A D D E N D U M N O. 5

NEW HILLIARD MEMORIAL MIDDLE SCHOOL
HILLIARD, OH

HILLIARD CITY SCHOOLS
COLUMBUS, OH 43228

Project No. 216064.00

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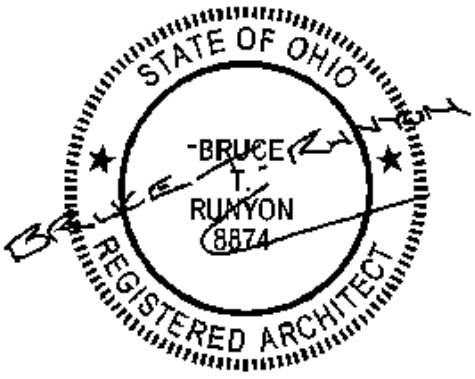
February 9, 2017

I hereby certify that the Project Drawings and the Project Manual were prepared by me or under my direct supervision and that I am a duly registered Architect/Engineer under the Laws of the State of Ohio.

FANNING/HOWEY ASSOCIATES, INC.
ARCHITECTS/ENGINEERS



Bruce T. Runyon, License No. A-01-8874
Expiration Date: 12/31/2017

TO: ALL BIDDERS OF RECORD

ADDENDUM NO. 5 to Drawings and Project Manual, dated January 9, 2017, for New Hilliard Memorial Middle School, Hilliard City Schools, 2140 Atlas Street, Columbus, Ohio 43228; as prepared by Fanning/Howey Associates, Inc., Dublin, Ohio.

This Addendum shall hereby be and become a part of the Contract Documents the same as if originally bound thereto.

The following clarifications, amendments, additions, revisions, changes, and modifications change the original Contract Documents only in the amount and to the extent hereinafter specified in this Addendum.

Each bidder shall acknowledge receipt of this Addendum in his proposal or bid.

NOTE: Bidders are responsible for becoming familiar with every item of this Addendum. (This includes miscellaneous items at the very end of this Addendum.)

RE: ALL BIDDERS

ITEM NO. 1. ADDENDUM NO. 4

A. Addendum No. 4 revision
   1. Change Item No. 5.A.2. (General Bid Packages Note to all Bidders) to read, "Any contractor providing rooftop equipment shall be responsible to provide the curb for the equipment."
   2. Change Item No. 5.C.9. (Bid Package No. 6.0 General Trades) to read, "General Trades Contractor shall provide all final cleaning of the building, except the exterior masonry (unless the masonry is included in the combination option)."
   3. Change Item No. 5.J.4. (Bid Package No. 32.0 Asphalt) to read, "For bidding purposes assume installation for the asphalt base course (parking and drives) is 4th Quarter of 2017 and the final course in the 2nd quarter of 2018."
   4. Document 00 21 13 Instructions to Bidders – change E. Estimate of Cost to read, "$**25,120,120.00**" and change bid opening date to February 14, 2017.

ITEM NO. 2. REVISED PROJECT MANUAL SECTIONS

A. Section 01 77 00 – Closeout Procedures, Section 07 51 13.11 – Built-Up Asphalt Roofing Hot-Applied, Section 11 40 00 – Food Service Equipment, Section 23 11 23 - Facility Natural-Gas Piping, Section 23 52 16 - Condensing Boilers, Section 23 65 00 – Cooling Towers, and Section 23 81 26 - Split-System Air-Conditioners have been revised, dated 2-9-17, are included with and hereby made a part of this Addendum.

ITEM NO. 3. PROJECT MANUAL, SECTION 00 12 00 – SCOPE OF WORK PACKAGES

A. General Bid Package Note to All Bidders:
   1. For clarity, owner provided equipment is identified in 01 10 00 – General Requirements. Please note there is no Matrix of Owner provided equipment.
   2. Monthly signoff of the project schedule is required for all prime contractors and will be connected to the monthly pay application process.
   3. For clarity, Sheet G 3.0 – Note 54 is in the Scope of Work for Bid Package 1.0.
   4. For clarity, Sheet G 3.0 – Notes 18, 22, 23 & 56 are in the Scope of Work for Bid Package 6.0 General Trades.
   5. For clarity, the scope of work is inclusive of the work described in bid documents for this project including of 3 volumes of drawings A/B/C and 4 volumes of specifications 1/2/3/4 and all issued addenda.
   6. For clarity, General Trades Contractor will furnish and install all exterior louvers.
   7. Sheet G4.2 detail 4 – Concrete Contractor responsible to furnish and install long jump pit and runway and Asphalt Contractor responsible for installation of synthetic surfacing.

B. Bid Package No. 3.0 Concrete – Add the Scope of Work as follows:
   1. Delete trench drain and concrete slab under athletic grandstands from Concrete Contractor's scope of work.
   2. Concrete Contractor to include Specification Sections 32 13 13 and Section 32 13 73 in their scope of work.

C. Bid Package No. 4.0 Masonry – Add the Scope of Work as follows:
   1. Masonry Contractor to provide all air barrier transition strips and thermal breaks, unless noted otherwise.

D. Bid Package No. 6.0 General Trades – Add the Scope of Work as follows:
   1. General Trades Contractor to provide the washed gravel and fabric at the bleachers and mechanical yard.
   2. General Trades Contractor to provide general laborer on site from November 2017 through June 2018 to perform work as directed by CM and approved by owner.
   3. The General Trades Contractor shall furnish and install all chain link fencing and gates per spec Section 32 31 13.
   4. Sheet G4.2 detail 4 – General Trades Contractor responsible to furnish and install long jump pit and runway in its entirety as detailed on G 4.2.

E. Bid Package No. 11.0 Food Service – Add the Scope of Work as follows:
   1. For clarity, the Food Service Contractor is responsible to provide the Food Service scope of work in the Concessions Building (Volume C drawings).

F. Bid Package No.. 32.1 Landscaping and Final Sitework – Add the Scope of Work as follows:
   1. For clarity, the Landscaping and Final Sitework Contractor is to provide all seeding of the entire site, except within the track.
   2. For clarity, the respreading of topsoil included in this bid package shall be included in the base bid of the project, however, the total cost of the respread, except the area inside the courtyard, is to be listed in the allowance line item on the revised Bid Form.

ITEM NO. 4. ACCEPTABLE MANUFACTURERS

The following manufacturers are to be considered acceptable manufacturers (suppliers and fabricators) for the Sections of the Specifications listed. Listed manufacturers are required to bid on products equal in type and design, size, function, and quality to that originally specified. Final decision as to equality of products specified versus those proposed shall be made by the Architect.

Section 09 67 66 – Fluid-Applied Athletic Flooring
- Dynamic Sports Construction; DynaForce

ITEM NO. 5. REVISED DRAWING SHEETS

A. Drawing Sheet Nos G3.0, E2.01, E7.01, and T2.01 have been revised, dated 2/9/17, and are included with and hereby made a part of this Addendum. These Drawings supersede the original documents.

ITEM NO. 6. DRAWING SHEET NO. G3.0 – OVERALL LAYOUT PLAN

A. Add (6) Bollards North of the mechanical yard wall in response to AEP's meter placement. Actual locations to be determined.

ITEM NO. 7. DRAWING SHEET NO. M5.01 – PROPELLER UNIT HEATER SCHEDULE

A. Revise the electrical requirements for Marks PUH-A101, PUH-D101, PUH-D102, PUH-E101, PUH-F101, PUH-F201, and PUH-F202 read be "120/1" rather than "208/1".

ITEM NO. 8. DRAWING SHEET NO. E5.04 – UNIT D – FIRST FLOOR POWER PLAN

A. Room 143; change the circuit for “PUH-D101” to “1LD1-7 (20A,1P Circuit Breaker, revise the panel schedule)”.

B. Room 143A; change the circuit for “PUH-D102” to “1LD1-9 (20A,1P Circuit Breaker, revise the panel schedule)”.

ITEM NO. 9. DRAWING SHEET NO. E5.06 – UNIT F – FIRST FLOOR POWER PLAN

A. Room 151; change the circuit for “PUH-F101” to “1LG2-17 (20A,1P Circuit Breaker, revise the panel schedule)”.

ITEM NO. 10. DRAWING SHEET NO. E5.11 – UNIT F – SECOND FLOOR POWER PLAN

A. Room 244; change the circuit for “PUH-F201” to “1LG2-16 (20A,1P Circuit Breaker, revise the panel schedule)”.

B. Room 244; change the circuit for “PUH-F202” to “1LG2-18, (20A,1P Circuit Breaker, revise the panel schedule)”.

ITEM NO. 11. DRAWING SHEET NO. T2.01 – TECHNOLOGY SITE PLAN

. Revise plan notes number 3 and 4 to remove fiber optic cable to Existing Bradley High School. Refer to attached revised drawing.

SECTION 01 77 00 - CLOSEOUT PROCEDURES

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 contract closeout, including, but not limited to, the following:
   1. Substantial Completion procedures.
   2. Final Completion procedures.
   3. Warranties.
      a. Correction of work period.
   4. Final cleaning.
   ~~5. Certification of code compliance.~~
   6. Corrections/Punch List.
   7. Repair of work.

B. Related Sections include the following:
   1. Division 01 Section "Payment Procedures" for requirements for Applications for Payment for Substantial and Final Completion.
   2. Division 01 Section "Construction Progress Cleaning" for progress cleaning of Project site.
   3. Division 01 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
   4. Division 01 Section "Project record Documents" for submitting Record Drawings.
   5. Division 01 Section "Demonstration and Training" for requirements for instructing Owner's personnel.

1.3 SUBMITTALS

A. Action Submittals
   1. Contractor’s List of Incomplete Items: Initial submittal of Substantial Completion.
   2. Certified List of Incomplete Items: Final submittal at Final Completion.

B. Closeout Submittals
   1. Certificates of Release: From authorities having jurisdiction.
   2. Certificate of Insurance: For continued coverage.
   3. Field Report: For pest control inspection.
   4. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.4 SUBSTANTIAL COMPLETION

A. Contractor’s List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor’s Corrections/Punch List), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
   1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar release.

2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, ~~final completion construction photographic documentation,~~ damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager.
    a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
5. Submit test/adjust/balance records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
7. Certification
    ~~a. Submit certification of code compliance as defined herein.~~
    b. Submit certification stating that no materials containing more than 1 percent asbestos were incorporated into the work.
    ~~c. Plumbing Contractor shall submit certification stating that no flux or solder used for drinking water piping contains more than 0.2 percent lead, and lead content shall not exceed a weighted average of not more than 0.25 percent in the wetted surface material in accordance with requirements of EPS's "Safe Drinking Water Act" (SDWA).~~
    ~~d. Submit certification stating firestopping systems have been installed in accordance with Contract Documents, Manufacturer's instructions, and requirement of authorities with jurisdiction.~~

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training".
6. Advise Owner of changeover in heat and other utilities.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements, including touchup painting.
10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection for Substantial Completion a minimum of 14 days prior to the date of the work will be substantially complete. On receipt of request, A/E and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. A/E 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 A/E, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

a. If more than one reinspection is necessary, Contractor shall be charged $500.00 for each reinspection when work is found not to be substantially complete.

2. Results of completed inspection will form the basis of requirements for Final Completion.

1.5 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 Division 01 Section "Payment Procedures."
2. Submit certified copy of A/E's Substantial Completion inspection list of items to be completed or corrected (Corrections/Punch List), endorsed and dated by A/E. 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. ~~Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of work.~~

B. Inspection: Submit a written request for final inspection for acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, A/E and Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. A/E 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. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
   a. For all additional reinspections, the Contractor shall be charged $500.00 per occurrence.

1.6 LIST OF INCOMPLETE ITEMS (CORRECTIONS/PUNCH LIST)

A. Prior to the A/E's preparation of a Corrections/Punch List, each Prime Contractor, with the Construction Manager, shall prepare an initial Corrections/Punch List on the job for use by his employees and subcontractors and for use by other Contractors and for use by the Construction Manager and A/E to facilitate completion of the Work.

B. Preparation: 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.
   b. Date.
   c. Name of A/E and Construction Manager.
   d. Name of Contractor.
   e. Page number.
4. Submit list of incomplete items in the following format:
   a. PDF electronic file. A/E, through Construction Manager, will return annotated file.

C. Upon receipt of the initial Corrections/Punch List, the A/E, assisted by the Construction Manager, will inspect the Work to determine if the work is substantially complete. Following the inspection, the A/E will issue a supplement to the Contractor's list of a Final Corrections/Punch List.

D. At the time the A/E commences the Substantial Completion Inspection, if the A/E discovers excessive additional items requiring completion or correction, the A/E may decline to continue the inspection, instructing the Contractor as to the general classification of deficiencies which must be corrected before the A/E will resume the Substantial Completion Inspection. If the Contractor fails to pursue the Work so as to make it ready for Substantial Completion Inspection in a timely fashion, the A/E shall, after notifying the Contractor, conduct inspections and develop a list of items to be completed or corrected. This list of items shall be furnished to the Contractor who shall proceed to correct such items within 21 days. The A/E will conduct additional inspections as required to determine that the Work is ready for Substantial Completion Inspection. The A/E will invoice the Owner for $500.00 per reinspection.

E. The time fixed by the A/E and Construction Manager for the completion of all items on the Final Corrections/Punch List shall not be greater than 21 days. The Contractor shall complete items on the list within such 21 day period. The Contractor shall begin completion and correction and correction activities within 7 days of receipt of the lists and complete all activities within the 21 day period specified. If the Contractor fails to do so, the Owner in its discretion may perform the Work by itself or others and the cost thereof shall be charged against the Contractor. If more than one inspection by the A/E for the purpose of evaluating corrected work is required by the subject list of items to be completed or corrected, it will be performed at the cost of $500.00 per inspection and deducted from the Contractor's Contract.

