. GFCI's shall be tested in accordance with manufacturer's specifications (before use each day). Temporary outlets shall be installed so there is no more than 50' between outlets.
    d. The **Electrical Work Contract #9** shall provide in each addition and/or existing building area, a minimum of one (1) 100 amp panel box for temporary power per floor.
    e. The **Electrical Work Contract #9** shall provide, connect, relocate when necessary, disconnect and remove all power and control wiring necessary for temporary heating and ventilation units provided by others.
29. The **Electrical Work Contract #9** shall provide, connect, maintain and remove power to the temporary office trailers for each Prime Contractor. Temporary power may be obtained from the existing main service. These services shall remain at the end of the project and are to be installed per NEC with NEMA approved equipment and wiring.
30. From time to time it will be necessary to relocate/eliminate/change-over temporary power and lighting. The cost for this work is the responsibility of the **Electrical Work Contract #9** and the work will be coordinated with the Construction Manager to minimize non-productive time.
31. Temporary Power for Portable Electric Welding Machines, etc.
    a. Temporary electrical power for portable electric welding machines or similar equipment with high power demands is not available. Contractors requiring use of welding machines or similar equipment with high power demands are cautioned that an alternate method of power shall be provided by such contractor at no additional cost to the Owner.

32. Removal of Temporary Electrical Service shall be completed **Electrical Work Contract #9,** includes but not limited to:
    a. Completely remove temporary materials and equipment as soon as project schedule permits. The new electric service specified shall be completed expeditiously. The temporary service shall be removed as soon as possible. Coordinate removal with the Construction Manager.
    b. Repair damage caused by installation and restore to specified or to original condition.

C. **Temp Phone / Internet**

1. Each contractor shall arrange with local telephone company to provide direct line service to their job trailers if required.
2. Use of the Owner's permanent telephone system by construction personnel is not permitted.
3. Any contractor requiring phone service shall pay costs for installation, maintenance and removal of temporary services. In addition, each contractor is responsible for restoring location of temporary facilities to original condition or to the satisfaction of the Owner/Construction Manager.
4. Installation will be subject to the Construction Manager's approval for location of line and pole, if required.
5. Completely remove temporary materials and equipment upon completion of construction.
6. Repair damage caused by installation or use of temporary facilities.

D. **Temporary Water Service**

1. **Plumbing Work Contract #10** shall furnish and install temporary water service at time of job mobilization. All equipment and prep work (including permits) by this contractor.
2. **Plumbing Work Contract #10** shall extend the service as required for construction activities as directed by the Construction Manager or as stated elsewhere in the Contract Documents.
3. The Plumbing /Fire Protection Contractor (Contract #3) shall maintain system to provide continuous service with adequate pressure.
4. The **Plumbing Work Contract #10** shall remove temporary system when permanent system is operational.
5. The Owner/Construction Manager/Architect shall not incur any additional costs for removal and restoration of temporary water facilities.
6. Users shall provide their own hoses from hose bibs to points of need, but shall practice prudent conservation.

E. **Temporary Sanitary Facilities**

1. The **General Trades Contract #7** shall provide adequate chemical toilets for use of all Contractors' construction personnel, and shall maintain, service, and clean these facilities for the duration of the project. These facilities shall be as called for by OSHA, State and local codes and regulations. Provide all toilet supplies as required including toilet paper, soap, paper towels, and waste receptors.
2. Provide at least one unit for each ten (10) personnel on site.
3. Provide separate, well-identified, facilities for female personnel.
4. Location of units to be field coordinated with the Construction Manager.
5. Provide and maintain all units in a clean and sanitary condition. At the minimum, clean on a weekly basis, and more often as necessary. Provide all toilet supplies as required.
6. Toilets shall be relocated or removed as necessary at the direction of the Construction Manager.

F. **Temporary Heating/Ventilation/Cooling**

1. Prior to Permanent Building Enclosure and interior walls being prime painted, the **General Trades Contract #7** shall furnish temporary heat installation, maintain and remove any and all fuel piping necessary for temporary heating units. **General Trades Contract #7** shall furnish, maintain, pay for all necessary power requirements for temporary heating units and temporary controls, and assume relocation of the units will be required during construction. The temporary heating system will be used to:
   a. Facilitate progress of finish work.
   b. Protect work against dampness and cold.
   c. Provide suitable ambient temperatures and humidity levels for proper installation and curing of finish materials.
2. Maintain minimum 60 degrees F. temperatures. Seven (7) days prior to, during and after placing of interior finishes, woodwork, finish flooring, painting and other finishing: minimum 68 degrees F., maximum 74 degrees F, unless otherwise specified.
3. **General Trades Contract #7** shall provide as noted in other sections, any and all temporary enclosures necessary to close in sections of the buildings for temporary heat and to protect his/her work and others work from weather-related damage and as further clarified in the summary of work.
4. Specific areas (Additions) requiring heat for performance of work, (i.e. excavation, backfill, concrete, masonry, roofing, fireproofing, etc.), shall be provided by the Prime Contractor requiring the temporary heat.
5. Temporary heating utilizing propane or kerosene as an energy source shall not be used in the building.

6. Temporary heat will be utilized until permanent building enclosure is complete and New Mechanical systems are turned over to the Owner.
7. **General Trades Contract #7** shall maintain specified conditions for construction operations to protect materials and finishes from damage due to temperature once the building is permanently enclosed.
8. **General Trades Contract #7** shall be responsible for all costs, (exclusive of fuel consumption costs), associated with the temporary heating units. Since consumption rates to the School District are lower and exclude supply and delivery taxes, the District will pay for the fuel costs during construction.
9. The minimum maintained temperature in any work area shall be 60 degrees Fahrenheit.
10. The Owner will not accept utilization of the permanent HVAC system for temporary heat during the course of construction except for the following:
    a. Renovation spaces: permanent HVAC will be used 4 weeks prior to scheduled substantial completion.
11. Each Prime Contractor shall provide indoor air quality management. Reference (Division 01 Indoor Air Quality Requirements).
    a. Provide an exhaust air system for all project areas that will eliminate fumes, VOC's off-gases, gases, dusts, mists, or other emissions. Furnish and install as many air/dust filters necessary to provide clean air.
    b. Temporary building exhaust shall terminate at the building exterior.
    c. Provide air seals to prevent migration of airborne contaminants from unoccupied areas to occupied areas.
    d. Maintain a negative pressure between the work area and the space surrounding the work area.
    e. Before start of work, submit a design for the exhaust air system. Do not begin work until approval of the District is obtained for the following:
        (1) The number of machines required.
        (2) Location of the machines in the workspace.
        (3) Description of the methods used to test airflow and pressure differential.
    f. Systems operation:
        (1) A sufficient quantity of exhaust fans in existing window openings or other approved locations shall be operated with the following standards:
        (2) Provide one (1) workplace air change every 15 minutes.
        (3) To calculate total air flow requirement:

$$\text{TOTAL CFM} = \frac{\text{VOLUME OF WORK AREA (IN CF)}}{\text{15 MINUTES}}$$

        (4) To calculate the number of units needed for the work area:

NUMBER OF UNITS NEEDED = TOTAL CFM
(CAPACITY OF UNIT IN CFM)

g. Exhaust air system shall operate for a minimum of 72 hours after work is completed, or until all materials have cured sufficiently as to stop off-gassing of fumes and odors and area has been ventilated to remove all detectable traces of odors and fumes.
h. Maintain minimum twenty-five (25) feet of clearance from all temporary exhaust outlets to all active building areas. Furnish and install filters at exterior or exhaust outlets to eliminate the free flow of dust to outside areas.

G. **Temporary Fire Protection**

1. Provide temporary fire protection in the course of performing their work. Fire protection includes, but is not limited to, fire watchers, extinguishers, etc.
2. Provide per OSHA standards, a fire extinguisher at stairwells, (all floors), and temporary means of egress at all necessary locations as determined by the Construction Manager.
3. All Contractors are forewarned that there shall be no smoking allowed in construction work areas, existing District facilities or on District grounds.

H. **Temporary Construction**

1. Temporary bridging, decks, hoists, lifts, scaffolding, and cranes shall be the responsibility of Contractor requiring it.
2. First aid requirements are the responsibility of each Contractor.
3. Temporary partitions and barricades are the responsibility of each Prime contract. Construction shall be in accordance with Section 01065, NYSED Uniform Safety Standards for School Construction.

3.3 SUPPORT FACILITIES INSTALLATION

A. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities in designated area only.

1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the District.
2. Security is the responsibility of each Contractor.

B. Provide non-combustible construction for offices, shops, and sheds located within the construction area as directed. Comply with requirements of NFPA 241.

C. **Field Offices:** Each Prime Contractor may utilize one insulated, weather tight temporary office of sufficient size to accommodate personnel at the Project Site. Keep the office clean and orderly for use for small meetings. Location as approved by Construction Manager. Parking is restricted to foremen and/or superintendents only.

D. **Construction Manager Field Office**: Not required under this contract.

E. **Temporary Access Roads and Staging Area:**

1. Refer to Section 01 55 00A – Site Logistics Plan
2. Storage Sheds will be restricted to locations indicated on the Site Utilization Plan or by CM/Owner and as directed by the Construction Manager and may in no way interfere with the construction's daily activity or normal operation of School.
3. Temporary parking by construction personnel shall be allowed only in areas so designated on the Site Logistics Plan. On-site parking is limited. Each Prime Contractor is responsible to arrange for suitable and legal parking for their personnel.
4. Traffic Regulations:
   a. Utilize only designated entrances.
   b. Maintain all traffic regulations.
5. Construction parking will be allowed only in the area designated on the Site Logistics Plan and as designated by CM/Owner.
6. Staging Areas, including but not limited to temporary parking, equipment and material storage shall be temporarily stoned with crushed stone. Mirafi 500X, or equal, pavement fabric must be installed prior to installation of stone base. **Contract #7** will remove stone and restore to acceptable standard per contract documents as directed by Construction Manager at the end of the project, or when directed.
   a. Staging Areas: Includes footprint of storage areas and storage sheds. Minimum of 18" reference NYS DOT section 304.101 type 4 subbase course.
   b. Entrances: As shown on Site Logistics Plan.
7. **General Trades Contract #7** will provide snow and ice removal for the duration of the project. Include staging areas, contractor parking, office and storage trailer areas, Construction Manager offices, site access road and toilet areas are required to be cleared whenever snow depth reaches 3", or as required for site access and safety. Snow and ice removal shall be completed to maintain construction schedule milestones.
8. **General Trades Contract #7** will provide grass mowing and maintenance for the entire site from NTP to November 31st, 2020. This shall occur on weekly basis, and grass shall not exceed 3". This is required within and outside of the temporary fencing and shall include weed whacking as necessary.

F. **Dewatering Facilities and Drains:** For temporary drainage, dewatering facilities and operations directly associated with construction activities of the project, the Contractor requiring same shall be responsible for providing.

G. **Temporary Enclosures:** Provide temporary enclosures for exterior openings and exterior penetrations for protection of construction in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. **General Trades Contract #7** shall provide temporary enclosures of exterior openings to provide acceptable working conditions, to protect materials, to allow for temporary heating, and to prevent entry of unauthorized persons.
2. Where heat is needed and the permanent building enclosure is not complete, provide temporary enclosures where there is no other provision for containment of heat. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
3. Close openings through floor or roof decks and horizontal surfaces with load-bearing, wood-framed construction.
4. Where temporary wood or plywood enclosure exceeds 100 sq. ft. (9.2 s.m.) in area, use UL labeled fire-retardant-treated material for framing and main sheathing.
5. Generally, temporary closures for openings are the responsibility of the **General Trades Contract #7** and shall be provided to protect building from exterior elements.
6. **General Trades Contract #7** shall enclose all new window, entrance and curtain wall openings at the building with 2 x 4 wood blocking and reinforced 6 mil. Polyethylene sheets, in the additions as soon as perimeter exterior concrete blocks are placed and the **General Trades Contract #7** in the renovated areas immediately after removals. Removal and disposal to Dumpster of temporary window, entrance and curtain wall enclosures shall be by the **General Trades Contract #7.**
7. The **General Trades Contract #7** shall enclose roof openings with blocking, plywood and EPDM until roof top appurtenances are placed. Removal of these roof opening enclosures and disposal to Dumpster shall be by Contractor placing permanent equipment.
8. **General Trades Contract #7** shall be responsible for all temporary doors and locks until permanent systems are installed to building entrances.
9. At point where additions tie into existing buildings, **General Trades Contract #7** shall provide any demolition of veneer. The **General Trades Contract #7** shall temporarily or permanently flash rooflines watertight. **General Trades Contract #7** shall flash at wall or foundation intersections.
10. Temporary partitions shall be installed, maintained and removed under **General Trades Work Contract #7**. Temporary partitions shall be installed at all openings where required to protect property; to separate

and control dust debris, moisture, noise, access, sight, fire areas, safety and security, and to separate phased construction areas. Temporary partitions shall be insulated, constructed of noncombustible materials and have emergency egress doors and hardware where noted on drawings.

11. Each Contractor shall provide temporary protection for installed products.
12. Provide protective coverings at walls, projections, jambs, sills and soffits of openings as required. Protect finished floors and stairs from traffic, movement of heavy objects and storage.
13. Prohibit traffic and storage on waterproofed, roofed surfaces and landscaped areas.
14. Installation, maintenance, removal and restoration costs to be paid by the installing Contractor.
15. Temporary enclosures may be new or used, adequate for the required purpose.
16. Materials to be fire-resistant treated, with UL labels and flame spread ratings of 15 or less.
17. Translucent, fiber-mesh-reinforced polyethylene may be used where daylight would benefit workmanship and reduce the need for temporary lighting. Polyethylene shall not be used where security is at risk.
18. Maintain to temporary enclosures at all times to provide intended service. Alter as required to maintain the project schedule.
19. Remove temporary enclosures as needed to permit completion of work.
20. Repair damage caused by installation and restore to specified or original condition without additional costs to the Owner.

H. **Temporary Lifts and Hoists:** Each Prime Contractor shall provide facilities for hoisting materials, equipment and employees in the advancement of the Project. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

I. **Existing Elevator Use:** Use of Owner's existing elevator is not permitted.

J. **Temporary Shoring:** Each Prime Contractor shall provide all shoring necessary for the advancement of the project and for the Work of their Contract. The work shall comply with all safety laws and be constructed so as not to interfere with other work. Coordinate with all other Contractors. All existing and new structural assemblies require shoring.

K. **Temp Stairs, Ladders, Chutes:**

1. Temporary stairs, ladders, scaffolds, chutes, ramps, etc., required for the proper execution of Work to be provided by Contractor or Subcontractor requiring same.
2. Ladders, scaffolds, work platforms, etc., shall comply with all applicable code and regulations.
3. Maintain all temporary devices and equipment to fulfill code requirements. Remove when no longer required.

4. Contractor must submit information on all scaffold, chutes, ramps, etc., to **General Trades Contract #7** and receive approval for use prior to bringing such scaffold, chutes, ramps, etc. on site.
5. All scaffold, chutes, ramps, etc., must be inspected by the Contractor daily, at the start of the work shift, prior to being used.

L. **Project Identification and Temporary Signs:** The project identification sign will be provided by Contract #7.

1. Project Identification Signs: Contract will provide modifications to project identification sign to identify additional Prime Contractors once awarded. Do not permit installation of unauthorized signs. **General Trades Contract #7** will remove sign at project completion as directed by CM.
2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors; provide all signs four (4) foot by four (4) foot on pressure treated "A" face plywood, back painted.
3. Provide construction signs at locations to be specified by the Construction Manager. Signs required at all project sites as follows:
   a. For construction traffic control/flow at entrances and exits. Location for signage of entrances and exits may be moved as Sitework progresses during the project.
   b. To direct visitors.
   c. For construction parking.
   d. To direct deliveries.
   e. Warning signs as required.
   f. Per OSHA standards as necessary.
   g. Trailer identification.
   h. For "No Smoking" safe work site at multiple locations.
   i. The signs shall be constructed of 4' x 8' x 3/4" exterior grade, "A" face plywood, mounted on 4" x 4" P.T. framing, painting and verbiage by Construction Manager, removal as directed.

M. **Collection and Disposal of Waste: Contract #7** shall provide and maintain project specific waste dumpster(s) for project site. Prime Contractors shall collect waste from construction areas and elsewhere and load to **Contract #7** dumpster daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 3 days during normal weather or 1 day when the temperature is expected to rise above 80 deg. F (27 deg. C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully. Each Prime Contractor to reference Section 01 74 19 Waste Management and Disposal.

N. **General and Final Cleaning:**

1. The maintenance of a clean work site shall be the responsibility of each Contractor.
2. Each Contractor shall remove their own debris daily from work area to waste disposal containers (Dumpsters). Time lapse is not acceptable.
3. Each Contractor shall leave an area in the same condition in which it was found.
4. Dumpsters shall be located accessible to building and roads. Each Prime Contractor may load legally acceptable construction debris to the dumpsters. Cost of all disposal fees shall be by the Prime contractor requiring it and dumpsters shall be provided until project completion, or as directed by Construction Manager. Each Prime contract shall secure dumpsters during off-hours.
5. Each Prime Contractor shall be responsible for final cleaning of their work. Comply with final cleaning requirements specified in Division 01 Final Cleaning and Closeout Procedures.

O. **Rodents and Pest Control:** Before deep foundation work has been completed, **Contract #7** is to retain a local exterminator or pest control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pest. Employ this service to perform extermination and control procedures at regular intervals so the Project including project site, construction manager site office and district site offices will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials. All stagnant, standing water is to be removed from the project site as soon as possible; old tires and debris that collects water shall be removed from site.

P. **Protection of Work:** Each Prime Contractor is reminded to temporarily protect work in place, or work area, at all times, pre, during or post construction, until accepted by the Owner.

1. After building enclosure, either temporary or permanent, each Prime Contractor shall protect and maintain any and all of their own specific work in place, or work responsibilities, from rain, water, snow, mud, dust, dirt, ice, freezing temperature, debris, etc.
2. Each Prime Contractor is responsible for protection of work in place from the operations of other contractors. Communicate daily with other supervisory personnel. Coordinate with all trades.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Each Prime Contractor is responsible for security and protection of their own work, work areas, temporary trailers or storage sheds, storage area, staging area, materials, or equipment stored on site, materials or equipment stored in

the building, materials or equipment permanently installed in place, trucks, vehicles, or any item until legally becoming property of the District.

B. **Temporary Facility Changeover:** Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion, as requested by the Construction Manager.

C. **Temporary Fire Protection:** Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10, "Standard for Portable Fire Extinguishers," and NFPA 241, "Standard for Safeguarding Construction. Alterations and Demolition Operations."

1. Each Prime Contractor to furnish and locate fire extinguishers where convenient and effective for their intended purpose per OSHA requirements.
2. All contractors to store combustible materials in containers in fire-safe locations.
3. All contractors to maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking.
4. All contractors to provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

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

E. **Barricades, Warning Signs and Lights:** Comply with standards and code requirements for erecting 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.

F. **Security Measures:** The Owner shall be responsible for providing onsite building security. Each Prime shall cooperate with the security contractor and provide a safe worksite for patrols.

1. Storage: All contracts are responsible for their own storage. Where materials and equipment must be stored provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

G. **Environmental Protection:** Each Prime Contractor shall 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 any other undesirable effect might result. Avoid using tools and equipment that produce harmful noise. Restrict use of noise-making tools and equipment to hours that will minimize complaints and disruption.

H. **Erosion and Sediment Control:** Comply with regulations of "New York Guidelines for Urban Erosion and Sediment Control" published by Soil and Water Conservation Society and appropriate local ordinances where applicable.

1. Erosion and Sediment Control Plan: Prepare "Erosion and Sediment Control Plan" for this Project in consultation with appropriate local agencies and soil conservation service.
   a. Submit Erosion and Sediment Control Plan to appropriate local agency and obtain local agency acceptance prior to Preconstruction Conference or start of construction site.
   b. At Preconstruction Conference, submit evidence of local agency acceptance of Erosion and Sediment Control Plan for Project, and schedule completion of construction required to install measures included in Erosion and Sediment Control Plan. DO NOT BEGIN CONSTRUCTION AT SITE UNTIL SCHEDULE AND METHODS OF OPERATION INCLUDED IN EROSION AND SEDIMENT CONTROL PLAN HAVE BEEN ACCEPTED BY ARCHITECT.
   c. If Conditions change during construction, submit revised Erosion and Sediment Control Plan to Architect and other agencies as directed by Architect.
2. Erosion and Sediment Control Measures
   a. Take precautions to prevent mud from construction site accumulating on adjoining public roads and sidewalks and Owner's roads and sidewalks. Clean accumulations of mud from public roads and sidewalks and from Owner's roads and sidewalks when required by public authorities, CM and when directed by Architect.
   b. Plan and execute construction by methods to control surface drainage from cuts and fills and from borrow areas, and to prevent erosion and sedimentations.
      (1) Minimize amount of bare soil exposed at one time.
      (2) Provide temporary measures such as berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and erosion control devices or methods appropriate to conditions at site.
      (3) Construct fills and waste areas by selective placement to avoid erosive surfaces silts or clays.
      (4) Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.
   c. Coordinate temporary erosion and sediment control measures with permanent erosion control features specified elsewhere in

Contract Documents to maximum extent possible to assure economical, effective, and continuous erosion control.

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. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations. Protection applies to each Prime Contractor until substantial completion is issued by the Architect.

C. **Termination and Removal:** Unless the Construction Manager requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the property of each Prime Contractor. The Owner reserves the right to take possession of project identification signs.

2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill 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 at the temporary entrances, as required by the governing authority.

3. At Substantial Completion, Each Prime Contractor shall clean and renovate permanent facilities used during the construction period including, but not limited to, the following:

a. Replace air filters and clean inside of ductwork and housings.

b. Replace significantly worn parts and parts subject to unusual operating conditions.
c. Replace lamps burned out or noticeably dimmed by hours of use.
d. Comply with final cleaning requirements specified in Division 01 Section 01 74 23 Final Cleaning and Section 01 77 00 Closeout Procedures.

END OF SECTION 01 50 00

SECTION 01 55 00 - ACCESS ROADS, PARKING AND STAGING AREAS

PART 1 GENERAL

1.01 Requirements Included:

A. Access Roads and parking.

PART 2 PRODUCTS

2.01 Materials

Not used

PART 3 EXECUTION

3.01 Installation

Not used

3.02 Access Roads

Not used

3.03 Existing Pavements and Parking Areas

A. Existing site driveways may be used for construction traffic:

- Parking facilities are not available for construction personnel.
- Storage of construction trailers or storage shed will be restricted to locations indicated on the Site Logistics Plan and as directed by the Construction Manager and may in no way interfere with the District's daily functions.
- Temporary parking by construction personnel is allowed on site and is restricted to locations indicated on the Site Logistics Plan and as directed by the Construction Manager.
- Traffic Regulations:
  - Utilize only designated entrances.
  - Maintain all traffic regulations.

3.04 Permanent Pavements and Parking Facilities

Not Used

3.05 Maintenance

A. Snow Removal as part of Abatement Demolition Contractor's (Contract 1) package.

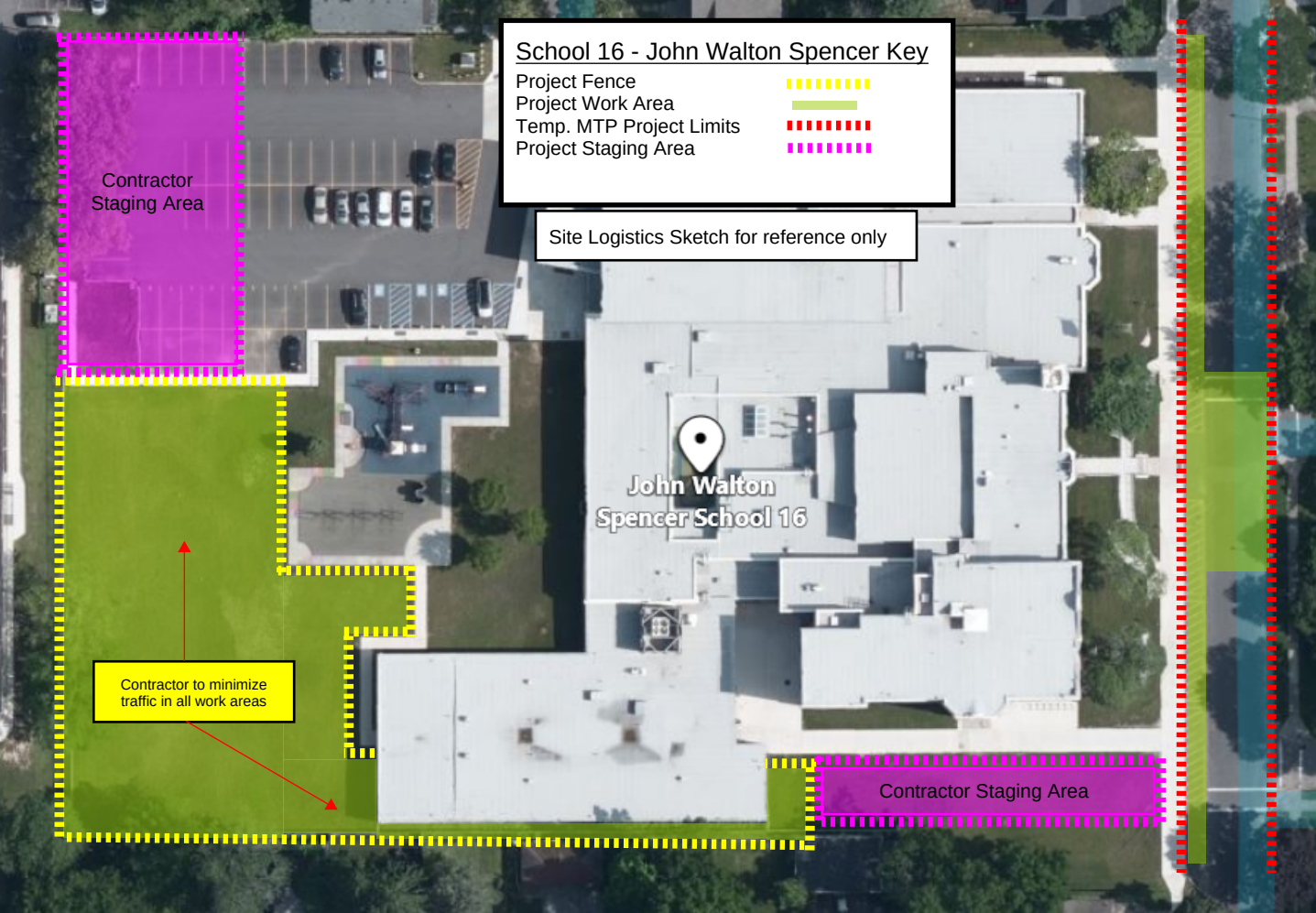
- Removal and Repair
- Staging
- Temporary staging is allowed on site and is restricted to locations indicated on the Site Logistics Plan and as directed by the Construction Manager.

PART 4 OTHER CONSIDERATIONS

2.01 Signage

A. Project Identification sign shall be coordinated with the Architect and shall include the following as a minimum:

- Program symbols: RSMP, City of Rochester, Rochester School District
- Architect and Construction Manager
- Contractors as appropriate
- Program Manager (Savin/Gilbane)
- Rochester Joint Schools Construction Board Members:


School 16 - John Walton Spencer Key
Project Fence
Project Work Area
Temp. MTP Project Limits
Project Staging Area
Site Logistics Sketch for reference only
Contractor Staging Area
John Walton Spencer School 16
Contractor to minimize traffic in all work areas
Contractor Staging Area

SECTION 01 56 10 - NOISE CONTROL

PART 1 - GENERAL

1.01 Requirements Included

A. Provide and maintain labor, methods, equipment, and temporary construction as necessary to provide controls over environmental conditions at the construction site and related areas under Contractor's control; remove physical evidence of temporary facilities at completion of Work.

B. Comply with the general noise and vibration restrictions as set forth by current OSHA, State and local government and as required by the Owner to avoid disruption of adjacent facility use.

PART 2 - PRODUCTS

Not Used

PART 3 - EXECUTION

Not Used

END OF SECTION 01 56 10

SECTION 01 56 90 – CONSTRUCTION CLEANING

PART 1 - GENERAL

1.01 Requirements Included

A. Cleaning and disposal of waste materials, debris and rubbish during construction.

1.02 Cleaning Notice

A. Each Contractor is responsible for clean-up and disposal of waste materials, debris and rubbish on a daily basis.

B. The Owner/Construction Manager may issue written notification of insufficient cleaning relative to the requirements of this Section. Upon issuance of the cleaning notice:

1. All waste and accumulation of trash containing the Contractor's debris shall be removed from the Owner's premises within 24 hours of notification.

2. All designated project areas containing the Contractor's debris or requiring general housekeeping shall be left fine broom clean (interior) or raked clean (exterior or rough surface). Sweeping compound shall be used for all interior broom cleaning to control dust.

C. Failure by the Contractor to comply with the 24 hour requirement of the notice to the satisfaction of the Owner/Construction Manager will result in a cleaning program directed by the Construction Manager at the expense of the Contractor. Cost of clean-up performed for the Owner will be deducted from the Contractor's Request for Payment.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.01 Cleaning

A. Maintain areas under Contractor's control free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from closed or remote spaces, prior to closing the space.

C. Daily clean interior areas to provide suitable conditions for work.

D. Broom clean interior areas prior to start of surface finishing, and continue cleaning on an as-needed basis.

E. Control cleaning operations so that dust and other particles will not adhere to wet or newly-coated surfaces.

3.02 Disposal

A. Dumpsters shall be located on site, accessible to building and roads. Each Contractor (exceptions see Section 01 10 00) may legally load acceptable construction debris into the Dumpsters (from this project only). Cost of all disposal fees for these Dumpsters shall be by the Contractor and Dumpsters shall remain on the project until project completion, or as directed by Construction Manager.

B. Dumpsters and costs of all disposal fees for the work shall be the responsibility of the Contractor.

C. It is the responsibility of all Contactors to secure all Dumpsters provided by same during off-hours.

END OF SECTION 01 56 90

SECTION 01 60 00 - PRODUCT REQUIREMENTS

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 administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Related Sections include the following:
   1. Division 01 Section "References" for applicable industry standards for products specified.
   2. Division 01 Section "Closeout Procedures" for submitting warranties for Contract closeout.
   3. Divisions 02 through 49 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

   1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
   2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
   3. Comparable Product: Product that is demonstrated and approved through review process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
2. Form: Tabulate information for each product under the following column headings:

   a. Specification Section number and title.
   b. Generic name used in the Contract Documents.
   c. Proprietary name, model number, and similar designations.
   d. Manufacturer's name and address.
   e. Supplier's name and address.
   f. Installer's name and address.
   g. Projected delivery date or time span of delivery period.
   h. Identification of items that require early submittal approval for scheduled delivery date.

3. Completed List: Within Thirty (30) days from Notice To Proceed, submit Five (5) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
4. Architect's Action: Architect will respond in writing to Contractor Ten (10) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.

B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

   a. Statement indicating why specified material or product cannot be provided.
   b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
j. Cost information, including a proposal of change, if any, in the Contract Sum.
k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within Seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within Fifteen (15) days of receipt of request, or Seven (7) days of receipt of additional information or documentation, whichever is later.

a. Form of Acceptance: Change Order.
b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01 Section "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.

1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
2. If a dispute arises between contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

B. Delivery and Handling:

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store cementitious products and materials on elevated platforms.
5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
3. Refer to Divisions 02 through 49 Sections for specific content requirements and particular requirements for submitting special warranties.

C. Submittal Time: Comply with requirements in Division 01 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
3. Where products are accompanied by the term "as selected," Architect will make selection.
4. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
5. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
6. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.

3. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
4. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product.
5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.
7. Visual Matching Specification: Where Specifications require matching an established Sample, select a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

    a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product.

8. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.

    a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
    b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

A. Refer to Section 01 25 00 – Substitution Procedures.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 71 16 - ACCEPTANCE OF EXISTING CONDITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction, and other Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Progress cleaning.
5. Starting and adjusting.
6. Protection of installed construction.
7. Correction of the Work.

B. Related Sections include the following:

1. Division 01 Section 01 30 00 "Construction Procedures and Control" for procedures for coordinating field engineering with other construction activities.
2. Division 01 Section 01 32 19 "Submittals" for submitting surveys.
3. Division 01 Section 01 73 29 "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
4. Division 01 Section 01 77 00 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

A. Qualification Data: For land surveyor.

B. Certificates: Submit certificate signed by land surveyor certifying that location and elevation of improvements comply with requirements.

C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

D. Certified Surveys: Submit three (3) copies signed by land surveyor.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.

1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.
d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a Request for Information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on the form provided in Section 01 25 10 “RFI Form”.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect and Construction Manager promptly and in writing.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
3. Inform installers of lines and levels to which they must comply.
4. Check the location, level and plumb, of every major element as the Work progresses.
5. Notify Architect and Construction Manager when deviations from required lines and levels exceed allowable tolerances.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather

conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect and Construction Manager.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect and Construction Manager before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

B. Benchmarks: Establish and maintain a minimum of two (2) permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.

D. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey.

1. Show boundary lines, monuments, streets, site improvements and utilities, existing improvements and significant vegetation, adjoining properties, acreage, grade contours, and the distance and bearing from a site corner to a legal point.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. 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.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 71 16

SECTION 01 72 00 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
   1. Construction layout.
   2. Field engineering and surveying.
   3. General installation of products.
   4. Progress cleaning.
   5. Starting and adjusting.
   6. Protection of installed construction.
   7. Correction of the Work.

B. See Division 01 Section "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.2 SUBMITTALS

A. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.

PART 2 - PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
   1. Before construction, verify the location and points of connection of utility services.

B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
   1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
   2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
2. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
3. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
4. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
    1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
    2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
    3. Inform installers of lines and levels to which they must comply.
    4. Check the location, level and plumb, of every major element as the Work progresses.
    5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
    6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Reference Points: Locate existing permanent benchmarks, control points, and similar
reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points.
   1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
   2. Allow for building movement, including thermal expansion and contraction.
   3. Coordinate installation of anchorages. 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.

H. Joints: Make joints of uniform width. Where joint locations in exposed work are not

indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 PROGRESS CLEANING

A. Refer to Section 01 56 90 - Construction Cleaning.
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3.7 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 01 Section "Quality Requirements."

3.8 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.9 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 01 Section "Cutting and Patching."
    1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
B. Restore permanent facilities used during construction to their specified condition.
C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01 72 00

SECTION 01 73 29 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Contractor is responsible for all cutting, fitting and patching required for alteration Work, including but not limited to:

1. Coordination between all trades.
2. Performing sequential excavation and backfill.
3. Completing the Work or making its several parts fit together properly or integrate with other Work.
4. Uncovering portions of the Work to provide for installation of ill-timed Work.
5. Removing and replacing defective Work.
6. Removing and replacing Work not conforming to requirements of Contract Documents.
7. Removing samples of installed Work as specified for testing.
8. Providing routine penetrations of non-structural surfaces for installation of materials such as piping and electrical conduit.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

1.3 SUBMITTALS

A. Cutting and Patching Plan: Submit a plan describing procedures at least 15 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:

1. Extent: Describe reason for and extent of each occurrence of cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
3. Products: List products to be used for patching and firms or entities that will perform patching work.

a. Include workmen qualifications for cutting and patching of weather-exposed or moisture-resistant elements, and sight exposed finished surfaces of existing construction being altered.
b. Include workmen qualifications for cutting and patching of weather-exposed or moisture-resistant elements, and sight exposed finished surfaces of existing construction being altered.

4. Dates: Indicate when cutting and patching will be performed.
5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

   a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Enclosure Elements: Indicate measures regarding the integrity or effectiveness of weather-exposed or moisture-resistant elements and systems.
8. Alternatives to Cutting and Patching: Include a description of alternatives to cutting and patching.
9. Notices: Notify Owner and separate contractor when cutting and patching affects newly installed construction not performed under this Project; include evidence of notification and written permission.
10. Construction Manager's Approval: Obtain approval of cutting and patching plan before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

1.4 QUALITY ASSURANCE

A. Structural Elements: When cutting and patching structural elements, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.

   1. A structural element includes any load-bearing, lateral force-resistant member, and wind or seismic movement resisting construction.
   2. Take precautions and exercise care to ensure Work is removed neatly and without movement or settlement to remainder of building. Contractor will be held liable for any damage, movement, settlement caused thereby or resulting therefrom.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Examples of operating elements include, but are not limited to, the following:

   1. Primary operational systems and equipment.

2. Air or smoke barriers.
3. Fire-suppression systems.
4. Mechanical systems piping and ducts.
5. Control systems.
6. Communication systems.
7. Conveying systems.
8. Electrical wiring systems.
9. Operating systems of special construction in Division 13 Sections

C. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Examples of miscellaneous elements include, but are not limited to, the following:

1. Water, moisture, or vapor barriers.
2. Membranes and flashings.
3. Exterior curtain-wall construction.
4. Equipment supports.
5. Piping, ductwork, vessels, and equipment.
6. Noise- and vibration-control elements and systems.

D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

F. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

G. Qualifications: Workmen to have minimum three (3) years experience in working with materials being cut and patched.

1.5 WARRANTY

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

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Comply with requirements specified in other Sections.

B. In-Place Materials: Use materials identical to in-place materials.

1. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
2. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

C. Materials used for sealing openings shall have a fire rating equal to or greater than the rating of the floor, ceiling or partition and shall comply with applicable codes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjacent Occupied Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
2. Restore Work and surfaces with new products in accordance with requirements of the Contract Documents.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. Employ original Installer for cutting and patching of newly installed construction; comply with original Installer's written recommendations.

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
6. Proceed with patching after construction operations requiring cutting are complete.

C. Patching: Where specifically indicated on the Drawings, patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   a. Refinish entire surfaces as necessary to provide an even new finish.
   b. For continuous surfaces, refinish to nearest intersection.
   c. For assemblies, entirely refinish.
   d. Clean piping, conduit, and similar features before applying paint or other finishing materials.
   e. Restore damaged pipe covering to its original condition.
3. Floors and Walls: Where walls or partitions that are removed extend on finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials.
   a. Patch subfloors under removed partitions, fixed equipment, etc. by cutting back, applying underlayment, concrete fill or other acceptable leveling fill as necessary to provide subfloor that is level with adjacent existing subfloors and properly prepared to receive finish flooring.

b. In renovated rooms/areas to receive new floor finishes, remove existing finish flooring and related materials and prepare subfloor by cutting back, applying concrete fill or other acceptable leveling fill as necessary to provide subfloor that is level and properly prepared to receive new floor finish as required by Room Finish Schedule and material manufacturers written recommendations.

c. In renovated rooms/areas to receive new wall finishes, those portions of existing walls that remain shall have their surfaces patched, cut back, or brought forward as necessary, and prepared as required to receive the new finishes per Room Finish Schedule.

d. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for the substrate over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.

e. In rooms or areas where patching is required on one wall only, that entire wall is to be refinished to match the existing finish and color, including existing painted doors, door frames and window frames if they occur in that wall.

f. In rooms or areas where patching is required on two or more walls, all walls including painted doors, door frames and painted window frames, are to be refinished.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

   a. In rooms or areas where patching is required in an existing plaster or gypsum wallboard ceiling, the entire ceiling is to be repainted. In rooms where patching is required in existing acoustic tile ceilings, patch ceilings with matching type and pattern of acoustic tile, clean all remaining tile and apply one coat of white latex paint by roller over all tile surfaces. Clean all exposed metal suspension system.

5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

6. Openings created as a result of removal of materials must be patched to match adjacent construction as to materials and finishes, unless otherwise indicated.

   a. Contractor responsible for cutting and patching shall also be responsible for furnishing and installing lintels where openings are cut through existing masonry or concrete walls. Refer to Lintel Schedule in Division 05 Section ”Metal Fabrications” for sizing of lintels, unless lintels are shown on Drawings.

7. Where existing equipment is removed and new equipment is installed in the existing opening, the Contractor installing the new equipment shall close up the unused portion of the opening with materials matching adjacent construction.

8. When new rubber or vinyl stair treads, risers, and landings are installed at existing stairs, paint all exposed steel.

9. Paint all exposed insulated or non-insulated pipes and ducts in finished rooms or areas.

10. Where existing equipment or assemblies are removed, the Contractor removing the equipment shall patch and repair the floor, walls and ceiling.

D. Roofing:

1. Before commencing with cutting and patching of roofing, consult with the Owner regarding the existence of an outstanding roofing warranty. If such a warranty exists, obtain written approval of the methods to be used from the roofing manufacturer who issued the warranty so as not to affect the value of the warranty.
2. If necessary, cutting and patching of roofing to be performed by roofing manufacturer authorized personnel only.
3. Cut, patch, repair and extend roofing and insulation as follows:

    a. Where disturbed or damaged by alteration Work or activities related to same.
    b. Where new Work connects to existing construction.

4. Roof areas penetrated for alterations shall be protected against damage and leakage by the Contractor performing the Work. Roof openings shall not be left uncovered or unprotected overnight or during any periods of rainy or inclement weather.
5. Remove loose aggregate, if applicable, and store away from work area.
6. Work shall be performed in a manner to provide for permanent water-tight splice or repair.
7. Roof repair and alteration Work and materials shall match existing roofing materials and construction.
8. Upon completion and inspection of splice or repair Work, remove debris from the roof and replace the aggregate as required.
9. Protect undisturbed existing and newly repaired roofing subject to traffic and damage.

3.4 CLEANING

A. Clean areas and spaces where cutting and patching are performed.

B. Completely remove excess paint, mortar, oils, putty, and similar materials from finished surfaces.

END OF SECTION 01 73 29

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Salvaging nonhazardous demolition and construction waste.
2. Disposing of nonhazardous demolition and construction waste.

1.2 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

D. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility as identified in section 02 41 00 selective demolition.

E. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work as identified in section 02 41 00 selective demolition.

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for the Notice of Award.

1.4 QUALITY ASSURANCE

A. Refrigerant Recovery Technician Qualifications: Certified by EPA-approved certification program.

B. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:

1. Review and discuss waste management plan.
2. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
3. Review waste management requirements for each trade.

1.5 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to ASTM E 1609 and requirements in this Section. Plan shall consist of waste identification and waste reduction work plan.

B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
3. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
4. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.

PART 2 - PRODUCTS - (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan. Coordinator shall be present at Project site full time for duration of Project.

C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

1. Distribute waste management plan to everyone concerned within three days of submittal return.
2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Division 01 requirements for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until installation.
4. Protect items from damage during transport and storage.
5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.

B. Salvaged Items for Sale and Donation: Not permitted on Project site.

C. Salvaged Items for Owner's Use:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

D. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.

E. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.

F. Plumbing Fixtures: Separate by type and size.

G. Lighting Fixtures: Separate lamps by type and protect from breakage.

H. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

A. General: Recycle paper and beverage containers used by on-site workers.

B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Owner.

C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical.

1. Provide appropriately marked containers or bins for controlling recyclable waste until they are removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

a. Inspect containers and bins for contamination and remove contaminated materials if found.

2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
4. Store components off the ground and protect from the weather.
5. Remove recyclable waste off Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

A. Asphaltic Concrete Paving: Break up and transport paving to asphalt-recycling facility.

B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.

C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.

D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.

E. Metals: Separate metals by type.

1. Structural Steel: Stack members according to size, type of member, and length.
2. Remove and dispose of bolts, nuts, washers, and other rough hardware.

F. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.

G. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.

H. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

I. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.

J. Carpet: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.

1. Store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

K. Carpet Tile: Remove debris, trash, and adhesive.

1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.

L. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.

M. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

A. Packaging:

1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
2. Polystyrene Packaging: Separate and bag materials.
3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.

C. Gypsum Board: Stack large clean pieces on wood pallets and store in a dry location.

1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 74 19

SECTION 01 74 23 - FINAL CLEANING

1.01 FINAL CLEANING

1. Final Cleaning; Provide final cleaning of this project's work, including related areas impacted by this project, at time indicated, consisting of cleaning each surface or unit of work to normal "clean" condition expected for a first-class building cleaning and maintenance program. Comply with manufacturer's instructions for cleaning operations. The following are examples, but not by way of limitation, of cleaning levels required:

2. Remove labels which are not required as permanent labels.
3. Clean transparent materials, including mirror and window/door glass, to a polished condition, remove substances which are noticeable as vision obscuring materials. Replace broken glass and damaged transparent materials.
4. Clean exposed exterior and interior hard-surface finishes, to a dirt free condition, free of dust, stains, films and similar noticeable distracting substances. Except as otherwise indicated, avoid disturbance of natural weathering of exterior surfaces. Restore reflective surfaces to original condition.
5. Remove debris and surface dust from limited-access spaces including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics and similar spaces.
6. Clean and shop vacuum concrete floors in non-occupied spaces (i.e. including equipment and storage areas) to broom-clean standard.
7. Clean and wet mop hard-surface floors in occupied spaces to wet mop standard.
8. Vacuum clean and shampoo carpeted surfaces and other similar soft surfaces.
9. Clean and wipe plumbing fixtures to a sanitary condition, free of stains including those resulting from water exposure.
10. Clean and wipe light fixtures and lamps as to function with full efficiency.
11. Clean project site (yard and grounds), including landscape development areas, of litter and foreign substances.
12. Sweep paved parking and sidewalk areas to a broom-clean condition, remove stains, petro-chemical spills and other foreign deposits. Rake grounds which are neither planted or paved, to a smooth even textured surface.
13. Wipe surfaces of mechanical and electrical equipment clean, remove and clean areas around equipment of any excess lubrication and other substances that may have resulted during installation or startup.
14. Prevent the spread of debris by providing plastic barriers between clean spaces and those still undergoing work or cleaning operations.

END OF SECTION 01 74 23

SECTION 01 77 00 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.

B. Related Sections include the following:
1. Division 01 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 02 through 49 Sections for specific closeout and special cleaning requirements for the Work in those Sections.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Obtain and submit releases permitting 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, Work duration 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.

9. Submit test/adjust/balance records.
10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
11. Advise Owner of changeover in heat and other utilities.
12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
13. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to the General Conditions of the Contract for Construction.
2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect and Construction Manager. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report and warranty.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

A. Preparation: Submit three (3) copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

a. Project name and SED control number
b. Date.
c. Name of Architect and Construction Manager.
d. Name of Contractor.
e. Page number.

PART 2 - PRODUCTS

2.1 MATERIALS

Not Used.

PART 3 - EXECUTION

3.1 FINAL CLEANING

Not Used.

END OF SECTION 01 77 00

SECTION 017823 - OPERATION AND MAINTENANCE MANUALS AND DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction, and other Division 00 and 01 Specification Sections, apply to this Section.

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 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
2. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
3. Divisions 02 through 49 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 fifty (50) days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Architect will return one (1) copy of draft and mark whether general scope and content of manual are acceptable.

B. Final Submittal: Submit one (1) copy of each manual in final form at least five (5) days before final inspection. Architect will return copy with comments within seven (7) days after final inspection.

1. Correct or modify each manual to comply with Architect's comments. Submit two (2) copies of each corrected manual within fifteen (15) days of receipt of Architect's comments.

2. Include (10) copies electronically and submit on CDs for distribution. O&M and Discs should include as builts as well.

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. Multiple Project Sites: When the Project involves multiple project sites prepare separate manuals for each separate site address, including in each manual only those items that apply to each individual site.

B. 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.
3. Manual contents.

C. 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.

D. 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.

E. 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 (215-by-280-mm) 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.

b. 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.

2. 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.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
4. Supplementary Text: Prepared on 8-1/2-by-11-inch (215-by-280-mm) white bond paper.
5. 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.

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:

4. Fire.
5. Flood.
6. Gas leak.
7. Water leak.
8. Power failure.
9. Water outage.
10. System, subsystem, or equipment failure.
11. Chemical release or spill.

B. 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.

C. 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.
6. Normal shutdown instructions.
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.
4. Material and chemical composition.
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 the 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 video, 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 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. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

H. 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 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 78 23

SECTION 01 78 39 - PROJECT RECORD DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Related Sections include the following:

1. Division 01 Section "Closeout Procedures" for general closeout procedures.
2. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
3. Divisions 02 through 49 Sections for specific requirements for Project Record Documents of the Work in those Sections.

1.3 SUBMITTALS

A. Record Drawings: Submit one (1) set of marked-up Record Prints showing construction modifications.

B. Record Specifications: Submit one (1) copy of marked-up Project's Specifications, including addenda and contract modifications.

C. Record Product Data: Submit one (1) copy of each Product Data submittal.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one (1) set of black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.

   a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
   b. Accurately record information in an understandable drawing technique.
   c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.

2. Content: Types of items requiring marking include, but are not limited to, the following:

   a. Dimensional changes to Drawings.
   b. Revisions to details shown on Drawings.
   c. Depths of foundations.
   d. Locations and depths of underground utilities.
   e. Revisions to routing of piping and conduits.
   f. Revisions to electrical circuitry.
   g. Actual equipment locations.
   h. Duct size and routing.
   i. Locations of concealed internal utilities.
   j. Changes made by Change Order or Change Directive.
   k. Changes made following Architect's written orders.
   l. Details not on the original Contract Drawings.
   m. Field records for variable and concealed conditions.
   n. Record information on the Work that is shown only schematically.

3. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
5. Mark important additional information that was either shown schematically or omitted from original Drawings.
6. Note Construction Change Directive numbers, Alternate numbers, Change Order numbers, and similar identification, where applicable.

B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
2. Identification: As follows:

    a. Project name.
    b. Date.
    c. Designation "PROJECT RECORD DRAWINGS."
    d. Name of Architect.
    e. Name of Contractor.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

2.4 MISCELLANEOUS RECORD SUBMITTALS

A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and Construction Manager's reference during normal working hours. Record Documents will be checked monthly, incomplete documents will be reason to withhold payments.

END OF SECTION 01 78 39

SECTION 01 79 00 - DEMONSTRATION AND TRAINING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions of the Contract for Construction, and other Division 00 and 01 Specification Sections, apply to this Section.

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.

B. Related Sections include the following:

1. Division 01 Section "Allowances" for administrative and procedural requirements for demonstration and training allowances.
2. Division 01 Section "Construction Procedure and Control" for requirements for pre-instruction conferences.
3. Divisions 02 through 28 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 (if there is one) as specified in Division 01 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 or if a unit price isn't specified for training.

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.

B. Attendance Record: For each training module, submit list of participants and length of instruction time.

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. 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 fourteen (14) days' advance notice.

C. 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.

END OF SECTION 01 79 00

SECTION 01 84 00 – MAINTENANCE PRODUCTS

PART 1 – GENERAL

1.1 Maintenance Products for New Floor Finishes

The Rochester City School System utilizes and stocks the Hillyard Floor Care Programs for various types of floor finishes. These programs, products and procedures have proven to provide superior, long lasting results, less maintenance and man-hours. Therefore immediately upon completion of installation or renovation, each applicable contractor or subcontractor shall prepare and finish all newly installed floor surfaces with the following applicable specified products. Also see various specification sections for any specific finishes required. Coordinate with City School District prior to applying products to make sure most current list of products is being used. Follow all manufacturers' directions in said preparation and application. Refer to the following by type of floor surface:

.1 Resilient Tile Floors: Two (2) coats of Hillyard Seal 341 plus three (3) coats of Hillyard Navigator wax. To be applied after proper stripping of the factory wax and neutralization of the stripper.
.2 Unsealed Quarry Tile/ Hard Surfaces: Two (2) coats of Hillyard Seal 341.
.3 Ceramic Tile: Two (2) coats of granite sealer (if sealing is required by specification or scope).
.4 Wood Floors and Sports Surfaces (Maintenance Coating):
   A. Clean the floor with full strength Poloplaz Tie Tack. Apply solution with a towel.
   B. Screen the entire floor with a 120 grit screen, changing as necessary.
   C. Vacuum the entire floor and wipe up all side-line dust to keep it from settling on the wet finish. Using 100% virgin mineral spirits, tack the floor with a clean wet towel multiple times until the entire floor is clean. Let the floor dry completely.
   D. Re-apply one (1) coat Poloplaz Magnum Low VOC 350 finish @ 500 sq ft./gallon.
   E. Keep off the floor for three days. (Resume play after seven days).
.5 Carpet: Spray with Soil Stop (Item #452) per manufacturer instructions.

1.2 Removal of Scale, Lime and Salts from Non-resilient Floor: Hillyard Super Shine All Cleaner

1.3 After the move of furniture and room contents boxes and prior to Final Turnover and occupation by staff: All hard floor surfaces need to be swept clean with a dust mop and damp mopped.

PART 2 – PRODUCTS

2.1 City School District Approved Product List:

.1 General
   A. Hillyard Devastator (Hard surface stripper)
   B. Hillyard Super Shine-All Cleaner (Neutral wood floor cleaner)
   C. Hillyard Nutri-Rinse (Entry and Lobby floor cleaner and neutralizer)
   D. Hillyard Restorer (All finished hard surfaces gloss restorer/spray buffer)
   E. Hillyard Super Hil-Tone (Dust-mop treatment)

.2 Resilient Tile floors
A. Hillyard Seal 341 (Seal after stripping)
B. Hillyard Navigator (Floor finish)
C. Hillyard Top Clean (Neutral floor cleaner)

.3 Gymnasium Floor (Secondary School)
A. PoloPlaz Low VOC Sealer (New installation - sanding sealer)
B. PoloPlaz Magnum Low VOC 350 Gym finish (New installation - Oil modified polyurethane finish; maintenance recoat finish).
C. PoloPlaz Tie Tack (Tacking solution prior to floor refinishing and between coats. Dust, oil, and dirt remover prior to maintenance recoat top finish).
D. PoloPlaz Mineral Spirits (100% Virgin Commercial Grade)

.4 Carpet Floor
A. Bonnet Cleaning – Low Moisture - Interim Cleaning
a. Hillyard Deep Action
b. Hillyard Soft Surface Sanitizer
c. Hillyard Deep Action Bonnets (17”, 19”, 21”)
B. Restorative- Normal Soil Load
a. Hillyard Carpet Pre-spray and Extraction
b. Hillyard Nutra Rinse
C. Restorative- Heavy Soil Load
a. Hillyard HD Extraction
D. Specialty Products
a. Hillyard Defoamer
b. Hillyard Soil Stop (soil retardant)
E. Carpet Spotters / Kits and Refills
a. Hillyard Double Down Starter Kit
b. Hillyard Double Down Refills
c. Hillyard Double Down Replacement Triggers
d. Hillyard Carpet Spotting Kit
e. Hillyard Carpet Debrowner
f. Hillyard Carpet Spotter
g. Hillyard Carpet Spotter Gel
h. Hillyard Rust Spotter Gel
i. Hillyard Take Down
j. Hillyard Liquid Gum Go

2.2 Any glue, mastic or adhesive shall be removed with Hillyard Liquid Gum Go.

2.3 <u>Maintenance Products For New Exterior Surfaces/Anti-Graffiti Sealer</u> (Plus new masonry at interior ‘Public’ surfaces.)

.1 The RCSD has standardized on an anti-graffiti system for their exterior wall systems. Any new exterior masonry, concrete, etc. surface or cleaning of restored existing surface shall have the following applied.

.2 Product: “Graffiti Melt Barrier Coating” by Genesis Coatings, Inc., a colorless breathable barrier that does not alter the surface appearance.

.3 Areas of Application: All exterior masonry, concrete, etc. surfaces below 8' above general surrounding grade level or above aptly adjacent surface that can be stood upon. If directly adjacent to driveways or vehicular access apply to minimum 12' above pavement level. This includes painted, glazed, or other type masonry surfaces, including joints.

.4 Application: Follow manufacturers requirements for type of surface. Generally done with an airless sprayer, in non-windy conditions. Clean and prepare surface as directed. Protect all non-masonry surfaces. Remove/clean all over spray. Apply two (2) coats, each at 350 sf per gallon.

.5 Notify Inspector prior to application so he may confirm complete installation.

END OF SECTION 01 84 00

SECTION 01 91 13 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 OVERVIEW

A. This section of the specification describes the process for commissioning and defines the responsibilities of the commissioning agent, the contractors, and outlines the duties of other members of the commissioning team.

B. The commissioning process shall be applied to all equipment, components, and systems as listed in this section, including specific interfaces to and from equipment and systems provided under separate contracts.

C. Building Commissioning work is a joint team effort to ensure that all systems function together properly to meet the design intent, and to document system performance parameters for fine-tuning of control sequences and operations procedures. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment start-up, control system calibration, testing and balancing, training, and performance testing. This section does not supersede other requirements of the specifications. It may, though, expand on some of them.

1.2 COMMISSIONING AGENT

A. The Commissioning Agent (CA) will be an independent 3rd party engaged by the Owner.

1.3 STANDARD AND CODE COMPLIANCE

A. Commissioning will be accomplished to comply with, and in accordance with the requirements of the following:

1. 2015 International Energy Conservation Code (IECC) Section C, 408 System Commissioning.

1.4 THE COMMISSIONING TEAM

A. The commissioning team shall consist of:

1. Commissioning Agent (CA).

2. HVAC Contractor (HC).

3. Electrical Contractor (EC).

4. All appropriate Contractors and Sub-Contractors including but not limited to; temperature controls, sheet metal, testing and balancing, fire alarm fire protection and elevator installer.

5. Approved Representatives of Mechanical, Electrical and Equipment Manufacturers.

6. Design Engineers (DE).

7. Design Architect (ARCH).

8. Facility Staff (FS).

9. Owner's Representative (OR).

1.5 COORDINATION

A. Project Commissioning Team - The members of the Project Commissioning Team shall consist of the Commissioning Authority and any support personnel, the Owner's facility staff (FS) or designee, the HVAC Contractor, Electrical Contractor or additional vendors as required, the Architect/Engineer (A/E) and Owner's Representative (OR).

B. Management - The CA coordinates the commissioning activities through the Owner's Representative (OR). All members shall work together to fulfill their contracted responsibilities and meet the objectives of the contract documents. Refer to Paragraph 1.6 for additional management details.

C. Scheduling - The CA, through the OR, will provide sufficient notice to the Contractors for scheduling commissioning activities with respect to the Owner's participation. The Contractors will integrate all commissioning activities into the overall project schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.

1.6 COMMISSIONING PLAN

A. The CA will develop the Commissioning Plan which shall be included in the project schedule when approved by the Owner.

B. The Commissioning Plan shall contain the information necessary to document the commissioning process as it progresses from pre-start checks, to start-up and initial operation, and finally to functional performance verification of all systems.

C. The Commissioning Plan shall also contain a schedule of commissioning work, integrated with the overall project schedule. This schedule shall show:

1. Completion dates for each system or systems in each area of the building.

2. Dates for controls installation completion and point checkout.

3. Dates for carrying out Steps 1 and 2 commissioning work for each system or group of systems.

4. Submission dates for the documentation required by the Engineer prior to Step 3 verification.

5. Dates for carrying out Step 3 commissioning work.

D. The following narrative provides a brief overview of the commissioning tasks that shall be performed during construction and the general order in which they occur.

1. Commissioning during construction begins with an initial commissioning meeting conducted by the CA where the commissioning process is reviewed with the project commissioning team members.

2. Additional meetings will be required throughout construction, scheduled by the CA, through the Owner or OR, with necessary parties attending to plan, scope, coordinate, schedule future activities and address issues.

3. Equipment documentation is submitted to the CA, through the Owner, OR, Architect, during normal submittals, including detailed startup procedures.

4. The prefunctional checklists, developed by the CA are to be completed by the Contractor (or its Subcontractors), before and during the startup process.

5. Prefunctional checklists, TAB and startup must be completed before performance testing.

6. Items of non-compliance in material, installation, or setup shall be corrected at no expense to the Owner.

7. The Contractor ensures that the Subcontractors' prefunctional checklists are executed and documented and that startup and initial checkout are performed. The CA verifies that the TAB, prefunctional checklists and startup were completed according to the approved plans. This includes the CA approving TAB, checklists and startup plans. This also includes witnessing startup of selected equipment. Any testing failure is to be corrected at no additional cost to the Owner, and a re-test is to be performed, observed, and documented.

8. The CA develops and implements equipment and system functional test procedures. The forms and procedures are approved by the Owner and A/E.

9. The performance tests are executed by the Contractor under the direction of the CA with the assistance of the facility staff. All documentation is by the CA.

10. The CA provides the Commissioning Record.

11. Commissioning is to be completed before substantial completion.

12. Deferred testing and/or seasonal verifications are to be conducted as specified or required.

1.7 COMMISSIONING RESPONSIBILITIES

A. Commissioning Agent:

1. Plan, organize, direct and implement the Commissioning Process as specified herein.

2. Prepare the Commissioning Plan and submit for review by the Owner and Architect.

3. Revise the Commissioning Plan as required during construction.

4. Chair commissioning meetings, prepare and distribute schedules and agendas for the meetings, and prepare and distribute minutes to all Commissioning Team members, whether or not they attended the meeting.

5. Write the prefunctional checklists, initial operation and functional test procedures and submit for review by the Owner. The test procedures and checklists should be designed to verify detailed aspects of the proper operation of all equipment items and overall system performance in accordance with the design intent of the systems.

6. Coordinate commissioning activities among all Contractors, sub-trades, and suppliers, and all related commissioning requirements in the various specifications for all contracts.

7. Carry out all required system readiness checks and document the results as the checks are done.

8. In cooperation with the Controls Subcontractor, ensure all control point checkouts are carried out and the results documented as the checks are done.

9. Observe or verify all start-ups and initial system operations tests and checks, which shall encompass all specified functional performance tests, ensuring the results are documented as the tests and checks are done.

10. Provide periodic site visits as required to observe system installation.

11. Maintain master issues log. Resolution to issues found shall be documented by installing contractor and submitted to CA.

12. At the direction of the Engineer, ensure equipment and systems are operated for functional performance verification purposes.

13. Ensure all required training and demonstrations are provided to the Owner's designated operating staff and that all Operations and Maintenance manuals are submitted, approved and provided to the Owner.

14. Develop a Final Commissioning Record.

15. Coordinate deferred/seasonal commissioning required.

B. Contractors:

1. Within four (4) weeks of the award of the contract, the HC, EC Contractors and relevant subcontractors shall submit the names of the Project Manager who will be the Commissioning Coordinator for this project, as well as the names, addresses, phone numbers and qualifications of Subcontractors' Representatives and factory trained Manufacturer's Representatives for all equipment and systems required to participate in the Commissioning Process as specified in this Section.

2. Each Contractor and all his sub-trades and suppliers, shall cooperate with the Commissioning Agent in carrying out the Commissioning Process. In this context, each Contractor shall:

a. Provide equipment and systems start-up as specified.

b. Operate equipment and systems as required for initial systems operations, and witness final functional performance tests as they are performed by the Commissioning Agent, including the on-site participation of approved factory trained Manufacturer's Representatives for equipment.

c. Attend commissioning meetings and attend to action items arising from them, as required to allow the Commissioning Process to proceed on schedule.

d. Provide instruction and demonstrations for the Owner's designated operating staff, in conjunction with the Commissioning Agent, in order to meet all specified training requirements in this regard.

e. The Contractors shall make any and all necessary corrections to systems, equipment, O & M manuals, as built drawings, and procedures as necessary to meet the design intent, contract documents, manufacturer's recommendations or performance requirements if errors are discovered during the Commissioning Process.

f. The Contractors shall supply all necessary documentation, such as shop drawings, submittal data, maintenance manuals, etc. required for equipment and systems, to the Commissioning Agent for preparation of the commissioning plan, checklists, and functional performance plans.

g. The Contractors shall provide the required names, addresses and qualifications of all specified Manufacturer's Representatives to participate in the Commissioning Process prior to the initial commissioning meeting.

h. Subsequent installation and performance verifications, made necessary due to required corrections after initial verification, shall be at the respective Contractor's expense.

i. Carry all commissioning related costs in contract bid price.

j. Review all documentation provided by CA and provide comments, if required prior to on site commissioning activities.

k. Engage, at Contractor's cost, any Manufacturer's Representatives required to complete start-up and commissioning activities.

l. Include cost of all devices and special tools to complete commissioning activities.

C. Manufacturer's Representatives:

1. The factory trained and authorized Manufacturer's Representatives shall participate in the commissioning process as specified in this section and as indicated in the technical section of the specifications.

2. Each Manufacturer's Representative shall cooperate with the commissioning agent in carrying out the commissioning process. In this context, each Manufacturer's Representative shall:

a. Provide equipment start-up as specified.

b. On-site participation as required for initial equipment operations and witness final functional performance tests as they are performed by the commissioning agent.

c. Attend commissioning meetings, as applicable and attend to action items arising from them, as required to allow the commissioning process to proceed on schedule.

d. Provide instruction and demonstrations for the Owner's designated operating staff, as specified in conjunction with the commissioning agent, in order to meet all specified training requirements in this regard.

e. Make any and all necessary corrections to equipment, O&M manuals, as-built drawings and procedures as necessary to meet the design intent, contract documents or performance requirements if errors are discovered during the commissioning process.

f. Subsequent installation and performance verifications, made necessary due to required corrections after initial verification, shall be at the respective manufacturer's expense.

D. Design Engineers and Architects:

1. Provide "Basis of Design" documentation inclusive of design criteria for CA review.

2. The Design Engineers and Architect shall review the Commissioning Plan, commissioning checklists and functional performance test plans. They shall also participate, as appropriate, in on-site commissioning meetings.

3. During the functional performance phase of the Commissioning Process, the Design Engineers and Architects may be on site to review commissioning documentation, witness functional performance tests, and verify acceptable performance or to declare performance unacceptable, as required.

4. Provide design narrative information to CA as required.

5. Participate in deficiency resolution process of items identified during Commissioning Process.

E. Owner's Representative (User):

1. Provide "Owner's Project Requirements" documentation for CA review.

2. The Owner shall ensure the availability of operating staff for all scheduled training and demonstration sessions. This staff shall possess sufficient skills and knowledge to operate and maintain the installation following attendance at these sessions.

3. Attend commissioning meetings.

4. Sign off of all accepted functional test procedures.

5. Participate in seasonal/deferred testing.

1.8 DESCRIPTION OF WORK

A. The "Systems and Equipment" as referred to in this section of the specifications shall include, but not be limited to, subsystems and components of subsystems; as provided by various contracts as follows:

1. HVAC Systems
2. Building Temperature Control Systems

1.9 COMMISSIONING PROCESS

A. The on-site commissioning process shall be organized and carried out in four (4) steps as follows:

1. Step 1 - System readiness and start-up.

2. Step 2 - Initial operation.
3. Step 3 - Functional performance verification.
4. Step 4 - Demonstration and instruction.

B. Each step is applicable to each separate system and its components, as listed in Part 3, including all related controls and specified interfaces to other divisions and contracts.

C. The Contractors shall review and verify the commissioning schedule and requirements for the interface between all trades in order to prevent delays in the Commissioning Process.

D. In some systems, improper adjustments, misapplied equipment, and/or deficient performance under varying loads may result in additional work being required to commission the systems. This work shall be completed under the direction of the General Contractor with input from the Contractors, Equipment Supplier, and Commissioning Agent. Whereas all members shall have input and the opportunity to discuss, debate, and work out problems, the Design Architect or Engineer shall have final jurisdiction over any additional work done to achieve performance.

E. Corrective work shall be completed in a timely fashion to permit the completion of the commissioning process. Experimentation to demonstrate system performance may be permitted. If the Commissioning Agent deems the experimentation work to be ineffective or untimely as it relates to the Commissioning Process, the Commissioning Agent shall notify the Owner, indicating the nature of the problem, expected steps to be taken, and suggestions for completion of activities. Costs incurred to solve the problems in an expeditious manner shall be the Contractor's responsibility.

F. Seasonal commissioning is required under full load conditions during peak heating and peak cooling seasons, as well as part load conditions in the spring and fall. Simulations of peak load conditions may be implemented to allow for complete commissioning of the work.

G. Systems that are not weather dependent shall be tested under full and partial load to the fullest extent possible.

1.10 STEP 1 - SYSTEMS READINESS AND START-UP

A. Before starting any equipment or systems, the Contractors shall complete the system readiness or pre-start checks in the commissioning plan and the Commissioning Agent shall document the results. The following conditions and items shall be completed as applicable:

1. Piping systems have been pressure tested as specified, found to be tight, with reports submitted.

2. Piping systems have been flushed and cleaned as specified, any required reports submitted, and then filled or charged as applicable.

3. Equipment has been lubricated to specification.

4. Air system cleaning is complete, and particulate filters have been installed.

5. Vibration isolation has been installed to specification and adjusted.

6. Equipment drives have been aligned.

7. Electrical, water and fuel services have been installed and checked.

8. Control point checkouts have been completed.

9. Safety controls have been installed and operation checked.

10. Major equipment start-up has been carried out by Manufacturer's Representative when specified and required startup reports completed and submitted.

B. All checks shall be documented on the relevant checklists as they are carried out. Deficiencies or incomplete work shall be corrected and the checks repeated until the installation is ready for operation before proceeding to Step 2 of the process.

1.11 STEP 2 - INITIAL OPERATION

A. In Step 2 of the Commissioning Process, the Contractors, with the Commissioning Agent verifying, complete the testing, balancing, and calibration of all components and systems. They also operate all systems through all specified modes of operation and test system responses to specified abnormal or emergency conditions.

B. Work carried out during this step of commissioning shall include but not be limited to, the following:

1. Air systems balancing, including positioning of all balance dampers, adjustments to diffusers, registers and grilles.

2. Hydronic systems balancing, including positioning of all balance valves.

3. Correction of problems revealed during balancing, including changes to fan speeds or blade pitch as necessary.

4. Setting up and calibrating all automatic temperature controls devices, including adjustments to control valves and damper actuators.

5. Setting up or programming controls for accurate response and precise sequencing to meet specified performance.

6. With Commissioning Agent verifying, the Balancing Contractor and Controls Contractor working together setting up airflows and controls calibrations for terminal units and airflow stations.

7. Ensuring final adjustments to vibration isolation are carried out as necessary.

C. As was done in Step 1, all checks and tests shall be documented on the relevant checklists as they are carried out. Deficiencies or incomplete work shall be corrected, and the checks or tests repeated until correct installation and function has been confirmed and the installation is ready for engineering verification.

1.12 STEP 3 - FUNCTIONAL PERFORMANCE TEST AND VERIFICATION

A. All equipment and systems shall be operated through the entire specified sequence of operations for witness and verifying acceptable operation, by the Commissioning Agent.

B. During this step of commissioning, the following checks and test shall be required:

1. Check the location and accessibility of all access panels.

2. Operation of all control system devices, both sensors and actuators.

3. Proper physical response of all controlled devices and components to setpoint changes or other relevant adjustments.

4. Operation of randomly selected motorized dampers.

5. Demonstration of acceptable noise and vibration levels from major equipment, under its full range of operational conditions.

6. Operation of equipment and systems under every specified mode of operation and sequence of control.

7. Once acceptable performance of systems has been verified, then verification of specified interfaces to/from equipment and systems provided under other divisions and contracts shall be performed.

1.13 STEP 4 - DEMONSTRATION AND INSTRUCTION

A. The formal demonstration and instruction for operating staff shall commence once the Step 3 commissioning is complete and substantial completion achieved.

B. Demonstration and instruction in accordance with the "Design Intent" shall cover all equipment and systems and their controls.

1.14 COMMISSIONING START-UP AND COMPLETION

A. Commissioning of certain systems may be required to be performed during both heating and cooling seasons. Commissioning shall be performed at the earliest such time as possible after substantial completion of each system.

1.15 REFERENCES

A. Systems commissioning shall be accomplished as specified and in accordance with the latest version of commissioning publications from one the following industry associations:

1. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Guideline 1.1, HVAC&R Technical Requirements for the Commissioning Process.

2. Associated Air Balancing Council, Commissioning Reference Manual.

3. Building Commissioning Association - The Building Commissioning Handbook.

1.16 DOCUMENTATION

A. Each Contractor shall provide to the Commissioning Agent three (3) copies of the following items as soon as they become available:

1. Certified and approved start-up and testing report forms for all subsystem equipment that comprise the System. Commissioning documentation shall include control schematics of the total system and all subsystems.

2. Records of required inspections for code compliance, and documentation of approved permits and licenses to operate components of the System.

3. Operating data which shall include all necessary instructions to the Owner's operating staff in order to operate the system to specified performance standards.

4. Maintenance data which shall include all necessary information required to maintain all equipment in continuous operating condition, such as the testing, balancing and adjusting report and the as-built drawings.

5. Written notice that building equipment and systems have been completed, tested and are fully operational.

6. Checklist of all submitted contract deliverables such as; operation and maintenance manuals, spare parts, warranties, training, documentation, etc.

PART 2 - PRODUCTS

2.1 TESTING

A. The Contractor shall provide any equipment or device required for access such as platforms, scaffolds, and spare filters as may be necessary for all verification and testing.

B. All standard testing equipment required to perform startup and initial checkout and required performance testing shall be provided by the Contractor for the equipment being tested. This includes, but is not limited to, two-way radios, meters, and data recorders.

C. Special equipment, tools, and instruments required for testing equipment according to these contract documents shall be included in the Contractor's base bid price and shall be turned over to the Owner at project close-out.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance within the tolerances specified in the specifications. If not otherwise noted, the following minimum requirements apply: Temperature sensors and digital thermometers shall have a certified calibration to NIST traceable standards within the past year to an accuracy of 0.5°F and a resolution of ± 0.1°F. Pressure sensors shall have an accuracy of ± 2.0% of the value range being measured (not full range of meter) and have been calibrated within the last year. All equipment shall be calibrated according to the manufacturer's recommended intervals and when dropped or damaged. Calibration tags shall be affixed or certificates readily available.

PART 3 - EXECUTION

3.1 GENERAL

A. Each Contractor shall coordinate with the Commissioning Team in the construction phase of the project to assure compliance with all system commissioning requirements.

3.2 DESIGN CRITERIA AND INTENT

A. Design criteria and intent shall be as described in the technical specification sections and contract drawings. The basis of design developed by the Architect and Engineer will be also referenced.

3.3 MEETINGS

A. Initial Meeting:

1. The CA, through the OR, will schedule, plan and conduct an initial commissioning meeting. The Contractors and their responsible parties are required to attend.

B. Miscellaneous Meetings:

1. Other meetings will be planned and conducted by the CA as construction progresses. These meetings will cover coordination, deficiency resolution, and planning issues. These meetings will be held to the extent possible following construction meetings to minimize additional travel for all parties.

3.4 STARTUP, CONSTRUCTION CHECKLISTS AND INITIAL CHECKOUT

A. The following procedures apply to all equipment/systems to be commissioned.

B. General: Prefunctional checklists are required to verify that the equipment and systems are fully connected and operational. It ensures that performance testing (in-depth system checkout) may proceed without unnecessary delays.

The prefunctional checklists for a given system must be successfully completed and approved prior to startup and formal performance testing of equipment or subsystems of the given system.

C. Startup and Checkout Plan: The CA will assist the Project Commissioning Team members responsible for startup of any equipment. The primary role of the CA in this process is to ensure that there is written documentation that each of the manufacturer recommended procedures has been completed. The CA shall provide prefunctional checklists and startup shall be identified in the commissioning scoping meeting and on the checklist forms.

1. The prefunctional checklists will be developed by the CA and provided to the Contractors. These checklists indicate required procedures to be executed as part of startup and initial checkout of the systems and the party responsible for their execution.

2. The Contractor shall determine which trade is responsible for executing and documenting each of the line item tasks and transmit the checklists to the responsible subcontractors. Each form may have more than one trade responsible for its execution.

3. The Contractor/Subcontractor responsible for the purchase of the equipment shall develop the full startup plan by combining the manufacturer's detailed startup and checkout procedures and the prefunctional checklists.

4. The Contractor/Subcontractor shall submit the full startup plan to the CA for review and approval.

5. The CA will review and approve the procedures and the documentation format for reporting. The CA will return the procedures and the documentation format to the Contractor.

6. The Contractor will transmit the full startup plan to the Subcontractors for their review and use.

D. Sensor and Actuator Calibration: All field-installed temperature, relative humidity, CO, CO_2, refrigerant, O_2, and/or pressure sensors and gages, and all actuators (dampers and valves) on all equipment shall be calibrated. Verify that all locations are appropriate and away from causes of erratic operation. Submit to the CA the calibration methods and results. All test instruments shall have had a certified calibration within the last six (6) months to NIST traceable standards, and comply with all local, state and/or federal requirements/certifications, as required. Sensors installed in the unit at the factory with calibration certification provided need not be field calibrated.

Provide bench testing as required at the direction of the CA.

1. Sensor Calibration Methods:

   a. All Sensors - Verify that all sensor locations are appropriate and away from causes of erratic operation. Verify that sensors with shielded cable, are grounded only at one end. For sensor pairs that are used to determine a temperature or pressure difference, make sure they are reading within 0.2°F of each other for temperature and within a tolerance equal to 2% of the reading, of each other, for pressure. Tolerances for critical applications may be tighter.

   b. Sensors without Transmitters - Standard Application. Make a reading with a calibrated test instrument within 6 in. of the site sensor. Verify that the sensor reading (via the permanent thermostat, gauge or building automation system (BAS)) is within the tolerances in the table below of the instrument-measured value. If not, install offset in BAS, calibrate or replace sensor.

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

Tolerances, Standard Applications

Sensor	Required Tolerance (+/-)		Sensor	Required Tolerance (+/-)
Outside air, space air, duct air temps	0.4F		Flow rates, air	10% of design
Watthour, voltage & amperage	1% of design		Flow rates, water Relative humidity Oxygen or CO_2 monitor CO monitor	4% of design 4% of design 0.1% pts 0.01 % pts
Pressures, air, water and gas	3% of design		Barometric pressure	0.1 in. of Hg

d. Valve and Damper Stroke Setup and Check EMS Readout: For all valve and damper actuator positions checked, verify the actual position against the BAS readout. Set pumps or fans to normal operating mode. Command valve or damper closed, visually verify that valve or damper is closed and adjust output zero signal as required. Command valve or damper open, verify position is full open and adjust output signal as required. Command valve or damper to a few intermediate positions. If actual valve or damper position doesn't reasonably correspond, replace actuator or add pilot positioner (for pneumatics).

E. Execution of Construction Checklists and Startup:

1. Two (2) weeks prior to the scheduled start up, the Contractor shall coordinate startup and checkout with the Owner, A/E, OR, and CA. The execution and approval of the construction checklists, startup, and checkout shall be directed and performed by the Contractor, Subcontractor or Vendor. Signatures are required of the applicable Subcontractors for verification of completion of their work.

2. The Owner and facility personnel as necessary, shall observe, at minimum, the procedures for each piece of primary equipment, unless there are multiple units, in which case a sampling strategy may be used.

3. For lower-level components of equipment, (e.g., sensors, controllers), the CA shall observe a sampling of the startup procedures.

4. The Contractors, Subcontractors and Vendors shall execute startup and provide the CA with a signed and dated copy of the completed startup and construction checklists.

5. Only individuals employed by the Contractor (Technicians, Engineers, Tradesmen, Vendors, etc.) who have direct knowledge and witnessed that a line item task on the construction checklist was actually performed shall check off that item. It is not acceptable for non-witnessing onsite supervisors to fill out these forms.

F. Deficiencies, Non-Conformance, and Approval of Checklists and Startup (Master Issues Log):

1. The Contractor shall ensure that the Subcontractors clearly list any outstanding items of the initial startup and construction checklist procedures that were not completed successfully, on an attached sheet. The form and any outstanding deficiencies shall be provided, to the CA within two (2) days of test completion.

2. The CA will review the report and issue either a non-compliance report or an approval form, to the Contractor. The installing Contractors or Vendors shall correct all areas that are deficient or incomplete in the checklists and tests in a timely manner, shall notify the CA as soon as outstanding items have been corrected, and resubmit an updated startup report with a Statement of Correction on the original non-compliance report. When satisfactorily completed, the CA will recommend approval of the execution of the checklists and startup of each system.

3. Items left incomplete, which later cause deficiencies or delays during performance may result in backcharges to the Contractor.

3.5 FUNCTIONAL PERFORMANCE TESTING

A. Requirements: The functional performance testing shall demonstrate that each system is operating according to the documented design intent and contract documents. Functional performance testing facilitates bringing the systems from a state of individual substantial completion to full dynamic operation. Additionally, during the testing process, areas of deficient performance are identified and corrected, improving the operation and functioning of the systems.

B. Coordination and Scheduling: The Contractor shall provide sufficient notice, regarding their completion schedule for the construction checklists and startup of all equipment and systems to allow the performance testing to be scheduled. The CA shall oversee, witness, and document the performance all equipment and systems. The CA, in association with the Contractor/Subcontractors and Facility Staff, shall execute the tests. Performance testing shall be conducted after the construction checklists, and startup has been satisfactorily completed. The control system shall be sufficiently tested and approved by the CA before it is used to verify performance of other components or systems. The air balancing and water balancing shall be completed and approved before performance testing of air or water-related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting individual systems has been achieved, the interface or coordinated responses between systems shall be checked.

C. Development of Test Procedures: Before test procedures are finalized, the Contractor shall provide to the A/E and the CA all requested documentation and a current list of changes affecting equipment or systems, including an updated points list, program code, control sequences, testing parameters, supplemental instructions, and addenda. Using the testing parameters and requirements in the technical specifications, the CA shall update/develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Contractor/Subcontractor or vendor, as appropriate, shall provide assistance to the CA in developing the final procedures. Prior to finalization, the A/E shall review and concur with the test procedure.

D. Test Methods:

1. Performance testing and verification may be achieved by manual testing or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CA may substitute specified methods or require an additional method to be executed other than what was specified, with the approval of the A/E. The CA will determine which method is most appropriate for tests that do not have a specified method.

2. Simulated Conditions. Simulating conditions shall be allowed, though timing the testing to experience actual conditions is encouraged wherever practical.

3. Overridden Values. Overriding sensor values to simulate a condition, such as overriding the outside air temperature reading in a control system to be something other than ambient is acceptable.

4. Simulated Signals. Using a signal generator which creates a simulated signal to test and calibrate transducers and DDC constants is generally recommended over using the sensor to act as the signal generator via simulated conditions or overridden values.

5. Altering Sensors. Overriding sensor values and when simulating conditions is difficult, altering setpoints to test a sequence is acceptable.

6. Indirect Indicators. Relying on indirect indicators for responses or performance shall be allowed only after visually and directly verifying and documenting, over the range of the test parameters, that the indirect readings through the control system represent actual conditions and responses.

7. Setup. Each functional performance test shall be performed under conditions that simulate actual conditions as closely as is practically possible. The Contractor/Subcontractor(s) assisting the CA in executing the test shall provide all necessary materials, system modifications, etc., to produce the necessary flows, pressures, temperatures, etc., necessary to execute the test according to the specified conditions. At completion of the test, the Contractor/ Subcontractor(s) shall return all affected equipment and systems to their approved operating settings.

E. Problem Solving: The burden of responsibility to solve, correct, and retest malfunctions/failures is with the Contractor, with the CA providing suggestions.

3.6 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation: The CA shall witness and verify/pre-approve the documentation of the results of all performance tests. The CA shall complete all documentation for performance testing.

B. Non-Conformance:

1. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CA. In such cases the deficiency and resolution will be documented on the procedure form or on an attached sheet. If the correction is made immediately, the item does not need to be added to the issues log.

2. As tests progress and a deficiency is identified, the CA shall discuss the issue with the Commissioning Team and the Contractor.

   a. When there is no dispute regarding the deficiency and the Contractor accepts responsibility to correct it:

      1) The CA will document the deficiency and the Contractor's response and intentions. After the day's work, the CA will enter the item into the issues log. The Contractor corrects the deficiency, signs the statement of correction at the bottom of the non-compliance form certifying that the equipment is ready to be retested and sends it back to the CA.

      2) The Contractor shall reschedule the test; and the test is repeated. The issues log is amended by the CA.

   b. If there is a dispute about a deficiency, regarding whether or not it is a deficiency:

      1) The dispute shall be documented on the non-compliance form with the Contractor's response.

      2) Resolutions are made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E.

      3) The CA documents the resolution process in the issues log.

      4) Once the interpretation and resolution have been decided, the contractor corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CA. The contractor shall reschedule the test and the test is repeated until satisfactory performance is achieved.

3. Cost for the CA to retest a functional performance test is borne by Contractor's.

4. The Contractor shall submit in writing to the CA at least as often as commissioning meetings are being scheduled, the status of each outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreement and proposed resolutions.

   a. The CA retains the original non-conformance forms until the end of the project.

   b. Retesting shall not be considered a justified reason for a claim of delay or for a time extension by the Contractor.

C. Failure Due to Manufacturer Defect: If 10% (or three (3), whichever is greater) of identical pieces of equipment fail to perform to the contract documents (mechanically or substantively) due to a manufacturing defect, not allowing it to meet its submitted performance specification, all identical units may be considered unacceptable. In such case, the Contractor shall provide the Owner with the following:

1. Within one (1) week of notification from the Owner, the Contractor or Manufacturer's Representative shall examine all other identical units making a record of the findings. The findings shall be provided to the CA within two (2) weeks of the original notice.

2. Within two (2) weeks of the original notification, the Contractor or Manufacturer shall provide a signed and dated, written explanation of the problem, cause of failures, etc., and all proposed solutions. The proposed solutions shall not significantly exceed the specification requirements of the original installation.

3. The A/E will determine whether a replacement of all identical units or a repair is acceptable.

4. Two (2) examples, where applicable, of the proposed solution shall be installed by the Contractor and the A/E shall be allowed to test the installations for up to one (1) week, upon which the A/E will decide whether to accept the solution.

5. Upon acceptance, the Contractor and/or Manufacturer shall replace or repair all identical items, at their expense. The replacement/repair work shall proceed with reasonable speed beginning within one week from when parts or material can be obtained.

D. Approval: The CA notes each satisfactorily demonstrated function on the test form. Final acceptance of the functional performance test by the Owner is made after review by the CA, following recommendations by the A/E.

3.7 DEFERRED TESTING

A. Unforeseen Deferred Tests: If any check or test cannot be completed due to the project completion level, weather conditions, or time of season, execution of checklists and functional performance testing may be delayed upon approval of the CA. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Contractors will not be due any additional compensation.

B. Seasonal Testing: During the warranty period, seasonal testing (tests delayed until weather conditions are closer to the system's design) shall be completed as part of this contract. The CA shall coordinate this activity through the Owner. Tests will be executed, documented by the CA and deficiencies should be corrected by the appropriate Contractor/Subcontractors with the CA witnessing. Any final adjustments to the O&M manuals and as-built's due to the testing shall be made by the Contractor.

3.8 COMMISSIONING RECORD

A. The CA is responsible to compile, organize and index the following commissioning data, for all commissioned equipment into labeled, indexed and tabbed, three-ring binders and deliver it to the Owner.

1. Commissioning Plan.

2. System reports including available design narratives and criteria including sequences. Each system shall contain the startup plan and report, approvals, corrections, construction checklists, completed performance tests, trending and analysis, training plan and recommended recommissioning schedule.

3. Complete issues log inclusive of all items and resolutions.

4. Final Commissioning Report including an executive summary, list of participants and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the disposition of the Commissioning Authority regarding the adequacy of the equipment, documentation and training meeting the contract documents in the following areas:

a. Equipment meeting the equipment specifications.

b. Equipment installation.

c. Performance and efficiency.

d. Equipment documentation and design intent.

e. Operator training.

5. All outstanding non-compliance items shall be specifically listed. Recommendations for improvement to equipment or operations, future actions, commissioning process changes, etc. shall also be listed. Each non-compliance issue shall be referenced to the specific performance test, inspection, trend log, etc. where the deficiency is documented. The performance and efficiency section for each piece of equipment shall include a brief description of the verification method used (manual testing, BAS trend logs, data loggers, etc.) and include observations and conclusions from the testing.

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SECTION 02 41 19 - SELECTIVE DEMOLITION

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. Demolition and removal of selected portions of building or structure.
2. Salvage of existing items to be reused or recycled.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.

D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.5 INFORMATIONAL SUBMITTALS

A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control, and for noise control. Indicate proposed locations and construction of barriers.

B. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations.

C. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

1.6 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.7 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:
   1. Roof system.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.9 COORDINATION

A. Arrange selective demolition schedule so as not to interfere with Owner's operations.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
   1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

C. Verify that hazardous materials have been remediated before proceeding with building demolition operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
   2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
      a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
      b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
      c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
      d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
      e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
      f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
      g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
   1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
   2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
   3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
   4. Cover and protect furniture, furnishings, and equipment that have not been removed.
   5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 "Temporary Facilities and Controls."

B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
   1. Strengthen or add new supports when required during progress of selective demolition.

C. Remove temporary barricades and protections where hazards no longer exist.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
   3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   4. Do not use cutting torches.
   5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
   6. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
   7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   8. Dispose of demolished items and materials promptly.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area on-site designated by Owner.
   5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
   3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

SECTION 04 20 00 - UNIT MASONRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
1. Concrete masonry units.
2. Clay face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry-joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.

B. Products Installed but not Furnished under This Section:
1. Steel lintels in unit masonry.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For the following:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.

C. Samples for Verification: For each type and color of the following:
1. Clay face brick, in the form of straps of five or more bricks.
2. Pigmented mortar. Make Samples using same sand and mortar ingredients to be used on Project.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:
1. Masonry units.
a. Include material test reports substantiating compliance with requirements.
b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.

c. For exposed brick, include test report for efflorescence according to ASTM C67.
d. For masonry units, include data and calculations establishing average net-area compressive strength of units.

2. Cementitious materials. Include name of manufacturer, brand name, and type.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.

B. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C1506 for water retention, and ASTM C91/C91M for air content.
2. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.

C. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

D. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
   1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.
   1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface.

C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide square-edged units for outside corners unless otherwise indicated.

B. CMUs: ASTM C90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2000 psi.
   2. Density Classification: Normal weight.
   3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.5 BRICK

A. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:
   1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
   2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
   3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
   4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

B. Clay Face Brick: Facing brick complying with ASTM C216.
   1. Face brick shall comply with ASTM C 216 without the use of coatings, and waivers.
   2. Grade: SW.
   3. Type: FBS.
   4. Initial Rate of Absorption: Less than 30 g/30 sq. in. per minute when tested according to ASTM C67.
   5. Efflorescence: Provide brick that has been tested according to ASTM C67 and is rated "not effloresced."
   6. Provide face brick matching color range, texture, and size of existing adjacent brickwork.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
   1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C114.

B. Hydrated Lime: ASTM C207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979/C979M. Use only pigments with a record of satisfactory performance in masonry mortar.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
      a. Davis Colors.
      b. Euclid Chemical Company (The); an RPM company.
      c. Lanxess Corporation.
      d. Solomon Colors, Inc.
   2. Formulate blend as required to produce color to match existing adjacent mortar.
   3. Pigments shall not exceed 10 percent of portland cement by weight.

E. Aggregate for Mortar: ASTM C144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
   2. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
   3. White-Mortar Aggregates: Natural white sand or crushed white stone.
   4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.

F. Aggregate for Grout: ASTM C404.

G. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated-Steel Reinforcing Bars: ASTM A615/A615M or ASTM A996/A996M, Grade 60.

B. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
   1. Hot-dip galvanized carbon steel.
   2. Wire Size for Side Rods: 0.148-inch diameter.
   3. Wire Size for Cross Rods: 0.148-inch diameter.
   4. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
   5. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into veneer but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:

1. Stainless Steel Wire: ASTM A580/A580M, Type 304.
2. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304.
3. Stainless Steel Bars: ASTM A276 or ASTM A666, Type 304.

C. Corrugated-Metal Ties: Metal strips not less than 7/8 inch wide with corrugations having a wavelength of 0.3 to 0.5 inch and an amplitude of 0.06 to 0.10 inch made from 0.062-inch-thick, stainless steel sheet.

2.9 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:
1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.016 inch thick.
2. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet. Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate metal drip edges from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees and hemmed.

B. Flexible Flashing: Use the following unless otherwise indicated:
1. Copper-Laminated Flashing: 7-oz./sq. ft. copper sheet bonded between two layers of glass-fiber cloth. Use only where flashing is fully concealed in masonry.

C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.

D. Termination Bars for Flexible Flashing: Stainless steel bars 1/8 inch by 1 inch.

2.10 MISCELLANEOUS MASONRY ACCESSORIES

A. Weep/Cavity Vent Products: Use the following unless otherwise indicated:
1. Cellular Plastic Weep/Vent: One-piece, flexible extrusion made from UV-resistant polypropylene copolymer, full height and width of head joint and depth 1/8 inch less than depth of outer wythe, in color selected from manufacturer's standard.
a. Products: Subject to compliance with requirements, provide one of the following:
1) Advanced Building Products Inc.; Mortar Maze Cell Vent.
2) Heckmann Building Products, Inc.; No. 85 Cell Vent.
3) Hohmann & Barnard, Inc; QV Quadro-Vent.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide Type S mortar unless another type is indicated.

D. Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.
   1. Pigments shall not exceed 10 percent of portland cement by weight.
   2. Mix to match existing adjacent mortar.
   3. Application: Use pigmented mortar for exposed mortar joints with the following units:
      a. Clay face brick.

E. Grout for Unit Masonry: Comply with ASTM C476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C143/C143M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
   2. Verify that substrates are free of substances that impair mortar bond.

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

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. per minute when tested according to ASTM C67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch or minus 1/4 inch.
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch.
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet, or 1/2-inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet, 1/4 inch in 20 feet, or 1/2-inch maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2-inch maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet or 1/2-inch maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch, with a maximum thickness limited to 1/2 inch.

2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch.
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch. Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch.
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay concrete unit masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs. Lay brick to match existing adjacent brick pattern.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 4 inches. Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:
1. Bed face shells in mortar and make head joints of depth equal to bed joints.
2. Bed webs in mortar in all courses of piers, columns, and pilasters.
3. Bed webs in mortar in grouted masonry, including starting course on footings.
4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 ANCHORED MASONRY VENEERS

A. Anchor masonry veneers to concrete and masonry backup with masonry-veneer anchors to comply with the following requirements:
   1. Fasten screw-attached anchors to concrete and masonry backup with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
   2. Embed tie sections in masonry joints.
   3. Space anchors as indicated.

3.7 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches.
   1. Space reinforcement not more than 8 inches o.c. in foundation walls.

B. Provide continuity at wall intersections by using prefabricated T-shaped units.

C. Provide continuity at corners by using prefabricated L-shaped units.

3.8 LINTELS

A. Install steel lintels where indicated.

B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.

3.9 FLASHING, WEEP HOLES, AND CAVITY VENTS

A. General: Install embedded flashing and weep holes in masonry at lintels, ledges, other obstructions to downward flow of water in wall, and where indicated.

B. Install flashing as follows unless otherwise indicated:
   1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
   2. At masonry-veneer walls, extend flashing through veneer, across airspace behind veneer, and up face of backup at least 8 inches. Fasten upper edge of flexible flashing to backup through termination bar.
   3. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch back from outside face of wall, and adhere flexible flashing to top of metal drip edge.

C. Install weep holes in exterior wythes and veneers in head joints of first course of masonry immediately above embedded flashing.
   1. Use specified weep/cavity vent products to form weep holes.
   2. Space weep holes 24 inches o.c. unless otherwise indicated.

3.10 REINFORCED UNIT MASONRY

A. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.

B. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.

3.11 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Frequency: One set of tests for each 5000 sq. ft. of wall area or portion thereof.

D. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.

E. Mortar Test: For each mix provided, according to ASTM C780. Test mortar for mortar air content and compressive strength.

F. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.

3.12 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean brick by bucket-and-brush hand-cleaning method described in BIA Technical Notes 20.
   6. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.

3.13 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Masonry Waste: Remove masonry waste and legally dispose of off Owner's property.

END OF SECTION 04 20 00

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

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. Structural steel.
2. Shrinkage-resistant grout.

1.3 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

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

1.5 ACTION SUBMITTALS

A. Product Data:
1. Structural-steel materials.
2. High-strength, bolt-nut-washer assemblies.
3. Shop primer.
4. Galvanized-steel primer.

B. Shop Drawings: Show fabrication of structural-steel components.
1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment Drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
5. Identify members not to be shop primed.

C. Delegated-Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural-steel materials, including chemical and physical properties.

1.7 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.
   3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:
   1. ANSI/AISC 303.
   2. ANSI/AISC 360.
   3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."

B. Connection Design Information:
   1. Option 2: Fabricator's experienced steel detailer shall select or complete connections in accordance with ANSI/AISC 303.
      a. Select and complete connections using schematic details indicated and ANSI/AISC 360.
      b. Use Allowable Stress Design; data are given at service-load level.

2.2 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A992/A992M, Grade 50.

B. Channels, Angles, M-Shapes, S-Shapes: ASTM A36/A36M.

C. Plate and Bar: ASTM A36/A36M.

D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade B structural tubing.

E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
   1. Weight Class: Standard.
   2. Finish: Black except where indicated to be galvanized.

F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
   1. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with plain finish.

B. High-Strength A490 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A490, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
   1. Direct-Tension Indicators: ASTM F959/F959M, Type 490-1, compressible-washer type with plain finish.

C. Zinc-Coated High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
   1. Finish: Hot-dip zinc coating.
   2. Direct-Tension Indicators: ASTM F959/F959M, Type 325-1, compressible-washer type with mechanically deposited zinc coating finish.

D. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex head assemblies, consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.
   1. Finish: Mechanically deposited zinc coating.

2.4 PRIMER

A. Steel Primer:
   1. Comply with Section 09 96 00 "High-Performance Coatings."
   2. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

2.5 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
   1. Camber structural-steel members where indicated.
   2. Fabricate beams with rolling camber up.
   3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
   4. Mark and match-mark materials for field assembly.
   5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.

C. Bolt Holes: Cut, drill,or punch standard bolt holes perpendicular to metal surfaces.

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

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.

F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.7 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Snug tightened, unless otherwise indicated as slip critical.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
   1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2.9 SHOP PRIMING

A. Shop prime steel surfaces, except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.
   3. Galvanized surfaces unless indicated to be painted.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
   1. SSPC-SP 3.

C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
   1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
   2. Bolted Connections: Inspect and test shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
   a. Ultrasonic Inspection: ASTM E164.
4. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.

B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.
   2. Weld plate washers to top of baseplate.
   3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
   4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

C. Maintain erection tolerances of structural steel within ANSI/AISC 303.

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

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

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

3.3 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
   1. Joint Type: Snug tightened, unless otherwise indicated as slip critical.

B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
   1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
   2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
   3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.4 REPAIR

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.

B. Touchup Painting:
   1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
      a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Cleaning and touchup painting are specified in Section 09 96 00 "High-Performance Coatings."

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
   1. Verify structural-steel materials and inspect steel frame joint details.
   2. Verify weld materials and inspect welds.
   3. Verify connection materials and inspect high-strength bolted connections.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
   1. Bolted Connections: Inspect and test bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
   2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
      a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
         1) Ultrasonic Inspection: ASTM E164.

END OF SECTION 05 12 00

SECTION 05 50 00 - 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. Steel framing and supports for applications where framing and supports are not specified in other Sections.

B. Products furnished, but not installed, under this Section include the following:
1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions 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. Product Data: For the following:
1. Fasteners.
2. Shop primers.
3. Shrinkage-resisting grout.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, 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. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.

D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

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 B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A307, Grade A; with hex nuts, ASTM A563; and, where indicated, flat washers.

C. Stainless Steel Bolts and Nuts: Regular hexagon-head annealed stainless steel bolts, ASTM F593; with hex nuts, ASTM F594; and, where indicated, flat washers; Alloy Group 2.

D. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

E. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel Is Indicated: Alloy Group 2 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

2.3 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09 96 00 "High-Performance Coatings."

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
   1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

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

D. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. 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 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. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where indicated.

D. Prime miscellaneous framing and supports with primer specified in Section 09 96 00 "High-Performance Coatings" where indicated.

2.6 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span, but not less than 8 inches unless otherwise indicated.

C. Galvanize and prime loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in exterior walls with primer specified in Section 09 96 00 "High-Performance Coatings."

2.7 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.8 GENERAL FINISH REQUIREMENTS

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.

2.9 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
   1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.

C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
   1. Shop prime with universal shop primer unless primers specified in Section 09 96 00 "High-Performance Coatings" are indicated.

D. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   1. Galvanized-Steel Items: SSPC-SP 16, "Brush-off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals."

E. 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.

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.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF 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 REPAIRS

A. Touchup Painting:
   1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
      a. Apply by brush or spray to provide a minimum 2.0-mil dry film thickness.

B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 05 50 00

SECTION 07 13 26 - SELF-ADHERING SHEET WATERPROOFING

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. Modified bituminous sheet waterproofing.
2. Protection course.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, and tested physical and performance properties of waterproofing.
2. Include manufacturer's written instructions for evaluating, preparing, and treating substrate.

B. Shop Drawings: Show locations and extent of waterproofing and details of substrate joints and cracks, expansion joints, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by waterproofing manufacturer.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended in writing by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

A. Manufacturer's Warranty:
1. Waterproofing Warranty: Manufacturer agrees to furnish replacement waterproofing material for waterproofing that does not comply with requirements or that fails to remain watertight within specified warranty period.
a. Warranty Period: Five years from date of Substantial Completion.

B. Installer's Special Warranty: Specified form, signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Waterproofing System: Obtain waterproofing materials, protection course, from single source from single manufacturer.

2.2 MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Modified Bituminous Sheet Waterproofing: Minimum 60-mil nominal thickness, self-adhering sheet consisting of 56 mils of rubberized asphalt laminated on one side to a 4-mil-thick, polyethylene-film reinforcement, and with release liner on adhesive side; formulated for application with primer or surface conditioner that complies with VOC limits of authorities having jurisdiction.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Carlisle Coatings & Waterproofing Inc; CCW MiraDRI 860/861.
b. GCP Applied Technologies Inc. (formerly Grace Construction Products); Bituthene 3000 or Bituthene 4000.
c. W. R. Meadows, Inc; Mel-Rol.
2. Physical Properties:
a. Tensile Strength, Membrane: 250 psi minimum; ASTM D412, Die C, modified.
b. Ultimate Elongation: 300 percent minimum; ASTM D412, Die C, modified.
c. Low-Temperature Flexibility: Pass at minus 20 deg F; ASTM D1970/D1970M.
d. Crack Cycling: Unaffected after 100 cycles of 1/8-inch movement; ASTM C836/C836M.
e. Puncture Resistance: 40 lbf minimum; ASTM E154/E154M.
f. Water Absorption: 0.2 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
g. Water Vapor Permeance: 0.05 perm maximum; ASTM E96/E96M, Water Method.
h. Hydrostatic-Head Resistance: 200 feet minimum; ASTM D5385.

3. Sheet Strips: Self-adhering, rubberized-asphalt strips of same material and thickness as sheet waterproofing.

2.3 AUXILIARY MATERIALS

A. Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.
   1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid primer recommended for substrate by sheet waterproofing material manufacturer.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by sheet waterproofing material manufacturer.

D. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, of trowel grade or low viscosity.

E. Substrate Patching Membrane: Low-viscosity, two-component, modified asphalt coating.

F. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch, predrilled at 9-inch centers.

G. Protection Course, Asphaltic: ASTM D6506, semirigid sheets of fiberglass or mineral-reinforced-asphaltic core, pressure laminated between two asphalt-saturated fibrous liners and as follows:
   1. Thickness: Nominal 1/8 inch.
   2. Adhesive: Rubber-based solvent type recommended by waterproofing manufacturer for protection course type.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of waterproofing.
   1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
   2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D4263.

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

3.2 PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections.

E. Fill form tie holes, honeycomb, aggregate pockets, holes, and other voids.

F. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D4258.
   1. Install sheet strips of width according to manufacturer's written instructions and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

G. Bridge and cover isolation joints, expansion joints, and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips of widths according to manufacturer's written instructions.
   1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.

H. Corners: Prepare, prime, and treat inside and outside corners in accordance with manufacturer's instructions.
   1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
      a. At footing-to-wall intersections, extend liquid membrane in each direction from corner or install membrane strip centered over corner.

I. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions.

3.3 INSTALLATION OF MODIFIED BITUMINOUS SHEET WATERPROOFING

A. Install modified bituminous sheets according to waterproofing manufacturer's written instructions.

B. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by sheet waterproofing in same day. Reprime areas exposed for more than 24 hours.

C. Apply and firmly adhere sheets over area to receive waterproofing. Accurately align sheets and maintain uniform 2-1/2-inch-minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure watertight installation.
   1. When ambient and substrate temperatures range between 25 and 40 deg F, install self-adhering, modified bituminous sheets produced for low-temperature application. Do not use low-temperature sheets if ambient or substrate temperature is higher than 60 deg F.

D. Apply continuous sheets over already-installed sheet strips, bridging substrate cracks, construction, and contraction joints.

E. Seal edges of sheet waterproofing terminations with mastic.

F. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheet waterproofing extending 6 inches beyond repaired areas in all directions.

G. Immediately install protection course with butted joints over waterproofing membrane.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a site representative qualified by waterproofing membrane manufacturer to inspect substrate conditions, surface preparation, membrane application, flashings, protection, and drainage components; and to furnish daily reports to Architect.

B. Waterproofing will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 PROTECTION, REPAIR, AND CLEANING

A. Protect waterproofing from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove waterproofing that does not comply with requirements; repair substrates, reapply waterproofing, and repair sheet flashings.

C. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 07 13 26

SECTION 09 91 23 - INTERIOR PAINTING

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 surface preparation and the application of paint systems on interior substrates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Benjamin Moore & Co.
   2. PPG Paints.
   3. Sherwin-Williams Company (The).

B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

C. Colors: As indicated on the Drawings.

2.3 PRIMERS/SEALERS

A. Interior Concrete and Masonry Primer: Factory-formulated acrylic-latex interior primer for interior application.
   1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer 253: Applied at a dry film thickness of not less than 1.2 mils.
   2. PPG Paints; Perma-Crete Acrylic Masonry Surface Sealer 4-808/4-809: Applied at a dry film thickness of not less than 1.4 mils.
   3. Sherwin-Williams; Loxon Concrete and Masonry Primer A24W8300: Applied at a dry film thickness of not less than 3.2 mils.

B. Interior Gypsum Board Primer: Factory-formulated latex-based primer for interior application.
   1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer 253: Applied at a dry film thickness of not less than 1.2 mils.
   2. PPG Paints; SPEEDHIDE Int. Latex Sealer QD 6-2: Applied at a dry film thickness of not less than 1.2 mils.
   3. Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Primer B28W2600 Series: Applied at a dry film thickness of not less than 1.1 mils.

C. Interior Plaster Primer: Factory-formulated latex-based primer for interior application.
   1. Benjamin Moore; Moorcraft Super Spec Latex Enamel Undercoater & Primer Sealer 253: Applied at a dry film thickness of not less than 1.2 mils.

2. PPG Paints; SPEEDHIDE Int. Latex Sealer QD 6-2: Applied at a dry film thickness of not less than 1.8 mils.
3. Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Primer B28W2600 Series: Applied at a dry film thickness of not less than 1.1 mils.

D. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Benjamin Moore; Moorcraft SuperSpec Alkyd Enamel Underbody and Primer Sealer C245: Applied at a dry film thickness of not less than 1.5 mils.
2. PPG Paints; Pitt-Tech Plus 90-912 DTM Industrial Primer: Applied at a dry film thickness of not less than 2.0 mils.
3. Sherwin-Williams; Kem Bond HS Universal Metal Primer B50 Series: Applied at a dry film thickness of not less than 3.0 mils.

E. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.
1. Benjamin Moore; Moore's SSHP Acrylic Metal Primer P04: Applied at a dry film thickness of not less than 2.0 mils.
2. PPG Paints; Pitt-Tech Plus 90-912 DTM Industrial Primer: Applied at a dry film thickness of not less than 2.2 mils.
3. Sherwin-Williams; DTM Acrylic Primer/Finish B66W1: Applied at a dry film thickness of not less than 3.0 mils.

F. Interior Flat Acrylic Dry-Fall: Factory-formulated flat dry-fall for interior application.
1. Benjamin Moore; 153 Sweep-Up Spray Latex Flat: Applied at a dry film thickness of not less than 1.5 mils.
2. PPG Paints; SPEEDHIDE SUPER TECH WB Int. Dry Fall Latex 6-723XI: Applied at a dry film thickness of not less than 1.5 mils.
3. Sherwin-Williams; Low VOC Waterborne Acrylic Dryfall B42W81: Applied at a dry film thickness of not less than 1.7 mils.

2.4 PAINTS

A. Interior Flat Acrylic Paint: Factory-formulated flat latex paint for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Flat 275: Applied at a dry film thickness of not less than 1.2 mils.
2. PPG Paints; SPEEDHIDE Int. Latex Flat 6-70: Applied at a dry film thickness of not less than 1.3 mils.
3. Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Flat Wall Paint B30W2600 Series: Applied at a dry film thickness of not less than 1.4 mils.

B. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell latex interior enamel.
1. Benjamin Moore; Moorcraft Super Spec Latex Eggshell Enamel 274: Applied at a dry film thickness of not less than 1.3 mils.
2. PPG Paints; SPEEDHIDE Int Eggshell Latex 6-411: Applied at a dry film thickness of not less than 1.3 mils.
3. Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Egg-Shell Enamel B24W2600 Series: Applied at a dry film thickness of not less than 1.6 mils.

C. Interior Semigloss Acrylic Enamel: Factory-formulated semigloss latex enamel for interior application.
   1. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel 276: Applied at a dry film thickness of not less than 1.2 mils.
   2. PPG Paints; SPEEDHIDE Int SG Latex 6-500: Applied at a dry film thickness of not less than 1.3 mils.
   3. Sherwin-Williams; ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel B31W2600 Series: Applied at a dry film thickness of not less than 1.3 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Masonry (Clay and CMUs): 12 percent.
   3. Gypsum Board: 12 percent.
   4. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Plaster Substrates: Verify that plaster is fully cured.

E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Preparation of Surfaces to be Painted:
   1. Metal Work; Remove all oil and grease with non-flammable solvent. Remove all rust with steel wool.
   2. New Areas, Patched Areas, Touch up Areas; Clean and prepare all surfaces as required to provide a smooth, even substrate for proper application of finish.
   3. Applicator must examine areas and conditions under which paint is to be applied and notify contractor in writing if conditions detrimental to proper and timely completion of work. Do not proceed until unsatisfactory conditions have been corrected.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

D. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

G. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer.

H. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

I. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

J. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

K. Plaster Substrates: Do not begin paint application until plaster is fully cured and dry.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed in occupied spaces:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
      h. Other items as directed by Architect.
   2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete and Masonry (Other Than Concrete Unit Masonry): Provide the following paint systems over interior concrete and brick masonry substrates:
   1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
      a. Primer: Interior concrete and masonry primer.
      b. Finish Coats: Interior semigloss acrylic enamel.

B. Gypsum Board and Plaster: Provide the following finish systems over interior gypsum board and plaster surfaces:
   1. Flat Acrylic Finish: Two finish coats over a primer.
      a. Primer: Interior gypsum board primer.
      b. Finish Coats: Interior flat acrylic paint.
   2. Low-Luster Acrylic-Enamel Finish: Two finish coats over a primer.
      a. Primer: Interior gypsum board primer.
      b. Finish Coats: Interior low-luster acrylic enamel.
   3. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
      a. Primer: Interior gypsum board primer.
      b. Finish Coats: Interior semigloss acrylic enamel.

C. Ferrous Metal: Provide the following finish systems over ferrous metal:
   1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
      a. Primer: Interior ferrous-metal primer.
      b. Finish Coats: Interior semigloss acrylic enamel.

D. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:
   1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.
      a. Primer: Interior zinc-coated metal primer.
      b. Finish Coats: Interior semigloss acrylic enamel.

E. Overhead Structure, Deck, Mechanical, and Electrical Elements: Provide the following finish.
   1. Flat Acrylic Dryfall finish: Two finish coats factory primed surface.

END OF SECTION 09 91 23

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

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 surface preparation and application of high-performance coating systems on the following substrates:
   1. Exterior Substrates: Steel and galvanized steel substrates.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of coating system and in each color and gloss of topcoat indicated.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

1.4 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each coating system specified in Part 3.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. Carboline Company (Carboline).
   2. Sherwin-Williams Company.
   3. Tnemec Company, Inc. (Tnemec).

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. Material Compatibility:
   1. Provide materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.
   3. Provide products of same manufacturer for each coat in a coating system.

B. Colors: Custom color to match panels specified in Section 13 34 10 – Acoustic Barrier Panel System.

2.3 HIGH-PERFORMANCE COATING SYSTEMS

A. Ferrous Metal and Galvanized Metal: Provide one of the following finish systems over ferrous-metal or galvanized metal surfaces:
   1. Moderate Environment (Semigloss Finish): One finish coat over an intermediate coat and a primer.
      a. Primer: Epoxy primer applied at spreading rate recommended by manufacturer.
         1) Carboline; 893 2-Component Cross-Linked Epoxy.
         2) Sherwin-Williams Company; Macropoxy 646 Fast Cure Epoxy.
         3) Tnemec; Series V 27 F. C. Typoxy Polyamide Epoxy.

b. Intermediate Coat: Epoxy applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 3.0 to 8.0 mils.
   1) Carboline; 890 2-Component Epoxy.
   2) Sherwin-Williams Company; Macropoxy 646 Fast Cure Epoxy.
   3) Tnemec; Series N 69 Hi-Build Epoxoline II Polamidoamine Epoxy.

c. Topcoat: Aliphatic polyurethane enamel applied at spreading rate recommended by manufacturer to achieve a dry film thickness of 1.5 to 4.0 mils.
   1) Carboline; Carboline 133 HB Aliphatic Polyurethane.
   2) Sherwin-Williams Company; Hi Solids Polyurethane 250 B65 Series.
   3) Tnemec; Series 1075 Endura-Shield II Aliphatic Acrylic Polyurethane.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."

E. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
   1. Use applicators and techniques suited for coating and substrate indicated.
   2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Coat back sides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Steel, and Galvanized Steel Substrates:
   1. Pigmented Polyurethane System:
      a. Prime Coat: Epoxy primer.
      b. Intermediate Coat: Epoxy intermediate coat.
      c. Topcoat: Aliphatic polyurethane enamel.

END OF SECTION 09 96 00

SECTION 13 34 10 - ACOUSTIC BARRIER PANEL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Prefabricated absorptive acoustic barrier panels, attachment/support system and accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide acoustic barrier panel system capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Wind Loads: Determine loads based on the following minimum design wind pressures:
      a. Uniform pressure as indicated on Drawings.

B. Seismic Performance: Provide acoustic barrier panel system capable of withstanding the effects of earthquake motions determined according to ASCE 7, "Minimum Design Loads for Buildings and Other Structures": Section 9, "Earthquake Loads."

C. Thermal Movements: Provide acoustic barrier panel system that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Acoustical Performance: Minimum NRC (Noise Reduction Coefficient) rating of 1.05 and an STC (Sound Transmission Class) of 33 after barrier installation.
   1. Sound Transmission Loss Data (1/3 Octave Band), dB (STC):

125	250	500	1K	2K	4K	8K
21	34	40	33	32	26	37

E. Reference Standards:
   1. ASTM E-90, Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
   2. ASTM E423, Sound Absorption by the Reverberation Room Method.

1.4 SUBMITTALS

A. Product Data: Include certified product test results, construction details, material descriptions, dimensions of individual components and profiles, and finishes for acoustic barrier panel system.

B. Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication and assembly of acoustic barrier panel system, as well as procedures and diagrams.

C. Delegated-Design Submittal: For acoustic barrier panel system indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   1. Detail fabrication and assembly of acoustic barrier panel systems.
   2. Include design calculations.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples: Submit selection and verification samples for finishes, colors and textures. Sample materials minimum 4 by 12 inches. Include any panel accessories as required.

F. Welding certificates.

G. Manufacturer Certificates: Product certificates and literature signed by the manufacturer certifying materials comply with specified performance characteristics and criteria, and physical requirements.

H. Operation and Maintenance Data: Include methods for maintaining installed products, and precautions against cleaning materials and methods detrimental to finishes and performance.

I. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

A. Professional Engineering Qualifications: A professional engineer who is legally qualified to practice in New York State and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of acoustic barrier panel systems that are similar to those indicated for this Project in material, design, and extent.

B. Installer: Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section

C. Acoustical Performance:
   1. The acoustical panel manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory indicating the panel system to be provided will have the required Sound Transmission Class Rating. Tests shall be performed in accordance with ASTM E 90 and ASTM E 413.
   2. The acoustical panel manufacturer will be required to submit acoustical performance data in the form of up-to-date test reports from an independent testing laboratory indicating the panel system to be provided will have the required Sound Absorption Coefficients. Tests shall be performed in accordance with ASTM C 423.
   3. For the required ratings, refer to the specification or drawing notes for Model type reference.

D. Source Responsibility: Provide sound control panel system from a firm specializing in producing sound control products for a minimum of ten (10) years.

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

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact. Use all means necessary to protect the materials of this section before, during and after installation and to protect the installed work and materials of all other trades.

1.7 PROJECT CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

1.8 WARRANTY

A. Manufacturer’s Warranty: Manufacturer’s standard warranty document executed by authorized company official. Fabricated panels shall be guaranteed against defective workmanship for (1) one year from date of shipment. Factory-applied finish shall be warranted for 10 years against fading, chalking or cracking.

B. Manufacturer’s warranty is in addition to, and not a limitation of, other rights the owner may have under Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for acoustic barrier panel system is based on product as listed below.
   1. Industrial Acoustics Company, 1160 Commerce Avenue, Bronx, NY 10462-5599; Phone (718) 931-8000.

B. Acoustic Barrier Panel System:
   1. Free Standing System FSS; Industrial Acoustics Company.

C. Doors and Frames:
   1. Moduline APR Type Single-Leaf Door; Industrial Acoustics Company.

2.2 MATERIALS

A. Panel Construction: Individual panels shall be 5 inches thick by 24 inches high by 16 feet long. Panels shall be constructed of galvannealed steel manufactured in accordance with the requirements of ASTM A 924 coated to ASTM A 653 specification. Panel components shall meet the following structural requirements:
   1. Perforated face sheet shall be 20 gauge.
   2. Solid face sheet shall be 14 gauge.
   3. Solid end caps shall be 20 gauge.

B. Acoustic Fill: Fill materials shall be fiberglass, non-corrosive, resistant to attack by fungus, fire-resistant, vermin proof and non-hygroscopic. Fill material shall be free draining, self-supporting and shall retain physical and sound absorptive characteristics after long term exposure to the elements. All materials shall have a Class A fire rating with a flame spread not greater than 25.

C. Bearing Blocks: The bottom panel of the wall system shall be supported with 1 inch thick by 2-1/4 inches wide by 4 inches long 65 durometer blocks. Blocks shall be EPDM, neoprene or rubber.

D. Door and Frame:
   1. Door leaf shall be 1-3/4 inch thick, fabricated from 16 gauge galvanized steel and filled with sound-absorbing and damping elements.
   2. Frame shall be fabricated from 16 gauge galvanized steel.
   3. Door and frame materials and fabrication shall comply with Division 08 Section “Hollow Metal Doors and Frames.”
   4. Door Hardware: Refer to Division 08 Section “Door Hardware.”

E. Structural Steel:
   1. Steel materials are specified in Division 05 Section “Structural Steel Framing.”

2.3 FABRICATION

A. The perforated and solid sheet shall be roll-formed to lengths up to and including 16 feet. The panel shall be assembled forming a non-welded, free draining module. Spot welds or mechanical fasteners shall not be acceptable. Fabricate panels to be rigid, neat in appearance and free from defects, warp or buckle.

B. The panel assembly shall be such so as to compress and hold the fill materials in place under severe conditions of vibration such as encountered in shipment, installation and operation. Any voids in the panel will be unacceptable.

C. Internal panel reinforcement shall not be required as the maximum unsupported height of the fill shall not exceed 24 inches and a length of 16 feet.

D. The panel manufacturer, where required, shall provide openings for any large known penetrations. Pipe and conduit penetrations shall be located and cut in the field and sealed in accordance with manufacturer’s instructions.

2.4 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.5 FINISH

A. Powder Coating: After the module is formed it shall be factory coated utilizing a polyester powder coating system that is applied through the use of an electrostatic charge to ensure complete panel and edge coverage. The coating shall be thermally bonded to the surface of the galvannealed steel. Finish coating shall have a dry film thickness of 3 mils (+/- 0.5 mils).
   1. Color: Gray Primer (Industrial Acoustics Company).

B. Corrosion Testing: Modules shall prove testing for corrosion resistance in accordance with ASTM B 117. After 2,400 hours of exposure the coating system shall not fail due to blistering, loss of adhesion, or corrosion along the score lines.

C. Weathering Testing: Modules shall prove testing for accelerated weathering in accordance with ASTM G 23. After 2,400 hours of testing, module samples shall not exhibit chalking less than No. 8 per ASTM D 4214 or a color change greater than 5 NBS units per ASTM D 2244.

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 work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.

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

3.2 INSTALLATION

A. Install acoustic barrier panel system according to manufacturer's written instructions.

B. Use no bolts or fasteners to secure acoustic barrier panels.

C. Door and Frame Installation:
   1. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturers' written instructions. Coordinate installation with other components.
   2. Install doors and frames according to SDI A250.8.

3.3 ADJUSTING

A. Adjust doors and hardware to operate smoothly, easily, properly, and without binding. Confirm that locks engage accurately and securely without forcing or binding.

3.4 CLEANING

A. After installation, clean soiled surfaces according to manufacturer's written instructions. Protect panel surfaces from damage until acceptance by Owner.

B. In the event that debris must be cleaned from the barriers or the perforated metal surfaces, the barrier should be vacuum cleaned or wiped clean with a cloth dampened in a mild detergent and/or Alcohol based solution.

C. In no event should solutions be used to clean Acoustic Barrier panels that might affect the galvanized, or powder coated finish. “Ketones” will damage the panel finish and should not be applied as a cleaning agent.

D. After completing installation, inspect exposed finishes and repair damaged finishes.

END OF SECTION 13 34 10

SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY`

A. Section Includes:

1. Pipes, fittings, and specialties.
2. Sprinklers.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For wet-pipe sprinkler systems.

1. Include plans, elevations, sections, and attachment details.
2. Include diagrams for power, signal, and control wiring.

C. Delegated-Design Submittal: For wet-pipe sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by a qualified New York State licensed professional engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13.

B. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

2.2 STEEL PIPE AND FITTINGS

A. Standard-Weight, Galvanized and Black Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.

B. Galvanized and Black Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.

C. Galvanized and Uncoated Steel Couplings: ASTM A 865/A 865M, threaded.

D. Galvanized and Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.

E. Malleable- or Ductile-Iron Unions: UL 860.

F. Cast-Iron Flanges: ASME 16.1, Class 125.

G. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.

1. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick.

   a. Class 125 and Class 250, Cast-Iron, Flat-Face Flanges: Full-face gaskets.
   b. Class 150 and Class 300, Ductile-Iron or -Steel, Raised-Face Flanges: Ring-type gaskets.

H. Grooved-Joint, Steel-Pipe Appurtenances:

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

   a. Anvil International.
   b. National Fittings, Inc.
   c. Shurjoint Piping Products USA Inc.
   d. Victaulic

2. Pressure Rating: 300-psig minimum.

3. Galvanized, Painted, Uncoated Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting, with dimensions matching steel pipe.
4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.3 SPRINKLERS

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

1. Reliable Automatic Sprinkler Co., Inc. (The).
2. Victaulic Company.
3. Viking Corporation.

B. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."

C. Pressure Rating for Residential Sprinklers: 175-psig maximum.

D. Pressure Rating for Automatic Sprinklers: 175-psig minimum.

E. Automatic Sprinklers with Heat-Responsive Element:
1. Nonresidential Applications: UL 199.
2. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

F. Sprinkler Finishes: bronze and painted.

G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.

1. Ceiling Mounting: concealed white Quick Response.
2. Sidewall Mounting: Semi-recessed white.

H. Sprinkler Guards:

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

a. Reliable Automatic Sprinkler Co., Inc. (The).
b. Victaulic Company.
c. Viking Corporation.

2. Standard: UL 199.

3. Type: Wire cage with fastening device for attaching to sprinkler.

I.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.

1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.

C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions adjacent to each valve in pipes NPS 2 and smaller.

E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

F. Install sprinkler piping with drains for complete system drainage.

G. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13. In seismic-rated areas, refer to Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."

H. Fill sprinkler system piping with water.

3.2 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.

B. Install unions adjacent to each valve in pipes NPS 2 and smaller.

C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.

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

E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. 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.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

G. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

3.3 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.

B. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

C.

3.4 FIELD QUALITY CONTROL

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

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.
6. Coordinate with fire-pump tests. Operate as required.
7. Verify that equipment hose threads are same as local fire department equipment.

B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.5 CLEANING

A. Clean dirt and debris from sprinklers.

B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.6 PIPING SCHEDULE

A.

B. Standard-pressure, wet-pipe sprinkler system, PS 2 and smaller

1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
3. Standard-weight, galvanized-steel pipe with galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

C. Standard-pressure, wet-pipe sprinkler system, NPS 2-1/2 to NPS 4, shall be the following:

1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.
2. Standard-weight, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
3. Standard-weight, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Standard-weight, galvanized-steel pipe with roll-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.7 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Rooms without Ceilings: Upright sprinklers.
2. Rooms with Suspended Ceilings: Concealed sprinklers
3. Wall Mounting: Sidewall sprinklers.
4. Spaces Subject to Freezing: Pendent, Uprights, dry sprinklers, Sidewall dry sprinklers.
5. Special Applications: Extended-coverage.

B. Provide sprinkler types in subparagraphs below with finishes indicated.

1. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
2. Flush Sprinklers: Bright chrome, with painted white escutcheon.
3. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.
4. Upright Sprinklers: rough bronze in unfinished spaces not exposed to view.

END OF SECTION 21 13 13

SECTION 22 05 00 - COMMON WORK RESULTS FOR PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions common to most piping systems.
2. Transition fittings.
3. Dielectric fittings.
4. Mechanical sleeve seals.
5. Sleeves.
6. Escutcheons.
7. Grout.
8. Plumbing demolition.
9. Equipment installation requirements common to equipment sections.
10. Painting and finishing.
11. Concrete bases.
12. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings and crawlspaces.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Provide product literature and warranty information for all products listed in this section and for the final O & M Manuals:

1. Transition fittings.
2. Dielectric fittings.
3. Mechanical sleeve seals.
4. Escutcheons.

B. Welding certificates for certified welders.

C. Maintenance data for the final O & M Manuals.

D. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015), the International Fuel Gas Code of New York State (2015) and all New York State Amendments.

E. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

1.5 COORDINATION DRAWINGS

A. Before construction work commences, the Contractor for this trade shall coordinate with all other trades and shall submit coordination drawings in the form of electronic drawing files or reproducible transparencies, drawn at not less than 1/4 inch scale. Such drawings will be required throughout all work areas, for all Contracts. The Plumbing Contractor shall be accountable for determining plumbing and equipment conflicts with the ductwork, heating piping, structure, foundations, beams and wall construction with respect to the work of this trade. The Plumbing Contractor shall provide written descriptions and schematic drawings for any conflicts discovered and determined during demolition and investigation of the building conditions for review by the Engineer. Schematics shall include suggested piping routings if different than the construction plans and proposed cost reductions or additions. The coordination drawings shall show resolutions determined jointly by the Contractors of trade conflicts in congested areas. Boiler, Electrical and Mechanical Equipment Rooms shall be drawn early in coordination drawing process simultaneous with all other congested areas. Provide for and prepare Coordination Drawings As Follows:

1. The Plumbing Contractor shall prepare the base plan coordination drawings showing all ductwork, all pertinent heating piping, and equipment. These drawings may be sepias of the required ductwork Shop Drawings. The drawings shall be coordinated with lighting fixtures, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Owner's Representative. Provide adjustments to exact size, location, and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of contract. Minor revisions need not be redrawn.

2. The Plumbing Contractor shall provide reproducible and/or prints and submit the base plan to all Contractors. Electronic drawing files may be furnished to the contractors which have the CAD capabilities required for their use.
3. HVAC Contractor shall draft location of piping and equipment on the base plan, indicating areas of conflict and suggested resolutions.
4. The Electrical Contractor shall draft location of lighting fixtures, cable trays, and feeders over 1-1/2 in. on the base plan, indicating areas of conflict and suggested resolution.
5. The General Construction Contractor shall indicate areas of architectural/structural conflicts or obstacles and coordinate to suit the overall construction schedule.
6. The Construction Manager shall expedite all drawing work and coordinate to suit the overall construction schedule. In the case of unresolved interferences, he shall notify the Owner's Representative. The Owner's Representative will then direct the various contractors as to how to revise their drawings as required eliminating installation interferences.
7. If a given Contract proceeds prior to resolving conflicts, then if necessary, that Contract shall change its work at no extra cost in order to permit others to proceed with a coordinated installation. Coordination approval will be given by areas after special site meetings involving all Contracts.

B. The purpose of the coordination drawing process is to identify and resolve potential conflicts between Contracts, and between Contracts and existing building construction, before they occur in construction. Coordination drawings are intended for the respective Contractor's use during construction and shall not replace any Shop Drawings, or record drawings required elsewhere in these contract documents.

1.6 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Plumbing Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

D. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015), and all New York State Amendments.

E. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.8 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for plumbing installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Provide for and coordinate requirements for access panel locations and doors for plumbing items including water hammer arrestors, electric transformers, valves and balance valve assemblies requiring access that are concealed behind finished surfaces with the General Contractor. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 22 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 22 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.

a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

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

2.4 TRANSITION FITTINGS

A. AWWA Transition Couplings: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.

1. Manufacturers:

a. Cascade Waterworks Mfg. Co.
b. Dresser Industries, Inc.; DMD Div.
c. Ford Meter Box Company, Incorporated (The); Pipe Products Div.
d. JCM Industries.
e. Smith-Blair, Inc.
f. Viking Johnson.

2. Underground Piping NPS 1-1/2 and Smaller: Manufactured fitting or coupling.
3. Underground Piping NPS 2 and Larger: AWWA C219, metal sleeve-type coupling.
4. Aboveground Pressure Piping: Pipe fitting.

B. Plastic-to-Metal Transition Unions: MSS SP-107, CPVC four-part union. Include brass end, solvent-cement-joint end, rubber O-ring, and union nut.

1. Manufacturers:

a. NIBCO INC.
b. NIBCO, Inc.; Chemtrol Div.
c. Dresser Industries, Inc.; DMD Div.

d. Ford.

2.5 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

1. Manufacturers:

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Stainless steel. Include two for each sealing element.
4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.6 SLEEVES

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

B. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

C. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.

1. Underdeck Clamp: Clamping ring with set screws.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.

1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 PLUMBING DEMOLITION

A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove plumbing systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping, cut at ends to isolate from existing piping systems to remain and cap or plug piping ends with the same or compatible piping material.
3. Equipment to Be Removed: Disconnect and cap plumbing piping and remove equipment.
4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make plumbing equipment operational.
5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove plumbing equipment and deliver to Owner. Verify with Owner items to be salvaged prior to commencing with work.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Provide piping according to the following requirements and Division 22 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Provide 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. Provide piping to permit valve servicing.

E. Provide piping at indicated slopes.

F. Provide piping free of sags and bends.

G. Provide fittings for changes in direction and branch connections.

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

I. Sleeves are not required for core-drilled holes.

J. Permanent sleeves are not required for holes formed by removable PE sleeves.

K. Provide sleeves for pipes passing through fire rated concrete and masonry walls and concrete floor and roof slabs.

L. Provide sleeves for pipes passing through fire rated concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. 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. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.

2. Provide sleeves in new walls and slabs as new walls and slabs are constructed.
3. Provide sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Provide the following sleeve materials:

a. Steel Sheet Sleeves: For pipes smaller than NPS 6.
b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

M. Verify final plumbing equipment and piping locations against other trade work prior to roughing-in.

N. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 22 Sections specifying piping systems.

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

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

D. 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.

E. 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.

F. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 PLUMBING PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:

1. Provide unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of plumbing equipment.
2. Provide flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.5 PLUMBING EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Provide equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

B. Provide equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Provide plumbing equipment to facilitate service, access, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Provide for equipment clearances in compliance with manufacturer’s written installation instructions. This Contractor shall coordinate the locations of plumbing equipment with the other trades and report any discrepancies, conflicting equipment locations, building conditions or structural issues to the Engineer. This Contractor shall provide sketches of recommended re-routing of piping or relocation of equipment to the Engineer describing proposed locations.

D. Provide plumbing piping and equipment with clearances and paths installed at required slopes for drainage. Slopes may be adjusted to accommodate existing conditions. Notify Engineer of any proposed changes in writing.

3.6 PAINTING

A. Painting of plumbing systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.

C. Field Welding: Comply with AWS D1.1.

D. Metal supports or unistrut assemblies shall be used at all thermostatic mixing valve and recirculation pump mounting locations on walls.

E. Provided supports with factory finish or prime and paint supports.

END OF SECTION 22 05 00

SECTION 22 05 13 - COMMON MOTOR REQUIREMENTS FOR PLUMBING 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 general requirements for single-phase and polyphase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

B. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015) and all New York State Amendments.

C. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

1.3 COORDINATION

A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:

1. Motor controllers.
2. Torque, speed, and horsepower requirements of the load.
3. Ratings and characteristics of supply circuit and required control sequence.
4. Ambient and environmental conditions of installation location.

PART 2 - PRODUCTS

2.1 GENERAL MOTOR REQUIREMENTS

A. Comply with requirements in this Section except when stricter requirements are specified in plumbing equipment schedules or Sections.

B. Comply with NEMA MG 1 unless otherwise indicated.

C. Comply with IEEE 841 for severe-duty motors.

2.2 MOTOR CHARACTERISTICS

A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.

B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

2.3 POLYPHASE MOTORS

A. Description: NEMA MG 1, Design B, medium induction motor.

B. Efficiency: Premium efficient, as defined in NEMA MG 1.

C. Service Factor: 1.15.

D. Multispeed Motors: Variable torque.

1. For motors with 2:1 speed ratio, consequent pole, single winding.
2. For motors with other than 2:1 speed ratio, separate winding for each speed.

E. Multispeed Motors: Separate winding for each speed.

F. Rotor: Random-wound, squirrel cage.

G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.

H. Temperature Rise: Match insulation rating.

I. Insulation: Class F.

J. Code Letter Designation:

1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.

K. Enclosure Material: Cast iron for motor frame sizes 324T and larger; rolled steel for motor frame sizes smaller than 324T.

2.4 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS

A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.

B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.

1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.

2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.

C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factors.

2.5 SINGLE-PHASE MOTORS

A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application:
1. Permanent-split capacitor.
2. Split phase.
3. Capacitor start, inductor run.
4. Capacitor start, capacitor run.

B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.

C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.

D. Motors 1/20 HP and Smaller: Shaded-pole type.

E. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 22 05 13

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Bronze ball valves
2. Bronze swing check valves

B. Related Sections:

1. Division 22 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.2 SUBMITTALS

A. Product data and warranty information for each type of product indicated in this section and for final O & M Manuals.

1.3 QUALITY ASSURANCE

A. ASME Compliance: ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.

B. NSF Compliance: ANSI/NSF 61, NSF 62 Annex G and NSF 372 for valve materials for potable-water service. Lead content shall not exceed 0.25 percent maximum by weighted average.

C. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015) and all New York State Amendments.

D. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:

1. Handlever: For quarter-turn valves NPS 6 and smaller.

E. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves.
2. Solder Joint: With sockets according to ASME B16.18.
3. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

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

1. Manufacturers: Subject to compliance with requirements, provide Watts Regulator Co. Series LFFBV-3C and LFFBVS-3C or products by one of the following:

a. Milwaukee Valve Company.
b. NIBCO INC.
c. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:

a. Standard: MSS SP-110.
b. SWP Rating: 125 psig.
c. CWP Rating: 400 psig.
d. Body Design: Two piece.
e. Body Material: Lead free ASTM B 62; NSF 372, Bronze.
f. Ends: Threaded.
g. Seats: TFE.
h. Stem: extened stem for insulation, 316 SS.
i. Ball: Chrome-plated brass.
j. Port: Full.

2.3 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Bronze Disc:

1. Manufacturers: Subject to compliance with requirements, provide Watts Regulator Co.; a division of Watts Water Technologies, Inc. Series LF777, LFCV or LFCVS products or one of the following:

a. Hammond Valve.
b. NIBCO INC.
c. Apollo.

2. Description:

a. Standard: MSS SP-80, Type 3.
b. CWP Rating: 200 psig.

c. Body Design: Horizontal flow.
d. Body Material: Lead free ASTM B 62, bronze.
e. Ends: Threaded.
f. Disc: Bronze.

PART 3 - EXECUTION

3.1 VALVE INSTALLATION

A. Provide valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Provide valves in position to allow full stem movement. Provide valve handle extensions for insulation to clear installed piping insulation.

D. Provide swing check valves for proper direction of flow and in horizontal position with hinge pin level.

3.2 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.3 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball valves.
2. Sump Pump-Discharge Check Valves: Bronze swing type.

a. NPS 2 inches and Smaller: Bronze swing check valves with bronze disc.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP class or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 inches and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.
2. For Copper Tubing, NPS 2-1/2 inches to NPS 4 inches: Flanged ends except where threaded valve-end option is indicated in valve schedules below.

3.4 SUMP PUMP WASTE VALVE SCHEDULE

A. Pipe NPS 2 inch and Smaller:

1. Bronze Valves: May be provided with solder-joint ends instead of threaded ends.

2. Ball Valves: Two piece, full port, bronze with bronze trim.
3. Bronze Swing Check Valves: Class 125, bronze disc.
4. Sump pump manufacturer's recommended check valve or ball discharge valve combination.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe positioning systems.
6. Equipment supports.

1.2 SUBMITTALS

A. Product data and warranty information for each type of product indicated in this section and for the final O & M Manuals.

B. Welding certificates for certified welders.

1.3 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.

C. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015), the International Fuel Gas Code of New York State (2015) and all New York State Amendments.

D. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

E. Piping supports shall comply with the International Plumbing Code of New York State (2015) Chapter 3.

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.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

B. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

2.2 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 or stainless steel, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.3 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

2.4 MISCELLANEOUS MATERIALS

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

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Provide hangers, supports, clamps, and attachments as required supporting the piping properly from the building structure.

B. Fastener System Installation:

1. Provide 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. Provide operators that are licensed by powder-actuated tool manufacturer. Provide fasteners according to powder-actuated tool manufacturer's operating manual.

2. Provide mechanical-expansion anchors in concrete after concrete is placed and completely cured. Provide fasteners according to manufacturer's written instructions.

C. Pipe Positioning-System Installation: Provide support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer to Division 22 plumbing fixture Sections for requirements for pipe positioning systems for plumbing fixtures.

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

E. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

F. Provide hangers and supports to allow controlled thermal 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. Provide building attachments within concrete slabs or attach to structural steel. Provide additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 inches and larger and at changes in direction of piping. Provide concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

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

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

3.2 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- inch or less.

3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Provide 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.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

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

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

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

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

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

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

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

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 inches to NPS 8 inches.
2. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of noninsulated, stationary pipes NPS 1/2 inches to NPS 8 inches.
3. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 inches to NPS 8 inches, from two rods if longitudinal movement caused by expansion and contraction might occur.

I. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, provide 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.

J. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, provide 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. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Provide 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.

K. Provide powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 22 05 29

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.

1.2 SUBMITTAL

A. Product data and warranty information for each type of product indicated in this section and for the final O & M Manuals.

B. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015), the International Fuel Gas Code of New York State (2015) and all New York State Amendments.

C. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Valve Tags:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. 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-fourths the size of principal lettering.
3. Fasteners: Stainless-steel rivets or cable.
4. Basis of Design Manufacturer: Seton Style 300 or approved equal.

B. 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.
2. Letter Color: Black.
3. Background Color: White.
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-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets.
8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

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

D. Equipment Label Schedule: For each item of equipment to be labeled, typewritten 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), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: Yellow.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 8 by 6 inches.

F. Minimum Letter Size: 1/2 inch for name of units if viewing distance is less than 24 inches, 1 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-steel rivets or cable.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

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

B. Pre-tensioned Pipe Labels: Pre-coiled semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesives.

C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, 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: At least 1 inch high.

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 EQUIPMENT LABEL INSTALLATION

A. Provide for or permanently fasten labels on each major item of mechanical equipment with anchors or plastic coated stainless steel chains.

B. Locate equipment labels where accessible and visible from a standing position on the floor.

3.3 VALVE TAGS

A. Provide valve tags on all domestic water piping valves installed as a part of this project work. Provide a typewritten valve tag chart to be located in the boiler room 4’-0” above the finished floor. Fasten chart to wall. Valve chart shall include valve number, size, location in building and service.

3.4 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Division 09 Section "Interior Painting."

B. 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 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 30 feet along each run. Reduce intervals to 15 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:

1. Storm Water and Pumped Discharge Piping:

   a. Background Color: Green
   b. Letter Color: White (ST)

END OF SECTION 22 05 53

SECTION 22 14 13 - FACILITY STORM DRAINAGE PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

1.2 PERFORMANCE REQUIREMENTS

A. Provide storm drainage piping in compliance with the Plumbing Code of New York State.

1.3 SUBMITTALS

A. Product data and warranty information for each type of product indicated in this section and for the final O & M Manuals.

B. Pressure test for the final O & M Manuals.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Provide all building plumbing systems in compliance with the International Plumbing Code of New York State (2015) and all New York State Amendments.

C. Provide all building plumbing systems in compliance with the written University of the State of New York, State Education Department Manual of Planning Standards for School Buildings and the Rochester City School District Design Standards.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service weight class and extra heavy weight class, asphalt coated.

B. Gaskets: ASTM C 564, rubber.

2.3 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 74, Service weight class, asphalt coated with ASTM A 888 or CISPI 310 couplings.

B. Heavy-Duty, Shielded Hubless-Piping Couplings:

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

2. Standards: ASTM C 1460-2012, I.A.P.M.O. (U.P.C.), CSA B602-2010 and ASTM C 1540.
3. Description: Stainless-steel shielded with double 301 stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.
4. Basis of Design Manufacturer: Mifab Model MI-HUB-TR or approved equal.

2.4 PVC PIPE AND FITTINGS

A. Solid-Wall Schedule 40 PVC Pipe: ASTM D 2665, drain, waste, and vent.

B. PVC Socket Fittings: ASTM D 2665, made to ASTM D 3311, drain, waste, and vent patterns and to fit Schedule 40 pipe.

C. Adhesive Primer: ASTM F 656.

1. Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

D. Solvent Cement: ASTM D 2564.

1. Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PE Pipe and Fittings:

1. NPS 6 (DN 150) and Smaller: ASTM F405 or AASHTO M 252, Type CP; corrugated, for coupled joints, and sock-style geotextile fabric.
2. NPS 8 (DN 200) and Larger: ASTM F667; AASHTO M 252, Type CP; or AASHTO M 294, Type CP; corrugated; for coupled joints.
3. Couplings: Manufacturer's standard, band type.
4. Basis of Design Manufacturer: ADS Single Wall Pipe with Sock or approved equal.

2.6 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.

2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified-piping-system fitting.

3. Shielded Transition Couplings:

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

1) Cascade Waterworks Mfg. Co.
2) Mission Rubber Company; a division of MCP Industries, Inc.
3) Fernco
4) Mifab.

b. Standard: ASTM C 1460.
c. Description: Elastomeric or rubber sleeve with full-length, 301 stainless steel sheer ring corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
d. Basis of Design Manufacturer: Fernco Model SR or approved equal.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

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

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

C. Provide 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. Provide piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Provide piping at indicated slopes.

F. Provide piping free of sags and bends.

G. Provide fittings for changes in direction and branch connections.

H. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Provide proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

I. Lay buried building storm drainage piping beginning at low point of each system. Provide true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Provide required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

J. Provide storm drainage piping at the following minimum slopes unless otherwise indicated:

1. Building Storm Drain: 1 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.
2. Horizontal Storm-Drainage Piping: 2 percent downward in direction of flow.

K. Provide cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Provide encasement on underground piping according to ASTM A 674 or AWWA C105.

L. Provide aboveground PVC piping according to ASTM D 2665.

M. Provide underground PVC piping according to ASTM D 2321.

N. PVC pipe <u>is not permitted</u> for installation in the following locations:

1. Boiler room.

2. Plenum air spaces for air return that could be subject to fire or smoke conditions. Contractor shall filed verify all locations during construction and prior to submittal of all trade coordination drawings. Provide for coordination and confirmation of locations with HVAC Division 26 plans.

3. Locations where exposed to view by the public or staff or students.

4. Locations where subject to damage or crushing.

5. Building attics.

O. PVC pipe shall only be permitted in the following locations:

1. Concealed inside plumbing chases.

2. Crawlspace.

P. Plumbing Specialties:

1. Provide cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping. Provide cleanout fitting with closure plug inside the building in storm drainage force-main piping. Comply with requirements for cleanouts specified in Division 22 Section "Storm Drainage Piping Specialties."
2. Provide drains in storm drainage gravity-flow piping. Comply with requirements for drains specified in Division 22 Section "Storm Drainage Piping Specialties."

Q. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

R. Provide sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 22 Section "Common Work Results for Plumbing."

S. Provide sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 22 Section "Common Work Results for Plumbing."

T. Provide escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 22 Section "Common Work Results for Plumbing."

U. Insulate all exposed horizontal storm sewer and rain leader piping in ceilings and above ceilings with 1 inch thick wall mineral fiber insulation and all-service jacket. Provide PVC fitting covers at elbows. Refer to specification section 220700 “Plumbing Insulation”.

3.2 JOINT CONSTRUCTION

A. Join hub-and-spigot, cast-iron soil piping with gasketed joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for shielded hubless-piping coupling joints.

C. Plastic, Non-pressure-piping, solvent-cement 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. PVC Piping: Join according to ASTM D 2855 and ASTM D 2665 Appendixes.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Provide transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Shielded transition couplings.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger and support devices and installation specified in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment."

1. Provide carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Provide carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
3. Vertical Piping: MSS Type 8 or Type 42 clamps.
4. Individual, Straight, Horizontal Piping Runs:

   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

5. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
6. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support horizontal piping within 12 inches of each fitting and coupling.

C. Support vertical piping at base and at each floor and mid-point at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Provide hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 inch and NPS 2 inch: 60 inches with 3/8-inch rod.
2. NPS 3 inch: 60 inches with 1/2-inch rod.
3. NPS 4 inch and NPS 5 inch: 60 inches with 5/8-inch rod.
4. NPS 6 inch and NPS 8 inch: 60 inches with 3/4-inch rod.
5. NPS 10 inch: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot pipe lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

F. Provide supports for vertical cast-iron soil piping every 15 feet and mid-point at each floor.

G. Support piping not listed above according to MSS SP-69 and manufacturer's written instructions.

H. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

I. Provide hangers for PVC piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: Every 48 inches minimum with 3/8-inch rod.
2. NPS 3: Every 48 inches minimum with 1/2-inch rod.
3. NPS 4: Every 48 inches minimum with 5/8-inch rod.

J. Provide supports for vertical PVC piping every 48 inches minimum and at each floor deck.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Provide transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

1. Provide test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.
2. Comply with requirements for cleanouts and drains specified in Division 22 Section "Storm Drainage Piping Specialties."

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.6 IDENTIFICATION

A. Identify visible storm drainage piping. Comply with requirements for identification specified in Division 22 Section "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Provide tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in of walls or ceilings after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Provide written pressure test and inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Test Procedure: Test storm drainage piping, except outside leaders, on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.
4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Provide written reports for tests and required corrective action. Provide copies of the reports in the O & M Manual.

3.8 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Provide plugs in the ends of uncompleted storm sewer piping at the end of each work day and when work stops.

3.9 PIPING SCHEDULE

A. Aboveground storm drainage piping NPS 6 inches and smaller shall be the following:

1. Hubless, service weight cast-iron soil pipe and fittings; heavy-duty, shielded hubless-piping couplings; and coupled joints.
2. Dissimilar Pipe-Material Couplings: Shielded transition couplings.

B. Aboveground, storm drainage piping NPS 8 inches and larger shall be the following:

1. Hubless, Service weight class cast-iron soil pipe and fittings; heavy-duty, shielded sheer ring hubless-piping couplings; and coupled joints.
2. Dissimilar Pipe-Material Couplings: Shielded transition couplings.

C. Aboveground, storm drainage piping NPS 4 and larger shall be the following:
   1. Schedule 40 solid-wall PVC pipe, PVC socket fittings, and solvent-cemented joints.
   2. Dissimilar Pipe-Material Couplings: Shielded transition couplings.
   3. Refer to 3.1 above for conditions.

D. Underground, storm drainage piping NPS 4 and larger shall be any of the following:

   1. Schedule 40 solid wall PVC pipe, PVC sockets fittings, and solvent-cemented joints.
   2. Service weight class, cast-iron Hub-and-Spigot soil pipe and fittings; gaskets; and gasketed joints.
   3. Dissimilar Pipe-Material Couplings: Shielded transition couplings.
   4. Refer to 3.1 above for conditions.

E. Sump pump discharge piping NPS 2 and smaller shall be:
   1. Schedule 40 solid wall PVC pipe, PVC sockets fittings, and solvent-cemented joints.
   2. Dissimilar Pipe-Material Couplings: Shielded Transition couplings.

END OF SECTION 22 14 13

SECTION 22 14 23 - STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cleanouts
2. Miscellaneous storm drainage piping specialties.

1.2 SUBMITTALS

A. Product data and warranty information for each type of product indicated in this section and for the final O & M Manuals.

B. Product Information: Product operation and maintenance data for the final O & M Manuals.

1.3 QUALITY ASSURANCE

A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Provide storm drainage piping specialties in compliance with the Plumbing Code of New York State (2015).

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Cast-Iron Cleanouts (CO):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Zurn Plumbing Products Group; Specification Drainage Operation Series 1440 or a comparable product by one of the following:

   a. Josam Company; Josam Div.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   d. Tyler Pipe; Wade Div.

2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hub-and-spigot, cast-iron soil pipe T-branch or Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk or raised-head, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Cast-Iron Cleanouts (CO):

1. Basis-of-Design Product: Subject to compliance with requirements, provide Zurn Plumbing Products Group; Specification Drainage Operation Series 1403-BP or a comparable product by one of the following:

   a. Josam Company; Josam Div.
   b. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
   c. Tyler Pipe; Wade Div.

2. Size: Same as connected branch.
3. Type: Non Adjustable housing.
4. Body or Ferrule: Cast iron.
5. Clamping Device: Not required.
6. Outlet Connection: Inside calk or Spigot.
7. Closure: Brass plug with straight threads and gasket.
8. Adjustable Housing Material: Cast iron with threads, set-screws or other device.
9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
10. Frame and Cover Shape: Round.
11. Top Loading Classification: Heavy Duty.

2.2 INSTALLATION

A. Provide cleanouts in aboveground piping and building drain piping according to the following instructions unless otherwise indicated:

1. Provide cleanouts the same size as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
3. Locate cleanouts at minimum intervals of 50 feet dimension for piping NPS 4 and smaller and 100 feet for larger piping.

B. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

C. Provide test tees, (wall cleanouts) in vertical storm conductors and 18 to 24 inches above floor. Provide cleanout cover plate or access door in wall.

2.3 CONNECTIONS

A. Comply with requirements for piping specified in Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

2.4 PROTECTION

A. Provide plugs in the ends of uncompleted storm sewer piping at the end of each work day or when work stops.

END OF SECTION 22 14 23

SECTION 22 14 29 - SUMP PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submersible sump pumps.
2. Sump pump basin.

1.2 SUBMITTALS

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

B. Wiring Diagrams: For power, signal, and control wiring.

A. Product Data: For each type of product indicated and for the final O & M manuals.

B. Product literature, specifications, operation and maintenance data.

C. Warranty information for the final O & M Manuals.

1.3 QUALITY ASSURANCE

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. UL Compliance: Comply with UL 778 for motor-operated water pumps.

PART 2 - PRODUCTS

2.1 SUMP PUMP (SP-1, SP-2, and SP-3) - (Duplex sump pumps in crawlspace)

A. Number of Pumps: Refer to plans for location within crawlspace.

B. Each Pump:

1. Capacity: 62 gpm.
2. Total Dynamic Head: 30 feet.
3. Epoxy coated Class 30 cast iron housing.
4. Speed: 3450 RPM.
5. Discharge Size: 2 inches NPS.
6. Four – (4) variable level float switches for operation including all wiring connected to duplex panel and PVC float controls to include off, on and second pump on. Detects high water conditions. Alarms by audio 85 dB buzzer and visual activation. 115 volts. ASME A 17.1 compliant. Contains 9 volt dc battery backup, led indicators. Includes indicator lights including power on, pump on, high water and detectable oil lights.

7. Electrical Characteristics:

Motor Horsepower: 0.50.
Volts: 115/1/60.
Phases: Single.
Hertz: 60.

C. Unit Electrical Characteristics:

1. Full-Load Amperes: 15 amps.
2. Minimum Circuit Ampacity: 20 amps.
3. Manufacturer's 30 foot power cord option.

D. Performance Requirements:

1. Pump, components and floats shall be capable of operating continuously for temperatures up to 130 degrees F.

E. Duplex Control Panel:

1. Panel, components and floats shall be capable of monitoring 2 pumps, hand-off-auto-toggle switch for each pump, green run pump pilot light for each pump, alarm test and silence switches, red pilot light and audible alarm with 85 decibel rating for a high water condition, auxiliary dry contact, high water alarm, on single phase circuit breaker for each pump, magnetic starter for each pump, alternating mechanism, numbered terminal strip for connecting pumps and float switches, NEMA 1 general purpose enclosure, integral auxiliary terminal board connections (dry contact) for remote alarm devices, 4 variable level float switch operation, float switches with 30 foot wires and manufacturer's 2 year warranty on panel.

F. Basis of Design Manufacturer: (2) Zoeller Model N 4161 sump pumps or approved equal Liberty or Stancor. Zoeller Model 10-1040 duplex control panel or approved equal Liberty or Stancor.

2.2 SUMP PUMP BASIN

A. Perforated basin with solid lid, 36 inch diameter by 48 inches deep.

B. Basis of Design Manufacturer: Zoeller Model 31-XXJP or approved equal Topps or Weil.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide a spring loaded check valve and ball valve in the discharge piping for sump pumps at a removable and accessible location 24 inches above finish floor or top of basin.

B. Refer to basement, crawlspace plan for locations of pumps.

C. For SP-2 and SP-3 duplex sump pump in crawlspace, provide for the removal of the existing sump pump, draining and cleaning of the pit basin and off-site disposal of the sediment or pit contents.

D. For SP-1,SP-2 and SP-3 locate and provide duplex pumps in pit. Provide for all discharge piping and wiring between pit and control panel. Discharge shall connect to storm sewer. Anchor panel on wall directly above the crawlspace area. Provide for coordination of location and of final power connection to panel with Division 26. Division 26 to provide final power to panel.