1. The A/E will reinspect the work with the Construction Manager, upon request by the Contractor or within 21 days. If items required for Substantial Completion have been completed a certificate for Substantial Completion will be issued.

F. Deferred Items

1. With the approval of Owner, A/E and Construction Manager, upon reinspection, items of Work that cannot be completed within 21 days or because of seasonal conditions, such as bituminous paving or landscaping, or if the Owner has a schedule conflict, payment will be released to the Contractor less twice the cost of completing the remaining work as determined by the A/E and Construction Manager.

1.7 WARRANTIES

A. Submittal Time: Submit written warranties on request of A/E for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.

B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

~~1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.~~

~~2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.~~

~~3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.~~

4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

C. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.8 CORRECTION OF WORK PERIOD (WARRANTY)

A. One month prior to the expiration of the one year correction of work period (warranty), the A/E will schedule a walk through to see if additional Work by the Contractor(s) is needed to make good on the warranties. An itemized list will be furnished to the Contractor for corrective or replacement work.
   1. The walk through will be attended by the A/E and Owner.

B. This Work shall be completed immediately by the Contractor(s) after receiving notification.

~~1.9 CERTIFICATION OF CODE COMPLIANCE~~

~~A. Prior to final payment the Contractors indicated below shall submit through the Construction Manager to the A/E (in duplicate) letters of certification of code compliance as follows:~~
   ~~1. The Contractors for Divisions 21, 22, and 23 Work shall submit letter certifying mechanical installations comply with the current applicable editions of the State and Local Codes having jurisdiction.~~
   ~~2. The Contractors for Divisions 26 and 28 Work shall submit letters certifying that the electrical wiring, alarm systems, smoke and heat detection systems comply with current applicable editions of the State and Local Codes having jurisdiction.~~

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
   1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
      a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
      b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
      c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
      d. Remove tools, construction equipment, machinery, and surplus material from Project site.
      e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
      f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
      g. Sweep concrete floors broom clean in unoccupied spaces.

h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
i. Clean 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 surfaces.
j. Remove labels that are not permanent.
k. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
l. Replace parts subject to unusual operating conditions.
m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
o. Leave Project clean and ready for occupancy.

C. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section “Temporary Facilities and Controls”.

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
   a. Do not paint over “UL” and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION 01 77 00

(For Information Only)

SECTION 07 51 13.11 - BUILT-UP ASPHALT ROOFING, HOT-APPLIED

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-applied built-up asphalt roofing system on metal deck, Acoustical Metal Deck, Including but not limited to:
      a. Substrate board.
      b. Roof insulation.
      c. Roof membrane and membrane base flashings.
      d. Roof surfacing consisting of adhesive surfacer with aggregate surfacing.

B. Section includes the installation of insulation strips in ribs of acoustical roof deck. Insulation strips are furnished under Division 05 Section "Steel Decking."

C. Related Sections:
   1. Division 06 Section "Rough Carpentry" for wood nailers, wood cants, curbs, and blocking.
   2. Division 07 Section "Sheet Metal Flashing and Trim" for custom metal roof penetration flashings, flashings, and counterflashings.
   3. Division 07 Section “Roof Accessories” for roof curbs, roof hatches, hatch-type heat and smoke vents, and performed flashing sleeves.
   4. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.
   5. Division 22 Section "Storm Drainage Piping Specialties" for roof drains.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to built-up roofing.

B. Hot Roofing Asphalt: Roofing asphalt heated to its equiviscous temperature, the temperature at which its viscosity is 125 centipoise for mop-applied roofing asphalt and 75 centipoise for mechanical spreader-applied roofing asphalt, within a range of plus or minus 25 deg F, measured at the mop cart or mechanical spreader immediately before application.

1.4 ACTION SUBMITTALS

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

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work. Provide roof plan showing orientation and types of roof deck, orientation of membrane roofing, and fastening spacings and patterns for mechanically fastened components.
   1. Base flashings and built-up terminations.
      a. Indicate details meet requirements of NRCA and FMG required by this Section.
   2. Tapered insulation, including slopes.
   3. Crickets, saddles, and tapered edge strips, including slopes.
   4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:
   1. Sheet roofing materials, of color specified for exposed material.
   2. Roof insulation.
   3. 1 lb of aggregate surfacing material in gradation and color indicated.
   4. Walkway material.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, Manufacturer, and Roofing Inspector. Include letter from Manufacturer written for this Project indicating approval.
   1. Include letter from Manufacturer written for this Project indicating approval of Installer.

B. Contractor's Product Certificate: Submit notarized certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of built-up roofing.

D. Warranties: Unexecuted sample copies of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: To include in maintenance manuals.

B. Warranties: Executed copies of warranties.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing similar work, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to furnish warranty of type specified.

B. Manufacturer Qualifications: Approved manufacturer with UL listed and FM Approvals approved roofing systems comparable to those specified for this Project, with minimum five years' experience in manufacture of comparable products in successful use in similar applications, and able to furnish warranty with provisions matching specified requirements.
   1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
      a. Product data, including certified independent test data indicating compliance with requirements.
      b. Samples of each component.
      c. Sample submittal from similar project.
      d. Project references: Minimum of five installations of specified products not less than five years old, with Owner and Architect contact information.
      e. Sample warranty.
   2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
   3. Approved manufacturers must meet separate requirements of Submittals Article.

C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be one of the following:
   1. An authorized full-time technical employee of the manufacturer.

2. An independent party certified as a Registered Roof Observer by the Roof Consultants Institute, retained by the Contractor or the Manufacturer and approved by the Manufacturer.

D. Source Limitations: Obtain roofing system components from or approved in writing by roofing system manufacturer.

E. Pre-installation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing to be installed according to manufacturer's written instructions and warranty requirements.

B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
3. Remove temporary plugs from roof drains at end of each day.

4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

A. Warranty, General: Warranties specified 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.

B. Manufacturer's Warranty: Manufacturer's standard or customized form in which manufacturer agrees to repair or replace components of built-up roofing that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
1. Manufacturer's warranty includes roofing membrane, base flashings, fasteners, roofing membrane accessories and other components of roofing system specified in this Section.
2. Warranty Period: 30 Years from date of substantial completion.

C. Installer's Warranty: Submit roofing Installer's warranty, signed by Installer, covering the Work of this Section and related Sections indicated above, including all components of built-up roofing such as built-up roofing membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:
1. Warranty Period: Two years from date of Substantial Completion.

D. Extended Roof System Warranty: Warranties specified in this Section include the following components and systems specified in other sections supplied by the roofing system Manufacturer, and installed by the roofing system Installer:
1. Sheet metal flashing and trim, including roof penetration flashings.
2. Manufactured copings, roof edge, counterflashings, and reglets.
3. Roof curbs, hatches, and penetration flashings.
4. Roof and parapet expansion joint assemblies.
5. Metal roof and trim.

E. Manufacturer Inspection and Preventive Maintenance Requirement: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's annual inspections and preventive maintenance is included in the Contract Sum. Inspections to occur in Years 2, 5, 10, 15, 20, and 25, following completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Manufacturer/Product: The roof system specified in this Section is based upon Tremco, Inc. products named in other Part 2 articles. Provide specified products.
1. No substitutions.

B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by built-up roofing manufacturer based on testing and field experience.

B. Roofing System Design: Provide roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency in accordance with ANSI/FM 4474, UL 580, or UL 1897, and to resist uplift pressures.

C. SPRI Wind Design Standard: Fabricate and install copings per the NRCA tested assemblies, metal gage guide, and fastening patterns.

D. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4470 as part of a roofing system and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.
   1. Fire/Windstorm Classification: Class 1A-90.
   2. Hail Resistance Rating: SH.

E. Flashings and Fastening: Comply with requirements of Division 07 Sections "Sheet Metal Flashing and Trim" and "Roof Specialties." Provide base flashings, perimeter flashings, detail flashings and component materials and installation techniques that comply with requirements and recommendations of the following:
   1. NRCA Roofing Manual (Sixth Edition) for construction details and recommendations.
   2. SMACNA Architectural Sheet Metal Manual (Seventh Edition) for construction details.

2.3 BASE-SHEET MATERIALS

A. ASTM D 4601 Type II non-perforated SBS-modified asphalt coated fiberglass/fiberglass/ polyester reinforced high tensile strength sheet dusted with fine mineral surfacing on both sides.
   1. Basis of design product: Tremco, BURmastic Composite Ply HT.
   2. Tensile Strength, minimum, ASTM D 5147: Machine direction, 165 lbf/in (28.9 kN/m); Cross machine direction, 150 lbf/in (26.3 kN/m).
   3. Tear Strength, minimum, ASTM D 5147: Machine direction, 210 lbf (0.9 kN); Cross machine direction, 185 lbf (0.8 kN).
   4. Elongation at 77 deg. F (25 deg. C), minimum, ASTM D 5147: 6 percent.
   5. Thickness, minimum, ASTM D 146: 0.055 inch (1.4 mm).

2.4 ROOFING MEMBRANE PLY SHEETS

A. ASTM D 2178 Type IV asphalt-impregnated glass-fiber ply sheet.
   1. Basis of design product: Tremco, THERMglass Type IV.
   2. Net Dry Mass, ASTM D 146: 7.5 lb/100 sq ft.
   3. Breaking Strength, ASTM D 146: 44 lbf/in.

2.5 BASE FLASHING SHEET MATERIALS

A. Thermoplastic PVC/TPA sheet, ASTM D4434 Type IV internally fabric reinforced, Energy Star qualified, CRRC listed, and California Title 24 Energy Code compliant.
   1. Basis of design product: Tremco, TPA Roof Membrane.
   2. Tensile Strength at 0 deg. F (-18 deg. C), minimum, ASTM D 6509: 300 lbf/in (52 kN/m).
   3. Tear Strength at 77 deg. F (25 deg. C), minimum, ASTM D 6509: 100 lbf (440 N).
   4. Elongation at 0 deg. F (-18 deg. C), minimum at fabric break, ASTM D 6509: 25 percent.
   5. Minimum Thickness, nominal, ASTM D 751: 45 mils (1.1 mm).
   6. Exposed Face Color: White.
   7. Reflectance, ASTM C 1549: 86 percent.
   8. Thermal Emittance, ASTM C 1371: 0.86.
   9. Solar Reflectance Index (SRI), ASTM E 1980: 108.
   10. Recycled Content, minimum: 25 percent preconsumer.

2.6 ASPHALT MATERIALS

A. Asphalt primer, ASTM D 41, low-VOC.
   1. Basis of design product: Tremco, TREMprime LV.
   2. Volatile Organic Compounds, maximum, ASTM D 3960: 350 g/L.
   3. Flash Point, minimum, ASTM D 3278: 100 deg. F (38 deg. C).

B. ASTM D 312 Type III hot-melt asphalt.
   1. Basis of design product: Tremco, Premium III.
   2. Softening Point, min/max, ASTM D 36: 195205 deg. F (9096 deg. C).
   3. Ductility at 77 deg. F, minimum, ASTM D 113: 1.5 cm.
   4. Penetration at 77 deg. F (25 deg. C), min/max, ASTM D 5: 1530 dmm.

C. Elastomeric low-VOC solvent-based contact-type adhesive for bonding TPA non-fleece-backed single ply membranes and flashings to substrates.
   1. Basis of design product: Tremco, TPA LV Single Ply Bonding Adhesive.
   2. VOC, maximum, ASTM D 3960: <200 g/L.

2.7 AUXILIARY BUILT-UP ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing manufacturer for intended use and compatible with built-up roofing.
   1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing manufacturer for application.

C. Mastic Sealant: Polyisobutylene, plain or modified bitumen, nonhardening, nonmigrating, nonskinning, and nondrying.

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening built-up roofing components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing manufacturer.

E. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

F. Miscellaneous Accessories: Provide miscellaneous accessories recommended by built-up roofing manufacturer.

2.8 SUBSTRATE BOARDS

A. Glass-mat-faced gypsum panel, ASTM C1177/C 1177M.
   1. Basis of design product: GP Gypsum DensDeck.
   2. Thickness: 1/2 inch.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.9 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Global-approved roof insulation.

B. Polyisocyanurate board insulation, high density, ASTM C 1289 Type II Class 4 CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces. CCMC listed.
   1. Compressive Strength, ASTM C 1621: ~~Grade 4~~ **Grade 2**: Not less than ~~80~~ **20** psi (550 kPa).
   2. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 2.5 at 0.5 inches (13 mm) thick.

C. Provide two layers of specified insulation above. Each layer ~~3.0"~~ **2.5 inch** thickness.

D. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/2 inch per 12 inches (1:48) unless otherwise indicated.

E. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

2.10 INSULATION ACCESSORIES

A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with built-up roofing.

B. Fasteners: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate and acceptable to roofing manufacturer.

C. Insulation Adhesive:
1. ASTM D 312 Type III hot-melt asphalt.
   a. Basis of design product: Tremco, Premium III.
   b. Softening Point, min/max, ASTM D 36: 195205 deg. F (9096 deg. C).
   c. Ductility at 77 deg. F, minimum, ASTM D 113: 1.5 cm.
   d. Penetration at 77 deg. F (25 deg. C), min/max, ASTM D 5: 1530 dmm.