END OF SECTION 22 14 29

SECTION 23 05 00 - BASIC MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, tools, materials, accessories, parts, transportation, taxes, and related items, essential for installation of the work and necessary to make work, complete, and operational. Provide new equipment and material unless otherwise called for. References to codes, specifications and standards called for in the specification sections and on the drawings mean, the latest edition, amendment and revision of such referenced standard in effect on the date of these contract documents. All materials and equipment shall be installed in accordance with the manufacturer's recommendations.

1.2 LICENSING

A. The Contractor shall hold a license to perform the work as issued by the authority having jurisdiction.

B. Electrical contract work shall be performed by, or under, the direct supervision of a licensed electrician.

1.3 PERMITS

A. Apply for and obtain all required permits and inspections, pay all fees and charges including all service charges. Provide certificate of approval from the Authorities Having Jurisdiction prior to request for final payment.

B. Provide electrical inspection certificate of approval from Middle Department Inspection Agency, Commonwealth Inspection Agency, or an Engineer approved Inspection Agency prior to request for final payment.

1.4 CODE COMPLIANCE

A. Provide work in compliance with the following:

1. 2015 International Building Code.
2. 2015 International Existing Building Code.
3. 2015 International Fire Code.
4. 2015 International Plumbing Code.
5. 2015 International Mechanical Code.
6. 2015 International Fuel Gas Code.
7. 2017 Uniform Code Supplement.

8. 2016 Supplement to the New York State Energy Code, which references:

   a. 2015 International Energy Conservation Code.

9. New York State Department of Labor Rules and Regulations.

10. New York State Department of Health.

11. 2014 National Electrical Code (NEC).

12. Occupational Safety and Health Administration (OSHA).

13. Local Codes and Ordinances.

14. Life Safety Codes, NFPA 101.

15. City of Rochester Plumbing Department.

16. New York State Education Department Manual of Planning Standards.

1.5 GLOSSARY

ACI	American Concrete Institute
AGA	American Gas Association
AGCA	Associated General Contractors of America, Inc.
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AFBMA	Anti-Friction Bearing Manufacturer's Association
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing Materials
AWSC	American Welding Society Code
AWWA	American Water Works Association
FM	Factory Mutual Insurance Company
IBR	Institute of Boiler & Radiation Manufacturers
IEEE	Institute of Electrical and Electronics Engineers

IRI	Industrial Risk Insurers
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NYS/DEC	New York State Department of Environmental Conservation
SBI	Steel Boiler Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UFPO	Underground Facilities Protective Organization
UL	Underwriter's Laboratories, Inc.
OSHA	Occupational Safety and Health Administration
XL - GAP	XL Global Asset Protection Services

1.6 DEFINITIONS

Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
As Specified	Materials, equipment including the execution specified/shown in the contract documents.
Basis of Design	Equipment, materials, installation, etc. on which the design is based. (Refer to the article, Equipment Arrangements, and the article, Substitutions.)
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Coordination Drawings	Show the relationship and integration of different construction elements and trades that require careful coordination during fabrication or installation, to fit in the space provided or to function as intended.
Delegated-Design Services	(Performance and Design criteria for Contractor provided professional services). Where professional design services or certifications by a design professional are specifically required of a Contractor, by the Contract Documents. Provide products and systems with the specific design criteria indicated. If criteria indicated is insufficient to perform services or certification required, submit a written request for additional information to the Engineer. Submit wet signed and sealed certification by the responsible design professional for each product and system specifically assigned to the Contractor to be designed or certified by a design professional.

	Examples: structural maintenance ladders, stairs and platforms, pipe anchors, seismic compliant system, wind, structural supports for material equipment, sprinkler hydraulic calculations.
Equal, Equivalent, Equal To, Equivalent To, As Directed and As Required	Shall all be interpreted and should be taken to mean "to the satisfaction of the Engineer".
Exposed	Work not identified as concealed.
Extract	Carefully dismantle and store where directed by Owner's Representative and/or reinstall as indicated on drawings or as described in specifications.
Furnish	Purchase and deliver to job site, location as directed by the Owner's Representative.
Inspection	Visual observations by Owner's site Representative.
Install	Store at job site if required, proper placement within building construction including miscellaneous items needed to affect placement as required and protect during construction. Take responsibility to mount, connect, start-up and make fully functional.
Labeled	Refers to classification by a standards agency.
Manufacturers	Refer to the article, Equipment Arrangements, and the article, Substitutions.
Prime Professional	Architect or Engineer having a contract directly with the Owner for professional services.
Product Data	Illustrations, standard schedules, performance charts, instructions, brochures, wiring diagrams, finishes, or other information furnished by the Contractor to illustrate materials or equipment for some portion of the work.
Provide (Furnish and Install)	Contractor shall furnish all labor, materials, equipment and supplies necessary to install and place in operating condition, unless otherwise specifically stated.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Remove	Dismantle and take away from premises without added cost to Owner, and dispose of in a legal manner.
Review and Reviewed	Should be taken to mean to be followed by "for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents".
Roughing	Pipe, duct, conduit, equipment layout and installation.
Samples	Physical full scale examples which illustrate materials, finishes, coatings, equipment or workmanship, and establishes standards by which work will be judged.
Satisfactory	As specified in contract documents.

Shop Drawings	Fabrication drawings, diagrams, schedules and other instruments, specifically prepared for the work by the Contractor or a Sub-contractor, manufacturer, supplier or distributor to illustrate some portion of the work.
Site Representative	Owner's Inspector or "Clerk of Works" at the work site.
Submittals Defined (Technical)	Any item required to be delivered to the Engineer for review as requirement of the Contract Documents. The purpose of technical submittals is to demonstrate for those portions of the work for which a submittal is required, the manner in which the Contractor proposes to conform to the information given and design concepts expressed and required by the Contract Documents.

1.7 PROTECTION OF PERSONS AND PROPERTY

A. Contractor shall assume responsibility for construction safety at all times and provide, as part of contract, all trench or building shoring, scaffolding, shielding, dust/fume protection, mechanical/electrical protection, special grounding, safety railings, barriers, and other safety feature required to provide safe conditions for all workmen and site visitors.

1.8 EQUIPMENT ARRANGEMENTS

A. The contract documents are prepared using one manufacturer as the Basis of Design, even though other manufacturers' names are listed. If Contractor elects to use one of the listed manufacturers other than Basis of Design, submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger motors, feeders, breakers, and equipment, additional control devices, valves, fittings and other miscellaneous equipment required for proper operation, and assume responsibility for proper location of roughing and connections by other trades. Remove and replace doorframes, access doors, walls, ceilings, or floors required to install other than Basis of Design. If revised arrangement submittal is rejected, revise and resubmit specified Basis of Design item which conforms to Contract Documents.

1.9 SUBSTITUTIONS

A. If Contractor desires to bid on any other kind, type, brand, or manufacture of material or equipment than those named in specifications, secure prior approval. To request such approval, Contractor shall submit complete information comparing (item-for-item) material or equipment offered with design material or equipment. Include sufficient information to permit quick and thorough comparison, and include performance curves on same basis, capacities, power requirements, controls, materials, metal gauges, finishes, dimensions, weights, etc., of major parts. If accepted, an addendum will be issued to this effect ahead of bid date. Unless such addendum is issued, substitution offered may not be used.

1.10 CONTINUITY OF SERVICES

A. The building will be in use during construction operations. Maintain existing systems in operation within all rooms of building at all times. Refer to "General Conditions of the Contract for Construction" for temporary facilities for additional contract requirements. Schedules for various phases of contract work shall be coordinated with all other trades and with Owner's Representative. Provide, as part of contract, temporary mechanical and electrical connections and relocations as required to accomplish the above. Obtain approval in writing as to date, time, and location for shutdown of existing mechanical/electrical facilities or services.

1.11 ROUGHING

A. The Contract Drawings have been prepared in order to convey design intent and are diagrammatic only. Drawings shall not be interpreted to be fully coordinated for construction.

B. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, interferences, etc. Make necessary changes in contract work, equipment locations, etc., as part of a contract to accommodate work to avoid obstacles and interferences encountered. Before installing, verify exact location and elevations at work site. **DO NOT SCALE** plans. If field conditions, details, changes in equipment or shop drawing information require an important rearrangement, report same to Owner's Representative for review. Obtain written approval for all major changes before installing.

C. Install work so that items both existing and new are operable and serviceable. Eliminate interference with removal of coils, motors, filters, belt guards and/or operation of doors. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Provide new materials, including new piping and insulation for relocated work.

D. Coordinate work with other trades and determine exact route or location of each duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Obtain from Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture, and switch mounting heights, and equipment mounting heights. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers, and other items. Do not rough-in contract work without reflected ceiling location plans.

E. Before roughing for equipment furnished by Owner or in other Divisions, obtain from Owner and other Divisions, approved roughing drawings giving exact location for each piece of equipment.

Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. For equipment and connections provided in this contract, prepare roughing drawing as follows:

1. Existing Equipment: Measure the existing equipment and prepare for installation in new location.

2. New Equipment: Obtain equipment roughing drawings and dimensions, then prepare roughing-in-drawings. If such information is not available in time, obtain an acknowledgement in writing, then make space arrangements as required with Owner's Representative.

1.12 COORDINATION DRAWINGS

A. Before construction work commences, Divisions for all trades shall submit coordination drawings in the form of CAD drawing files, drawn at not less than 1/4 in. scale. Such drawings will be required throughout all areas, for all Contracts. These drawings shall show resolutions of trade conflicts in congested areas. Mechanical Equipment Rooms shall be drawn early in coordination drawing process simultaneous with all other congested areas. Prepare Coordination Drawings as follows:

1. Division 23 shall prepare the base plan CAD coordination drawings showing all ductwork, all pertinent heating piping, and equipment. These drawings may be CAD files of the required Ductwork Shop Drawings. The drawings shall be coordinated with lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Owner's Representative. Provide adjustments to exact size, location, and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of contract. Minor revisions need not be redrawn.

2. Division 23shall provide CAD files and submit the base plan CAD Coordination Drawings to all Divisions.

3. Divisions 21 and 22 shall draw the location of piping and equipment on the base plan CAD Coordination Drawings, indicating areas of conflict and suggested resolutions.

4. Divisions 26, 27 and 28 shall draw the location of lighting fixtures, cable trays, and feeders over 1-1/2 in. on the base plan CAD Coordination Drawings, indicating areas of conflict and suggested resolution.

5. The General Construction Trade shall indicate areas of architectural/structural conflicts or obstacles on the CAD Coordination Drawings, and coordinate to suit the overall construction schedule.

6. The Construction Manager shall expedite all Coordination Drawing work and coordinate to suit the overall construction schedule. In the case of unresolved interferences, he shall notify the Owner's Representative. The Owner's Representative will then direct the various trades as to how to revise their drawings as required to eliminate installation interferences.

7. If a given trade proceeds prior to resolving conflicts, then if necessary, that trade shall change its work at no extra cost in order to permit others to proceed with a coordinated installation. Coordination approval will be given by areas after special site meetings involving all Divisions.

B. The purpose of the coordination drawing process is to identify and resolve potential conflicts between trades, and between trades and existing or new building construction, before they occur in construction. Coordination drawings are intended for the respective trade's use during construction and shall not replace any Shop Drawings, or record drawings required elsewhere in these contract documents.

1.13 REMOVAL WORK

A. Where existing equipment removals are called for, submit complete list to Owner's Representative. All items that Owner wishes to retain that do not contain asbestos or PCB material shall be delivered to location directed by Owner. Items that Owner does not wish to retain shall be removed from site and legally disposed of. Removal and disposal of material containing asbestos, lead paint, mercury and PCB's shall be in accordance with Federal, State and Local law requirements. Where equipment is called for to be relocated, contractor shall carefully remove, clean and recondition, then reinstall. Remove all abandoned piping, wiring, equipment, lighting, ductwork, tubing, supports, fixtures, etc. Visit each room, crawl spaces, and roofs to determine total Scope of Work. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.

B. For materials indicated to contain lead, that are being affected by demolition or construction, the contractor shall comply with all Federal, State and Local law requirements regarding worker exposure to lead disturbance and abatement procedures.

C. Refer to the Owner's Lead Paint Survey. The Survey identifies the surfaces within the buildings that were tested for lead by collecting paint samples and performing laboratory analysis. If any unidentified surfaces are to be impacted the lead content shall be tested by analytical determinations conducted by a qualified laboratory approved by the Owner. The contractor shall review the current owner’s lead paint reports on file before starting any work which may disturb existing surfaces.

D. Refer to Division 02 for additional information regarding hazardous materials.

1.14 EQUIPMENT AND MATERIAL REQUIREMENTS

A. Provide materials that meet the following minimum requirements:

1. Materials shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, in accordance with NFPA 255.

2. All equipment and material for which there is a listing service shall bear a UL label.

3. Potable water systems and equipment shall be built according to AWWA Standards.

4. Gas-fired equipment and system shall meet AGA Regulations and shall have AGA label.

5. Electrical equipment and systems shall meet UL Standards and requirements of the NEC.

6. Fire protection equipment shall be UL listed and FM approved.

B. Exterior and wet locations shall utilize materials, equipment supports, mounting, etc. suitable for the intended locations. Metals shall be stainless steel, galvanized or with baked enamel finish as a minimum. Finishes and coatings shall be continuous and any surface damaged or cut ends shall be field corrected in accordance with the manufacturer's recommendations. Hardware (screws, bolts, nuts, washers, supports, fasteners, etc.) shall be:

1. Stainless steel where the associated system or equipment material is stainless steel or aluminum.

2. Hot dipped galvanized or stainless steel where the associated system or equipment is steel, galvanized steel or other.

1.15 CUTTING AND PATCHING

A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction Contract. Refer to General Conditions of the Contract for Construction, for additional requirements. Cut and drill from both sides of walls and/or floors to eliminate splaying. Patch cut or abandoned holes left by removals of equipment or fixtures. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering, other finished surfaces. Patch openings and damaged areas equal to existing surface finish. Cut openings in prefabricated construction units in accordance with manufacturer's instructions.

1.16 PAINTING

A. Paint all bare piping, ductwork and supports exposed to the out-of-doors with rust inhibiting coatings. Paint all equipment that is not factory finish painted (i.e. expansion tanks, etc.).

B. All painting shall consist of one (1) prime coat and two (2) finish coats of non-lead oil base paint, unless otherwise indicated herein. Provide galvanized iron primer for all galvanized surfaces. All surfaces must be thoroughly cleaned before painting. Review system color coding prior to painting with the Owner's Representative or Architect.

C. All items installed after finished painting is completed and any damaged factory finish paint on equipment furnished under this contract must be touched up by the Contractor responsible for same.

D. Include painting for patchwork with color to match adjacent surfaces. Where color cannot be adequately matched, paint entire surface. Provide one (1) coat of primer and two (2) finish coats or as called for in the Specifications.

E. All primers and paint used in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

F. Refer to Division 9 - Finishes, for additional information.

1.17 EXISTING CEILING REMOVAL AND RE-INSTALLATION

A. In a renovation project, any existing ceiling removal and re-installation work required for the completion of a Contractors or Subcontractors work, shall be removed and re-installed by that Contractor or Subcontractor. This applies in any areas not called for to have a new ceiling installed.

B. The ceiling removal and re-installation shall include lay-in ceiling tile and grid, to the extent necessary to accomplish the work. Removed ceiling tile and grid shall be safely stored during the course of the work, and it shall be re-installed to the original existing condition.

1.18 CONCEALMENT

A. **Conceal all contract work** above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.

1.19 CHASES

A. In Existing Buildings:

1. Drill holes for floor and/or roof slab openings.

2. Multiple pipes smaller than 1 in. properly spaced and supported may pass through one 6 in. or smaller diameter opening.

3. Seal voids in fire rated assemblies with a fire-stopping seal system to maintain the fire resistance of the assembly. Provide 18 gauge galvanized sleeves at fire rated assemblies. Extend sleeves 2 in. above floors.

4. In wall openings, drill or cut holes to suit. Provide 18 gauge galvanized sleeves at shafts and fire rated assemblies. Provide fire-stopping seal between sleeves and wall in drywall construction. Provide fire stopping similar to that for floor openings.

1.20 PENETRATION FIRESTOPPING

A. Fire-Stopping for Openings Through Fire and Smoke Rated Wall and Floor Assemblies:

1. Provide materials and products listed or classified by an approved independent testing laboratory for "Penetration Fire-Stop Systems". The system shall meet the requirements of "Fire Tests of Penetrations Fire-Stops" designated ASTM E814.

2. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for drywall construction.

3. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

4. The methods used shall incorporate qualities which permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion, and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.

5. Plastic pipe/conduit materials shall be installed utilizing intumescent collars.

6. Provide a submittal including products intended for use, manufacturer's installation instructions, and the UL details for all applicable types of wall and floor penetrations.

7. Fire-stopping products shall not be used for sealing of penetrations of non-rated walls or floors.

B. Acceptable Manufacturers:

1. Dow Corning Fire-Stop System Foams and Sealants.

2. Nelson Electric Fire-Stop System Putty, CLK and WRP.

3. S-100 FS500/600, Thomas & Betts.

4. Carborundum Fyre Putty.

5. 3-M Fire Products.

6. Hilti Corporation.

1.21 NON-RATED WALL PENETRATIONS

A. Each trade shall be responsible for sealing wall penetrations related to their installed work, including but not limited to ductwork, piping, conduits, etc. See individual specification sections for requirements.

1.22 SUPPORTS

A. Provide required supports, beams, angles, hangers, rods, bases, braces, and other items to properly support contract work. Modify studs, add studs, add framing, or otherwise reinforce studs in metal stud walls and partitions as required to suit contract work. If necessary, in stud walls, provide special supports from floor to structure above.

B. For precast panels/planks and metal decks, support mechanical/electrical work as determined by manufacturer and the Engineer. Provide heavy gauge steel mounting plates for mounting contract work. Mounting plates shall span two or more studs. Size, gauge, and strength of mounting plates shall be sufficient for equipment size, weight, and desired rigidity.

C. For finished areas without a finished ceiling system such as classrooms, offices, conference rooms, etc., where decking and structure is exposed, and ductwork/piping/conduit is exposed: All mounting brackets, channel support systems and mounting hardware for ductwork, piping, lighting, etc. shall be concealed and approved by the Architect/Engineer prior to the installation. AirCraft cable style hanging for ductwork is required. It is recommended that room mockups be done and receive Architect/Engineer approval prior to proceeding with installation.

D. Equipment, piping, conduit, raceway, etc. supports shall be installed to minimize the generation and transmission of vibration.

E. Materials and equipment shall be solely supported by the building structure and connected framing. Gypboard, ceilings, other finishes, etc. shall not be used for support of materials and equipment.

1.23 APPLIED FIREPROOFING

A. Scope: Provide encapsulation of surfaces where applied fireproofing materials have been disturbed, removed, or left missing by the removal of hangers or upper attachments, or when new hangers or upper attachment are installed.

B. Fire Resistance Rating: Fireproofing shall meet the original hourly rating when applied to the construction assembly where materials have been removed or disturbed, or is missing.

C. Fire Hazard Classification: Fireproofing shall be listed in the Underwriters Laboratories Building Materials Directory with the following performance properties:

1. Flame Spread: 10 or less.

2. Smoke Developed: 5 or less.

D. Product Data: Provide manufacturer's product descriptions for each required fireproofing material. Include application instructions, including primer/adhesive requirements and recommended minimum thickness and density for each required hourly rating.

E. Fire Proofing Manufacturer:

1. Retro-Guard cementitious replacement fireproofing by Grace Construction Products, or equivalent Cafco Blaze Shield, and Cafco 300 by Isolatek.

2. Physical Properties:

a. Dry Field Density (ASTM E 605): 15 lb/cu ft minimum average.

b. Cohesion/Adhesion (Bond Strength) (ASTM E 736): 200 lb/sq ft minimum average.

c. Compressive Strength (ASTM E 761): 500 lb/sq ft minimum.

d. Impact (Bond Impact) Resistance (ASTM E 760): Shall not crack or delaminate.

e. Effect of Deflection (ASTM E 759): Shall not crack or delaminate.

f. Corrosion Resistance (ASTM E 937): No evidence of corrosion.

g. Air Erosion (ASTM E 859): Maximum 0.025 g/sq ft weight loss.

h. Provide primer or adhesive recommended by the fireproofing manufacturer to obtain required bond strength for the specific fireproofing and substrate.

F. Apply fireproofing prior to installation of ductwork, piping, conduits, and other suspended items. Hangers, clips and other supports for these items shall be installed before application of fireproofing.

G. Examine the substrate and conditions under which fireproofing is to be applied. Do not proceed with the fireproofing work until unsatisfactory conditions have been corrected. Verify that hangers, clips, sleeves, and other items that will penetrate the fireproofing are in place. Check paint on substrate for compatibility with primer/fireproofing and adequacy of bond strength in accordance with fireproofing manufacturer's instructions.

H. Surface Preparation: Remove dirt, dust, oil, grease, loose paint and rust, mill scale, and other foreign matter that may impair the bonding of the fireproofing to the substrate.

Clean substrate free of contamination from chemicals and solvents. Apply primer/adhesive where necessary to obtain bond strength of fireproofing to steel shop paint and where recommended by the fireproofing manufacturer.

I. Apply the fireproofing in accordance with UL fire test report and the manufacturer's application instructions. Thickness and density of fireproofing shall be in accordance with the approved product data and as required to produce the hourly fire resistance rating required.

1.24 ACCESS PANELS

A. Provide access panels for required access to respective trade's work. Location and size shall be the responsibility of each trade. Bear cost of construction changes necessary due to improper information or failure to provide proper information in ample time. Access panels over 324 square inches shall have two cam locks. Provide proper frame and door type for various wall or ceiling finishes. Access panels shall be equal to "Milcor" as manufactured by Inland Steel Products Co., Milwaukee, Wisconsin. Provide General Construction trade with a set of architectural plans with size and approximate locations of access panels shown.

1.25 CONCRETE BASES

A. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, and securely bond to floor by roughening slab and coating with cement grout. Bases 6 in. high (unless otherwise indicated); shape and size to accommodate equipment. Provide anchor bolts in equipment bases for all equipment provided for the project, whether mounted on new concrete bases or existing concrete bases.

1.26 HVAC EQUIPMENT CONNECTIONS

A. Contractor is responsible for draining, filling, venting, chemically treating and restarting any systems which are affected by work shown on the Contract Documents unless specifically noted otherwise.

B. Provide final chilled water, drain, vent connections to all equipment as required by the equipment. Provide final connections, including domestic water piping, wiring, controls, and devices from equipment to outlets left by other trades. Provide equipment waste, drip, overflow and drain connections extended to floor drains.

C. Provide for Owner furnished and Contractor furnished equipment all valves, piping, piping accessories, traps, pressure reducing valves, gauges, relief valves, vents, drains, insulation, sheet metal work, controls, dampers, as required.

1.27 ELECTRICAL EQUIPMENT CONNECTIONS

A. Provide complete power connections to all electrical equipment. Provide control connections to equipment. Heavy duty NEC rated disconnect ahead of each piece of equipment. Ground all equipment in accordance with NEC.

B. Provide for Owner furnished and Contractor furnished equipment all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required.

1.28 STORAGE AND PROTECTION OF MATERIALS AND EQUIPMENT

A. Store Materials on dry base, at least 6 in. aboveground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.

B. Refer to Division 01 for additional information.

1.29 FREEZING AND WATER DAMAGE

A. Take all necessary precautions with equipment, systems and building to prevent damage due to freezing and/or water damage. Repair or replace, at no change in contract, any such damage to equipment, systems, and building. Perform first seasons winterizing in presence of Owner's operating staff.

1.30 OWNER INSTRUCTIONS

A. Before final acceptance of the work, furnish necessary skilled labor to operate all systems by seasons. Instruct designated person on proper operation, and care of systems/equipment. Repeat instructions, if necessary. Obtain written acknowledgement from person instructed prior to final payment. Contractor is fully responsible for system until final acceptance, even though operated by Owner's personnel, unless otherwise agreed in writing. List under clear plastic, operating, maintenance, and starting precautions procedures to be followed by Owner for operating systems and equipment.

1.31 OPERATION AND MAINTENANCE MANUALS

A. Prepare three (3) Operation and Maintenance Manuals. Include in each O&M Manual, a copy of each approved Shop Drawing, wiring diagrams, piping diagrams spare parts lists, as-built drawings and manufacturer's instructions. Include typewritten instructions, describing equipment, starting/operating procedures, emergency operating instructions, summer-winter changeover, freeze protection, precautions and recommended maintenance procedures. Include name, address, and telephone number of installing contractor and of supplier manufacturer Representative and service agency for all major equipment items. Provide a table of contents page and dividers based upon specification section numbers. Bind above items in a three ring binder with name of project on the cover. Deliver three (3) copies to Owner's Representative for review before request for final acceptance.

B. Refer to Division 01 for additional requirements.

C. Operation and Maintenance Manuals shall also be submitted electronically, in PDF format on CD or flash drive.

1.32 RECORD DRAWINGS

A. The Contractor shall obtain at his expense one (1) set of construction Contract Drawings, (including non-reproduction black and white prints or electronic files) for the purpose of recording as-built conditions.

B. The Contractor shall perform all survey work required for the location and construction of the work and to record information necessary for completion of the record drawings. Record drawings shall show the actual location of the constructed facilities in the same manner as was shown on the bid drawings. All elevations and dimensions shown on the drawings shall be verified or corrected so as to provide a complete and accurate record of the facilities as constructed.

C. It shall be the responsibility of the Contractor to mark **EACH** sheet of the contract documents in red and to record thereon in a legible manner, any and all approved field changes and conditions as they occur. A complete file of approved field sketches, diagrams, and other changes shall also be maintained. At completion of the work, the complete set of red marked contract documents, plus all approved field sketches and diagrams shall be submitted to the engineer and used in preparation of the record drawings.

D. A complete set of red marked contract drawings shall be submitted, at one time, as the "Record" set. If there are no changes to a specific drawing, the contractor shall indicate "NO CHANGES" on that drawing. ALL drawings shall be included in the "Record" set.

E. The complete set of red marked Contract Documents or electronic files shall be certified by the Contractor as reflecting record conditions and submitted to the engineer for review.

F. The Contractor shall have the marked up set scanned, if they are not already electronic files, and then submit them to the Engineer as the "Record Set".

G. Refer to Division 01 for additional requirements.

1.33 FINAL INSPECTION

A. Upon completion of all Engineering Site Observation list items, the Contractor shall provide a copy of the Engineering Site Observation Report back to the Engineer with each items noted as completed or the current status of the item. Upon receipt, the Engineer will schedule a final review.

1.34 COMMISSIONING

A. Refer to General Commissioning Requirements in Division 01 for additional requirements.

1.35 TEMPORARY COOLING

A. Refer to the General Conditions of the Contract for Construction and Supplemental General Conditions.

B. Systems and equipment installed as part of this project shall not be used for temporary cooling.

1.36 TEMPORARY FACILITIES

A. Refer to the Division 1 Sections, General Conditions and Supplemental General Conditions.

1.37 TEMPORARY LIGHT AND POWER

A. Refer to the Division 1 Sections, General Conditions and Supplemental General Conditions.

1.38 CLEANING

A. It is the Contractor's responsibility to keep clean all equipment and fixtures provided under this contract for the duration of the project. Each trade shall keep the premises free from an accumulation of waste material or rubbish caused by his operations. The facilities require an environment of extreme cleanliness, and it is the Contractor's responsibility to adhere to the strict regulations regarding procedures on the existing premises. After all tests are made and installations completed satisfactorily:

1. Thoroughly clean entire installation, both exposed surfaces and interiors.

2. Remove all debris caused by work.

3. Remove tools, surplus, materials, when work is finally accepted.

1.39 SYSTEM START-UP AND TESTING

A. Prior to commencement of work, the Division(s) effecting such system shall survey all building electrical systems and components, including fire alarm, intrusion, communications, clock and computer; make written notice to the Owner regarding existing damages, missing items and incomplete systems. Prior to the conclusion of this project, the Contractor shall verify with the Owner's Representative that all building system has been returned to their original conditions.

B. Start-up and testing of HVAC systems shall occur while the building is not occupied by Owner and only after notice to the Owner's Representative is made at least 24 hours in advance.

1.40 TRANSFER OF ELECTRONIC FILES

A. M/E Engineering, P.C. will provide electronic files for the Contractor's use in the preparation of sheet metal shop drawings, coordination drawings, or record drawings related to the project, subject to a $50.00 charge per drawing file and the following terms and conditions:

1. The Contractor shall submit a formal request for electronic drawing files on the M/E Engineering, P.C. website, by utilizing the following website link: http://www.meengineering.com/contact-pages/contractor-request

2. M/E Engineering, P.C. makes no representation as to the compatibility of these files with the Contractor's hardware or the Contractor's software beyond the specific release of the referenced specifications.

3. M/E Engineering can only provide CAD files of M/E/P/FP drawing levels for which we are the Engineer of Record. CAD files of Architectural backgrounds, reflected ceiling plans, structural plans, etc. must be obtained separately from the Architect of Record.

4. Data contained on these electronic files is part of M/E Engineering, P.C.'s instruments of service shall not be used by the Contractor or anyone else receiving data through or from the Contractor for any purpose other than as convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by the Contractor or by others will be at the Contractor's sole risk and without liability or legal exposure to M/E Engineering, P.C. The Contractor agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against M/E Engineering, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with the Contractor's use of the electronic files.

5. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless, M/E Engineering, P.C. from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the Contractor's use of these electronic files.

6. These electronic files are not contract documents. Significant difference may arise between these electronic files and corresponding hard copy contract documents due to addenda, change orders or other revisions. M/E Engineering, P.C. makes no representation regarding the accuracy or completeness of the electronic files the Contractor receives. In the event that a conflict arises between the signed contract documents prepared by M/E Engineering, P.C. and electronic files, the signed contract documents shall govern. The Contractor is responsible for determining if any conflicts exist. By the Contractor's use of these electronic files the Contractor is not relieved of the Contractor's duty to comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, field verify conditions and coordinate the Contractor's work with that of other contractors for the project.

1.41 VIDEO RECORDING OF TRAINING SESSIONS

A. The contractor shall video record all training sessions required by their discipline. Video shall be in DVD format and two (2) copies submitted to the Owner. DVD to be individually marked with training session name, installing Contractor and date of training.

1.42 ENERGY INCENTIVES

A. The Contractor, his Subcontractors and Suppliers shall provide to the Owner all paperwork necessary to support the Owners pursuit of incentives related to energy conservation as offered by the utility company or state sponsored incentive programs. This shall include at a minimum, receipts, and quantities and data sheets for energy efficient equipment such as: lighting, motors, variable frequency drives, etc.

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SECTION 23 05 04 - ELECTRIC WIRING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services for the complete installation of motor control wiring and temperature control wiring as required in Contract Documents. Provide wiring and conduit, required to connect devices furnished as part of or adjunctive to the automatic temperature control system and for motor control regardless of the source of supply. Control wiring includes 120 volt and lower voltage wiring for control signals directing equipment operation. Control circuits shall be 120 volt maximum. Provide wiring in accordance with requirements specified in Division 26, "Electrical" and the National Electrical Code. Provide devices required for proper system operation, including special electrical switches, transformers, disconnect switches, relays, and circuit breaker protection.

B. Coordinate all work with Division 26, "Electrical".

1.2 QUALIFICATIONS

A. Wiring installed in compliance with all requirements of Division 26, "Electrical".

1.3 SUBMITTALS

A. Provide complete wiring diagrams for equipment systems. Deliver wiring diagrams to proper trades in time for roughing of conduit, equipment connections, and avoid delay in construction schedule. Wiring diagrams and roughing information to be wired as part of the Work of Division 26, "Electrical", shall be clearly indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Refer to Division 26 specifications for required wiring materials.

PART 3 - EXECUTION

3.1 GENERAL

A. Check electrical wiring pertaining to equipment for completeness and correctness of connections. Correct any misapplied motor and/or motor starter, improper thermal overload device, or device which fails to function and resultant damage, whether due to incorrect connections or improper information on wiring diagrams.

3.2 WIRING FOR CONTROL SYSTEMS

A. Provide motor control and temperature control wiring for equipment. All wiring shall be in conduit, unless otherwise noted. Refer to Section 260501 for type of conduit to be used in specific applications. Provide 18 in. length flexible conduit at motors and devices subject to vibration. Conduit supported on 5 ft. centers. Do not attach directly to hot surfaces, piping, or ductwork. Control wiring shall be in separate conduit from all other wiring. Provide green grounding wire circuited from starter, and run ground wire through conduit to each remote auxiliary relay, pushbutton station, remote panel heating device, thermostat, or device with potentials in excess of 50 volts. Size ground wire as required by NEC.

B. All temperature control wiring shall be plenum rated type, meeting the requirements of NEC Article 300.

C. Provide pushbutton stations, pilot lights, selector switches, auxiliary starter contacts, and other devices required to provide specified functions.

D. Where allowable by Code and contract documents, temperature control wiring may be installed without conduit. Installation and wire insulation types shall be as described by NEC, Article 725. All low voltage wiring circuits 50 volt and under shall:

1. Be adequately supported using bridle rings spaced a maximum of 3 ft. on centers or other approved method when installed horizontally above accessible ceilings or run exposed in unfinished areas.

2. Be installed in conduit when run in wall cavity or surface metal raceway where no access is available to wall cavity, in finished areas.

3. Be installed in conduit when installed vertically in Mechanical Rooms from panels and devices up to ceiling.

4. Be installed in conduit in all cases not specifically covered by the above cases, or where subject to physical damage.

3.3 EQUIPMENT WIRING

A. Provide power and control wiring between sections of electrical radiation units, between shipping splits, and between remote panels, thermostats, disconnect switches, and their respective units. Provide control wiring from the package control system, to each respective electric heat coil, reheat coil or motor. Properly mount control package. Power wiring to and including disconnect switch shall be by Division 26 "Electrical".

3.4 FIELD WIRING IN STARTERS, CONTROLLERS AND PANELS

A. Wiring within starters, controllers, and temperature control panels, shall be routed neatly in gutter space, away from moving and/or heat producing parts. Provide 30 ampere, 600 volt rated terminal blocks. Do not place more than two wire connections on pilot device or relay terminal. Where more than two circuit connections are required, use terminal blocks. Provide nylon self insulated-insulated, locking type spade lugs for all control wires. Cables and wires shall be neatly bundled and lashed with nylon cable straps.

END OF SECTION 23 05 04

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SECTION 23 05 13 - MOTORS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

A. Submit manufacturer's product data on all motors. Provide voltage, RPM, enclosure type, frame type, and rated efficiency and duty.

PART 2 - PRODUCTS

2.1 MOTORS

A. General Requirements:

1. Motors built for 60 Hz operation. In compliance with NEMA Standards, wound specifically for nameplate voltage, and selected for appropriate duty and environment. 1.15 minimum service factor at rated voltage and frequency. Bearings rated 20,000 life hours. V-belt connected motors with adjustable slide rail bases and pulleys. Motors shall have Class F insulation system, with Class B temperature rise. Maximum allowable motor temperature rise for open drip-proof or totally enclosed fan cooled (TEFC) type at 1.15 service factor shall be 80°C above 40°C ambient up to 300 HP. NEMA locked rotor kVA code as required to match unit equipment torque characteristics. Single-phase motors shall be capacitor start, induction run, or split phase type. Polyphase motors shall be constant speed, squirrel cage, unless otherwise called for. Nameplates shall have as a minimum, all information as described in NEMA Standard MG-1-20.60.

2. Motors for use with adjustable speed drive applications shall be inverter duty rated in accordance with NEMA. These motors shall meet NEMA corona inception voltage requirements, withstanding peak voltages up to 1600 volts, and be manufactured in accordance with NEMA MG-1 Part 31.

3. Three phase motors rated 1 HP and greater shall be special design, copper winding, relubable ball bearings, 1.15 service factor, premium efficiency, energy-saver type with a guaranteed NEMA nominal full-load efficiency, by IEEE Standard 112 Test Method "B". Motors to have three-year warranty. Efficiency rating shall appear on nameplate, and shall be not less than as follows:

MINIMUM NOMINAL FULL-LOAD MOTOR EFFICIENCY						
HP	ODP MOTORS (RPM)			TEFC MOTORS (RPM)		
	1200	1800	3600	1200	1800	3600
1.0	82.5	85.5	77	82.5	85.5	77.0
1.5	86.5	86.5	84	87.5	86.5	84

MINIMUM NOMINAL FULL-LOAD MOTOR EFFICIENCY						
HP	ODP MOTORS (RPM)			TEFC MOTORS (RPM)		
	1200	1800	3600	1200	1800	3600
2.0	87.5	86.5	85.5	88.5	86.5	85.5
3.0	88.5	89.5	85.5	89.5	89.5	86.5
5.0	89.5	89.5	86.5	89.5	89.5	88.5
7.5	90.2	91.0	88.5	91.0	91.7	89.5
10	91.7	91.7	89.5	91.0	91.7	90.2
15	91.7	93.0	90.2	91.7	92.4	91.0
20	92.4	93.0	91.0	91.7	93.0	91.0
25	93.0	93.6	91.7	93.0	93.6	91.7
30	93.6	94.1	91.7	93.0	93.6	91.7
40	94.1	94.1	92.4	94.1	94.1	92.4
50	94.1	94.5	93.0	94.1	94.5	93.0

4. Nominal Motor Voltage Table:

Nominal System Voltage	Motor Nameplate
480V - 3 phase	460 volt
240V - 1 phase and 3 phase	230 volt
208V - 1 phase and 3 phase	200 volt
120V - 1 phase	115 volt

5. Motor Application; Provide the following enclosure types unless noted:

Environment/Location	Motor Enclosure Type
General Purpose	Open drip-proof, TEFC with cast iron frame, or encapsulated
Outdoors, below grade or high humidity	TEFC with cast iron frame
Hazardous	Explosion-proof
Packaged Refrigeration Compressors	Hermetic or semi-hermetic

6. Manufacturers: Need not be all of same make, but one of the following: General Electric GE XD/EP, Gould, Baldor Super E, Emerson E-Line (US Motors), A.O. Smith Century E-Plus, Lincoln Ultimate E CTAC, Marathon XR1, Siemens GP100A.

PART 3 - EXECUTION

3.1 MOTORS

A. Furnished by equipment manufacturer and especially manufactured and/or selected, mounted, and installed for intended use. Install motors accessible for maintenance and belt adjustment.

END OF SECTION 23 05 13

SECTION 23 05 19 - GAUGES AND THERMOMETERS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTAL

A. Gauges, thermometers and thermowells.

PART 2 - PRODUCTS

2.1 WATER PRESSURE GAUGES

A. Construction to be Bourdon tube type; 4-1/2 in. diameter minimum, dial face, in cast aluminum case, replaceable glass lens, with snap-on rings. Phosphor bronze tube, bronze bushed rotary movement, silver brazed or soldered to brass socket and brass tip. 1/4 in. bottom connection. Accuracy, one (1.0) percent of included scale range. White dial face with black numerals, graduated in pounds; equipped with bronze pulsation dampener or snubber.

B. Make: American, Ashcroft, Crosby, Duro, Marsh, Moeller, Trerice, Weiss, Weksler, Winters.

2.2 PIPING SYSTEM THERMOMETERS

A. Industrial type, plastic, aluminum or steel case, glass or plastic front, non-toxic organic liquid filled, red reading column, white or silver V-shaped scale, black numerals. Union flange mounted, separable socket with thermowell, extension necks where required; range as called for service. Universal adjustable type, 9 in. scale. For installation in hot water systems, graduations of 2°F., accurate to within 1°F. For installation in water systems where the maximum temperature is less than 120°F, graduations of 1°F, accurate to within 1/2°F.

B. Make: American, Moeller, Trerice, Weiss, Weksler, Winters.

PART 3 - EXECUTION

3.1 GENERAL

A. Provide where called for in the drawings and as noted below.

3.2 WATER PRESSURE GAUGES

A. Chilled water coils: 0 to 60 psi range.

B. Provide 1/4 in. ball valve in each pump inlet and outlet tapping, or in piping adjacent to same. Range 30 in. vacuum to 100 psi.

C. Expansion tanks: 0 to 100 psi range.

D. Each water make-up valve assembly: 0 to 60 psi range.

3.3 THERMOMETERS

A. Provide thermowells mounted in oversize tee, or elbow if necessary, to provide as little restriction as possible to fluid flow. Provide thermometer stems and thermowell depths of proper length to allow accurate reading. Locate adjacent to control sensing equipment. Install and adjust angles so as to be easily read from floor.

B. Cooling Coil: Inlet and outlet; range 20° to 120°F.

C. Chillers: Supply and return; range 20° to 120°F.

END OF SECTION 23 05 19

SECTION 23 05 23 - VALVES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services as required for the complete installation and related Work designed in Contract Documents.

1.2 SUBMITTAL

A. Valves and accessories.

PART 2 - PRODUCTS

2.1 VALVES

A. General: Valves shall have following requirements:

1. Working pressure stamped or cast on bodies.

2. Stem packing serviceable without removing valve from line.

3. Valves on insulated services shall have handle extensions so that the handle is fully beyond the insulation jacketing.

B. Make:

1. Check Valves: Jenkins, Hammond, Milwaukee, Powell, Watts, Kitz.

2. Ball Valves: Apollo, Hammond, Jamesbury, Milwaukee, Watts, NIBCO, Kitz.

3. Butterfly Valves: DeZurik, Jamesbury, Keystone, Milwaukee, Watts, Victaulic, Kitz.

4. To establish a standard of quality and identify features, certain manufacturer's numbers are given in the following paragraphs.

C. Check Valves:

1. 2-1/2 in. and Larger: Iron body, renewable seat and disc, bolted flange cap, flanged ends, 125 SWP, Milwaukee F-2974.

2. 2 in. and Smaller: Bronze, swing check, threaded ends, 125 SWP, Milwaukee 509.

3. Silent Check Valves: Renewable seat, bronze body with bronze trim and stainless steel spring, 125 lb. SWP. Conbraco 61-500 Series.

D. Ball Valves:

1. Bronze body with Type 316 stainless steel ball and shaft, glass reinforced carbon impregnated seats, standard porting, 400 lb., W.O.G., adjustable packing gland, insulated handle, screwed or soldered ends, Watts B6000SS (threaded) B6001SS (soldered). Provide handle extension on insulated services.

E. Valves for Gauges and Instruments:

1. 1/4 in., bronze body, hardened chrome plated brass ball, glass reinforced carbon impregnated seats, standard porting, 400 lb. W.O.G., adjustable packing gland, screwed ends, tee handle, Watts B6000TH.

F. Lug Type Butterfly Valves for Water Service:

1. Rated for working pressure 200 psi, bi-directional dead end service, bubble-tight.

2. Body: Lug type, cast iron ASTM A126, or ductile iron.

3. Disc: Aluminized bronze.

4. Seat: EPDM, resilient seat. Rated to 250ºF.

5. Stem: 316 or 416 stainless steel. Single offset.

6. Operator: Lockable Lever for sizes through 6 in. Manual hand wheel gear actuator for sizes 8 in. and larger.

7. Milwaukee CL223E (2 in. - 6 in.) or Watts BF-03.

G. Hose Thread Drain Valves:

1. Ball valve, bronze body, hardened chrome ball with hose thread end, cap and chain, Watts B6001CC (sweat connection), Watts B6000CC (threaded connection).

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Provide valves of type called for and where required to service equipment.

2. Provide at major building and systems sections.

3. Locate valves with handles at horizontal position when 5 ft. or more above the floor, for greater visibility and easier use. Otherwise, locate valves with handles at or above horizontal position. Swing check valves in upright position only.

4. Provide hose threaded valves at low points, strainers, equipment, and as called for.

END OF SECTION 23 05 23

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SECTION 23 05 30 - ROOF CURBS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide labor, materials, equipment and services as required for the complete installation of roof curbs as shown in Contract Documents.

1.2 SUBMITTALS

A. Typical detail and schedule for equipment. Details shall include cross-sectional view illustrating clearly the type of curb being submitted, i.e. double wall insulated, with or without cant.

PART 2 - PRODUCTS

2.1 EQUIPMENT SUPPORTS

A. Double wall, 2 in. x 8 in. wood blocking, minimum 18 in. high. Constructed of 18 gauge galvanized steel with continuous welded corner seams and painted at all welds. Constructed of heavier gauge steel where standard curb cannot support unit weight. Provide with top cap counter flashing. Support provided with raised cant, flanged or recessed. Support flange shall suit roof construction and type of insulation being applied.

B. Design Equipment: RPS Model ER-2A.

C. Acceptable Makes: Pate, Shipman & Son, RPS.

2.2 PIPE SUPPORTS

A. Same construction as "Equipment Supports". Provide with full length steel bracket, U bolts and accessories as required to secure piping to the pipe support as detailed on Contract Drawings.

B. Design Equipment: RPS Model ER-2A.

C. Acceptable Makes: Pate, Shipman & Son, RPS.

2.3 PIPE VAULT

A. All aluminum construction, 3rd- Party tested for wind and ICC2015 Air Permeance and Insulated Curb code compliance.

B. Exit seals to be constructed of aluminum and gasketed. Seals to be provided for all penetrations, including but not limited to, electrical conduits, controls conduits, refrigeration piping.

C. 18" insulated aluminum curb system.

D. Vault size to be determined by piping quantity.

E. Design Make: AWI VAULT Series.

PART 3 - EXECUTION

3.1 GENERAL

A. Height as recommended by equipment manufacturer, not less than described in this specification. This Contractor shall be responsible for exact size, length, and location and shall set and secure each curb to the roof. Shim and level curb as required. Provide curb and supports for all roof-mounted equipment. All roof penetrations shall be made through an appropriate curb. All roof mounted equipment including fans, air handling units, etc, shall be set on an equipment support unless otherwise noted. Refer to Contract Drawings for details on plenums extending from curbs.

END OF SECTION 23 05 30

SECTION 23 05 50 - WIND RESTRAINT FOR HVAC SYSTEMS

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 SECTION INCLUDES

A. Support and brace mechanical and electrical systems, as called for, to resist directional wind forces (lateral, longitudinal and vertical).

1.3 APPLICABLE CODES AND STANDARDS

A. Provide work in compliance with the following codes and standards:

B. Building Code of New York State, Section 1613.

C. Mechanical Code of New York, Section 301.

D. American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures - Standard ASCE/SEI 7-05.

1.4 QUALITY ASSURANCE

A. General:

1. The contractor shall provide professional engineer stamped and signed calculations, and details of wind restraint systems to meet total design lateral force requirements for support and restraint of mechanical and electrical systems.

2. Systems requiring wind restraint:

a. Condensing units.
b. Piping.
c. Chillers

1.5 SUBMITTALS

A. Submit wind force level (Fp) calculations from applicable building code. Submit pre-approved restraint selections, installation details, and plans indicating locations of restraints.

B. Calculations, plans, restraint selection, and installation details shall be stamped and signed by a professionally licensed engineer experienced in wind restraint design.

C. Submit manufacturer's product data.

D. For each piece of equipment that requires wind restraint as outlined in this section, include the following:

1. Dimensioned Outline Drawings of Equipment Unit: Identify the center of gravity and locate and describe mounting and anchoring provisions.

2. Anchorage: Provide detailed description of equipment anchorage devices on which the calculations are based and their installation requirements. Identify anchor bolts, studs and other mounting devices. Provide information on the size, type and spacing of mounting brackets, holes and other provisions.

PART 2 - PRODUCTS

2.1 CODE INFORMATION

A. This project is subject to the wind bracing requirements of the Building Code of New York State, International Building Code and American Society of Civil Engineers ASCE 7. The following criteria are applicable to this project:

1. Basic Wind Speed (V) (Per ASCE 7-05): 90 mph.

2. Importance Factor (I) (Per ASCE 7-05): 1.00.

3. Exposure Category (Per ASCE 7-05): B

4. Height and Exposure Adjustment Coefficient (Per ASCE 7-05)

5. The mean height of the structure (h_{MEAN}) shall be determined thru coordination with Architectural plans and the General Contractor.

2.2 WIND BRACING AND SUPPORT OF SYSTEMS AND COMPONENTS

A. General:

1. Design analysis shall include calculated dead loads, wind loads, and capacity of materials utilized for the connection of the equipment or system to the structure.

2. Analysis shall detail anchoring methods, bolt diameter, and embedment depth.

3. All wind restraint devices shall be designed to accept without failure the forces calculated per the applicable building code and as summarized in Section 2.1.

B. Friction from gravity loads shall not be considered resistance to wind forces.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Wind Restraint of Piping:

1. All restraint systems shall be installed in strict accordance with the manufacturer's restraint guidelines and all certified data.

2. Installation of restraints shall not cause any change in position of equipment or piping, resulting in stresses or misalignment.

3. Transverse piping restraints shall be at 40-foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.

4. Longitudinal restraints shall be at 80-foot maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.

5. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24-inches of the elbow or tee or combined stresses are within allowable limits at longer distances.

6. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints.

7. Branch lines may not be used to restrain main lines.

8. Provide reinforced clevis bolts when required.

9. Piping crossing building seismic or expansion joints, passing from building to building, or supported from different portions of the building shall be installed to allow differential support displacements without damaging the pipe, equipment connections, or support connections. Pipe offsets, loops, anchors, and guides shall be installed as required to provide specified motion capability and limit motion of adjacent piping.

10. Do not brace a system to two independent structures such as roof and wall.

B. Wind Restraint of Electrical Services:

1. All restraint systems shall be installed in strict accordance with the manufacturer's restraint guidelines manual and all certified data.

2. Installation of restraints shall not cause any change in position of equipment or piping, resulting in stresses or misalignment.

3. No rigid connections between equipment and the building structure shall be made that degrade the noise and vibration-isolation system specified.

4. Do not install any equipment, piping, duct, or conduit that makes rigid connections with the building unless isolation is not specified.

5. Prior to installation, bring to the Architect's/Engineer's attention any discrepancies between the specifications and the field conditions, or changes required due to specific equipment selection.

6. Bracing may occur from flanges of structural beams, upper truss cords of bar joists, cast in place inserts, or wedge-type concrete anchors. Consult Structural Engineer of record.

7. Overstressing of the building structure shall not occur from overhead support of equipment. Bracing attached to structural members may present additional stresses. The Contractor shall submit loads to the structural engineer of record for approval in this event.

8. Brace support rods when necessary to accept compressive loads. Welding of compressive braces to the vertical support rods is not acceptable.

9. Provide reinforced clevis bolts where required.

10. Do not brace a system to two independent structures such as a roof and wall.

C. Wind Restraint of Ductwork and Equipment:

1. All restraint systems shall be installed in strict accordance with the manufacturer's restraint guidelines and all certified submittal data.

2. The interaction between mechanical and electrical equipment and the supporting structures shall be designed into the restraint systems.

3. Friction clips shall not be used for anchorage attachments.

4. Expansion anchors shall not be used for non-vibration isolated equipment rated over 10 HP.

5. Components mounted on vibration isolation systems shall have a bumper restraint or snubber in each horizontal direction and vertical restraints shall be provided to resist overturning.

6. Installation of restraints shall not cause any change in position of equipment or ductwork, resulting in stresses or misalignment.

7. No rigid connections between equipment and the building structure shall be made that degrade the noise and vibration-isolation system specified.

8. Do not install any equipment or duct that makes rigid connections with the building unless isolation is not specified.

9. Prior to installation, bring to the Architect's/Engineer's attention any discrepancies between the specifications and the field conditions, or changes required due to specific equipment selection.

10. Bracing may occur from flanges of structural beams, upper truss cords of bar joists, cast in place inserts, or wedge-type concrete anchors. Consult Structural Engineer of record.

11. Overstressing of the building structure shall not occur from overhead support of equipment. Bracing attached to structural members may present additional stresses. The Contractor shall submit loads to the Structural Engineer of record for approval in this event.

12. Brace support rods when necessary to accept compressive loads. Welding of compressive braces to the vertical support rods is not acceptable.

13. Provide reinforced clevis bolts where required.

14. Do not brace a system to two independent structures such as a roof and wall.

END OF SECTION 23 05 50

SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 QUALIFICATION

A. All identification devices shall comply with ANSI A13.1 for lettering size, length of color field, colors and viewing angles.

1.3 SUBMITTALS

A. Submit manufacturer's technical product data and installation instructions for each identification material and device. Submit valve schedule for each piping system typewritten on an 8-1/2 in. x 11in. (Minimum) indicating valve number, location, and valve function. Submit schedule of pipe, equipment and name identification for review before stenciling or labeling.

1.4 MAKES

A. Allen Systems, Inc.; Brady (W.H.) Co.; Signmark Div.; Industrial Safety Supply Co., Inc.; Seton Name Plate Corp.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide manufacturer's standard products of categories and types required for each application. In cases where this is more than one type specified for an application, selection is installer's option, but provide single selection for each product category.

B. All adhesives used for labels in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits as called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

2.2 PIPING IDENTIFICATION

A. Identification Types:

1. Pressure Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color coded, pressure sensitive vinyl pipe markers complying with ANSI A13.1. Provide a 360° wrap of flow arrow tape at each end of pipe label.

O.D. Pipe or Covering	Letter Size
3/4 in., 1 in., 1-1/4 in.	1/2 in.
1-1/2 in., 2 in.	3/4 in.

O.D. Pipe or Covering	Letter Size
2-1/2 in. and over	1 in.

B. Lettering:

1. Piping labeling shall conform to the following list:

Pipe Function	Identification
Cold Water	CW
Glycol Chilled Water Supply	GCWS
Glycol Chilled Water Return	GCWR
Indirect Waste	IW

2.3 VALVE IDENTIFICATION

A. Valve Tags:

1. Standard brass valve tags, 2 in. diameter with 1/2 in. high numerals. Identify between heating and plumbing services with 1/4 in. letters above the valve number. Lettering to be stamped and in-filled black. Seton, or equal.

B. Valve Chart:

1. Provide valve chart for all valves provided as a part of this project. Frame and place under clear glass. Hang in Mechanical Room.

2.4 EQUIPMENT IDENTIFICATION

A. General:

1. Provide engraved vinyl plates for each major piece of mechanical equipment provided.

2. Nameplate to be 3/4 in. x 2-1/2 in. Seton, or equal.

3. Provide for the following equipment:

a. Pumps

b. Chillers

c. Condensing units

2.5 ABOVE CEILING EQUIPMENT LOCATOR

A. 3/4 in. diameter adhesive stickers placed on ceiling grid. Color coded. Provide for the following:

1. Fire dampers/smoke dampers - RED

2. Plumbing valves - BLUE

3. HVAC valves - ORANGE

4. VAV boxes or reheat coils - GREEN

5. Fans - YELLOW

6. Pumps - BLACK

PART 3 - EXECUTION

3.1 GENERAL

A. Provide valve tags for all valves provided on project.

B. Provide equipment tags for all equipment listed above.

C. Provide above ceiling equipment locator stickers on ceiling grid for all equipment listed above.

D. Provide piping identification with directional flow arrows for all piping on project, at maximum intervals of 20 feet. For piping installed through rooms, provide at least one pipe label in each room, for each pipe function.

E. Label piping after painting of piping is complete.

END OF SECTION 23 05 53

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SECTION 23 05 93 - ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for complete adjusting and balancing Work as required in Contract Documents.

B. This Section specifies the requirements and procedures of, mechanical systems testing, adjusting, and balancing. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet design specifications, and recording and reporting the results.

C. Test, adjust, and balance the following mechanical systems:

1. Hydronic systems; including constant flow and variable flow systems.

D. This Section does not include:

1. Testing boilers and pressure vessels for compliance with safety codes;

2. Specifications for materials for patching mechanical systems;

3. Specifications for materials and installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing, refer to the respective system sections for materials and installation requirements.

4. Requirements and procedures for piping and ductwork systems leakage tests.

1.2 SUBMITTALS

A. Provide information in report form listing items required by specifications. Results shall be guaranteed. Contractor shall be subject to recall to site to verify report information before acceptance of the report by the Owner's Representative.

B. Strategies and Procedures Plan: Within thirty (30) days of Contractor's Notice to Proceed, submit testing and balancing strategies and step-by-step procedures as specified in Section 3.1.B, "Preparation", and consistent with those listed in Part 3 of this specification.

C. System Readiness Checklists: Within thirty (30) days of Contractor's Notice to Proceed, AABC agency shall provide system readiness checklists as specified in Section 3.1.C, "Preparation", to be used and filled out by the installing contractors verifying that systems are ready for Testing and Balancing.

D. Examination Report: Provide a summary report of the examination review required in Section 3.1.D to the Engineer, documenting issues that may preclude the proper testing and balancing of the systems.

E. Certified report format shall consist of the following:

1. Title sheet with job name, contractor, engineer, date, balance contractor's name, address, telephone number and contact person's name and the balancing technician's name.

2. Individual test sheets for air handlers, terminal units, air distribution, exhaust fans, duct traverses, pumps, air handling coils, reheat coils, radiation, convectors, cabinet unit heaters and unit ventilators.

3. TAB Report Forms: Use standard forms from AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems." or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems".

1.3 DEFINITIONS

A. System testing, adjusting and balancing is the process of checking and adjusting all the building environmental systems to produce the design objectives. It includes:

1. The balance of air and water distribution;

2. Adjustment of total system to provide design quantities;

3. Electrical measurement;

4. Verification of performance of all equipment and automatic controls.

B. Test: To determine quantitative performance of equipment.

C. Adjust: To regulate the specified fluid flow rate and air patterns at the terminal equipment (e.g., reduce fan speed, throttling).

D. Balance: To proportion flows within the distribution system (submains, branches, and terminals) according to specified design quantities.

E. Procedure: Standardized approach and execution of sequence of work operations to yield reproducible results.

F. Report Forms: Test data sheets arranged for collecting test data in logical order for submission and review. This data should also form the permanent record to be used as the basis for required future testing, adjusting, and balancing.

G. Terminal: The point where the controlled fluid enters or leaves the distribution system. There are supply inlets on water terminals, supply outlets on air terminals, return outlets on water terminals, and exhaust or return supply or outside air inlets or outlets on terminals such as registers, grilles, diffusers, and louvers.

H. Main: Duct or pipe containing the system's major or entire fluid flow.

I. Submain: Duct or pipe containing part of the systems' capacity and serving two or more branch mains.

J. Branch Main: Duct or pipe serving two or more terminals.

K. Branch: Duct or pipe serving a single terminal.

1.4 QUALIFICATIONS

A. Follow procedures and methods published by one or more of the following:

1. Associated Air Balance Council (AABC) or National Environmental Balancing Bureau (NEBB).

2. Individual manufacturer requirements and recommendations.

B. Maintain qualified personnel at project for system operation and trouble shooting. TAB contractor shall change sheaves and perform mechanical adjustments in conjunction with balancing procedure.

C. Balancing contractor shall be current member of AABC or NEBB.

D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in the *AABC National Standards for Total System Balance.*

1.5 GENERAL REQUIREMENTS

A. Before concealment of systems visit the job site to verify and advise on type and location of balancing devices and test points. Make changes as required to balance facilities.

B. Place systems in satisfactory operating condition.

1. Adjusting and balancing shall be accomplished as soon as the systems are complete and before Owner takes possession.

2. Prior to balancing, adjust balancing devices for full flow; fill, vent and clean hydronic systems, replace temporary filters and strainers.

3. Initial adjustment and balancing to quantities as called for or as directed by the engineer, to satisfy job conditions.

4. All outdoor conditions (Db, Wb, and a description of the weather conditions) at the time of testing shall be documented in the report.

5. Provide sheaves and belts as required to meet system performance requirements for all belt-driven fan motors 10 HP and greater. Adjust and align sheaves to obtain proper settings and operation. Verify motors are not overloading.

6. Installing contractor shall replace balancing cocks, flow balancers and dampers in new systems that cannot be manipulated to satisfy balancing requirements.

7. Identify flow balancers, balancing cocks and dampers in existing systems that cannot be manipulated to satisfy balancing requirements.

8. Traverse main ducts to determine total system air quantities after all outlets have been set prior to final adjustment if the system does not meet design requirements. A sum of room CFM's is not acceptable.

9. If duct construction and/or installation prohibits proper traverse readings, provide coil measurements at main coils and/or fresh air intake traverse with units operating in 100% outside air mode (where applicable).

1.6 CONTRACTOR RESPONSIBILITIES

A. Provide Testing and Balancing agency one complete set of contract documents, change orders, and approved submittals in digital and hard copy formats.

B. Controls contractor shall provide required BAS hardware, software, personnel and assistance to Testing and Balancing agency as required to balance the systems. Controls Contractor shall also provide trending report to demonstrate that systems are complete.

C. Coordinate meetings and assistance from suppliers and contractors as required by Testing and Balancing agency.

D. Provide additional valves, dampers, sheaves and belts as required by Testing and Balancing agency.

E. Flag all manual volume dampers with fluorescent or other high-visibility tape.

F. Provide access to all dampers, valves, test ports, nameplates and other appurtenances as required by Testing and Balancing agency.

G. Installing contractor shall replace or repair insulation as required by Testing and Balancing agency.

H. Have the HVAC systems at complete operational readiness for Testing and Balancing to begin. As a minimum verify the following:

1. Hydronics:

a. Piping is complete with all terminals installed.

b. Water treatment is complete.

c. Systems are flushed, filled and air purged.

d. Strainers are pulled and cleaned.

e. Control valves are functioning per the sequence of operation.

f. All shutoff and balance valves have been verified to be 100% open.

g. Pumps are started, and proper rotation is verified.

h. Pump gauge connections are installed directly at the pump inlet and outlet flange or in discharge and suction pipe prior to any valves or strainers.

i. ASD start-up is complete and all safeties have been verified.

j. System readiness checklists are completed and returned to Testing and Balancing agency.

I. Promptly correct deficiencies identified during Testing and Balancing.

J. Maintain a construction schedule that allows the Testing and Balancing agency to complete work prior to occupancy.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Provide tools, ladders, recording meters, gauges, thermometers, velometers, anemometers, Pitot tubes, inclined gauge manometers, magnehelic gauges, amprobes, voltmeters, psychrometers and tachometers required.

B. Instrumentation Calibration: Calibrate instruments at least every six (6) months or more frequently if required by instrument manufacturer.

1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine Bid Documents and submittals and notify Owner's Representative and Engineer of any questions regarding balancing.

1. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper Testing and Balancing of systems and equipment.

2. Examine the approved submittals for HVAC systems and equipment.

3. Examine equipment performance data including fan and pump curves.

B. Prepare a Testing and Balancing Strategies and Procedures Plan that includes:

1. Equipment and systems to be tested.

2. Strategies and step-by-step procedures for balancing the systems.

3. Instrumentation to be used.

4. Sample forms with specific identification for all equipment.

C. Prepare system-readiness checklists, as described in the *AABC National Standards for Total System Balance*, for use by contractors in verifying system readiness for Testing and Balancing. These shall include, at a minimum:

1. Hydronics:

a. Piping is complete with all terminals installed.

b. Water treatment is complete.

c. Systems are flushed, filled and air purged.

d. Strainers are pulled and cleaned.

e. Control valves are functioning per the sequence of operation.

f. All shutoff and balance valves have been verified to be 100% open.

g. Pumps are started and proper rotation is verified.

h. Pump gauge connections are installed directly at the pump inlet and outlet flange or in discharge and suction pipe prior to any valves or strainers.

i. Permanent electrical power wiring and ASD start-up is complete and all safeties are verified.

j. Suitable access to balancing devices and equipment is provided.

B. Examine construction and notify Owner's Representative and Engineer of outstanding issues related to balancing, as part of "Examination Report" submittal.

1. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they are properly separated from adjacent areas.

2. Examine HVAC equipment and verify that bearings are greased, belts are aligned and tight, clean permanent filters are installed, and controls are ready for operation.

3. Examine terminal units, such as variable-air-volume boxes, and verify that they are accessible and their controls are connected, configured by the controls contractor and functioning.

4. Examine strainers to verify that Mechanical Contractor has replaced startup screens with permanent screens and that all strainers have been cleaned.

5. Examine two-way valves for proper installation and function.

6. Examine three-way valves for proper installation for their intended function of diverting or mixing fluid flows.

7. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

8. Examine air vents to verify that mechanical contractor has removed all air from all hydronic systems.

9. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, weld-o-lets, and manual volume dampers prior to pressure testing. Note the locations of devices that are not accessible for testing and balancing.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to insulation Specifications for this Project.

C. Mark equipment and balancing device settings with paint or other suitable, permanent identification material, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

C. Check airflow patterns from the outside-air louvers and dampers and the return and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

D. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

E. Verify that motor starters are equipped with properly sized thermal protection.

F. Check dampers for proper position to achieve desired airflow path.

G. Check for airflow blockages.

H. Check condensate drains for proper connections and function.

I. Check for proper sealing of air-handling unit components.

J. Check for proper sealing of air duct system.

3.4 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

1. Measure fan static pressures to determine actual static pressure as follows:

a. Measure outlet static pressure as far downstream from the fan as practicable and upstream from restrictions in ducts such as elbows and transitions.

b. Measure static pressure directly at the fan outlet or through the flexible connection.

c. Measure inlet static pressure of single-inlet duct as near the fan as possible, upstream from flexible connection and downstream from duct restrictions.

d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.

2. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and treating equipment.

3. Compare design data with installed conditions to determine variations in design static pressures versus actual static pressures. Compare actual system effect factors to identify where variations occur. Recommend corrective action to align design and actual conditions.

4. Obtain approval from Engineer for adjustment of fan speed higher or lower than indicated speed. Make required adjustments to sheaves sizes, motor sizes, and electrical connections to accommodate fan-speed changes.

5. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full cooling, full heating, economizer, and any other operating modes to determine the maximum required brake horsepower.

3.5 GENERAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports for pumps, coils and heat exchangers. Obtain approved submittals and any manufacturer-recommended testing procedures. Cross check the summation of required coil and heat exchanger gpms with pump design flow rate.

B. Verify that hydronic systems are ready for testing and balancing:

1. Check liquid level in expansion tank and verify that tank is set to specified pressure for system fill and expansion.

2. Check that makeup water has adequate pressure to highest vent.

3. Check that control valves are in their proper positions.

4. Check that air has been purged from the system.

5. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

6. Verify that motor starters are equipped with properly sized thermal protection.

3.6 PROCEDURES FOR CONSTANT-FLOW HYDRONIC SYSTEMS

A. Adjust pumps to deliver total design gpm.

1. Measure total water flow.

a. Position valves for full flow through coils.

b. Measure flow by main flow meter, if installed.

c. If main flow meter is not installed, determine flow by pump total dynamic head (TDH) or exchanger pressure drop.

2. Measure pump TDH as follows:

a. Measure discharge pressure directly at the pump outlet flange or in discharge pipe prior to any valves or fittings.

b. Measure inlet pressure directly at the pump inlet flange or in suction pipe prior to any valves or strainers.

c. Convert pressure to head and correct for differences in gauge heights.

d. On single stage centrifugal pumps, verify pump impeller size by measuring the TDH with the discharge valve closed. Note the point on manufacturer's pump curve at zero flow and verify that the pump has the intended impeller size.

e. With all valves open, read pump TDH. Adjust pump discharge valve until design water flow is achieved.

3. Monitor motor performance during procedures and do not operate motor in an overloaded condition.

B. Adjust flow measuring devices installed in mains and branches to design water flows.

1. Measure flow in main and branch pipes.

2. Adjust main and branch balance valves for design flow.

3. Re-measure each main and branch after all have been adjusted.

C. Adjust flow measuring devices installed at terminals for each space to design water flows.

1. Measure flow at all terminals.

2. Adjust each terminal to design flow.

3. Re-measure each terminal after all have been adjusted.

4. Position control valves to bypass the coil and adjust the bypass valve to maintain design flow.

5. Perform temperature tests after all flows have been balanced.

D. For systems with pressure-independent valves at the terminals:

1. Measure differential pressure and verify that it is within manufacturer's specified range.

2. Perform temperature tests after all flows have been verified.

E. For systems without pressure-independent valves or flow measuring devices at the terminals:

1. Measure and balance coils by either coil pressure drop or temperature method.

2. If balanced by coil pressure drop, perform temperature tests after all flows have been verified.

F. Verify final system conditions as follows:

1. Re-measure and confirm that total water flow is within design.

2. Re-measure all final pump operating data, TDH, volts, amps, static profile.

3. Mark all final settings.

G. Verify that all memory stops have been set.

3.7 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:

1. Supply, Return Fans: Zero to plus 10 percent.

2. Minimum Outside Air: Zero to plus 10 percent.

3. Maintaining pressure relationships as designed shall have priority over the tolerances specified above.

4. Cooling-Water Flow Rate: Plus or minus 10 percent.

3.8 FINAL TEST AND BALANCE REPORT

A. The report shall be a complete record of the HVAC system performance, including conditions of operation, items outstanding, and any deviations found during the Testing and Balancing process. The final report also provides a reference of actual operating conditions for the owner and/or operations personnel. All measurements and test results that appear in the reports must be made on site and dated by the technicians or Test and Balance Engineers.

B. The report must be organized by systems and shall include the following information as a minimum:

1. Title Page:

a. AABC or NEBB Certified Company Name.

b. Company Address.

c. Company Telephone Number.

d. Project Identification Number.

e. Location.

f. Project Architect.

g. Project Engineer.

h. Project Contractor.

i. Project Number.

j. Date of Report.

k. Certification Statement.

l. Name, Signature, and Certification Number.

2. Table of Contents.

3. National Performance Guaranty.

4. Report Summary:

a. The summary shall include a list of items that do not meet design tolerances, with information that may be considered in resolving deficiencies.

5. Instrument List:

a. Type
b. Manufacturer
c. Model
d. Serial Number
e. Calibration Date

C. Required air side data - Test, adjust and record the following:

1. AHU (In both minimum O.A. and economizer modes):

a. Minimum outdoor air Cfm
b. Total discharge and return Cfm
c. Static profile thru unit
d. Complete nameplate data

2. Coil:

a. Entering air temperature (DB/WB)
b. Leaving air temperature (DB/WB)
c. Static differential
d. Face velocity and area
e. Cfm
f. Complete nameplate data

D. Required Fluid Data: Test, adjust and record the following:

1. Heat Transfer Devices: Including, but not limited to air handlers, convectors, fin tube radiation sections, unit ventilators, fan coils, cabinet heaters, unit heaters, heat pumps, heat exchangers.

   a. GPM (coil and bypass)
   b. Entering water temperature
   c. Leaving water temperature
   d. Water pressure drop
   e. Complete nameplate data

2. Pumps:

   a. Check rotation
   b. GPM
   c. Pump off pressures (suction and discharge)
   d. Running suction pressure
   e. Running discharge pressure
   f. Running load amps
   g. RPM - motor
   h. Complete nameplate motor and pump
   i. Marked up pump curve illustrating final operating conditions

3. Chillers - (Evaporator and Condensing Sections):

   a. GPM
   b. Entering water temperature and pressure
   c. Leaving water temperature and pressure
   d. Complete nameplate data

E. One (1) copy of the final test and balance report shall be sent directly to the Engineer of Record. Provide five (5) additional copies to the Contractor.

END OF SECTION 23 05 93

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SECTION 23 07 10 - INSULATION

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents.

1.2 SUBMITTAL

A. Submit product data, product description, manufacturer's installation instructions, types and recommended thicknesses for each application, and location of materials.

1.3 RELATED WORK SPECIFIED ELSEWHERE

A. Section 232010 - Piping Systems and Accessories.

PART 2 - PRODUCTS

2.1 GENERAL

A. Insulation, jackets, adhesive, and coatings shall comply with the following:

1. Treatment of jackets or facing for flame and smoke safety must be permanent. Water-soluble treatments not permitted.

2. Insulation, including finishes and adhesives on the exterior surfaces of ducts, pipes, and equipment, shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, when tested in accordance with ASTM E84.

3. Asbestos or asbestos bearing materials are prohibited.

4. Comply with 2015 International Energy Conservation Code as amended by Part 1 of the 2016 Supplement to the New York State Energy Conservation Code.

5. All adhesives, coatings and sealants used for insulation in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits as called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

6. Provide materials which are the standard products of manufacturers regularly engaged in the manufacture of such products and that essentially duplicate items that have been in satisfactory use for at least two (2) years prior to bid opening. Provide insulation systems in accordance with the approved MICA or NAIMA Insulation Standards.

7. Insulation shall be clearly marked with manufacturer's name, identification of installed thermal resistance (R) value, out-of-package R value, flame spread and smoke developed indexes in accordance with Energy Code requirements.

2.2 ACCEPTABLE MANUFACTURERS

A. Fiberglass: Knauf/Manson, Johns Manville, Owen-Corning, Certainteed. (Board, Blanket and Liner)

B. Flexible Elastomeric: Armacell, K-Flex.

C. Adhesives, Coatings, Mastics, Sealants: Childers, Foster.

2.3 PIPE INSULATION (RIGID FIBERGLASS TYPE)

A. Product meeting ASTM C 547, ASTM C 585, and ASTM C 795; rigid, molded, noncombustible.

B. 'K' Value: ASTM C 335, 0.23 at 75°F mean temperature installed value. Maximum Service Temperature: 1000°F.

C. Vapor Retarder Jacket: ASJ/SSL conforming to ASTM C 1136 Type I, secured with self-sealing longitudinal laps and butt strips.

D. Field-Applied PVC Fitting Covers with Flexible Fiberglass Insulation: Proto Corporation 25/50 or Indoor/Outdoor, UV-resistant fittings, jacketing and accessories, white or colored. Fitting cover system consists of pre-molded, high-impact PVC materials with blanket type fiberglass wrap inserts. Blanket fiberglass wrap inserts shall have a thermal conductivity ('K') of 0.26 at 75°F mean temperature. Closures to be stainless steel tacks, matching PVC tape, or PVC adhesive per manufacturer's recommendations.

E. Prefabricated Thermal Insulating Fitting Covers: Comply with ASTM C 450 for dimensions used in pre-forming insulation to cover valves, elbows, tees, and flanges.

2.4 FLEXIBLE TYPE INSULATION

A. Flexible Elastomeric Thermal Insulation: Closed-cell, foam material. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials. Maximum thermal conductivity (k) shall be 0.25 BTU-in/ft^2 hr. °F at 75°F mean temperature. Adhesive: As recommended by insulation material manufacturer.

B. Insulation shall have a flame-spread index of less than 25 and a smoke-developed index of less than 50 as tested by ASTM E 84 and CAN/ULC S-102, "Method of Test for Surface Burning Characteristics of Building Materials".

2.5 EQUIPMENT INSULATION

A. Rigid Fiber Glass Board:

1. Product meeting ASTM C 612 Type IA and IB.

2. Concealed Areas:

a. Density: Minimum 3 PCF.

b. 'K' Value of 0.23 at 75°F mean temperature. Maximum Service Temperature: 450°F.

c. Vapor Retarder Jacket: ASJ conforming to ASTM C 1136 Type I, or FSK conforming to ASTM C 1136 Type II.

3. Exposed Areas:

a. Density: Minimum 6 PCF

b. 'K' Value: ASTM C 177, 0.22 at 75°F mean temperature.

B. Foam Board. Polyisocyanurate core. Foil faced on one side and opposite side faced with white acrylic coated embossed aluminum, 4-mil. equal to "Dow Chemical Thermax Heavy Duty".

2.6 FIELD-APPLIED JACKETS

A. Piping:

1. PVC Pipe Jacket: High-impact, ultraviolet-resistant PVC; 20 mils thick; roll stock ready for shop or field cutting and forming. Adhesive: As recommended by insulation material manufacturer. PVC Jacket Color: White.

2. Alumaguard Jacketing: Self adhesive, 60 mil thick, rubberized bitumen, foil faced membrane. Polyguard Products, Inc. Alumaguard 60, or equal.

2.7 COATINGS, MASTICS, ADHESIVES AND SEALANTS

A. Vapor Barrier Coatings: Used in conjunction with reinforcing mesh to coat insulation on below ambient services temperatures. Permeance shall be no greater than 0.08 perms at 45 mils dry as tested by ASTM F1249. Foster 30-65 Vapor Fas; Childers CP-24, or approved equal.

B. Weather Barrier Mastic: Used outdoors to protect above ambient insulation from weather. Foster 46-50 Weatherite; Childers CP-10 Vi Cryl, or approved equal.

C. Fiberglass Adhesive: Used bond low density fibrous insulation to metal surfaces. Shall meet ASTM C916 Type II. Foster 85-60; Childers CP-127, or approved equal.

D. Elastomeric Insulation Adhesive: Used to bond elastomeric insulation. Foster 85-75; Childers CP-82, or approved equal.

E. Elastomeric Insulation Coating: Water based coating used to protect outside of elastomeric insulation. Foster 30-65, or approved equal.

F. Insulation Joint Sealant: Used as a vapor sealant on below ambient piping with polyisocyanurate and cellular glass insulation. Foster 95-50; Childers CP-76, or approved equal.

G. Reinforcing Mesh: Used in conjunction with coatings/mastics to reinforce. Foster Mast A Fab; Childers Chil Glass #10, or approved equal.

2.8 MATERIALS AND SCHEDULES

A. See Exhibits at the end of this section.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. All materials shall be installed by skilled labor regularly engaged in this type of work. All materials shall be installed in strict accordance with manufacturer's recommendations, building codes, and industry standards.

B. Locate insulation and cover seams in the least visible location. All surface finishes shall be extended in such a manner as to protect all raw edges, ends and surfaces of insulation. No glass fibers shall be exposed to the air.

C. All pipe and duct insulation shall be continuous through hangers, walls, ceiling and floor openings, and through sleeves, unless not allowed by Fire Stop System. Refer to Section 230500 "Basic Requirements" for Fire Stop Systems.

D. Provide thermal insulation on clean, dry surfaces and after piping, ductwork and equipment (as applicable) have been tested. Do not cover pipe joints with insulation until required tests are completed.

E. All cold surfaces that may "sweat" must be insulated. Vapor barrier must be maintained; insulation shall be applied with a continuous, unbroken moisture and vapor seal. All hangers, supports, anchors, or other projections that are secured to cold surfaces shall be insulated and vapor sealed to prevent condensation. Cover valves, fittings and similar items in each piping system with insulation as applied to adjoining pipe run. Extra care must be taken on piping appurtenances to insure a tight fit to the piping system. For piping systems with fluid temperatures below ambient, all vapor retarder jacket (ASJ) seams must be coated with vapor barrier coating. All associated elbows, fittings, valves, etc. must be coated with vapor barrier coating and reinforcing mesh to prevent moisture ingress. Valve extension stems require Elastomeric insulation that is tight fitting to the adjoining fiberglass system insulation. Pumps, strainers, air separators, drain valves, etc. must be totally encapsulated with Elastomeric insulation.

F. Items such as boiler manholes, handholds, clean-outs, ASME stamp, and manufacturers' nameplates, may be left un-insulated unless omitting insulation would cause a condensation problem. When such is the case, appropriate tagging shall be provided to identify the presence of these items. Provide neatly beveled edges at interruptions of insulation.

G. Provide protective insulation as required to prevent personnel injury: Piping from zero to seven feet above all floors and access platforms including hot (above 140°F) piping and any other related hot surface.

H. All pipes shall be individually insulated.

I. If any insulation material has become wet because of transit or job site exposure to moisture or water, the contractor shall not install such material, and shall remove it from the job site.

3.2 PIPE INSULATION

A. Insulate piping systems including fittings, valves, flanges, unions, strainers, and other attachments installed in piping system, whether exposed or concealed except within radiation enclosures.

B. Insulation installed on piping operating below ambient temperatures must have a continuous vapor retarder. All joints, seams and fittings must be sealed.

C. Hanger Shields: Refer to Section 232010 "Piping Systems and Accessories".

D. Metal shields shall be installed between hangers or supports and the piping insulation. Rigid insulation inserts shall be installed as required between the pipe and the insulation shields. Inserts shall be of equal thickness to the adjacent insulation and shall be vapor sealed as required.

1. Pre-Insulated Type: Butt insulation to hanger shields and apply a wet coat of vapor barrier cement to the joints and seal with 3 in. wide vapor barrier tape.

2. Field Insulated Type: Provide Hamfab Co. "H" blocks per manufacturers recommended spacing between pipe and shield.

3. Tape shields to insulation.

E. Joints in section pipe covering made as follows:

1. All ends must be firmly butted and secured with appropriate butt-strip material. On high-temperature piping, double layering with staggered joints may be appropriate. When double layering, the inner layer should not be jacketed.

2. Standard: Longitudinal laps and butt joint sealing strips cemented with white vapor barrier coating, or factory supplied pressure sensitive adhesive lap seal.

3. Vapor Barrier: For cold services, Longitudinal laps and 4 in. vapor barrier strip at butt joints shall be sealed with white vapor barrier coating. Seal ends of pipe insulation at valves, flanges, and fittings with white vapor barrier coating. When using polyisocyanurate or cellular glass on below ambient piping/duct, seal all insulation joints with insulation joint sealant.

F. Fittings, Valves and Flanges:

1. Chilled Water: Flexible fitting insulation of the same material and thickness as the adjacent pipe insulation.

2. Domestic Cold Water: Flexible fitting insulation of the same material and thickness as the adjacent pipe insulation.

3. White PVC jacketing, with continuous solvent weld of all seams. Tape all fittings.

G. Flexible Pipe Insulation:

1. Split longitudinal joint and seal with adhesive.

2. Fittings made from miter-cut pieces properly sealed with adhesive, or ells may be continuous.

3. Where exposed outdoors, provide with Alumaguard jacketing.

H. Apply PVC jacket where indicated, with 1 in. overlap at longitudinal seams and end joints. Seal with manufacturers recommended adhesive.

I. Apply either aluminum or PVC jacketing to exposed insulated pipe, valves, fittings, and specialties, at an elevation of 8 feet or less above finished floor in mechanical/electrical rooms, penthouses, and services aisles/pipe chases. Fittings of aluminum-jacketed piping may be either aluminum or standard PVC fitting covers.

3.3 EQUIPMENT INSULATION

A. Apply insulation with joints firmly butted as close as possible to the equipment surface. Insulation shall be secured as required with adhesive, mechanical fasteners or banding material. Fasteners shall be located a maximum of 3 in. from each edge and spaced no greater than 12 in. on center.

B. Vapor retarders shall overlap a minimum of 2 in. at all seams and be sealed with appropriate pressure-sensitive tape and vapor barrier coating. All penetrations, facing damage, and mechanical fasteners shall be covered with a minimum 2 in. overlap of tape and vapor barrier coating.

C. Fiberglass Equipment Insulation: Secure fiberglass with pins, studs, or clips. Field apply 8 oz. knit fiberglass cloth, cemented and applied over standard jacket. Properly cut at fittings to avoid wrinkles and coat with white lagging adhesive/coating. Leave ready for painting.

EXHIBIT "I" - PIPE INSULATION MATERIALS

SERVICE	INSULATION MATERIAL	THICKNESS	REMARKS
Hot water (200°F and lower)	Glass fiber	1-1/2 in. and Larger: 2 in. 1-1/4 in. and Smaller: 1-1/2 in.	
Chilled water, glycol/chilled water	Glass fiber	1-1/2 in. and Larger: 1 in. 1-1/4 in. and Smaller: 1/2 in.	
Refrigeration Piping (Suction and liquid lines)	Flexible	1 in. and Larger: 1 in. 3/4 in. and Smaller: 1/2 in.	
Outdoor Refrigeration Piping (Suction and liquid lines)	Flexible	1 in. and Larger: 1 in. 3/4 in. and Smaller: 1/2 in.	Insulation shall be provided Alumaguard jacketing.
Outdoor Piping	Flexible	Insulate pipe with double the thickness called for above	Cover with Alumaguard jacketing applied per manufacturer's recommendations
Concealed AC unit condensate drains	Flexible	All Sizes: 1/2 in.	

EXHIBIT "III" - EQUIPMENT INSULATION MATERIALS

SERVICE	INSULATION MATERIAL	THICKNESS	REMARKS
Air removal assemblies and fabric filter assemblies	----------	SAME AS WATER PIPING	
Cooling system expansion tanks and chemical feed tanks	----------	SAME AS WATER PIPING	----------
Chilled water pumps and cold heat exchangers	Flexible sheets of Elastomeric foam	…….…. 1 in.	Arrange for easy removal. Coat with white finish.

END OF SECTION 23 07 10

SECTION 23 09 23 - BUILDING MANAGEMENT SYSTEM - ELECTRONIC DDC LOGIC

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Drawings, to perform the functions described in this Section. All new equipment shall be compatible with the existing system. Provide wiring and conduit required to connect devices furnished as a part of, or accessory to, this automatic control system. Control wiring is defined as wiring up to and including 120 volts. Install wiring in accordance with requirements of "Electrical Wiring" in Section 230504, and the National Electrical Code. Provide all required devices for proper system operation, including special electrical switches, transformers, relays, pushbutton stations, etc.

B. All existing DDC controllers and sensors removed from the project shall be turned over to the owner in good condition.

C. This contract shall be responsible for decommissioning of the temperature control systems being removed and modifications to existing system graphics and software programming.

D. Removal of pneumatic control system shall include the complete removal of the associated pneumatic tubing and specialties, including conduit and wire mold.

E. The controls contractor shall conform to the requirements of the Specification 01 91 13 - General Commissioning Requirements. This includes, but is not limited to: attending Cx Meetings, conducting point to point checks, provide documentation of sensor calibration, provide trend log data for review by CxA to confirm system operation, assist contractor with pre-functional checks and conduct functional performance checks at direction of CxA.

1.2 SUMMARY

A. It is the Owners intention to extend the existing District Building Management System through the existing district Ethernet. All points being provided for this project will be monitored and controlled through the existing Andover Continuum Workstation through the campus Ethernet backbone.

B. The BMS will communicate between the existing Andover Continuum Workstations to all new DDC controllers through the existing campus Ethernet system. All new points being controlled and monitored shall communicate through the Campus Ethernet system.

C. The complete control system for the Rochester City School District is designed and based on that manufactured by Andover, represented by Day Automation.

D. The DDC equipment shall be purchased by the Rochester City School District off from State Contract and turned over to the HVAC Contractor for installation. The HVAC Contractor is responsible for installation of a complete operational system.

1.3 QUALITY ASSURANCE

A. The complete automatic temperature control system shall be comprised of electronic control devices with a microprocessor based Direct Digital Control System. All work shall be installed only by skilled mechanics employed by the temperature control contractor or subcontractor.

B. All components shall be fully tested and documented to operate as a complete system.

1.4 SUBMITTALS

A. Submit for review, a brochure containing the following:

1. Detailed piping and wiring control diagrams and systems description for each system under control.

2. Detailed layout and nameplate list for component control panels and DDC panels.

3. Submit a valve and damper scheduled showing size, pressure drop configuration, capacity, and locations. Provide apparatus Bulletins and data sheets for all control system components.

4. A complete listing of input and output points, control loops and/or routines, including time of day functions, and facilities management system functions for each controlled system. This listing shall include point logical names, identifiers, and alarmable ranges.

5. Provide as part of a separate submittal a hard copy of all graphics showing system components, sensor locations, setpoints and fixed/variable data. Engineer shall review and approve graphic format prior to final acceptance of system.

1.5 INCIDENTAL TO TEMPERATURE CONTROL SUBCONTRACTOR

A. The temperature control contractor shall furnish the following materials, installation by the Mechanical Contractor:

1. For piping work:

a. Control valves in piping.
b. Immersion sensing wells in piping systems.
c. Valved pressure taps.

B. Control manufacturer shall furnish written details, instructions and supervision for the above trades to ensure proper installation size, and location of any equipment furnished for installation by others.

C. Temperature Control Contractor is responsible for providing 120 volt dedicated emergency power with surge protection to all DDC panels serving the equipment tied into the emergency generator. Refer to the Electrical Plans for equipment tied into emergency power.

D. Temperature Control Contractor is responsible for providing Ethernet data drops at main building controller and at operator workstation.

1.6 CONTROL SYSTEM GUARANTEES

A. Guarantee the new control system to be free from defects in material and workmanship, for a period of one year after final acceptance. Guarantee System to:

1. Maintain temperatures within 1°F above and below setting.

2. Humidity devices shall maintain relative humidity conditions within 3% of span 0-100% RH.

B. Provide one year maintenance service of control components, to start concurrently with the guarantee specified above. Such service shall include software updates and 24-hour, 7-day emergency and seasonal inspection and adjustment of operating controls and replacement of parts or instruments found deficient and defective during this period.

C. The Contractor will provide monitoring of the DDC system as soon as the system is operating and then for a minimum of one (1) year (24 hours/day, 7 days/week) after the acceptance date. A monthly report will be sent to the Owner with a description of general system status and any alarms or off-normal conditions.

D. The Contractor will guarantee future availability of continuous, 24-hour, 7-day a week service for the systems through available maintenance contracts.

1.7 SYSTEM ADJUSTMENT AND CALIBRATION

A. When the Work has been completed, completely adjust and calibrate the control system. Review the operation of each system input and output, control loops and/or software routings, timing functions, operator entered constants and facilities management functions and observe that they perform their intended functions. Provide a complete values and points log, printed every hour, for one week to demonstrate control functions and programming. Provide one point log for summer operation and one winter. Points to be trended shall be selected by the engineer.

When above procedure has been completed and the control system is operating satisfactorily, submit a letter with one copy of completed values and points log to the Owner's Representative advising them that the control system is 100% complete and operates in accordance with the Contract Documents.

B. After review and approval of points log by the Engineer, the control system subcontractor shall schedule a technician on site for field review of system components, operation and graphics as part of final system appearance.

1.8 INSTRUCTIONS TO THE OWNER'S REPRESENTATIVE

A. Provide competent control technicians to instruct the Owner's operating personnel and turn over three copies of maintenance manual. Provide a total of 24 hours of instruction at the site, 12 hours during start-up and 12 hours after six months. Instruction sessions shall be scheduled at the owner's convenience and shall be limited to four (4) hours per session.

PART 2 - PRODUCTS

2.1 CONTROL DEVICES

A. Control Valves:

1. Sized by temperature control manufacturer and guaranteed to meet the heating and cooling requirements. Water valves shall be sized on the basis of 15% of the total system pressure drop, but not more than 10 ft. of head drop. Pressure drop for valves shall be submitted for review, including all CV values.

2. Valves shall be equal percentage type, equipped with characteristic type throttling plug, #316, stainless steel or Monel stem, removable composition discs, and rubber diaphragms. Provide with necessary features to operate in sequence with other valves or damper operators and adjustable throttling range as required by the sequence of operations.

3. Valves in 2 in. and smaller shall be screwed bodies; 2-1/2 in. and larger shall be flanged bodies; designed for 125 psi operating pressure. Arranged to fail-safe as called for; tight closing and quiet operating.

4. Valves to be spring return, ball style CCV.

5. Electric Operators (Valve):

a. Provide 24 VAC control operators which are 0-10 VDC input proportional with spring return as needed by control sequence and designed for water service valve bodies. Operator shall be synchronous motor driven with up to 150 in. lb. force and force sensor safety stop.

b. Johnson Type M-9100, M-9200, M-130, M-150, Belimo, or equal.

B. Temperature Transmitters:

1. Provide at least 16 ft. averaging type of multiple point (4 minimum) sensing elements for transmitters in mixed air and coil discharge to reduce the effects of stratification. Other applications to may have short bulbs for temperature sensing. Provide separable immersion wells filled with "Insulgrease" for water service.

2. Room thermostats shall be of the miniature type, two-wire with thermistor, adjustable sensitivity, calibrated dial suitable for set back to 45°F. Metal cover with tamperproof screws, to have concealed adjustment in public and multi-occupancy areas, open adjustments for use with key and exposed dial for private offices and single occupancy type areas. Closed adjustment on humidistats and transmitters.

   a. Provide polycarbonate guards on thermostats and humidistats located in areas where instruments may be subject to damage, and where called for. Safety Technology International, Inc., Model STI-9105 Common Areas.

C. Safety/Status Devices:

1. Low Limit Detector: Electric type, with 20' long serpentine element, with manual reset and auxiliary contacts to the DDC, set for 37°F for "freeze" protection and 55°F for fan discharge application. Provide a 20' long element for every 25 sq. ft. of coil face area.

2. High Limit Detector: Electric type, with manual reset and auxiliary contacts to the DDC, UL listed for fire, set for 180°F.

3. Pump status shall be provided through current switches on pump motor. Switches equal to Veris H800.

D. Miscellaneous Devices:

1. Provide necessary, relays, transformers, cumulators, positioners required for a complete and operable system.

2. Locate these devices in a separate panel unless specified otherwise.

2.2 CONTROL CABINETS

A. Central DDC control panels shall be fully enclosed cabinet, baked enamel, steel, aluminum or composite material construction and shall meet the requirements of NEMA 1 enclosures. Panels shall have hinged door with a locking latch. Each component on front panel shall have an appropriate stick-on label describing its function. Components inside the panel shall be appropriately labeled for ease of identification. Stick-on labels are not acceptable. Panels shall be either free-standing or wall-mounted. Provide support steel framing.

2.3 DIRECT DIGITAL CONTROL SYSTEM

A. The basic elements of the Direct Digital Control System structural shall consist of standard components kept in inventory by the equipment supplier. The components shall not require customizing other than setting jumpers and switches, adding firmware modules or software programming to perform required functions. The system may be expanded to its full capacity by adding sensors and entering programs in available random access memory (RAM). Future expansion shall not require hardware modifications to the controller. The entire system shall be a Direct Digital processing type with pneumatic output devices.

B. The DDC system shall consist of the following:

1. Central DDC panels.

2. Application specific controllers (ASCI).

3. Personal Computer Operator Workstations.

4. System architectural design shall eliminate dependence upon any single device for alarm reporting and control execution. Each DDC panel (Central or ASC) shall operate independently by performing its own specified control, alarm management, operator I/O, and historical data collection. The failure of any single component or network connection shall not interrupt the execution of control strategies at other operational devices.

5. Central DDC panels shall be able to access any data form, send control commands and alarm reports directly to any other DDC panel, operator workstation, or printer on the network.

2.4 NETWORKING COMMUNICATIONS

A. Inherent in the system's design shall be the ability to expand or modify the network either via the local area network, or auto-dial telephone line modem connections.

B. Local Area Network:

1. Workstation/DDC Panel Support: Operator workstations and DDC panels shall directly reside on a local area network such that communications may be executed directly between controllers, workstations, and between controllers and workstations on a peer-to-peer basis.

2. Dynamic Data Access: The system shall have the ability to access all point status and application report data, or execute control functions for any and all other devices via the local area network.

3. General Network Design: Network design shall include the following provisions:

a. The minimum baud rate shall be 10 Mbps.

b. Detection and accommodation of single or multiple failures of either workstations, DDC panels or the network. The network shall include provisions for automatically reconfiguring itself to allow all operational equipment to perform their designated functions as effectively as possible in the event of single or multiple failures.

c. Message and alarm buffering and default device definition to prevent information from being lost.

d. Synchronization of the realtime clocks in all DDC panels shall be provided.

4. Building controllers shall operate over a high-speed, local area network utilizing Ethernet protocol and TCP/IP. The controller shall be a microcomputer of modular design. LAN-based building controllers will share information with and from entire network of building controllers for full global control.

5. This local area network shall operate under the Ethernet protocol at 10 Mbps. The high-speed LAN will provide transfer of point data, alarms and file activity among building controllers, workstations and the file server at 10 Mbps. The high-speed LAN shall support a minimum of 150 nodes consisting of building controllers or workstations.

6. The high-speed LAN shall support multi-user communications and multi-session activity. That is, all global data sharing shall occur simultaneously with the transmission of alarm data or user activity.

7. Workstations shall be connected directly to the high-speed LAN to the building controllers through the building owner's Ethernet LAN at 10 Mbps. Workstations shall also be able to communicate via modems to remote network controllers. Telephone communications shall operate simultaneously with communication to any controllers connected on the high-speed LAN. Building controllers shall perform automated control of HVAC equipment and lighting, control peripheral devices, and coordinate communications to other building controllers in the network.

8. Building controllers shall provide communication to both the high-speed LAN (Ethernet) and the field bus. For Ethernet-based controllers, connections shall be provided for 10BaseT or 10Base2 cabling.

9. In addition, a minimum of four (4) RS232 ports shall be provided for connection to modems, field bus controllers and third-party devices. When the port is RS 232, it shall optionally support communication to a modem or printer. Where multiple RS232 ports are available, multi-user communications shall be supported.

10. Any of the RS232C ports shall be usable for connection to third-party devices such as tank probes, fire alarm panels and other microprocessor-based devices which communicate in ASCII.

C. Remote Communications to Computers:

1. Provide remote communication to the workstations. The provided workstations and server must have a remote PC control software package. Acceptable software packages will include PC Anywhere and NetOp. The remote PC control software must allow the user to take control of the computer's monitor, mouse and keyboard from telephone dial up, TCP/IP internet connection or TCP/IP district network connection.

2.5 CENTRAL DDC PANELS

A. General: Central DDC panels shall be microprocessor based, multi-tasking, multi-user, real-time digital control processors. Each DDC panel shall consist of required processors, communication controllers, power supplies, and input/output devices.

B. Memory: Each DDC panel shall have sufficient memory to support its own operating system and database including:

1. Control processes
2. Energy Management Applications
3. Alarm Management
4. Historical/Trend Data for all points
5. Maintenance Support Applications
6. Custom Software for engineer defined sequence of operation
7. Operator I/O
8. Dial-Up Communications
9. Manual Override Monitoring

C. Serial Communications Ports: Central DDC panels shall provide at least two RS-232C serial data communication ports for simultaneous operation of multiple operator I/O devices such as printers, laptop workstations, PC workstations, and panel mounted or portable DDC Panel Operator's Terminals.

D. Hardware Override switches: Provide on all Central Systems this includes air handling units, boilers, chillers and pumps. The operator shall have the ability to manually override automatic or centrally executed commands at the DDC panel via local, point discrete, onboard hand/off/auto operator override switches for binary control points and gradual switches for analog control type points. These override switches shall be operable whether the panel is powered or not.

E. Hardware Override Monitoring: DDC panels shall monitor the status or position of all overrides, and include this information in logs and summaries to inform the operator that automatic control has been inhibited.

F. Integrated On-Line Diagnostics: Each DDC panel shall continuously perform self-diagnostics, communication diagnosis and diagnosis of all subsidiary equipment. The DDC panel shall provide both local and remote annunciation of any detected component failures, or repeated failure to establish communication. Indication of the diagnostic results shall be provided at each DDC panel, and shall not require the connection of an operator I/O device.

G. Surge and Transient Protection: Isolation shall be provided at all network terminations, as well as all field point terminations to suppress induced voltage transients consistent with IEE Standard 587. Isolation levels shall be sufficiently high as to allow all signal wiring to be run in the same conduit as high voltage wiring where acceptable by electrical codes.

H. Powerfail restart: In the event of the loss of normal power, there shall be an orderly shutdown of all Central DDC panels to prevent the loss of database or operating system software. Non-Volatile memory shall be incorporated for all critical controller configuration data, and battery back-up shall be provided to support the real-time clock and all volatile memory for a minimum of 48 hours. Upon restoration of normal power, the DDC panel shall automatically resume full operation without manual intervention.

2.6 SYSTEM SOFTWARE FEATURES

A. General:

1. The system shall be Windows 7 based, and shall include all necessary software to form a complete system as described in this specification. The software programs specified in this section shall be provided as an integral part of the DDC panel and shall not be dependent upon any higher level computer execution.

2. All programmed control functions in each DDC controller associated with each piece of mechanical equipment shall be operational as indexed by the status feedback from that piece of equipment. The output command shall not be used to index the unit program logic.

B. Control Software Description:

1. Pre-Tested Control Algorithms: The DDC panels shall have the ability to perform the following pre-tested control Algorithms:

   a. Two Position Control
   b. Proportional, Integral, plus Derivative Control
   c. Automatic Control Loop Tuning

2. Equipment Cycling Protection: Control software shall include a provision for limiting the number of times each piece of equipment may be cycled within any on-hour period.

3. Equipment Start-Up: The system shall provide protection against excessive demand situations during start-up periods (morning or power failure restart) by automatically introducing time delays between successive start commands to electrical loads.

4. Powerfail Motor Restart: Upon the resumption of normal power, the DDC panel shall analyze the status of all controlled equipment, compare it with normal occupancy scheduling, and turn equipment on or off as necessary to resume normal operation.

C. Energy Management Applications: DDC Panels shall have the ability to perform the following energy management routines:

1. Time of Day Scheduling
2. Calendar Based Scheduling
3. Holiday Scheduling
4. Temporary Schedule Overrides
5. Optimal Start
6. Optimal Stop
7. Night Setback Control
8. Enthalpy Switchover (Economizer)
9. Peak Demand Limiting
10. Temperature Compensated Load Rolling
11. Fan Speed/CFM Control
12. Heating/Cooling Interlock
13. Cold Deck Reset
14. Hot Deck Reset
15. Hot Water Reset
16. Chilled Water Reset
17. Condenser Water Reset
18. Chiller Sequencing

D. Custom Process Programming Capability: DDC panels shall be able to custom, job-specific processes defined by user, to automatically perform calculations and special control routines.

E. Custom Process Documentation: The custom programming feature shall be self-documenting. All interrelationships defined by this feature shall be documented via graphical flowcharts and English language descriptions.

F. Alarm Management: Alarm management shall be provided to monitor, buffer and direct alarm reports to operator devices and memory files. Each DDC panel shall perform distributed and independent alarm analysis.

1. Point Change Report Description: All alarm or point change reports shall include the point's English language description, and the time and dated of occurrence.

2. Prioritization: The user shall be able to prioritize (2 levels minimum) and define the specific system reaction for each point. Each DDC panel shall automatically inhibit the reporting of selected alarms during system shutdown and start-up. Users shall have the ability to manually inhibit alarm reporting for each point and define which alarms need to be acknowledged by an operator, and/or sent to follow-up files for retrieval and analysis at a later date.

a. Alarm Messages: In addition to the point's descriptor and the time and date, the user shall be able to print, display or store a 65-character alarm message to more fully describe the alarm condition or direct operator response. Each Central DDC panel shall be capable of storing a library of at least 250 Alarm Messages.

b. Auto-Dial Alarm Management: In Dial-up applications, only critical alarms shall initiate a call to a remote operator device. In all other cases, call activity shall be minimized by time-stamping and saving reports until an operator scheduled time, a manual request, or until the buffer space is full. The alarm buffer must store a minimum of 50 alarms.

c. The computer shall have the capability to dial up to three (3) phone numbers of pagers and leave a message in the event an alarm is received and not acknowledged at the host computer, if so required, within 15 minutes. The first phone number shall be from a library of numbers assigned to the watch engineers and shall be changed when the watch engineer logs on each shift. The second phone number shall be supplied by the Owner.

3. Pager Specification:

a. Alpha-numeric messages: Critical alarms for each building will be sent to an alpha-numeric pager. The pager will consist of an alarm message. Message will consist of the building name and alarm description. The building name and the alarm message will be fully adjustable from a graphic screen. The alarm will dial out to three (3) different pagers. The order of the pagers and frequency of the pages will be determined by the Owner.

G. Historical Data and Trend Analysis: Data collection utilities shall be provided to automatically sample, store, and display system data as follows:

1. Continuous Point Histories: System shall store Point History Files for analog and binary inputs and outputs. The Point History shall continuously and automatically sample the value of all analog inputs at half hour intervals. Samples for all points shall be stored for the past 24 hours. Point History Files for binary input and output points and analog output points shall include a continuous record of the last ten status changes or commands for each point.

2. Control Loop Performance Trends: System shall provide sampling capability with an operator-adjustable resolution of 10-300 seconds for verification of control loop performance.

3. Extended Sample Period Trends: Measure and calculated analog and binary data shall also be assigned to user-definable trends for the purpose of collecting operator-specified performance data over extended periods of time. Sample intervals of 1 minute to 2 hours, in one-minute intervals, shall be provided. The system shall have a dedicated buffer for trend data, and shall be capable of storing a minimum of 5000 data samples.

4. Data Storage and Archiving: Trend data shall be stored and downloaded to hard disk storage when archival is desired. Downloads shall occur based upon wither user-defined interval or manual command. All trend data shall be available in disk file form for use in 3rd party software.

H. Runtime Totalization: The system shall automatically accumulate and store runtime hours and number on/off cycles per time period for binary input and output points.

2.7 APPLICATION SPECIFIC CONTROLLERS - HVAC APPLICATIONS

A. Each Central DDC Controller shall be able to extend its performance and capacity through the use of remote Application Specific Controllers (ASCs).

B. Each ASC shall operate as a standalone controller capable of performing its specified control responsibilities independently of other controllers in the network. Each ASC shall be a microprocessor-based, multi-tasking, real-time digital control processor.

C. Each ASC shall have sufficient memory to support its own operating system and data bases including:

1. Control Processes
2. Energy Management Applications
3. Operator I/O (Portable Terminal)

D. The operator interface to any ASC point data or programs shall be through any network resident PC workstation or portable operator's terminal connected to any Central DDC panel in the network.

E. Application Specific Controllers shall directly support the temporary use of a portable service terminal. The capabilities of the portable terminal in the ASC port shall include:

1. Display temperatures
2. Display status
3. Display setpoints
4. Display control parameters
5. Override binary output control
6. Override analog setpoints
7. Modification of gain and offset constants

F. Powerfail Protection: All system setpoints, proportional bands, control algorithms, and any other programmable parameters shall be stored such that a power failure of any duration does not necessitate reprogramming the controller.

2.8 SYSTEM SOFTWARE

A. General:

1. System operator:

a. The software supplied as part of this Contract shall consist of Windows 7 based operating system, and a complete database to include hardware address assignments. English language identifiers, alarm response handling, point type assignments, event program interaction assignments and equation assignments for each point, will be generate on-line.

2. Input process:

   a. The software shall, through various security levels, allow the user to command points to a different state, gather information points, build parameters and modify parameters. Changes shall be accomplished on-line at the operator workstation as allowed by password.

3. System advisories:

   a. The system shall be capable of providing logs and summaries of system hardware on a per point basis using special characters and flags.

   b. The operator shall have the ability to review the condition of field hardware and communication trunks through the operator workstation.

4. Alarm reporting:

   a. Change-of-state or out-of-limits alarms (adjustable range for each point) shall be reported to the operator workstation and shall contain point description data. An alarm character string shall be printed in hard copy form whenever an alarm is received and shall take precedence over other functions.

   b. When multiple alarms are received, they will be output to the line printer as they are received. Non acknowledgeable changes-of-state shall be output on a prioritized level format.

   c. Alarm messages shall include time, date, actual value, setpoint and alarm setpoint.

5. Data base generation:

   a. The operator shall have the ability to modify the system software on-line as allowed by his password restriction.

   b. The database shall be expandable to adapt to system hardware or software changes.

6. Security:

   a. The system shall be capable of restricting any operator to any level of the system using a password system. Passwords shall be changeable through on-line keyboard entry. A minimum of three security levels shall be available.

   b. Operator inputs executed under a valid password shall be recorded on the line printer.

   c. A password summary shall be available showing password initials, 24 character name, time out value, degree of capability.

d. At no time shall the actual password numbers be printed on the CRT screen. The operator with the strictest level of password shall be able to generate a password summary listing.

7. Building/system wide control points:

a. Control points common to system (e.g. outside air may be shared by field panels providing a minimum of two values are sensed and averaged). This information shall be available at all times on the local area network.

B. Application Features:

1. The following programs shall reside at the operator workstation:

a. Trend Log:

1) Points shall be assignable at the host computer. Trended values shall be historically retained on the system hard disk for future inquiry. Provide one (1) customized trend log reports with up to eight variables per report.

b. Alarms and summaries:

1) System log shall log the status of points within system.

2) Alarm summary shall log specified alarm points which are actually in alarm.

3) Off-normal summary shall log points specified by the operator to be in the off-normal mode.

4) Lockout summary shall log points specified to be in the lockout condition.

c. Messages:

1) The system shall support a minimum of 500 alarm messages in English as defined by the operator. Minimum message length shall be 256 alpha-numeric characters. Messages shall also indicate whether acknowledgement is necessary.

2) Alarm messages may be assignable to system messages.

d. Totalization:

1) The system shall allow for analog or digital point totalization with respect to time.

2) Run time totalization shall be provided to track the run time of point assigned. A summary shall list run time points and their present values.

3) Analog totalization shall be provided to measure analog data over real time span. A summary shall list analog totalization points and their current period values, current day values, previous period and previous day totalized values.

4) Provide one (1) customized totalization reports.

e. Scheduling:

1) The system shall be capable of initiating equipment based on a preselected time-of-day schedule. This program shall provide scheduling for seven days of the week with 500 unique schedules. The user shall not be required to enter control programs to alter time-of-day schedules.

2) Provisions shall be made to program in holidays up to one year in advance; up to 366 consecutive holidays shall be enterable.

f. On-Line Graphic Generation:

1) This program shall allow the operator to generate chromatic graphics on-line using symbols selected from a standard library of symbols.

2) Provide one (1) customized graphic with dynamic point values and set points for each system.

2. Energy Management Features: The following energy management programs shall reside in the host computer or global control purposes:

a. Demand limiting program shall monitor total demand at the on-site meter and reduce load, if possible, to maintain a fixed value.

b. Duty cycling program shall periodically turn selected loads off to reduce energy consumption. Ventilation systems shall not be shut down during occupied hours.

c. Optimal run time program shall control the start-up and shutdown of HVAC equipment based on the most energy efficient schedule. Ventilation systems shall not be shut down during occupied hours.

d. Programs shall be supervised by an energy management program which shall oversee the execution of global energy management functions. These programs may also reside in individual field panels on systems of this architecture. If the host is to act only in a supervisory mode, specific panels shall be assigned to global function duty.

2.9 AUXILIARY EQUIPMENT/DEVICES

A. Analog Sensors:

1. Space sensors: Monitoring range to suit application. Two-wire, thermistor based. Series TE200AD.

2. Liquid immersion temperature sensors: Monitoring range to suit application. Platinum wound RTD Type + 0.1% of range with well and spring loading device to assure RTD contact with end of sensing well. Factory calibration point as required. Adjustments for zero and span.

3. In lieu of the above specification the Contractor may use Precon Type ST-R3 thermistors which are compatible with system. Temperature sensors shall be accurate to 0.35°F over a range of -40° to 240°F and shall have a demonstrated stability of 0.2°F over a 15-year period.

4. Differential fluid pressure sensor: Pressure range to suit application. Accuracy of 1%. Maximum working pressure of 250 psig. Maximum differential and static pressure shall be 250% of rated range. Type 304 stainless steel construction. 100% solid state dual diffused piezoresistive silicon sensing elements compatible with all medusa encountered in HVAC applications. Factory calibrated and tested. Easily accessible adjustments for zero and span. 1/8 in. NPT pressure port connections. Input limiting capability by precisely clipping to transducer's output. Adjustable output averaging from 1 to 10 seconds. Provide an external regulated power supply.

a. Make: Setra #C230.

B. Static Pressure Transducers and Transmitters:

1. The sensors shall be a variable capacitance type, utilizing a stainless steel diaphragm and insulated electrode for positioning of the diaphragm. The sensor shall produce a linear 4 to 20 mA or 0-5 VDC with accuracies of 1% full scale in normal ambient temperature environments. Pressure ranges o to 0.1 in. w.g. through 0 to 25.0 in. w.g. The transmitter shall be temperature range of 40°F to 100°F, 0 to 95% RH. Overpressurization 10 in. w.g. up to ten times range. The transmitter shall have zero span adjustment capability, but shall be factory calibrated.

2.10 SURGE SUPPRESSION (SP) RECEPTACLE

A. Provide at operator workstation locations, a surge suppression receptacle with metal oxide varister to dissipate the electrical energy of voltage spikes. 20 ampere, duplex, NEMA 5-20R configuration. Back and side wiring, high impact nylon body.

B. Acceptable Make: Hubbell 5352-S.

PART 3 - EXECUTION

3.1 GENERAL SYSTEM REQUIREMENTS

A. The control of each system shall be guaranteed to perform as described in the Sequence of Operation Section of this specification. Equipment, remote switches, in finished rooms shall be flush-mounted, if possible. For existing buildings, install exposed wiring in finished areas inside "Wiremold". Interlock supply and return fans, condensers with air conditioning equipment and similar situations demanding coordinated operation.

B. Remove all pneumatic tubing and control devices. Remove air compressor station complete.

3.2 SYSTEM COMPONENTS

A. Valves: Union or flanged connected. Locate close to apparatus controlled with pipe reducers and increasers located closest to valve. Locate, arrange, and pipe per installation diagram.

B. Mounting height for all room thermostats or sensors shall be 48 in. to the top of the cover.

C. Locate thermostats on walls symmetrical with adjacent items. Verify exact room location to avoid doors, fixed and portable equipment. Install to minimize damage. Do not install adjacent to lighting dimmers or other heat generating equipment.

3.3 SYSTEM TESTING AND COMMISSIONING

A. At the time of installation, systems shall be tested for control device operation prior to the systems acceptance. A report of each systems performance shall be submitted to the Owner's Representative. The report shall include:

1. Field verification and demonstration checklist of analog input calibration, analog output operation, digital input function, and digital output operation.

2. Trend log of inputs and output, printed every two hours, for one week.

3. Refer to "Instructions and Adjustments".

PART 4 - SEQUENCE OF OPERATION

4.1 SYSTEM DESCRIPTION – GENERAL

A. Provide normally closed chilled water control valves.

B. Mode of operation (occupied/unoccupied) including building warm-up and pull-down cycles, as well as all system functions shall be programmable and controlled by the DDC system.

C. All setpoints shall be adjustable.

4.2 DUCTLESS SPLIT SYSTEM AIR CONDITIONING UNITS

A. Ductless split system units shall be controlled by their packaged micro-processor system.

B. The DDC system shall monitor space temperature and generate an alarm if space temperature rises above setpoint.

C. The DDC system shall enable/disable system.

4.3 CHILLED WATER SYSTEM

A. General Information:

1. The air-cooled chiller shall be controlled under its own unit mounted control panel to maintain chilled water set point.

2. The chiller and secondary chilled water pumps shall be wired N.C.

3. The chiller shall not operate until flow is proven via a flow switch.

B. Common Mode Control:

1. All alarms and alarm levels shall be generated at all operator interfaces.

2. Chilled water set points shall be local and fully adjustable from any interfaces. System shall be capable of chilled water reset.

3. Accumulate runtime on all pumps and chillers.

4. The building control system shall enable on or off the chillers.

C. Alarms:

1. Chiller pumps failure

2. Interface to stand alone controllers alarm points.

D. Chilled water system enable/disable:

1. The occupied period chiller enable setpoint shall initially be set for 70° F (adj.) outside air temperature.

2. Disable the chiller plant when the outside air temperature is below 70° F (adj.).

3. During unoccupied period, chilled water system shall be disabled.

E. Chiller Pump Control:

1. When the chiller is enabled, its associated pump shall start. When flow is proven via a flow switch, the chiller shall start.

2. If proof of flow is not proven, stop the pump, disable the chiller, enable the lag chiller, and generate an alarm at all operator interfaces.

3. Secondary pump(s) motor speed shall be increased/decreased by its respective variable frequency drive (VFD) based on a remote differential pressure sensor.

F. Building supply and return temperatures shall be monitored.

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SECTION 23 20 10 - PIPING SYSTEMS AND ACCESSORIES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

A. Anchors and guides. Provide detailed fabrication drawings for all field-fabricated anchors and intermediate structural elements.

B. Schedule of pipe materials, fittings and connections.

C. Pressed mechanical connection system.

PART 2 - PRODUCTS

2.1 GENERAL

A. Pipe and fittings shall be new, marked with manufacturer's name and comply with applicable ASTM and ANSI Standards.

B. All adhesives, sealants, primers and paint used for piping in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

2.2 STEEL PIPING AND FITTINGS

A. Pipe: ASTM A53, Schedule 40 weight or extra strong (Schedule 80; black or galvanized finish as called for; ends chamfered for welding connections.

B. Fittings: Same material and pressure class as adjoining pipe.

1. Welded Fittings: Factory forged, seamless construction, butt weld type, chamfered ends. Where branch connections are two or more sizes smaller than main size, use of "Weldolets", "Thredolets", or "Sockolets" are acceptable. Socket weld type, 2000 psi wp, where required.

2. Threaded Fittings: Cast or malleable iron, black or galvanized, as required; drainage type where called for.

C. Flanges, Unions and Couplings:

1. Threaded Connections:

a. Flanges: Cast iron companion type; for sizes 2-1/2 in. and larger.

b. Unions: Malleable iron, bronze to iron seat, 300 lb. wwp; for sizes 2 in. and smaller.

c. Couplings: Malleable iron, 150 or 300 lb. wwp, based on system pressure. Steel thread protectors are not acceptable as couplings.

2. Welded Connections:

a. Flanges: Welding neck type.

b. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents and working temperatures and pressures. ASME B16.21, nonmetallic, flat, asbestos free, 1/8 in. maximum thickness unless thickness or specific material is indicated.

c. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Gauge and Instrument Connections: Nipples and plugs for adapting gauges and instruments to piping system shall be IPS brass.

2.3 COPPER TUBE AND FITTINGS - SOLDER JOINT

A. Pipe: ASTM B88; Type K, L or M, hard temper. Soft temper only where specified. Plans show copper tube sizes.

B. Tees, Elbows, Reducers: Wrought copper, ANSI B16.22 or cast bronze; ANSI B16.18 solder end connections.

C. Unions and Flanges: 2 in. and smaller use unions, solder type, cast bronze, ground joint, 150 lb. swp: 2-1/2 in. and over use flanges, cast bronze, companion type, ASME drilled, solder connection, 150 lb. swp.

D. Solder Materials: No-lead solder, using alloys made from tin, copper, silver and nickel.

E. Make: Harris "Stay-Safe 50" and "Bright", Engelhard "Silverbright 100", Willard Industries "Solder Safe (silver bearing), Canfield "Watersafe" or approved equal.

2.4 COPPER TUBE AND FITTINGS - PRESS FITTINGS

A. Tubing Standard: Copper tubing shall conform to ASTM B75 or ASTM B88.

B. Fitting Standard: Copper fittings shall conform to ASME B16.18, ASME B16.22, or ASME B16.26.

C. Press Fitting: Copper press fittings shall conform to the material and sizing requirements of ASME B16.18 or ASME B16.22. O-rings for copper press fittings shall be EPDM.

D. Make: Viega, Pro-Press, Nibco, Tyco Grinnell, Elkhart Apolloxpress.

2.5 COPPER DRAINAGE TUBE AND FITTINGS - SOLDER JOINT

A. Pipe: ASTM B306, Type DWV, hard temper.

B. Fittings: Wrought copper, ANSI B16.29 or cast bronze, ANSI B16.23; solder end connections.

C. Solder Materials: No lead solder, using alloys made from tin, copper, silver and nickel.

D. Make: Harris "Stay-Safe 50" and "Bright", Engelhard "Silverbright 100", Canfield "Watersafe" or approved equal.

2.6 DIELECTRIC PIPE FITTINGS

A. Description: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.

B. Unions: Factory fabricated, for 250 psi minimum working pressure at 180°F, threaded or solder ends, insulating material suitable for system fluid, pressure and temperature.

C. Flanges: Factory-fabricated, companion-flange assembly, for 150 or 300 psig minimum pressure to suit system fluid pressures and temperatures with flange insulation kits and bolt sleeves.

D. Waterway Fittings: 300 psi maximum working pressure at 230°F, male threaded or grooved ends, electroplated ductile iron or steel body with LTHS high temperature polyolefin polymer liner.

E. Make: EPCO, Capitol Manufacturing, Watts, Victaulic, or approved equal.

F. The use of brass valves, brass nipples (3 in. and larger) and Shurjoint epoxy coated transition coupling IPS-CTS may be used for dielectric isolation. Dielectric transition fittings shall be Shurjoint Model DE30-GG for sizes 2 in. through 8 in., which shall provide effective insulation between the steel and copper systems to avoid galvanic local cell and stray current problems. The dielectric transition fitting shall be made of ductile iron per ASTM A536 Gr. 65-45-12, electric deposition coated, with a virgin PP (propylene) lining.

2.7 REFRIGERATION PIPING

A. Type L hard temper deoxidized, dehydrated, and sealed copper tubing, refrigerant grade.

B. Refrigerant grade wrought copper fittings. Long radius elbows.

C. Factory made suction traps, Melco Type PT.

D. Piping and system shall meet the requirements of Safety Code for Mechanical Refrigeration, ANSI/ASHRAE 15-1994 and ASME/ANSI B31.5.

E. Make: Mueller, Howell Metal, Cerro, Cambridge-Lee, Universal Tube.

2.8 HANGERS, INSERTS, AND SUPPORTS

A. Hangers, Inserts, Clamps: B-Line, Grinnell, Michigan Hanger, PHD Manufacturing, Anvil, Hilti.

B. Hangers:

1. Adjustable, wrought malleable iron or steel with electroplated zinc or cadmium finish. Copper plated or PVC coated where in contact with copper piping. Hot-dipped galvanized finish for exterior locations.

2. Adjustable ring type where piping is installed directly on hanger for piping 3 in. and smaller.

3. Adjustable steel clevis type for 4 in, and larger, and where insulation passes through hanger.

4. Hangers sized to permit passage of insulation through the hanger for chilled water, and refrigerant piping.

5. Nuts, washers and rods with electroplated zinc or cadmium finish. Hot-dipped galvanized finish for exterior locations.

C. Hanger Shields:

1. Pre-Insulated Type:

a. Insulated pipes shall be protected at point of support by a 360° insert of high density, 100 psi waterproof calcium silicate, encased in a 180° sheet metal shield. Insulation insert to be same thickness as adjoining pipe insulation and extend 1 in. beyond sheet metal shield. Insulation shall be provided with a factory installed ASJ.

2. Field-Insulated Type:

a. #18 USSG, galvanized steel shields, minimum 120° arc. Provide ICA-HAMFAB-BLOCK, 18# density molded fiberglass inserts, between pipe and hanger shield to maintain proper spacing for insulation. Insulation inserts shall extend 1 in. beyond the sheet metal shields. Material shall comply with ASTM E84 25/50, have a thermal conductivity of K=.30 (stable) and have a service temperature of -120°F to +650°F. Install in accordance with manufacturer's printed instructions.

3. Shield Sizing:

PIPE SIZE	SHIELD LENGTH	MINIMUM GAUGE
1/2 in. to 3-1/2 in.	9 in.	20
4 in.	9 in.	20
5 in. and 6 in.	9 in.	20

PIPE SIZE	SHIELD LENGTH	MINIMUM GAUGE
8 in. to 12 in.	12 in.	18
14 in. to 24 in.	18 in.	16

4. Hanger shield gauges listed are for use with band type hangers only. For point loading (roller support), increase shield thickness by one gauge, and length by 50%.

D. Spacing Schedule:

PIPE SIZE	STEEL	COPPER	ROD SIZE
3/4 to 1 in.	8 ft.	6 ft.	3/8 in.
1-1/4 to 2-1/2 in.	10 ft.	6 ft.	3/8 in.
3 to 4 in.	12 ft.	10 ft.	1/2 in.
5 and 8 in. and larger	12 ft.	10 ft.	3/4 in.

E. Inserts: Carbon steel body and square insert nut, galvanized finish, maximum loading 1,300 lbs., for 3/8 in. to 3/4 in. rod sizes. Drill through decking for hanger rods and secure devices with integral support plate strap with sheet metal screws. Devices shall have a safety factor of four.

F. Beam Attachments:

1. C-Clamp, locknut, electroplated finish, UL listed, FM approved, for pipe sizes 2 in. and smaller.

2. Center load style with clamp attachments that engage both edges of beam, electroplated finish, UL listed, FM approved, for pipe sizes larger than 2 in., refer to "Supports" for additional requirements.

3. Welded beam attachments may be considered only upon the review and acceptance of the structural engineer of record with written confirmation of weld meet configuration, location and service/pipe size submitted to the Mechanical Engineer for review.

G. Supports:

1. Provide intermediate structural steel members where required for hanger attachment. Secure member to structure. Select size of members based on a minimum factor of safety of four.

2. For Weights Under 1000 lbs.: Insert, "U" shaped channel, beam clamps or other structurally reviewed support. The factor of safety shall be at least four. Follow manufacturer's recommendations.

3. For Weights Above 1000 lbs.: Drill through floor slabs and provide flush plate welded to top of rod or provide additional inserts and hangers to reduce load per hanger below 1000 lbs.

4. Make: Hilti, ITW Ramset, Phillips "Red Head", or approved equal.

H. Trapeze Hangers:

1. For use on 1-1/2 in. and smaller piping only.

2. Hangers shall be supported with rod sized with a safety factor of four.

3. May be manufactured type "U" shaped channel, or suitable angle iron or channel. Round off all sharp edges.

4. Securely fasten piping to trapeze with "U" bolt or straps, dissimilar metals shall not touch, use isolation gaskets.

5. Make: B-Line, Kindorf, Unistrut, or approved equal.

2.9 PIPING ACCESSORIES

A. Escutcheon Plates: Provide escutcheon plates on uninsulated piping in exposed and finished areas. Steel or cast brass polished chrome, split hinge type with setscrew, high plates where required for extended sleeves.

B. Pipe Guides: Cylindrical steel guide sleeve, proper length for travel, integral bottom base anchor, top half removable. Split steel spider to bolt to pipe, copper plated spider for copper pipe. Insulated style where pipe is required to be insulated. Make: Tri-State Industries, or equal.

2.10 SLEEVES

A. Pre-Insulated Type:

1. Adjustable or fixed length metal cans, 24 gauge minimum sized for 1 in. spacing between insulation and can. Insulation shall consist of a 360° waterproofed calcium silicate insert sized to extend 1 in. beyond wall or floor penetration. Calcium silicate insert shall be the same thickness as adjoining pipe insulation. Spacing between shield and can packed at each end with double neoprene rope positively fastened.

2.11 PIPING MATERIALS AND SCHEDULE

A. See Exhibit "A", "Schedule of Piping Materials" at end of this Section for (HVAC) piping.

PART 3 - EXECUTION

3.1 EQUIPMENT AND SYSTEMS

A. Equipment and systems in accordance with laws, codes, and provisions of each applicable section of these specifications. Accurately establish grade and elevation of piping before setting sleeves. Install piping without springing or forcing (except where specifically called for), making proper allowance for expansion and anchoring. Arrange piping at equipment with necessary offsets, union, flanges, and valves, to allow for easy part removal and maintenance. Offset piping and change elevation as required to coordinate with other work. Avoid contact with other mechanical or electrical systems. Provide adequate means of draining and venting units, risers, circuits and systems. Install drains consisting of a tee fitting with a 3/4 inch ball valve with hose end cap and chain, at low points in hydronic piping system mains, and elsewhere as required for system drainage.

B. Conceal piping unless otherwise called for. Copper tubing shall be cut with a wheeled tubing cutter or other approved copper tubing cutter tool. The tubing must be cut square to permit proper joining with the fittings. Ream pipes after cutting and clean before installing. Cap or plug equipment and pipe openings during construction. Install piping parallel with lines of building, properly spaced to provide clearance for insulation. Make changes in direction and branch connections with fittings unless submitted and accepted per Part 2. Do not install valves, union and flanges in inaccessible locations. Provide trap seal of adequate depth on drain pans.

C. Provide reducers at all control valves, where control valve is smaller than pipeline size. Reducers for steam control valves shall be eccentric type. Provide unions at each side of every control valve and reducers directly adjacent to the unions.

D. Provide reducers at all balance valves, where balance valve is smaller than pipeline size.

3.2 PIPING OVER ELECTRICAL EQUIPMENT

A. Contractor shall route piping to avoid installation directly over electric equipment, including, but not limited to panels, transformers, disconnects, starters, motor control center, adjustable speed drives and fused switches.

B. Piping shall not be installed in the dedicated electric and working space as defined by NEC 110. Dedicated electrical space is generally equal to the depth and width of electrical equipment, and extends 6 ft. above the electrical equipment, or to a structural ceiling. Dedicated working space is a minimum of 30 in. wide or the width of equipment (whichever is larger) a minimum of 6 ft.-6 in. tall, with a depth of 3ft. to 9 ft. depending on the voltage.

3.3 WATER AND GLYCOL SYSTEMS

A. Top connection for upfeed, bottom or side connection for downfeed. Grade off level; up in direction of flow and down toward drain.

3.4 REFRIGERATION PIPING

A. Fittings brazed with silver brazing alloy. Guarantee refrigerant charge for one year from date of final acceptance. Provide for flexibility at compressor connections. Piping and system shall meet the requirements of Mechanical Refrigeration Safety Code, ANSI B9.1. Clean piping, then pump-down and evacuate system to 0.1 in. VAC break vacuum with dry nitrogen and re-evacuate to 0.1 in. VAC and hold for four (4) hours; then charge system. Charge with refrigerant as recommended by manufacturer.

3.5 HANGERS, INSERTS AND SUPPORTS

A. Piping shall not be supported by wires, band iron, chains, or from other piping. Support each pipe with individual hangers from concrete inserts, welded supports, or beam clamps of proper configuration and point loading design requirements for each location including the designated safety factor. Trapeze hangers are acceptable for racking of multiple pipes of 1-1/2 in. or less in size. Follow manufacturer's safe loading recommendations. Suspend with rods of sufficient length for swing and of size as called for, using four nuts per rod. Provide additional rustproofed structural steel members, where required for proper support. Provide oversized hangers where insulation/supports must pass between pipe and hanger. Only concentric type hangers are permissible on piping larger than 2-1/2 in., "C" types are permitted for piping 2-1/2 in. and smaller. Provide riser clamps for each riser at each floor.

3.6 HANGERS ATTACHED TO JOISTS

A. Individual hangers may be suspended directly from the bottom chord panel point provided that the sum of the concentrated loads within the chord panel does not exceed 100 pounds and the attachments are concentric to the chord. (Eccentrically loaded joists using beam clamps or other attachment methods are not acceptable.)

B. For nominal concentrated loads between panel chords, which have been accounted for in the specified uniform design load for the joists, this Contractor is to provide struts to transfer the load to a panel point on the opposite chord as reviewed and acceptable by the Structural Engineer of Record.

3.7 PIPE CONNECTIONS

A. Solder Connections: Nonacid flux and clean off excess flux and solder.

B. Press Connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool approved by the manufacturer.

C. Threaded Connections: Clean out tapering threads, made up with pipe dope; screwed until tight connection. Pipe dope must be specific for each application.

D. Flanged Joints: Select appropriate gasket material, size, type and thickness for service applications. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

E. Dielectric Pipe Fittings: Provide dielectric protection devices at ALL equipment connections where dissimilar metals meet. In addition, provide dielectric unions in all open type piping systems (condensing water, domestic water, etc.) where dissimilar metals are to be joined. Dielectric protection devices are not required in typical closed systems such as heating water, chilled water, heat pump loop, etc. except for the equipment connections. Dielectric protection systems are not required for air or gas systems.

3.8 WELDING

A. Welding shall be performed in compliance with the welding procedure specifications prepared by the National Certified Pipe Welding Bureau. Welded pipe fabricated by certified welder. Contractor shall submit proof of current certification of each welder if requested by Owner. Use full-length pipe where possible; minimum distance between welds, 18 in. on straight runs. Welds must be at least full thickness of pipe inside smooth and remove cutting beads, slag and excess material at joints; chamfer ends. Minimum gap 1/8 in., maximum 1/4 in., for butt welds. One internal pass and one external pass minimum required on slip-on flanges. Do not apply heat to rectify distorted pipe due to concentrated welding; replace distorted pipe. Welding is prohibited in existing building, except in following areas: Boiler Rooms, Mechanical Rooms, Crawl Spaces. When welding galvanized pipe, apply cold galvanizing on joint after welding.

3.9 HANGER SHIELDS

A. Provide at hangers for chilled water and refrigerant piping. Pre-insulated type or field-insulated type at Contractor's option.

3.10 SLEEVES

A. Provide for pipes passing through floors, walls or ceilings. Not required for floors which are core-drilled, except where floor is waterproofed.

B. Pre-Insulated Type: Required for chilled water and refrigerant piping.

C. Extend 1/8 in. above finished areas. In above grade mechanical and other areas with floor drains; use steel pipe sleeves 2 in. above floor. Use pipe sleeves in bearing walls, structural slabs, beams and other structural surfaces, and where called for. Sleeves shall be as small as practical, consistent with insulation, so as to preserve fire rating. Fill abandoned sleeves with concrete. Provide rubber grommet seals for pipes passing through ducts or air chambers or built-up housings.

3.11 SLEEVE PACKING

A. Seal void space at sleeves as follows:

1. Interior Locations: Firmly pack with fiberglass and caulk.

2. Exterior Walls and Below Grade Cored Holes: Use sealing element.

3. Waterproofed Walls and Floors: Use waterproof sealing element, device, or compound.

3.12 CLEANING CHILLED WATER AND GLYCOL SYSTEMS

A. Provide the services of an experienced Water Treatment Subcontractor.

B. After each closed system has been tested and thoroughly flushed, the entire piping system shall be cleaned by, or as per, the Water Treatment Subcontractor.

C. Operate pumps and arrange control system so that all control valves are open. Fill, vent and circulate system with this solution, while rising to design temperature.

D. Remove, clean and/or replace air vents, strainers, and check valves, which do not function properly. After cleaning strainers, circulate for additional time, then clean strainers again; repeat until strainers are found clean. Drain and refill system.

E. Provide a batch chemical feed tank, valving and accessories as shown in the Contract Documents. Add water treatment as necessary to prevent deterioration of piping systems and equipment due to oxygen, acid, scaling, etc. Submit typewritten letter to inform Owner's Representative upon completion of the work.

F. Pumps shall not be operated continuously until system is flushed, strainers cleaned and water treatment is complete.

G. Water Treatment:

1. After system cleaning, furnish report of water test to determine quality.

2. Provide complete water treatment facilities to Owner, including water analysis, feed equipment, metering equipment, pumps, and chemical, obtained from Calgon, Vulcan, Bird Archer, Heating Economy Service, Inc., Mogul, Garratt-Callahan Company, Metropolitan, or Allen-Murray.

3. Recommendations for water treatment reviewed by Owner's Representative before systems are placed into service.

4. Add water treatment as necessary to prevent deterioration of piping system and equipment due to oxygen, acid, scaling, etc.

5. Water treatments shall be deemed complete when circulation has been established throughout, and water runs clear and clean from deposits and discoloration. Submit typewritten letter to inform Owner's Representative upon completion of the Work.

3.13 TESTS

A. Test piping and accessories before insulation, connection to existing piping or concealment. Repeat as many times as necessary to prove tight system. Notify Owner's Representative at least seven days in advance of each test. Isolate valves and equipment not capable of withstanding test pressures. Make leaks tight; no caulking permitted. Remove and replace defective fittings, pipe or connections. Furnish necessary pumps, gauges, equipment, piping, valving, power and labor for testing. Certify that tests have been successfully completed.

B. Schedule of Test Requirements:

1. Chilled, Glycol Water: Hydrostatic, 100 psig at high point of system; two (2) hours duration.

2. Refrigeration:

a. After installation, charge system with dry nitrogen to manufacturer's recommended pressure.

b. System shall hold this charge with no pressure drop for 24 hours.

3. Test: No change in pressure under stable temperature conditions.

4. Equipment: Test at working pressures.

3.14 PIPE LINE SIZING

A. Pipe sizes called for are to be maintained. Pipe sizing changes made only as reviewed by Owner's Representative. Where discrepancy in size occurs, the larger size shall be provided.

EXHIBIT "A" - PIPING MATERIALS (HVAC)

SERVICE	PIPE MATERIALS	FITTINGS	CONNECTIONS
Hot water heating (optional)	Type L copper	Wrought copper or cast bronze, solder end	No-lead solder for 2 in. and smaller; 95/5 for 2-1/2 in. and larger
Hot water heating (optional)	Type L copper	Wrought copper or cast bronze	Viega Pro-Press, Nibco Press, Elkhart Apolloxpress
Glycol Chilled water	Schedule 40, black steel	Butt weld and malleable iron	2-1/2 in. and larger welded or flanged; 2 in. and smaller screwed
Glycol chilled water (optional)	Type L copper	Wrought copper or cast bronze solder end	No-lead solder for 2 in. and smaller 95/5 for 2-1/2 in. and larger
Glycol chilled water (optional)	Type L copper	Wrought copper or cast bronze	Viega Pro-Press, Nibco Press, Elkhart Apolloxpress
Refrigerant	Type L refrigerant grade hard temper, deoxidized copper	Wrought copper, solder end	Sil-Flo "5" silver brazing
Gas	Schedule 40, black steel	Malleable iron, 2 in. and smaller	Threaded
Vent, overflow, drain	Type M copper	wrought copper	solder

END OF SECTION 23 20 10

SECTION 23 21 10 - WATER SYSTEMS SPECIALTIES

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

A. Submit shop drawings on water system specialties.

1.3 GENERAL REQUIREMENTS

A. Equipment and accessories shall be rated for a minimum of 125 psi wwp, and 250°F temperatures. Manufacturer's written installation procedures shall become a part of these specifications.

PART 2 - PRODUCTS

2.1 AIR SEPARATOR

A. The air separator shall have an internal stainless steel air collector tube with 5/32 in. diameter perforations and 63% open area designed to direct accumulated air to the compression tank or air vent via an NPT vent connection at top of unit.

B. The air separator shall have a removable galvanized steel system strainer with 3/16 in. diameter perforations and a free area of not less than five times the cross-sectional area of the connecting pipe. The strainer shall be located at the bottom of the vessel to reduce floor space required for strainer removal.

C. A blowdown connection shall be provided to facilitate routine cleaning of the strainer and the separator.

D. Vessel shell diameter to be three times the nominal inlet/outlet pipe diameter, with a minimum vessel volume for sufficient velocity reduction. The air separator must be designed, constructed and stamped for 125 psig at 350°F in accordance with Section VIII, Division 1 of the ASME Boiler and Pressure Vessel Code, and registered with the National Board of Boiler and Pressure Vessel Inspectors. The air separator(s) shall be painted with one (1) shop coat of air dry enamel.

E. A manufacturer's Data Report for Pressure Vessels, Form U-1 as required by the provisions of the ASME Boiler and Pressure Vessel Code, shall be furnished for each air separator upon request.

F. The air separator shall be sized for a maximum pressure drop of 2 ft. wg. at full system flow rate, but the inlet air outlets sizes shall not be smaller than the line size as shown on drawings.

G. Designer Equipment: Taco.

H. Manufacturer: Armstrong, Bell & Gossett, Taco.

2.2 PRESSURIZED EXPANSION TANKS AND ACCESSORIES

A. Steel tanks, 125 psi wwp, ASME construction, with reinforced opening of size and location as required. Red oxide coating outside and final exterior coat of paint; factory applied. Heavy duty butyl rubber removable bladder. Full acceptance vessel. Maximum operating temperature of 240°F. Provide ring stand.

B. Design Equipment: Taco.

C. Manufacturers: Armstrong, Bell & Gossett, Taco.

2.3 MAKE-UP WATER VALVES

A. Bronze body, stainless steel rim, gauge tapping on outlet side. Adjustable Range: 25 to 75 psi.

B. Manufacturers: Watts No. U5.

2.4 RELIEF VALVES

A. To relieve full heating capacity.

B. Provide an ASME labeled safety relief valve as called for on the plans/details.

C. Manufacturer: ITT, Bell & Gossett.

2.5 FLOW BALANCERS

A. Balancing and flow meter stations suitable for use on heating and cooling systems. Constructed for 125 psi and 250°F.

B. 6 in. and Smaller: Calibrated balance valve with provisions for connecting a portable differential pressure meter. Flow balancer is to be suitable as a service valve. Meter connections to have built-in check valves. An integral pointer shall register degree of valve openings. Valve shall have internal seals.

1. Balance valve sizes shall be based upon gpm range rather than pipe size.

Balance Valve Size	GPM Range
1/2 in.	Up to 2.5
3/4 in.	2.5 - 4.5
1 in.	4.5 - 10
1-1/4 in.	10 - 15
1-1/2 in.	15 - 30
2 in.	30 - 60

Balance Valve Size	GPM Range
2-1/2 in.	60 - 100
3 in.	100 - 180
4 in.	180 - 300
5 in.	300 - 450
6 in.	450 - 600

2. Design Equipment: Taco.

3. Manufacturers: Bell & Gossett, Armstrong, Taco, Tour & Anderson, Oventrop Hydrocontrol.

2.6 STRAINERS

A. Cast semi-steel body or cast iron construction for steel piping and bronze body construction for copper piping; equipped with removable, monel or stainless steel water screen; maximum pressure drop 2 psi with free area at least four times area of pipe. Provided with blow-off outlet.

B. Sizes 5 in. and Smaller, Y-Pattern Strainer: 125 psig working pressure; flanged ends for NPS 2-1/2 in. and larger, threaded connections for NPS 2 in. and smaller, bolted cover, perforated stainless steel basket and bottom drain connection.

C. Design Equipment: Mueller.

D. Manufacturers: Elliott, Illinois, Keckley, Mueller, Webster, Victaulic, Watts, Spirax-Sarco.

2.7 AIR VENTS

A. Manual air vents shall be a 3/4 in. ball valve with bronze body, nickel plated bronze ball, hose end, cap and chain, Watts B6000CC.

B. Automatic air vents shall be float type, 35 psig rated, Armstrong No. 502CV OR float type, 150 psig rated, Armstrong No. 75. Provide unit with an appropriate rating, as necessary for location.

C. High Capacity Automatic Air Vent:

1. Cast iron body. 300 psig rated. Stainless steel float.

2.8 GLYCOL MAKE-UP SYSTEM

A. Provide the following apparatus including all external piping and wiring:

1. One (1) fifty gallon polyethylene solution tank, with cover, mounted in a welded steel frame. Frame shall be furnished with an epoxy coating to resist chemical attack.

2. One (1) close coupled pump, rotary gear type, bronze construction with stainless steel shaft, internal pressure relief valve. Motor shall be 1/2 HP, 115 VAC, 60 Hz at 1,725 RPM. Pump shall be capable of delivering 1.7 GPM at 70 psi. Pump to be mounted under the tank and pre-piped at the factory.

3. One (1) low level cut-off and alarm shall be mounted on the tank.

B. One (1) pressure switch to activate glycol pump on descending pressure. Pressure switch shall be 5-65 psi range with an adjustable differential of 10-30 psi.

C. Manufacturers: Wessels Series GMP, or equal.

2.9 GLYCOL SOLUTION

A. The closed loop system shall contain a preblended solution of industrially inhibited propylene glycol and deionized water. The solution concentration shall be 35% by volume providing slush protection to approximately 0°F, and burst protection to approximately -40°F.

B. Automotive grade antifreeze is not acceptable.

C. The water used for the dilution of the glycol must meet the following water quality criteria: <25 ppm Sulfate; <25 ppm Chloride; <1 ppm Calcium; <1 ppm magnesium; <25 ppm Silica. Electrical conductivity umho/cm @ 25 C. 1.0 max. Total water hardness must be less than 60 ppm and meet the Type II Reagent Water Specification as per ASTM D-1193.

D. The selected coolant must meet or exceed the ASTM D-1384 corrosion test for coolants in glassware @ 190°F for 336 hours. The supplier prior to delivery must provide a Certificate of Assurance.

E. The solution shall contain a fluorescent dye to facilitate easy leak detection.

F. Approved Coolant Manufacturers are:

1. Interstate Chemical Company INTERCOOL NFP - Propylene Glycol.

2. Dow Chemical Company Dowfrost HD - Propylene Glycol.

3. Interstate Chemical Company INTERCOOL NFP-50 AA and NFP-40 AA (For boilers and other equipment with aluminum alloy heat exchangers).

2.10 CHEMICAL POT FEEDER

A. 5 gallon carbon steel body, domed bottom, powder coated finish, rated for 320 psi at 250°F.

B. Funnel kit with sealed safety bar closure cap rated for design pressure. Furnish with pedestal mounted legs. Provide site glass with damage guard and associated isolation valves. Provide air vent with air release valve.

C. Design make: Griswold.

D. Makes: Griswold, Neptune, Wessels.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. Obtain detailed instructions from each manufacturer for proper method of installation.

3.2 SYSTEM FILLING

A. After cleaning, fill each system from low point.

B. With pumps off, vent mains, risers, run-outs, and units, working consecutively from low to high point of building. Obtain approximately 2 psi at highest point. Obtain proper air cushion in compression/expansion tanks.

3.3 AIR VENTING

A. Provide where specifically called for in piping details and at all points in piping systems where air may collect due to changes in piping elevation.

1. Manual air vent assembly consisting of 1-1/4 in. x 4 in. air collection chamber with 3/4 in. hose end ball valve with cap and chain.

2. Automatic air vent with a ball valve for the purpose of isolation and service or replacement.

3. Unless otherwise indicated, automatic air vents shall only be installed in Mechanical Rooms. Pipe high capacity air vent discharge down to floor.

B. Equipment Vents:

1. When equipment is above mains: Connect run-outs or risers to upper quadrant or top of mains. Install vent assembly concealed within enclosure, consisting of 1 in. diameter by 4 in. to 6 in. long air collection chamber with 1/4 in. soft copper tube to manual valve. Mount securely near bottom of enclosure, but not fastened to enclosure. For individual units, radiators, fan convectors and units with return grilled: Provide screwdriver operated manual valve, operated from discharge grille or access door. Drill enclosure and position valve for operating without removing enclosure.

2. When equipment is below mains: Connect piping run-outs or risers to bottom or lower quadrant of mains. Vent assembly not required in unit. Provide means of purging and draining each unit if required. Use tees instead of ells at low point of run-outs.

3.4 AIR SEPARATOR

A. Provide supports and provide blow-down with hose end drain valve. Hang unit from structure at an elevation low enough to allow for upward pitch of piping to compression tank.

3.5 MAKE-UP WATER VALVES

A. Provide for each system, with 3/4 in. globe valve bypass connection, and check valve downstream of bypass connection. Set valves to provide 2 psi at high point of system. Provide pressure gauge assembly.

3.6 RELIEF VALVES

A. Hot Water System: Pipe discharge to floor drain and place hanger at elbow. Install piping so as not to introduce stress of PRV body.

3.7 STRAINERS

A. Install strainers on supply side of each control valve, pressure reducing valve, solenoid valve, in-line pump and elsewhere as indicated. Install NPS 3/4 in. nipple and ball valve in blowdown connection of strainers NPS 2 in. and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 in.

3.8 FLOW BALANCERS

A. Where flow balancers are smaller than pipe line size, provide reducers directly adjacent to flow balancers.

B. Provide on zone or riser returns, on each hydronic unit and where called for. Meter connection points shall not point downward.

C. On terminal heating and cooling unit details where a shut-off valve is shown in conjunction with the flow balancer (3 in. and smaller), if the Armstrong "CBV" or Tour & Anderson "ST" is used, the shut-off valve may be deleted. This does not apply to AHU coils, pumps, heat exchangers, boilers or chillers.

3.9 GLYCOL MAKE-UP SYSTEM

A. Set unit on a 6 in. concrete pad.

B. Pipe all relief valves to solution tank.

C. Install pressure switch in system main piping. Wire switch such that it activates pump when system pressure drops.

D. Fill tank prior to turn-over to Owner.

3.10 GLYCOL SOLUTION

A. The Coolant Manufacturer shall analyze the fluid two (2) times during the warranty period to ensure the glycol water solution continues to provide corrosion protection within industry standards and at no cost to the Owner.

B. No chemical additions shall be made to the glycol water solution until the Coolant Manufacturer has completed an analysis. Should such a chemical addition be required, it will be done in accordance with the recommendations on the analyticals as supplied by the manufacturer.

C. The Mechanical Contractor shall meter the initial water fill for the purpose of hydrostatic pressure testing and/or system flushing. After completion of this requirement, the water shall be metered out. This will provide the contractor with a precise measure of coolant required to fill the system as well as the amount of water trapped in the system. This process will allow for any adjustments required prior to delivery of the premixed glycol solution and ensure that the solution strength is in compliance with the specification.

D. Should the concentration still require adjustment after the system has been filled and as a result of trapped water, then drain the required amount of fluid from the system and replace it with the same manufacturer's coolant in its concentrated form. Repeat this process until compliance with this specification is achieved.

END OF SECTION 23 21 10

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SECTION 23 21 23 - PUMPS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide labor, materials, equipment and services as required, for the complete installation designed in Contract Documents.

1.2 SUBMITTALS TO THE ARCHITECT/ENGINEER

A. Shop drawings and performance curves, on pumps and pump accessories clearly indicate which equipment is being submitted.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Pumps shall be non-overloading over their entire performance range with motors capable of running continuously without undue noise, heating, or sparking. Impellers statically and dynamically balanced. Mechanical seals for closed systems, shall be constructed of carbon rings with ceramic mating seat up to 220°F. Packing type seals for open systems only. Materials suitable for water pressures, temperature and conditions for each application. Tapped discharges and suction connections for gauges vent and drain. With trimmed impeller if required to meet initial delivery requirements. Factory service engineer or machinist must check each pump alignment before pump is started. Include the cost of checking and start-up in pump quotation.

2.2 IN-LINE CENTRIFUGAL PUMPS

A. Designed for continuous operation between 40° and 225°F. In-line, close-coupled, single stage, bronze fitted construction. All pump internals shall be capable of being serviced without disturbing piping connections. Replaceable shaft sleeves at the seal or packing. Enclosed type impeller, keyed to the shaft and secured by a locking capscrew. Factory guaranteed operating performance. Pumps used in a variable speed pumping system shall contain couplings suitable for very low and intermittent torque loads.

B. Design Equipment: Taco.

C. Make: Armstrong, Bell & Gossett, Taco.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Adjust gpm of each pump to capacity called for on schedule, readjust during balancing. Install in-line pumps in locations shown, supported independently of piping using hangers on both pump flanges.

END OF SECTION 23 21 23

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SECTION 23 64 26.20 - AIR COOLED SCROLL COMPRESSOR PACKAGED CHILLER

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide all materials, equipment and services as described in the Contract Documents.

1.2 SUBMITTALS

A. ARI certified part load performance data for 100%, 75%, 50% and 25% load.

B. Dimensional data and weights of all sections.

C. Product Data: Submit manufacturer's technical product data, including rated capacities of selected model clearly indicated, sound data, weights (shipping, installed, and operating), furnished specialties and accessories; and installation and start-up instructions.

D. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weight loadings, required clearances, and methods of assembly of components.

E. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply to units. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed and wiring by others.

F. Clearly identify all equipment and accessories included in quotation, as well as any Scope of Work excluded. List and identify any Scope of Work required of other companies.

1.3 START-UP AND INSTALLATION DATA

A. Manufacturer of refrigeration machine responsible for:

1. Furnishing complete installation drawings, templates, wiring diagrams, refrigerant piping diagrams, and instruction manuals for the equipment.

2. Submitting drawings either made especially for this job or distinctly modified for same; errors resulting from use of standard factory drawings, responsibility of this Manufacturer.

3. Supervising and checking installation for compliance with manufacturer's recommendations.

4. Checking out machines and actual start-up of same.

5. Advising and assisting Contractor in making final adjustments, i.e.:

a. Regulating flow of chilled water, sizing of refrigerant piping, etc.

b. To provide for proper balance and most economical operation, such as setting operating controls and setting and checking safety.

6. Providing five (5) year parts and labor warranty. This coverage will not exceed five (5) years from start up or five (5) years and six (6) months from shipment, whichever occurs first.

7. Furnishing Engineers log of results, all balancing and adjusting for various load conditions, including pressures, temperatures, flow quantities, etc.

8. Furnishing Contractor and Engineer with exact location and arrangement of all piping thermostats, flow switches, gauges, thermometers, insertion wells, etc., required.

9. Thoroughly instructing Owner's operating, personnel in proper operation of equipment.

1.4 GENERAL REQUIREMENTS

A. Completely factory assembled, wired and tested prior to shipment. Include initial charge of lubricating oil.

B. Chillers shall shut down for low oil pressure, condenser high pressure, chilled water low temperature, motor overload.

C. Chillers shall be provided with motor-driven elapsed time meters to indicate machine operating hours.

D. Chiller performance shall be in ARI certified in accordance with Standard 550-88 for the conditions scheduled.

E. Chiller shall comply with the requirements of ASHRAE Standard 15 - Safety Code for Mechanical Refrigeration.

PART 2 - PRODUCTS

2.1 UNIT DESCRIPTION

A. Provide and install as shown on the plans factory-assembled, factory-charged air-cooled scroll compressor packaged chillers in the quantity specified. Each chiller shall consist of hermetic tandem scroll compressor sets (total four compressors), brazed plate evaporator, air-cooled condenser section, microprocessor-based control system and all components necessary for controlled unit operation.

B. Chiller shall be functionally tested at the factory to ensure trouble free field operation

2.2 DESIGN REQUIREMENTS

A. Flow Range: The chiller shall have the ability to support variable flow range down to 40% of nominal design (based on AHRI conditions).

B. Operating Range: The chiller shall have the ability to control leaving chilled fluid temperature from 15F to 65F.

C. General: Provide a complete scroll compressor packaged chiller as specified herein and as shown on the drawings. The unit shall be in accordance with the standards referenced in section 1.02 and any local codes in effect.

D. Performance: Refer to the schedule of performance on the drawings. The chiller shall be capable of stable operation to a minimum percentage of full load (without hot gas bypass) of 25%. Performance shall be in accordance with AHRI Standard 550/590.

E. Acoustics: Sound pressure levels for the unit shall not exceed the following specified levels. All manufacturers shall provide the necessary sound treatment (parts and labor) to meet these levels if required. Sound data shall be provided with the quotation. Test shall be in accordance with AHRI Standard 370.

F.

Sound (with insulation)											
Type of Sound Insulation:	Low Noise (Sound Reduction Compressor Blankets)										
Sound Pressure (*at 30 feet*)											
63 Hz dB	**125 Hz** dB	**250 Hz** dB	**500 Hz** dB	**1 kHz** dB	**2 kHz** dB	**4 kHz** dB	**8 kHz** dB	**Overall** dBA	**75% Load** dBA	**50% Load** dBA	**25% Load** dBA
58	58	58	59	53	50	48	43	**60**	59	57	56
Sound Power											
63 Hz dB	**125 Hz** dB	**250 Hz** dB	**500 Hz** dB	**1 kHz** dB	**2 kHz** dB	**4 kHz** dB	**8 kHz** dB	**Overall** dBA	**75% Load** dBA	**50% Load** dBA	**25% Load** dBA
85	85	85	86	80	77	75	70	**87**	86	84	83
Octave band is non 'A' weighted and overall readings are 'A' weighted. Sound data rated in accordance with AHRI Standard-370.											

2.3 CHILLER COMPONENTS

A. Compressor:

1. The compressors shall be sealed hermetic, scroll type with crankcase oil heater and suction strainer. The compressor motor shall be refrigerant gas cooled, high torque, hermetic induction type, two-pole, with inherent thermal protection on all three phases and shall be mounted on RIS vibration isolator pads. The compressors shall be equipped with an internal module providing compressor protection and communication capability.

B. Evaporator:

1. The evaporator shall be a compact, high efficiency, dual circuit, brazed plate-to-plate type heat exchanger consisting of parallel stainless steel plates. The water-side working pressure shall be a minimum of 653 psig. Vent and drain connections shall be provided in the inlet and outlet chilled water piping by the installing contractor. Evaporators shall be designed and constructed according to, and listed by, Underwriters Laboratories (UL).