D. Insulation Cant Strips: ASTM C 208, Type II, Grade 1, cellulosic-fiber insulation board.

E. Cover Board:
1. Cellulosic-fiber Insulation Board ASTM C208, Type II, Grades 1 and 2, with water-resistant binders, non-asphaltic primer coated on four sides and chemically treated for deterioration, 1/2 inch (13 mm) thick.
   a. Basis of design product: Blue Ridge Structodek High Density Fiberboard.
   b. Compressive strength, ASTM C 165: 15 lbf/sq. in..
   c. Thermal resistance at 75 deg. F, ASTM C 518: R 1.3.

2.11 SURFACING

A. ASTM D 312 Type III hot-melt asphalt.
1. Basis of design product: Tremco, Premium III.
2. Softening Point, min/max, ASTM D 36: 195205 deg. F (9096 deg. C).
3. Ductility at 77 deg. F, minimum, ASTM D 113: 1.5 cm.
4. Penetration at 77 deg. F (25 deg. C), min/max, ASTM D 5: 1530 dmm.

B. Aggregate Stone Surfacing: Water worn or crushed stone.

2.12 WALKWAYS

A. Walkway pads, ceramic-granule-surfaced reinforced asphalt composition slip-resisting pads, manufactured as a traffic pad for foot traffic, 1/2 inch (13 mm) thick minimum.
1. Basis of design product: Tremco, Trem-Tred.
2. Flexural Strength at max. load, minimum, ASTM C 203: 210 psi (1.5 kPa).
3. Granule adhesion (weight loss), maximum, ASTM D 4977: 1.1 gram.
4. Impact Resistance at 77 deg. F (25 deg. C), ASTM D 3746: No Damage to Roof.
5. Pad Size: 36 by 48 inch (914 by 1220 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
   1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
   2. Verify that, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation. wood cants
   3. Steel Roof Deck:
      a. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Division 05 Section "Steel Decking."
      b. Verify that deck is securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch out of plane relative to adjoining deck.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. Install insulation strips in ribs of acoustical roof decks according to acoustical roof deck manufacturer's written instructions.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer's recommendations.

B. Install wood cants, blocking, curbs, and nailers in accordance with requirements of Division 06 carpentry section.

C. Install roofing system in accordance with the following NRCA Manual Plates and NRCA recommendations; modify as required to comply with requirements of FMG references above:

3.4 SUBSTRATE BOARD INSTALLATION

A. Install substrate board with long joints in continuous straight lines, perpendicular to roof slopes with end joints staggered between rows. Tightly butt substrate boards together.
   1. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to built-up roofing manufacturer's written instructions.

3.5 INSULATION INSTALLATION

A. Comply with built-up roofing manufacturer's written instructions for installing roof insulation.

B. Cant Strips: Install and secure preformed 45-degree cant strips at junctures of built-up roofing with vertical surfaces or angle changes greater than 45 degrees.

C. Install tapered insulation under area of roofing to conform to slopes indicated.

D. Install insulation with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
   1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.
   1. Install insulation at minimum thickness of 1-1/2 inches.
   2. Install insulation at average overall thickness of minimum 6 inches.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.

H. Mechanically Fastened and Adhered Insulation: Install first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.
   1. Fasten first layer of insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
   2. Fasten first layer of insulation to resist uplift pressure at corners, perimeter, and field of roof.
   3. Set each subsequent layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F of equiviscous temperature.

I. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction. Loosely butt cover boards together. Tape joints if required by roofing manufacturer.
   1. Apply hot roofing asphalt to substrate and immediately bond cover board to substrate.

3.6 HOT-APPLIED BUILT-UP ROOFING INSTALLATION, GENERAL

A. Install roofing membrane according to roofing manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing" and as follows:
   1. Deck Type: Metal deck.
   2. Base Sheet: One.
      a. Adhering Method: Mopped.
   3. Number of Asphalt Ply Sheets: Three.
      a. Adhering Method: Mopped.
   4. Surfacing Type: A (aggregate).

B. Start installation of built-up roofing in presence of manufacturer's technical personnel.

C. Cooperate with testing agencies and personnel engaged or required to perform services for installing roofing.

D. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   1. Provide tie-offs at end of each day's work configured as recommended by NRCA Roofing Manual Appendix: Quality Control Guidelines - Insulation to protect new and existing roofing.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
   3. Remove temporary plugs from roof drains at end of each day.
   4. Remove and discard temporary seals before beginning work on adjoining roofing.

E. Hot Roofing Asphalt Heating: Heat asphalt to its equiviscous temperature, measured at the mop cart or mechanical spreader immediately before application. Circulate asphalt during heating. Do not raise asphalt temperature above equiviscous temperature range more than one hour before time of application. Do not exceed asphalt manufacturer's recommended temperature limits during asphalt heating. Do not heat asphalt within 25 deg Fof flash point. Discard asphalt maintained at a temperature exceeding finished blowing temperature for more than four hours.
   1. Apply hot roofing asphalt within plus or minus 25 deg Fof equiviscous temperature and adhere components to asphalt heated to not less than 425 deg F.

F. Substrate-Joint Penetrations: Prevent roofing asphalt and adhesives from penetrating substrate joints, entering building, or damaging built-up roofing components or adjacent building construction.

3.7 ROOFING MEMBRANE INSTALLATION

A. Install lapped base sheet course, extending sheet over and terminating beyond cants. Attach base sheet as follows:
   1. Adhere to substrate in a solid mopping of hot roofing asphalt.

B. Install ply sheets starting at low point of roofing. Align ply sheets without stretching. Shingle side laps of ply sheets uniformly to achieve required number of plies throughout thickness of roofing membrane. Shingle in direction to shed water. Extend ply sheets over and terminate beyond cants.
   1. Embed each ply sheet in a solid mopping of hot roofing asphalt applied at rate required by roofing manufacturer, to form a uniform membrane without ply sheets touching.

3.8 FLASHING AND STRIPPING INSTALLATION

A. Install base flashing over cant strips and other sloping and vertical surfaces, at roof edges, and at penetrations through roof, and secure to substrates according to built-up roofing manufacturer's written instructions and as follows:
   1. Flashing Sheet Application: Adhere flashing sheet to substrate in cold-applied adhesive at rate required by roofing manufacturer.

B. Extend base flashing up walls or parapets a minimum of 12 inches above built-up roofing and 6 inches onto field of built-up roofing.

C. Mechanically fasten top of base flashing securely at terminations and perimeter of roofing.
   1. Seal top termination of base flashing with a metal termination bar.

D. Install stripping, according to roofing manufacturer's written instructions, where metal flanges and edgings are set on built-up roofing.
   1. Flashing-Sheet Stripping: Install flashing-sheet stripping in a continuous coating of applied adhesive, and extend onto roofing membrane.

E. Roof Drains: Set 30-by-30-inch metal flashing in bed of asphalt roofing cement on completed built-up roofing. Cover metal flashing with built-up roofing cap-sheet stripping and extend a minimum of 6 inches beyond edge of metal flashing onto field of built-up roofing. Clamp built-up roofing, metal flashing, and stripping into roof-drain clamping ring.
   1. Install flashing sheet stripping according to roofing manufacturer's written instructions.

3.9 SURFACING INSTALLATION

A. Aggregate Surfacing: Promptly after installing and testing roofing membrane, base flashing, and stripping, flood-coat roof surface with 60 lb/100 sq. ft.of hot roofing asphalt. While flood coat is hot and fluid, cast the following average weight of aggregate in a uniform course:
   1. Aggregate Weight: 400 lb/100 sq. ft.

3.10 WALKWAY INSTALLATION

A. Walkway Pads: Install walkway pads using units of size indicated or, if not indicated, of manufacturer's standard size according to walkway pad manufacturer's written instructions.
   1. Sweep away loose aggregate surfacing.
   2. Set walkway pads in. cold-applied adhesive

3.11 FIELD QUALITY CONTROL

A. Roofing Inspector: Owner will engage a qualified roofing inspector to perform roof tests and inspections and to prepare test reports.

B. Roofing Inspector: Contractor shall engage a qualified roofing inspector for a minimum of 10 full-time days on site to perform roof tests and inspections and to prepare start up, interim, and final reports. Roofing Inspector's quality assurance inspections shall comply with criteria established in ARMA/NRCA's "Quality Control Guidelines for the Application of Built-up Roofing."

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation at commencement and upon completion.
   1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. Repair or remove and replace components of built-up roofing where test results or inspections indicate that they do not comply with specified requirements.
   1. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 PROTECTING AND CLEANING

A. Protect built-up roofing from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove built-up roofing that does not comply with requirements, repair substrates, and repair or reinstall roofing to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 07 51 13.11

SECTION 11 40 00

FOOD SERVICE EQUIPMENT

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. The provisions of the General Conditions, Supplementary conditions, and the Sections included under Division 1, General Requirements, are included as a part of this Section as though bound herein.

B. K.E.C. may offer voluntary alternates by submittal in writing, along with supporting literature and other data, at the time the bid is submitted. Voluntary Alternates shall not be confused with items listed as "equals" in the item specifications. Although they will be given consideration after award of the Contract, voluntary alternates will not be considered in the judgment about award of the Contract. Change in the Contract price proposed for the voluntary alternate(s) shall reflect all possible costs to be encountered should the voluntary alternate(s) be accepted and incorporated in the work.

C. If the K.E.C. discovers an apparent conflict or discrepancy between portions of the Contract Documents that appears to be inconsistent or is not reasonably inferred from the intent of the Contract Documents, the Contractor shall include in their bid the most stringent and demanding, or highest cost, requirement.

D. The utility schedule information is based on the prime spec equipment shown in the specifications. In the event the K.E.C. proposes to furnish an approved equal to the prime spec equipment, the K.E.C. shall be responsible for any upcharges incurred because of plumbing, mechanical, or electrical changes necessary for the equipment being provided

1.02 SUMMARY

A. Provide labor and materials required to deliver, uncrate, assemble, set in place, level, install, supervise, and coordinate the installation of the food service equipment and accessories as indicated on drawings and as specified, exclusive of utility connections.

B. Utility roughs-ins, final connections, and interconnection of components will be performed by Divisions 22 and 26.

1. Work provided by Division 22 shall include, but not be limited to, the following:

a. Rough-in mechanical and plumbing services

b. Drain line piping and components from the rough-in to the equipment connections.

c. Supply line piping and components from the rough-in to the equipment connections.

d. Traps, strainers, unions, piping, service valves and vents.

e. Install escutcheons on utility lines which extend through equipment.

f. Install faucets, pre-rinse assemblies, quick disconnect assemblies, hose station, pot fillers, and vacuum breakers, and check valves and flow control valves as furnished with the equipment.

g. Disconnection of existing equipment which is to be removed or relocated.

h. Paint, or chrome sleeve, all exposed water and gas piping (above counter height or in a direct line of sight) as directed by the Architect.

2. Work provided by Division 26 shall include, but not be limited to the following:

a. Rough-in electrical service.

b. Conduit and conductors from the rough-in to the equipment and between remote controls and the equipment.

c. Electrical outlets in walls, floor, and ceiling.

d. Disconnect switches as required by the electrical code.

e. Disconnection of existing equipment which is to be removed or relocated.

3. Work provided by various other trades shall include, but not be limited to, the following:

a. Raised concrete or masonry bases and platforms.

b. Floor depressions, wall openings, recesses and holes through walls, floor and ceiling as required for piping and ducts.

4. Refer to item specifications for additional work and requirements.

1.03 DEFINITIONS

A. The term "Kitchen Equipment Contractor", "Contractor", or "K.E.C." is defined as the person or company that will contract for the work specified in this section.

B. The Consultant for this section of the work is *FOOD SERVICE CONSULTANTS, INC., DBA VORNDRAN AND ASSOCIATES, 3125 STERLING RIDGE COVE, FORT WAYNE, INDIANA 46825-1704*. The Consultant is responsible to the Architect for ascertaining that the work complies with the requirements of this section.

C. The term "provide" is defined as "Contractor furnish and install."

D. Transmit reports, submissions, questions, or correspondence to the Architect for distribution.

1.04 SUBMITTAL

A. Refer to Section 01 33 23 and Section 01 77 00.

B. Submit one (1) set of shop drawings (in PDF format) for review. Upon final review of drawings, distribute prints to the various trades.

C. Shop drawings to include a plan, elevation, and cross sections through each equipment item. Indicate anchor devices, reinforcements, dimensions, gauges, holes, radii, cutouts and details of construction, installation, and relation to adjoining work. Do not start fabrication until final reviews are received. Draft shop drawings at 1 inch per foot scale.

D. Rough-in drawings to show accurately the curbs, platforms, gutters, sleeves, pipe stubs, refrigerant lines, water supply lines, drains, floor drains, electrical services and other utility connections required. Coordinate work with the various trades. Draft rough-in drawings at ½ inch per foot scale.

E. Submit product data brochures for review prior to equipment purchase. Brochure to contain a product data sheet for each manufacturer, along with a typewritten cover sheet indicating the item number, quantity, manufacturer, and model number, mechanical and electrical services required and a listing of accessories specified. Assemble cover sheet and literature in order. Partial lists submitted from time to time will be rejected. Bind brochure in a three (3) ring hard back black binder.

F. Ventilation system shop drawings shall include a scaled roof plan indicating the locations of the exhaust duct termination in comparison to other roof equipment in the same area and information on automatic power/fuel shut-off to cooking appliances in accordance with provisions in Ohio Mechanical Code and Ohio Building Code.

G. Submit, when requested, a copy of the manufacturer's order acknowledgement for each item of pre-fabricated equipment. Acknowledgement to show date item was ordered and the scheduled shipping date.