2. The evaporator shall be protected with an external, electric resistance heater plate and insulated with 3/4" thick closed-cell polyurethane insulation. This combination shall provide freeze protection down to -20°F ambient air temperature.

3. The water-side maximum design pressure shall be rated at a minimum of 653 psig. Evaporators shall be designed and constructed according to, and listed by Underwriters Laboratories (UL).

C. Condenser

1. Condenser fans shall be propeller type arranged for vertical air discharge and individually driven by direct-drive fan motors. The fans shall be equipped with a heavy-gauge vinyl-coated fan guard. Fan motors shall be TEAO type with permanently lubricated ball bearings, inherent overload protection, three-phase, direct-drive, 1140 rpm. Each fan section shall be partitioned to avoid cross circulation.

2. Coil shall be microchannel design and shall have a series of flat tubes containing multiple, parallel flow microchannels layered between the refrigerant manifolds. Tubes shall be 9153 aluminum alloy. Tubes made of 3102 alloy or other alloys of lower corrosion resistance shall not be accepted. Coils shall consist of a two-pass arrangement. Each condenser coil shall be factory leak tested with high-pressure air under water. Coils shall withstand 1000+ hour acidified synthetic sea water fog (SWAAT) test (ASTM G85-02) at 120°F (49°C) with 0% fin loss and develop no leaks.

D. Refrigerant Circuit

1. Each of the two refrigerant circuits shall include a replaceable-core refrigerant filter-drier, sight glass with moisture indicator, liquid line solenoid valve (no exceptions), expansion valve, and insulated suction line.

E. Construction

1. Unit casing and all structural members and rails shall be fabricated of pre-painted or galvanized steel. Painted parts shall be able to meet ASTM B117, 1000-hour salt spray test.

2. Upper condenser coil and base section of unit shall have protective, 12 GA, PVC-coated, wire grille guards and have painted steel wraps enclosing the coil end sections and piping.

F. Control System

1. A centrally located weatherproof control panel shall contain the field power connection points, control interlock terminals, and control system. Box shall be designed in accordance with NEMA 3R rating. Power and starting components shall include factory circuit breaker for fan motors and control circuit, individual contactors for each fan motor, solid-state compressor three-phase motor overload protection, inherent fan motor overload protection and two power blocks (one per circuit) for connection to remote, contractor supplied disconnect switches. Hinged access doors shall be lockable. Barrier panels or separate enclosures are required to protect against accidental contact with line voltage when accessing the control system.

2. Shall include optional single-point connection to a non-fused disconnect switch with through-the-door handle and compressor circuit breakers.

G. Unit Controller

1. An advanced DDC microprocessor unit controller with a 5-line by 22-character liquid crystal display provides the operating and protection functions. The controller shall take preemptive limiting action in case of high discharge pressure or low evaporator pressure. The controller shall contain the following features as a minimum:

2. The unit shall be protected in two ways: (1) by alarms that shut the unit down and require manual reset to restore unit operation and (2) by limit alarms that reduce unit operation in response to some out-of-limit condition. Shut down alarms shall activate an alarm signal.

3. Shutdown Alarms

a. No evaporator water flow (auto-restart)

b. Sensor failures

c. Low evaporator pressure

d. Evaporator freeze protection

e. High condenser pressure

f. Outside ambient temperature (auto-restart)

g. Motor protection system

h. Phase voltage protection (Optional)

4. Limit Alarms

a. Condenser pressure stage down, unloads unit at high discharge pressures.

b. Low ambient lockout, shuts off unit at low ambient temperatures.

c. Low evaporator pressure hold, holds stage #1 until pressure rises.

d. Low evaporator pressure unload, shuts off one compressor.

5. Unit Enable Section

a. Enables unit operation from either local keypad, digital input, or BAS

6. Unit Mode Selection

a. Selects standard cooling, ice, glycol, or test operation mode

7. Analog Inputs:

a. Reset of leaving water temperature, 4-20 mA\

b. Current Limit

8. Digital Inputs

a. Unit off switch

b. Remote start/stop

c. Flow switch

d. Ice mode switch, converts operation and setpoints for ice production

e. Motor protection

9. Digital Outputs

a. Shutdown alarm; field wired, activates on an alarm condition, off when alarm is cleared

b. Evaporator pump; field wired, starts pump when unit is set to start

10. Condenser fan control - The unit controller shall provide control of condenser fans based on compressor discharge pressure.

11. Building Automation System (BAS) Interface

a. Factory mounted DDC controller(s) shall support operation on a BACnet®, Modbus® or LONMARK ® network via one of the data link / physical layers listed below as specified by the successful Building Automation System (BAS) supplier.

b. BACnet MS/TP master (Clause 9)

c. The information communicated between the BAS and the factory mounted unit controllers shall include the reading and writing of data to allow unit monitoring, control and alarm notification as specified in the unit sequence of operation and the unit points list.

d. For chillers communicating over a LONMARK network, the corresponding LONMARK eXternal Interface File (XIF) shall be provided with the chiller submittal data.

e. All communication from the chiller unit controller as specified in the points list shall be via standard BACnet objects. Proprietary BACnet objects shall not be allowed. BACnet communications shall conform to the BACnet protocol (ANSI/ASHRAE135-2001). A BACnet Protocol Implementation Conformance Statement (PICS) shall be provided along with the unit submittal.

2.4 OPTIONS AND ACCESSORIES

A. The following options are to be included:

1. Low Ambient Control: Provide fan cycling control to allow unit operation down to 32°F

2. BAS interface module to provide interface with the BACnet MSTP protocol.

3. Compressor Sound Reduction - Acoustic reduction blankets shall be factory installed on each compressor.

4. The following accessories are to be included:

a. Rubber-in-shear vibration isolators for field installation

b. Factory-mounted thermal dispersion type flow switch

c. Wye strainer, to be installed at the evaporator inlet and sized for the design flow rate , with perforation diameter of 0.063" with blowdown valve and Victaulic couplings (factory mounted or field installed)

d. Single point non fused disconnect switch

e. Condenser and base frame wire grilles

2.5 ACCEPTABLE MANUFACTURES

A. Daikin Applied

B. Trane

PART 3 - EXECUTION

3.1 CHILLER INSTALLATION

A. Install in accordance with manufacturer's recommendations.

B. General:

1. Obtain installation and wiring diagrams, piping diagrams, etc., from manufacturer.

2. Set chiller unit on proper vibration isolation equipment. Install precisely according to vibration isolator manufacturer's installation details.

3. Providing piping, valves and accessories to connect flow switches, oil piping, and other miscellaneous special devices or piping required for actual machine selected; obtain exact requirements from manufacturer of equipment before submitting bid.

4. Install thermometers, flexible connectors, drain valves and pressure gauges at all inlets and outlets.

5. Coordinate work in area adjacent to machine to insure adequate clearances for operating and service, as well as tube pulling space.

6. Prevent freeze-up from any cause.

7. Insulate completely as recommended by manufacturer those areas of unit not factory insulated.

C. Piping Connections:

1. Use flexible connectors at chilled water connections.

2. Verify chilled water IN and OUT, before piping.

3. Install thermometer wells, flow switches, pressure gauges, etc. as directed by manufacturer.

4. Provide refrigerant piping, sized and routed as per the chiller manufacturer's recommendations.

5. Install thermometers in all entering and leaving water piping.

6. Install all necessary air vents, drains, controls, and auxiliary piping or accessories.

3.2 ELECTRIC WIRING

A. Electrical Contractor shall provide all power wiring to chiller.

B. HVAC Contractor shall provide all control wiring at chiller, including flow switches, pressure switches, control circuit transformer, etc.

3.3 ACCESSORIES

A. Install accessories which are not factory mounted.

END OF SECTION 23 64 26.20

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SECTION 23 81 26.11 - DUCTLESS SPLIT SYSTEM AIR CONDITIONER

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, materials, equipment and services as required for the complete installation designed in Contract Documents.

1.2 SUBMITTALS

A. Split system ductless air conditioner.

1.3 GENERAL REQUIREMENTS

A. Provide units to fit intended use and location as indicated:

1. Capacity, size and arrangement, component parts and accessories as scheduled and/or as necessary to obtain required results and allow for proper maintenance.

2. Unit capacities to be ARI 210 rated.

3. Unit to meet or exceed minimum Seer Requirements of New York State Energy Code and Department of Energy (DOE).

PART 2 - PRODUCTS

2.1 AIR HANDLING UNIT

A. Units shall be completely factory assembled including coil, condensate drain pan, fan, motor, filters and controls in an insulated casing. Units shall be UL listed and C.S.A. certified. Forward curved, dynamically and statically balanced fan with 3 speed direct drive. Fan motor bearing shall be permanently lubricated.

B. Units shall have sheet metal and steel frame construction and shall be painted with an enamel finish. Casing shall be insulated and knockouts shall be provided for electrical power and control wiring.

C. Unit shall have a single refrigerant circuit controlled by a flow control check valve (FCCV). Aluminum fin surface shall be mechanically bonded to 3/8 in. OD copper tubing. Coils shall be factory pressure and leak tested.

2.2 CONDENSING UNIT

A. The condensing unit shall be fully charged from the factory for up to 100 feet of piping. The unit must be designed to operate at outdoor ambient temperatures as high as 115°F and as low as 0°F. The unit shall be UL listed. Unit casing shall be constructed of heavy gauge, galvanized steel and painted with a weather-resistant powder paint finish.

B. Refrigeration system controls include condenser fan and compressor contactor. High and low pressure controls shall be inherent to the compressor. A factory installed liquid line dryer shall be standard. The compressor shall feature internal over temperature and pressure protection, total epoxy dipped hermetic motor windings, thermostatically controlled sump heater, centrifugal oil pump, and internal spring mounts to reduce vibration and noise. The coil shall be continuously wrapped, corrosion resistant all aluminum glued with minimized brazed joints. The coil shall be 3/8 in. O.D. seamless aluminum glued to a continuous aluminum fin. The coil shall be protected on all four sides by louvered panels.

2.3 ACCESSORIES

A. Wall Mounted Microprocessor Controller:

1. Liquid crystal digital display indicating: Operating mode, setpoint temperature, room temperature, timer setting, fan speed and airflow direction.

2. Self diagnostic fault indication.

3. 24 hour on-off timer.

4. Previous setpoint memory feature.

B. Low ambient protection kit with wind baffle. Allow unit operation down to -12°F.

C. Auto restart following power failure.

D. Built-in condensate drain pump .

E. Pre-charged uninsulated refrigerant piping lines.

F. Factory relay for integration into building DDC system.

2.4 DESIGN EQUIPMENT

A. Daikin Applied.

2.5 ACCEPTABLE MAKE

A. Sanyo, Mitsubishi, Daikin, Samsung.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install equipment in strict accordance with manufacturer's instructions and so as to be compatible with intent of the respective system performance requirements.

B. Connect condensate drain pump.

C. Provide refrigerant piping and control wiring.

D. Provide any and all necessary control wiring

END OF SECTION 23 81 26.11

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SECTION 26 05 00 - BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide all labor, tools, materials, accessories, parts, transportation, taxes, and related items, essential for installation of the work and necessary to make work, complete, and operational. Provide new equipment and material unless otherwise called for. References to codes, specifications and standards called for in the specification sections and on the drawings mean, the latest edition, amendment and revision of such referenced standard in effect on the date of these contract documents. All materials and equipment shall be installed in accordance with the manufacturer's recommendations.

1.2 LICENSING

A. The Contractor shall hold a license to perform the work as issued by the authority having jurisdiction.

B. Electrical contract work shall be performed by, or under, the direct supervision of a licensed electrician.

1.3 PERMITS

A. Apply for and obtain all required permits and inspections, pay all fees and charges including all service charges. Provide certificate of approval from the Authorities Having Jurisdiction prior to request for final payment.

B. Provide electrical inspection certificate of approval from Middle Department Inspection Agency, Commonwealth Inspection Agency, or an Engineer approved Inspection Agency prior to request for final payment.

1.4 CODE COMPLIANCE

A. Provide work in compliance with the following:

1. 2015 International Building Code.
2. 2015 International Existing Building Code.
3. 2015 International Fire Code.
4. 2015 International Plumbing Code.
5. 2015 International Mechanical Code.
6. 2015 International Fuel Gas Code.
7. 2017 Uniform Code Supplement.

8. 2016 Supplement to the New York State Energy Code, which references:

   a. 2015 International Energy Conservation Code.

9. New York State Department of Labor Rules and Regulations.

10. New York State Department of Health.

11. 2014 National Electrical Code (NEC).

12. Occupational Safety and Health Administration (OSHA).

13. Local Codes and Ordinances.

14. Life Safety Codes, NFPA 101.

15. City of Rochester Plumbing Department.

16. New York State Education Department Manual of Planning Standards.

1.5 GLOSSARY

ACI	American Concrete Institute
AGA	American Gas Association
AGCA	Associated General Contractors of America, Inc.
AIA	American Institute of Architects
AISC	American Institute of Steel Construction
AFBMA	Anti-Friction Bearing Manufacturer's Association
AMCA	Air Moving and Conditioning Association, Inc.
ANSI	American National Standards Institute
ARI	Air Conditioning and Refrigeration Institute
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.
ASME	American Society of Mechanical Engineers
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing Materials
AWSC	American Welding Society Code
AWWA	American Water Works Association
FM	Factory Mutual Insurance Company
IBR	Institute of Boiler & Radiation Manufacturers
IEEE	Institute of Electrical and Electronics Engineers

IRI	Industrial Risk Insurers
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NESC	National Electrical Safety Code
NFPA	National Fire Protection Association
NYS/DEC	New York State Department of Environmental Conservation
SBI	Steel Boiler Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
UFPO	Underground Facilities Protective Organization
UL	Underwriter's Laboratories, Inc.
OSHA	Occupational Safety and Health Administration
XL - GAP	XL Global Asset Protection Services

1.6 DEFINITIONS

Acceptance	Owner acceptance of the project from Contractor upon certification by Owner's Representative.
As Specified	Materials, equipment including the execution specified/shown in the contract documents.
Basis of Design	Equipment, materials, installation, etc. on which the design is based. (Refer to the article, Equipment Arrangements, and the article, Substitutions.)
Code Requirements	Minimum requirements.
Concealed	Work installed in pipe and duct shafts, chases or recesses, inside walls, above ceilings, in slabs or below grade.
Coordination Drawings	Show the relationship and integration of different construction elements and trades that require careful coordination during fabrication or installation, to fit in the space provided or to function as intended.
Delegated-Design Services	(Performance and Design criteria for Contractor provided professional services). Where professional design services or certifications by a design professional are specifically required of a Contractor, by the Contract Documents. Provide products and systems with the specific design criteria indicated. If criteria indicated is insufficient to perform services or certification required, submit a written request for additional information to the Engineer. Submit wet signed and sealed certification by the responsible design professional for each product and system specifically assigned to the Contractor to be designed or certified by a design professional.

	Examples: structural maintenance ladders, stairs and platforms, pipe anchors, seismic compliant system, wind, structural supports for material equipment, sprinkler hydraulic calculations.
Equal, Equivalent, Equal To, Equivalent To, As Directed and As Required	Shall all be interpreted and should be taken to mean "to the satisfaction of the Engineer".
Exposed	Work not identified as concealed.
Extract	Carefully dismantle and store where directed by Owner's Representative and/or reinstall as indicated on drawings or as described in specifications.
Furnish	Purchase and deliver to job site, location as directed by the Owner's Representative.
Inspection	Visual observations by Owner's site Representative.
Install	Store at job site if required, proper placement within building construction including miscellaneous items needed to affect placement as required and protect during construction. Take responsibility to mount, connect, start-up and make fully functional.
Labeled	Refers to classification by a standards agency.
Manufacturers	Refer to the article, Equipment Arrangements, and the article, Substitutions.
Prime Professional	Architect or Engineer having a contract directly with the Owner for professional services.
Product Data	Illustrations, standard schedules, performance charts, instructions, brochures, wiring diagrams, finishes, or other information furnished by the Contractor to illustrate materials or equipment for some portion of the work.
Provide (Furnish and Install)	Contractor shall furnish all labor, materials, equipment and supplies necessary to install and place in operating condition, unless otherwise specifically stated.
Relocate	Disassemble, disconnect, and transport equipment to new locations, then clean, test, and install ready for use.
Remove	Dismantle and take away from premises without added cost to Owner, and dispose of in a legal manner.
Review and Reviewed	Should be taken to mean to be followed by "for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents".
Roughing	Pipe, duct, conduit, equipment layout and installation.
Samples	Physical full scale examples which illustrate materials, finishes, coatings, equipment or workmanship, and establishes standards by which work will be judged.
Satisfactory	As specified in contract documents.

Shop Drawings	Fabrication drawings, diagrams, schedules and other instruments, specifically prepared for the work by the Contractor or a Sub-contractor, manufacturer, supplier or distributor to illustrate some portion of the work.
Site Representative	Owner's Inspector or "Clerk of Works" at the work site.
Submittals Defined (Technical)	Any item required to be delivered to the Engineer for review as requirement of the Contract Documents. The purpose of technical submittals is to demonstrate for those portions of the work for which a submittal is required, the manner in which the Contractor proposes to conform to the information given and design concepts expressed and required by the Contract Documents.

1.7 PROTECTION OF PERSONS AND PROPERTY

A. Contractor shall assume responsibility for construction safety at all times and provide, as part of contract, all trench or building shoring, scaffolding, shielding, dust/fume protection, mechanical/electrical protection, special grounding, safety railings, barriers, and other safety feature required to provide safe conditions for all workmen and site visitors.

1.8 EQUIPMENT ARRANGEMENTS

A. The contract documents are prepared using one manufacturer as the Basis of Design, even though other manufacturers' names are listed. If Contractor elects to use one of the listed manufacturers other than Basis of Design, submit detailed drawings, indicating proposed installation of equipment. Show maintenance clearances, service removal space required, and other pertinent revisions to the design arrangement. Make required changes in the work of other trades, at no increase in any contract. Provide larger motors, feeders, breakers, and equipment, additional control devices, valves, fittings and other miscellaneous equipment required for proper operation, and assume responsibility for proper location of roughing and connections by other trades. Remove and replace doorframes, access doors, walls, ceilings, or floors required to install other than Basis of Design. If revised arrangement submittal is rejected, revise and resubmit specified Basis of Design item which conforms to Contract Documents.

1.9 SUBSTITUTIONS

A. If Contractor desires to bid on any other kind, type, brand, or manufacture of material or equipment than those named in specifications, secure prior approval. To request such approval, Contractor shall submit complete information comparing (item-for-item) material or equipment offered with design material or equipment. Include sufficient information to permit quick and thorough comparison, and include performance curves on same basis, capacities, power requirements, controls, materials, metal gauges, finishes, dimensions, weights, etc., of major parts. If accepted, an addendum will be issued to this effect ahead of bid date. Unless such addendum is issued, substitution offered may not be used.

1.10 CONTINUITY OF SERVICES

A. The building will be in use during construction operations. Maintain existing systems in operation within all rooms of building at all times. Refer to "General Conditions of the Contract for Construction" for temporary facilities for additional contract requirements. Schedules for various phases of contract work shall be coordinated with all other trades and with Owner's Representative. Provide, as part of contract, temporary mechanical and electrical connections and relocations as required to accomplish the above. Obtain approval in writing as to date, time, and location for shutdown of existing mechanical/electrical facilities or services.

1.11 ROUGHING

A. The Contract Drawings have been prepared in order to convey design intent and are diagrammatic only. Drawings shall not be interpreted to be fully coordinated for construction.

B. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevation, interferences, etc. Make necessary changes in contract work, equipment locations, etc., as part of a contract to accommodate work to avoid obstacles and interferences encountered. Before installing, verify exact location and elevations at work site. **DO NOT SCALE** plans. If field conditions, details, changes in equipment or shop drawing information require an important rearrangement, report same to Owner's Representative for review. Obtain written approval for all major changes before installing.

C. Install work so that items both existing and new are operable and serviceable. Eliminate interference with removal of coils, motors, filters, belt guards and/or operation of doors. Provide easy, safe, and code mandated clearances at controllers, motor starters, valve access, and other equipment requiring maintenance and operation. Provide new materials, including new piping and insulation for relocated work.

D. Coordinate work with other trades and determine exact route or location of each duct, pipe, conduit, etc., before fabrication and installation. Coordinate with Architectural Drawings. Obtain from Owner's Representative exact location of all equipment in finished areas, such as thermostat, fixture, and switch mounting heights, and equipment mounting heights. Coordinate all work with the architectural reflected ceiling plans and/or existing Architecture. Mechanical and electrical drawings show design arrangement only for diffusers, grilles, registers, air terminals, lighting fixtures, sprinklers, speakers, and other items. Do not rough-in contract work without reflected ceiling location plans.

E. Before roughing for equipment furnished by Owner or in other Divisions, obtain from Owner and other Divisions, approved roughing drawings giving exact location for each piece of equipment.

Do not "rough in" services without final layout drawings approved for construction. Cooperate with other trades to insure proper location and size of connections to insure proper functioning of all systems and equipment. For equipment and connections provided in this contract, prepare roughing drawing as follows:

1. Existing Equipment: Measure the existing equipment and prepare for installation in new location.

2. New Equipment: Obtain equipment roughing drawings and dimensions, then prepare roughing-in-drawings. If such information is not available in time, obtain an acknowledgement in writing, then make space arrangements as required with Owner's Representative.

1.12 COORDINATION DRAWINGS

A. Before construction work commences, Divisions for all trades shall submit coordination drawings in the form of CAD drawing files, drawn at not less than 1/4 in. scale. Such drawings will be required throughout all areas, for all Contracts. These drawings shall show resolutions of trade conflicts in congested areas. Mechanical Equipment Rooms shall be drawn early in coordination drawing process simultaneous with all other congested areas. Prepare Coordination Drawings as follows:

1. Division 23 shall prepare the base plan CAD coordination drawings showing all ductwork, all pertinent heating piping, and equipment. These drawings may be CAD files of the required Ductwork Shop Drawings. The drawings shall be coordinated with lighting fixtures, sprinklers, air diffusers, other ceiling mounted items, ceiling heights, structural work, maintenance clearances, electric code clearance, reflected ceiling plans, and other contract requirements. Reposition proposed locations of work after coordination drawing review by the Owner's Representative. Provide adjustments to exact size, location, and offsets of ducts, pipes, conduit, etc., to achieve reasonable appearance objectives. Provide these adjustments as part of contract. Minor revisions need not be redrawn.

2. Division 23shall provide CAD files and submit the base plan CAD Coordination Drawings to all Divisions.

3. Divisions 21 and 22 shall draw the location of piping and equipment on the base plan CAD Coordination Drawings, indicating areas of conflict and suggested resolutions.

4. Divisions 26, 27 and 28 shall draw the location of lighting fixtures, cable trays, and feeders over 1-1/2 in. on the base plan CAD Coordination Drawings, indicating areas of conflict and suggested resolution.

5. The General Construction Trade shall indicate areas of architectural/structural conflicts or obstacles on the CAD Coordination Drawings, and coordinate to suit the overall construction schedule.

6. The Construction Manager shall expedite all Coordination Drawing work and coordinate to suit the overall construction schedule. In the case of unresolved interferences, he shall notify the Owner's Representative. The Owner's Representative will then direct the various trades as to how to revise their drawings as required to eliminate installation interferences.

7. If a given trade proceeds prior to resolving conflicts, then if necessary, that trade shall change its work at no extra cost in order to permit others to proceed with a coordinated installation. Coordination approval will be given by areas after special site meetings involving all Divisions.

B. The purpose of the coordination drawing process is to identify and resolve potential conflicts between trades, and between trades and existing or new building construction, before they occur in construction. Coordination drawings are intended for the respective trade's use during construction and shall not replace any Shop Drawings, or record drawings required elsewhere in these contract documents.

1.13 REMOVAL WORK

A. Where existing equipment removals are called for, submit complete list to Owner's Representative. All items that Owner wishes to retain that do not contain asbestos or PCB material shall be delivered to location directed by Owner. Items that Owner does not wish to retain shall be removed from site and legally disposed of. Removal and disposal of material containing asbestos, lead paint, mercury and PCB's shall be in accordance with Federal, State and Local law requirements. Where equipment is called for to be relocated, contractor shall carefully remove, clean and recondition, then reinstall. Remove all abandoned piping, wiring, equipment, lighting, ductwork, tubing, supports, fixtures, etc. Visit each room, crawl spaces, and roofs to determine total Scope of Work. The disturbance or dislocation of asbestos-containing materials causes asbestos fibers to be released into the building's atmosphere, thereby creating a health hazard to workmen and building occupants. Consistent with Industrial Code Rule 56 and the content of recognized asbestos-control work, the Contractor shall apprise all of his workers, supervisory personnel, subcontractors, Owner and Consultants who will be at the job site of the seriousness of the hazard and of proper safeguards and work procedures which must be followed, as described in New York State Department of Labor Industrial Code Rule 56.

B. For materials indicated to contain lead, that are being affected by demolition or construction, the contractor shall comply with all Federal, State and Local law requirements regarding worker exposure to lead disturbance and abatement procedures.

C. Refer to the Owner's Lead Paint Survey. The Survey identifies the surfaces within the buildings that were tested for lead by collecting paint samples and performing laboratory analysis. If any unidentified surfaces are to be impacted the lead content shall be tested by analytical determinations conducted by a qualified laboratory approved by the Owner. The contractor shall review the current owner’s lead paint reports on file before starting any work which may disturb existing surfaces.

D. Refer to Division 02 for additional information regarding hazardous materials.

1.14 EQUIPMENT AND MATERIAL REQUIREMENTS

A. Provide materials that meet the following minimum requirements:

1. Materials shall have a flame spread rating of 25 or less and a smoke developed rating of 50 or less, in accordance with NFPA 255.

2. All equipment and material for which there is a listing service shall bear a UL label.

3. Potable water systems and equipment shall be built according to AWWA Standards.

4. Gas-fired equipment and system shall meet AGA Regulations and shall have AGA label.

5. Electrical equipment and systems shall meet UL Standards and requirements of the NEC.

6. Fire protection equipment shall be UL listed and FM approved.

B. Exterior and wet locations shall utilize materials, equipment supports, mounting, etc. suitable for the intended locations. Metals shall be stainless steel, galvanized or with baked enamel finish as a minimum. Finishes and coatings shall be continuous and any surface damaged or cut ends shall be field corrected in accordance with the manufacturer's recommendations. Hardware (screws, bolts, nuts, washers, supports, fasteners, etc.) shall be:

1. Stainless steel where the associated system or equipment material is stainless steel or aluminum.

2. Hot dipped galvanized or stainless steel where the associated system or equipment is steel, galvanized steel or other.

1.15 CUTTING AND PATCHING

A. Each trade shall include their required cutting and patching work unless shown as part of the General Construction Contract. Refer to General Conditions of the Contract for Construction, for additional requirements. Cut and drill from both sides of walls and/or floors to eliminate splaying. Patch cut or abandoned holes left by removals of equipment or fixtures. Patch adjacent existing work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering, other finished surfaces. Patch openings and damaged areas equal to existing surface finish. Cut openings in prefabricated construction units in accordance with manufacturer's instructions.

1.16 PAINTING

A. Paint all bare piping, ductwork and supports exposed to the out-of-doors with rust inhibiting coatings. Paint all equipment that is not factory finish painted (i.e. expansion tanks, etc.).

B. All painting shall consist of one (1) prime coat and two (2) finish coats of non-lead oil base paint, unless otherwise indicated herein. Provide galvanized iron primer for all galvanized surfaces. All surfaces must be thoroughly cleaned before painting. Review system color coding prior to painting with the Owner's Representative or Architect.

C. All items installed after finished painting is completed and any damaged factory finish paint on equipment furnished under this contract must be touched up by the Contractor responsible for same.

D. Include painting for patchwork with color to match adjacent surfaces. Where color cannot be adequately matched, paint entire surface. Provide one (1) coat of primer and two (2) finish coats or as called for in the Specifications.

E. All primers and paint used in the interior of the building shall comply with the maximum Volatile Organic Compound (VOC) limits called for in the current version of U.S. Green Building Council LEED Credits EQ 4.1 and EQ 4.2.

F. Refer to Division 9 - Finishes, for additional information.

1.17 EXISTING CEILING REMOVAL AND RE-INSTALLATION

A. In a renovation project, any existing ceiling removal and re-installation work required for the completion of a Contractors or Subcontractors work, shall be removed and re-installed by that Contractor or Subcontractor. This applies in any areas not called for to have a new ceiling installed.

B. The ceiling removal and re-installation shall include lay-in ceiling tile and grid, to the extent necessary to accomplish the work. Removed ceiling tile and grid shall be safely stored during the course of the work, and it shall be re-installed to the original existing condition.

1.18 CONCEALMENT

A. **Conceal all contract work** above ceilings and in walls, below slabs, and elsewhere throughout building. If concealment is impossible or impractical, notify Owner's Representative before starting that part of the work and install only after his review. In areas with no ceilings, install only after Owner's Representative reviews and comments on arrangement and appearance.

1.19 CHASES

A. In Existing Buildings:

1. Drill holes for floor and/or roof slab openings.

2. Multiple pipes smaller than 1 in. properly spaced and supported may pass through one 6 in. or smaller diameter opening.

3. Seal voids in fire rated assemblies with a fire-stopping seal system to maintain the fire resistance of the assembly. Provide 18 gauge galvanized sleeves at fire rated assemblies. Extend sleeves 2 in. above floors.

4. In wall openings, drill or cut holes to suit. Provide 18 gauge galvanized sleeves at shafts and fire rated assemblies. Provide fire-stopping seal between sleeves and wall in drywall construction. Provide fire stopping similar to that for floor openings.

1.20 PENETRATION FIRESTOPPING

A. Fire-Stopping for Openings Through Fire and Smoke Rated Wall and Floor Assemblies:

1. Provide materials and products listed or classified by an approved independent testing laboratory for "Penetration Fire-Stop Systems". The system shall meet the requirements of "Fire Tests of Penetrations Fire-Stops" designated ASTM E814.

2. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for drywall construction.

3. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

4. The methods used shall incorporate qualities which permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion, and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.

5. Plastic pipe/conduit materials shall be installed utilizing intumescent collars.

6. Provide a submittal including products intended for use, manufacturer's installation instructions, and the UL details for all applicable types of wall and floor penetrations.

7. Fire-stopping products shall not be used for sealing of penetrations of non-rated walls or floors.

B. Acceptable Manufacturers:

1. Dow Corning Fire-Stop System Foams and Sealants.

2. Nelson Electric Fire-Stop System Putty, CLK and WRP.

3. S-100 FS500/600, Thomas & Betts.

4. Carborundum Fyre Putty.

5. 3-M Fire Products.

6. Hilti Corporation.

1.21 NON-RATED WALL PENETRATIONS

A. Each trade shall be responsible for sealing wall penetrations related to their installed work, including but not limited to ductwork, piping, conduits, etc. See individual specification sections for requirements.

1.22 SUPPORTS

A. Provide required supports, beams, angles, hangers, rods, bases, braces, and other items to properly support contract work. Modify studs, add studs, add framing, or otherwise reinforce studs in metal stud walls and partitions as required to suit contract work. If necessary, in stud walls, provide special supports from floor to structure above.

B. For precast panels/planks and metal decks, support mechanical/electrical work as determined by manufacturer and the Engineer. Provide heavy gauge steel mounting plates for mounting contract work. Mounting plates shall span two or more studs. Size, gauge, and strength of mounting plates shall be sufficient for equipment size, weight, and desired rigidity.

C. For finished areas without a finished ceiling system such as classrooms, offices, conference rooms, etc., where decking and structure is exposed, and ductwork/piping/conduit is exposed: All mounting brackets, channel support systems and mounting hardware for ductwork, piping, lighting, etc. shall be concealed and approved by the Architect/Engineer prior to the installation. AirCraft cable style hanging for ductwork is required. It is recommended that room mockups be done and receive Architect/Engineer approval prior to proceeding with installation.

D. Equipment, piping, conduit, raceway, etc. supports shall be installed to minimize the generation and transmission of vibration.

E. Materials and equipment shall be solely supported by the building structure and connected framing. Gypboard, ceilings, other finishes, etc. shall not be used for support of materials and equipment.

1.23 APPLIED FIREPROOFING

A. Scope: Provide encapsulation of surfaces where applied fireproofing materials have been disturbed, removed, or left missing by the removal of hangers or upper attachments, or when new hangers or upper attachment are installed.

B. Fire Resistance Rating: Fireproofing shall meet the original hourly rating when applied to the construction assembly where materials have been removed or disturbed, or is missing.

C. Fire Hazard Classification: Fireproofing shall be listed in the Underwriters Laboratories Building Materials Directory with the following performance properties:

1. Flame Spread: 10 or less.

2. Smoke Developed: 5 or less.

D. Product Data: Provide manufacturer's product descriptions for each required fireproofing material. Include application instructions, including primer/adhesive requirements and recommended minimum thickness and density for each required hourly rating.

E. Fire Proofing Manufacturer:

1. Retro-Guard cementitious replacement fireproofing by Grace Construction Products, or equivalent Cafco Blaze Shield, and Cafco 300 by Isolatek.

2. Physical Properties:

a. Dry Field Density (ASTM E 605): 15 lb/cu ft minimum average.

b. Cohesion/Adhesion (Bond Strength) (ASTM E 736): 200 lb/sq ft minimum average.

c. Compressive Strength (ASTM E 761): 500 lb/sq ft minimum.

d. Impact (Bond Impact) Resistance (ASTM E 760): Shall not crack or delaminate.

e. Effect of Deflection (ASTM E 759): Shall not crack or delaminate.

f. Corrosion Resistance (ASTM E 937): No evidence of corrosion.

g. Air Erosion (ASTM E 859): Maximum 0.025 g/sq ft weight loss.

h. Provide primer or adhesive recommended by the fireproofing manufacturer to obtain required bond strength for the specific fireproofing and substrate.

F. Apply fireproofing prior to installation of ductwork, piping, conduits, and other suspended items. Hangers, clips and other supports for these items shall be installed before application of fireproofing.

G. Examine the substrate and conditions under which fireproofing is to be applied. Do not proceed with the fireproofing work until unsatisfactory conditions have been corrected. Verify that hangers, clips, sleeves, and other items that will penetrate the fireproofing are in place. Check paint on substrate for compatibility with primer/fireproofing and adequacy of bond strength in accordance with fireproofing manufacturer's instructions.

H. Surface Preparation: Remove dirt, dust, oil, grease, loose paint and rust, mill scale, and other foreign matter that may impair the bonding of the fireproofing to the substrate.

Clean substrate free of contamination from chemicals and solvents. Apply primer/adhesive where necessary to obtain bond strength of fireproofing to steel shop paint and where recommended by the fireproofing manufacturer.

I. Apply the fireproofing in accordance with UL fire test report and the manufacturer's application instructions. Thickness and density of fireproofing shall be in accordance with the approved product data and as required to produce the hourly fire resistance rating required.

1.24 ACCESS PANELS

A. Provide access panels for required access to respective trade's work. Location and size shall be the responsibility of each trade. Bear cost of construction changes necessary due to improper information or failure to provide proper information in ample time. Access panels over 324 square inches shall have two cam locks. Provide proper frame and door type for various wall or ceiling finishes. Access panels shall be equal to "Milcor" as manufactured by Inland Steel Products Co., Milwaukee, Wisconsin. Provide General Construction trade with a set of architectural plans with size and approximate locations of access panels shown.

1.25 CONCRETE BASES

A. Provide concrete bases for all floor mounted equipment. Provide 3,000 lb. concrete, chamfer edges, trowel finish, and securely bond to floor by roughening slab and coating with cement grout. Bases 6 in. high (unless otherwise indicated); shape and size to accommodate equipment. Provide anchor bolts in equipment bases for all equipment provided for the project, whether mounted on new concrete bases or existing concrete bases.

1.26 HVAC EQUIPMENT CONNECTIONS

A. Contractor is responsible for draining, filling, venting, chemically treating and restarting any systems which are affected by work shown on the Contract Documents unless specifically noted otherwise.

B. Provide final chilled water, drain, vent connections to all equipment as required by the equipment. Provide final connections, including domestic water piping, wiring, controls, and devices from equipment to outlets left by other trades. Provide equipment waste, drip, overflow and drain connections extended to floor drains.

C. Provide for Owner furnished and Contractor furnished equipment all valves, piping, piping accessories, traps, pressure reducing valves, gauges, relief valves, vents, drains, insulation, sheet metal work, controls, dampers, as required.

1.27 ELECTRICAL EQUIPMENT CONNECTIONS

A. Provide complete power connections to all electrical equipment. Provide control connections to equipment. Heavy duty NEC rated disconnect ahead of each piece of equipment. Ground all equipment in accordance with NEC.

B. Provide for Owner furnished and Contractor furnished equipment all power wiring, electric equipment, control wiring, switches, lights, receptacles, and connections as required.

1.28 STORAGE AND PROTECTION OF MATERIALS AND EQUIPMENT

A. Store Materials on dry base, at least 6 in. aboveground or floor. Store so as not to interfere with other work or obstruct access to buildings or facilities. Provide waterproof/windproof covering. Remove and provide special storage for items subject to moisture damage. Protect against theft or damage from any cause. Replace items stolen or damaged, at no cost to Owner.

B. Refer to Division 01 for additional information.

1.29 FREEZING AND WATER DAMAGE

A. Take all necessary precautions with equipment, systems and building to prevent damage due to freezing and/or water damage. Repair or replace, at no change in contract, any such damage to equipment, systems, and building. Perform first seasons winterizing in presence of Owner's operating staff.

1.30 OWNER INSTRUCTIONS

A. Before final acceptance of the work, furnish necessary skilled labor to operate all systems by seasons. Instruct designated person on proper operation, and care of systems/equipment. Repeat instructions, if necessary. Obtain written acknowledgement from person instructed prior to final payment. Contractor is fully responsible for system until final acceptance, even though operated by Owner's personnel, unless otherwise agreed in writing. List under clear plastic, operating, maintenance, and starting precautions procedures to be followed by Owner for operating systems and equipment.

1.31 OPERATION AND MAINTENANCE MANUALS

A. Prepare three (3) Operation and Maintenance Manuals. Include in each O&M Manual, a copy of each approved Shop Drawing, wiring diagrams, piping diagrams spare parts lists, as-built drawings and manufacturer's instructions. Include typewritten instructions, describing equipment, starting/operating procedures, emergency operating instructions, summer-winter changeover, freeze protection, precautions and recommended maintenance procedures. Include name, address, and telephone number of installing contractor and of supplier manufacturer Representative and service agency for all major equipment items. Provide a table of contents page and dividers based upon specification section numbers. Bind above items in a three ring binder with name of project on the cover. Deliver three (3) copies to Owner's Representative for review before request for final acceptance.

B. Refer to Division 01 for additional requirements.

C. Operation and Maintenance Manuals shall also be submitted electronically, in PDF format on CD or flash drive.

1.32 RECORD DRAWINGS

A. The Contractor shall obtain at his expense one (1) set of construction Contract Drawings, (including non-reproduction black and white prints or electronic files) for the purpose of recording as-built conditions.

B. The Contractor shall perform all survey work required for the location and construction of the work and to record information necessary for completion of the record drawings. Record drawings shall show the actual location of the constructed facilities in the same manner as was shown on the bid drawings. All elevations and dimensions shown on the drawings shall be verified or corrected so as to provide a complete and accurate record of the facilities as constructed.

C. It shall be the responsibility of the Contractor to mark **EACH** sheet of the contract documents in red and to record thereon in a legible manner, any and all approved field changes and conditions as they occur. A complete file of approved field sketches, diagrams, and other changes shall also be maintained. At completion of the work, the complete set of red marked contract documents, plus all approved field sketches and diagrams shall be submitted to the engineer and used in preparation of the record drawings.

D. A complete set of red marked contract drawings shall be submitted, at one time, as the "Record" set. If there are no changes to a specific drawing, the contractor shall indicate "NO CHANGES" on that drawing. ALL drawings shall be included in the "Record" set.

E. The complete set of red marked Contract Documents or electronic files shall be certified by the Contractor as reflecting record conditions and submitted to the engineer for review.

F. The Contractor shall have the marked up set scanned, if they are not already electronic files, and then submit them to the Engineer as the "Record Set".

G. Refer to Division 01 for additional requirements.

1.33 FINAL INSPECTION

A. Upon completion of all Engineering Site Observation list items, the Contractor shall provide a copy of the Engineering Site Observation Report back to the Engineer with each items noted as completed or the current status of the item. Upon receipt, the Engineer will schedule a final review.

1.34 COMMISSIONING

A. Refer to General Commissioning Requirements in Division 01 for additional requirements.

1.35 TEMPORARY COOLING

A. Refer to the General Conditions of the Contract for Construction and Supplemental General Conditions.

B. Systems and equipment installed as part of this project shall not be used for temporary cooling.

1.36 TEMPORARY FACILITIES

A. Refer to the Division 1 Sections, General Conditions and Supplemental General Conditions.

1.37 TEMPORARY LIGHT AND POWER

A. Refer to the Division 1 Sections, General Conditions and Supplemental General Conditions.

1.38 CLEANING

A. It is the Contractor's responsibility to keep clean all equipment and fixtures provided under this contract for the duration of the project. Each trade shall keep the premises free from an accumulation of waste material or rubbish caused by his operations. The facilities require an environment of extreme cleanliness, and it is the Contractor's responsibility to adhere to the strict regulations regarding procedures on the existing premises. After all tests are made and installations completed satisfactorily:

1. Thoroughly clean entire installation, both exposed surfaces and interiors.

2. Remove all debris caused by work.

3. Remove tools, surplus, materials, when work is finally accepted.

1.39 SYSTEM START-UP AND TESTING

A. Prior to commencement of work, the Division(s) effecting such system shall survey all building electrical systems and components, including fire alarm, intrusion, communications, clock and computer; make written notice to the Owner regarding existing damages, missing items and incomplete systems. Prior to the conclusion of this project, the Contractor shall verify with the Owner's Representative that all building system has been returned to their original conditions.

B. Start-up and testing of HVAC systems shall occur while the building is not occupied by Owner and only after notice to the Owner's Representative is made at least 24 hours in advance.

1.40 TRANSFER OF ELECTRONIC FILES

A. M/E Engineering, P.C. will provide electronic files for the Contractor's use in the preparation of sheet metal shop drawings, coordination drawings, or record drawings related to the project, subject to a $50.00 charge per drawing file and the following terms and conditions:

1. The Contractor shall submit a formal request for electronic drawing files on the M/E Engineering, P.C. website, by utilizing the following website link: http://www.meengineering.com/contact-pages/contractor-request

2. M/E Engineering, P.C. makes no representation as to the compatibility of these files with the Contractor's hardware or the Contractor's software beyond the specific release of the referenced specifications.

3. M/E Engineering can only provide CAD files of M/E/P/FP drawing levels for which we are the Engineer of Record. CAD files of Architectural backgrounds, reflected ceiling plans, structural plans, etc. must be obtained separately from the Architect of Record.

4. Data contained on these electronic files is part of M/E Engineering, P.C.'s instruments of service shall not be used by the Contractor or anyone else receiving data through or from the Contractor for any purpose other than as convenience in the preparation of shop drawings for the referenced project. Any other use or reuse by the Contractor or by others will be at the Contractor's sole risk and without liability or legal exposure to M/E Engineering, P.C. The Contractor agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against M/E Engineering, P.C., its officers, directors, employees, agents or sub-consultants which may arise out of or in connection with the Contractor's use of the electronic files.

5. Furthermore, the Contractor shall, to the fullest extent permitted by law, indemnify and hold harmless, M/E Engineering, P.C. from all claims, damages, losses and expenses, including attorney's fees arising out of or resulting from the Contractor's use of these electronic files.

6. These electronic files are not contract documents. Significant difference may arise between these electronic files and corresponding hard copy contract documents due to addenda, change orders or other revisions. M/E Engineering, P.C. makes no representation regarding the accuracy or completeness of the electronic files the Contractor receives. In the event that a conflict arises between the signed contract documents prepared by M/E Engineering, P.C. and electronic files, the signed contract documents shall govern. The Contractor is responsible for determining if any conflicts exist. By the Contractor's use of these electronic files the Contractor is not relieved of the Contractor's duty to comply with the contract documents, including and without limitation, the need to check, confirm and coordinate all dimensions and details, take field measurements, field verify conditions and coordinate the Contractor's work with that of other contractors for the project.

1.41 VIDEO RECORDING OF TRAINING SESSIONS

A. The contractor shall video record all training sessions required by their discipline. Video shall be in DVD format and two (2) copies submitted to the Owner. DVD to be individually marked with training session name, installing Contractor and date of training.

1.42 ENERGY INCENTIVES

A. The Contractor, his Subcontractors and Suppliers shall provide to the Owner all paperwork necessary to support the Owners pursuit of incentives related to energy conservation as offered by the utility company or state sponsored incentive programs. This shall include at a minimum, receipts, and quantities and data sheets for energy efficient equipment such as: lighting, motors, variable frequency drives, etc.

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SECTION 26 05 01 - BASIC MATERIALS AND METHODS

PART 1 - GENERAL

1.1 DESCRIPTION

A. The drawings are diagrammatic, unless detailed dimensioned drawings are included, and show only approximate locations of equipment, fixtures, panelboards, conduits, and wiring devices. Exact locations are subject to the approval of the Owner's Representative. The general run of electrical feeders, branch circuits, and conduits, indicated on the drawings, is not intended to be the exact routing. Exact routings of conduit shall suit the job conditions.

B. Circuit designations, in the form of "Home Runs" on branches, indicate the designation of the branch circuit, the size and the quantity of branch circuit conductors, and the panel board or interconnection box from which the branch circuit is served.

C. Make measurements at the site and in the building during construction for all systems installed as the work progresses in such a manner that the equipment, piping, vents, ducts, conduit, and boxes will fit in the space available. Maintain headroom and if in unfinished areas, be as neatly installed, as obscure and "out-of-the-way" as physically possible. Where more than one trade is involved in an area, space or chase, all shall cooperate and install their own work to utilize the space equally between them in proportion to their individual requirements. In general, ductwork shall be given preference except where grading of piping becomes a problem, followed by piping then electrical wiring. If, after installation of any equipment, piping, ducts, conduit, and boxes, it is determined that ample maintenance and passage space has not been provided, rearrange work and /or furnish other equipment as required for ample maintenance space.

D. Any changes in the size or location of the material or equipment supplied, which may be necessary in order to meet field conditions or in order to avoid conflicts between trades, shall be brought to the immediate attention of the Owner's Representative and approval received before such alterations are made.

1.2 QUALITY ASSURANCE

A. Electric equipment shall be installed in a neat and workmanlike manner. All methods of construction, details of workmanship, that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative.

B. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc., correspond to the nomenclature dictated by those manufacturers. Where "or equal" is stated, equipment shall be equal in every way to that of the equipment specified and subject to approval. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

1.3 SUBMITTALS

A. Submit product data for the following equipment, materials and products, including all fittings and accessories:

1. Conduit
2. Surface Metal Raceway
3. Expansion Fittings
4. Power/Communications Poles
5. Wireway and Wire Trough
6. Cable Tray
7. Channel Support Systems
8. Conductors
9. Cables
10. Cable Termination and Splice Kits
11. Terminal and Equipment Cabinets
12. Flush Floor Boxes
13. Wiring Devices Including Dimmers
14. Telephone/Data Communication Outlets
15. Television Outlets
16. Elapsed Time Switches
17. Time Switches
18. Photoelectric Controls
19. Occupancy/Vacancy Sensors
20. Lighting Control Contactors
21. Boiler Shutdown Switches
22. Clocks
23. Water Proofing Seals
24. Flashing, Sealing, Firestopping Materials
25. Testing reports prior to energizing equipment and materials.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Conduit, Raceway and Tubing:

1. Rigid Metal Conduit shall be hot-dipped galvanized or electro-galvanized steel, UL listed "rigid metal conduit."

a. Acceptable Manufacturers:

1) Republic Conduit
2) Allied Tube and Conduit
3) Wheatland Tube Company
4) Approved equal

2. Electrical Metallic Tubing shall be electro-galvanized steel; UL listed "electrical metallic tubing."

   a. Acceptable Manufacturers:

      1) Republic Conduit
      2) Allied Tube and Conduit
      3) Wheatland Tube Company
      4) Approved equal

3. Flexible Metal Conduit shall be constructed one continuous length of electro-galvanized, spirally wound steel strip with interlocking convolutions and interior surfaces free from burrs and sharp edges. Shall be UL listed "flexible metal conduit" or "liquidtight flexible metal conduit" as required.

   a. Acceptable Manufacturers:

      1) Republic Conduit
      2) Allied Tube and Conduit
      3) Wheatland Tube Company
      4) American Flexible Conduit Company

4. Rigid Non-Metallic Conduit (Schedule 40 for concrete encasement, Schedule 80 for direct burial or where exposed) shall be UL listed "rigid non-metallic conduit" for application in underground, encased, and exposed applications in accordance with Article 352 of the National Electrical Code. The conduit shall be made from polyvinyl chloride (PVC) and shall be rated for 90ºC conductors. Conduit and fittings shall be tested in accordance with the testing requirements defined in NEMA TC-2, NEMA TC-3, UL-651 and UL-514.

   a. Acceptable Manufacturers:

      1) Carlon
      2) Heritage Plastics
      3) PW Eagle

5. Surface Metal Raceway shall be .040 in. steel UL listed "Surface Metal Raceway". Use manufacturer's standard fittings designed to be used with the specific raceway.

   a. One-Piece Raceway:

      1) Ivory finish.

      2) Acceptable Manufacturers:

         a) Wiremold "700" Series (Design Make)
         b) Mono Systems
         c) Approved equal

b. Two-Piece Raceways:

1) Ivory finish.

2) Duplex or special receptacles as specified in wiring devices.

3) Corners, turns, tees and elbows shall have suitable turning radius for the intended cable.

4) Provide divider in raceways utilized for power and communications. Utilize wire clips 18 in. on center to hold in the conductors/cables.

5) Utilize rounded head screws for mounting.

6) Acceptable Manufacturers:

a) Wiremold 2400, 3000, 4000 or 6000 (Design Make)
b) Mono Systems
c) Approved equal

B. Conduit Fittings:

1. Fittings for rigid metal conduit shall be fully threaded and shall be of the same material as the respective raceway system. Fittings for electrical metallic tubing shall be single screw indenter fittings for conduits up to 2 in. and double screw indenter fittings for conduits 2 in. and larger. Connectors shall also have insulated throat up to and including 1 in. size. For sizes 1-1/4 in. and larger, provide plastic insulating bushing. Die-cast, pressure cast fittings shall not be used. Fittings for rigid non-metallic conduit shall be solvent cemented in accordance with the manufacturer's instructions.

a. Acceptable Manufacturers:

1) O.Z. Gedney
2) Steel City
3) Thomas & Betts
4) Crouse-Hinds
5) Carlon

2. Expansion Fittings shall be watertight, combination expansion and deflection type designed to compensate for movement in any direction. Fittings shall have flexible copper braid bonding jumpers, neoprene sleeve and stainless steel bands, use aluminum body fittings for rigid aluminum conduit.

a. Acceptable Manufacturers:

1) Crouse-Hinds, Type "DX"
2) O.Z./Gedney, Type "DX"
3) Approved equal

C. Power/Communications Poles:

1. Poles shall contain a communication and power divider and be nominally 2-14 in. square by height required. Each pole shall be equipped with two (2), 20 ampere, 125 volt, grounded, duplex receptacles, and knockouts for telephone and computer/data connections. Constructed of a minimum of 0.050 in. thick, anodized aluminum extrusion, with removable trim plate and cover. Unit shall be furnished with top plate mounting assembly for easy installation to accessible ceiling. Unit shall be prewired with wire leads at top of pole.

   a. Acceptable Manufacturers:

      1) Wiremold AMDTP Series
      2) Hubbell "PAX-5" Series

D. Wireway and Wire Trough:

1. Wireway and Wire Trough shall be hinged cover type wireway with provisions for full lay-in along the entire length of run. Wireway shall be steel, enclosed with gray enamel finish. Provide NEMA 1 units for interior/dry/clean locations and NEMA 12 for interior dry maintenance/shop/utility locations. Size to meet NEC fill requirements or larger as noted on Contract Documents. Provide knockouts along runs. Recess in wall where required for flush mounted equipment. Hinge shall be on the bottom of front face for horizontal mounting. Provide all elbows, tees, pullboxes, fittings, hangers, reducers, supports, supports, etc., to meet installation requirements.

   a. Acceptable Manufacturers:

      1) Square D "Square Duct"
      2) General Electric
      3) Hoffman
      4) Meco

E. Channel Support Systems:

1. Channel Support Systems shall be provided for racking of conduit, trapeze suspensions, equipment support, cable racks and panel racks. Channel shall be steel with electroplated zinc finish for interior dry locations. Provide necessary accessories such as bolts, screws, anchors, connection plates, and straps as required to perform the necessary functions.

   Wet location and exterior channel support systems shall be steel with hot dipped galvanized finish and stainless steel hardware as a minimum. Cut ends shall be touched up with suitable matching finish.

   a. Acceptable Manufacturers:

      1) Unistrut
      2) Globe

3) Kindorf
4) B-Line

F. Conductors and Cables:

1. Conductors shall be insulated for 600 volts, unless otherwise noted, and shall be standard AWG and kcmil sizes. Conductors shall be 98% copper, thermal plastic or cross-linked polymer insulated, heat and moisture resistant. Conductors shall be stranded, except for conductors used for fire alarm system wiring. Conductor sizes No. 18 AWG and smaller shall be a solid single strand; No. 16 AWG and larger shall be multiple stranded. Minimum conductor size shall be #12 AWG except smaller sizes may be used for communications and special systems. Conductor sizes shall be as called for. Conductors shall be labeled with UL seal and be marked with the manufacturer's name, wire size and insulation type. Insulation for all 600 volt conductors shall be Type THHN/THWN-2 for conductor sizes #8 AWG and smaller or Type XHHW-2 for conductor sizes #6 AWG and larger, unless otherwise noted. All exterior and underground conductors shall be XHHW-2. Luminaire fixture wire shall conform to the latest Underwriters Laboratories requirements. Flexible cords and cables for general portable use shall be Type SO or SOOW or as noted. Cables for special use shall be of the type specified for the application.

a. Color Coding:

1) All circuits shall be color coded according to the following schedule.

	Three Phase 120/208V	**Three Phase 277/480V**
Ground	Green	Green
Neutral	White	Gray
A or L1	Black	Brown
B or L2	Red	Orange
C or L3	Blue	Yellow

b. Acceptable Manufacturers:

1) General Cable
2) Prysmian
3) South Wire
4) Okonite
5) Senator

2. Metal Clad, Type "MC" Cable shall consist of thermal plastic insulated copper conductors of size and quantity indicated, protected by a positive interlocked armor of galvanized steel. The conductors shall be twisted together and shall have an overall moisture and fire resistant fibrous covering. The cable shall provide an adequate path for equipment grounding as required by the NEC and have an integral green insulated full size equipment grounding conductor running its entire length. The cable shall meet the requirements of the NEC for "Type MC" Metal Clad Cable and shall bear the UL Label.

   a. Acceptable Manufacturers:

      1) Southwire
      2) AFC Cable
      3) Approved equal

3. "Split-bolt" Connectors shall be solderless type.

   a. Acceptable Manufacturers:

      1) Burndy
      2) Kearney
      3) O.Z./Gedney
      4) Thomas and Betts
      5) Anderson

4. "TWIST ON" Connectors shall be spiral steel spring type and insulated with vinyl cap and skirt.

   a. Acceptable Manufacturers:

      1) 3-M Company "Scotch-Lok"
      2) Ideal "Wing-Nuts"
      3) Approved equal

G. Boxes:

1. Outlet boxes shall be galvanized steel, not less than 2-1/2 in. deep, unless restricted by the surroundings, 4 in. square or octagonal, with knockouts. Boxes and associated fittings, plates and devices shall be mechanically fastened (screwed), friction fitting is not acceptable. Outlet boxes exposed to moisture, exterior, wet or damp locations shall be cadmium cast alloy complete with external threaded hubs and gasketed screw fastened covers.

Minimum box size shall be as indicated in the NEC for the conductors and devices installed. Boxes shall be approved for the environmental condition where they will be installed.

a. Acceptable Manufacturers:

1) Steel City
2) Raco
3) Appleton
4) Crouse Hinds

2. Telephone/Data Communications Outlet Boxes:

a. 4 in. x 4 in. outlet box with single gang plaster ring with cover plate suitable for indicated communications outlet and conduit routed to accessible ceiling space. Cover plate shall match the receptacle cover type.

3. Pull and junction boxes shall be constructed of not less than 14 gauge galvanized steel with trim for flush or surface mounting in accordance with the location to be installed. Provide screw-on type covers. Boxes installed in damp or wet locations shall be of raintight construction with gasketed cover and threaded conduit hubs. In no case shall boxes be sized smaller than as indicated NEC for conduit and conductor sizes installed. Boxes shall be approved for the environmental condition of the location where they will be installed.

a. Acceptable Manufacturers:

1) Hoffman
2) Keystone
3) Approved equal

4. Flush floor junction boxes shall be recessed cover boxes designed for flush mounting in masonry. Provide checkered plate gasketed cover suitable for foot traffic. Make: O.Z. Gedney Type YR or approved equal.

5. Flush Floor Boxes: Boxes shall be cast in place with height adjustability prior to pour. Provide power, communication and/or audio/visual outlets as indicated. Installation shall be suitable for the intended floor finish: if carpet, then provide a carpet flange, if tile/terrazzo/concrete finish, then provide a collar flush with finished floor and no flange. Units shall be cast iron standard depth of 3.75 in. Units shall meet UL scrub water protected requirements. To have integral ground terminal.

a. Type A: Single gang unit with two (2) 3/4 in. threaded hubs on each side, collar, flange (if carpet) and hinged device cover (duplex locking flap, decorator rectangular single dedicated outlet or blank). Collar, flange and cover shall be brass.

b. Type B: Two gang unit with two (2) 3/4 in. threaded hubs on each side for each gang, collar, flange (if carpet) and hinged device covers (duplex locking flap, decorator rectangular, single or blank). Collar, flange and cover shall be brass.

c. Type C: Three gang unit with two (2) 3/4 in. threaded hubs on each side for each gang, collar, flange (if carpet) and hinged device covers (duplex locking flap, decorator rectangular, single or blank). Collar, flange and cover shall be brass.

d. Type D: Multiple service type unit to have 100 cubic inches of device volume minimum, four individual entrance compartments each with two (2) 1-1/4 in. and one 3/4 in. conduit knockouts/hubs, removable dividers between compartments and reinforced cover with color to match surrounding and hinged cable opening (dust protection and support to keep all weight off cables). Provide flooring insert. Provide the following device plates for each compartment with spares turned over to the Owner.

1) Standard duplex.
2) Style line/decorator/GFI duplex.
3) Six port RJ45.
4) Blank.
5) Plates for any devices indicated.

e. Acceptable Manufacturers:

1) Acceptable manufactures shall include the following and shall meet the requirements herein.

a) Steel City - Series 640/840SC or 665SC.

b) Hubbell - Series B or CFB.

c) Wiremold - Omni or RFB Series.

d) Fire rated units - Wiremold Omni or RFB Series, CEYY listed or approved equal.

H. Terminal and Equipment Cabinets:

1. Terminal and equipment cabinets shall be code gauge galvanized steel with removable endwalls. Fronts shall be of code gauge steel, flush or surface type (as indicated) with concealed trim clamps, concealed hinges, flush lock, and grey baked enamel finish.

Boxes and front shall be UL listed and shall be minimum 35 in. H x 24 in. W x 6 in. D. Provide removable insulated plywood terminal board mounted on inside back wall of cabinet.

a. Acceptable Manufacturer:

1) Square D "Mono-Flat"
2) Approved equal

I. Wiring Devices:

1. Wiring Devices (toggle switches, key switches, receptacles, dimmers, occupancy sensors, etc.) shall be ivory color, specification grade as a minimum. Switch handle and receptacle face shall be as directed by the Architect. Provide device cover plates of satin finish type 302 stainless steel in finished areas and rounded raised (Steel City 450/460 series) only for surface mounted locations in unfinished areas.

Provide neoprene gasketed cast aluminum/zinc box with hinged rain tight cast aluminum/zinc lockable while in use cover with stainless steel hardware for devices designated "WP".

a. Acceptable Manufacturers:

1) Pass and Seymour
2) Hubbell
3) Leviton

2. Toggle/Snap Switches:

a. Units shall be quiet operation, quick make/quick break, rated for 20A/120-277V/1hp at 120/277V, side/back wired, with nylon/polycarbonate toggle, self grounding mounting screw clip plate (not staple), ground terminal and silver alloy contacts. Units shall meet latest Federal Specification WS-896, NEMA WD-1 and UL Test 20. Single pole units shall be Hubbell HBL1221, P&S 20AC1 or Leviton 1221-2. Provide two pole, three way, four way, illuminated handle, keyed, etc. type of the same quality and model.

b. Momentary Contact: Units shall be as indicated above (20A, 277V, nylon handle, side/back wired), three position, two circuit/three wire with spring return to center position, provide where indicated and as needed for proper system operation. Hubbell HBL 1557, P&S 1250, Leviton 1256 or approved equal. Provide keyed operation or pilot light where indicated.

3. Receptacles:

a. Provide receptacles where indicated on the drawings and where called for. Provide type receptacle as indicated and if not indicated then utilize general receptacle.

b. General Receptacle:

1) Units shall be NEMA 5-20R, duplex, 20A, 125V, side/back wired, #14 to 10AWG screw terminals with nylon face, indented brass contacts for three point connection, self-grounding mounting screw clip plate (not staple), ground terminal Meet requirements of Federal Specification W-C-596, NEMA WD-6 and UL 498.

2) Units shall be UL Listed Tamper Resistant and have protective shutters for the two 20A 125V outlets to prevent entry into the line or grounded front openings unless all plug prongs are present.

3) Units shall have two UL Listed fast charging USB charging outlets, one (1) Type A and one (1) one Type C, compatible with the latest USB 2.0/3.0 standards or later versions. The internal USB charging system shall deliver 6.0A total @ 5VDC, and have a processing chip that monitors and maximizes charging speeds between each outlet.

4) Units shall be highest Specification Commercial grade available, and have an overall depth not exceeding 1.35 inches.

5) Design Make: P&S TR20USBAC6 or approved equal.

c. Ground Fault Interrupting Receptacles: Units shall be as specified above for General Receptacle, except not have the USB outlets. Units shall have 5mA interrupting ground fault level, test/reset front buttons, full through feed capability, power off on reverse wired sensing, 10kA short circuit current rating, be tamper/weather resistant and in compliance with UL 943. Unit shall self-test function to periodically test the components automatically and indicate a failure condition utilizing an LED. Shall be Hubbell TRGFR5362, P&S 2096TR or Leviton S7599TR.

d. Surge Protected Receptacles: Units shall be as specified above for General Receptacle, and have 240 joule energy/15,000A capacity, three modes of protection (line to neutral, line to ground and neutral to ground), 500V maximum clamping, LED indicator (operational, failure), blue color and UL 1449 compliant. Shall be Hubbell HBL5360SA, P&S 5352XSP or Leviton 5280.

e. Isolated Ground Receptacles: Units shall be as specified above for General Receptacle and have an orange color and electrically independent/isolated mounting strap and ground terminal. Shall be Hubbell IG5352, P&S IG5362 or Leviton 5362IG.

f. Tamper Resistant Receptacles: Units shall be as specified above for General Receptacle, except not have USB outlets. Units shall have protective shutters to prevent entry into the line or grounded front openings unless all plug prongs are present. Shall be Hubbell BR20TR, P&S TR5362 or Leviton 6362TR.

g. Surge Protected and Isolated Ground Receptacles: Units shall be as specified above for General Receptacle and the Surge Protected and Isolated Ground units above. The unit shall have an orange color.

h. USB Power Receptacle: Units shall be as specified above for General Receptacle; units shall have two 20A 125V outlets and two UL Listed fast charging USB charging outlets, one (1) Type A and one (1) one Type C, compatible with the latest USB 2.0/3.0 standards or later versions. The internal USB charging system shall deliver 6.0A total @ 5VDC, and have a processing chip that monitors and maximizes charging speeds between each outlet. Overall depth shall not exceed 1.35 inches. Shall be P&S TR20USBAC6 or approved equal.

i. Dryer Receptacles: To be NEMA 14-30R single receptacle in suitable box and steel cover plate painted to match the surrounding. Shall be Hubbell, P&S or Leviton highest grade available.

j. Stove Receptacles: To be NEMA 14-50R single receptacle in suitable box and steel cover plate painted to match the surrounding. Shall be Hubbell, P&S or Leviton highest grade available.

k. Clock Receptacle: To be NEMA 5-15R single receptacle with hanger and stainless steel cover plate. Hubbell HBL 5235 or approved equal.

4. Special Receptacles: provide other type receptacles as indicated herein or on the drawings. Such receptacles shall be Hubbell, P&S or Leviton highest grade available Lighting Dimmers:

a. Refer to Lighting Controls specification section for additional requirements.

b. Provide lighting dimmer where indicated suitable for the type of luminaire for even continuous control. Unit shall be rated for the indicated connected load plus 25% minimum (even when ganged). Review luminaire schedule for type and loading. Provide for three-way control as indicated.

c. Dimmers to be Lutron "Nova" NT-(1000W minimum) with debuzzing coil for incandescent.

d. Low voltage dimming shall be as recommended by the luminaire manufacturer for magnetic or solid state.

e. LED dimmers shall be as recommended by the luminaire manufacturer and be listed for use with the associated driver.

f. Device color shall match the toggle switch.

g. Acceptable Manufacturers:

1) Lutron
2) Approved equal

5. Television Outlets:

a. 4 in. x 4 in. outlet box with single gang plaster ring with coax connector and plate and conduit routed to accessible ceiling space. Cover plate shall match the receptacle cover type.

6. Extension Cord Reels

a. Power cord reels:

1) Ceiling mounted. Positive stop action at any length, ratchet lock, and automatic rewind spring. Provide heavy duty type with 20 ft. of #12/3 SJEO minimum cord terminating in molded high impact outlet box with wire mesh cord grip and P&S #5362A or HBL 5362 receptacle (brown), and spring close cover plate. Provide rigid mounting support to building structure.

2) Acceptable Manufacturers:

a) Hubbell HBL45123R20 (Design Make)
b) Woodhead
c) Appleton RL5000 Series

b. Data cord reels:

1) Similar to power cord reels except:

a) 25 feet long, Category 6 LAN cable and male connectors.

b) Refer to LAN section for additional requirements.

c) AMTEK Hunter Spring & Reel #301172-2 or approved equal.

7. Time Switches:

   a. Digital Lighting Controller:

      1) Two inputs, two outputs, battery back-up.

      2) Provide (2-pole), (3-pole) mechanically held contactor.

      3) 120 volt clock input: Tork DGLC.

      4) 277 volt clock input: Tork DGLC-3.

   b. Digital Time Switch (for use with Lighting Contactor):

      1) SPDT, 7-day with 14 set points.

      2) Digital, AM/PM Clock with LCD display.

      3) Battery backup to keep program in memory for approximately seven (7) days.

      4) 120V Make: Tork EW120 or equal.

      5) 277 Make: Tork EW120-3 or equal.

   c. Time switches shall be provided with NEMA 1 general purpose, surface mount enclosures unless otherwise noted.

8. Elapsed Time Switches:

   a. Mechanical spring wound timer, which requires no electricity to operate the timing mechanism. Device shall fit a standard 2-1/2 in. deep wall box. Switch contacts shall break current carrying contacts at the end of the timed cycle.

      1) 0-30 Minutes: Tork A530M or equal.
      2) 0-4 Hours: Tork A504HH or equal.
      3) 0-12 Hours: Mark Time or equal.

9. Emergency Shutdown Pushbutton:

   a. Where called for provide emergency shutdown/emergency power off push button. Unit shall be Square D Class 9001 Type K NEMA 13 oil tight pushbutton with the following:

      1) Red mushroom head 1-1/2 in. button, hinged protective flip up cover, push to operate, pull to reset.

2) Maintained contact operation with one normally open and one normally closed 10A 120V contacts. Provide relay for additional contacts.

3) Red pilot light.

4) Engraved legend plate indicating "XX - Emergency Stop" with XX = the system name.

10. Photoelectric Controls (Exterior Lighting):

a. Heavy Duty, 1/2 in. Conduit Mounting:

1) 120 volt, SPST, 2000 watt: Tork Model 2101.
2) 277 volt, SPST, 2000 watt: Tork Model 2104.

b. Combination Photoelectric Control and Contactor:

1) 120 volt, DPST, 3000 watt per pole: Tork Model 5403.
2) 277 volt, DPST, 3000 watt per pole: Tork Model 5404-3.
3) 208 volt, DPST, 3000 watt per pole: Tork Model 5404.

c. Refer to Lighting Control section for Day Lighting components

11. Occupancy/Vacancy (Automatic/Manual) Sensors:

a. Refer to Lighting Control section for additional requirements

b. Sensors shall comply with the following as a minimum:

1) Zero crossing switching operation (switch on/off only where sine wave is at zero volts) suitable for linear, non-linear and electronic/magnetic fluorescent ballasts for the loads indicated. Where the load to be controlled exceeds the sensor load rating provide a separate relay of adequate rating.

2) Failure of the unit shall be to the on/closed position or manual operation.

3) Motion sensitivity adjustment (dip switch or dial) and time delay adjustment (5 to 20 minutes minimum, dip switch or dial).

4) Line voltage input and switching. Field selectable for 120 or 277 VAC, 60 Hz.

5) UL listed and have a five (5) year manufacturer full replacement warranty.

6) Test mode feature to override the set time delay to allow adjusting of the sensitivity.

7) Sensor locations shall be adjusted during construction and at occupancy as recommended by the manufacturer for optimal sensing and operation.

8) Operation shall have adjustable time delay. Occupancy sensors shall have automatic on and vacancy sensors shall have manual on.

9) Adjustable controls/settings shall only be accessible when the front cover is removed or from the back of the unit.

10) Unit color shall match the project devices except for the ceiling mounted units which shall match the ceiling color. All color selections shall be by the Architect.

11) Ultrasonic sensing shall not be affected by air movement and shall operate at 32 kHz minimum (shall not interfere with hearing aids or other equipment).

12) Provide components as needed for the indicated control.

13) A factory authorized representative shall coordinate and instruct the start up services of the sensors providing placement recommendations, connection guidance and start up supervision and adjustment.

c. Wall Mounted - Passive Infrared (PIR):

1) Unit shall fit into a standard single gang electrical box, have an on/off button and utilize PIR technology motion sensing. Selectable manual or automatic on mode.

2) Minimum Switching Capacity: 120 V - 800 W, 277 V - 1200 W.

3) The sensing shall be 180° and the sensitivity area to be a minimum of:

a) Major Motion (Walking/Arm Wave): 35 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 20 ft. x 15 ft.

4) Ambient light level sensing (adjustable 20-300 fc) to prevent "on" operation when the ambient light level is greater than the set point level.

5) High impact resistant sensor lens.

6) Acceptable Manufacturers:

a) Pass & Seymour Model OS300S (Design Make)

b) Hubbell
c) Watt Stopper
d) Sensor Switch

d. Wall Mounted - Dual Technology (PIR and Ultrasonic):

1) Unit shall fit into a standard single gang electrical box, have an on/off button and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one is needed to keep it closed. Selectable manual or automatic on mode.

2) Minimum Switching Capacity: 120 V - 800 W, 277 V - 1200 W.

3) The sensing shall be 180° and the sensitivity area to be a minimum of:

a) Major Motion (Walking/Arm Wave): 35 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 20 ft. x 15 ft.

4) Ambient light level sensing (adjustable 20-300 fc) to prevent "on" operation when the ambient light level is greater than the set point level.

5) High impact resistant sensor lens.

6) Acceptable Manufacturers:

a) Hubbell Model AD2000 (Design Make)
b) Watt Stopper
c) Cooper
d) Sensor Switch

e. Wall Mounted - Dual Technology - Dual Switching:

1) Unit shall fit into a standard single gang electrical box, have two on/off buttons and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one is needed to keep it closed. To have two contacts each fully rated, electrically separate and be commonly controlled. Selectable manual or automatic on mode.

2) Minimum switching capacity: 120 V - 800 W, 277 V - 1200 W.

3) The sensing shall be 180° and the sensitivity area to be a minimum of:

a) Major Motion (Walking/Arm Wave): 35 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 20 ft. x 15 ft.

4) Ambient light level sensing (adjustable 20-300fc) to prevent "on" operation when the ambient light level is greater than the set point level.

5) High impact resistant sensor lens.

6) Acceptable Manufacturers:

a) Hubbell Model AD2000X2 (Design Make)
b) Watt Stopper
c) Cooper
d) Sensor Switch

f. Ceiling Mounted - Occupancy Sensor - Ultrasonic:

1) Unit shall mount to standard octagonal box, have adjustable sensitivity/time delay, have auxiliary contact (form C, 0.5A at 24 VDC) and utilize ultrasonic sensing. Auxiliary contact shall indicate movement sensing and be programmable to utilize time delay or not.

2) Shall have self contained rated contacts or control a separate switch pack. If a self contained unit then the ratings and function shall meet or exceed the switch pack specifications.

3) Sensing shall be 360° with a minimum operating area of:

a) Major Motion (Walking/Arm Wave): 50 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 40 ft. x 20 ft.

c) Corridor (Major Motion): 50 ft. x 16 ft.

4) Units shall be suitable for overlap of motion detection areas without reduction in spacing and false operation.

5) Sensing shall be suitable for a ceiling/mounting height of up to 12 ft. minimum.

6) The maximum depth shall be 1.5 in. below the ceiling/box.

7) Acceptable Manufacturers:

a) Hubbell Model ATU2000CRP (Design Make)
b) Watt Stopper
c) Cooper
d) Sensor Switch

g. Ceiling Mounted - Occupancy Sensor - Dual Technology:

1) Unit shall mount to standard octagonal box, have adjustable sensitivity/time delay, have auxiliary contact (form C, 0.5A at 24 VDC) and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one is needed to keep it closed. Auxiliary contact shall indicate movement sensing and be selectable to utilize time delay or not.

2) Shall have self contained rated contacts or control a separate switch pack. If a self contained unit then the ratings and function shall meet or exceed the switch pack specifications.

3) Sensing shall be 360° with a minimum operating area of:

a) Major Motion (Walking/Arm Wave): 50 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 40 ft. x 20 ft.

c) Corridor (Major Motion): 50 ft. x 16 ft.

4) Units shall be suitable for overlap of motion detection areas without reduction in spacing and false operation.

5) Sensing shall be suitable for a ceiling/mounting height of up to 12 ft. minimum.

6) The maximum depth shall be 1.5 in. below the ceiling/box.

7) Acceptable Manufacturers:

a) Hubbell Model ATD2000CRP (Design Make)
b) Watt Stopper
c) Cooper
d) Sensor Switch

h. Ceiling Mounted - Vacancy Sensor - Dual Technology:

1) Unit shall mount to standard octagonal box, have adjustable sensitivity/time delay, have auxiliary contact (form C, 0.5A at 24 VDC) and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one is needed to keep it closed. Operation shall require manual operation of momentary wall switch for lighting to be switched on and automatic off. Auxiliary contact shall indicate movement sensing and be selectable to utilize time delay or not.

2) Shall have self contained rated contacts or control a separate switch pack. If a self contained unit then the ratings and function shall meet or exceed the switch pack specifications.

3) Sensing shall be 360° with a minimum operating area of:

a) Major Motion (Walking/Arm Wave): 50 ft. x 30 ft.

b) Minor Motion (Small Motion at Desk): 40 ft. x 20 ft.

c) Corridor (Major Motion): 50 ft. x 16 ft.

4) Units shall be suitable for overlap of motion detection areas without reduction in spacing and false operation.

5) Sensing shall be suitable for a ceiling/mounting height of up to 12 ft. minimum.

6) The maximum depth shall be 1.5 in. below the ceiling/box.

7) Provide momentary switch(es) and any other needed equipment for indicated operation.

8) Acceptable Manufacturers:

a) Hubbell Model ATD2000CRP (Design Make)
b) Watt Stopper
c) Cooper
d) Sensor Switch

i. Switch Pack:

1) Provide a minimum of one (1) switch pack for each ceiling mounted occupancy sensor. Provide additional units for multiple circuits (quantity to match the quantity of circuits).

2) Unit shall be plenum rated with line voltage side into a metallic box.

3) Low voltage power shall be suitable for a minimum of three (3) occupancy sensors. Multiple sensors shall be able to control a single switch pack.

4) Minimum switching capacity shall be 20A (all types of loads) at 120/277VAC.

j. Testing:

1) Each occupancy sensor shall be fully tested for proper operation of all functions after installation.

2) Testing shall include sensitivity, time delay, ambient lighting level, etc.

3) Operation and settings shall be acceptable to the Owner.

J. Automatic Load Control Relay (ALCR):

1. Senses normal power local outage and automatically energizes emergency circuit bypassing switch control. Relay shall be UL924 listed for use in monitoring and controlling emergency circuits; shall have 20A, 600 volt rating.

2. Locations to be centrally located. Coordinate with Owner.

3. Design Make: Watt-stopper, ELCU-200 Series

K. Hand Dryers:

1. Hand dryers shall include a ¼ inch thick cast iron cover, finished with porcelain enamel. Motor shall be universal type, 1/10 HP at 7,500 rpm. Dryer shall deliver 7,300 linear feet of air per minute. Dryer shall be activated by means of a pushbutton control device and cam-operated timer. Dryer shall be listed by Underwriters Laboratories, Inc.

2. Electrical Characteristics:

a. Drying Cycle: 40 Seconds.
b. Nozzle: Fixed.
c. Volts: 115.
d. Amps: 15.
e. Watts: 1,725.
f. Frequency: 60 Hz.

3. Make: World Dryer Corporation, Model No. A2, or approved equivalent.

L. Ceiling Fans:

1. Ceiling fans shall have a 52 in. blade sweep unless otherwise noted. Ceiling fans in larger spaces, such as Libraries, Media Centers, Cafeterias, etc., shall have a 96 in. blade sweep unless otherwise noted. Motor shall be direct drive with sealed ball bearings. Quiet high efficiency type EC motor with digital inverter drive shall operate at 120 volt, 60 HZ, .6 amps form 60-182 RPM and a maximum of 35 dBA. Provide complete with three (3) hybrid resin blades, all mounting hardware and downrod with white enamel finish. Universal mount for both flat and sloped ceilings. Shall have 8" downrods for high ceilings and flush mounted "hugger style" for low ceilings. Provide mounting and associated hardware per manufacturer's recommendations and fan distance guidelines.

2. Controller: Hardwired 3-speed, multiple fan variable controller (Non-BT).

3. Warranty: Minimum 2-year motor warranty, 1-year parts warranty, 5-year motor controller warranty.

4. Design Makes:

   a. 52-inch: Big Ass Fans Haiku L-Series with 3-speed hardwired wall controller..

   b. 96-inch: Big Ass Fans Essence Series with 3-speed hardwired wall controller.

M. Waterproofing Seals:

1. Provide expanding link type seal, for installation between duct/conduit, and sleeve or core-drilled hole in concrete.

2. Make: Link Seal, manufactured by Thunderline Corp., or approved equal.

N. Flashing, Sealing, Fire-stopping:

1. Fire-Stopping for Openings Through Fire and Smoke Rated Wall and Floor Assemblies:

   a. Provide materials and products listed or classified by an approved independent testing laboratory for "Through-Penetration Fire-Stop Systems". The system shall meet the requirements of "Fire Tests of Through-Penetration Fire-Stops" designated ASTM E814.

   b. Provide fire-stop system seals at all locations where piping, tubing, conduit, electrical busways/cables/wires, ductwork and similar utilities pass through or penetrate fire rated wall or floor assembly. Provide fire-stop seal between sleeve and wall for drywall construction.

   c. The minimum required fire resistance ratings of the wall or floor assembly shall be maintained by the fire-stop system. The installation shall provide an air and watertight seal.

   d. The methods used shall incorporate qualities, which permit the easy removal or addition of electrical conduits or cables without drilling or use of special tools. The product shall adhere to itself to allow repairs to be made with the same material and permit the vibration, expansion and/or contraction of any items passing through the penetration without cracking, crumbling and resulting reduction in fire rating.

2. Acceptable Manufacturers:

   a. Dow Corning Fire-Stop System Foams and Sealants
   b. Nelson Electric Fire-Stop System Putty, CLK and WRP
   c. S-100 FS500/600, Thomas & Betts
   d. Carborundum Fyre Putty
   e. 3-M Fire Products

2.2 WIRE GUARD

A. Where specified herein or shown on the drawings provided a wire guard for devices or equipment. Units shall be custom as needed for the application.

B. Wire guard shall be a minimum #6 wire gage of zinc plated steel, overall clear coating and welded at joints. For any unit needing access it shall have an integral hinge and locking means.

C. Wires shall have 2 in. maximum spacing.

D. Acceptable Manufacturers:

1. Design Make: American Time and Signal

2. Approved equal

PART 3 - EXECUTION

3.1 INSTALLATION

A. Unless otherwise noted, wiring for all systems indicated in the contract documents shall consist of insulated conductors installed in raceways. Raceways shall be continuous from outlet box to outlet box and from outlet box to cabinet, junction or pull box. Secure and bond raceways to all boxes and cabinets so that each system of raceways is electrically continuous throughout. Unless otherwise indicated on the drawings, install all wiring in the following raceway system:

1. Wiring Above 600 Volts in Indoor Dry Locations or Outdoors, Above Grade Locations: Rigid metal conduit or aluminum conduit.

2. Wiring Above 600 Volts, Below Grade: Rigid non-metallic conduit with rigid metal conduit bends and penetrations through building floors and walls.

3. Wiring 600 Volts or Less in Dry Locations: Electrical metallic tubing or type MC cable.

4. Wiring 600 Volts or Less in Outdoors, Above Grade Locations: Rigid metal conduit.

5. Wiring 600 Volts or Less Installed Below Grade, in Concrete Floor Slabs or Below Ground Floor Slab: Rigid non-metallic conduit encased in concrete with rigid metal conduit bends and penetrations through building floors and walls.

6. Flexible metal conduit shall be used for final connection to all motors, final connection to rotating or vibrating equipment, final connections to dry type transformers and final connections to recessed lighting fixtures. Liquidtight flexible conduit shall be used in all wet or damp locations. Maximum length of flexible conduit shall be 36 in., except that from outlet boxes to lighting fixture maximum length shall be 6 ft. Provide green insulated equipment grounding conductor in all flexible metal conduit.

7. Surface metal raceway may be used for surface runs in finished area where concealed conduit cannot be run or where specifically indicated on drawings. Submit detailed description and/or layout for approval prior to roughing.

8. Where allowed, branch circuits may be type MC cable between homerun junction box and equipment/device connection in drywall partitions only. Homerun junction box to be a maximum of 20 ft. from equipment/device.

B. Raceways:

1. Sized as indicated on the drawings. Where sizes are not indicated, raceways shall be sized as required by the National Electrical Code in accordance with the quantity, size, and type of the insulation conductors to be installed. Raceways shall be minimum 1/2 in. trade size for branch circuit wiring and minimum 3/4 in. trade size for all telephone intercommunications, instrumentation, fire alarm, television and computer systems and for all branch circuit "Home Runs" to panelboards.

2. Installed to provide adequate grounding between all outlets and the established electrical system ground.

3. Cut square, free of burrs due to field cutting or manufacture, and bushed where necessary.

4. Installed with exterior surfaces not less than 6 in. from any surface with normal operating temperature of 200°F or higher.

5. Plugged at the ends of each roughed-in raceway with an approved cap or disc to prevent the entrance of foreign materials during construction.

6. Concealed throughout except where exposure is permitted by the Owner's Representative. All exposed raceways shall be painted to match existing adjacent surface finish as directed by the Architect.

7. Installed parallel or perpendicular to floors, walls and ceilings where exposed wiring is permitted.

8. Installed with a minimum of bends and offsets. All bends shall be made without kinking or destroying the cross section contour of the raceway. Factory made bends are acceptable and should be considered for raceways larger than 2 in.

9. Installed with UL approved rain-tight and concrete-tight couplings and connectors.

10. Firmly fastened within 3 ft. of each outlet box, junction box, cabinet or fitting. Raceways shall not be attached to or supported by wooden plug anchors or supported from mechanical work such as ductwork, piping, etc.

11. Installed with a #14 AWG fish wire in all telephone, intercommunication, "Spare" or "Empty" conduit runs to facilitate future installation of conductors.

12. Installed with expansion fittings at all building expansion joints such that no undue stress is placed on any electrical raceway due to the proper functioning of expansion joints.

13. Arranged in a neat manner for access and allow for access to work installed by other trades.

14. Raceways installed in concrete slabs shall be located so as not to affect structural integrity of slab, and such that conduit shall have a minimum of 1 in. of concrete cover on all sides. Obtain approval from the Owner's Representative prior to installing conduit larger than 1 in. trade size in concrete slabs. Raceways in slabs shall be for floor box use only.

15. Raceways installed below ground floor slab shall be encased in concrete with 3 in. minimum coverage on all sides. Where possible, install conduit directly below slab with concrete envelope poured monolithic with slab. Where this is not possible, support raceways and envelop maximum 5 ft. - 0 in. on centers from underside of structural slab by means of galvanized pipe hangers. Pipe hangers shall be coated with asphalt mastic. Installation shall maintain integrity of waterproofing membrane.

16. If it is necessary to burn holes through webs of beams or girders, call such points to the attention of the Owner's Representative and receive written approval both as to location and size of hole before proceeding with work. All holes shall be burned no larger than absolutely necessary.

17. Become familiar with the general construction of the building and place sleeves, inserts, etc., as required. All penetrations through existing floors shall be core drilled and sleeved.

18. Wherever a cluster of four (4) or more raceways rise out of floor exposed, provide neatly formed 6 in. high concrete envelop, with chamfered edges, around raceways.

19. All raceways shall be supported adequately by malleable iron pipe clamps or other approved methods. In exterior or wet locations, supports shall allow not less than 1/4 in. air space between raceway and wall. Firmly fasten raceway within 3 ft. of each outlet box, junction box, cabinet or fitting. The following table lists maximum spacing between conditions, strength of supporting members, etc.

20. Furnish and install such supports at no additional cost to owner.

Conduit Trade Size	Type of Run	Horizontal Spacing in Feet	Vertical Spacing in Feet
1/2 in., 3/4 in.	Concealed	7	10
1 in., 1-1/4 in.	Concealed	8	10
1-1/2 in. and larger	Concealed	10	10
1/2 in., 3/4 in.	Exposed	5	7
1 in., 1-1/4 in.	Exposed	7	8
1-1/2 in. and larger	Exposed	10	10

21. Where raceways puncture roof, install pitch pockets as required in order that the roof warranty is maintained. Coordinate with representative of roofing material manufacturer.

22. At each flush mounted panelboard, terminal cabinet, control cabinet, etc., provide four (4) spare 3/4 in. raceways from panelboard, etc., to an area above the nearest accessible ceiling space. Make 90° turn above the ceiling, arranged for further continuation of raceway, and cap.

23. Provide a bushing at each conduit termination unless fitting at box where conduit terminates has hubs designed in such a manner to afford equal protection to conductors. Provide grounding type insulated bushings on all conduit sizes 1-1/4 in. trade size and larger, and on all feeder raceways regardless of size. Provide standard bushings for conduits 1 in. and smaller unless otherwise stated.

24. Differing Temperatures: For raceways routed between areas with differing temperatures (interior to exterior, walk in coolers/freezers, environmental chambers, etc.) install raceway as follows:

    a. Provide a thermal break, 4 in. minimum of stainless steel conduit within space wall/separation.

    b. Seal raceway penetration through the wall/separation.

    c. Provide a box on each side of the space wall/separation.

    d. Provide raceway interior sealant (duct seal or suitable foam) to provide a complete air barrier after conductors are installed.

    e. Mounting of raceway and boxes on equipment shall be coordinated and approved by the equipment manufacturer.

25. Raceway installed in wet, damp or exterior walls shall have a spacer provided to maintain a space/void between the mounting surface and the raceway.

C. Wiring Methods:

1. Conductors shall not be installed until raceway system, including all outlets, cabinets, bushings and fittings, is completed. Verify that all work of other trades which may cause conductor damage is completed. Use only U.L. approved cable lubricants when necessary. Do not use mechanical means to pull conductors No. 8 or smaller.

2. In general, conductors shall be the same size from the last protective device to the load.

3. All wiring systems shall be properly grounded and continuously polarized throughout, following the color-coding specified. Connect branch circuit wiring at panelboards, as required, in order to provide a "balanced" three-phase load on feeders.

4. Provide insulated green ground conductor in each branch circuit.

5. All feeder connections shall be made to bus and other equipment using solderless, pressure type terminal lugs.

6. For splices and taps, No. 10 AWG and smaller, use solderless "twist on" connectors having spiral steel spring and insulated with a vinyl cap and skirt.

7. For splices and taps, No. 8 and larger, use insulated solderless set screw AL/CU or hydraulically compressed sleeve fittings suitable for the intended use.

8. Use cast connections for ground conductors.

9. Provide minimum 6 in. of spare/slack of each conductor in each junction or pull box and termination.

10. Make all splices and connections in accessible boxes and cabinets only.

11. Cover uninsulated splices, joints, and free ends of conductor with rubber and friction tape of PVC electrical tape. Plastic insulating caps may serve as insulation. Heat shrink sleeves shall be acceptable for crimp type splices.

12. On termination at branch circuit outlets, leave a minimum of 8 in. free conductor for installation of devices and fixtures.

13. Feeder conductors shall be continuous from point of origin to load termination without splice. If this is not practical, contact the Owner's Representative and receive written approval for splicing prior to installation of feeder(s). Where feeder conductors pass through junction and pull boxes, bind and lace conductors of each feeder together. For parallel sets of conductors, match lengths of conductors as near equal as possible.

14. Branch circuit conductors installed in panelboards, and control conductors installed in control cabinets and panels shall be neatly bound together using "Ty-Raps" or equal.

15. Provide conduit seals and explosion proof devices as indicated on the plans and as dictated by the NEC for all hazardous locations indicated on the drawings.

16. Lighting fixtures, detectors, etc., in mechanical equipment, boiler and pump rooms shall be installed with exposed wiring after equipment, ductwork, piping, etc., are in place. In general, lighting shall be as located on the drawings; where conflicts exist, locate lights for best distribution.

17. Fire proof tape all medium voltage cables in handholes, man holes, building entrance and junction/pull boxes.

18. Provide cable/conductor vertical support in accordance with the NEC.

D. Outlet Boxes:

1. Consider location of outlets shown on drawings as approximate only. Study architectural, process piping, mechanical, plumbing, structural, roughing-in, etc., drawings and note surrounding areas in which each outlet is to be located. Locate outlet so that when fixtures, motors, cabinets, equipment, etc., are placed in position, outlet will serve its desired purpose. Where conflicts are noted between drawings, contact Owner's Representative for decision prior to installation. Comply with the NEC relative to position of outlet boxes in finished ceilings and walls.

2. Prior to installation, relocate any outlet location a distance of 5 ft. in any direction from location indicated on drawings if so directed by the Owner's Representative. Prior to completion of wall construction, adjust vertical height of any outlet from height indicated if so directed by Owner's Representative. The above modifications shall be made at no additional cost to the Owner.

3. Where outlets at different mounting heights are indicated on drawings adjacent to each other (due to lack of physical space to show symbol on drawings), install outlets on a common vertical line.

4. Where switch outlets are shown adjacent to strike side of door, locate edge of outlet box approximately 3 in. from door frame.

5. Outlet boxes in separate rooms shall not be installed "back-to-back" without the approval of the Owner's Representative.

6. Outlet boxes shall be sized to accommodate the wiring, splices and device(s) to be installed in accordance with the NEC.

7. Outlet boxes installed in plaster, gypsum board or wood paneled hollow cavity walls shall be installed flush with raised plaster covers or raised tile covers. Boxes shall be mechanically fastened and supported by two (2) adjacent structural members (studs) with cross brackets (Garvin Industries Model BMB or approved equal).

8. Outlet boxes installed in tile, brick or concrete block walls shall be installed flush and have extra-deep type raised tile covers or shall be 3-1/2 in. deep boxes with square corners and dimensions to accommodate conductors installed.

9. Surface ceiling mounted outlet boxes shall be minimum 4 in. square, 1-1/2 in. deep, galvanized sheet metal.

10. Surface wall mounted outlet boxes shall be cast type boxes.

11. Floor outlet boxes shall be installed flush with finished floor, adjust level and tile as required. Where finished floor is terrazzo, provide boxes specifically designed for installation in terrazzo. Where floors are to receive carpet or flooring material, coordinate with appropriate trade and provide insert. Rectangular covers shall be parallel and perpendicular with the building and, if used, floor tile/floor joints/pattern. Coordinate cover type with the flooring and device type.

12. Install a device cover plate over each and every outlet indicated on drawings. Do not install plates until painting, cleaning and finishing of surfaces surrounding the outlet are complete. Install single one-piece multi-gang covers over multi-gang devices.

E. Toggle Switches:

1. Switches shall be installed in accessible locations near room/space entryway(s).

2. Provide lighted handle switches in mechanical rooms, elevator pits, electric rooms, etc.

F. Junction and Pull Boxes:

1. Install junction and pull boxes in readily accessible locations. Access to boxes shall not be blocked by equipment, piping, ducts and the like. Provide all necessary junction or pull boxes required due to field conditions and size as require by the National Electrical Code.

G. Equipment Mounting Heights

1. Unless otherwise noted, mount devices and equipment at heights measured from finished floor to device/equipment centerline as follows:

a. Toggle switches (up position "on") 46 in.

b.	Receptacle outlets (long dimension vertical, ground" pole farthest from floor)	18 in.
c.	Receptacle outlets above counters	8 in. above counters
d.	Receptacle outlets, above hot water or steam baseboard heaters. Do not install receptacle outlets above electric baseboard heaters	30 in.
e.	Receptacle outlets, hazardous areas; also for refrigerators	48 in.
f.	Receptacle outlets, weatherproof, above-grade	24 in.
g.	Clock outlets (104 in. AFF or 10 in. below ceiling, whichever is lower) For large, high spaces, coordinate with Architect.	104 in.
h.	Telephone outlets	18 in.
i.	Telephone outlets, wall mounted	46 in.
j.	T.V. outlet	18 in.
k.	Fire alarm manual stations	46 in.
l.	Fire alarm combination audio/visual and standalone visual device (entire strobe lens at heights indicated)	80 in. to bottom of the notification device
m.	Standalone fire alarm audio device	90 in. (min) to 96 in. (max)
n.	Distribution panelboards, to top of backbox	72 in.
o.	Terminal cabinets, control cabinets, to top of backbox	72 in.
p.	Disconnect switches, motor starters, enclosed circuit breakers.	48 in.

2. Where structural or other interferences prevent compliance with mounting heights listed above, consult Owner's Representative for approval to change location before installation.

H. Hangers and Supports:

1. Provide steel angles, channels and other materials necessary for the proper support and erection of motor starters, distribution panelboards, large disconnect switches, large circuit breakers, pendant mounted lighting fixtures, etc.

2. Panelboards, disconnect switches, circuit breakers, cabinets, large pull boxes, adjustable speed drives, cable support boxes and starters shall be secured to the building structure and not supported from conduits. Small panelboards, etc., as approved by Owner's Representative, may be supported on walls. Racks for support of conduits and heavy electrical equipment shall be secured to building construction by substantial structural supports.

I. Identification:

1. Provide engraved lamicoid identification nameplates on switchboards, main service disconnects, transfer switches, motor control centers and on all panelboards using designation shown in panelboard schedule. Include voltage, phase, equipment served, voltage source to panel or equipment.

2. Provide engraved lamicoid identification nameplates for each circuit breaker in the main distribution panel listing the panelboard or equipment connected to each device.

3. Provide engraved lamicoid identification nameplates on all items of equipment including individual circuit breaker enclosures and disconnect switches, listing the equipment connected to the particular device provided under Specification Section 262000, including, but not limited to: starters, disconnect switches, adjustable speed drives, circuit breakers, etc. Include voltage, phase, equipment served, voltage source to panel or equipment.

4. Provide complete type written directory for each panelboard listing room number, function, etc., for each circuit breaker. Provide type written updated panelboard directories for existing panelboards affected by this work.

5. Nameplates shall be engraved black, with white core, with Helvetica medium 3/16 in. lettering. 1/8 in. lettering is acceptable where space of 3/16 in. is not available.

6. Identify junction and pullboxes for particular service and circuit such as power, lighting, fire alarm, telephone, interphone, public address, nurse call, etc. using stencil lettering on cover.

7. Provide signage at each electrical service room indicating "DANGER - HIGH VOLTAGE - KEEP OUT". Utilize adhesive backed, yellow background, block lettering signage at door.

8. Using adhesive backed printed tape label all receptacle and switch coverplates, power poles, etc. listing panel designation and circuit number. Tape shall be attached to inside of receptacle or switch coverplates.

J. Spare Parts:

1. Deliver to Owner and obtain receipt for spare parts including key switches, fuses, etc.

3.2 TESTS

A. Branch circuits shall be tested during installation for continuity and identification and shall pass operational tests to determine that all circuits perform the function for which they are designed. For all feeder wiring rated 600 volts or less, provide 1,000 volt "Megger" insulation test prior to energizing feeders. Use a 1,000-volt motor driven megger for all tests. Test voltage shall be applied until readings reach a constant value, and until three (3) equal readings, each one (1) minute apart, are obtained. Minimum megger reading shall be 45 megohms for feeder conductors. Document test results and submit for approval prior to energizing conductors.

END OF SECTION 26 05 01

SECTION 26 05 26 - GROUNDING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide grounding system equal to or exceeding the requirements of NEC and as indicated in the contract documents. Raceway system which includes metal conduit, wireways, pullboxes, junction boxes, busway, wire ways, cable trays, enclosures, motor frames, etc., shall be made to form a continuous, conducting permanent ground circuit of the lowest practical impedance to enhance the safe conduction of ground fault currents and to prevent objectionable differences in voltage between metal nonload current carrying parts of the electrical system.

B. Provide solid grounding of building structures and electrical and communications systems and equipment. It includes basic requirements for grounding for protection of life, equipment, circuits and systems. Types of grounding systems include the following:

1. Electrical Service and Transformer Grounding
2. Building Grounding
3. Equipment Room Ground Terminal Bar
4. Electrical Equipment Grounding
5. Surge Protection Device (SPD) Grounding
6. Telecommunications Grounding
7. Equipotential Grounding Systems
8. Underground Distribution Grounding
9. Common Ground Bonding with Lightning Protection System

1.2 QUALITY ASSURANCE

A. All methods of construction, details of workmanship, that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions. etc., correspond to the nomenclature dictated by those manufacturers. Where "or equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

B. Electrical Components, Devices and Accessories: Listed and labeled as defined in the NEC by Nationally Recognized Testing Laboratory (NRTL) and marked for intended use.

C. Comply with UL 467 for grounding and bonding materials and equipment.

1.3 REQUIREMENTS

A. Grounding conductors, bonding conductors, jumpers, grounded conductors, etc. shall be sized in accordance with the NEC.

B. Equipment and materials shall be installed in accordance with the manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Conductors:

1. Exposed grounding components such as bars, straps, cables, flexible jumpers, braids, shunts, etc., shall be bare copper unless otherwise indicated.

2. Grounding conductors in raceway with 600V circuiting shall be insulated to match the circuit conductors with green color.

3. Grounding conductors used with system voltage greater than 1000V shall be bare unless otherwise indicated.

4. Grounding conductor size shall be as indicated or as required by the NEC whichever is larger, stranded, soft drawn or soft annealed copper, unless otherwise indicated. Sizing shall take into account circuit voltage drop.

5. Acceptable Manufacturers:

a. Same make as for 600 volt conductors.

B. Connectors, Clamps and Terminals:

1. Mechanical connectors and clamps shall be made of copper alloy or silicon bronze. Solderless compression terminals shall be copper, long-barrel, NEMA two bolt. Bolts and washers (Belleville) shall be of comparable material or stainless steel.

a. Acceptable Manufacturers:

1) Burndy
2) Hubbell Anderson Corp.
3) Thomas & Betts
4) Approved equal

2. Exothermic Welds:

   a. Provide exothermic welds designed for size and type of intended cable, rods, structure, etc. Solder prohibited for connections, except for medium and high voltage cable metallic tape shields (utilize mechanical and solder).

   b. Acceptable Manufacturers:

      1) Erico "Cadweld"
      2) Burndy "ThermOweld"
      3) Approved equal

3. Pipe Clamp:

   a. Pipe clamp for bonding to pipe type electrode (water pipe, etc.) shall be a suitably sized copper alloy clamp.

   b. Acceptable Manufacturers:

      1) Burndy GAR-BU
      2) O-Z Gedney type CG
      3) Burndy "Durium"
      4) AFL Global "Everdur"
      5) Approved equal

4. Flexible Strap:

   a. Flexible grounding straps shall be of braided high conductivity copper with two hole connector. Strap shall have equal to or greater than ampacity of the system it is bonding to. Strap shall provide flexibility in all directions when installed properly.

   b. Acceptable Manufacturers

      1) Burndy
      2) OZ Gedney
      3) Approved Equal

PART 3 - EXECUTION

3.1 INSTALLATION

A. Grounding Conductors:

1. Provide grounding conductor(s) with all power circuits. Conductor shall be sized as indicated or as required by the NEC as a minimum and shall be terminated on the equipment, device, enclosure, etc. grounding terminal. Conductor size shall be for the entire length unless approved by the Engineer where oversized for voltage drop.

2. Conductors above grade to ground electrodes (water piping, structural column, etc.) and to equipment (service entrance, ground bars, ground halos, etc.) shall be installed in metallic conduit with ends bonded to the conduit.

3. Grounding conductors shall be installed to have a minimum radius of 3 in.

4. Grounding conductors in a raceway system shall be terminated/bonded to each box, cabinet, enclosure, etc. through which it passes or terminates.

5. Grounding conductors routed with underground circuits shall be bonded to each ground electrode and metallic cable support system within the raceway system including pull and access locations.

6. Stranded conductors penetrating vapor barriers, foundations, slab on grade and water stop membranes shall have the interstitial spaces between strands filled with solder 4 in. beyond the membrane each side. The conductor shall be sealed to the membrane with a manufacturer approved method.

B. Raceway Systems:

1. All metal supports, cable trays, messenger cables, frames, sleeves, brackets, braces, etc. for the raceway system, panels, switches, boxes, starters controls, etc., which are not rigidly secured to and in contact with the raceway system, or which are subject to vibration and loosening, shall be bonded to the raceway system.

2. Termination of rigid conduit at all boxes, cabinets, and enclosures shall be made up tightly with a double locknut arrangement and a bushing, bushings being of the insulated type. Utilize grounding bushings as specified elsewhere in these specifications.

3. Conduit which runs to or from boxes, cabinets, or enclosures having concentric or eccentric knockouts which partially perforate the metal around the conduit and hence impair the continuity of system ground circuits shall be provided with bonding jumpers connected between a grounding type bushing/locknut on the conduit and a ground bus or stud inside the box, cabinet, or enclosure and attached thereto.

4. Conduit expansion joints and telescoping sections of metal raceways shall be provided with bonding jumpers sized in accordance with the NEC.

C. Connectors Clamps and Terminals:

1. Connectors utilized above grade in dry accessible locations shall be mechanical or exothermic type.

2. Connectors in damp locations, below grade or if not indicated shall be exothermic type.

3. Clean the area near the connecting surfaces prior to any connection to ensure effective contact. Cleaning shall be to the bare metal. Wire brush area if needed to remove rust scale paint, dirt, etc. to expose bare metal.

4. Exothermic connections shall be installed in accordance with the manufacturer's recommendations and tested with heavy blow of a five pound sledge.

D. Flexible Strap:

1. Flexible straps shall be used when bonding vibrating/moveable equipment, with expansion fittings and where recommended by the manufacturer.

2. Sufficient slack shall be provided to compensate for the anticipated vibration, movement and expansion.

E. Secondary Electrical Systems:

1. The neutral (grounded) conductor of each low voltage, single and/or polyphase system or distribution system, except special isolated double insulated systems, shall be solidly connected to ground at the transformer neutral bushing, or at the main secondary switchgear to the system ground, and shall be sized for current carrying capacity, not to be less than as required by the NEC. Ground connection shall be to the building grounding system, building steel, building water service, building concrete reinforcement and as indicated.

2. Provide equipment grounding conductor, green colored insulation, with phase conductors, to primary side of all transformers rated 600 volts or less circuited to the enclosure and secondary neutral bushing, to all electrical utilization and distribution equipment; insulation shall be same type as phase conductors. Transformer enclosures shall be bonded to the primary and secondary circuit grounding conductor.

3. Equipment grounding conductors shall extend from the point of termination back to the ground bus of the source panelboard, switchboard, transformer, or switchgear.

F. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors in conduit from building's main service equipment or grounding bus to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes using a bolted clamp connector or by bolting a lug-type connector to a pipe flange using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor or sleeve to conductor at each end.

2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

G. Underground Distribution:

1. Manholes and Handholes: Provide a driven ground rod through opening in the floor/bottom with 4 in. exposed. If necessary due to the site conditions, install the ground rod prior to manhole/handhole installation and provide a #1/0AWG bare conductor from the ground rod with an exothermic connection in the manhole/handhole. Seal the opening with waterproof non-shrinking grout.

2. Bond exposed parts within manhole/handhole such as inserts, pulling rings, cable racks, ladders and cable shields to the ground rod with #2AWG bare conductor minimum. Conductors shall be neatly installed around the perimeter of the unit and support 3 ft. on center with non-corrosive support and hardware.

3.2 TESTS

A. Test the building ground system before backfilling to ensure continuity and determine system resistance value.

B. Testing procedure shall be a fall of potential type with a moving auxiliary electrode in accordance with IEEE Standard 142 and reviewed/approved by the Engineer. Sufficient test points shall be taken for accurate resistance value.

C. Make resistance measurements in dry weather, no earlier than 48 hours after rainfall. Provide tabulated test results indicating distance between rods and resistance readings on a plotted graph.

D. Test each ground electrode system separately prior to connection to the system or main building ground bar. Test each system ground electrode system a second time after backfilling has occurred and all final connections (building steel, water service, etc.) have been made.

E. Soil type, date, time, meter manufacturer/model number, person performing the test, test witnesses and most recent rainfall shall be noted in test submittal.

END OF SECTION 26 05 26

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SECTION 26 09 36- LIGHTING CONTROL

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide a complete lighting control system as indicated on the Contract Documents and as specified herein.

1.2 RELATED DOCUMENTS

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

1.3 QUALITY ASSURANCE

A. All methods of construction, details of workmanship that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc. correspond to the nomenclature dictated by those manufacturers. All equipment shall be tested at the factory.

B. Installation shall be accordance with NFPA 70 (National Electrical Code), energy conservation codes, state codes, local codes, and requirements of authority having jurisdiction.

C. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published ANSI, NEMA and IEEE Standards.

D. All equipment shall NRTL tested.

E. The controls provider must:

1. Provide equipment from manufacturers for which they maintain a contract, distributorship, are an agent, or other formal arrangement for which documentation can be produced showing authority to sell and service the equipment in this territory.

2. Demonstrate that they have successfully installed similar systems, utilizing their standard products, for a minimum period of five (5) years.

3. Maintain adequate spare parts inventory to provide both normal and emergency service.

4. Employ service technicians who are trained in accordance with the systems manufacturer's recommendations.

5. Own and demonstrate proficiency in the use of the required test equipment, tools, etc. for the proper installation, set-up, testing and maintenance of the system. If requested, must provide a listing of tools and/or equipment and where appropriate, certifications in the proper training and use of the tools and/or equipment.

   a. Provide all system programming to meet the Owner's requirements.

   b. All system programming is to be completed to the satisfaction of the Owner. After six (6) months of use of the system, and/or training, the increased understanding of the system's features and capabilities necessitates reprogramming to any extent, it is to be performed at no additional cost.

1.4 SUBMITTALS

A. Submit the following equipment, materials, and products including all components and accessories:

1. Digital Lighting Control System

2. Vacancy/occupancy Sensors

3. Low Voltage Switches

4. Photocell Units

5. Wiring diagrams

6. Equipment data sheets

7. Sequence of Operation to describe how each component operates and how any building wide functionality is achieved to exceed local energy code (Title 24 2016, ASHRAE 90.1 2016, IECC 2015, or any newer versions of these codes.

8. Commissioning Plan

1.5 SYSTEM DESCRIPTION

A. The lighting control system and/or components, as specified and indicated on the drawings to provide the intended and required control of the lighting systems, includes but is not limited to a digital lighting control system, dimming panels, automatic lighting control system, photocells/day-light sensors, lighting relay panels and associated room controllers and switches.

1. All components and assemblies are to be factory pretested.

2. Lighting control panels are to be NRTL tested under UL 916 Energy Management Equipment.

3. All assemblies are to be in compliance with FCC Emissions Standards specified in Part 15 Subpart J for Class A application.

4. Manufacturer shall utilize open communication protocol (Bacnet, Modbus, etc) for transferring information between network devices, allowing the lighting control system to be interoperable with devices from other manufacturers and with other network systems such as building control or other systems.

B. The lighting control system shall be capable of providing all of the following functions for all lighting:

1. Continuous dimming and automatic on/off controls.

2. Occupancy control.

3. Vacancy control.

4. Daylight harvesting.

5. Load management.

6. Multi-level scene control

7. Scheduling

8. Demand Response

9. Task Tuning.

10. Power measurement data reporting.

11. Mobile device configuration and control

12. Automatic Code Commissioning

13. The lighting control system shall be capable of continuous dimming and switching allowing each fixture to monitor its local environment and provide distributed control in response to environmental changes.

14. The lighting control system shall provide network communication of all sensor and device data for all light fixtures including power measurement, occupied/unoccupied status, scene status and daylight information.

15. The lighting control system shall provide out-of-the-box functionality of all light fixtures with integrated sensors providing occupancy automatic ON to 75% light level and automatic OFF after 20 minutes.

16. The lighting control system shall provide a method for the installer to verify communications and address all devices with a single push button.

17. The lighting control system shall provide visible indication on all devices when as each device joins the network.

18. The lighting control system shall provide the capabilities for the installer to create a construction group of all occupancy sensors and wall stations to control all installed light fixtures.

19. The lighting control system shall be able to be completely programmed and configured using a mobile application. Systems that require web or PC software for configuration shall not be acceptable.

20. The lighting control system shall allow addressed light fixtures with integrated sensors to be identified by shining a laser or bright flashlight into the sensor. Identified light fixtures shall provide visible indication on the mobile application. Systems that do not permit reverse identification method shall not be acceptable.

21. The lighting control system shall allow wallstations, receptacles, relays and remote sensors to be identified by simple pushbutton method on each device. Identified devices shall provide visible indication on the mobile application. Systems that do not permit reverse identification method shall not be acceptable.

C. The lighting control system includes the following components:

1. Integrated sensors shall include passive infrared sensor, digital photocell, microprocessor, and a load controller for ON/OFF/DIM.

2. Relay Switchpack with 0-10V control shall contain a utility grade power meter chip and a latching relay to control 20Amp load and 120mA 0-10V sink. Device shall include LED indication and pushbutton for device override and identification.

3. Tilemount daylight sensor shall include a digital photocell, microprocessor, and a load controller for ON/OFF/DIM.

4. Wallstation shall be mains powered (120/277VAC), including the following features:

   a. Numerous button configurations, supporting small and large engraved buttons

   b. Individual button LED indication

   c. Universal light icon with raise/lower buttons

   d. Each button fully programmable for Area Scene or Zone control

5. Ceiling sensor shall include passive infrared sensor, microprocessor, LED indication and pushbutton for device identification.

6. Receptacle control shall include a constant hot and controlled plug output.

   a. The receptacle control shall provide a single input for incoming power, devices that require constant hot and switched inputs shall not be acceptable.

   b. The receptacle control shall be clearly marked "Controlled" and with the NEMA defined controlled symbol ⏻

   c. The receptacle control shall include a microprocessor to provide control and power measurement data.

D. Area Controllers shall communicate with all sensors, wallstations, relays, and receptacles to coordinate control areas, and zones. The Area Controller shall support the following features:

1. Multiple controllers
2. Power over Ethernet connection to building LAN
3. Up to 16 areas
4. Up to 16 zones per area
5. Area scene configurations
6. Multiple occupancy sets per area
7. Multiple daylight sets per area
8. Demand Response reduction values
9. Scheduling configuration
10. Configuration backup and restore capabilities
11. Automatic Code Commissioning

E. Mobile application shall communicate using Wi-Fi to a single Area Controller or a building IT network with multiple Area Controllers. The Mobile application shall include the following features:

1. Ability to connect to multiple Area Controllers
2. Administrative and user login credentials
3. Demonstration and Live mode
4. Automatic Code Commissioning
5. Drag and drop or multi select programming of lighting system

1.6 SYSTEM SEQUENCE OF OPERATIONS

A. Lighting Control Applications:

1. Minimum lighting control performance required, unless local Energy Code is more stringent.

2. Occupancy/vacancy requirements – Provide an occupancy/vacancy sensors with Manual On/ Automatic Off or Automatic On/ Automatic Off functionality in all spaces. Manual On vacancy sensors should be used for any enclosed space with a Manual On switch that does not require hands free operation. Spaces with multiple occupants or where line of sight might be obscured ceiling or corner mount sensors and Manual wallstations would be required. Automatic On of lighting via occupancy sensor cannot exceed 50% of lighting. Systems that do that allow the user to select Occupancy or Vacancy Mode shall not be acceptable.

3. Bi-Level switching – Provide multi-level switching and/or variable dimming for maximum energy savings. (Qualifies for EPACT tax deductions of $0.60 per foot)

4. Task Lighting / Receptacle Control – Provide automatic shut off of non-essential plug loads and task lighting in all spaces. Provide Manual On or Automatic On of receptacles whenever spaces are occupied. Receptacle Control will only be shut off when no occupancy is detected within the space. Systems that do not provide receptacle control for a full 20 Amp circuit shall not be acceptable.

5. Daylight Zones – Primary side lit or top lit areas within an enclosed space shall be controlled separately and automatically by individual integrated daylight sensors. Adjustments to the daylight zones must be provided by a simple to use, intuitive mobile application.

6. Provide smooth and continuous daylight dimming for areas marked on drawings. Daylighting control system may be designed to dim electric light to the lowest light level and OFF.

7. Provide the ability to adjust the high end and low end trim of the dimmers to ensure the lighting automatically provides energy saving even when daylighting calls for full illumination.

8. Provide the ability for the dimmers and the relays to function separately. Systems where the 0-10V dimmers and relays are tied together reduce design capabilities and shall not be acceptable.

9. Shall be capable of automatically responding to a Demand Response Signal and adjusting the lighting level, without the need of programming or software. Systems that require software or commissioning to provide Demand Response integration shall not be acceptable. (Required for California Title 24 2013)

10. Additional controls:

    a. Provide occupancy or vacancy sensors (Auto On or Manual On) for any enclosed office, conference, meeting or training rooms. Spaces with multiple occupants or where line of sight may be obscured require ceiling or wall/corner mounted sensors with Manual On switches.

    b. Conference, meeting, training, auditoriums and multi-purpose rooms shall have controls that allow for scene based and independent control of each output. Rooms larger than 300 square feet shall support at least four (4) pre-set lighting scenes. Occupancy or vacancy sensors shall ensure all lighting, receptacles.

    c. Egress lighting control shall be integral to the system. The system shall provide an automatic control of adjacent corridor and/or egress lighting based upon room occupancy. Systems that do not ensure that adjacent corridor and/or egress lighting is controlled with room occupancy shall not be acceptable.

B. Connected Spaces:

1. Spaces shall be equipped with an automatic control device to shut off lighting in those areas. This automatic control device shall function on either:

    a. A scheduled basis, using time of day, with an independent program schedule that controls the interior lighting in areas that do not exceed 5,000 square feet and are not more than one floor, or

    b. An occupant sensor that shall turn lighting off within 20 minutes of an occupant leaving a space, or

    c. A signal from another control or alarm system that indicates the area is occupied.

C. Connected Applications:

1. Automatic Code Commissioning features include:

    a. Automatic association of all devices added to an area to provide a California Title 24 2016 code compliant sequence of operations

    b. All occupancy sensors are joined together to provide an Automatic ON to 50% light level

    c. All occupancy sensors are joined together to provide an Automatic OFF of all luminaires and plug loads after 20 minutes of unoccupancy.

    d. Automatic closed loop daylighting to approximately 500lux

e. Automatic wallstation button mapping providing the dominant button providing a 50% light level all other buttons provide multi-level dimming control from 30%-100%

f. Automatic display of area power measurement data

g. Automatic Demand Response of 20%

PART 2 - PRODUCTS

2.1 DIGITAL LIGHTING CONTROL SYSTEM COMPONENTS

A. Lighting Control system as defined under this section covers the following equipment:

1. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relays controllers with 0-10 volt control for ballasts (where dimming is indicated) and single relay application-specific plug load controllers.

2. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) communications. Shall be capable of manual on operation.

3. Digital Switches – Self-configuring, digitally addressable pushbutton switches, dimmers, and scene switches with two-way active infrared (IR) communications.

4. Digital Photosensors – Single-zone closed loop and multi-zone open loop daylighting sensors with two-way active infrared (IR) communications can provide switching or dimming control for daylight harvesting. On a zone by zone basis, an open loop controlling three (3) zones could have one (1) zone dimming, one (1) zone bi-level and one (1) zone on/off.

5. Configuration Tools – Handheld remote for room configuration provides two way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow send and receive of room variables and store of occupancy sensor settings. Computer software also customizes room settings.

6. Digital Lighting local network – open topology, LAN Category plug-in wiring system for power and data to room devices.

7. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building

B. Vacancy/Occupancy Sensors:

1. Wall or ceiling mounted (to suit installation) dual technology digital (passive infrared and ultrasonic) occupancy sensor. Provide unit to accommodate the square-foot coverage requirements for each area controlled, utilizing room controllers, digital occupancy sensors and accessories to meet the lighting and electrical system parameters.

2. Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features shall include the following:

   a. Sensitivity: 0-100% in 10% increments.

   b. Time Delay: 1-30 minutes in 1 minute increment. Time delay shall be set 20 minutes from the factory.

   c. Detection Technology: Dual technology activation and or re-activation. The sensor shall be capable of being set to either PRI & Ultrasonic, PIR Only or Ultrasonic only as required by the space being controlled.

   d. Test mode – Five second time delay

   e. Walk-through mode

   f. Load parameters including Auto (Occupancy) / Manual (Vacancy) - ON, blink warning, and daylight enable/disable when photosenors/day-light sensors are included in the digital network.

3. Two RJ-45 port(s) for connection to digital lighting control network.

4. Two-way infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.

5. Device Status LEDs including:

   a. PIR Detection

   b. Ultrasonic detection

   c. Configuration mode

6. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.

7. Manual override of controlled loads.

8. Units shall not have any dip switches or potentiometers for field settings.

9. Multiple occupancy sensors may be installed in a room by simply connecting them to the open topology digital lighting control network. No additional configuration will be required.

10. Acceptable Manufacturer:

    a. WattStopper product numbers: LMDC

    b. Or approved equal.

C. Digital Daylight/Photo Sensor

1. Digital daylighting/photo sensors shall work with load controllers and relay panels to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to the controller or panel. Daylighting sensors shall be interchangeable without the need for rewiring.

    a. Closed loop sensors measure the ambient light in the space and control a single lighting zone.

    b. Open loop sensors measure incoming daylight in the space, and are capable of controlling up to three lighting zones.

    c. Dual loop sensors measure both ambient and incoming daylight in the space to insure that proper light levels are maintained as changes to reflective materials are made in a single zone.

2. Digital daylighting sensors shall include the following features:

    a. Sensor's internal photodiode shall only measure lightwaves within the visible spectrum. The photodiode's spectral response curve shall closely match the entire photopic curve. Photodiode shall not measure energy in either the ultraviolet or infrared spectrums. Photocell shall have a sensitivity of less than 5 percent for any wavelengths less than 400 nanometers or greater than 700 nanometers.

    b. Sensor light level range shall be from 1-1000 foot-candles (fc).

    c. Capability of ON/OFF, bi-level, tri-level switching or dimming, for each controlled zone, depending on the selection of load controller(s) and load binding to controller(s).

    d. For switching daylight harvesting, the photosensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.

e. For dimming daylight harvesting, the photosensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.

f. Photosensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.

g. Photosensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.

h. Integral set infrared (IR) transceiver/sensor for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.

1) Configuration LED status light on device that blinks to indicate data transmission.

2) Status LED indicates test mode, override mode and load binding.

i. Recessed switch on device to turn controlled load(s) ON and OFF.

j. BACnet information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:

1) Light level

2) Day and night setpoints

3) Off time delay

4) On and off setpoints

5) Up to three zone setpoints

6) Operating mode - on/off, bi-level, tri-level or dimming

k. One RJ-45 port for connection to digital lighting control network.

l. A choice of accessories to accommodate multiple mounting methods and building materials. Photosensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Unit mounting shall be suitable for the intended location.

m. Any load or group of loads in the room can be assigned to a daylighting zone.

n. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).

o. All digital parameter data programmed into a photosensor shall be retained in non-volatile memory within the photosensor itself. Memory shall have an expected life of no less than 10 years.

3. Dual loop digital photosensors shall include the following additional features:

a. Closed loop portion of dual loop device must have an internal photodiode that measures light in a 100 degree angle, cutting off the unwanted light from sources outside of this con.

b. Open loop portion of dual loop device must have an internal photodiode that can measure light in a 60 degree angle, cutting off the unwanted light from the interior of the room.

c. Automatically establishes application-specific set-points following self-calibration. For switching operation, an adequate deadband between the ON and OFF setpoints shall prevent the lights from cycling; for dimming operation a sliding setpoint control algorithm with separate Day and Night setpoints shall prevent abrupt ramping of load.

d. Device must reference closed loop photosensor information as a base line reference. The device must be able to analyze the open loop photosensor information to determine if an adjustment in light levels is required.

e. Device must be able to automatically commission setpoints each night to provide adjustments to electrical lighting based on changes in overall lighting in the space due to changes in reflectance within the space or changes to daylight contribution based on seasonal changes.

f. Device must include extendable mounting arm to properly position sensor within a skylight well.

4. Acceptable Manufacturer:

a. WattStopper product number LMLS-600

b. Or approved equal.

D. Digital Wall Switches

1. Low voltage momentary pushbutton switches to have 1, 2, 3, 4, 5 and 8 button configurations; colors to be white, light almond, ivory, grey and black; compatible with wall plates with decorator opening. The color shall match the other devices and be coordinated with the architect. Wall switches shall include the following features:

   a. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.

   b. Removable buttons for field replacement with customized engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.

   c. Red configuration LED on each switch that blinks to indicate data transmission.

   d. Blue Load/Scene Status LED on each switch button with the following characteristics:

      a) Bi-level LED that is field configurable.

      b) Dim locator level indicates power to switch

      c) Bright status level indicates that load or scene is active

   e. Dimming switches shall include seven bi-level LEDs to indicate load levels using 14 steps.

2. Two RJ-45 ports for connection to DLM local network.

3. Multiple digital wall switches may be installed in a room by connecting them to the open lighting control network. No additional configuration shall be required to achieve multi-way switching.

4. The following switch attributes shall be changed or selected using a wireless configuration tool or laptop:

   a. Load and Scene button function reconfigured for individual buttons (from Load to Scene, and vice versa).

   b. Individual button function may be configured to Toggle, On only or Off only.

   c. Individual scenes may be locked to prevent unauthorized change.

   d. Fade Up and Fade Down times for individual scenes and loads adjustable from 0 seconds to 18 hours.

e. Ramp rate adjustable for each dimmer switch from 0 to 10 minutes.

f. Switch buttons may be bound to any load on any room controller and are not load type dependent; each button may be bound to multiple loads.

5. WattStopper product numbers: LMSW and LMDW Series or approved equal.

B. Room Controllers

1. Room Controllers automatically bind the room loads to the connected devices in the space without the use of any tools. Room Controllers shall be provided to match the room lighting load and control requirements. The controllers will not have, dip switches, potentiometers or require special configuration. The control units will include the following features:

a. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.

b. Replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf unit without requiring any configuration or setup.

c. Device Status LEDs to indicate:

1) Data transmission

2) Device has power

3) Status for each load

4) Configuration status

d. Installation features:

1) Standard junction box mounting

2) Low voltage connections using standard RJ-45 patch cable

e. Plenum rated

f. Manual override and LED indication for each load

g. Dual voltage (120/277 VAC, 60 Hz) with full 20A rated isolated relays.

h. Zero cross circuitry switching for each load.

2. On/Off/Dimming enhanced Room Controllers shall include:

a. Real time current monitoring

b. One, two or three relay configuration

c. Efficient 250 mA switching power supply

d. 70 deg. C rating.

e. Four RJ-45 digital lighting control network ports.

f. One (1) 0-10V analog output per relay for control of compatible dimming ballasts and LED drivers.

g. Capability to provide forward phase dimming control for two separate loads. Compatible with line voltage luminaires being dimmed.

h. Network Bridge for BACnet MS/TP communications to allow communication and networking of all building room controllers.

i. The following dimming attributes may be changed or selected using a wireless configuration tool:

1) Establish preset level for each load from 0-100%

2) Set high and low trim for each load

3) Set lamp burn in time for each load up to 8 hours.

4) Set controller for switched or dimmed applications

j. Discrete model listed for connection to receptacles, for occupancy-based control of plug loads within the space. Locations requiring connection to receptacles are indicated on the construction drawings as a "controlled" receptacle.

k. One relay configuration only

l. Automatic-ON/OFF configuration

m. Room controllers shall have a separate isolated relay interface to allow direct connection to the building management system (BMS) for occupied/unoccupied control through the room occupancy sensors.

n. Acceptable Manufacturer:

1) WattStopper product numbers: LMRC-210 and LMRC-220 Series.

2) Or approved Equal.

C. Digital Lighting Control Network

1. The system network is to be an open topology lighting control physical connection and communication protocol designed to control the lighting in a area of a building. Digital room devices to connect to the network using CAT 5e cables with RJ-45 connectors to provide both data and power to room devices. Features to include:

   a. Plug n' Go automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.

   b. Replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.

D. Emergency Lighting Control Unit (ELCU)

1. Emergency Lighting Control Unit – To be a UL 924 listed device that monitors a switched circuit providing normal lighting to an area. The unit shall provide normal ON/OFF or dimmed and dimming control of emergency lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features to include:

   a. 120/277 volts, 50/60 Hz., 20 amp ballast rating

   b. Push to test button. Test buttons shall be mounted remotely in an electrical closet or above the accessible ceiling in a lab/test bed and ganged together to keep the quantity of test buttons to a minimum.

   c. Final button locations shall be coordinated with the owner.

   d. Auxiliary dry contact control for remote test or fire alarm system interface operation.

   e. Provide auxiliary shunt relay when used with dimming ballast to automatically force the luminaire to 100% output.

2. Acceptable Manufacturer:

   a. WattStopper Product Number: ELCU-200.

   b. Or approved equal.

E. Configuration Tools

1. Provide a configuration tool to facilitate optional customization of digital lighting control system, and used to set up open loop daylighting sensors. The wireless configuration tool shall feature infrared communications, while PC software connects to each local network via a USB interface.

2. Features and functionality of the wireless configuration tool shall include:

a. Two-way infrared (IR) communication with system devices within a range of approximately 30 feet.

b. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.

c. Read, modify and send parameters for occupancy sensors, daylighting sensors, room controllers and buttons on digital wall switches and network settings.

d. Save up to nine occupancy sensor setting profiles, and apply profiles to selected sensors.

e. Temporarily adjust light level of any load(s) on the local network, and incorporate those levels in scene setting.

f. Adjust or fine-tune daylighting settings established during auto-commissioning, and input light level data to complete commissioning of open loop daylighting controls.

3. Provide a total of two (2) configuration tools. The units shall be turned over to the owner for distributions to the building occupants and the campus facilities group to allow for future modifications to the DLM local network system setup and programming.

4. Acceptable Manufacturer:

a. WattStopper Product Number: LMCT-100.

b. Or approved equal

2.2 WIRELESS LIGHTING CONTROL SYSTEM

A. IEEE 802.15.4 wireless radio lighting control system shall meet requirements of digital lighting control system above, except:

1. LED fixtures, devices and sensors are powered by local J-Box, and controlled with wireless signal.

2. Wireless access controllers (WAC) receive status signals from sensors and send control signals to LED fixtures, wiring devices and equipment.

3. WAC's shall reside on the LAN, either converged, segregated or virtualized, per the owner's direction.

4. Light fixtures and control system shall be from same manufacturer and carry a 5-year warranty as a system.

B. Acceptable Manufactures:

1. Cooper Enlighted (Design Make)

2. Eaton Cooper Wave Linx

3. Must be compatible with Owner's existing Enlighted Controls Energy Manager Program.

2.3 LINE VOLTAGE VACANCY/OCCUPANCY SENSORS

A. Vacancy/occupancy Sensors:

1. Vacancy/occupancy sensors shall comply with the following as a minimum:

a. Zero crossing switching operation (switch on/off only where sine wave is at zero volts) suitable for linear, non-linear and electronic/magnetic fluorescent ballasts for the loads indicated. Where the load to be controlled exceeds the sensor load rating provide a separate relay of adequate rating.

b. Failure of the unit shall be to the on/closed position or manual operation.

c. Motion sensitivity adjustment (dip switch or dial) and time delay adjustment (5 to 30 minutes minimum, dip switch or dial).

d. Line voltage input and switching. Field selectable for 120 or 277 VAC, 60 Hz.

e. UL listed and have a five (5) year manufacturer full replacement warranty.

f. Test mode feature to override the set time delay to allow adjusting of the sensitivity.

g. Sensor locations shall be adjusted during construction and at occupancy as recommended by the manufacturer for optimal sensing and operation.

h. Operation shall be field selectable manual "on" with close switch/contact upon motion sensing and open after the set amount of time delay without motion or automatic on upon motion sensing.

i. Adjustable controls/settings shall only be accessible when the front cover is removed or from the back of the unit.

j. Unit color shall match the project devices except for the ceiling-mounted units which shall match the ceiling color. All color selections shall be by the Architect.

k. Ultrasonic sensing shall not be affected by air movement and shall operate at 32 kHz minimum (shall not interfere with hearing aids or other equipment).

l. Provide components as needed for the indicated control.

m. A factory-authorized representative shall coordinate and instruct the startup services of the sensors providing placement recommendations, connection guidance and startup supervision and adjustment.

2. Wall Mounted - Dual Technology (PIR and Ultrasonic):

a. Unit shall fit into a standard single gang electrical box, have an Off button, and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one (1) is needed to keep it closed.

b. Minimum Switching Capacity: 120 V - 800 W, 277 V - 1200 W.

c. The sensing shall be 180 degrees and the sensitivity area to be a minimum of:

1) Major Motion (Walking/Arm Wave): 35 ft. x 30 ft.

2) Minor Motion (Small Motion at Desk): 20 ft. x 15 ft.

d. Ambient light level sensing (adjustable 20-300 fc) to prevent "On" operation when the ambient light level is greater than the setpoint level.

e. High impact resistant sensor lens.

f. Acceptable Manufacturers:

1) Watt Stopper DW-100 & DW-200 Series (Design Make)

2) Hubbell Model

3) Cooper

4) Sensor Switch

3. Wall Mounted - Dual Technology - Dual Switching:

a. Unit shall fit into a standard single gang electrical box, have two (2) Off buttons, and utilize PIR and ultrasonic technology motion sensing.

Both types of sensing are needed for contact closure but only one (1) is needed to keep it closed. To have two (2) contacts each fully rated, electrically separate and be commonly controlled.

b. Minimum Switching Capacity: 120 V - 800 W, 277 V - 1200 W.

c. The sensing shall be 180 degrees and the sensitivity area to be a minimum of:

1) Major Motion (Walking/Arm Wave): 35 ft. x 30 ft.

2) Minor Motion (Small Motion at Desk): 20 ft. x 15 ft.

d. Ambient light level sensing (adjustable 20-300fc) to prevent "On" operation when the ambient light level is greater than the setpoint level.

e. High impact resistant sensor lens.

f. Acceptable Manufacturers:

1) Hubbell Model AD1277x2 (Design Make)

2) Watt Stopper

3) Cooper

4) Sensor Switch

4. Ceiling Mounted - Ultrasonic:

a. Unit shall mount to standard octagonal box, have auxiliary contact (Form C, 0.5A at 24 VDC), and utilize ultrasonic sensing.

b. Shall have self-contained rated contacts or control a separate switch pack. If a self-contained unit, then the ratings and function shall meet or exceed the switch pack specifications.

c. Sensing shall be 360 degrees with a minimum operating area of:

1) Major Motion (Walking/Arm Wave): 50 ft. x 30 ft.

2) Minor Motion (Small Motion at Desk): 40 ft. x 20 ft.

d. Corridor (Major Motion): 50 ft. x 16 ft.

e. Units shall be suitable for overlap of motion detection areas without reduction in spacing and false operation.

f. Sensing shall be suitable for a ceiling/mounting height of up to 12 ft. minimum.

g. Ambient light level sensing (adjustable 20-300 fc) to prevent "On" operation when the ambient light level is greater than the setpoint level.

h. The maximum depth shall be 1.5 in. below the ceiling/box.

1) Acceptable Manufacturers:

2) Hubbell Model ATU2000CRP (Design Make)

3) Watt Stopper

4) Cooper

5) Sensor Switch

5. Ceiling Mounted - Dual Technology:

a. Unit shall mount to standard octagonal box, have auxiliary contact (Form C, 0.5A at 24 VDC), and utilize PIR and ultrasonic technology motion sensing. Both types of sensing are needed for contact closure but only one (1) is needed to keep it closed.

b. Shall have self-contained rated contacts or control a separate switch pack. If a self-contained unit, then the ratings and function shall meet or exceed the switch pack specifications.

c. Sensing shall be 360 degrees with a minimum operating area of:

1) Major Motion (Walking/Arm Wave): 50 ft. x 30 ft.

2) Minor Motion (Small Motion at Desk): 40 ft. x 20 ft.

d. Corridor (Major Motion): 50 ft. x 16 ft.

e. Units shall be suitable for overlap of motion detection areas without reduction in spacing and false operation.

f. Sensing shall be suitable for a ceiling/mounting height of up to 12 ft. minimum.

g. Ambient light level sensing (adjustable 20-300 fc) to prevent "On" operation when the ambient light level is greater than the setpoint level.

h. The maximum depth shall be 1.5 in. below the ceiling/box.

i. Acceptable Manufacturers:

1) Hubbell Model ATD2000CRP (Design Make)

2) Watt Stopper

3) Cooper

4) Sensor Switch

6. Switch Pack:

a. Provide a minimum of one (1) switch pack for each ceiling-mounted vacancy sensor. Provide additional units for multiple circuits (quantity to match the quantity of circuits).

b. Unit shall be plenum rated with line voltage side into a metallic box.

c. Low voltage power shall be suitable for a minimum of three (3) sensors. Multiple sensors shall be able to control a single switch pack.

d. Minimum switching capacity shall be 20A (all types of loads) at 120/277 VAC.

B. Testing:

1. Each sensor shall be fully tested for proper operation of all functions after installation.

2. Testing shall include sensitivity, time delay, ambient lighting level, manual "on", auto "off", etc.

3. Operation and settings shall be acceptable to the Owner.

PART 3 - EXECUTION

3.1 INSTALLATION, TESTING AND TRAINING

A. Manufacturer shall provide a factory trained technician to confirm proper installation and operation of all system components.

B. Manufacturer shall provide factory trained application engineer to train owner personnel in the operation and programming of the lighting control system.

C. Manufacturer shall provide system documentation including:

1. System 1-line showing all components, number and type of switches.

2. Drawings for each component showing hardware configuration and numbering.

3. Device and network wiring schedules.

4. Typical wiring diagrams for each component.

D. Provide the following spares:

1. None.

E. All low voltage control cabling shall be plenum rated. Cabling shall be installed in raceway in vertical runs in walls/partitions.

F. Provide cabinets for system components. There shall not be exposed cabling allowed in finished areas.

3.2 SYSTEM TEST AND MANUFACTURER APPROVAL

A. The lighting control system(s) shall be commissioned to verify sensor location, time delay & sensitivity is properly set, override times & controls, day-lighting control is operating correctly, communications between control panels is operational, and timeclock controls.

B. The Contractor shall submit a written test report from an authorized representative of the equipment manufacturer indicating that the system has been 100% tested and approved.

C. The Contractor shall provide instruction to the Owner's Representative with regard to use and operation of the system. Obtain signed receipt from Owner's Representative that instruction has been given.

D. Refer to system description and system sequence of operations for commissioning requirements of the system.

END OF SECTION 26 09 36

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SECTION 26 20 00 - ELECTRIC DISTRIBUTION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide a complete distribution system as indicated on the Contract Documents and as specified herein.

1.2 QUALITY ASSURANCE

A. All methods of construction, details of workmanship, that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc., correspond to the nomenclature dictated by those manufacturers. Where "or equal" is stated, equipment shall be equivalent in every way to that of the equipment specified and subject to approval. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

B. Installation shall be in accordance with NFPA-70 (National Electrical Code), National Electrical Safety Code (NESC), state codes, local codes, and requirements of authority having jurisdiction.

C. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published ANSI, NEMA, UL and IEEE Standards.

1.3 SUBMITTALS

A. Submit the following product data/information:

1. Manufacturer and equipment type.

2. Standard catalog information sheet.

3. Detailed shop drawings indicating plan, elevation, end and isometric views. Top and bottom conduit areas shall be clearly shown and dimensioned on the drawings.

4. Single-line diagram.

5. Complete Bill of Materials.

6. All relevant ratings including, but not limited to, voltage, current, interrupting and withstand.

7. Over-Current Device Information. Model number, available settings, setting ranges, capabilities, etc.

8. Submit available and final settings, programming and adjustments.

B. Submit product data and information for the following equipment, materials, products, etc.:

1. Distribution and branch circuit panelboards.

2. Enclosed circuit breakers.

3. Motor starters, contactors and relays.

4. Disconnect switches.

5. Adjustable Speed Drives (ASD's).

6. Surge Protective Device.

1.4 WARRANTY

A. Provide full system warranty (labor, travel, equipment, etc.) in accordance with Division 1 and a minimum of one (1) year from acceptance.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Circuit Breakers:

1. Circuit breakers below 400 amp frame shall be molded case with inverse time and instantaneous tripping functions, unless indicated otherwise in contract documents.

2. Circuit breakers 400 amp frame and above shall be 100% rated and equipped with adjustable solid state trip units with short time, short time delay, long time, long time delay, front adjustable and instantaneous trip functions as indicated.

3. Listed combination of coordinated circuit breakers shall be verified by the equipment manufacturer utilizing published data sheets. Confirm listings shall be submitted.

4. Lugs shall be mechanical, rated for 60/75° AL/Cu.

5. Branch circuit breakers shall be quick-make, quick-break, thermal-magnetic and trip indicating, and multipole breakers shall have common trip. Single pole 15 and 20 ampere circuit breakers shall be UL listed as "Switching Breakers" at 120V ac or 277 V ac and carry the SWD marking.

6. Ground-Fault circuit breakers shall be quick-make, quick-break, thermal-magnetic, 5 milliampere ground fault sensing and trip indicating, and multipole breakers shall have common trip. The ground fault circuit breakers shall not occupy any more space than a standard breaker of the same number of poles.

7. Ground Fault Protective circuit breakers shall be utilized for electric heating equipment and where indicated. These shall be quick-make, quick-break, thermal-magnetic, 30 milliampere ground fault sensing and trip indicating, and multipole breakers shall have common trip. The ground fault circuit breakers shall not occupy any more space than a standard breaker of the same number of poles.

8. Ratings shall be as indicated in the Contract Documents.

9. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:

    a. Shall be listed for use with existing panel boards.

10. Enclosed circuit breakers shall be molded case, thermal-magnetic type, ratings as noted, with overcenter, trip-free, toggle-type operating mechanism, quick make/quick break action and positive handle indication. Multiple pole breakers shall be common trip type. Each circuit breaker shall have a permanent trip unit containing individual thermal and magnetic trip elements in each pose. Provide provisions for padlocking in the "off" position. Breakers shall be calibrated for operation in an ambient temperature of 40°C and shall be suitable for mounting and operating in any position. Breakers shall have removable lugs, UL listed for copper and aluminum conductors. Breakers shall be installed in NEMA 1 general purpose, surface enclosures, unless otherwise noted.

    a. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:

        1) Square D
        2) Cutler Hammer
        3) General Electric
        4) Siemens

B. Motor Starters:

1. Provide motor starters, disconnect switches, etc. as listed on the Electric Equipment and Control Schedule on the drawings.

2. Starters, contactors and controllers shall comply with NEMA standards having general purpose NEMA 1 or 1B enclosure unless otherwise called for. Provide explosion proof, weather resistant or watertight construction as required. Starters shall be minimum NEMA size 0 with solid state overloads in each phase sized per NEC, motor full load amperage, service factor, and motor operating conditions.

3. Pad lock arrangements shall be provided to lock the disconnect device in the "off" position. Magnetic starters shall be provided with a control power transformer with 120V secondary and primary and secondary fusing and be sized to accept the loads imposed there on. Starters shall have LED type pilot lights. Each starter subject to electrical interlock and/or automatic control shall have necessary auxiliary contacts.

4. Auxiliary Devices: Provide pushbutton stations, pilot lights, devices, relays, transformers, selector switches, electric thermostats, auxiliary starter contacts as required for functions called for. Provide separate relay for each speed to operate electric dampers or other devices as required for multispeed motor circuit.

5. Manual Motor Starter:

   a. Provide all starters with thermal overload(s); and pilot light(s) and handle lock-out provisions. Gang starter with selector switch for multispeed applications. Provide single or 2-pole as required:

      1) 120 volt, single-pole, surface mounted: Square-D FG-5P and handle guard.

      2) 120 volt, single-pole, flush mounted: Square-D FS-1P and handle guard.

      3) 240 volt, two-pole, surface mounted: Square-D FG-6P and handle guard.

      4) 240 volt, two-pole, flush mounted: Square-D FS-2P and handle guard.

      5) 120 volt, single-pole, two speed, surface mounted: Square-D FG-11P and handle guards.

      6) 120 volt, single-pole, two speed, flush mounted: Square-D FF-11P and handle guards.

      7) 240 volt, two-pole, two-speed, surface mounted: Square-D FG-22P and handle guards.

      8) 240 volt, two-pole, two-speed, flush mounted: Square-D FF-22P and handle guards.

      9) 120 volt, single-pole, H-O-A selector, surface mounted: Square-D FG-71P and handle guard.

      10) 120 volt, single-pole, H-O-A selector, flush mounted: Square-D FS-71P and handle guard.

      11) 240 volt, two-pole, H-O-A selector, surface mounted: Square-D FG-72P and handle guard.

12) 240 volt, two-pole, H-O-A selector, flush mounted: Square-D FS-72P and handle guard.

6. Manual Motor Starter - Speed Controller: Shall be similar to "Manual Motor Starter", above, except two-gang with motor speed control sized to handle motor indicated, with positive full on and full off bypass of speed control unit.

7. Manual Starter with Relay: Shall be similar to "Manual Motor Starter", above, except to include a two-gang box with relay sized for load indicated, and hand-off-automatic switch. Connect relay for 120V operation on load side of starter in "automatic" mode. Coordinate connection of Form C maintained contact for control with Mechanical Contractor.

8. Magnetic Starter: Shall be single-speed, across-the-line type rated in accordance with NEMA standards, sizes and horsepower ratings. Starters shall be mounted in NEMA 1 enclosures unless otherwise indicated. Magnetic starters shall be equipped with fused control power transformer for 120V control power and double break silver alloy contacts; all contacts shall be replaceable without removing starter or disconnecting power wiring. Starter shall have straight-through wiring. Coils shall be of molded construction and shall be replaceable from the front without removing starter. Overload relays shall be solid state type with replaceable control circuit module. Thermal units shall be of one-piece construction and interchangeable. Starter shall be inoperative if thermal unit is removed. Provide hand-off-auto selector switch and start-up pushbuttons and "run" pilot light in cover. Wire for maintained contact unless otherwise noted.

9. Combination Magnetic Starter: Shall be similar to "Magnetic Starter", above, except shall include fusible disconnect switch connected ahead of starter. The disconnect handle shall be in control of the disconnect device with the door open or closed. Disconnect handle shall be clearly marked as to whether the disconnect device is "on" or "off".

10. Combination Two-Speed Magnetic Starter: Shall be similar to "Combination Magnetic Starter", above, except with two starters, and six thermal overload units coordinated to match torque and horsepower characteristics of the motor. Starter shall be designed for variable torque operation, and shall be provided with high-low-off-auto selector switch and high and low pilot lights mounted in the cover. Wire for maintained contact unless otherwise noted.

11. Combination Reduced Voltage Magnetic Starter: Shall be similar to "Combination Magnetic Starter", above, except autotransformer closed transition reduced voltage type with autotransformer protection by winding over-temperature device.

12. Packaged Control Unit: Shall be furnished and mounted by others, and connected by Electrical Contractor. Generally consists of one or more starters, disconnect switches and additional control devices prewired.

13. Contactor: Shall be similar to "Magnetic Starter", above, except without thermal overload units.

14. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:

    a. Square-D - Design Make.
    b. Cutler Hammer
    c. General Electric
       Allen-Bradley
    d. Siemens

15. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:

    a. Manual, 1 HP and under - Allen Bradley Bulletin 600.

    b. Manual, 1-1/2 to 5 HP, 1 phase - AB Bulletin 609.

        1) 1.H.15.b.1.a.1.a.1. Manual, 1-1/2 to 7 1/2, 3-phase - AB Bulletin 609.

    c. Magnetic, AB Bulletin 509, minimum, NEMA size 1.

    d. Combination, AB Bulletin 512, minimum, NEMA size 1.

C. Disconnect Switches:

1. Shall be heavy-duty type three-pole, with "Quick Make/Quick Break" operating handle mechanically interlocked with the cover, horsepower and voltage rated to match equipment served. Where indicated switches shall be provided with dual-element, time delay, rejection type fuses. Switches shall be installed in NEMA 1, 12 for indoor use, NEMA 4X for outdoor use. Provide provisions for padlocking in the "off" position. Provide neutral bar in single phase or three phase, four wire circuits, and ground bar in all switches. Provide auxiliary contacts where called for.

2. All disconnects connected downstream of ASD's shall have a normally open and normally closed auxiliary contacts which shall be wired to the ASD to indicate disconnect is open.

3. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:

    a. Square-D - Design Make.
    b. Cutler Hammer
    c. General Electric
    d. Siemens

D. Lighting Contactors:

1. Similar to magnetic motor starters without overloads.

2. Mechanically held, electrically operated with control as indicated.

3. NEMA 1 enclosure.

4. Supply with appropriate accessories to interface with 2-wire and 3-wire control devices as required by the Construction Documents.

5. 10,000 ampere withstand at 480V.

6. 30 ampere continuous current rating per pole at 600 VAC.

7. Number of poles as indicated.

8. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:

   a. ASCO 918 Series.
   b. Square D Class 8902
   c. Eaton Cutler Hammer
   d. GE

E. Adjustable Speed Drive (ASD) with Drive Bypass:

1. The ASD shall be 5 HP minimum size, UL Listed, NEMA standard frame size for horsepower rating indicated including 115% motor service factor. Short circuit rating shall be 42kA minimum. Integral solid state programmable overload relay with selectable time class (10, 20 or 30) shall be provided.

2. Units shall be wall or floor mounted as suitable for the intended location. Units shall be an integral component of a motor control center where indicated. Units shall be in NEMA 1 enclosure.

3. The unit shall be provided with a 120V control power transformer. The control power transformer shall be provided with primary and secondary fusing.

4. Cooling fans shall have removable washable filter.

5. Unit shall be of six (6) pulse design with separate common mode choke on the input and output of the drive, if not already built in the unit to minimize total harmonic distortion. Provide with 5% input line reactor.

6. The allowable conductor length between the unit and the controlled motor shall be 100 feet. Ambient temperature range shall be 0 to 40ºC with a 3300' altitude.

7. Provide a dv/dt filter to minimize voltage doubling at the motor terminals caused by excessively long motor conductors from the ASD. The dv/dt filter shall be installed at the ASD unit, preferably in the same enclosure as the ASD. The dv/dt filter shall be factory installed in the ASD.

8. Door mounted selector switch for Auto-Manual control. In the auto mode, the start command and speed control shall be provided from a remote source. In the manual mode, the start-stop and speed control shall be provided through the door mounted controls. Provide extra contact blocks on the selector switch for monitoring of switch position.

9. Door mounted pushbuttons for start-stop control. Stop pushbuttons shall always be active. Door mounted LED type pilot lights for indication of On (Red) and Off (Green). Door mounted human interface module for programming, display and speed control.

10. Interface so ASD has indication of downstream disconnect switch(es) status (open-closed) and operates accordingly.

11. Programming shall include:

    a. One isolated, configurable analog input.

    b. Two isolated, configurable analog outputs.

    c. Alarm digital input for automatic shutdown, field configurable for ramped deceleration, full stop and manual/auto reset. Digital input to force unit to a preprogrammed speed for smoke control or other need.

    d. Four field programmable digital outputs.

12. Field selectable isolated process control interface to enable the ASD to follow 0-5 mA, 1-5 mA, 4-20 mA, 10-50 mA, 0-8 VDC, 1-4 VDC, or 0-10 VDC grounded or ungrounded signal from a process controller. Provide RS232 or RS485 communication module board.

13. Network connection shall be suitable for unit on/off and speed control. Communication to the building control system shall include actual motor speed verification, amperage, voltage, kW, and kWh. All unit programming functions shall be accessible through network communication. Communication shall be selectable for BACnet, Metasys, Modbus, Lonworks, Profibus and the project building control system.

14. Isolation Disconnect Switch: Provide isolation disconnect switch integral to unit with a provision for padlocking in the "Off" position.

15. Provide Status Output to Fire Alarm System to indicate the drive is "OFF" for fans. This indication shall close associated system smoke dampers.

16. Where indicated the drive shall be a part of a unit with a three contactor isolated manual drive bypass as described below:

    a. The manual isolated drive bypass unit will consist of two units - a bypass starter unit and an adjustable speed drive (ASD) unit. The intent of the manual isolated drive bypass unit is to isolate the adjustable speed AC drive for servicing. The ASD unit door shall be interlocked with the bypass starter unit. When in the bypass mode the motor can be energized and de-energized with the across-the-line bypass starter. Starter shall meet the requirements of a magnetic starter defined in this section.

    b. All power components shall have a normal duty rating suitable for the nominal horsepower of the application.

    c. Bypass Starter Unit: The bypass starter unit shall include the fusible disconnect or circuit breaker, the bypass contactor and solid state overload relay, control circuit transformer and terminal blocks. "DRIVE ON" and "BYPASS ON" pilot lights shall be provided to indicate operational status. Shall be three contactor design.

    d. ASD Unit: A "DRIVE-OFF-BYPASS" selector switch, a "BYPASS START" push button and a "BYPASS STOP" push button shall be provided. These pilot devices shall be located in the same control station as the "DRIVE ON" and "BYPASS ON" pilot lights on the bypass starter unit.

    e. Isolating Disconnect: The isolating disconnect shall be a six-pole device capable of making and breaking the load. Auxiliary isolating disconnect contacts will permit the operation of only one unit at a time either the Bypass Starter or the ASD.

    f. Two (2) auxiliary contacts to mimic drive status.

    g. Isolation Switch Operation:

        1) Bypass Mode: When in bypass mode the "BYPASS ON" pilot light shall be energized when the bypass motor control circuit is energized. When in bypass mode the bypass starter unit and the ASD unit are isolated from one another. In addition, the isolation switch shall have means to be padlocked, to prevent being switched to drive mode. In this mode no power shall be present in the ASD enclosure.

        2) Drive Mode: When in drive mode the isolating disconnect shall permit the starter bypass unit to supply power to the ASD unit and connects the ASD unit to the motor. When the isolation switch is in the drive mode the "DRIVE ON" pilot light shall be energized. In addition, the isolation switch shall have means to be padlocked to prevent being switched to bypass mode.

3) Unit shall be of three contactor construction.

17. Design Make: Allen Bradley Powerflex 700 with Drive Bypass.

18. Make: Allen Bradley, Eaton Corporation, Square D, General Electric, ABB, Emerson or approved equal.

F. Branch Circuit Panelboards (480Y/277 volt, 208Y/120 volt, 240/120 volts):

1. Provide branch circuit panelboard as indicated in the "Panelboard Schedule" and as located on the drawings. Panelboards shall be equipped with quick make/quick break thermal-magnetic, molded case circuit breakers as scheduled. U.L. listed as suitable for use as a service equipment.

2. Panelboard bussing and lugs shall be copper. Provide grounding bus in each panelboard, securely bonded to the box. Panelboard bus structure and main lugs or main circuit breaker shall have current ratings as indicated. Such ratings shall be established by heat rise tests, conducted in accordance with UL Standard 67.

3. Provisions for additional circuit breakers shall be such that field addition of connectors or mounting hardware will not be required to add circuit breakers to the panelboard. Bus connections shall be bolt-on.

4. Each panelboard, as a complete unit, shall have a short circuit current rating equal to or greater than the rating shown on the panelboard schedule or on the plans. All panelboards shall be fully rated. "Series ratings" are NOT acceptable. Reducing breaker ratings on the basis of series rating is not acceptable.

5. The panelboard bus assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel to be specified in UL Standard 50 cabinets. Wiring gutter space shall be in accordance with UL Standard 67 for panelboards. Each front shall include a door and have a flush, stainless steel, cylinder type lock with catch and spring-loaded door pull. All panelboard locks shall be keyed alike. Doors shall be mounted by completely concealed steel hinges. A circuit directory frame and card with a clear plastic covering shall be provided on the inside of the door. Fronts shall be of code gauge, full-finished steel with rust inhibiting iron phosphate sealer and baked enamel finish. Minimum box width shall be 20 in. Provide corbin lock keyed to match the Owner's existing system. Provide full length piano-hinged trim allowing access to wiring gutters without removal of trim.

6. Ratings shall be as indicted on the Panelboard Schedule.

7. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:

a. 480Y/277 Volt:

1) Square D "NF" Design Make

b. 208Y/120 Volt and 240/120 Volt:

1) Square D "NQOD" - Design Make

G. Fuses:

1. All fuses rated 600 volts and below shall be rejection type dual-element, time-delay type. Provide two (2) complete sets of fuses for all fusible devices. Deliver spare fuses to the Owner and obtain receipt.

2. Manufacturers: Subject to compliance with Contract Documents, the following manufacturers are acceptable:

a. Fuses 600 Amperes and Below: Bussman Type FRS-R (600 volts), Bussman Type FRN-R (300 volts) or equivalent.

b. Fuses Rated Above 600 Amperes: Bussman Type KRP-C or equivalent.