H. Submit samples when requested. Samples will not be returned unless specifically requested.

I. Guarantee equipment and accessories for one (1) year from date of substantial completion. covering replacement cost and/or labor cost of defective material and adjustment of controls. School projects shall be guaranteed for one (1) year from the date of the first day of the school opening. Provide a five (5) year parts and labor warranty for ***ALL*** remote refrigeration components for the walk-ins, and a five (5) year compressor only warranty for all self-contained refrigerated units.

J. Submit operating / maintenance manuals prior to completion of work. Manual to contain directions and recommendations for the operation, care, adjustment, service, and maintenance of equipment. Provide parts list and diagrams showing parts location and assembly. Provide three (3) copies of the manual. Identify each item of equipment with titled tabs. Arrange in alphabetical order. Bind manual in a three (3) ring hard back black binder.

K. Submit a listing of the name and address of equipment manufacturers used, along with the name and address of the local service agencies. Include listing as a part of the maintenance and operation manuals.

L. Submit three signed copies of pressure vessel inspection report. Inspector's report to be completed by a qualified pressure vessel inspector. Test all pressure equipment.

1.05 QUALITY ASSURANCE

A. Manufacture and install equipment and accessories in strict compliance with and, if applicable, bear the seal of UL, NEMA, ASME, NSF, AGA, ANSI, OSHA and NFPA.

B. Manufacture and install equipment in strict conformity with Public Health Service Publication - "Food Service Sanitation Manual" and applicable governmental codes and regulations.

C. Provide safety guards on equipment in compliance with codes.

D. Approval of contractor's drawings and other data does not relieve the Contractor from responsibility of complying with codes and regulations.

E. Provide, at no extra charge, equipment, trim and accessories which may be required by codes and regulations.

F. The custom equipment fabricator will be subject to the acceptance of the Architect, Consultant, and Owner. Fabricator must have the plant, personnel, and engineering facilities to properly design, detail and fabricate high quality equipment. Equipment shall be of standard unit assembly, manufactured by one manufacturer and of uniform design, material, and finish.

G. Manufacturer's catalog designations are intended to represent the standards required. Equipment furnished must closely conform thereto in design, construction, capacity, and function, to the manufacturer and model specified. Where catalog designations are given, the items shall be complete as described and shown in the catalog, unless exceptions are specified.

1.06 DELIVERY STORAGE AND HANDLING

A. Acquire approved "off-site" storage to house equipment if provisions cannot be made at the job site.

B. Ship fittings to the job site as follows:

1. Wrap and identify with tag naming the job, the supplier, the items enclosed and the item to which it is to be attached at the job.

2. Fittings to be delivered to various trades involved. Obtain a receipt signed by the foreman.

3. Do not ship fittings or accessories inside larger items of equipment.

C. Continuously maintain protection of work from damage. Protect the Owner's property and that of other contractors from injury or loss arising about this contract, and repair or replace damage, injury, or loss. Damage to equipment not directly attributed to separate trades shall be the responsibility of the K.E.C.

D. Permanently fasten manufacturer’s nameplates to the equipment. One nameplate of the fabricator will be allowed in each room.

E. Equipment of a like nature (cooking batteries, carts, self-leveling dispensers, etc.) shall be of one manufacturer to insure uniformity of design and to simplify service and maintenance.

1.07 PROJECT CONDITIONS

A. Prior to fabrication of equipment, field measure and verify in-place construction.

B. Fit equipment into the space provided regardless of the manufacturer's standards. Variations in equipment not recessed or built into fixed spaces, shall in no case be sufficient to materially change capacity of the equipment.

C. Field inspect conditions at site and verify that the rough-ins were properly installed. Compensate the various trades for relocations of rough-ins caused by inaccuracy of drawings.

D. Notify the Consultant and Architect in writing of discrepancies between the contract documents and the actual conditions on the job site prior to equipment fabrication.

E. Pay for the cost incurred for special equipment; for removal or replacement of portions of the building if required for delivery and installation of equipment specified; as well as other costs incurred if work specified under this section must be done by others due to jurisdictional agreements or other conditions.

F. Coordinate work specified under "WORK BY OTHERS", or other work that may arise incidental to completing the project. Furnish installing trades with information and assistance for the proper installation of equipment and components.

G. Supervise the installation of the equipment and components. Submit to the Architect the name, address, and telephone number of the supervisor. The Contractor agrees to accept collect telephone calls from the Consultant or Architect.

PART 2 PRODUCTS

2.01 MECHANICAL WORK INCLUDED IN CONTRACT

A. Work provided by this section shall include, but not be limited to, the following:

1. Chrome plated faucets with check valves, swing spout, soft flow aerators, and union coupling inlets. Equip faucets for 160° to 180° hot water with heat resistant red handle. Faucets and components shall be as follows:

a. Pre-Rinse, Backsplash
T & S B 2278-01 w/ B-107C
Chicago Faucet 510 / 902B / 851
Fisher 2210 / 2902 / 2925

b. Faucet, Backsplash
T & S B-0231-CR with B-199-2-F-12 aerator (1.20 gpm)
Chicago Faucet 540LD
Fisher 3252

c. Faucet, ¾" Backsplash mounted
T & S B-0290 with B-199-2-F-12 aerator (1.20 gpm)
Fisher 5412
Chicago Faucet

d. Pot Filler, Wall mounted
   T & S B-0610
   Chicago Faucet 512
   Fisher 2240

e. Hose Reel, Wall mounted
   T & S B-7222
   Chicago Faucet 538
   Fisher 2980

f. Vacuum Breaker - ¾"
   T & S B-457, B-458
   Watts
   Arrowhead

   Vacuum Breaker - ½"
   T & S B-455, B-456
   Watts
   Arrowhead

g. Check Valves
   T & S Brass CVH
   Watts
   Crane

   T & S Brass CVV
   Watts
   Crane

h. Quick disconnect Assemblies
   Dormont
   Greitzer
   Connect It, Inc.

i. Drain Valve Assemblies
   CHG DSS-8000
   Kason
   Fisher

2. Waste outlets with stainless steel twist handle, stainless steel drain valve body, a self-centering face flange, a flat stainless steel "snap-in" strainer plate and a chrome plated tailpiece. Overflow fittings will not be required unless specifically stated in the item specifications.

3. Control valves required for operation, located convenient to the operator. Extension stems with supports shall be chrome plated. Equip steam valves with heat resistant red handles.

4. Chrome plated vacuum breakers on threaded faucets, hose stations and on fixtures where the water inlets are placed below the water level.

5. Backflow preventers on pre-rinse units.

6. Anti-siphon pressure type vacuum breakers on hose reels.

7. Angle flange or deck and wall flange where vacuum breakers extend through equipment.

8. Special valves, regulators, strainers, pressure reducing valves, control valves, thermometers, pressure gauges, keyed water flow restrictors and accessories required by code or necessary for the operation of equipment.

9. Quick disconnect with couplers and flexible double wall stainless steel hose with built in restraining device and double shut-off at ends. Disconnect hoses for steam lines to be insulated. Assemblies to be color coded: Yellow for gas, green for steam, red for hot water and blue for cold water. Provide equipment chain retainer.

2.02 ELECTRICAL WORK INCLUDED IN CONTRACT

A. Work provided by this section shall include, but not be limited to, the following:

1. Plugs matching the receptacles specified in the Electrical Section of specifications. Plugs to be manufactured by Hubbell, Leviton, or GE.

2. Grounded receptacles mounted in type "IB" enclosures equipped with stainless steel faceplates and boxes where receptacles are exposed. Do not furnish twist lock unless specified. Receptacles mounted on tables and counters shall be equipped with ground fault interrupts (GFI).

3. Controls, thermostats, starters, motor control switches, switches, and contactors. Furnish remote mounted components to Division 26 00 00 for mounting.

4. Magnetic starters with NEMA enclosure for motors sized as required by codes.

5. Type "ND" single throw heavy duty industrial, quick make - quick break disconnect switch with interlocked cover control where called for in the item specifications.

6. NEMA type 4 enclosures for controls, disconnects, magnetic starters and other components which are in wet or damp areas.

7. Bolted type circuit breaker where called for in the item specifications. Verify with Architect as to the manufacturer.

8. Three wire or four wire type "SO" neoprene cord and plug sets with one leg grounded to equipment.

9. Anaconda Sealtite Type "EF", Electri-Flex, or Cantex conduit and waterproof boxes. Unprotected flexible metal conduit will not be accepted.

10. Conduit and conductors in conduit raceway for fabricated equipment.

11. Low voltage control circuits on equipment operating on voltages over 120 volts.

12. Totally enclosed, fan cooled motors where exposed to damp and wet areas.

13. Motors less than ½ horsepower, for solenoid valves and lighting shall be 120 volts, single phase. Unless otherwise noted motors greater than ½ horsepower shall be three phase. Motors shall have ball and thrust type bearings, totally enclosed, 55º rise above 40º ambient continuous duty. Motors shall have low starting torque, current characteristics, with NEMA frames.

2.03 HARDWARE

A. Hardware other than stainless steel shall be heavy duty chrome plated brass, with concealed fasteners.

B. Provide master keyed locks. Refrigeration equipment locks shall be keyed alike and fabricated equipment door and drawer locks shall be keyed alike.

2.04 FABRICATED EQUIPMENT

A. Material shall be new prime quality, full gauge thickness, of composition indicated by names or abbreviations stated in item specifications.

B. Stainless Steel shall be type 302 or type 304, with a No. 4 finish, as designated by the American Iron and Steel Institute and shall be austenitic.

C. Galvanized steel angles, bars, channels, piping, tubing, and sheets shall be uniformly ductile in quality and free from hard spots, runs, blisters, spelter, checks and other surface defects. Material shall be mild steel, galvanized by the hot dip process, unless otherwise specified.

D. Welds shall be of same basic composition as sheets or parts welded. Joints shall be fully welded. Pits, cracks, discolorations, distortion, and depressions will not be acceptable. Grind smooth and polish welded joints, flush with the adjoining material and neatly finish to harmonize therewith. Soldered, lapped, fillet corners and bolted joints will not be acceptable in place of welded seamless construction.

E. Burrs, projections, and fins are not acceptable on sheared edges. Neatly grind miters and bullnosed corners to a uniform condition.

F. Bolts, screws, and rivets are not acceptable on exposed surfaces of equipment. Where bolts or studs are welded to the underside of stainless steel surfaces, the reverse side of the weld shall be neatly finished to blend in with the adjacent surface. Depressions at these points will not be acceptable. Cap bolt threads and studs with a suitable lock washer and chromium plated brass acorn nut. Bolts used to fasten trim shall be stainless steel.

G. Fabricate metal table tops, sinks and drainboards of 14 gauge stainless steel. Sound deaden underside of tops, drainboards, and sinks with an NSF approved sound deadening product. Provide tacky tape between all support channel and metal table tops. Exposed table top corners shall be radiused 1¾".

H. Edges, corners, rims, and backsplash shall be die formed of same sheet as top. Cove intersection of tops at backsplash and rims on a ¾" radius. Rim and backsplash tops shall be level.

I. Backsplash shall be flanged back a minimum of 2" at 45º and down 1" at 45º. Enclose ends and rear of exposed backsplash.

J. Provide raised die formed ferrule around punch or drilled holes in table tops and shelves.

K. Sink back, bottom and front shall be formed of one continuous sheet with the ends welded into place. Construct bottom by creasing or forming the metal downward from each wall a minimum of one degree distinct slope toward the waste receptacle which shall be recessed a minimum of ⅜" below the adjoining surfaces. Provide double wall partition between each pair of sink compartments with rounded top edge. Provide sinks having two or more compartments with full length, full height flush stainless steel front panel to conceal joint between sinks. Turn back panel at sides and bottom and weld to sink bowl. Cove sink corners on a ¾" radius.

L. Slope drainboards, dishtable tops and beverage stand tops, urn drainers and troughs with an integral pitch towards the drain water receptor to ensure positive drainage and to eliminate water pockets.

M. Reinforce tops with 12 gauge channels, one channel provided on tops up to 36" wide and two channels on tops over 36" wide. Provide open base tables with channel runner at each pair of legs. Exposed channels shall be stainless steel. Attach top to the channel reinforcements with studs welded to the underside of top. Seal intersection of channel edge and underside of top with silicone.

N. Cabinet type enclosures shall be 16 gauge stainless steel. Round exposed vertical corners on a ¾" radius die. Flange top and bottom off at 2" right angles to the body and weld in corner gusset plates. The walls of cabinet shall be a fully welded seamless assembly with channels and box sections corners. A STRUCTURAL ANGLE FRAMEWORK SUPPORTING THE ENCLOSURE IS NOT ACCEPTABLE. Provide individual compartments separated by a partition, enclosing sinks, machinery, and drawers from the balance of the base cabinet. Weld partition to the cabinet body.

O. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel. Internally reinforce doors 24" wide and greater with a 4" wide channel to prevent warpage. Tack weld intersection of front and rear door face around inside perimeter. Corners shall be fully welded. Space tack welds no greater than 6" apart. Grind smooth and polish all welds. Balance of space to be sealed with silicone.

P. Provide sliding doors with rubber button bumpers, die stamped stainless steel flush mounted door pull, sheaves, nylon rollers with stainless steel ball bearings, overhead aluminum door track and a bronze or stainless steel door guide bar attached to the bottom of cabinet.

Q. Provide lockable hinged doors with rubber button bumpers, stainless steel lift off hinge, die stamped stainless steel flush mounted door pull and a Component Hardware Model M27-2490, FMP, or Kason catch. Provide locks on all doors housing machinery and power panels.