H. Surge Protective Device:

1. Device shall be rated for location as shown on drawings.

2. Seven Mode Protection: Line-to-neutral (three), line-to-ground (three) and neutral-to-ground.

3. Provide test report from a recognized independent testing laboratory verifying the Surge Protective Devices (SPD) can survive published surge current rating on both a per mode and per phase basis. ANSI/UL 1449, latest edition.

4. Surge Current Capacity - The minimum total surge current tested with the ANSI/IEEE C42.41, 20 kA-8/20 microsecond waveform that the device is capable of withstanding shall be as shown in the following table:

	Application	Peak Surge Current Per Phase	Nominal Discharge Current - In Per Mode
a.	Type 1 - Before Service Entrance	250 kA	20 kA
b.	Type 2 - After Service Entrance	160 kA	20 kA

5. Unit shall comply with ANSI/UL-1449, latest edition. Voltage Protection Rating (VPR) per Mode must not exceed the following for Type 1 SPD:

a. 208Y/120, L-N 700 volts, L-G 700 volts, N-G 800 volts, L-L 1000 volts.

b. 480Y/277, L-N 1200 volts, L-G 1200 volts, N-G 1200 volts, L-L 2000 volts.

6. Unit shall comply with ANSI/UL-1449, latest edition. Voltage Protection Rating (VPR) per Mode must not exceed the following for Type 2 SPD:

   a. 208Y/120, L-N 800 volts, L-G 700 volts, N-G 800 volts, L-L 1000 volts.

   b. 480Y/277, L-N 1000 volts, L-G 1200 volts, N-G 900 volts, L-L 1800 volts.

7. UL-1283 bi-directional high frequency noise attenuation for electric line noise shall be 50 dB at 10 kHz-100 MHz.

8. Short Circuit Current Rating: 200 KAIC.

9. Indication system:

   a. A green/red LED indicator for each phase.

   b. Flashing trouble light.

   c. Shall alarm open circuit damage, thermal conditions and overcurrent.

   d. Transient surge counter.

   e. Provide dry contact for remote monitoring.

10. External mounted model.

11. Manufacturers: Subject to compliance with contract documents, the following manufacturers are acceptable:

    a. Cutler Hammer SPD.
    b. L.E.A./Dynatech
    c. Liebert
    d. Square D
    e. Current Technology - Design Make

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment shall be grounded per the NEC.

B. Electrical distribution equipment shall have lugs/terminations suitable for the indicated conductor size. Where conductors have been oversized for voltage drop and where approved by the Engineer it shall be allowed to reduce the conductor size using hydraulically crimpled splice in a box next to the distribution equipment to allow for standard lug termination.

C. Motor Starters:

1. Coordinate overload and fuse sizes with the Contractor providing the equipment to be controlled.

2. Coordinate termination of control wiring with the Contractor providing the equipment to be controlled.

D. Adjustable Speed Drives:

1. Set in place controllers on 4 in. high concrete base, on wall or freestanding steel frame as required. Completely erect and assemble, including shipping splits and make respective connections from terminal or terminal strips to any miscellaneous control devices.

2. Provide respective line side power supply connections to load side power terminals. Adjust unit controls in accordance with manufacturer's instructions.

3. Adjust unit controls in accordance with manufacturer's instructions.

4. A factory-trained manufacturer's service representative shall provide complete start-up services at the site during construction plus a separate (after startup on a 100% correctly operating drive) 4 hour training session for the Owner. Coordinate start-up and controls with the Contractor providing the equipment to be controlled.

E. Identification:

1. Identify all items of equipment as described in Section 260501-3.1, Identification. Identification shall be provided for switchboards, panelboards, transformers, ASD's, motor starters, disconnect switches, enclosed circuit breakers, switchboard main/distribution breakers, MCC's automatic transfer switches, UPS's, generators, surge suppression devices, control panels, switchgear, etc.

2. Switchboards, panelboards, MCC's, switchgear, etc. shall have a label indicating name/tag ID, feeder source, conductor color convention and for service entrance locations the available short circuit current.

3.2 CLEANING

A. At the completion of the project, while equipment is de-energized, it shall be thoroughly cleaned to a shipped condition using methods in accordance with the manufacturer's recommendations. Utilize vacuum for cleaning and not compressed gas.

3.3 SPARE PARTS

A. Deliver loose equipment to the Owner and obtain receipt for fuses, keys to panelboards, etc.

3.4 DISCONNECT DEVICES

A. All disconnect devices downstream of ASD's: Provide wiring, conduit and connections between ASD and disconnect auxiliary switch to ASD.

END OF SECTION 26 20 00

SECTION 26 50 00 - LIGHTING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide interior and exterior lighting systems, including luminaires, hangers, supports, fittings, lamps, wiring, connections and controls, as indicated in the Contract Documents for complete and operational systems. The lighting layouts on the drawings are diagrammatic only. Luminaires, in general, have been specified for the particular type of ceiling in which they are to be installed. Verify the ceiling construction details and provide luminaires suitable for the respective ceiling types and room finish schedule.

1.2 ENERGY CONSERVATION WORK

A. Work installed as part of this Contract will be eligible for energy rebates/incentives available. The energy rebate shall be paid directly to the Owner. The Electrical Contractor shall cooperate with the Owner and the funding source to provide proof of purchase information, quantities involved, fill out forms, etc., to accommodate all required paperwork. Include all costs associated with this requirement.

1.3 QUALITY ASSURANCE

A. All luminaires shall be new and bear a NRTL label for the service intended. Luminaires shall be standard products of manufacturers regularly engaged in the manufacture to the specific type light luminaires specified and shall be the manufacturer's latest standard design that complies with specification requirements. Manufacturer's luminaire catalog numbers as indicated on the "Luminaire Schedule" indicate quality, type, and style, but may not cover required special design details. Provide luminaires having such special details as noted in the "Luminaire Schedule", as indicated by the specified luminaire model number and as required for proper installation. Verify the availability of all luminaires proposed to be used in the execution of the work prior to submitting same for approval. The discontinuance of production of any luminaire after such approval has been granted shall not relieve the Contractor from furnishing an approved luminaire of comparable quality and design at no additional cost. Luminaires shall be as specified in the "Luminaire Schedule". Luminaire types, appearance, characteristics, photometrics, finishes, etc., correspond to the specified manufacturer, and associated catalog number, listed in the "Luminaire Schedule". Products of other listed acceptable manufacturers shall be equivalent in every way to that of the luminaire specified. The Engineer reserves the right to disapprove any luminaire type submitted which he feels is not equal in quality, appearance or performance to the luminaire specified.

B. Should there be any difference between drawings and schedules, secure from Architect/Engineer such information as is necessary before tendering his proposal. When finishes are not definitely specified, they shall be as selected by the Architect.

C. Locations indicated for luminaires are approximate. Field coordinate exact locations as near as possible to the location indicated. Coordinate with the Engineer for any major location changes.

D. Where existing luminaires are being retrofitted, the retrofit shall be performed using a retrofit kit provided with a NRTL listing.

1.4 SUBMITTALS

A. Submit shop drawings as described in Section 260500. Luminaire shop drawings shall include photometric data for each luminaire utilizing the specified lens/louver type, lamp(s) and ballast(s). All luminaire types for the project shall be submitted in a single complete package which shall be in the form of a soft cover binder with each luminaire separated by an identified index tab. Information on each luminaire shall include:

1. Manufacturer and Catalog Number.

2. Dimensioned Construction Drawing(s).

3. Complete Catalog "Cut" Sheet.

4. Photometrics (space to mounting height ratio, coefficient of utilization complete values, IES distribution hard and electronic copy, candlepower distribution by angle and luminaire efficiency).

5. Lens/Louver Type.

6. Reflector information (type, material, reflectance, etc.).

7. Ballast with each type luminaire as applicable (type, sound rating, overload protection, voltage, input/fixture wattage, ballast factor, power factor, etc.).

8. Materials for all components.

9. Socket Type.

10. Lamp (rated life, initial lumen output, mean lumen output, Kelvin color, color rendering index, dimensions, wattage, socket type, mercury content).

11. Certification of IES LM-79 an IES LM-80 testing for LED luminaires.

12. Proof that the lamps and ballasts to be provided are on the Consortium for Energy Efficiency's (CEE) list of approved equipment.

1.5 DELIVERY, STORAGE AND HANDLING

A. Luminaires and equipment shall be delivered with NRTL and manufacturer's labels intact and legible. Broken, cracked and damaged materials and equipment shall be removed from the site immediately and be replaced with new materials and equipment. Luminaires and accessories shall be stored in protected dry locations in their original unbroken package or container. Luminaires shall be protected from dust and dampness both before and after installation. Luminaires shall be protected from paint and cleaning solvents during all phases of construction.

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. LED luminaires shall be identical in construction features, options and appearance to the luminaries specified in the Luminaire Schedule. LED luminaires include white and RGB systems respectively.

1. LED luminaries shall be provided with all cables, controllers, power supplies, connectors, terminators and accessories required for a complete installation. LED system shall utilize pulse width modulation, non-linear scaling techniques and reverse polarity protection for high-resolution output.

2. RGB LED systems shall be capable of at least 8-bit control of red, green and blue module. RGB LED system shall be capable of setting each module with a unique and individual address. Each address shall be controlled independently by DMX or alternate method protocol. All RGB LED fixtures shall undergo a minimum of eight-hour burn-in testing during manufacturing.

3. LED luminaries shall be high brightness and binned for forward voltage, luminous flux and wavelength.

4. LED luminaires shall be tested in accordance with IESNA LM-79 (luminous output, power input, luminaire efficacy (lumens/watt), color temperature and color rendering index) and IESNA LM-80 (output luminous maintenance, 10,000 hour minimum test). Luminaire output shall be a minimum of 60 lumens/watt. Rated life shall be a minimum of 50,000 hours at 50% output. Testing shall be performed by a US Department of Energy (DOE) accredited laboratory.

5. LED drivers shall be solid state Class 1 power supply/driver. The system shall have a minimum 90% power factor and a maximum of 30% THD, and heat sensing with color sensing feed-back. Adequate heat sink capability shall be provided to ensure the rated life.

6. The luminaire (to include LED lamps and LED drivers) shall have a full five (5) year minimum warranty for replacement and labor.

a. Acceptable LED Node Manufacturers:

1) Philips
2) Osram
3) Cree
4) Nichea
5) Lumiled

B. Lenses:

1. Shall be listed materials tested in accordance with ASTM D-635, "Rate of Burning and/or Extent and Time of Burning of Self-Supporting Plastics in a Horizontal Position" and burns less than 2/5 inches per minute.

2. The products shall have a smoke density of less than 75 when tested in accordance with ASTM D-2843, standard test method for "Density of Smoke from the Burning or Decomposition of Plastics".

3. The flame spread rating shall not exceed 0-25 and smoke developed rating shall not exceed 450 in accordance with ASTM E-84, standard test method for "Surface Burning Characteristics of Building Materials".

4. Self-ignition shall not occur below 600°F, in accordance with ASTM D-1929, standard test method for "Ignition Properties of Plastics".

5. Materials shall remain in place 15 minutes at 175°F and fall from frame at 200° below ignition temperature in accordance with ASTM D-648, "Deflection Temperature of Plastics Under Flexural Load".

C. Wiring:

1. Wiring within lighting fixture for connection to branch circuit shall be:

a. NEC Type AF for 120 volt, minimum No. 18 AWG.

b. NEC Type SF-2 for 277 volt, minimum No. 18 AWG.

2. Stranded wire within lighting fixture shall be lead dipped.

D. Luminaire Schedule:

1. Luminaire schedule is found on contract drawings.

E. Emergency Battery Pack Luminaires:

1. Completely self-contained in compact, low profile injection molded UL 94V-0 flame rated thermoplastic housing with universal mounting plate.

2. UL924 listed, NFPA 101 compliant, 90-minute life safety lighting unit.

3. Premium grade, Lithium-Iron-Phophate (LiFePO) maintenance free battery. Two with sufficient capacity to operate the lamps for 1-1/2 hours to an end voltage of 87-1/2% of nominal battery voltage. Three stage charger (constant current, equalize and float charge), relay, low voltage battery disconnect and brownout protection circuits.

4. Two (2) fully adjustable, glare-free, beam type lighting heads. Each lighting head lamp shall have: 3 high output LED's, cool white color, 5000K rating, 6-Watt power load, a 100,000 hour lifecycle rating, and an output of 546 lumens per lamp (1092 lumen unit total).

5. Various coverages are required for the unit with 80/50/20 surface reflectance:
   a. Single Unit, Forward Throw: 43' L x 10' W @ 12' MH, 1 fc Average
   b. Single Unit, Side to Side: 66' L x 6' W @ 12' MH, 1 fc Average
   c. Refer to plans and submit point-by-point drawings from manufacturer that meet 1 fc average egress pathway requirements.

6. Universal 120/277 volt supply.

7. Test switch and charge rate indicator. Provide self-diagnostic circuitry to warn malfunction of battery, charger, transfer circuit of emergency lamps by means of separate LED indicator lights. Also provide automatic self-test programming which will include five minute discharge/diagnostic cycling every 28 ± days to exercise the unit's battery and check emergency operation.

8. Design Make: Dual-Lite EVHC Series or approved equal.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

A. Provide for every luminaire shown on the plans, as scheduled on the drawings.

B. Where a luminaire is specified or approved for certain locations, all luminaires in those locations must be of the same manufacturer and style. All luminaires shall be NRTL tested.

C. Obtain exact location of all ceiling and wall mounted luminaires from the Architect/Engineer.

D. Luminaire fasteners or hangers shall be capable of supporting four times the luminaire weight.

E. Luminaires shall be supported independent from ceiling system or other building services. Support luminaires at two locations, using #10 steel wire similar to that used to support the ceiling grid. Directly attach steel wire to structural member.

F. Mount luminaires in true vertical and horizontal alignment. Offset luminaires as required to avoid obstructions. Provide all necessary hangers and supports for proper luminaire installation. Such supports shall be anchored to channels in the ceiling construction, to the structural slab or to structural members above the suspended ceiling.

G. Provide all necessary accessories for "end-to-end" mounting where continuous rows of fluorescent luminaires are indicated. All luminaire assemblies shall be grounded.

H. New luminaires may be provided to replace existing luminaires scheduled to remain or be reused, subject to shop drawing approval.

3.2 SURFACE CEILING MOUNTING

A. Mount surface luminaires tight to surface in a manner such that mounting surface does not distort fixture.

B. Luminaires installed in continuous rows may be fed by a single outlet if fixtures are UL approved and suitable for through wiring in luminaire raceway.

C. Luminaire fasteners or hangers shall be capable of supporting four times luminaire weight.

D. Luminaires shall be supported independent from ceiling system or other building services.

3.3 PENDANT MOUNTING

A. Mount pendant mounted luminaires from 1/4 in. threaded rods of required length.

B. Sleeve threaded rods with 1/2 in. EMT painted with color as directed by Architect/Engineer.

C. Luminaires installed in continuous rows may be fed by a single outlet if they are UL approved and suitable for through wiring in luminaire raceway.

3.4 LAMPS

A. Furnish and install required lamps in all luminaires. Any lamp which fails prior to project close-out shall be replaced at no additional cost.

B. Replace any lamp or lamps whose color is determined to be unsatisfactory.

3.5 GROUNDING

A. Ground all non-current carrying parts of all lighting fixtures.

B. All grounding shall be accomplished with NRTL tested grounding connectors suitable for this purpose.

3.6 LABELING

A. Attach a self-adhesive red dot label, 1/2 in. in diameter, to all lighting fixtures with an integral battery back up and/or those tied into an emergency generator. Labels shall be attached to these fixtures or to adjacent ceiling tiles so that they are readily discernible for testing and maintenance purposes.

3.7 FINAL CLEANING

A. Immediately prior to acceptance, damp clean diffusers, glassware, luminaire trim, reflectors, lamps, louvers, lens and similar objects of all luminaires. Remove all dirt, corrosion, foreign material, finger marks, and blemishes. Replace all burned out lamps and failed components.

3.8 REMOVAL OF BALLASTS IN EXISTING LUMINAIRES

A. Assume ballasts contain PCB material unless labeled otherwise or test samples show materials are not PCB; submit a test report. Remove all ballasts from existing luminaires indicated on contract documents. Dispose of all ballasts which do not have non PCB labels in PCB containers and pay all costs to have containers taken to EPA approved incinerators and disposed of all EPA regulations. Follow all EPA regulations for transporting material. If ballast has leaked in existing luminaires, remove material deposited in luminaire and dispose of those materials as indicated above. Provide documentation verifying disposal of PCB contaminated ballasts.

3.9 REMOVAL OF LAMPS IN EXISTING LUMINAIRES

A. The Contractor shall employ the service of a certified disposal/recycling service company to dispose of all removed fluorescent and/or HID lamps. All disposal procedures shall be performed in accordance with EPA Requirements and Subtitle C for the disposal of mercury contaminated lamps.

END OF SECTION 26 50 00

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SECTION 27 05 10 - COMMUNICATIONS, GENERAL

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for the complete installation and related Work as required in Contract Documents. This section specifies general wiring requirements for systems provided under 27 Series sections of these specifications.

1.2 SUBMITTALS

A. Refer to particular Specification Sections covering all systems. Submit system test reports as called for.

1.3 GENERAL REQUIREMENTS

A. Provide conduit systems and special systems as called for.

1. Provide conduit, wireway, wire terminations, etc., necessary to provide for system functions.

2. Cross-sectional area of wires installed in a conduit shall not exceed 40% of the cross-sectional area called for in the National Electrical Code.

3. Provide separate circuit power source for each system.

4. Where allowable by Code and contract documents, special systems wiring may be installed without conduit. Installation and wire insulation types shall be as described by NEC, Article 725. All low voltage wiring circuits 50V and under shall:

a. Be adequately supported using bridle rings or other approved method when installed horizontally above accessible ceilings or run exposed in unfinished areas.

b. Be run in raceway in wall cavity, or surface metal raceway where no access is available to wall cavity, in finished areas.

c. Be installed in conduit when installed vertically in Mechanical Rooms from panels and devices up to ceiling.

d. Be installed in conduit in all cases not specifically covered by the above cases, or where subject to physical damage.

e. Have the proper insulation and meet the requirements of NEC Article 300-22 when installed in plenums or other spaces used for environmental air.

f. Be installed in raceway where used for fire alarm systems.

B. Identification:

1. Provide consistent color code wiring and identify with permanently attached number to each end of each wire, except where color coding is prohibited to meet UL burglary protection requirements.

C. Termination:

1. Unless special terminations are required, such as coaxial cable termination, wires shall be terminated on screw type terminal blocks with metal terminal cabinets.

D. Wiring Diagrams:

1. Install systems in accordance with manufacturer's certified correct wiring diagrams.

2. Provide record drawings for each system, with wire identification, numbers and colors, as installed.

PART 2 - PRODUCTS

2.1 MAKE AND SERVICE

A. Provide devices and equipment by an established manufacturer for respective systems. All devices and equipment for which there is a listing shall be UL listed and FM approved.

B. Provide system equipment and devices of one manufacturer who maintains a competent service organization and who shall be prepared to offer a service contract for maintenance of the respective system.

C. Provide three service organization inspections for each system at four-month intervals during the year following final acceptance.

D. Correct defects found in the system at the time of these inspections.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide complete installation in a neat and workmanlike manner including all accessories and appurtenances for a complete operating system, including equipment mounting backboards, power supplies, wiring, etc.

B. Each system installation shall be supervised, tested, adjusted and approved by authorized representative of the manufacturer of the system devices and equipment.

C. Provide written statement from the authorized representative of the manufacturer of the system devices and equipment that the completed system has been inspected and tested and is approved.

D. Riser and wiring diagrams are not intended as final installation drawings but only as a guide for bidding. Install system based on final wiring drawings prepared by the manufacturer of the system.

3.2 WIRING

A. Wire sizes shall be as recommended by system manufacturer.

B. #14 AWG wire, minimum unless otherwise called for.

C. #12 AWG wire, minimum for alarm signal circuits and all power supplies.

D. Provide #20/2 copper minimum twisted and shielded with overall jacket for audio frequency circuits. Shield shall be Mylar backed aluminum foil with drain wire, or copper braid. Do not provide spiral wrap shielding.

E. Provide coaxial cable and fiberoptic cable as called for video and RF distribution.

F. Do not install low level lines such as microphone wires in same conduit with high level lines such as speaker wires.

G. All final wire connections and terminations shall be performed by an authorized representative of the equipment manufacturer who is regularly engaged in, and experienced in this type of work. Subcontracting this work to others is not acceptable.

END OF SECTION 27 05 10

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SECTION 27 10 00 - LOCAL AREA NETWORK WIRING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work included in this section shall include only cable plant of Computer Network. Additional computer network components maybe provided on a per project basis. Engineer shall contact the Design Group in order to determine scope of computer network and latest component specifications. Provide a horizontal wiring system using enhanced Category 6 cable from the patch panels in closet to all classrooms, offices and miscellaneous computer outlets throughout the building to provide for a flexible Ethernet LAN.

1.2 CABLE AND JACK COLOR CODING

A. Data Jacks RJ-45 style – Orange

B. Voice Jacks RJ-45 style – Ivory

C. Wireless Jacks RJ-45 style – Blue

D. Data & Voice Cabling Jacket Color (Cat. 6) – Blue

E. IP Security and Camera Cabling Jacket Color (Cat. 6A) – Teal

F. Multi-mode Optical Fiber Cabling Jacket Color (indoor) – Orange

G. Single-mode Optical Fiber Cabling Jacket Color (indoor) – Yellow

H. Wireless Access Points Jacket Color (Cat. 6A) -- Blue

1.3 BACKBONE CABLING

A. Backbone cabling includes optical fiber, coaxial and copper cable from the utility demarcation to the communication equipment room (CER), cabling between multiple CERs in a building, video trunk cable and optical fiber and copper cable between buildings on the campus. All strands shall be terminated.

B. Exterior grade optical fiber for campus distribution.

1. Acceptable Manufacturers: Corning, ADC, Berk-Tek, Belden, General Cable, OCCF.

C. Interior grade optical fiber for building backbones, OM4, 50 micron.

1. Acceptable Manufacturers: Corning, ADC, Berk-Tek, Belden, General Cable, OCCF.

D. Exterior UTP cable.

1. Acceptable Manufacturers: General Cable Qualpath Series, Superior Essex, ADC.

E. Interior copper backbone cable.

1. UTP PowerSum Backbone Cables,

2. Acceptable Manufacturers: General Cable, Belden, ADC, Berk-Tek.

F. Coaxial cable.

1. Acceptable Manufacturers: West Penn, Commscope, Belden.

1.4 HORIZONTAL CABLING

A. Horizontal cabling includes Category 6 UTP from the communications equipment room (CER) to the data station outlet, Category 6 cable to voice outlets and coaxial cable from the broadband trunk to the multi-media outlet and wall mounted television outlet.

B. Data jack 100 ohm unshielded twisted pair (UTP) cable shall be plenum rated, 4-pair, 24 AWG, third party verified “Category 6” (Cat 6) type cable, meeting the requirements of ANSI/EIA/TIA 568B Category 6. Acceptable Manufacturers: Berk-Tek “LANmark-350”, ADC TrueNet, Belden, General Cable, Commscope.

C. Voice 100 ohm unshielded twisted pair (UTP) cable shall be plenum rated, 4-pair, 24 AWG, third party verified "Category 5e” (Cat. 5e) type cable. Acceptable Manufacturers: Berk-Tek “Hyper Plus”, ADC, Belden, General Cable, Commscope.

D. Coaxial cable shall be UL listed NEC type CLR or CATV, RG-6/U, 18 AWG copper conductor. Acceptable Manufactures: West Penn, Commscope, Belden.

E. Interior Grade Optical Fiber Cable for horizontal runs to multimedia outlets. Acceptable Manufactures: Corning, Berk-Tek, Belden, Amp, OCCF, ADC.

F. Horizontal cabling includes Category 6 UTP from the communications equipment room (CER) to the data station outlet, Category 6 cable to voice outlets and coaxial cable from the broadband trunk to the multi-media outlet and wall mounted television outlet.

G. WAP (Wireless Access Point): Category 6A (2 per WAP in room). Terminated above ceiling in a single gang box with two (2) female RJ-45 jacks.

H. IP CCTV Cameras: Category 6A.

I. All cabling shall be plenum rated

1.5 COMMUNICATION EQUIPMENT ROOMS AND HARDWARE

A. Floor Mounted Racks shall be 84 in. high, with 19 in. wide rack mounting space and 15 in. deep base, and be provided with standard tapped holes and power strip with six (6) surge-protected outlets. Acceptable Manufacturers: Chatsworth 55053 Series with 101814 Power Strip, Ortronics, Panduit, Hubbell.

B. Wall Mounted Racks shall be 35 in. high, with 19 in. wide rack mounting space, and 18 in. deep. Hinged mounting, standard tapped holes and power strip shall be provided. Acceptable Manufacturers: Chatsworth 11348719, Ortronics, Panduit, Hubbell.

C. Wall Mounted Cabinets shall be 41 in. high x 24 in. wide (with 19 in. wide rack mounting space), x 24 in. deep. Universal mounting, with standard tapped holes, power strip and 120V ventilation fan with filtered air passages shall be provided. Acceptable Manufacturers: Chatsworth 11685-719, Ortronics, Panduit, Hubbell.

D. Floor Mounted Cabinets shall be 84 in. high x 31 in. wide (standard 19” rack mounting rails) x 40 in. deep, with lockable perforated double hinged steel door in front, and perforated steel split door in rear. Provide vented roof. Provide with full height vertical cable management channels, 4” wide minimum on each side with plastic fingers to support cables. Provide power strip with six (6) surge-protected outlets. Design Make: Panduit CN1. Acceptable Manufacturers: Chatsworth, Hubbell.

E. Provide Category 6 UTP patch cables with RJ-45 modular jacks of sufficient quantity and length for all wired ports plus 10% additional spare capacity. Acceptable Manufacturers: Commscope, Belden, ADC.

F. Fiber Patch Panels shall be rack or wall mounted as called for. Panels shall be constructed of 16 gauge steel, and be provided with adapter panels with duplex SC or LC couplers, mounted in housing, for all fiber cables installed. Rack mounted housings shall have splice organizer drawers; wall mounted housings shall have a lockable hinged door enclosing the cable loop and termination section, and a latchable hinged door enclosing the connector section of the housing. Patch panels shall accommodate 24, 48, 72 or 96 fibers as called for. Acceptable Manufacturers: Hubbell FCR Series with FSP Series adapter panels (rack mounted) or FCW Series (wall mounted), ADC, Belden, Corning.

G. Rack Mounted Patch Panels shall meet or exceed all Category 6 UTP specifications with EIA/TIA T568B wiring configuration with insulation displacement connectors on the back, and universal modular connectors on the front. They shall be 48-port angled UTP panels constructed of black anodized aluminum and be rack or wall mounted as called for. Acceptable Manufacturers: Panduit, Belden, ADC.

H. Provide 2RU high wire management for each fiber patch panel and each Ethernet switch.

I. Ladder Racks to be provided and installed for a minimum of the perimeter of each IDF.

1.6 CONNECTION HARDWARE (AT DROP LOCATIONS)

A. Shall be modular and user configurable for future retrofit of fiber and multimedia connectors. Data and VOIP connectors shall be RJ-45, 8-wire modular jack.

B. Each contact surface shall have a minimum of 50 micron hard gold and a minimum contact force of 100g.

C. Each drop should have a loop of 10 feet in order to accommodate exact placement of cable. Especially for Video Surveillance Drops and Wireless Access Points.

D. Acceptable Manufacturers:

1. Hubbell

2. Belden

3. ADC

4. Panduit

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Refer to section 272100 and "T" series drawings for quantities.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cable

1. Provide a minimum of one (1) UTP cable to each RJ45 jack from respective equipment/telecommunications room as called for. Quantity of data jacks equals minimum quantity of UTP cables (typical).

2. Provide a minimum of one (1) pair (2 strands) of multi-mode fiber optic cable to each fiber jack from respective equipment/telecommunications room as called for. Quantity of fiber jacks equals minimum quantity of 2 strand cables (typical).

3. All risers, and wiring concealed in walls or soffits, shall be installed in metal conduits.

4. All cable above accessible ceilings shall be installed in cable tray and J-hook cable rings 3 ft. O.C. Refer to Specification Section 260501.

5. Provide wire management and Velcro cable wraps every 6 inches throughout closets. Provide Velcro cable wraps every 36 inches elsewhere.

6. Verify all wiring requirements with the Manufacturer. If the manufacturer recommends larger wire sizes, they shall be provided. However, smaller sizes or lower cable categories are not acceptable.

7. All Contract Documents are schematic. The system supplier shall incorporate their wiring requirements on the system drawings. The Contractor in conjunction with the system manufacturer shall be responsible for complete wiring requirements and conduit sizes.

8. Install UTP cable in accordance with latest revision of TIA/EIA 568 standards.

9. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.

10. All raceways and closets shall be installed in accordance with latest revision of TIA/EIA-569.

11. All cables shall be labeled in accordance with latest revision of TIA/EIA 606.

12. All horizontal cables shall be terminated in patch panels at the distribution frames, and at the UTP jack at the telecommunications outlet.

13. Maximum length shall be 90 meters.

B. Fiber Optic Cable:

1. All cables shall be installed in a separate plenum rated flexible PVC conduit system type ENT raceway.

2. Terminate backbone fiber cables in rack mounted patch panels at both ends.

3. Terminate horizontal fiber cables in patch panels at the distribution frame and at the telecommunications outlet.

4. Adhere to all manufacturer bend radius requirements.

C. Terminations:

1. All terminations shall be made by a manufacturer's authorized representative.

2. Use termination kits for fiber and UTP that are approved by manufacturer of the cable.

3. All backbone cable shall be terminated in a patch panel and all connections between horizontal and backbone cables shall be via cross connect cable.

D. Equipment and Devices:

1. Install all devices where shown on drawings. Provide all necessary conduit outlet boxes, junction boxes, supports, etc. Verify all required box sizes with the system supplier. All devices shall be modular for future moves and changes.

2. Install all equipment in specified 19 in. racks/cabinets leaving minimum 30 in. of access space on sides and back of rack and 36 in. in front of rack.

3. Provide all power outlets and plug strips required for system operation but not shown on plans.

E. Raceways:

1. Minimum size raceway shall be 1 inch.

2. Minimum backbox size for telecommunications outlet locations shall be two-gang; no single-gang boxes allowed.

F. Data Network Ground System:

1. Provide grounding system for all equipment rooms and telecommunication rooms as called for in Specification Section 260526.

END OF SECTION 27 10 00

SECTION 27 21 00 - LOCAL AREA NETWORK SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment, services, etc. to extend Local Area Network (LAN) and related work as required in the Contract Documents.

B. The systems to be provided shall be for a switched LAN environment. The system shall hereafter be referred to as the Data Network System.

C. Basic Intent:

1. Located throughout the building as shown on the drawings, are places where computers and associated equipment are intended to be placed and connected to the network for the purposes of utilizing common resources.

2. The telecommunications rooms for the data network in the building(s) are located as shown on the drawings.

3. Located in various other places are additional Telecommunication Rooms. It is intended that these be connected with the Main Telecommunication Room by a fiber optic cable backbone. From each of these locations, data cable is to be run to the data jacks where computer equipment is connected.

4. Patch panels shall be used as termination points for all data cables and the individual fiber cables in telecommunication rooms.

D. Description of System:

1. The system shall include the items listed below, as described herein and as indicated on the Contract Documents:

a. Existing cable plant shall remain.

b. Existing electronics shall remain and be reused.

c. Data network shall be compatible with existing network configuration and characteristics.

d. Complete raceway system (cable tray, J hooks, conduit) for cabling distribution.

1.2 QUALITY ASSURANCE

A. Work shall be as specified herein and it shall be neat and orderly installation. All methods of construction, details of workmanship that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative.

B. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

C. Installation shall be accordance with NFPA 70 (National Electrical Code), TIA/EIA, IEEE, IEC, state codes, local codes, and requirements of the Authority Having Jurisdiction.

D. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published ANSI, NEMAIEC, TIA/EIA and IEEE Standards.

E. Each item shall be NRTL tested and listed.

F. The system provider must:

1. Provide equipment from manufacturers for which they maintain a contract, distributorship, are an agent, or other formal arrangement for which documentation can be produced showing authority to sell and service the equipment in this territory.

2. Demonstrate that they have successfully installed these systems, utilizing their standard products, for a period of five (5) years.

3. Maintain a service organization to provide both normal and emergency service. Emergency service must be available 24 hours per day; 365 days per year and staff must be adequate to respond within two (2) hours of an emergency call.

4. Maintain adequate spare parts inventory to provide both normal and emergency service.

5. Employ service technicians who are trained in accordance with the systems manufacturer's recommendations.

6. Own and demonstrate proficiency in the use of the required test equipment, tools, etc. for the proper installation, set-up, testing and maintenance of the system. If requested, must provide a listing of tools and/or equipment and where appropriate, certifications in the proper training and use of the tools and/or equipment.

7. Provide all system programming to deliver a customized system to the Owner ready for use.

a. All system programming is to be completed to the satisfaction of the Owner. If after preliminary use of the system, and/or training, the increased understanding of the system's features and capabilities necessitates reprogramming to any extent, it is to be performed at no additional cost.

b. System shall be reprogrammed three months after occupancy/system turn over to incorporate all Owner desired modifications.

8. Any system being extended or connected to an existing system shall be tested for full functionality prior to beginning work and at the completion.

G. Contractor Qualifications:

1. This Contractor shall be a certified installer for the proposed equipment/system manufacturer(s) and be BICSI certified ITS Installer 2, Copper and Optical Fiber and shall be certified to terminate indicated fiber connectors.

2. The cable installer shall provide documentation and references from three (3) similar installations installed within the previous two (2) years within a 60 mile radius.

H. Installer Qualifications:

1. Cabling installer must have personnel certified by BICSI on staff.

1.3 SUBMITTALS

A. Provide the following in a single clear and organized submittal. Package shall be submitted as specified in:

1. Manufacturers catalog sheets, specifications and installation instructions for all system components.

2. Contractor certification and qualifications.

3. List of three (3) installations of equivalent or larger systems that have been installed within the past two (2) years and have been operating satisfactorily for a minimum of one (1) year.

4. Warranty information.

5. System test reports.

1.4 SYSTEM DESCRIPTION

A. Extend fully operational state of the art Local Area Network (LAN) system as described herein and indicated on the contract documents. Include any and all interface equipment to supply a complete network with complete equipment connections necessary to form a complete "turnkey" network system as outlined in these specifications.

B. The complete system shall include, but is not limited to, the following:

1. Horizontal cabling.
2. Modular jacks, backboxes and faceplates.
3. Terminations and testing.
4. Raceways, pathways, cable tray, sleeves, pull boxes.
5. Firestopping.

1.5 WARRANTY

A. All cable plant parts shall be warranted to the owner for a period of fifteen (15) years as a complete end-to-end system.

B. Make available an extended warranty to the customer.

C. Warranties shall commence upon final acceptance of the system.

PART 2 - PRODUCTS

2.1 HORIZONTAL CABLE

A. Category 6 UTP Cable:

1. Initially, the manufacturer shall perform qualification tests on each cable. These tests shall be performed in accordance with the latest revision of the ANSI/TIA/EIA 568-C.2 Permanent Link Transmission Performance standard prior to shipment.

2. Date of Manufacture: Cable shall be a maximum of one (1) year old, from date of manufacture when installed.

3. Cable shall have a ripcord.

4. Cable shall be plenum rated, 4 pair, 100 OHM, 23 AWG.

5. Cable shall meet all requirements of FCC 68, the latest revision of the TIA/EIA 568B-C.2 and Addenda.

6. Cable shall have blue colored thermoplastic jacket with overall diameter not to exceed 0.365 in.

7. The cable pulling tension shall be rated for 25 pounds minimum.

8. Cable shall be able to withstand a minimum bend radius of 1.0 in. at -20ºC without insulation cracking.

9. Cable shall be color coded in accordance with the latest revision of the TIA/EIA T568B polarization sequence.

10. Cable shall not exceed maximum length of 90 meters.

11. Provide a printed report documenting testing based on ANSI/TIA 568 C.2 testing at 250 MHz. The following are the minimum values associated with the cable for a 100 meter length.

a. Less than 21.000 ohm per 100 m DC loop resistance.

b. Return loss > 20.0 dB.

c. Insertion Loss < 31.1 dB/100M.

d. Near end cross talk (NEXT)> 35.3 dB (43.4 dB).

e. Power Sum - near end cross talk (PS-NEXT)> 41.0 dB.

f. Attention to cross talk ratio (ACRF) > 16.2 dB (24.8 dB).

g. Power Sum - Attenuation to cross talk ratio (PSACRF) > 13.2 dB (21.8 dB).

h. DC resistance unbalance between any two (2) conductors of any pair shall not exceed 3%.

i. The capacitance unbalance of any pair to ground shall not exceed 33.0pF.

j. Delay < 490 ns.

k. Delay skew < 44 ns.

l. Cable shall be ANSI/TIA/EIA-568.B.2 Category 6 compliant. The cable shall be tested and characterized by the manufacturer.

m. PoE Type 4:

1) System shall be IEEE 802.3bt compliant PoE ++ (4PPoE) using 4 power pairs at 100 W.

2) System shall be NEC Article 725 and Article 800 class 2 low power compliant.

12. Acceptable Manufacturers:

a. Belden
b. Berk-Tek
c. TE Connectivity
d. General Cable
e. Comm Scope

B. Category 6A UTP Cable:

1. Initially, the manufacturer shall perform qualification tests on each cable. These tests shall be performed in accordance with the latest revision of ANSI/TIA/EIA 568-C.2 standard prior to shipment.

2. Date of Manufacture: Cable shall be a maximum of one (1) year old, from date of manufacture when installed.

3. Cable shall have a ripcord.

4. Cable shall be plenum rated, 4 pair, 100 OHM, 23 AWG.

5. Cable shall meet all requirements of FCC 68, the latest revision of the TIA/EIA 568B-C.2 and Addenda.

6. Cable shall have blue colored thermoplastic jacket with overall diameter not to exceed .215 in. x .290 in.

7. Pulling tension shall be rated for 25 pounds minimum.

8. Cable shall be able to withstand a minimum bend radius of 1.2 in. at -20ºC without insulation cracking.

9. Cable shall be color coded in accordance with the latest revision of the TIA/EIA T568B polarization sequence.

10. Cable shall not exceed maximum length of 90 meters.

11. Provide a printed report documenting testing based on ANSI/TIA 568-C.2 tested at 500 MHz. Testing parameters as follows:

    a. Less than 21.0 ohm per 100 m DC resistance.

    b. Return loss > 10.0 dB/100m at 500 MHz.

    c. Insertion loss < 43.8 dB/100m at 500 MHz.

    d. Near end cross talk (NEXT) > 26.7 dB at 500 MHz.

    e. Power Sum - near end cross talk (PS-NEXT) > 23.8 dB at 500 MHz.

    f. Attenuation to cross talk ration far end (ACRF) > 10.2 dB at 500 MHz.

    g. Power sum - attenuation to cross talk ratio (PS-ACRF) > 7.2 dB at 500 MZz.

    h. DC resistance unbalance between any two (2) conductors of any pair shall not exceed 3%.

    i. The capacitance unbalance of any pair to ground shall not exceed 65.6 pF per 100 meters.

    j. Delay < 490 ns at 100MHz.

    k. Delay skew < 44 ns at 100MHz.

    l. Cable shall be ANSI/TIA/EIA-568-C.2 Category 6A compliant. The cable shall be tested and characterized by the manufacture to 500 MHz.

m. PoE Type 4:

1) System shall be IEEE 802.3bt compliant PoE ++ (4PPoE) using 4 power pairs at 100 W.

2) System shall be NEC Article 725 and Article 800 class 2 low power compliant.

12. Acceptable Manufacturers:

a. Belden
b. Berk-Tek
c. TE Connectivity
d. General Cable
e. Comm Scope

2.2 OUTLETS AND CONNECTORS

A. UTP Outlets/Connectors:

1. Physical Specifications:

a. Shall be 8 position connector compatible with the cable characteristics.

b. Shall be modular and snap-in to user configurable faceplates for future retrofits meeting durability requirements specified in the latest revision of the CEI/IEC standard.

c. Shall be IDC type suitable for eight 22-24 AWG wires with a gas-tight connection.

d. Each contact surface shall have at a minimum, copper alloy with 50 micro-inches gold over nickel and a minimum contact force of 100g.

e. Conductors shall be separated and aligned internally by jack comb.

f. Shall have easy to read 568A/B color scheme to prevent termination errors.

g. Wired in accordance with TIA/EIA polarization sequence specified in Patch Panel section of this specification.

h. Transmission characteristics shall meet the requirements for the UTP cabling specified.

i. Minimum durability shall be 1000 connecting cycles.

2. Acceptable Manufacturers:

a. Ortronics

b. Panduit
c. Belden
d. Hubbell
e. TE Connectivity

2.3 COLOR CODING

A. Cable outer jacket shall follow the color coding scheme as follows. Jacket color shall be continuous. Patch cords shall match the cabling.

B. Copper Cable:

1. Data Communication:

a. Category 5e - Gray
b. Category 6 - Blue
c. Category 6A - Yellow

2. Voice Communication:

a. Category 3 - Black
b. Category 5e - Gray
c. Category 6 - Blue
d. Category 6A - Yellow

3. Wireless Network - Green / Purple

4. CCTV - Category 6A - Green / Mauve

5. Paging - White

6. Security/Access - Indigo

2.4 LABELING

A. General:

1. System labeling shall be in accordance with the latest revision of TIA/EIA 606. Labeling system and structure shall match the Owners existing. System shall provide as built final conditions for each cable, port, panel, rack, etc. and utilize MS Excel or approved equal documentation. Provide hard and electronic copy of labeling documentation to the Owner as part of the O and M process.

2. Each label shall contain the Telecommunication Room designated, the room number and the port number in the room. Verify color of label and size of font prior to completion. Provide samples as requested.

3. Labels shall correspond to the room/names/numbers upon completion of the project. Contractor shall not necessarily utilize existing room/names/numbers or those indicated on the blueprints.

4. Label each rack and patch panel with 1 in. high lettering, black on white, adhered electronically printed plastic type label with labels at top, bottom, front and back.

B. Patch Panel

1. Individually label all patch panel ports. Port numbers shall match opposite end outlet/port number.

C. Outlets

1. Individually label all patch panel ports. Labels shall be installed in a workman-like manner and fit completely in the recessed area of the labeled location.

2. Contractor shall utilize adhered labels at poke-thru locations and any other locations that do not have a label location.

3. Copper

a. Specifically label cables at each termination point indicating the destination room, rack number, panel number and port number.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cable:

1. Provide a minimum of one horizontal UTP cable to each communication outlet jack from respective equipment/telecommunications room patch panel as called for. Quantity of data jacks equals minimum quantity of UTP cables (typical).

2. All risers, and wiring concealed in walls or soffits, shall be installed in metal conduits.

3. All cable above accessible ceilings shall be installed in cable tray or J-hook style cable rings 3 ft. O.C.

4. Provide wire management and Velcro cable wraps every 24 in. throughout closets.

5. Wiring/cabling shall be installed in accordance with the manufacturer's recommendations. If the manufacturer recommends larger wire sizes, they shall be provided. However, smaller sizes or lower cable categories are not acceptable.

6. All Contract Documents are schematic. The system supplier shall incorporate their wiring requirements on the system drawings. The Contractor in conjunction with the system manufacturer shall be responsible for complete wiring requirements and conduit sizes.

7. Install UTP cable in accordance with latest revision of TIA/EIA 568 standards.

8. The Contractor shall be responsible for replacing all cables that do not pass required bandwidth and throughput tests.

9. All raceways and closets shall be installed in accordance with latest revision of TIA/EIA-569.

10. All cables shall be labeled in accordance with latest revision of TIA/EIA 606 and these specifications.

11. All horizontal cables shall be terminated in patch panels at the distribution frames, and at the UTP jack at the telecommunications outlet.

12. Maximum length shall be 90 meters.

B. Terminations:

1. All terminations shall be made by a manufacturer's trained representative.

2. Use termination kits for fiber and UTP that are approved by the manufacturer of the cable.

3. All backbone cable shall be terminated in a patch panel and all connections between horizontal and backbone cables shall be through cross connect cable.

C. Equipment and Devices:

1. Install all devices where shown on drawings. Provide all necessary conduit outlet boxes, junction boxes, supports, etc. Verify all required box sizes with the system supplier and coordinate with bending radius needs. All devices shall be modular for future moves and changes.

2. Install all equipment in specified 19 in. racks/cabinets leaving minimum 30 in. of access space on sides and back of rack and 36 in. in front of rack.

3. Provide all power outlets and plug strips required for system operation but not shown on plans.

D. Raceways:

1. Minimum size raceway shall be 1 in.

2. Minimum backbox size for telecommunications outlet locations shall be two-gang with raised cover; <u>no single-gang boxes allowed</u>.

3. Provide no greater than 180° in bends without pull box in any raceway.

3.2 TESTING

A. Copper Cable: System supplier shall channel test end-to-end each permanent link connection using latest IEEE testing procedure for project specified. Tester must conform to the latest standards at the time of testing not time of bid and be Fluke DTX-5000 with latest software version, or approved equal. Testing shall be performed by a technician trained with the specific testing equipment. Testing shall be witnessed by the Owner's Representative.

B. Replace any cables and connectors that do not meet or exceed standards referenced and stated herein and then tested. Testing shall be end-to-end / port-to-port for each cable.

C. Test equipment shall be in good condition and working order, calibrated within one year of its use and utilize leads without twisting and kinks. Unit calibration shall be in accordance with Level III Field Tester per ANSI/TIA 1152.

D. A representative of the end-user will select a random sample of 5% of the installed links. The representative (or his authorized delegate) shall test these randomly selected links. The results obtained shall be compared to the data provided by the installation contractor. If more than 2% of the sample results differ in terms of the pass/fail determination, the installation contractor under supervision of the end-user representative shall repeat 100% testing at no additional cost. Cables and connectors that do not pass shall be replaced and retested until acceptable results are obtained.

E. Test Reporting:

1. The field testing shall be accurately documented for submission, inclusion in O&M Manuals and for Owner future use.

2. Test reports shall include data directory table cross-referencing room numbers and cable numbers with the test report. Post copies of directory at telecommunications room location.

3. Report shall utilize electronic Windows based documenting with a hard and electronic copy provided to the Owner.

4. The report documentation for each cable test shall include the following as a minimum:

a. Project name.

b. Test equipment manufacturer and model number, and last calibration date.

c. Date and time of the test.

d. Patch panel identification.

e. Cable identification.

f. Cable type.

g. Pass/Fail: Pass indicating meeting or exceeding the identified criteria or standard (whichever more stringent) for all parameters. Fail indicating test not meeting identified criteria for one or more parameters.

h. Test pass criteria.

i. Cable length.

j. Propagation delay and attainable bandwidth.

k. List of tested parameters with test and allowable values. Any failed parameters shall be noted or highlighted.

3.3 WARRANTY

A. All cable plant parts shall be warranted to the owner for a period of fifteen (15) years as a complete end-to-end system.

B. Make available an extended warranty to the customer.

C. Warranties shall commence upon final acceptance of the system.

END OF SECTION 27 21 00

SECTION 27 32 00 - PAGING AND INTERCOM SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for the complete installation of the telecommunications system as described in this Section and detailed on the Drawings.

1.2 GENERAL REQUIREMENTS

A. All equipment shall be U.L. listed.

B. All materials furnished and all work performed shall comply with all State, County and Local Authority Codes.

C. All equipment and work shall comply with FCC regulations.

1.3 QUALITY ASSURANCE

A. Equipment furnished under this specification shall be the standard product of one supplier having a minimum of ten years experience in this field.

B. The supplier shall be an authorized Manufacturers Distributor with In-house Staff factory trained in the installation, maintenance and programming of all components.

C. The Supplier shall have a local service department (within a 50 mile radius) and have available a minimum of three (3) factory trained technicians within a 24 hour period.

D. All components shall be fully tested and documented to operate as a complete system.

E. Supplier must guarantee that all replacement parts will be carried in stock for a period of 10 years minimum from the date that the system is commissioned.

1.4 SUBMITTALS

A. Manufacturer's catalog sheets, specifications and installation instructions for all components.

B. Detailed description of system operation.

C. Itemized list of all features and functions.

D. Dimensioned drawings of all system control cabinets and telecommunications room layouts.

E. Wiring diagrams showing typical connections for equipment.

F. Riser diagrams showing all components, devices and interconnecting cable.

G. List of five (5) installations of equivalent or larger systems that have been installed within the past five (5) years and have been operating satisfactorily for a minimum of one year.

H. Warranty information.

I. Programming books coordinated with Owner.

J. Provide a brief description of the size and scope of the suppliers organization, addressing the following issues:

1. Number of locations.
2. Number of employees by job classification.
3. Affiliated companies
4. Size and scope of account base.

1.5 SYSTEM DESCRIPTION

A. Provide a microprocessor based paging and intercom system at HFL Manor School.

B. The complete system shall include but is not limited to the following:

1. Equipment cabinets.
2. Distribution frames and patch panels.
3. Premises wiring and connections.
4. Jacks and face plates.
5. Testing.
6. Raceways.
7. Training.
8. Intercom devices.
9. Standby power.
10. Public address control equipment amplifiers, etc.
11. Speakers and housings.
12. CD player, AM/FM tuners, microphone(s), Antenna, i-Pod docking station.

C. All telephone handsets both analog and digital shall be connected directly to the digital telephone switch. Only speakers and call buttons shall be connected to the intercom/paging control equipment. The systems shall be interfaced via tie lines/or trunks to allow for the following functions:

1. All call, zoned and individual speaker paging from any analog or digital phone connected to the phone switch.

2. Night ring through all P.A. speakers.

D. Provide auxiliary relay at existing master clock to allow schedule tones to be broadcast over loud speakers.

PART 2 - PRODUCTS

2.1 ANALOG PHONES

A. Type "c" on drawings shall be single line telephones including ringer, transfer access button with time hook flash, DTMF dial, standard length mounting cord and handset coil cord. Color shall be selected by the Architect. Shall have message waiting lamp.

B. Acceptable Manufacturers:

1. ITT
2. AT&T
3. Northern Telecom

2.2 INTERCOM AND PAGING SYSTEM

A. Shall use advanced microprocessor technology, be user programmable and be controlled by a central administrative control station equipped with microphone, speaker, handset and control panel with appropriate buttons to program and operate the system.

B. The system shall have the following features:

1. Amplifiers for provision for up to eight programmable zones including emergency all page.

2. Amplifiers for program distribution from an AM/FM radio and cassette tape player to any of the programmable zones.

3. Speaker control assemblies for direct connection of speakers in each room and for zone connection of corridor speakers.

4. Intercom amplifier for hands free communication between speaker and any phone.

5. Intercom and program panel at rack mounted head end equipment providing inputs for microphone or auxiliary plus a built-in microphone for emergency announcements.

6. Connection port at head end equipment for connection of computer or modem line for system diagnostic checks.

7. Tone generator with four (4) emergency tones and three (3) class change tones.

8. Two way voice communication links to the telephone switch allowing the following:

a. Direct dialing two way "amplified voice" intercom between administrative telephones and classroom speakers.

b. Predetermination by administrative user as to whether to ring the telephone or the speaker.

c. Distribution of emergency announcements to all speakers from any authorized telephone (any phone shall be authorized using a 3 digit access code).

d. Night ring through selected zones.

9. Two way voice communication between classroom speaker and administrative control center via push to talk button.

10. Line link modules for connection of DTMF telephones to the intercom system. Provide one telephone at each location with type "C" phone.

a. Provide intercom amplifiers for hands free communication between any phone and any speaker.

11. Emergency call buttons at all rooms equipped with a speaker that will annunciate a trouble light at the administrative control center.

12. Built in master clock system for distribution of class change tones.

13. Provide emergency call buttons on the telephone handset in the classrooms that will annunciate 12 in H x 24 in. W flashing display showing room number, in the main office and open a communications channel from the office to the classroom. In addition, the room number shall be displayed at an annunciation panel at the front entrance of the building. The emergency button shall have the appearance of a normal function pushbutton on the phone. System shall be reset at the P.A. control console.

14. The intercom and paging system shall be equipped with a minimum of 4 hours of battery standby. The intercom and paging system shall be equipped with battery charging circuits sufficient to recharge fully depleted batteries to within 70% of maximum capacity within 12 hours.

C. Power amplifiers shall meet the following:

1. Capable of delivering 250 watts continuous RMS power.

2. Frequency response shall be 45 Hz to 20 Khz at rated output with less than .5% harmonic distortion over the full bandwidth.

3. Signal to noise ratio shall be greater than -90db below rated output for the 20-20 Khz bandwidth.

4. Input sensitivity shall be 1 volt RMS at 1 Khz for rated output and input impedance shall be 75 K ohms.

5. Separate amplifiers shall be provided for program and paging.

D. AM/FM tuner shall meet the following:

1. Tuning range, AM 525-1605 Khz; FM 88-108 MHz.

2. Sensitivity, AM 40 microvolt for 30 db signal to noise ratio; FM 20 microvolt for 30 db single to noise ratio.

3. Antenna input, AM 75 phms, single ended; FM 300 ohms balanced, twin lead, screw terminals.

4. Image rejection, AM greater than 30 db; FM greater than 25 db.

5. I.F. rejection, AM greater than 30 db; FM greater than 50 db.

6. Frequency response 100 - 4,500 Hz. Plus or minus 3 db on A.M. 50 - 15,000 Hz. plus or minus 2 db on FM.

7. Distortion less than 6% on A.M. and less than 2% on F.M.

8. Output 1.0 volt nominal.

9. Controls shall include power switch, AM-FM selector switch, AM-FM selector switch, tuning control and dual function signal reception/pilot light that shall glow when tuner is on and shall glow brighter with strong signal reception.

10. Provide roof mounted AM and FM antennas.

E. Compact Disk (CD Player) Meeting the Following:

1. Description: Five (5) disk CD player with programmable sequence playback of 32 tracks, random playback, repeat play, bypass play, play, pause, stop, search, track change, LCD display and disk change while another disk is engaged.

2. Performance:

a. Frequency response of 20 to 20,000 Hz plus or minus 1.0 dB.

b. .0025% harmonic distortion @ 1 KHZ.

c. 100 dB dynamic range.

d. 100 dB signal-to-noise ratio.

e. 100 dB channel separation at 1 kHz.

f. 2-channel 16-bit linear quantization with 8 or 12 LCM disks.

3. Outputs:

   a. Analog: XLR, balanced, 4.5 dBm, 1.3V, 600 ohm.

   b. Analog: RCA, unbalanced, 6 dBv, 2V, 47K ohms.

   c. Digital: Coaxial, S/PDIF 0.5V P-P, 75 ohms.

4. 120V AC, 60 Hz power input.

5. Physical Enclosure:

   a. Dimensions: 17-1/8" W x 4-1/2" H x 10-5/8" D.

   b. Rack mounted ears and hardware.

6. Design Make: Tascam CD-305.

F. Speakers:

1. Cone type speakers (main system, ceiling mounted) shall be 8 in. diameter with attached 25 volt line matching transformer and meet the following standards:

   a. Frequency range of 30 to 15,000 Hz.

   b. Power rating of 10 watts, 16 watts program.

   c. Voice coil impedance of 8 ohms.

   d. Magnet weight 4.8 ounces, ceramic.

   e. Flux density 9,000 lines/square cm.

   f. Axial sensitivity of 93 db at 4 ft. with (1) watt input.

   g. Line matching transformer shall have taps for 1/2, 1, 2, and 4 watts.

2. Exterior, Gymnasium and Pool: (Wall Mounted)

   a. Subscript "H" indicates horn type, subscript "HV" indicates vandal-proof horn type.

   b. Wall mounted, 10-1/2 in. diameter projector type speaker 350 Hz - 12 Khz frequency response, 120 dB sound level with 130° dispersion.

   c. Outdoor type shall be weatherproof.

   d. Taps: 4, 8, 16 watts.

3. Provide volume control on all speakers located at the speaker.

G. Speaker Housings:

1. The housing for ceiling recessed speakers shall include a grille which has a round steel frame with perforated steel center, all finished in flat white, and a 4 in. deep round back box.

2. Speakers in Gymnasium shall be mounted in a square 4 in. deep surface mounted box finished with epoxy paint and constructed of 18 gauge sheet steel. Box shall be rigidly fastened to the structure.

3. Exterior speakers shall be mounted in a surface weatherproof, vandal resistant enclosure.

H. Upon failure of any electronic components in the system emergency announcements shall be able to be made from the microphone at the control center.

I. Provide switchbanks at the control center for reaching any room even if electronic components in the system have failed.

J. Design Make: Telecor XL Series

1. Provide new system in its entirety at the following buildings:

a. Transportation Building

b. Manor Elementary (alternate)

K. Acceptable Manufacturers:

1. Dukane
2. Bogen
3. Simplex

2.3 PREMISES WIRING

A. Phones:

1. Shall be 24 AWG, 4 pair unshielded twisted third party verified to category 3.

B. Speakers:

1. Shall be 18 AWG, single twisted pair solid, shielded with 18 AWG solid drain.

C. Speakers with call-in switch:

1. Shall be one 18 AWG, shielded twisted pair with one 18 AWG conductor.

D. Wiring between closets and distribution frames shall be multi-conductor combinations of the appropriate cables as called for by the system supplier. Provide sufficient quantity of spare conductors for 25% future expansion.

E. Acceptable Manufacturers:

1. Belden
2. West-Penn
3. AT&T

2.4 DISTRIBUTION FRAMES AND CONNECTORS

A. Wiring terminations at MDF and IDP's shall be made using 66 Style punch down. All terminations shall be labeled per TIA/EIA 606.

B. Provide 3/4 in. x 4 ft. x 4 ft. plywood backboard with two coats of medium gray fire proof paint at all IDF locations, at a minimum one in each telephone closet. Provide 8 ft. x 4 ft. x 3/4 in. plywood backboard at “MDF”. Cut backboards into sections as required to fit in space allotted.

C. Provide surge protection and grounding system.

D. Telephone/Intercom connectors shall be modular in construction and meet EIA/TIA category 5e requirements for near end cross talk (NEXT) and attenuation. Connectors shall be RJ11 6 position 4 wire. Provide connectors for all telephone instruments shown on plans.

E. 8 wire, 6 wire and 4 wire modular jacks shall fit in the same size opening of common faceplate.

F. Provide hardwired connection for all Type "C" phones shown on plans.

G. Acceptable Manufacturers:

1. Panduit
2. Amp
3. Ortronics
4. Hubbell

PART 3 - EXECUTION

3.1 INSTALLATION

A. Cable:

1. All wiring concealed in walls or so fits shall be installed in metal conduits.

2. All cable above accessible ceilings shall be installed in J-hooks, 3 ft. O.C.

3. Verify all wiring requirements with the Manufacturer. If the manufacturer recommends larger wire sizes, they shall be provided. However, smaller sizes or lower cable categories are not acceptable.

4. All Contract Documents are schematic. The system supplier shall incorporate their wiring requirements on the system drawings. The Contractor in conjunction with the system manufacturer shall be responsible for complete wiring requirements and conduit sizes.

5. After the system has been completely tested, the cables between the main control cabinet and the conduit access box shall be neatly bundled and held with either nylon lacing cord or nylon cable clamping devices similar to Thomas and Betts "Ty-Rap". More than one bundle may be used if one would be too large to be workable. Provide sufficient loop in cable bundle to allow moving the cabinet away from the wall. Internal cable shall be similarly bundled, and rounded in such a manner to permit easy access to internal equipment and connections. Where control equipment has a pullout feature, provide sufficient loop of cable to prevent binding.

6. Label all pullboxes in ceilings "telecommunications" using wide marking pen.

7. Label all cables per the latest TIA/EIA Standards.

B. Equipment and Devices:

1. Install all devices where shown on drawings. Provide all necessary conduit outlet boxes, junction boxes, supports, etc. Verify all required box sizes with the system supplier.

2. Install all head end equipment in 19 in. fixed racks leaving minimum 30 in. of access space on sides and back rack and 36 in. in front of rack.

3. Provide surge suppression per Manufacturers requirements for all equipment.

4. Provide all power outlets and plug strips required for system operation but not shown on plans.

C. Speakers:

1. Provide volume controls for speakers where indicated in plans. Volume controls shall have emergency call override.

2. Unless otherwise directed, each system speaker shall be wired to operate at the following wattages:

a. Classrooms, Library, Offices……1 Watt

b. Exterior Speakers……..…8 Watts

c. Corridors and Areas with Ceilings 10 ft. and higher…….2 Watts

d. Gymnasium……..16 Watts

3.2 PROGRAMMING

A. Two months prior to job completion the supplier shall arrange a meeting with the Owner to perform all programming functions. At this time all authorization codes, restrictions, etc. shall be determined.

3.3 TESTING

A. Upon completion of the system installations it shall be the responsibility of the Contractor to perform the necessary adjustments and balancing of all signals, amplifier level controls, and speaker taps to the satisfaction of the Owner.

B. In the presence of the Owner's Representative and the Contractor, the system supplier shall test each device and all system functions. The test shall be documented with a signed copy submitted to the Contractor, Owner and Architect/Engineer.

C. A cables shall be tested for continuity.

3.4 TRAINING SESSIONS

A. Provide two, one-hour training sessions for each administrative staff member. Training sessions shall be limited to five staff members at one time. Provide phones for staff members use during the training sessions.

1. The training sessions shall include the following:

a. All page, zone page and classroom page through public address from any phone on the system.

b. Detailed description of all digital phone features.

c. Detailed description on the handling of "911" calls at the attendant or "911" calls that have been routed from the attendant to another administrative phone. The procedure should include first calling into the classroom or office in over the speaker and then determining what action should be taken at that point.

2. Provide laminated short form instructions detailing all functions and emergency procedures for all administrative staff members.

B. Provide one, one-hour training session for each teacher. Training sessions shall be limited to 15 teachers at a time.

1. The training sessions shall include the following:

a. System description and functions.

b. Detailed description of emergency call procedures both with "911" and using the emergency call button on the phone. The training session shall be done in conjunction with the school superintendent or safety coordinator. The Contractor shall meet with the school to determine the exact policy and format of the training a minimum of two weeks prior to the scheduled date.

C. Provide 16 hours of trainer's time within 30 days after completion to clarify any operating problems experienced by the users.

D. Provide two (2) eight-hour training sessions for four (4) maintenance personnel teaching emergency repairs to the system such as replacement of defective standard components such as loud speakers, lamps, etc. and basic programming required for system operation. Session shall be given by factory authorized representative of the Equipment Manufacturer.

3.5 INSTRUCTION MANUALS

A. The Contractor shall provide, in addition to three (3) approved copies of the telecommunications system submittals, three copies of complete written operating instructions, pertinent system orientation documents, system service and parts list and testing documentation and programming manual.

B. The Contractor shall provide four (4)complete sets of service manuals and wiring diagrams of the entire system, including manufacturer's parts and number, schematics, complete with operating information, including equipment characteristics, operating voltages, etc.

3.6 WARRANTY

A. Provide a 12 month warranty for all parts and labor from the date the system is accepted.

B. Provide written documentation from the Manufacturer that system parts will be available for a minimum of ten (10) years.

C. Make available an extended warranty that guarantees labor coverage for repairs in years 4-10.

D. If the supplier is not the manufacturer of the proposed system(s), the Supplier must provide:

1. Documented proof that the Supplier is an "AUTHORIZED" distributor of the proposed system(s) in good standing.

2. Written certification that the Supplier currently employs factory-trained and certified engineers/technicians who will install the cut over the proposed system(s) in accordance with the manufacturer's specifications.

3. Written certification that the Supplier will continue to employ factory-trained and certified engineers/technicians who will provide on-going service for the proposed system(s) and maintain the proposed system(s) according to the manufacturer's recommended level of performance.

4. Written certification that the Supplier will locally maintain a sufficient level of inventory of new, original equipment or equipment manufacturer recertified spare parts and components that will enable the Supplier to provide on-going service for the proposed system(s) according to the manufacturer's recommended level of performance.

3.7 MAINTENANCE

A. Supplier shall provide a detailed description of its service dispatch process, remote maintenance facilities and customer-site technician reporting procedures or protocol. This description must include:

1. A copy of supplier's service work order.

2. A description of supplier's computerized service dispatch and management system.

3. A list of names of all local technicians employed by the supplier, their factory certification level on the proposed system, and the number of years they have been installing/devicing the type of system being proposed.

4. A description of the technical support hierarchy that exists throughout the supplier's organization and that of the manufacturer of the proposed system with an indication of how this hierarchy provides technical support to field technicians as well as the name of the department within the manufacturer's organization which provides technical support of the supplier, field technicians and the method by which that support can be obtained.

5. For the system being proposed, the supplier shall identify the location and availability of necessary system spar parts and qualified technicians. The supplier should also indicate any other levels of support that can be provided for system service and maintenance.

6. The Supplier must be able to perform Move, Add and Change (MAC) software changes remotely whenever possible in order to minimize cost of such changes to the buyer.

7. The supplier shall describe and maintenance contracts or service agreements that are available.

END OF SECTION 27 32 00

SECTION 28 31 02 - ANALOG ADDRESSABLE FIRE ALARM SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Provide labor, materials, equipment and services to perform operations required for the expansion of the existing fully operational analog addressable fire alarm system and related Work as described in the Contract Documents.

B. Provide system as approved by local Fire Marshal and the Authority Having Jurisdiction (AHJ). System materials and installation shall be in accordance with the manufacturer's recommendations.

1.2 QUALITY ASSURANCE

A. All methods of construction, details of workmanship that are not specifically described or indicated in the contract documents, shall be subject to the control and approval of the Owner's Representative. Equipment and materials shall be of the quality and manufacture indicated in their respective sections of the specifications. The equipment specified is based upon the acceptable manufacturers listed. Equipment types, device ratings, dimensions, etc. correspond to the nomenclature dictated by those manufacturers. All equipment shall be tested at the factory. Unless specified elsewhere, standard factory inspection and operational tests will be acceptable.

B. Installation shall be in accordance with NFPA-70 (National Electrical Code), NFPA-72 (National Fire Alarm Code), AHJ, state codes, local codes, requirements of authority having jurisdiction and the contract documents. Installer shall be certified in the State of New York for fire alarm installation.

C. Equipment shall be designed, manufactured, assembled, and tested in accordance with the latest revisions of applicable published UL, NFPA, ANSI, NEMA and IEEE Standards. All system equipment shall be compatible and of the same manufacturer.

D. Each item of the fire alarm system shall be listed as a product of a single fire alarm system manufacturer and shall bear the UL Label.

E. System installation shall be under the supervision of an accredited factory representative. Final connections to the FACP, annunciator panel and any other panels shall be by the factory representative.

F. The system provider must:

1. Provide equipment from a single manufacturer for which they maintain a contract, distributorship, are an agent, or other formal arrangement for which documentation can be produced showing authority to sell and service the equipment in this territory.

2. Demonstrate that they have successfully installed these systems, utilizing their standard products, for a period of five (5) years minimum.

3. Maintain a service organization to provide both normal and emergency service. Emergency service must be available 24 hours per day,365 days per year and staff must be adequate to respond within 2 hours of an emergency call.

4. Have a service location not more than 50 miles from the project location.

5. Maintain adequate spare parts inventory to provide both normal and emergency service.

6. Employ service technicians who are trained in accordance with the systems manufacturer's recommendations.

7. Own and demonstrate proficiency in the use of the required test equipment, tools, etc. for the proper installation, set-up, testing and maintenance of the system. If requested, provide a listing of tools and/or equipment and where appropriate, certifications in the proper training and use of the tools and/or equipment.

8. Provide all system programming to deliver a customized system to the Owner ready for use.

9. All system programming is to be completed to the satisfaction of the Owner. If after preliminary use of the system, and/or training, the increased understanding of the system's features and capabilities necessitates reprogramming to any extent, it is to be performed at no additional cost.

10. Provide a minimum of two system inspections/tests each year during the warranty period as described in NFPA 72. Needed and requested system programming changes shall be provided at these times.

11. Warranty period shall be as described elsewhere with two years being minimum. Provide a service contract for the Owner review for two years beyond the warranty period. Warranty shall include all parts, materials, labor, transportation, etc.

1.3 SYSTEM DESCRIPTION

A. The system shall constantly monitor all initiation devices and notification circuits for any abnormalities or alarm conditions. System shall sample/poll each addressable device no less than every 10 seconds.

B. The system operation subsequent to the alarm activation by any initiating device (manual station, automatic detector, sensor, sprinkler flow switch, etc.) shall be as follows:

1. All audible alarm notification appliances within corresponding building or designated area shall provide a common audible fire alarm signal until the System Reset Key or the Signal Silence Key is depressed.

2. All visual alarm notification appliances shall flash continuously and synchronized until the system is reset or silenced.

3. The remote central monitoring station shall be notified automatically until the System Reset Key or the Signal Silence Key is depressed. The municipal box shall be activated notifying the fire department.

4. Shutdown of the corresponding HVAC system equipment shall occur with a supervisory alarm until the system is reset. All fans over or 1,000cfm shall be shut down.

5. Activation of all programmed outputs assigned to the initiating device shall occur until the system is reset or the silence key is depressed.

6. The alarm shall be displayed at the local Fire Alarm Control Panel (FACP) and the fire alarm annunciator panel.

7. The system alarm LED shall flash on the control panel and the fire alarm annunciator panel until the alarm has been acknowledged/reset. Once acknowledged, this same LED shall latch on. A subsequent alarm received shall flash the system alarm LED on the control panel and annunciator. The LCD display shall show the new alarm information.

8. A pulsing audible alarm tone shall occur within the local building control panel and, where applicable, the fire alarm annunciator panel until the event has been acknowledged.

9. Alarms shall be entered into the system event log history.

10. Refer to Appendix A for operational/sequence matrix.

C. Any subsequent alarm shall follow the operation described above.

D. The activation by any system smoke detector or sensor shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within a preset time after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described previously. If no second alarm occurs within the prescribed time, the system shall resume normal operation. The alarm verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. The alarm verification operation shall be selectable by device.

E. A manual evacuation (drill) switch shall be provided to operate the alarm notification appliances without causing other control circuits to be activated. However, should an actual alarm occur, all alarm functions shall occur as described previously.

F. The system shall have a password(s) to allow the operator to display all alarms, troubles, and supervisory service conditions log history including the time of each occurrence. This shall be able to be viewed from the front of the control panel, annunciator panel or from a computer connected to the FACP.

G. The actuation of the " walk test" program at the control panel shall activate the "Walk Test" mode of the system which shall cause the following to occur:

1. The remote central monitoring station connection shall be bypassed.

2. Only audible and visual appliances shall be operated. Other alarm functions (elevator recall, HVAC shutdown, etc.) shall not be affected.

3. Walk test shall be selectable by circuit or circuits.

4. Actual alarms received during a "Walk Test" shall cause the control panel to go into alarm and override the walk test mode.

5. The control panel shall show trouble conditions.

6. The walk test activation of any initiation device shall cause the audible signals to activate for two seconds or a distinguishable audible.

7. The panel shall automatically reset itself after signaling is complete.

8. The control panel shall automatically return to normal condition if there is no activity on a walk test circuit for a period of 30 minutes.

H. Any momentary opening of an initiating or notification appliance circuit wiring shall cause an audible signal to sound at the Fire Alarm Control Panel and, where applicable, the annunciator panel for four seconds indicating a trouble condition.

I. Elevator Operation:

1. Provide the following equipment as a minimum and as indicated on the drawings:

a. Smoke detection in the elevator equipment room.

b. Smoke detection at each elevator lobby.

c. Smoke detection in the elevator shaft if a smoke hatch.

d. Heat detection in the equipment room and shaft (high and low) if a sprinkler system is in the area. Detectors shall be within 2 ft. of the individual sprinkler heads.

e. Detection devices located in elevator lobbies, elevator hoistways and elevator machine rooms shall be used for elevator recall. Hoistway and equipment room heat detection shall initiate power shut down prior to water flow. Operation shall be in accordance with ASME A17.1, Safety Code for Elevators and Escalators. Signals shall be provided to the elevator controls for main level lobby alarm, any lobby alarm, elevator equipment room alarm and elevator hoistway alarm as a minimum.

Provide addressable control modules for the signals to the elevator controls.

J. Alarm initiation of a detector associated with a smoke hatch or fire barrier shall initiate a system alarm. Also, provide connections between the auxiliary contacts on the detectors or addressable control module and the associated smoke hatches [and fire barriers such that the smoke hatch or fire barriers will be operated upon its respective detector activation. Provide power supplies, wiring and accessories for fire alarm system and all supervisory functions required for proper smoke hatch and fire barriers operation.

K. Duct mounted smoke detectors associated with duct dampers shall have an addressable control module to operate the duct damper. In the event of an alarm initiation by the duct mounted smoke detector or the associated air handling unit/fan shut down the duct damper shall be closed. Control wiring shall be provided to shut the damper(s) when the associated air handling unit is not operational. Provide power supplies, wiring and accessories as needed for this operation.

L. Provide wiring and equipment such that alarm initiation of a heat detector located in the elevator machine room and/or the elevator shaft shall provide suitable voltage from the fire alarm control panel to be applied to the shunt trip coil of the elevator's supply circuit breaker. No fire alarm devices except the heat detectors in the elevator machine rooms and shaft shall cause this. Also, alarm initiation of these heat detectors shall initiate the system alarm functions described above. Provide an addressable control module with a Form C contact at the elevator controllers, which shall be normally closed and shall open upon alarm initiation of any of these heat detectors; this contact shall be used to disconnect the battery-powered emergency return unit if so equipped with the use of a relay suitable for the emergency power circuit. Also, provide an auxiliary contact on the main line disconnect switch (four pole unit) and two (2) #12 in conduit to the elevator controller from this contact for the same purpose.

M. Carbon Monoxide (CO) Detectors shall initiate:

1. A trouble on the system, including networked panels monitoring the system.

2. A notification of trouble at the owner designated central locations in the building, for both the primary and secondary locations. For example: (Daytime and Night Time Locations, shift change locations, etc.)

3. A CO alarm in the space.

4. CO alarms in the immediate adjacent spaces only.

5. Only local CO alarms that are near the initiated detector, not the entire building.

6. Audible and visual CO alarms that are different from a fire alarm appliance, both visually and audibly, and are labeled accordingly.

N. Provide a minimum of two Form C contacts at the building's fire alarm control panel. This contact shall activate upon activation of any fire alarm initiating device.

O. Supplementary Remote Annunciation Network: System shall be compatible and report all status via Owner's LAN to existing master offsite networked fire alarm system. Signal shall be supplementary and not be in lieu of code required monitoring services.

1.4 SUPERVISION

A. The system shall utilize independently supervised initiation device circuits. The alarm activation of any initiation device shall not prevent the subsequent alarm operation of any other initiation device.

B. Notification appliance circuits shall be supervised to indicate an open or short circuit condition.

C. The incoming power to the system shall be supervised so that any power failure must be audible and visually indicated at the control panel and the remote annunciator. A green "power on" LED shall be displayed continuously while incoming power is present. This shall be a trouble alarm.

D. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated at the control panel and the remote annunciator. This shall be a trouble alarm.

E. The system shall have provisions for disabling and enabling all circuits individually for maintenance or testing purposes.

1.5 SUBMITTALS

A. Provide a complete system submittal prior to ordering of equipment and installation including but not limited to:

1. Complete equipment list.

2. Catalog descriptive literature for all equipment. This shall include a description of the unit, ratings, functions, capability, materials and compatibility with other components.

3. Riser Wiring Diagram showing all equipment, devices, device addresses, connections, control connections, remote notification connection(s), wire quantities and sizes.

4. Floor plan indicating equipment and device locations, addresses, power circuit information with power panel location, notification circuiting, initiation circuiting, control circuiting and any system applicable building characteristics (ceiling heights, structural members impeding detection, etc.). Contact the Engineer for an electronic copy of the project floor plans. Engineer logo shall be included in final drawing.

5. Typical Terminal Wiring Diagram for each type of device.

6. Terminal wiring Diagram for all Fire Alarm equipment.

7. Calculations including:

   a. Battery sizing calculations indicating total number of power devices, load associated with each type device, backup period and recommended battery capacity (AH).

   b. Voltage drop calculations with actual equipment loads used to derive battery back-up ampere-hour rating and individual circuit voltage drop (indicate the wire size to be used and the associated voltage drop with the allowed voltage drop) for each circuit.

8. Complete console enclosure and equipment configuration.

B. If required by the Authority Having Jurisdiction (AHJ) provide a submission of all requested information for review and comment by the AHJ. All AHJ comments shall be incorporated and resubmitted until approved.

C. Test reports at the completion of the project. Testing shall be of all system devices, equipment, circuits, features and functions.

PART 2 - PRODUCTS

2.1 EXISTING FIRE ALARM NETWORK

A. Expand existing fire alarm network to include the building fire alarm system(s) described in the contract documents.

B. Building fire alarm system shall be compatible, UL listed and networked with existing fire alarm network. The existing simplex TrueSite Workstation (TSW) is located in Hudson Avenue. All points shall report to the TSW.

C. The fire alarm network shall operate with the same functionality as the building fire alarm system, except in a remote fashion, to all of the buildings connected:

1. Monitoring status of any device.

2. Enabling and disabling any device.

3. Adjusting the sensitivity of any device.

4. Historical logging of any device.

5. Generating reports for any device.

6. Capable of mass notification.

D. The project fire alarm system shall comply with and be in accordance with the drawings and specifications. All system equipment and materials shall be of the same manufacturer unless otherwise indicated. System and component acceptable manufacturers include the following unless otherwise indicated.