R. Drawer assembly to be flush mounted double pan construction the same as described for doors. Provide two (2) rubber button bumpers, one on each side of drawer face, drawer insert, self-closing drawer slides, die stamped stainless steel flush mounted door pull and a cylinder lock. Provide 20" × 20" × 5" deep Component Hardware Model S80-2020, FMP, or Kason drawer insert, set loosely in a perimeter supporting channel frame with drawer face welded to the frame. Provide Component Hardware Model S-52, FMP, or Kason ball bearing roller drawer slides with adjustable stops at the fully opened position mounted to the channel frame. Enclosed drawers on open base table in an 18 gauge stainless steel enclosure.

S. Fabricate shelves of 16 gauge stainless steel with formed edges, reinforced with channels, the same as specified for tops.

T. Construct stationary shelves on open base tables formed with edge set on tangent point of leg and fully welded to leg.

U. Provide solid stationary shelves in enclosed base cabinets with back and ends turned up 2" and coved on a ¼" minimum radius. Tack weld turn up to cabinet body and calk joint with silicone. Provide ¾" diameter perforations spaced on 4" center on shelves in heated base cabinets.

V. Construct pipe slots through undershelves with turned up edge on four sides. Provide cabinets with an inner duct to conceal vertical piping.

W. Tubular leg assemblies shall consist of 1⅝" diameter 16 gauge stainless steel tubular legs and 1" diameter 16 gauge stainless steel crossrails. Fit top of legs into fully enclosed stainless steel sockets. Continuously weld sockets to reinforcing channel on underside of table tops, or to the reinforced stainless steel corner pads under sink corners. Bottom of pipe legs to be finished off smoothly and overlap the foot or caster stem. Crossrails shall be mitered and fully welded to each leg.

X. Provide NSF labeled casters. Medium and heavy duty casters of 4", 5", and 6" diameter shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings. Casters shall be Component Hardware Group, Darnell, or Jarvis.

Y. Provide fully enclosed bullet shaped stainless steel feet with a slightly rounded foot at bottom and an extra-long threaded stem at the top.

2.05 FINISHES

A. Polish exposed stainless steel to a No. 4 commercial mill finish. Where unexposed, polish to a No. 2B finish. Satin finish exposed surfaces.

B. Paint and coatings shall be durable, non-toxic, non-dusting, non-flaking and mildew resistant, complying with NSF standards and governing regulations. Apply in accordance with the manufacturers recommendations.

C. Clean metal prior to painting and paint with a rust inhibiting primer. Finish with two (2) coats of enamel in color selection determined by the Architect. Do not paint galvanized shelving.

2.06 REFRIGERATION SYSTEMS

A. Provide refrigeration systems complete with components required for operation, designed for direct expansion, employing thermostatic expansion valves and pressure switches. Refrigeration systems must meet all required code criteria noted in OBC Mechanical Code Section 11, and/or all state and local codes as required.

B. Rate compressors on the American Society of Refrigeration Engineers Standards, based on a maximum operating time of 16 hours per day on 100º F days. Mount compressor, condenser, motor, and auxiliary equipment on a single rigid base. Automatically control each unit by a suction pressure switch and a high pressure cut-off. Provide relief lines required by the codes, capped with screen vent fittings.

C. Provide the following components:

1. Sporlan, Ansul, or Cooper liquid line dryer.

2. Suction line accumulators on air cooled condensers which are located remote and outside the building.

3. Room temperature thermostats and solenoid valves.

4. Strainers ahead of all valves.

5. Type "L" copper refrigerant piping.

6. Vibration eliminators and flexible tubing in suction and liquid lines.

7. Wrought copper recessed solder fittings for refrigeration lines.

8. Type "L" copper piping with cast brass or wrought copper water line piping.

9. Sta-Brite, Sil-Fos 15, or Stay-Silv 15 silver solder.

10. Drip gutters under uncovered pipes, valves, and fittings.

11. Pipe hangers spaced a maximum of 96" on center and adjusted to the drop required.

12. Packless shutoff valves with port area equal to pipe area.

13. Charging valves located at the compressor.

14. Sporlan, Alco or Detroit Lubricator Thermostatic expansion valves.

15. Liquid line solenoid valves with port area equal to pipe area.

16. Cover refrigerant lines and chilled water lines with ¾" minimum thickness refrigerant pipe insulation with joints neatly cut and glued with adhesive. Exposed exterior insulation shall be UV protected or wrapped.

17. Pipe sleeves constructed of steel and molded vinyl large enough to permit covered insulated pipes to pass through.

18. Oil traps located at base of vertical risers in suction lines and at outlet of evaporator. Depth of trap to be three times the suction pipe diameter with a minimum horizontal dimension.

19. Equalizing line from expansion valve on compressor side of expansion bulb. Suction lines to be pitched from high point at coil to compressor. It may be necessary to rise to avoid pipes, ducts, etc. There shall be a trap of minimum dimensions at base of each vertical rise if over 48".

D. Design system for not over two lbs. loss between compressor and evaporator. Dehydrate system and hold at 150 lbs. pressure for a period of twelve hours without loss of pressure.

E. Test the refrigeration system for a period of three days making required adjustments.

PART 3 EXECUTION

3.01 PREPARATION

A. Fit equipment accurately in space provided. Notify the Architect in writing of modifications required to receive equipment.

B. Verify electrical and mechanical services at job site prior to ordering equipment. Information shown on drawings does not relieve the Contractor of this responsibility.

3.02 INSTALLATION

A. Assist in moving equipment so other trades can make connections and be on the job to level and adjust equipment as the last connection is made. During installation instruct the trades on hook up of the various items of equipment.

B. Equipment fit adjacent to walls, ceilings, floors, and corners shall be tight. Allow selvage for a perfect fit.

3.03 SEALING AND TRIMMING

A. Caulk joints with GE Silastic, Component Hardware, or Dow Corning 732 RTV sealant. Joints exceeding ⅜" in width shall be trimmed with a stainless steel channel and caulked with sealant.

3.04 START-UP AND TESTING

A. Start-up, test and inspect equipment after installation under operating conditions. If inspection or test shows defects, correct the defects and repeat inspection and test.

B. Equipment must be operable prior to the demonstration of equipment by the manufacturer.

3.05 ADJUSTING

A. Adjust service equipment so as to be in perfect operating condition when turned over to the Owner at completion of work.

3.06 CLEANING

A. Keep premises free from accumulation of waste material during progress of work and, at completion, leave the premises clean and the equipment washed down, polished, and ready for use.

3.07 TOUCH-UP

A. Polish out scratches in stainless steel and touch up scratches on painted surfaces.

3.08 DEMONSTRATION OF EQUIPMENT

A. Schedule the equipment manufacturer’s representatives to appear and teach the Owner’s Staff on the correct operation, maintenance, and safety features of all the equipment.

B. After instruction, prepare a letter stating that equipment was demonstrated, and personally checked by the manufacturer's representative, and found to be operating properly. Acceptance of the installation will not be contemplated until the letter, signed by the Owner, is received.

C. A representative of the supplier of the kitchen equipment must be present in the kitchen during the demonstration by the appropriate equipment manufacturer.

3.09 INSPECTION AND PUNCH LIST

A. When it has been concluded that work is installed, operating and substantially complete, prepare a "punch list" of items yet to be completed and forward a copy to the Architect and the Consultant.

B. The Architect will request the Consultant to inspect the equipment after receipt of the punch list. If inspection reveals that the installation is not substantially complete or the punch list is not of a minor nature, and another inspection is required, then a Certificate of Substantial Completion will not be issued.

C. Reimburse the Consultant for subsequent inspections (including long distance telephone calls) and time of the Consultant. If the costs have not been paid before final payment, the costs will be deducted from the Contractor's final payment.

D. Immediately upon completion of the Consultant's inspection, correct punch list items. When items have been corrected, the Contractor shall notify the Architect in writing that the installation is ready for inspection.

3.10 EQUIPMENT SCHEDULE / SPECIFICATIONS

The following equipment schedule/specifications refers to various items of food service equipment shown on the Contract Drawings. The Contract Drawings and notes form a part of these specifications and shall be as binding as if written herein.

ITEM NO. 1 - WALK-IN COOLER / FREEZER
QUANTITY - ONE
MFG. AND MODEL: KOLPAK
ELEC. REQ'M'TS: 120-1 / 208-1 / 208-3

Walk-in shall be the size and shape as shown on the plans, approved, and listed in accordance with UL, NSF and constructed in accordance with all state and local codes and meet OBC 2603.4 and all Energy Independence and Security Act of 2007 requirements. Refer to the last page of this section for additional information to be submitted prior to installation.

Provide sectional pre-fabricated wall and ceiling panels constructed and joined together per manufacturer's standard. Panels to be equipped with compression gaskets. Seal all wall and floor sections to building floor with silicone. Where the span of the ceiling is too great to support itself, provide hanger rods attached to the building structural system. Provide all steel, hanger rods, and turnbuckles required. Installation of complete assembly shall be by factory authorized personnel. K.E.C. to submit installer's name and record prior to installation. Refrigeration system shall be installed by, and serviced by, a local refrigeration specialist approved by the Owner and/or Owner's representative. Refer to standard form at the end of this section.

Floor shall be built up on the site and installed in a floor recess, the depth as shown on the drawings. Install a 15" high, metal clad, insulated pre-fabricated curb around perimeter of exterior walls and below all party walls. Curb shall be anchored in the floor recess by clip angles attached to pit floor with nylon tap-its. Furnish and install 4" thick urethane insulation and .004" thick polyethylene vapor barrier in the floor recess. Division 03 shall furnish and install a concrete pad in the size shown in the drawings. Division 09 to provide the floor covering over the floor insulation, along with compacted back-fill between the walk-in panels and building walls. Refer to details for construction and room finish schedule for type of floor covering. Provide a stainless steel coved base on the interior of the unit and seal as required. Exterior base shall be furnished and installed by Division 09 and shall be of the same material as the floor.

Insulation for wall and ceiling panels shall be reaction injection molded urethane (no CFC's used) and contain wall, ceiling, and door insulation of at least R–25 for coolers and R–32 for freezers. Insulation for wall panels shall be 4" thick. Ceiling panels shall be 4" thick, single piece, and self-supporting. Interior height of unit shall be a minimum of 8'-0".

Exposed exterior finish of wall panels shall be 20 gauge type 302 or 304 stainless steel with a No. 4 finish. Interior finish of wall panels and ceiling panels shall be .032" smooth aluminum with white baked on acrylic finish.

Doors shall be off-set type construction insulated with urethane insulation. Interior surface of door shall be the same finish as adjacent wall panels. Exterior finish shall be 20 gauge type 302 or 304 stainless steel with a No. 4 finish.

Door frames shall be equipped with heating elements at jamb, sill, and head. Elements shall be factory wired to a junction box mounted on top of the ceiling panels. Equip each door with magnetic gasket, adjustable bottom sweep gasket, International 850 series hydraulic door closer with hold open device, heated vision panel in freezer door, unheated vision panel in cooler door, three (3) self-closing chrome plated cam-action hinges, Kason 27C polished chrome handle with two (2) keys for each door, mortise tamper-proof deadbolt lock with inside release, and 36" high stainless steel kickplates on the interior and exterior.

Provide all exterior doors with a Curtron, Polar-Flex, or Ardco two-piece strip door, constructed of clear vinyl strips in accordance with the manufacturer's instructions. Strip door to meet all Energy Independence and Security Act of 2007 requirements.

Interior lighting shall meet all Energy Independence and Security Act of 2007 requirements. Provide eight (8) Kason model 1809LED series compact light fixtures with high impact Lexan lens. Lights shall be controlled by an automatic motion sensor with indicator light mounted in the interior of the wall panel adjacent to the door. Division 26 to mount fixtures on ceiling panels and shall punch all holes through cooler/freezer ceilings for final wiring. Mount fixtures in locations shown in the manufacturer's shop drawings. All conduit shall be installed on the exterior top of ceiling and not within the interior of the compartment.

Air pressure relief ports shall be provided for each compartment through the walls or ceiling. Ports shall be the design as standard with the cooler manufacturer. Division 26 to wire all electrically heated air pressure relief ports.

Thermometers shall be located and mounted on the exterior walls near the entrance doors and in full view of the kitchen. Thermometers shall be of the electronic digital type.

Provide each compartment with a Modularm model 75LC temperature alarm indicator with a remote sensor, adjustable tamper resistant high-low set-point limits, automatic alarm reset, voltage alarm output and both audible and visual alarms. Provide unit with dry contacts. Division 26 to wire as noted in the manufacturer's wiring diagram.

Trim at side walls and closure panels to finished ceiling shall be the same finish as the exterior wall panels. Refer to drawings for details.

Coil supports to be provided in a ceiling panel of each compartment to support the cooling coils. Mounting nuts and bolts shall be non-corrosive. Sleeves through walls for refrigeration lines, electrical lines and drains shall be of extruded vinyl.

Unit cooler coils shall be equipped with fan blade guards, aluminum housing, disconnect switch and all controls required for operation. Division 26 wire from the junction box on coil to the remote temperature thermostat and the solenoid valve with Sealtite conduit. Evaporator fan motors less than 1 horsepower require electronically commutated (EC) or 3 phase design.