E. Acceptable Manufacturers: Simplex (Design Make).

2.2 EXISTING FIRE ALARM SYSTEM

A. The fire alarm system shall be comprised of the components specified as a minimum and also include components not indicated but required for a complete and operable system as described herein.

B. The system and all its components shall be UL listed and in accordance with NFPA 72, local and state codes.

C. The system shall have 25% spare capacity. This shall include all individual notification circuits, initiation circuits, initiating modules, alarm modules, power supplies, batteries, central processing unit memory and printed circuit card space. System initiation device and control device capacity shall be a minimum of the indicated percentage over the shown quantity or 250 whichever is greater.

D. Each initiating device shall have an individual address for system communication. The system addresses shall not exceed seven digits. Each address, initiation circuit, notification circuit and control point shall have an individual identification description.

E. System shall shut down all air handlers more than 1,000 cfm upon an alarm.

2.3 EXISTING FIRE ALARM CONTROL PANEL (FACP)

A. The system shall be entirely solid state, microprocessor based, use digital transmission and shall be field programmable. All system programming including field modifications shall be stored in non-volatile memory. Field modifications shall be automatically stored without special actions. The panel shall be designed and manufactured expressly for the intent to detect the presence of fire and to provide indication of such detection. Panel shall contain as a minimum power supply(s), control module, main control printed circuit board, initiation modules, notification modules, terminals and back up battery(s). Control module shall have 80 character backlit LCD display and twelve control buttons (four being field assignable), minimum. Display shall indicate the battery voltage at all times.

B. The system shall be modular in design to allow for future expansion with a minimum of hardware additions.

C. The FACP shall be located where shown on the drawings. Enclosures shall accept all system items for an aesthetically suitable operator's console. Enclosures shall be of modular size to allow surface mounting of multiple boxes adjacent to each other, shall have hinged solid metal doors and contain a lock with a key common to all system devices. Enclosure shall have a red finish.

D. The FACP shall operate its integral LCD Display through an RS-232C port operating up to 9600 baud to indicate all operator transactions, alarms, trouble reports and any other conditions specified by system programming.

E. Conditions of the system shall be indicated at the operator interface by LED's. These conditions shall be alarm, supervisory, trouble and alarm silenced. An LCD 2 line, 40 character per line display shall also be included. It shall display "SYSTEM IS NORMAL" with the date and time under normal circumstances. The LCD display shall also indicate type of alarm, point status, number of alarms and location. Through the use of function keys, historical data can also be displayed.

F. The FACP shall include a password (three (3) levels of protection with individual passwords, minimum) protected key pad for access to programming, special functions and all system features.

G. Any event initiated by the FACP due to an alarm input shall be retained in nonvolatile EPROM memory. The FACP shall also have sufficient memory for 1200 individual alarm/trouble events.

H. The FACP shall have the following user connection types:

1. Ethernet connection for a computer, personal data device or printer. Connection shall allow for programming changes, history download, setting review/changes, etc.

2. RS 232 port for connection of a serial printer.

I. Provide modules for network interfacing and off site monitoring.

J. The FACP shall be equipped with a minimum of 24 hours of battery standby. The FACP shall be equipped with battery charging circuits sufficient to recharge fully depleted batteries to within 70% of the maximum capacity within 12 hours. When the system is operating on the battery supply, a trouble condition shall be generated. When utility power is restored, the system shall revert back to 120 VAC supply without any operator intervention.

K. Design Equipment: Simplex 4100ES.

2.4 EXISTING EMERGENCY VOICE COMMUNICATION SYSTEM

A. Provide a complete emergency voice communications system with audio evacuation system.

B. The Emergency Communications Control Panel (ECCP) shall be alerted to incoming calls from any remote emergency telephone station by individual line flashing lamps for each station and a common audible signal. When the attendant picks up the master handset located in the ECCP, the audible signal shall be silenced, but each line lamp shall continue to flash until the call is answered by placing individual switches in the talk position. The line lamp for the answered call shall remain constantly illuminated until the attendant terminates the call. The attendant shall be able to communicate privately with an individual station or simultaneously with several stations as required by placing the individual line switches in the talk position.

C. All wiring of the Emergency Voice Communication System shall be supervised. Open or short circuits shall report to the ECCP as trouble condition.

D. In the event of normal power failure, the entire communications system shall automatically transfer to standby power source. Provide separate and dedicated power circuit(s) for the ECCP.

E. Design Equipment: Simplex.

2.5 AUDIO EVACUATION SYSTEM

A. Notification speakers shall be located as shown on the drawings and shall be electrically supervised, and zoned as shown on the drawings. Minimum zoning shall be by floor. Provide zone selector switches, individual zone lamps, trouble lamp and test switch at the Emergency Communications Control Panel (ECCP). All-call capability shall be provided by operation of a single switch. Master microphone shall be located in the ECCP and shall have integral "press-talk" announcement. Signals shall automatically sound again upon lifting of "press-to-talk" switch at the end of the announcement.

B. Provide an audible amplifier unit and locate within the ECCP. All components shall be solid state. Preamplifier shall contain microphone input and necessary tone and volume controls. Power amplifier shall be rated 100 watts minimum for suitable power rating for the indicated system, locations and ambient sound level while having the system spare capacity factor indicated and have a frequency response of 125-12,000 Hz. System shall provide intelligible voice communication throughout the project.

C. Speakers shall be surface mounted, 4 in. size, 8 ohms impedance, 11 watts rating. Provide integral matching transformer for 70 volt line and with 0.25, 0.5, 0.75, 1.0 and 2 watt taps. Speakers shall have a steel housing, water-sealed compression driver, and baked epoxy finish. Color shall be red. Provide bi-directional or weatherproof mounting where shown on drawings.

D. In the event of 120 VAC power failure, the entire audio evacuation system shall automatically transfer to the system standby power source.

E. Design Equipment: Simplex.

2.6 VENTILATION FAN SHUTDOWN CONTROL

A. Provide supervised normally closed relays and contactors for connection into the fan motor control circuits ahead of all automatic devices.

B. Sequence fan shutdown for every air distribution system over 1000 cfm. Provide duct detectors in return of systems over 2,000 cfm and in both supply and return at each floor of systems over 15,000 cfm.

C. Provide drill bypass feature, locate switch on Fire Alarm Control Panel and label "DRILL-FAN SHUTDOWN BYPASS". Buzzer shall sound continuously while in bypass mode.

D. Provide fan reset feature, locate switch on Fire Alarm Control Panel and label "FAN RESET".

2.7 INITIATION DEVICES

A. General:

1. Provide analog addressable smoke and thermal sensors as shown. All detectors, control modules, monitor modules and all other initiation devices shall communicate with twisted pair cable and have an individual address. Peripheral devices shall be of the some manufacturer as the FACP.

2. Spot type detectors shall utilize the same interchangeable bases.

3. If a device is removed or taken out of service a trouble signal shall be initiated.

B. Photo-Obscuration Type Smoke Detector:

1. The photo-obscuration detector shall operate on the photo electronic principle and provide an analog signal to the system indicating the amount of smoke. Detector shall be an analog addressable type.

2. The detector shall incorporate a built in type identification so the system can identify the type of detector. The sensor shall be continually monitored to measure any change in their sensitivity because of the environment (dirt, smoke, temperature, humidity, etc.). Unit shall not be affected by exterior light or EMF.

3. The detector shall be designed and arranged to prevent interference from exterior electromagnetic fields and light.

4. The detector shall provide advance indication of the analog value of the products of combustion to the FACP indicating that maintenance is required in order to insure normal operation. The detector sensitivity shall be adjustable per device (within UL limits) and be set at the FACP for continuous or variable based on time of day. There shall be a minimum of six (6) selectable sensitivity levels. The individual detector sensitivity setting shall be adjusted to meet the building/space characteristics and operation.

5. Detectors shall be designed for twistlock mounting to a separate base assembly. Provide manufacturer's recommended back box suitable for surface mounting where required.

6. The detector base shall have terminals for making all connections; no soldering shall be required. It shall be possible to secure the detector to the base with a concealed socket headscrew to prevent unauthorized tampering.

7. Smoke detectors shall be UL 268 listed and FM approved.

8. All smoke detectors shall be field checked and set to meet the prevailing conditions of the premise and any Owner requests. All such work shall be performed by an authorized representative of the manufacturer trained in such procedures.

9. Photo-obscuration type smoke detection shall be used for smoke detection unless indicated otherwise indicated.

C. Projected Beam Photo Electric Smoke Detectors:

1. Microprocessor based beam type smoke detector consisting of a separate transmitter and receiver units. Units shall have individual system addresses and provide an analog signal based on the beam obscuration. Unit shall have a sensing range suitable for the intended location with capability up to 60 ft. x 320 ft. of detection area. Where an analog signal is not available provide an addressable initiation module for system interface.

2. Transmitter shall produce a crystal controlled infrared beam.

3. Shall have an adjustable time delay (up to 30 seconds) for momentary beam blockage. Alarm sensitivity shall be adjustable from 20 to 60%.

4. Shall initiate trouble alarm when dust obscures beam by 50%. Unit shall compensate for a gradual buildup of dust.

5. Installation with convenient beam alignment adjustments.

6. Provide with manufacturer surface mounting backbox for surface mounted locations.

7. Housing color to match the surrounding colors.

8. Operating voltage 18-32 VDC. Provide a 24 VDC power circuit from the FACP. Connect unit to the system addressable circuit.

9. Provide with remote indicator and testing station for each unit. Station shall indicate system condition (alarm, normal, trouble), have the ability to remotely test the system and have time delay/sensitivity adjustments. Mount station in local utility space and label for the specific unit.

10. Acceptable Manufacturer:

    a. System manufacturer.

    b. Another manufacturer listed with the system and meeting these specifications.

D. Heat Detector:

1. The heat detector shall be a thermal sensor and shall constantly monitor the space temperature and constantly report this to the system. The unit shall be analog addressable.

2. The sensor shall use dual solid state thermistors and shall monitor the ambient temperature from 32 degrees F, to 155 degrees F and provide a fast response to rapid increase in temperature. The sensor shall send data to the FACP representing the analog value of the ambient temperature. The FACP shall be suitable to monitor for set temperature (selectable by detector for 135 or 155 degrees F) and rate of rise (selectable by detector for 15 or 20 degrees F per minute). Individual detector thermal settings shall be adjusted for the building/space characteristics and operation but shall initially be set to 135 degrees F set temperature and 15 degrees F per minute rate of rise.

3. Detectors shall be designed for twistlock mounting to a separate base assembly. Provide back box suitable for surface mounting where required.

4. The detector base shall have terminals for making all connections; no soldering shall be required. It shall be possible to secure the detector in the base with a concealed socket headscrew to prevent unauthorized tampering.

5. Smoke detectors shall be UL 268 listed and FM approved.

6. All thermal sensors shall be field checked and set to meet the prevailing conditions of the premise. All such work shall be performed by an authorized representative of the manufacturer trained in such procedures.

E. Combination Smoke And Heat Detector:

1. Single detector shall have both heat and smoke sensing capability as described in the photoelectric smoke detector and heat detector paragraphs above. Unit shall provide two individual analog sensing levels to the FACP including one for smoke and one for heat.

2. Detector shall utilize the same base unit as the smoke and heat detectors.

F. Addressable Initiation Module/Monitor Module:

1. The addressable initiation module shall be used to connect supervised conventional initiating device or zone of supervised conventional initiating devices (water flow switches, tamper switches, manual pull stations, (4) wire smoke detectors, conventional (4) wire duct detectors, fire pump alarms, dry chemical fire extinguisher control panels, etc.) to one of the system's addressable circuits.

2. The module shall provide address setting means using rotary decimal switches and also store an internal identifying code which the control panel shall use to identify the type of device.

3. The module shall contain an integral LED that flashes each time the unit is polled.

G. Manual Pull Stations:

1. Noncoded pull-down type, double action (push then pull down) manual addressable units with front keyed test/reset. Units shall be semi-flush where installed in construction with hollow or block walls. Where construction does not allow semi-flush mounting then unit shall be surface mounted utilizing the manufacturers back box. Each unit shall have a distinct address. Units shall be key reset.

2. Units installed outdoors or in potentially wet locations shall be rated for such conditions.

3. Bright red finish with white lettering "FIRE ALARM".

4. Provide tamperproof clear lexan protective shield with horn and batteries to produce 85 Db minimum sound pressure level at 10 ft. when shield is raised. Shield shall have activation/deactivation switch with lockout screw, and 400 lb. breaking strength retaining cable.

H. Duct-Type Smoke Detector:

1. Detector shall be a photoelectric type that shall be activated by the presence of combustion products.

2. The detector head shall be a plug-in unit. The unit shall contain no moving parts. One chamber shall be for fire detection and the second chamber shall function as a reference, to stabilize the detector for changes in environmental temperature, humidity and pressure. It shall be possible to electrically check detectors sensitivity, using a sensitivity test set, or equivalent, and readjust the detectors sensitivity as required.

3. The detector base shall have terminals for making all connections; no soldering shall be required. It shall be possible to secure the detector in the base with a concealed socket-head screw to prevent unauthorized tampering.

4. Smoke detectors shall be listed by Underwriter's Laboratories, Inc. and approved by Factory Mutual Insurance Company.

5. Provide complete with sampling tubes. Size sampling tubes for 80% of the width of the duct. Locate in ductwork for the indicated system and in accordance with the manufacturer's recommendations.

6. Provide auxiliary contacts and separate 24 VDC power to relay required for smoke damper operation.

7. Provide a remote indicating light/key test switch for each duct detector and mount directly below each duct detector on the underside of the ceiling where the detector is concealed with a label indicating the system and location of the duct detector (i.e. AHU-2, Second Floor East End).

8. Provide addressable base.

I. Carbon Monoxide (CO) Detector:

1. Detector shall sense the level of CO concentration within a space and provide analog addressable signal to the system and be UL 2075 listed. Unit shall have a minimum life span of 10 years without replacement/recalibration.

2. Provide with audible notification base unit for local unique notification. Alarm and notification initiation shall be from the control panel.

3. Detector shall connect to the system addressable circuiting.

4. Alarm level shall be adjusted at the control panel. Upon an alarm the local notification shall sound and a trouble alarm initiated.

2.8 NOTIFICATION APPLIANCES

A. Speakers:

1. Refer to audio evaluation article for additional requirements.

2. Basic grille type with powder coated red finish paint.

3. Speaker shall be rated 94 dBA (anechoic chamber) at 10 feet. Output shall be selectable steady tone or coded. Provide dampening devices to reduce unit output by 5dBA for a minimum of 40% of the system speaker units and install as needed to meet the Owner's needs.

4. Units shall be semi-flush where installed in construction with hollow or block walls. Where construction does not allow semi-flush mounting then unit shall be surface mounted utilizing the manufacturers back box.

5. Units installed outdoors or in potentially wet locations shall be rated for such conditions.

6. Provide directional projector where noted on the Drawings.

7. Provide backbox and grille for fully recessed installations; 4 in. deep box maximum.

8. Speaker for carbon monoxide alarm notification shall meet the requirements above but have a white finish color and have a temporal Code 4 alarm.

B. Strobe Unit:

1. 24 volts DC with built-in Xenon Flasher; two watts maximum. Pulse duration shall be 0.2 seconds with maximum duty cycle of 40%. Flash rate minimum 1 Hz, maximum 2 Hz. Units within building shall flash in synchronization. Illumination intensity shall be field selectable for 15, 30, 75 or 110 candela. Output setting shall be:

   a. 30 candela in general areas, unless noted otherwise.

   b. 15 candela in single toilet rooms and small single offices.

   c. 60 candela in classrooms.

   d. 15 candela in corridors.

   e. 110 candela in sleeping areas, or as indicated.

2. Protruding pyramid shaped lexan lens with reflector and the word "FIRE" imprinted on the lens.

3. Rated life shall be a minimum of 500 hours of continuous operation.

4. Units installed outdoors or in potentially wet locations shall be rated for such conditions.

5. Units shall be semi-flush where installed in construction with hollow or block walls. Where construction does not allow semi-flush mounting then unit shall be surface mounted utilizing the manufacturers back box. Wall or ceiling mounted as noted on the Drawings.

6. Provide surface backbox for surface installation; 4 in. deep maximum.

7. Strobe for carbon monoxide alarm notification shall meet the requirements above but have a white finish color and have the word "ALARM" imprinted on the device.

C. Combination Speaker-Strobe Units:

1. Unit shall be a combination of the speaker and strobe units specified above in a single manufactured unit.

2. All CO Alarms shall be combination speaker-strobe units.

D. Addressable Notification Appliances:

1. Notification appliances specified herein shall be addressable and individually programmed for use as dictated by the Owner. Notification shall be programmed by floor, office space, common space, specialty use space and others as directed. Appliances shall only annunciate upon the directed conditions and order.

2.9 ADDRESSABLE CONTROL MODULE

A. The addressable control module shall have an individual system address, be supervised and control an output dry contact from indication from the FACP. This can be used to control or have an input to elevator controls, notification appliances, door holder circuits, fans systems, etc. as indicated. Modules shall be connected to the addressable loop(s).

B. The unit shall control an output relay (dry contact form C). The module shall mount in a 4 in. square, 2-1/8 in. deep electrical box.

C. The module shall contain an integral LED that shall flash each time the module is polled.

D. The module shall provide address setting means using rotary decimal switches and also store an internal identifying code which the control panel shall use to identify the type of device. Each unit shall have a separate address and be connected to the system addressable signaling circuit.

2.10 REMOTE ANNUNCIATOR

A. Wall mount within a surface box. Maximum depth of 4 in., stainless steel trim. Nominal dimensions of 4 in. x 12 in.

B. Annunciation shall be by two line by 40 character LCD display to provide system information and alarm/trouble description.

C. Unit power and control shall be from the FACP. Unit circuiting shall be supervised.

D. Provide trouble signal with audible buzzer, silencing switch and system reset. All pushbuttons shall be inoperable without keyswitch activated. Pushbuttons for alarm acknowledge, silence and alarm reset shall be standard on the front with a description. Shall include a minimum of four auxiliary switches/pushbuttons to be programmed as coordinated with the owner (possible options are door holder release override, manual alarm initiation, elevator capture bypass, etc.).

E. Tamper-resistant front panel screws.

F. Provide a 24 in. x 36 in. framed directory showing the building outline of each floor and referencing device descriptions. All lettering shall be minimum 1/2 in. high. Mount next to remote annunciator.

2.11 MAGNETIC DOOR HOLDERS

A. Rated 24VDC from a dedicated supervised power supply.

B. Holders shall be wall or floor mounted adjacent to the doors as dictated by the building conditions. Floor mounted units shall only be used where wall mounted are not possible.

C. Door holders shall be aluminum construction, have 25 pound holding force and shall have all necessary mounting hardware. Provide door plate for each and extender chain (chromed and 1 in. links) where needed.

2.12 MUNICIPAL TIE EQUIPMENT - RFD MASTER RADIO SYSTEM

A. Provide complete system consisting of sending equipment to interface with existing master box equipment.

B. Transmission shall be sent over existing 4-channel master radio network arranged by the Fire Department.

C. Associated equipment shall be contained within the Fire Alarm Central Processing Unit enclosure. Provide surge suppression to protect the two (2) systems.

D. Sending equipment shall transmit line trouble as well as fire alarm condition signal.

E. Provide all required work to complete communication tie to local Fire Department 911 Center, RFD Master, Radio Network System.

2.13 NOTIFICATION APPLIANCE CIRCUIT EXTENDER (NAC)

A. Unit shall provide additional notification appliance circuit capability for new or existing system and be utilized for horns and strobe units.

B. Connections to the unit shall include power, notification appliance circuit output circuits and addressable control input or notification circuit input. The power circuit shall be from an emergency source if available in the building.

C. Notification appliance circuit capability shall be four Class B or Class A, 2A, 24VDC minimum. Selectable for synchronized or not.

D. Power supply shall be rated for 8A minimum at 24VDC for circuit power use and battery charging. Battery and charger shall be as specified within this section.

E. Unit shall provide output circuit/operation/battery/power/status monitoring and trouble signal to FACP as needed.

F. Operation: upon a signal through the addressable control input or the notification appliance circuit indicating a system alarm.

G. Use: Units can be utilized where indicated or where building is greater than 60,000square feet or over six stories in height. There shall be a minimum of one unit for each floor.

2.14 CENTRAL STATION MONITORING

A. Provide all work required to communicate system status to Fire Department.

2.15 BATTERY AND CHARGER

A. Standby power shall be provided through 24 volt DC battery and automatic charger.

B. Provide sealed lead-calcium batteries, ampere-hour capacity which will allow system to operate 24 hours under supervisory condition and at the end of this period to operate all alarm signals for fifteen 15 consecutive minutes.

C. Provide cell reversal protection.

D. Life expectancy shall be five (5) years minimum.

E. Charger shall be self-regulating, solid state, type, automatic with capability to fully charge the discharged battery within five (5) hours.

F. Locate charger within the FACP enclosure. Locate batteries in a separate vented enclosure directly adjacent to the FACP.

2.16 WIRE GUARDS

A. Where specified herein or shown on the drawings provided a suitable wire guard for protection of indicated devices/equipment. Units shall be custom as needed for the application.

B. Wire guard shall be a minimum #6 wire gage of zinc plated steel, overall clear coating and welded at joints. For any unit needing access it shall have an integral hinge and locking means.

C. As a minimum provide a wire guard for equipment where indicated and in gymnasiums.

D. Wires shall have 2 inch maximum spacing.

E. Acceptable Manufacturers:

1. Design Make: American Time and Signal.

2. Simplex.

3. Approved equal.

2.17 PULL STATION ALARM COVER

A. Provide a protective alarm cover over manual pull stations in public places. Unit shall allow easy access to the manual pull station and also provide an audible alarm when operated.

B. Unit shall provide a 95dB alarm at 1 foot and be powered from a 9VDC battery.

C. Unit shall be suitable for use in the intended location and pull station.

D. Acceptable manufacturer:

1. System manufacturer.

2. STI Stopper II.

PART 3 - EXECUTION

3.1 INSTALLATION, EQUIPMENT

A. All installations shall be accomplished in a professional manner by qualified personnel regularly engaged in and experienced in this type of Work. Fire alarm installation shall be directed by a person who possesses a state license for installation of fire alarm systems. All equipment and components shall be installed in accordance with the manufacturer's recommendations.

B. System junction boxes and surface mounted device boxes shall be painted red.

C. All notification circuits shall originate from the FACP. Signal expander units shall not be used.

D. Provide all wiring to sprinkler flow switches, pressure switches, and alarm check valves, installed by others. Maintain supervisory circuitry to the switches. Use liquidtight conduit for the last 2 ft. - 0 in. of raceway at the switch.

E. Provide all wiring to post indicator valves, OS&Y valves and dry pipe sprinkler system maintenance air pressure switches, provided by others. Wire into the supervisory alarm portion of the fire alarm system.

F. Provide all wiring to the smoke dampers installed by others. Provide an addressable control module for each. Wire to the damper junction box with flexible conduit and wire; provide box or boxes as required. Install according to NEC. Smoke dampers shall close when its associated smoke duct detector is in alarm, upon direction from the FACP or if the associated fan unit is not operating.

G. Provide all power supplies and wiring to smoke relief hatches and fire barriers provided by others. Smoke relief hatch or fire barrier shall operate only when its associated smoke detector is in alarm.

H. Provide all wiring to duct smoke detectors. Duct smoke detectors shall be mounted on the ventilating ductwork by others. All mounting arrangements, holes cut into ductwork, sealing of openings along with ceiling and access doors for the duct type detectors shall be provided by others. Provide duct detectors along with sampling tubes with end caps. Sequence smoke damper operation thirty seconds after its associated fan has been shut down.

I. Provide all wiring required for fan shutdown. Wire from the addressable control module for each fan to be shut down and provide wiring from the module to the fan control unit (starter, adjustable speed drive, etc.) Dry contact shall be wired ahead of all control functions for starters. Provide intermediate relay for control circuits beyond the rating of the control module.

J. Coordinate the municipal tie with the local Fire Department and comply with Fire Department requirements and regulations.

K. Install all door holders in accordance with installation detail on the drawings and coordinate with the General Construction trade. A maximum of fifty (50) door holders shall be wired to each power circuit.

L. Provide 120 volt AC supervisory relays in the Fire Alarm Control Panel enclosure for each magnetic door holder power circuit to insure their associated circuit breakers are in the "ON" position. In the event a circuit breaker is in the "OFF" position, its associated supervisory relay shall transmit a trouble signal.

M. Provide all elevator capture control wiring. Installation shall be in accordance with manufacturer's recommendations. Pay all costs to modify existing elevator controllers for elevator capture and alternate level capture.

N. Elevator machine room and shaft heat detectors shall be mounted within two feet of the sprinkler head where applicable.

O. Detection and initiating equipment shall be listed by NRTL and approved by FM.

P. All surface mounted devices shall be mounted on a special box furnished by fire alarm equipment manufacturer. Total assembly shall be secure, smooth contour and have no protrusions.

Q. Where detectors are installed on wood or masonry surfaces, attach brackets directly to the surface with tamperproof fasteners. Where detectors are installed on suspended ceilings, provide additional supports in the ceiling, such as channel support system, angle iron or additional runner bars. Fasten the additional supports rigidly to the ceiling runner bar system. Attach bracket to the supports with tamperproof fasteners. Install metal spacers between the bracket and supports so that the ceiling tiles will not be a part of the support system.

R. Install wall mounted audio/visual signal devices at 80 in. AFF to center line. Where ceiling types are called for, verify ceiling type and mounting height in the field. Provide pendant-mounted devices as required for specified mounting height.

S. An auxiliary fire alarm relay used to control an emergency control device that provides control functions described in this specification shall be located within 3 ft. of the emergency control device and all wiring shall be supervised.

T. All smoke detectors shall be field checked and set to meet the prevailing conditions of the premise. All such Work shall be performed by an authorized representative of the manufacturer trained in such procedures.

3.2 SYSTEM CIRCUITING

A. All wiring shall conform to the NEC, and to NFPA-72, National Fire Alarm Code.

B. Install all wiring in accordance with manufacturer's recommendations taking into account loading, intended location, circuit length, spare capacity and voltage drop.

C. All wiring shall be copper and installed in a dedicated/segregated raceway system.

D. Power circuits:

1. Provide the required quantity of 20 ampere, 120 volt circuits to the system with a minimum of one (1) for the FACP, one (1) for door release, one (1) for ECCP.

2. All 120 volt wiring shall be installed in separate raceway system.

E. Provide minimum #18 AWG twisted shielded pair for addressable signal line circuits. Notification appliance circuits shall be#14AWG minimum.

F. Provide minimum #18 AWG twisted pair for speakers and telephones.

G. Addressable signal line and Speaker circuits shall be shielded, unless shielding is not required by manufacturer. Maintain separation from nearby power interference.

H. Addressable signal line circuits shall be NFPA 72 - 2010 Class B.

I. Notification appliance circuits shall be NFPA 72 - 2010 Class B.

J. NFPA pathway survivability:

1. LEVEL 0: NO PROVISIONS.

2. LEVEL 1: BUILDING SPRINKLER PROTECTED AND METAL CIRCUIT RACEWAY.

3. LEVEL 2: 2 HOUR FIRE RATED PROTECTION FOR CIRCUITING.

4. LEVEL 3: 2 HOUR FIRE RATED PROTECTION FOR CIRCUITING AND BUILDING SPRINKLER PROTECTED.

K. Provide a 24VDC power circuit, #16 twisted pair minimum, with each initiation addressable circuit for the entire length.

L. Notification circuits shall be segregated as indicated on the drawings and by individual floors as a minimum. Circuits shall also be dedicated to audible or visual appliances but not both.

3.3 PROGRAMMING

A. Include in bid the cost to cover all system programming, including items particular to this project (such as custom zone descriptions, time delay settings, sensitivity settings, etc.) such that entire system is 100% complete and operating to the Owner's satisfaction. Coordinate all system programming with the Owner. Also, provide programming of the system a minimum of once during the warranty period to provide changes requested by the Owner.

3.4 SPARE EQUIPMENT

A. Provide spare equipment with installation included. Field verify quantities prior to ordering. At the end of the project, if the equipment is not needed to be installed, deliver the equipment to an Owner designated location in the original packaging. Submit a credit proposal for the deleted labor.

B. Equipment to include:

1. Manual pull stations: Five (5).

2. Smoke detectors: 5% of each type used with a minimum of five (5).

3. Heat detectors: Five (5).

4. Carbon Monoxide detectors: Five (5)

5. Addressable control modules: Five (5).

6. Addressable initiation modules: Five (5).

7. Strobes: Five (5) indoor, 2 outdoor.

8. Speakers: Five (5) indoor, 2 outdoor.

9. Speakers/Strobes: Five (5).

10. Carbon Monoxide Alarms: Five (5).

11. Fire Alarm Fan Shutdowns: Five (5).

12. Smoke Damper locations: Five (5).

13. Duct-Mounted Smoke Detectors: Two (2).

14. Magnetic Door Holders: Ten (10).

3.5 TESTING AND INSTRUCTION

A. The complete fire alarm system shall be fully tested after the installation is complete. Testing shall include all devices, FACP, annunciator panel, other panels, features and functions. Testing shall be witnessed by the owners representative and be in accordance with the NFPA and herein. Provide a testing report to the authority having jurisdiction and the Engineer as a submittal.

B. Provide a minimum of four (4) hours of instruction to the operating personnel designated by the Owner's Representative with regard to use and operation of the system. Provide up to three programming modifications.

C. Provide three (3) sets of keys to all panels, manual stations, etc., to the Owner's Representative.

D. Provide a copy of the system programming to the Owner on a CD/DVD disk or flash drive.

E. Provide to the Owner system Operation Manuals as specified, that shall include as a minimum:

1. Bill of Material.

2. Catalog descriptive literature for all equipment. This shall include a description of the unit, ratings, functions, capability, materials and compatibility with other components.

3. Riser Wiring Diagram showing all equipment, devices, device addresses, connections, control connections, remote notification connection(s), wire quantities and sizes.

4. Floor plan indicating equipment and device locations, addresses, power circuit information with power panel location, notification circuiting, initiation circuiting and control circuiting. Contact the Engineer for a copy of the project floor plans.

5. Typical Terminal Wiring Diagram for each type of device.

6. Terminal wiring Diagram for all Fire Alarm equipment.

7. Calculations including:

   a. Battery sizing calculations indicating total number of power devices, load associated with each type device and recommended battery capacity (AH).

   b. Voltage drop calculations with actual equipment loads used to derive battery back-up ampere-hour rating and individual circuit voltage drop (indicate the wire size to be used and the associated voltage drop with the allowed voltage drop) for each circuit.

8. Instruction report starting when instruction was given and who was in attendance, signed by Owner's Representative.

9. A written test report from an authorized representative of the equipment manufacturer that each device and overall system operation has been 100% tested and approved.

10. Certificate of Completion as described in NFPA-72.

11. A two (2) year warranty in accordance with the Basic Requirements of these Specifications shall be provided for this system.

END OF SECTION 28 31 02

APPENDIX A
FIRE ALARM SYSTEM OPERATION/SEQUENCE MATRIX

WARNING, THIS IS NOT SET UP FOR SMOKE EVAC SYSTEMS; HIGH RISES NOT APPLICABLE ON ALL PROJECTS

	SYSTEM OUTPUTS																								
SYSTEM INPUTS	ACTUATE COMMON ALARM SIGNAL INDICATOR	ACTUATE AUDIBLE ALARM SIGNAL	ACTUATE COMMOM SUPERVISORY SIGNAL INDICATOR	ACTIVATE AUDIBLE SUPERVISORY SIGNAL	ACTUATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE AUDIBLE TROUBLE SIGNAL	INDICATE ZONE OR DEVICE DESCRIPTION	ACTIVATE NOTIFICATION APPLIANCES	DISPLAY CHANGE OF STATUS ON ALL ANNUNCIATORS/PRINTERS	TRANSMIT ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION	RELEASE MAGNETICALLY HELD DOORS	RECALL ELEVATOR TO RECALL FLOOR	ACTUATE WARNING TO ELEVATOR CONTROLS	ACTUATE WARNING TO ELEVATOR CABS	ACTIVATE ELEVATORS SHUNT TRIP	CLOSE ALL RELATED SMOKE DAMPERS	UNLOCK ALL EXITS AND CONTROL DOORS	SHUT DOWN RESPECTIVE AIR HANDLING UNITS (SA AND RA)	ACTIVATE FLOOR PRESSURIZATION (HIGH RISE ONLY)	ACTIVATE STAIRWELL PRESSURIZATION (HIGH RISE ONLY)	ACTIVATE SMOKE EXHAUST (HIGH RISE ONLY)	OPEN ASSOCIATED SMOKE HATCH	LOCAL NOTIFICATION
FIRE ALARM SYSTEM AC POWER FAILURE					X	X						X													
FIRE ALARM SYSTEM LOW BATTERY					X	X						X													
OPEN CIRCUIT					X	X						X													
GROUND FAULT					X	X						X													
CIRCUIT SHORT					X	X						X													
MANUAL PULL STATION ACTUATION	X	X					X	X	X	X			X						X						
AREA SMOKE DETECTORS	X	X					X	X	X	X			X	X				X	X		X	X	X		
HVAC AIR DUCT SMOKE DETECTOR	X	X					X		X	X										X					
AREA HEAT DETECTORS	X	X					X	X	X	X			X	X				X	X		X	X	X		
FIRE SUPPRESSION SYSTEM ALARM	X	X					X	X	X	X			X	X				X	X						
SPRINKLER TAMPER SWITCH			X	X			X				X														
SPRINKLER WATER FLOW IN BUILDING	X	X					X			X			X	X				X	X						
SPRINKLER WATER FLOW IN ELEVATOR EQUIPMENT ROOM OR SHAFT	X	X					X	X	X	X					X	X	X	X							
ELEVATOR SHAFT SMOKE DETECTOR	X	X					X	X	X	X														X	
ELEVATOR EQUIPMENT ROOM AREA SMOKE DETECTOR	X	X					X	X	X	X			X	X		X		X	X						
ELEVATOR SHAFT AND EQUIPMENT ROOM HEAT DETECTORS	X	X	X	X			X	X	X	X			X	X		X	X	X	X						
ELEVATOR PIT SPRINKLER FLOW	X	X					X			X				X	X	X	X								
ELEVATOR PIT HEAT DETECTOR	X	X					X	X		X				X	X	X	X								
ELEVATOR LOBBY SMOKE DETECTORS	X	X					X	X	X	X			X	X				X	X		X	X	X		
ELEVATOR LOBBY RECALL FLOOR	X	X					X	X	X	X			X	X				X	X		X	X	X		
FIRE PUMP POWER FAILURE/PHASE REVERSAL			X	X			X		X	X	X	X													
FIRE PUMP LOW FUEL			X	X			X		X	X	X		X	X				X	X						
FIRE PUMP RUNNING	X	X					X		X	X			X	X				X	X						
JOCKEY PUMP RUNNING			X	X			X		X		X														
FIRE PUMP NOT IN AUTOMATIC MODE	X	X					X			X															
AREA OF REFUGE TWO WAY COMMUNICATION STATUS	X	X					X			X															
SMOKE DETECTOR ADJACENT TO SMOKE HATCH	X	X					X	X	X	X			X	X					X						
AHU OFF, ANY REASON																									
CO DETECTION			X	X			X		X		X														X

SECTION 31 10 00 - SITE CLEARING

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. Protecting existing vegetation to remain.
2. Removing existing vegetation.
3. Stripping and stockpiling topsoil.
4. Removing above- and below-grade site improvements.
5. Temporary erosion and sedimentation control.

1.3 DEFINITIONS

A. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil," but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil; the zone where plant roots grow.

D. Plant-Protection Zone: Area surrounding individual trees, groups of trees, shrubs, or other vegetation to be protected during construction and indicated on Drawings.

E. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction and indicated on Drawings.

F. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 MATERIAL OWNERSHIP

A. Except for materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

1.6 INFORMATIONAL SUBMITTALS

A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
   1. Use sufficiently detailed photographs or video recordings.
   2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plant designated to remain.

B. Topsoil stripping and stockpiling program.

1.7 QUALITY ASSURANCE

A. Topsoil Stripping and Stockpiling Program: Prepare a written program to systematically demonstrate the ability of personnel to properly follow procedures and handle materials and equipment during the Work. Include dimensioned diagrams for placement and protection of stockpiles.

1.8 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed trafficways if required by Owner or authorities having jurisdiction.

B. Salvageable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises.

C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.

D. Do not commence site clearing operations until temporary erosion- and sedimentation-control and plant-protection measures are in place.

E. Soil Stripping, Handling, and Stockpiling: Perform only when the soil is dry or slightly moist.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Verify that trees, shrubs, and other vegetation to remain or to be relocated have been flagged and that protection zones have been identified and enclosed.

C. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.

B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

C. Remove erosion and sedimentation controls, and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations.

3.4 EXISTING UTILITIES

A. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others.

3.5 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to depth indicated on Drawings in a manner to prevent intermingling with underlying subsoil or other waste materials.
   1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects larger than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil away from edge of excavations without intermixing with subsoil or other materials. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
   1. Limit height of topsoil stockpiles to 72 inches.
   2. Do not stockpile topsoil within protection zones.
   3. Dispose of surplus topsoil. Surplus topsoil is that which exceeds quantity indicated to be stockpiled or reused.

3.6 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.

3.7 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 10 00

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Excavating and filling for rough grading the Site.
   2. Preparing subgrades for turf and grasses.

1.3 DEFINITIONS

A. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

B. Fill: Soil materials used to raise existing grades.

C. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

D. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
   1. Classification according to ASTM D2487.
   2. Laboratory compaction curve according to ASTM D1557.

1.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.

B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

C. Do not commence earth-moving operations until temporary site fencing and erosion- and sedimentation-control measures Section 31 10 00 "Site Clearing" are in place.

D. Do not commence earth-moving operations until plant-protection measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.

B. Protect and maintain erosion and sedimentation controls during earth-moving operations.

C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

B. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 STORAGE OF SOIL MATERIALS

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

3.4 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.5 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D1557:
   1. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 85 percent.

3.6 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to elevations required to achieve indicated finish elevations, within the following subgrade tolerances:
   1. Turf or Unpaved Areas: Plus or minus 1 inch.

3.7 SUBSURFACE DRAINAGE

A. Refer to Section 33 46 00 “Subdrainage”.

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
   1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
   2. Determine that fill material classification and maximum lift thickness comply with requirements.
   3. Determine, during placement and compaction, that in-place density of compacted fill complies with requirements.

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

C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.

3.9 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
   1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.10 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION 31 20 00

SECTION 32 12 16 - ASPHALT PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Hot-mix asphalt paving and Hot-mix Asphalt Microsurfacing Paving.
   2. Pavement-marking paint.

B. Related Sections:
   1. Division 31 Section "Earth Moving" for aggregate subbase and base courses and for aggregate pavement shoulders.
   2. Division 32 Section "Concrete Paving" for concrete pavement.

1.3 DEFINITION

A. NYSDOT: New York State Department of Transportation.

B. NYSDOT SS: New York State Department of Transportation Standard Specifications.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.

   1. Job-Mix Designs: Certification, by NYSDOT, of approval of each job mix proposed for the Work.

B. Qualification Data: For qualified manufacturer and installer.

C. Material Certificates: For each paving material, from manufacturer.

D. Material Test Reports: For each paving material.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A paving-mix manufacturer registered with and approved by NYSDOT.

B. Testing Agency Qualifications: Qualified according to ASTM D 3666 for testing indicated.

C. Asphalt Microsurfacing Contractor Qualifications: Qualified contractor approved by Monroe County Dept. of Transportation

D. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of NYSDOT SS for asphalt paving work.

1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture, and directions for storage.

B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not apply asphalt materials if subgrade is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
1. Microsurfacing and Tack Coat: Minimum surface temperature of 60 deg F.
2. Asphalt Base and Binder Course: Minimum surface temperature of 45 deg F and rising at time of placement.
3. Asphalt Top Course: Minimum surface temperature of 50 deg F at time of placement.

B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, and not exceeding 95 deg F.

PART 2 - PRODUCTS

2.1 AGGREGATES

A. General: Use materials and gradations that have performed satisfactorily in previous installations.

B. Coarse Aggregate: sound; angular crushed stone, crushed gravel conforming to NYSDOT SS 703-02, coarse aggregate.

C. Fine Aggregate: sharp-edged natural sand or sand prepared from stone, gravel, or combinations thereof, conforming to NYSDOT SS 703-01, fine aggregate.

1. For hot-mix asphalt, limit natural sand to a maximum of 10 percent by weight of the total aggregate mass.

D. Mineral Filler: rock or slag dust, hydraulic cement, or other inert material, conforming to NYSDOT SS 703-08, Mineral Filler.

2.2 ASPHALT MATERIALS

A. Asphalt Binder: AASHTO M 320 or AASHTO MP 1a, PG 64s conforming to NYSDOT SS table 702-1, Performance Graded Binders for Paving. See Table 702-1.

B. Asphalt Cement: Conforming to NYSDOT SS table 702-2, Miscellaneous Asphalt Cements .

C. Tack Coat: emulsified asphalt, meeting NYSDOT SS table 702-8.

D. Water: Potable.

2.3 AUXILIARY MATERIALS

A. Pavement-Marking Paint: Epoxy Reflectorized as indicated on drawings and on the NYSDOT materials approval list.

1. Color: White, Yellow, and/or Blue, as indicated.

B. Pavement Striping Pre-formed markings and striping: As indicated on drawings and on the NYSDOT materials approval list.

1. Color: White, Yellow, and Blue, as indicated.

2.4 MIXES

A. Hot-Mix Asphalt: Dense, hot-laid, hot-mix asphalt plant mixes approved by authorities having jurisdiction and complying with the following requirements:

1. Base Course: NYSDOTSS item 402.378903.
2. Binder Course: NYSDOTSS Item 402.198903.
3. Surface Course: NYSDOTSS Item 402.098203.
4. Micro Surfacing course: NYSDOT Item 413.02010118 TYPE II, F3

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that subgrade is dry and in suitable condition to begin paving.

B. Proof-roll subgrade below pavements with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.

1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
2. Proof roll with a loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
3. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

C. Proceed with paving only after unsatisfactory conditions have been corrected.

D. Verify that utilities, traffic loop detectors, and other items requiring a cut and installation beneath the asphalt surface have been completed and that asphalt surface has been repaired flush with adjacent asphalt prior to beginning installation of imprinted asphalt.

3.2 SURFACE PREPARATION

A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.

B. Tack Coat: Apply uniformly to surfaces of existing pavement at a rate of 0.03 to 0.04 gal./sq. yd.

1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.3 HOT-MIX ASPHALT PLACING

A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that

prevents segregation of mix. Place each course to required grade, cross section, and thickness when compacted.

1. Place hot-mix asphalt base course in number of lifts and thicknesses indicated.
2. Place hot-mix asphalt surface course in single lift.
3. Spread mix at minimum temperature of 250 deg F.

B. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.

3.4 JOINTS

A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.

1. Clean contact surfaces and apply tack coat to joints.
2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
3. Offset transverse joints, in successive courses, a minimum of 24 inches.
4. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
5. Compact asphalt at joints to a density within 2 percent of specified course density.

3.5 COMPACTION

A. General: Begin compaction as soon as placed hot-mix paving will bear roller weight without excessive displacement. Compact hot-mix paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.

1. Complete compaction before mix temperature cools to 185 deg F.

B. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.

C. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.

D. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.

E. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.6 INSTALLATION TOLERANCES

A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:

1. Base and Binder Courses: Plus or minus 1/2 inch.
2. Surface Course: Plus 1/4 inch, no minus.

B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:

1. Base and Binder Courses: 1/4 inch.
2. Surface Course: 1/8 inch.

3.7 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow paving to age for 30 days before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce pavement markings, of dimensions indicated, with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.8 FIELD QUALITY CONTROL

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

B. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D 3549.

C. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.

D. In-Place Density: Testing agency will take samples of uncompacted paving mixtures and compacted pavement according to AASHTO T 168.

1. Reference maximum theoretical density will be determined by averaging results from four samples of hot-mix asphalt-paving mixture delivered daily to site, prepared according to ASTM D 2041, and compacted according to job-mix specifications.
2. In-place density of compacted pavement will be determined by nuclear density testing.

E. Replace and compact hot-mix asphalt where core tests were taken.

F. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.

3.9 DISPOSAL

A. Except for material indicated to be recycled, remove excavated materials from Project site and legally dispose of them in an EPA-approved landfill.

END OF SECTION 32 12 16

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Walks.

1.3 DEFINITIONS

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

B. NYSDOT: New York State Department of Transportation.

C. NYSDOT SS: New York State Department of Transportation Standard Specifications.

1.4 SUBMITTALS

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

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 QUALITY ASSURANCE

A. Detectable Warning Installer Qualifications: An employer of workers trained and approved by manufacturer of stamped concrete paving systems.

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

C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.

D. ACI Publications: Comply with ACI 301 unless otherwise indicated.

1.6 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.

1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less.

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

2.2 STEEL REINFORCEMENT

A. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.

B. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.

C. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, plain.

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

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

E. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:

1. Portland Cement: ASTM C 150, gray portland cement Type I/II.

2. Blended Hydraulic Cement: ASTM C 595, Type IP, portland-pozzolan cement.

B. Normal-Weight Aggregates: ASTM C 33, size No.7 or NYSDOT type CA-1 course aggregate, uniformly graded. Provide aggregates from a single source from the NYSDOT approved aggregate list..

1. Maximum Coarse-Aggregate Size: 1 inch nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260 and on NYSDOT materials approval list.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A and on NYSDOT materials approval list.
2. Retarding Admixture: ASTM C 494/C 494M, Type B and on NYSDOT materials approval list.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D and on NYSDOT materials approval list.
4. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II and on NYSDOT materials approval list.

2.4 CURING MATERIALS

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet and on NYSDOT materials approval list.

B. Water: Potable.

C. Burlap and Water.

2.5 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751, asphalt-saturated cellulosic fiber or ASTM D 1752, cork or self-expanding cork in preformed strips.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, of NYSDOT 721-01 and on the NYSDOT materials approval list.

2.6 DETECTABLE WARNING MATERIALS

A. Embedded Detectable Warning Units: In conformance with NYSDOT SS 726-02 and on NYSDOT materials list and City of Rochester Non Standard Detail DWG No. S608-28 included on drawings.

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

   a. Advantage Tactile System.
   b. Neenah Foundry Company.
   c. Transpo Industries.

2.7 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, Type N; and on NYSDOT materials approval list.

1. Color: White, Yellow, and Blue, as indicated.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 4000 psi.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches, plus or minus 1 inch.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:
   1. Air Content: 6 percent plus or minus 1.5 percent for 1-inch nominal maximum aggregate size.

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

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

   1. Use water-reducing admixture and plasticizing and retarding admixture in concrete as required for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer's recommended rate, but not less than 1.0 lb/cu. yd.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M. Furnish batch certificates for each batch discharged and used in the Work.

   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface below concrete paving and bases to identify soft pockets and areas of excess yielding.

   1. Completely proof-roll subbase in one direction and repeat in perpendicular direction. Limit vehicle speed to 3 mph.
   2. Proof-roll with a roller or hand tamper.

3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Division 31 Section "Earth Moving."

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

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

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

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M.

3.5 JOINTS

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

1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.

1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
2. Provide tie bars at sides of paving strips where indicated.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.

1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
2. Extend joint fillers full width and depth of joint.
3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

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

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.

2. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.

K. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:

   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.

3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:

1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

3.8 EXTERIOR STAIR TREAD NOSINGS

A. Install in accordance with manufacturers written installation methods and industry standards. Work shall be aligned plumb, level, and flush with adjacent surfaces and rigidly anchored into the concrete.

3.9 DETECTABLE WARNINGS

A. Embedded Detectable Warnings: Install embedded detectable warning units as part of a continuous concrete paving placement and according to manufacturer's written instructions.

1. Prior to placement of the Detectable/Tactile Warning Surface Tile system, review manufacturer installation instructions refer any and all discrepancies to the Architect.
2. The physical characteristics of the concrete shall be consistent with the contract specifications while maintaining a slump range of 4 - 7 to permit solid placement

of the Detectable/Tactile Warning Surface Tile system. An overly wet mix will cause the tile to float.

3. When preparing to set the tile no concrete be removed in the area to accept the tile. The installation technique shall eliminate any air voids under the tile. Holes in the tile perimeter allow air to escape during the installation process.
4. The concrete shall be poured and finished true and smooth to the required dimensions and slope prior to the tile placement. Immediately after finishing concrete, the electronic level should be used to check that the required slope is achieved. The tile shall be placed true and square to the curb edge in accordance with the contract drawings. The Detectable/Tactile Warning Surface Tiles shall be tamped (or vibrated) into the fresh concrete to ensure that the field level of the tile is flush to the adjacent concrete surface. The embedment process should <u>not</u> be accomplished by stepping on the tile as this may cause uneven setting which can result in air voids under the tile surface. The tile field level (base of truncated dome) is flush to adjacent surfaces to permit proper water drainage and eliminate tripping hazards between adjacent finishes.
5. Immediately after placement, the tile elevation is to be checked to adjacent concrete. The elevation and slope should be set consistent with contract drawings to permit water drainage to curb as the design dictates. Ensure that the field surface of the tile is flush with the surrounding concrete and back of curb so that no ponding is possible on the tile at the back side of curb.
6. While concrete is workable, an edging tool shall be used to create a finished edge of concrete, then a steel trowel shall be used to finish the concrete around the tile's perimeter, flush to the field level of the tile.
7. During and after the tile installation and the concrete curing stage, it is imperative that there is no walking, leaning or external forces placed on the tile that may rock the tile causing a void between the underside of tile and concrete.
8. Following tile placement, review installation tolerances to contract drawings and adjust tile before the concrete sets. Two suitable weights of 25 lb each may be required to be placed on each tile as necessary to ensure solid contact of the underside of tile to concrete.
9. Following the concrete curing stage, remove all protective plastic wraps from the tile surface by cutting the plastic with a sharp knife, tight to the concrete/tile interface. Clean surface of concrete bled under the plastic with a soft brush without damage to the tile surface.

3.10 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, or a combination of these as follows:

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

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

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.

3.11 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/2 inch.
4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
5. Lateral Alignment and Spacing of Dowels: 1 inch.
6. Vertical Alignment of Dowels: 1/4 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch, no minus.
10. Joint Width: Plus 1/8 inch, no minus.

3.12 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.

C. Sweep and clean surface to eliminate loose material and dust.

D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

3.13 FIELD QUALITY CONTROL

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

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

1. Testing Frequency: Obtain at least one composite sample for each truck load approximately 8-10 cu.yd. or fraction thereof of each concrete mixture placed each day.

   a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.

   a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

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

D. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design

compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

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

F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

G. Concrete paving will be considered defective if it does not pass tests and inspections.

H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

I. Prepare test and inspection reports.

3.14 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.

C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

SECTION 321314 - GRANITE CURBS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Furnish labor, materials and equipment necessary to complete installation of granite curbs and related work as shown on the drawings and as specified herein to include, but not limited to, the following:

1. Granite Curbs.

B. Related Sections:

1. Division 31 Section "Earthwork” for subbase preparation.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Underdrain piping.
2. Granite Curbs

1.4 QUALITY ASSURANCE

A. Codes and Standards: Comply with local codes if more stringent than herein specified. Comply with State Department of Transportation’s standard specifications, except as otherwise specified herein, if more stringent.

B. Do not change sources of brands of cement and aggregate materials during course of the work.

1.5 PROJECT CONDITIONS

A. Establish and maintain required lines and grade elevations for each curb section.

B. Protect adjacent work.

C. Provide temporary barricades, warning lights and signs as required for protection of work and public safety.

PART 2 - PRODUCTS

2.1 GRANITE CURB SECTIONS

A. Granite Curbing Material Requirements: Granite curb shall be approved, hard, durable granite, free from seams and defects which affect structural strength. Granite shall conform to the following requirements:
   1. Only stone curb from a source appearing on the New York State Department of Transportation Approved List of Granite Stone Curb Quarries shall be accepted on the basis of source name.
   2. The stone shall be sound and durable, free from seams which impair its structural integrity and of a smooth splitting and machining character. Natural color variations that are characteristic of the deposit will be permitted. Any curb containing discoloration other than cleanable surface stains shall be tested as per the provisions of this Section.
   3. Testing - All stone curbing delivered to the project site, as quarried or dressed and trimmed, shall be subject to inspection and testing prior to installation by the Engineer or by an independent laboratory approved by the Engineer, and the cost of such testing shall be borne by the Contractor.
   4. Approved Source - Stone curb shall be inspected for dimensional compliance upon arrival at the project location by the Engineer. Curb not in compliance with the standard sheets or contract plans may be rejected by the Engineer.

2.2 UNDERDRAIN PIPING

A. Perforated PE underdrain pipe and fittings. ASTM F405 or AASHTO M 252, Type CP; corrugated, for coupled joints.

2.3 DIMENSIONAL REQUIREMENTS

A. Curb shall be cut to conform to the shape and size shown on the plans (16” ±1” height).

B. Sections Sections - Minimum lengths of straight curb shall be three feet (3'). Transition pieces shall be a minimum of twenty (20") inches and a maximum of thirty (30") inches.

C. Curved Sections - Segments on curves with radii of one-hundred (100') feet or less shall be shaped to the required curvature and the ends cut on radial lines

D. Curb Widths - The curb shall be five inch (5”) with bevel.

2.4 FINISH

A. General - Curb surfaces shall be finished as indicated on the plans or standard details.

B. Top Surface - Top surface shall be finished to approximately true planes. The top surface shall be sawed with no projection or depression greater than three-sixteenth (3/16") inch. Saw marks normal to the sawing process will be permitted if within the three-sixteenth (3/16") inch tolerance.

C. Arris Lines - The front and back arris lines shall be straight and true with no variations greater than one-eight (1/8") inch measured from a two foot (2') straightedge placed along the arris line.

D. Back Surfaces - Back surfaces shall have no projection or depression which exceeds a batter of one (1") inch in three (3") inches for a distance of three (3") inches from the top.

E. Front Exposed Faces - No projection on the exposed face of curb shall extend over one-quarter (1/4") inch beyond a vertical plane extending from the intersection of the pavement grade line and the curb face. The exposed face of curb shall have no depression greater than one-half (1/2”) inch measured from the plane of the face through the top arris line.

F. Ends - The ends of all curb sections shall be square with the planes of the top and face. The ends shall be finished so that when the curbs are set, no space greater than three-quarter (3/4") inch shall show in the joint for the full width of the top or down the face for eight (8") inches.

G. Joints – Shall be carefully filled, mix to be stiff as practicable and of such consistency that will require rodding when placed in joints. The top and exposed face of the joints shall be neatly pointed flush with the curb surface and satisfactorily cleaned of all excess mortar.

H. Drill Holes - Drill holes will not be permitted on exposed curb surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Stone Curb - The curb shall be set true to line and grade on an approved foundation providing a firm and uniform bearing. The trench shall be excavated to a depth of twenty-seven (27") inches from the top of the curb. The trench foundation shall be dry and free from mud and debris before dry mix is placed into the trench. The foundation shall be a dry concrete mix of 1 part cement to 3 parts sand to 6 parts course aggregate by weight (1-3-6). This mix shall be placed as foundation for the full length of the curb at a depth of as shown on the drawing details. All spaces under the curb shall be carefully and thoroughly rammed to support the curb throughout its entire length.
   1. The curb shall be set so that no space greater than three-quarter (3/4") inch shall show in the joint for the full width of the top and for nine (9") inches down the face.

2. After the curb has been set, it shall be backed with nine (9") inches of concrete (1-3-6 mix) to within ten (10") inches of the top for the entire length of the curb. The remainder of the trench shall be backfilled and tamped as shown on the standard details.
3. The joints in the curb shall be carefully filled with cement mortar (mixed one (1) part Portland cement to one (1) part mortar sand). The cement mortar shall be mixed as stiff as practicable and shall be of such a consistency that it will require rodding when it is placed in the joint. The top and exposed front face of the joint shall be neatly pointed flush with the curb surfaces and satisfactorily cleaned of all excess mortar.
4. The Contractor shall keep the curb clean, aligned and protected from damage until completion of the contract.

3.2 RESTORATION FRONT OF CURB

A. Saw Cut - The Contractor shall saw cut the existing pavement (minimum six (6") inches in width) to a neat cut edge prior to removing the old curb.

B. Subbase Course (Stone) - The Contractor shall fill, grade and compact the area under the concrete base as specified in Section 312000 – “Earth Moving.

C. Concrete Base - The Contractor shall replace the concrete base in front of the new curb (minimum seven (7") inches in width and seven (7") inches in depth) to the top elevation of the existing concrete base. The material shall be as specified in Section 321313 – “Concrete Paving”.

D. Asphalt Binder - The Contractor shall hand place binder to within one and one-half (1-½”) inches of the finished pavement grade. The material shall be hand tamped in place. The material shall conform to Section 321216 – “Asphalt Concrete Paving”.

E. Asphalt Topping - The Contractor shall paint the edge of the existing pavement with hot asphalt cement prior to the placement of the top material. The topping shall then be placed and leveled to the finished grade. The Contractor shall then back-smooth the new asphalt with hot smoothing irons. Section 321216 – “Asphalt Concrete Paving”. Hot asphalt cement shall then be spread evenly along the gutter to a minimum eighteen (18") inches. Care shall be taken not to splash the new curb.

3.3 BACK OF CURB – CONCRETE SIDEWALK/DRIVEWAY APPROACH ABUTS CURB

A. Saw-Cut - The Contractor shall saw-cut the existing concrete (minimum six (6") inches in width) to a neat cut edge prior to removing the curb.

B. Subbase Course (Stone) - The Contractor shall fill, grade and compact the area under the concrete sidewalk/driveway approach as specified in Section 312000 – “Earth Moving

C. New Concrete - The Contractor shall place new concrete behind the curb (minimum six (6") inches in width and four (4") inches in depth) to the top elevation of the existing

concrete sidewalk/driveway approach. The material shall be as specified in Section 321313 – “Concrete Paving”.

3.4 BACK OF CURB NON-CONCRETE AREA ABUTS CURB

A. Excavation - The Contractor will excavate the area abutting the backing of the curb a minimum of six (6") inches in width.

B. The Contractor shall rehabilitate the area abutting the back of the curb in a manner consistent with the surrounding landscape and as directed by the Engineer

END OF SECTION 321314

SECTION 32 13 19 - CONCRETE GUTTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes the Following:
   1. Gutters.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, slag cement, and other pozzolans.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified ready-mix concrete manufacturer.

B. Material Certificates: For the following, from manufacturer:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Curing compounds.

C. Material Test Reports: For each of the following:
   1. Aggregates: Include service-record data indicating absence of deleterious expansion of concrete due to alkali-aggregate reactivity.

1.6 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").

1.7 FIELD CONDITIONS

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

B. Cold-Weather Concrete Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

C. Hot-Weather Concrete Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover steel reinforcement with water-soaked burlap, so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless otherwise indicated.

2.2 FORMS

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

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

2.3 STEEL REINFORCEMENT

A. Epoxy-Coated Welded-Wire Reinforcement: ASTM A884/A884M, Class A, plain steel.

B. Epoxy-Coated Reinforcing Bars: ASTM A775/A775M or ASTM A934/A934M; with ASTM A615/A615M, Grade 60 (Grade 420) deformed bars.

C. Epoxy-Coated-Steel Wire: ASTM A884/A884M, Class A; coated, plain.

D. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded-wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified, and as follows:
   1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.
   2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.

E. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating, compatible with epoxy coating on reinforcement.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Use the following cementitious materials, of same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C150/C150M, gray portland cement Type I.
   2. Fly Ash: ASTM C618, Class C or Class F.

B. Normal-Weight Aggregates: ASTM C33/C33M, Class 4S, uniformly graded. Provide aggregates from a single source with documented service-record data of at least 10 years' satisfactory service in similar paving applications and service conditions using similar aggregates and cementitious materials.
   1. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
   1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
   2. Water-Reducing and Retarding Admixture: ASTM C494/C494M, Type D.

E. Water: Potable and complying with ASTM C94/C94M.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

2.6 RELATED MATERIALS

A. Joint Fillers: ASTM D1751, asphalt-saturated cellulosic fiber in preformed strips.

B. Bonding Agent: ASTM C1059/C1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash or Pozzolan: 25 percent.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air indicated in mix designs.

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

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture in concrete as required for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Concrete Mixtures: Normal-weight concrete.
   1. Exposure Class: ACI 318 F3.
   2. Minimum Compressive Strength: 5000 psi at 28 days.
   3. Maximum w/cm: 0.40.
   4. Slump Limit: 4 inches, plus or minus 1 inch.
   5. Air Content: 6 percent.
   6. Maximum Percent of Fly Ash (of total cementitious materials): 25 percent.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94/C94M. Furnish batch certificates for each batch discharged and used in the Work.
   1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Compact prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
   1. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 31 20 00 "Earth Moving."

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

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT INSTALLATION

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

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded-wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

E. Epoxy-Coated Reinforcement: Use epoxy-coated steel wire ties to fasten epoxy-coated reinforcement. Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D3963/D3963M.

3.5 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleedwater appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

3.6 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation when bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Trowel Finish:
      a. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
      b. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

D. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period, using cover material and waterproof tape.

3.8 PAVING TOLERANCES

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

3.9 FIELD QUALITY CONTROL

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

B. Testing Services: Testing and inspecting of composite samples of fresh concrete obtained according to ASTM C172/C172M shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least one composite sample for each 50 cu. yd. or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   2. Slump: ASTM C143/C143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C231/C231M, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
   4. Concrete Temperature: ASTM C1064/C1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C31/C31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C39/C39M; test one specimen at seven days and two specimens at 28 days.
      a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.

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

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

E. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.

F. Concrete paving will be considered defective if it does not pass tests and inspections.

G. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

H. Prepare test and inspection reports.

3.10 REPAIR AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.

B. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.

C. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 32 13 13

SECTION 32 91 13 - SOIL PREPARATION

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 planting soils specified by composition of the mixes.

1.3 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.

B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.

C. CEC: Cation exchange capacity.

D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.

E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.

F. Imported Soil: Soil that is transported to Project site for use.

G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.

H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.

I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.

J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."

K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.

M. SSSA: Soil Science Society of America.

N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.

P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil"; but in disturbed areas such as urban environments, the surface soil can be subsoil.

Q. USCC: U.S. Composting Council.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include recommendations for application and use.
2. Include test data substantiating that products comply with requirements.
3. Include sieve analyses for aggregate materials.
4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:
a. Manufacturer's qualified testing agency's certified analysis of standard products.
b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.

B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.

1.6 TESTING REQUIREMENTS

A. Percolation Test: Perform percolation test in a location on site before all topsoil is spread. Percolation test shall be performed following Monroe County Health Department requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:
   1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
   2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
   3. Do not move or handle materials when they are wet or frozen.
   4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 TOPSOIL (ON-SITE)

A. General: Soil amendments, fertilizers, and rates of application specified in this article are guidelines that may need revision based on testing laboratory's recommendations after preconstruction soil analyses are performed.

B. Planting-Soil Type: Existing, on-site surface soil, with the duff layer, if any, retained and stockpiled on-site; modified to produce viable planting soil. Blend existing, on-site surface soil with the following soil amendments and fertilizers in the following quantities to produce planting soil:
   1. Ratio of Loose Compost to Soil: 1:4 by volume.
   2. Ratio of Loose Sphagnum Peat to Soil: 1:4 by volume.
   3. Weight of Lime: .5 per 1000 sq. ft. per 6 inches of soil depth, based on the recommendations of soils analysis and direction of the Landscape Architect.
   4. Weight of Sulfur: .25 lbs. per 1000 sq. ft. per 6 inches of soil depth, based on recommendations of soil tests and direction of the Landscape Architect
   5. Weight of Agricultural Gypsum: .25 lbs. per 1000 sq. ft. per 6 inches of soil depth. based on recommendations of soil analysis and direction of the Landscape Architect
   6. Weight of Commercial Fertilizer: 1 lb. per 1000 sq. ft. per 6 inches of soil depth, or
   7. Weight of Slow-Release Fertilizer: 1 lb. per 1000 sq. ft. per 6 inches of soil depth.

2.2 TOPSOIL (IMPORTED):

A. Imported, naturally formed soil from off-site sources and consisting of loam soil according to USDA textures; and modified to produce viable planting soil.
   1. Sources: Take imported, unamended soil from sources that are naturally well-drained sites where topsoil occurs at least 4 inches deep, not from bogs, or marshes; and that do not contain undesirable organisms; disease-causing plant pathogens; or obnoxious weeds and invasive plants including, but not limited to, quackgrass, Johnsongrass, poison ivy, nutsedge, nimblewill, Canada thistle, bindweed, bentgrass, wild garlic, ground ivy, perennial sorrel, and bromegrass.
   2. Additional Properties of Imported Soil before Amending: Soil reaction of pH 6.5 to 7.2 and minimum of 5 percent organic-matter content, friable, and with sufficient structure to give good tilth and aeration.

3. Unacceptable Properties: Clean soil of the following:
   a. Unacceptable Materials: Concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
   b. Unsuitable Materials: Stones, roots, plants, sod, clay lumps, and pockets of coarse sand that exceed a combined maximum of 8 percent by dry weight of the imported soil.
   c. Large Materials: Stones, clods, roots, clay lumps, and pockets of coarse sand exceeding 1 inch in any dimension.
4. Amended Soil Composition: Blend imported, unamended soil with the following soil amendments and fertilizers in the following quantities to produce planting soil: Refer to B 1-7 above.

2.3 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
   2. Class: O, with a minimum of 95 percent passing through a No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.

B. Form: Provide lime in form of ground dolomitic limestone. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 sieve and a maximum of 10 percent passing through a No. 40 sieve. (or)

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Perlite: Horticultural perlite, soil amendment grade.

E. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

F. Sand: Clean, washed, natural or manufactured, free of toxic materials, and according to ASTM C33/C33M.

2.4 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
   1. Feedstock: May include sewage sludge USCC reaction range requirement is pH of 5.0 to 8.5.
   2. Reaction: pH of 6.0 to 8.0
   3. Soluble-Salt Concentration: Less than 4 dS/m.
   4. Moisture Content: 35 to 55 percent by weight.
   5. Organic-Matter Content: 35 to 60 percent of dry weight.
   6. Particle Size: Minimum of 98 percent passing through a 3/4-inch sieve.

B. Sphagnum Peat: Partially decomposed sphagnum peat moss, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 3.4 to 4.8, and a soluble-salt content measured by electrical conductivity of maximum 5 dS/m.

C. Muck Peat: Partially decomposed moss peat, native peat, or reed-sedge peat, finely divided or of granular texture with 100 percent passing through a 1/2-inch sieve, a pH of 6 to 7.5, a soluble-salt content measured by electrical conductivity of maximum 5 dS/m, having a water-absorbing capacity of 1100 to 2000 percent, and containing no sand.

D. Manure: Well-rotted, unleached, stable or cattle manure containing not more than 25 percent by volume of straw, sawdust, or other bedding materials; free of toxic substances, stones, sticks, soil, weed seed, debris, and material harmful to plant growth.

2.5 FERTILIZERS

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
   1. Composition: 1 lb./1000 sq. ft. 20-25 of actual nitrogen, and 5-11 percent potassium, by weight.
   2. Composition: Nitrogen, and potassium in amounts recommended in soil reports from a qualified testing agency.

B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, and 10 percent potassium, by weight.
   2. Composition: Nitrogen, , and potassium in amounts recommended in soil reports from a qualified testing agency.

C. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.

B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.

C. Proceed with placement only after unsatisfactory conditions have been corrected.

D. Avoid re-compacting the sub soil after tilling. Don’t work the soil wet and use low ground pressure equipment.

E. Notify Landscape Architect to inspect the rough graded and tilled sub-soil prior to placement of topsoil.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches (in accordance with depths indicated on boring analysis and stockpile until amended.

B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.

C. Unsuitable Materials: Clean soil to contain a maximum of 5 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.

D. Screening: Pass unamended soil through a 1-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Subgrade Preparation: Till subgrade to a minimum depth of 12 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
   1. Apply, add soil amendments, and mix approximately half the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.

C. Mixing: Spread unamended soil to total depth of 6 inches or as indicated on Drawings, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
   1. Amendments: Apply soil amendments**,** except compost**,** and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
      a. Mix lime and sulfur with dry soil before mixing fertilizer.
      b. Mix fertilizer with planting soil no more than seven days before planting.
   2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.

D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698 and tested in-place except where a different compaction value is indicated on Drawings.

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Mixing: Apply soil amendments**,** except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
1. Mix lime and sulfur with dry soil before mixing fertilizer.
2. Mix fertilizer with planting soil no more than seven days before planting.

D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D698

E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

A. Application: Apply compost component of planting-soil mix, 4 inches of compost to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.

B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 PROTECTION

A. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
1. Storage of construction materials, debris, or excavated material.
2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

B. If planting soil or subgrade is over compacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Landscape Architect and replace contaminated planting soil with new planting soil.

3.7 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.
   1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION 32 91 13

SECTION 33 41 00 - STORM UTILITY DRAINAGE 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.

B. Requirements of the Monroe County Pure Waters (MCPW) and Rochester Pure Waters District (RPWD).

1.2 SUMMARY

A. Section Includes:

1. Pipe and fittings.
2. Nonpressure transition couplings.
3. Cleanouts.
4. Manholes.
5. Catch basins.

1.3 SUBMITTALS

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

B. Shop Drawings:

1. Manholes: Include plans, elevations, sections, details, frames, and covers.
2. Catch basins: Include plans, elevations, sections, details, frames, covers, and grates.
3. Stormwater disposal system.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic pipe and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle manholes and catch basins according to manufacturer's written rigging instructions.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC Type PSM Sewer Piping:

1. Pipe: ASTM D 3034, SDR 35 and SDR 21 PVC Type PSM sewer pipe with bell-and-spigot ends for gasketed joints.
2. Fittings: ASTM D 3034, PVC with bell ends.
3. Gaskets: ASTM F 477, elastomeric seals.

2.2 PE PIPE AND FITTINGS

A. Corrugated PE Pipe and Fittings NPS 12 to NPS 60: AASHTO M 294M, Type S, with smooth waterway for coupling joints.

B. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings.

2.3 NONPRESSURE TRANSITION COUPLINGS

A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.

B. Sleeve Materials:
1. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
2. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

C. Shielded, Flexible Couplings:

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

a. Cascade Waterworks Mfg.
b. Dallas Specialty & Mfg. Co.
c. Mission Rubber Company; a division of MCP Industries, Inc.
d. Fernco Inc.

2. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.

2.4 CLEANOUTS

A. Cast-Iron Cleanouts:

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

   a. Josam Company.
   b. MIFAB, Inc.
   c. Smith, Jay R. Mfg. Co.
   d. Tyler Pipe.
   e. Watts Water Technologies, Inc.
   f. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.

2. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
3. Top-Loading Classification(s): Heavy Duty.
4. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.
5. Frames and Covers: Install with lettering cast into cover, per MCPW requirements.

2.5 MANHOLES

A. Standard Precast Concrete Manholes:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Diameter: 48 inches minimum unless otherwise indicated.
3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
4. Base Section: 8-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
5. Riser Sections: 5-inch minimum thickness, and lengths to provide depth indicated.
6. Top Section: Flat-slab-top type, unless eccentric-cone type is indicated, and of size that matches grade rings.
7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
9. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.

10. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.

B. Manhole Frames and Covers:

1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording per MCPW requirements.
2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

2.6 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:

1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.

1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.

   a. Invert Slope: 1 percent through manhole.

2. Benches: Concrete, sloped to drain into channel.

   a. Slope: 4 percent.

2.7 CATCH BASINS

A. Standard Precast Concrete Catch Basins:

1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
2. Base Section: 6-inch minimum thickness for floor slab and 6-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
3. Riser Sections: 6-inch minimum thickness, square, and lengths to provide depth indicated.
4. Top Section: Top of size that matches grade rings.
5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.

6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match square frame and grate.
7. Steps: ASTM A 615/A 615M, deformed, 1/2-inch steel reinforcing rods encased in ASTM D 4101, PP, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12 inch intervals. Omit steps if total depth from floor of catch basin to finished grade is less than 60 inches.
8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.

B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.

1. Size: 24 by 24 inches minimum unless otherwise indicated.
2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

3.2 PIPING INSTALLATION

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.

C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.

D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow, nonpressure drainage piping according to the following:

1. Install piping pitched up, from low elevation to high, opposed to direction of flow.

2. Install piping with minimum cover as indicated.
3. Install PE corrugated sewer piping according to ASTM D 2321.
4. Install PVC profile gravity sewer piping according to ASTM D 2321 and ASTM F 1668.

F. Clear interior of piping and manholes of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed. Place plug in end of incomplete piping at end of day and when work stops.

3.3 PIPE JOINT CONSTRUCTION

A. Join gravity-flow, nonpressure drainage piping according to the following:
1. Join corrugated watertight PE piping according to ASTM D 3212 for push-on joints.
2. Join PVC profile gravity sewer piping according to ASTM D 2321 for elastomeric-seal joints or ASTM F 794 for gasketed joints.
3. Join dissimilar pipe materials with nonpressure-type flexible shielded couplings.

3.4 CLEANOUT INSTALLATION

A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
1. Use Heavy-Duty, top-loading classification cleanouts.

B. Set cleanout frames and covers flush with finished surface.

3.5 MANHOLE INSTALLATION

A. General: Install manholes, complete with appurtenances and accessories indicated.

B. Install precast concrete manhole sections with sealants according to ASTM C 891.

C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.

D. Set tops of frames and covers flush with finished surface unless otherwise indicated.

3.6 CATCH BASIN INSTALLATION

A. Construct catch basins to sizes and shapes indicated.

B. Set frames and grates to elevations indicated.

3.7 CONCRETE PLACEMENT

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

3.8 CONNECTIONS

A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."

B. Make connections to existing piping and underground manholes.

1. Perform connections per Monroe County Pure Waters and Rochester Department of Public Works requirements.

2. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
3. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
4. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.

   a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
   b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.

5. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

C. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.

   a. Shielded flexible couplings for same or minor difference OD pipes.
   b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.

3.9 CLOSING ABANDONED STORM DRAINAGE SYSTEMS

A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use procedure from MCPW requirements.

B. Backfill to grade according to Division 31 Section "Earth Moving."

3.10 IDENTIFICATION

A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
   1. Use detectable warning tape over nonferrous piping and over edges of underground structures.

3.11 FIELD QUALITY CONTROL

A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.

   1. Submit separate reports for each system inspection.
   2. Defects requiring correction include the following:

      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.

   3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   4. Reinspect and repeat procedure until results are satisfactory.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to requirements of MCPW.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate report for each test.

C. Leaks and loss in test pressure constitute defects that must be repaired.

D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

3.12 CLEANING

A. Clean interior of piping of dirt and superfluous materials. Flush with potable water.

END OF SECTION 33 41 00

SECTION 33 46 00 - SUBDRAINAGE

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. Perforated-wall pipe and fittings.
2. Geotextile filter fabrics.
3. Stone drainage course.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Pipe and fittings.
2. Geotextile filter fabrics.

PART 2 - PRODUCTS

2.1 PERFORATED-WALL PIPES AND FITTINGS

A. Perforated PVC Sewer Pipe and Fittings: ASTM D2729, bell-and-spigot ends, for loose joints.

2.2 STONE DRAINAGE COURSE

A. Drainage Course: Narrowly graded mixture of washed crushed stone, or crushed or uncrushed gravel; New York State Department of Transportation Standard Specifications (NYSDOTSS) Coarse Aggregate 703-02, Table 703-4, Size Designation 1.

2.3 GEOTEXTILE FILTER FABRICS

A. Description: Fabric of PP or polyester fibers or combination of both, with flow rate range from 110 to 330 gpm/sq. ft. when tested according to ASTM D4491.

B. Structure Type: Nonwoven, needle-punched continuous filament.
1. Survivability: AASHTO M 288 Class 2.
2. Styles: Flat and sock.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.

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

3.2 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."

3.3 DRAINAGE INSTALLATION

A. Excavate for drainage system before drainage course has been placed. Include horizontal distance of at least 6 inches between drainage pipe and trench walls. Grade bottom of trench excavations to required slope.

B. Place supporting layer of drainage course over subgrade and geotextile filter fabric.

C. Lay geotextile filter fabric over subgrade.

D. Place supporting layer of drainage course over subgrade and geotextile filter fabric, to depth of not less than 4 inches.

E. Encase pipe with sock-style geotextile filter fabric before installing pipe. Connect sock sections with tape.

F. Install drainage piping as indicated in Part 3 "Piping Installation" Article for subdrainage.

G. After satisfactory testing, cover drainage piping with drainage course to elevation indicated.

3.4 PIPING INSTALLATION

A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.
   1. Install piping level.
   2. Lay perforated pipe with perforations down.
   3. Excavate recesses in trench bottom for bell ends of pipe. Lay pipe with bells facing upslope and with spigot end entered fully into adjacent bell.

B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.

C. Install thermoplastic piping according to ASTM D2321.

3.5 PIPE JOINT CONSTRUCTION

A. Join perforated PVC sewer pipe and fittings according to ASTM D3212 with loose bell-and-spigot, push-on joints.

B. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and fit materials and dimensions of both pipes.

3.6 CONNECTIONS

A. Connect subdrainage piping to sump pump crocks.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. After installing drainage course to top of piping, test drain piping with water to ensure free flow before backfilling.
   2. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

B. Drain piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 CLEANING

A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 33 46 00