Unit freezer coil shall be equipped with fan blade guards, aluminum housing, electric defrost, drain pan heater, timers, thermostats, and all components required for proper operation. Provide unit with the following special components and controls: Built-in thermostats and timer to return system to freezing cycle and to delay the start of fan motors after the completion of the defrost cycle, a timer with a stop defrost cycle in the event of thermostat failure. K.E.C. to provide a thermostatically controlled heater tape or internal drain pipe heater for the condensate drain line. Heater to be wired by Division 26 to the freezer coil "hot" terminal (see the mfr's wiring diagram). Division 26 wire from the remote timer located at compressor to the junction box on the freezer coil and from the junction box on the coil to the room temperature thermostat with Sealtite conduit. Evaporator fan motors less than 1 horsepower require electronically commutated (EC) or 3 phase design.

Condensate drain lines shall be extended from all coils to the open sight wastes by Division 22. All lines shall be type "L" hard copper using sweat fittings. Division 22 to provide a union fitting directly below the coils to all easy removal of the bottom pan of the coils. Drain lines to be secured to the cooler - freezer walls with 1" corrosion-resistant stand-offs and shall be concealed where possible. The walk-in installer shall punch all holes through cooler / freezer walls and assist Division 22 as to the proper installation of the drain lines. Division 22 to insulate total length of drain piping in both the cooler and freezer with 1" thick closed-cell insulation equal to Rubatex model R-180-FS, RBX, or Owens Corning pipe insulation.

Semi-hermetic compressors shall be completely pre-wired to the defrost cycle timers, starters, disconnect switch and other related components which are mounted on the compressor frame. Compressor fan motors less than 1 horsepower shall be required to be electronically commutated (EC), permanent split capacitor (PSC), or 3 phase design. Provide anti-vibration devices and a plastic sign with ¾" high letters stating the refrigerant type and the name of the walk-in which the compressor is refrigerating. Refrigerant to be R404A or similar HFC type. Provide with crank case heaters and reverse acting pressure controls.

Compressor shall be enclosed in an RDM Products PSE Series, Kool-Star, or Heatcraft all-weather outdoor housing, constructed of a galvanized steel frame and an exterior skin of anodized aluminum. Provide hinged and lockable louvered access doors with padlock and a removable top. Housing shall be painted in a custom color as selected by the Architect.

Provide the following coils and compressors:

Room	Coil	Compressor	Evap. Temp.
COOLER	AM26-87B	PR99MOP	+25
FREEZER	EL26-92B	PR249LOP	- 20

Provide Pate model ES5B, LM Curbs, or Roof Products equipment support rails for mounting the compressor on the roof, constructed of 18 gauge galvanized steel with continuously mitered and welded corner seams, integral base plate, factory installed nailer and 18 gauge galvanized steel counter flashing. Install rails on the roof deck in locations as shown on the drawings. Flashing of equipment rails shall be by Division 07 70 00.

Provide Pate model PCA-5B, LM Curbs, or Roof Products pipe curb assembly complete with neoprene pipe boots, stainless steel clamps and ABS plastic cap. Install pipe curb on the roof deck in location as shown on the drawings. Cut all holes through roof deck as required. Flashing of curb shall be by Division 07 70 00.

ITEM NO. 2 - SHELF UNIT, MOBILE
QUANTITY - SIXTEEN
MFG. AND MODEL: METRO SUPER ERECTA PRO

Shelf unit to include frames and posts constructed of steel with an electroplated substrate, abrasion-resistant epoxy finish, shelf mats constructed of injection molded polypropylene with anti-microbial protection, shelf wedge connectors constructed of reinforced nylon, and a corner lock release system. Shelf mats shall be open grid style and removable without the use of tools. Posts shall be mounted on 5" diameter casters two equipped with brakes and revolving donut type bumpers. Each unit shall consist of four (4) 63" high posts and four (4) shelves.

ITEM NO. 3 - DUNNAGE PLATFORM, MOBILE
QUANTITY - ONE
MFG. AND MODEL: METRO MHP55K3

Dunnage platform shall be the size and shape as shown on the drawings equipped with 16" high uprights and a wire mat deck coated with corrosion resistant epoxy with antimicrobial protection. Uprights shall be equipped with plastic caps on top and 5" diameter casters, two equipped with brakes.

ITEM NO. 4 - HIGH-DENSITY SHELF SYSTEM
QUANTITY - ONE
MFG. AND MODEL: METRO SUPER ERECTA ADJUSTABLE

Provide shelf system as sized in the drawings. Track and joining channel shall be constructed of aluminum. Shelves shall be constructed of wire ribs reinforced with a wire truss on all four sides. Corners to have a tapered fitting welded to the truss, designed to fit the posts. Provide the corner fitting with a sleeve with an identical taper as the corner shelf fitting and designed to effect a wedge anchorage holding the shelf in a rigid position. Finish shall be zinc plated cold rolled steel coated with hard baked clear nontoxic epoxy.

Posts shall be ringed with rolled grooves 1" apart along their length and equipped with plastic caps on the top and 5" diameter casters two equipped with brakes and revolving donut type bumpers. Each unit shall consist of four (4) 74" high posts and four (4) shelves.

ITEM NO. 5 - UTILITY CART
QUANTITY - FOUR
MFG. AND MODEL: LAKESIDE 7020

Provide cart with ergonomic handles, three (3) shelves, blue leg bumpers, 5" front swivel casters, 8" rear fixed casters, and blue handle grips.

ITEM NO. 6 - PAN RACK, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CRESCOR 200-1841

Rack to be manufactured of extruded aluminum welded construction with two (2) tie rods applied at front and rear, corrugated sides for thirty-nine (39) 18" × 26" sheet pans on 1½" centers, 5" swivel neoprene casters, permanently lubricated, sealed ball bearings, 200 lbs. load capacity, and a 2-year parts warranty.

Provide the following accessories: Two (2) case lots of Lincoln Wearever® 18" × 26" sheet pans, Pan Stop, and Corner Bumpers.

ITEM NO. 7 - CAN DISPENSING RACK, MOBILE
QUANTITY - ONE
MFG. AND MODEL: NEW AGE 1250CK

Dispensing rack shall be all welded aluminum construction consisting of heavy duty tubing uprights and cross braces with can guides of T and angle. Vertical corner uprights shall be constructed of extruded aluminum. Rack shall be mounted on heavy duty 5" diameter casters, two equipped with brakes.

ITEM NO. 8 - MOBILE WORK TABLE
QUANTITY - ONE
MFG. AND MODEL: LAKESIDE 130

Provide stand with bottom shelf, channel ledges, 12 gauge stainless steel legs, 18 gauge stainless steel top, and four (4) casters, two (2) with brakes.

ITEM NO. 9 - WARMING CABINET, MOBILE
QUANTITY - TWO
MFG. AND MODEL - CRESCOR H-339-X-1813C
ELEC. REQ'M'TS: 120-1

Unit to have inner, outer, and top liners constructed of .063 aluminum (reinforced with channel frame), field reversible aluminum door, fiberglass insulation in walls, door, top and bottom, welded and finished base, inner wall heaters, removable pan supports for 18" x 26" pans or 12" x 20" pans, handles, and 5" swivel neoprene casters.

ITEM NO. 10 - SPARE NUMBER

ITEM NO. 11 - DISPOSER
QUANTITY - ONE
MFG. AND MODEL: IN SINK ERATOR SS-200 / CC-101
ELEC. REQ'M'TS: 480-3

Provide disposer with removable safety baffle, stainless steel cone welded to the table top and a control assembly attached to the underside of the table top. Mount disposer, cone, and control assembly in accordance with manufacturer's instructions. The furnishing and installation of all piping and wiring and the installation of all related components furnished with the disposer shall be the responsibility of Divisions 22 and 26. Refer to disposer piping diagram for method of installation.

Control assembly shall consist of a NEMA 4 stainless steel watertight control box, automatic reversing magnetic contactors, 24-volt solid state control circuit with transformer, optional timed run or continuous run, post water flush with adjustable timer set for 30 seconds, water tight start-stop buttons, solenoid valve, and a line disconnect switch interlocked with cover. Division 22 to install module as shown in the manufacturer’s piping diagram. Provide a T & S Brass Model 455 vacuum breaker assembly and flow control valves as required.

ITEM NO. 12 - HOSE REEL
QUANTITY - ONE
MFG. AND MODEL: T & S BRASS B-7222-C01

Hose reel shall consist of a retractable hose reel and spray with thirty (30) feet of heavy duty hose, G016636-45 painted swing mounting bracket, B-1420 spray valve with locking ring, heatproof handle and quick-connect nozzle assembly, B-1423 fan spray nozzle, B-1428 fan jet spray nozzle, BR10 brush attachment nozzle, B-1421 spray nozzle, B-CVH3-8 check valve, HW-4B-36 connector hose with stainless steel braid and extruded coating, chrome plated vacuum breaker model B-0966, and a B-0512 chrome plated mixing valve.

Hose reel shall be mounted 90" above the finished floor to the plumbing connections. The mixing valve shall be installed below the table top near the front edge of top. Provide Division 22 with assistance in the proper installation of the hose reel piping.

Division 22 shall pipe from the rough-in to the remote located mixing valves and from the mixing valve with a single tempered water line to the hose reel. Tempered water line to be concealed within the building wall and above the finished ceiling.

ITEM NO. 13 - SPARE NUMBER

ITEM NO. 14 - CONVECTION STEAMER
QUANTITY - ONE
MFG. AND MODEL: SOUTH BEND GSX-10S
ELEC. REQ'M'TS: 120-1

Unit shall be constructed of satin finish #304 stainless steel. The cooking chamber shall be a one piece all welded, #316 stainless steel with coved corners. The heavy-duty door shall have an inner liner of stainless steel with a full perimeter gasket seal, an outer liner of one piece all welded stainless steel, and a positive lock and seal mechanism with spring release. Each compartment shall be provided with removable stainless steel pan supports. Stainless steel drip trough shall be integrally connected to drain to collect condensate when the doors shall be opened. The control housing shall be constructed of stainless steel with a full access removable panel. Each compartment shall have individual controls which include an illuminated three-way power switch (ON/OFF/Delime), a pilot ready light, a pilot cooking light, an ignition light, a 60-minute electric timer which sounds an audible signal at the end of the cooking cycle, solid state generator controls, and electronic ignition for each generator. Steam flow to the cooking chamber shall be cut off when the door shall be opened and reactivated when the door shall be closed. Steamers shall be mounted on a 36” stainless steel cabinet base with exterior hinged door and 6” stainless steel adjustable legs with bullet feet on front and flanged on rear. The cabinet houses the generators, automatic blow down and drain box.

Provide the following optional accessories: manufacturer's recommended water filter system, electronic ignition, stainless steel frame, Dormont Double Supr-Swivel gas connector kit with flexible gas line.

ITEM NO. 15 - FOUR BURNER RANGE
QUANTITY - ONE
MFG. AND MODEL: SOUTH BEND 4241E

Provide gas pressure regulator, gas shut-off valve, six (6) open burners, thermostats, Dormont Double Supr-Swivel gas connector kit with flexible gas line, T&S Posi-Set equipment placement system, rear gas connection, 10” stainless steel flue riser, **flame failure for open top burners, battery spark ignition for open tops,** and a standard oven base. Exterior finish shall be the manufacturers standard. Mount unit on stainless steel caster frame.

ITEM NO. 16 - CONVECTION OVEN
QUANTITY - ONE
MFG. AND MODEL: SOUTH BEND GS25SC
ELEC. REQ'M'TS: 120-1

Provide with stainless steel french-type lockable hinged doors, gas pressure regulator, manual gas shut-off, gas burners assembly, automatic thermal overload protection, "on-off" switch, blower motor with switch, indicator lights, door interlock switch, draft diverter, interior compartment lights with switch, electronic ignition system, solid state temperature control system with control knob temperature selectors, one hour timer, electric buzzer working in conjunction with a timer, Dormont Double Supr-Swivel gas connector kit with flexible gas line, cord and plug set, glass vision panels in doors, and a two speed fan motor.

Interior finish shall be porcelain steel and equipped with five (5) pan racks for each compartment. Exterior finish shall be manufacturer’s standard finish. Mount on 5" diameter casters, two equipped with brakes.

ITEM NO. 17 - CONVECTION OVEN
QUANTITY - ONE
MFG. AND MODEL: SOUTH BEND GS25SC
ELEC. REQ'M'TS: 120-1

Future, not in Kitchen Equipment Contract.

ITEM NO. 18 - COOKING VENTILATION SYSTEM
QUANTITY - ONE
MFG. AND MODEL: MASTER AIR EH
ELEC. REQ'M'TS: 120-1 AND 480-3

Provide ventilation system meeting all the requirements of NFPA 96, U.L., bear the NSF No. 908 seal and equipped with exhaust hood, roof top exhaust fan unit, roof top make up air supply unit, furnace, fire control system, connecting ductwork, roof curbs, start-up, balance, and service.

The furnishing and installation of the complete ventilation package shall be the responsibility of the hood manufacturer.

Per International Mechanical Code (IMC 507.2.1.1), a control system shall be provided to start the exhaust system when cooking appliances are turned on. This shall be accomplished with the use of temperature sensors mounted in the exhaust hood collars. The temperature sensors shall be connected to a temperature controller with a digital display. The temperature controller shall be provided with a locking adjustable set point, and a digital readout, indicating duct temperature. When cooking appliances are turned on, the temperature sensors shall read the duct temperature increase and signal a relay. The relay shall close the motor starter coil circuits and actuate the fans. A stop button shall be used to turn the system off. Division 26 provide wiring from the temperature controller relay to the motor starter coil terminals.

Provide two (2) exhaust hoods with all hanging devices and support steel as required to complete the installation and hang the hood. Grease filter frame to be stainless steel and equipped with a built-in pitch to drain to a stainless steel removable catch pan. Duct collars with fusible link actuated fire dampers shall be provided if required by U.L. listing requirements and/or local code requirements. Hood shall be constructed of 18 gauge stainless steel.

Above body of canopy provide a bulkhead to enclose the area from the top of hood to the finished ceiling. Bulkhead shall be constructed of same material as the exterior finish of the hood body.

Grease extractors to be the baffle type, UL listed and constructed of stainless steel. Provide stainless steel blank off panels as required.

Ceiling discharge make up air plenum to be provided at ceiling along the full length of the hood fronts. Plenum to include perforated air baffles and adjustable louvers to provide for even air distribution. Plenums to be constructed of steel with off white finish.

Provide Component Hardware Flame Gard® L82-1040-22 light fixtures. Fixtures shall extend the full length of hood and equipped with rapid start ballasts. Fixtures shall be two (2) tube vapor proof fixtures completely sealed and gasketed, equipped with fluorescent tubes and glass shields. Wire fixtures to a common junction box and switch. Wiring for fixtures to be concealed in a wire chase. Chase to extend the full length of hood on all sides and equipped with removable stainless steel covers on outside of hood body. Fixture to provide approximately 90 foot candles of light on the cooking surface.

Provide stainless steel wireway with removable wireway cover hood. Wireway shall contain the control switches for the hood lights and fans. Provide engraved nameplates for each switch. Switches shall be oil tight, equipped with indicator lights and factory wired to a junction box on top of the hood.

The ventilator to accommodate the fire control system which is specified as a separate item of equipment.

Provide upblast roof mounted exhaust fan with disconnect switch, bird screen and the necessary controls required for operation.

Supply fan to be equipped with enameled exterior body, blower with sealed bearings, adjustable drive sheave and motor base plate, open drip proof motor, factory wired disconnect switch, intake shroud with washable aluminum filters. Combination volume/fire damper to be mounted in unit make up air outlet. Damper to be motorized and interwired with kitchen hood fire protection system micro switch. Damper to close when unit is turned off to prevent outside air infiltrating into building. Damper will close shutting off make up air into the kitchen during normal operation if actuated by fire system micro switch or dampers fusible linkage. Provide unit with extended air intake shroud with mesh filter if required by codes.

Provide model DFPN direct gas-fired make up air furnace installed as an integral part of the fan system. Furnace shall be factory assembled, tested and adjusted for operation conditions as shown on the plans. Cabinet enclosing the furnace shall be constructed of 18 gauge steel and painted with enamel. Cabinet to be provided with a lift out door with stainless steel handle. Outside air shroud to fit without modification on the intake end of gas furnace cabinet. Air pressure drop through furnace shall be adjustable with pre-drilled baffle plates to maintain pressure drop between 0.4" and 0.55" water column. Provide furnace with spark ignition system, Maxitrol electronic control system, gas pressure regulators and all controls and accessories required for proper operation. Provide a temperature sensing device in the make-up air plenum.

The furnishing and installation of ducts shall be the responsibility of the K.E.C. Exhaust ducts to be constructed of 16 gauge black iron steel with continuous liquid tight external welds. Provide cleanouts as required. Supply duct to be constructed of steel in the gauge as required by ASHRAE. Make up air ducts shall be per SMACNA low pressure standards and internally insulated.

Supplier of ductwork to provide two-hour rated exhaust duct wrap. Wrap to be dual layer uncompressed insulation banded to the duct with stainless steel banding strips. The duct wrap system to be installed in strict accordance with the ASTM E 2336.

Furnish curbs with roof top units. Curb shall be metal clad insulated double wall with welded corners, a continuous nailer, and compatible with the roof.

Fan system housing and curb assemblies shall be painted with enamel in color as selected by the Architect.

Factory authorized agency to start-up, balance system, and perform a capture and containment test. Test to be verified by simulated cooking utilizing smoke candles, smoke puffers, or other approved means. Submit balance report and test results, and provide one (1) year free service with two (2) on-site inspections.

The following lists the responsibility of work:

Roof curbs:	Section 11 40 00
Cutting of roof deck:	Section 05 00 00
Perimeter steel around deck opening:	Section 05 00 00
Flashing of roof curb:	Section 07 00 00
Ducts and hangers:	Section 11 40 00
Wiring of electrical components:	Section 26 00 00

ITEM NO. 19 - FIRE CONTROL SYSTEM
QUANTITY - ONE
MFG. AND MODEL: ANSUL R-102
ELEC. REQ'M'TS: 120-1

Fire control system shall be designed and installed to conform to the latest editions of the National Fire Protection Association Standards, Underwriters Laboratories UL-300 standard and the local and state authorities having authority. The State Fire Marshal and/or State Rating Bureau shall approve system.

Fire extinguishing nozzles shall be provided in all ducts, plenum chambers and in or above all surfaces of equipment which poses a potential fire hazard. System shall be installed complete with filled and chemical cylinders, chemical piping, gauges, mounting brackets, trip mechanism, nozzles, fusible link housings, special fittings, manual and integral release, stainless steel cable, cornering boxes, and fusible links. Chemical tanks shall be activated by a remote manually operated pull station located near the exit and working in conjunction with the fusible links located within the hood. Centerline of pull station box to be mounted 48” above finished floor.

All piping and conduit shall be concealed where possible. All exposed piping, fittings and conduit shall be encased in a chrome plated sleeve or the piping and fittings shall be individually chromed. All piping shall be installed in an absolute vertical and horizontal plain. All changes in direction of piping must be made by a Venturi or a 90-degree elbow.

Provide a micro switch at the chemical tank location with contacts "open" under fire condition. Division 26 to wire from the micro switch to the following:

to the holding coil of hood exhaust fan to turn fan on in the event of a fire.

to the building fire alarm panel alarm circuit.

to the motorized fire damper in the supply air fan system.

to the electrically operated automatic gas shut off valve and reset,

to fuel and power shut down devices.

An automatic gas shut off valve to be provided with this system and valve shall be installed in the gas line by Division 22.

Division 26 provide U.L. listed industrial type power contactors, shunt trips with 120 volt holding coils with contact ratings matching the cooking equipment to be shut down in the event of a fire.

K.E.C. to submit fire protection information with the ventilation hood submittals. Information to include the following:

- Identify the location of the manual fire pull station in a scaled floor plan. The location of the suppression tanks to be indicated in the submittal as required.
- Identify each piece of existing equipment located under the new kitchen hood. Identify if equipment is gas or electric.
- Submit a drawing complete with fire suppression piping layout locating the drops.

ITEM NO. 20 - SPARE NUMBER

ITEM NO. 21 - PREP TABLE
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Top shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel and reinforced on the underside with 12 gauge stainless steel channels. Sound deaden the underside. Openings in the top shall be die stamped and completely finished. Field joints shall be welded, ground and polished smooth. Backsplash to be provided along wall sides and sealed thereto with silicone.

Sink compartments shall be the size and shape as shown, constructed of 14 gauge stainless steel and made as an integral part of the top. Crease bottom of sink bowl and pitch to the drain. Provide a T & S Brass model B-0231-CR faucet assembly with B-199-2-F-12 aerator, and a CHG DSS-8000 lever waste assembly.

Cabinet base shall be located below the top as shown on the drawings and constructed of 16 gauge stainless steel with all seams welded and ground to a smooth finish.

Cabinet below sink shall be enclosed on the back and ends. Front to be equipped with a lockable hinged door with CHG M27-2490 spring catch and CHG P63-1012 die-stamped pull. Back or bottom shall be neatly cut out to allow for utilities.

Provide a tier of three (3) drawers. Cabinet base enclosing the drawers shall have the back, bottom and ends enclosed.

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be the same finish as the face of the cabinet body. Provide door with CHG M27-2490 spring catch, door locks, and CHG P63-1012 die-stamped pull.

Bottom and intermediate shelves shall be constructed of 16 gauge stainless steel with front edge turned down 1-½" and back ½" at a 45º angle. Turn back and sides up 1½" and seal to the cabinet body.

Mount cabinet on 1⅝" diameter × 16 gauge stainless steel legs equipped with top mounting plate and stainless steel adjustable bullet type feet.

ITEM NO. 22 - UTENSIL WASHING SINK
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Top shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel and reinforced on the underside with 12 gauge stainless steel channels. Sound deaden the underside of top. Openings in the top shall be die stamped and finished. Field joints shall be welded, ground and polished smooth. Backsplash to be provided along wall sides and sealed thereto.

Sink compartments shall be the size and shape as shown, constructed of 14 gauge stainless steel and made as an integral part of the top. Crease bottom of sink bowl and pitch to the drain.

Above center partitions of sink bowls and mounted to backsplash, provide T & S Brass model B-0290CER, Fisher, or Chicago fast flow faucets. Faucet to be equipped with street EL inlets and locknuts. Omit the soft flow aerator. Provide bottom of soak and wash sink bowls with a CHG DSS-8000 stainless steel lever waste assembly equipped with stainless steel rod type twist handle.

Stationary undershelf shall be constructed of 16 gauge stainless steel. Shelf shall be fully welded to legs with weld ground and polished to blend with the adjacent surfaces.

Crossrails shall be 1" diameter × 16 gauge stainless steel tubing. Crossrails shall be fully welded to legs and ground and polished to blend with adjacent surfaces. Omit the crossrails where shown.

Legs shall be constructed of 1⅝" diameter × 16 gauge stainless steel tubing equipped with stainless steel gussets and stainless steel adjustable bullet type feet. Leg gussets shall be fully welded to the top reinforcing channels.

ITEM NO. 23 - WALL SHELF
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Wall shelf shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel with front and ends turned down forming a rim as indicated on the detailed drawings. All corners shall be fully welded, ground and polished to blend in with adjacent stainless steel surfaces. Attach shelf to 12 gauge stainless steel wall brackets and mount to wall with stainless steel machine bolts and wall anchors. Where shelf abuts walls or fixtures, the edge shall be turned up 1½" on a minimum of ⅝" coved radius.

ITEM NO. 24 - REAR WALL PANEL
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Wall covering shall be constructed of 20 gauge diamond patterned stainless steel attached to the building wall with constructions adhesive. Crimp in the perimeter edge to perfect a tight fit to the building wall. Provide all panel joints with CHG stainless steel divider bar or equal snap on flat molding. Seal all end returns to building wall with silicone. Care shall be taken to ensure that the wall panel fits tightly to top of the building quarry tile base.

ITEM NO. 25 - WALL CABINET
QUANTITY - FOUR
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Wall cabinets shall be the size and shape as shown on the drawings. Provide a fixed bottom shelf and adjustable intermediate shelves of 18 gauge stainless steel. Edge of fixed shelf to be turned up 1½" on back and ends and tight to body and sealed with silicone. Rear wall of cabinet to be recessed to allow space for the wall hanging devices. Provide matching wall fillers where required. Cabinet body and doors shall be constructed of 18 gauge stainless steel. Provide a matching sloping top above cabinets forming a dust cover.

ITEM NO. 26 - ICE MAKER W/ BIN
QUANTITY - ONE
MFG. AND MODEL: MANITOWOC IY-0524A / B-420
ELEC. REQ'M'TS: 120-1

Provide ice maker with an automatic ice maker shut down device to cut off production when the bin is full. Provide vacuum breaker on incoming water line to the ice maker. Refrigeration system shall be self-contained and air-cooled. Ice maker shall be complete with an ice storage bin the same finish as the ice maker unit.

Provide unit with the manufacturer's recommended water filter system, Dormont model IMIKFS-01D Ice Maker Installation Kit, and a cord and plug set as required. Exterior finish of unit shall be stainless steel. Ice maker shall produce cubelet type ice. Mount unit on 6" high adjustable legs.

ITEM NO. 27 - HEATED ZONE MERCHANDISER
QUANTITY - TWO
MFG. AND MODEL: HATCO HZMS-48D
ELEC. REQ'M'TS: 120-1

Merchandiser shall include a thermostatically-controlled heated base, infrared heat from above, full-view tempered glass sides, LED display lights fast heating infrared ribbon elements, and a NEMA L14-20P cord with plug attached. Provide six (6) additional stainless steel dividers rods.

Provide the following optional accessories: Designer Color as selected by the Architect, LED accent lighting in support posts, Flip-up Doors for front.

ITEM NO. 28 - PASS-THRU WARMER
QUANTITY - TWO
MFG. AND MODEL: HATCO GR2SDH-36D
ELEC. REQ'M'TS: 120-1

Warmer shall be constructed of stainless steel and aluminum and provided with black anodized shelves, movable dividers, Pyrex insert heat tubes, insulated heat cable base, individual infinitely and adjustable heat controls with pilot lights for each level, incandescent illumination with on-off switch and a cord and plug set.

ITEM NO. 29 – REACH-IN WARMING CABINET, MOBILE
QUANTITY - TWO
MFG. AND MODEL: VICTORY HSA-2D-1-HD
ELEC. REQ'M'TS: 208-1

Provide food warmer with self-contained heating system with thermostats, and thermometer. Unit shall be provided with a NEMA 6-20R cord and plug set. Doors shall be hinged as indicated on the drawings and equipped with half-size doors with glass panel inserts, stainless steel hinges, magnetic gasket, pull handle and cylinder lock and two keys.

Interior of unit shall be fitted with universal angle slides in upper portion of compartments and three (3) standard removable shelves in each of the lower compartments. Mount on 5" diameter casters equipped with top mounting plate and brakes on two casters.

ITEM NO. 30 - BREAD DISPLAY, MOBILE
QUANTITY - ONE

By vendor, not in Kitchen Equipment Contract.

ITEM NO. 31 - COLD FOOD COUNTER, MOBILE
QUANTITY - THREE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material.

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide an LTI drop-in cold pan sized as shown in the drawings. Top perimeter frame shall be constructed of 14 gauge stainless steel, welded, ground and polished with a thermal break provided between the top and refrigerated interior. Interior pan shall be 18 gauge stainless steel, fully welded, ground and polished with a ¾" open drain and shall be fully insulated with a 1½" to 2" urethane insulation. Exterior jacket shall be constructed of heavy gauge galvanized steel. Refrigeration system shall be hermetically sealed compressor operating on R-507 (HFC) refrigerant and shall include the "Temp-est Aire" circulating cold air system. Thermostatic control shall clear the cooling surface of frost on every cycle. All switches and controls shall be fully accessible. Provide with standard adapter bars, and a cord set with NEMA 5-15 plug. Unit shall be UL listed and shall bear the UL classified EPH label for sanitation meeting all NSF7 requirements. Provide louvers in the base cabinet to allow for proper air circulation. Seal perimeter of frame to the countertop with NSF listed silicone. Provide cold pan with adapter bars.

Provide VersaGard VG7 brushed aluminum self-service adjustable sneeze guard with LED display lighting and on/off switch. Unit shall be surface mounted with posts, flange, and flange covers.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings.

Drain line to extend down through the cabinet base terminating to a ball-type shut-off valve below the cabinet.

ITEM NO. 32 - UTILITY COUNTER, MOBILE
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material.

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide VersaGard VG7 brushed aluminum self-service adjustable sneeze guard with LED display lighting and on/off switch. Unit shall be surface mounted with posts, flange, and flange covers.

Provide NSF labeled 5” heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings.

ITEM NO. 33 - HOT FOOD COUNTER, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120/208-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material.

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide an LTI drop-in four well hot food unit. Top perimeter frame to be constructed of 14 gauge stainless steel; welded, ground and polished with a thermal break provided between the top and heated sections. Interior pan to be 18 gauge stainless steel, deep drawn, with covered corners. To be fully insulated with fiberglass insulation. The exterior jacket to be constructed of 18 gauge galvanized steel. Each compartment to have 1000-watt heat source with solid state digital controls. All switches and controls to be fully accessible. Seal perimeter of frame to the countertop with NSF listed silicone. Units to be UL listed and shall bear the UL and UL Sanitation seals. Provide unit with a 6’ cord set and NEMA 14-50P plug. Controls shall be flush mounted in cabinet base.

Provide the following optional accessories: four (4) Vollrath model 90022 2.5" deep steam table pans with model 94100 slotted covers, two (2) Vollrath model 19186 sheet pan adapter plate.

Provide VersaGard VG7 brushed aluminum self-service adjustable sneeze guard with Hatco heated warmer, LED display lighting and on/off switch. Unit shall be surface mounted with posts, flange, and flange covers.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings.

ITEM NO. 34 - UTILITY COUNTER, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120/208-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type. Provide space below the top for the Mobile Heated Warmer (item #9).

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material. Provide a NEMA 14-20R flush mounted receptacle for the Horizontal Zone Merchandiser, (item #27) and a NEMA 5-20R flush mounted receptacle in the base cabinet for the Mobile Heated Warmer (item #9).

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings. Provide unit with a 6' cord set and NEMA 14-30P plug.

ITEM NO. 35 - UTILITY COUNTER, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120/208-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material. Provide a NEMA 5-20R flush mounted receptacle for the Pass-Thru Heated Merchandiser, (item #28).

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings. Provide unit with a 6' cord set and NEMA 14-20P plug.

ITEM NO. 36 – CASHIER COUNTER, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends, front, and tray slides shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material.

Provide two (2) 12" wide tray slides mounted on stainless steel fold down brackets, 2" ferruled cutout in top for cash register cords, one (1) electrical receptacle flush mounted in cabinet base, unit interlocking device, and a cash drawer with lock and change insert.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings. Provide unit with a 6' cord set and NEMA 5-20P plug.

ITEM NO. 37 - UTILITY COUNTER, MOBILE
QUANTITY - TWO
MFG. AND MODEL: CONOVER CUSTOM STAINLESS
ELEC. REQ'M'TS: 120-1

Counter shall be sized as shown in the drawings and constructed of fully welded stainless steel square tubing, with square tubing crossrails. Welds shall be fully ground and sanded smooth. Laminated front and side panels shall be mounted with stainless steel hex bolts. The Architect shall select laminate type.

Top, ends and front shall be constructed of ½" thick solid surface material in adhesively joined with no exposed seams, having edge detail and top as indicated on the drawings. Reinforce edges and cutouts as recommended by the manufacturer. The Architect shall select solid surface material.

Hinged doors enclosing cabinet base shall be provided where shown. Doors shall be flush mounted double pan construction, with ½" thick semi-rigid fiberglass board between the two panels. Door face shall be 16 gauge steel and back face shall be 20 gauge stainless steel with Delfield style black vinyl pulls and magnetic catch.

Provide NSF labeled 5" heavy duty casters. Casters shall have a minimum capacity of 200 lbs. with double ball bearing raceway and non-marking neoprene soft tread ball bearing wheels with drilled axle and grease fittings. Provide unit with a 6' cord set and NEMA 5-20P plug.

Provide VersaGard VG7 brushed aluminum self-service adjustable sneeze guard with LED display lighting and on/off switch. Unit shall be surface mounted with posts, flange, and flange covers.

ITEM NO. 38 - DISPLAY REFRIGERATOR
QUANTITY - FOUR
MFG. AND MODEL: TRUE GDM-35SL-RF-LD37
ELEC. REQ'M'TS: 120-1

Unit to come equipped with an oversized and balanced 134A refrigeration system that shall hold between 33°F to 38°F. Exterior to be black vinyl with a black, vinyl coated aluminum interior and 300 series stainless steel bottom (NSF approved).

Doors to have a positive seal and be self-closing. Provide standard adjustable vinyl coated wire shelves, epoxy coated evaporator, triple pane thermal insulated glass, fluorescent interior lighting (safety shielded), foamed-in-place polyurethane high density cell insulation, bottom mount slide out compressor, rear compressor cover, and 2½" castors. Provide the following optional accessories: ratchet door locks, and three (3) Owner selected sign panels.

ITEM NO. 39 AND 40 - SPARE NUMBER

ITEM NO. 41 - HAND SINK
QUANTITY - TWO

Not in Kitchen Equipment Contract. Unit to be furnished and installed by Division 22.

ITEM NO. 42 - MOP SINK
QUANTITY - ONE

Not in Kitchen Equipment Contract. Unit to be furnished and installed by Division 22.

ITEM NO. 43 - LOCKERS
QUANTITY - SEVEN

Not in Kitchen Equipment Contract. Unit to be furnished and installed by Division 10 51 13.

ITEM NO. 44 - CASH HANDLING SYSTEM
QUANTITY - TWO

Not in Kitchen Equipment Contract. Unit to be furnished and installed by Owner.

THE FOLLOWING EQUIPMENT SHALL BE LOCATED IN THE CONCESSION BUILDING

ITEM NO. C1 – ISLAND PREP TABLE
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Top shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel and reinforced on the underside with 12 gauge stainless steel channels. Sound deaden the underside.

Stationary undershelf shall be constructed of 16 gauge stainless steel. Shelf shall be fully welded to legs with weld ground and polished to blend with the adjacent surfaces.

Legs shall be constructed of 1⅝" diameter × 16 gauge stainless steel tubing equipped with stainless steel gussets and stainless steel adjustable bullet type feet.

ITEM NO. C2 – WORK COUNTER W/ SINK
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Top shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel and reinforced on the underside with 12 gauge stainless steel channels. Sound deaden the underside. Openings in the top shall be die stamped and completely finished. Field joints shall be welded, ground and polished smooth. Backsplash to be provided along wall sides and sealed thereto with silicone.

Sink compartment shall be the size and shape as shown, constructed of 14 gauge stainless steel and made as an integral part of the top. Crease bottom of sink bowl and pitch to the drain. Provide a T & S Brass model B-0231-CR faucet assembly with B-199-2-F-12 aerator, and a CHG DSS-8000 lever waste assembly.

Bottom and intermediate shelves shall be constructed of 16 gauge stainless steel with front edge turned down 1-½" and back ½" at a 45º angle. Turn back and sides up 1½" and seal to the cabinet body.

Mount cabinet on 1⅝" diameter × 16 gauge stainless steel legs equipped with top mounting plate and stainless steel adjustable bullet type feet.

ITEM NO. C3 – TWO COMPARTMENT SINK
QUANTITY - ONE
MFG. AND MODEL: CONOVER CUSTOM STAINLESS

Top shall be the size and shape as shown on the drawings, constructed of 14 gauge stainless steel and reinforced on the underside with 12 gauge stainless steel channels. Sound deaden the underside. Openings in the top shall be die stamped and completely finished. Field joints shall be welded, ground and polished smooth. Backsplash to be provided along wall sides and sealed thereto with silicone.

Sink compartments shall be the size and shape as shown, constructed of 14 gauge stainless steel and made as an integral part of the top. Crease bottom of sink bowl and pitch to the drain. Provide a T & S Brass model B-0231-CR faucet assembly with B-199-2-F-12 aerator, and a CHG DSS-8000 lever waste assembly.

Stationary undershelf shall be constructed of 16 gauge stainless steel. Shelf shall be fully welded to legs with weld ground and polished to blend with the adjacent surfaces.

Crossrails shall be 1" diameter × 16 gauge stainless steel tubing. Crossrails shall be fully welded to legs and ground and polished to blend with adjacent surfaces. Omit the crossrails where shown to allow space for carts.

Mount cabinet on 1⅝" diameter × 16 gauge stainless steel legs equipped with top mounting plate and stainless steel adjustable bullet type feet.

END OF SECTION 11 40 00

KITCHEN EQUIPMENT CONTRACTOR'S
WALK-IN INSTALLATION AUTHORIZATION FORM

This form shall be completed and forwarded for approval prior to installation of the Walk-In and accompanying Refrigeration System.

Project: _____ Location: _____

K.E.C.: _____ Proj. Mgr: _____

Walk-In Mfr: _____ Mfr Rep: _____

Name of Authorized Installer: _____

The following shall be completed by the Walk-In Factory Personnel

Installation Factory Authorized by: _____

Position: _____ Signature: _____

Refrigeration System Installed by: _____

Location: _____ Name of Lead Installer: _____

Refrigeration Industry Affiliation(s): _____

Signature of K.E.C. Representative: _____ Date: _____

SECTION 23 11 23 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:
   1. Pipes, tubes, and fittings.
   2. Piping specialties.
   3. Piping and tubing joining materials.
   4. Valves.
   5. Pressure regulators.
   6. Mechanical sleeve seals.
   7. Concrete bases.

B. Provide new piping for the natural gas service which shall be installed in strict accordance with the latest edition of the Pressure Piping Code, NFPA Code #54, and in confirmation with the local gas utility company requirements, as approved by the Architect/Engineer.

C. Contractor shall make his own arrangements with local gas utility company for connection on house side of gas meter or regulator.

D. This Contractor is to coordinate for all work on the gas system which occurs downstream of the gas meter. This includes all valves, gas pressure regulators inside or outside of the building, gas pressure regulator vents for a complete and operational system. The Contractor shall review the Site Utility and Plumbing Drawings, for any additional work required to complete work entirely to the point just downstream of gas meter.

~~E. This Contractor is responsible for all work on the gas system which occurs downstream of the gas meter. This includes all valves, gas pressure regulators inside or outside of the building, gas pressure regulator vents for a complete and operational system. The Contractor shall review the Site Utility Drawings, including the "PSU2" series, for any additional work required to complete work entirely to the point just downstream of gas meter.~~

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

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.

1.4 PERFORMANCE REQUIREMENTS

A. Natural-Gas System Pressure within Buildings: 0.5 psig but not more than 2 psig.

1.5 SUBMITTALS

A. Product Data: For each type of the following:

1. Piping specialties.
2. Piping materials and associated components a specified.
3. Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
4. Pressure regulators. Indicate pressure ratings and capacities.

1.6 QUALITY ASSURANCE

A. Steel Support 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. 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.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handling Flammable Liquids: Remove and dispose of liquids from existing natural-gas piping according to requirements of authorities having jurisdiction.

B. 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.

C. Store and handle pipes and tubes having factory-applied protective coatings to avoid damaging coating, and protect from direct sunlight.

1.8 PROJECT CONDITIONS

A. Perform site survey, research public utility records, and verify existing utility locations. Contact utility-locating service for area where Project is located.

B. Interruption of Existing Natural-Gas Service: Do not interrupt natural-gas service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide purging and startup of natural-gas supply according to requirements indicated:
1. Notify Owner no fewer than two days in advance of proposed interruption of natural-gas service.
2. Do not proceed with interruption of natural-gas service without Owner's written permission.

1.9 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

B. Coordinate requirements for access panels and doors for valves installed concealed behind finished surfaces. Comply with requirements in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Gas piping for pipe sizes 2 inches and smaller may be Schedule 40 steel pipe with threaded malleable iron fittings in compliance with NFPA 54 (1988) Section 2.6.8. Gas piping and fittings for pipe sizes 2-1/2 inches and larger shall be welded Schedule 40 black steel. Piping smaller than 1/2 inch NPS will not be allowed.

B. Fittings shall be standard weight welding fittings, Nibco, Tubeturns, Allied, or approved equal.

C. Corrugated, Stainless-Steel Tubing: Comply with ANSI/IAS LC 1. (Pipe sizes 2 inches and smaller.)
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. OmegaFlex, Inc.
   2. Tubing: ASTM A 240/A 240M, corrugated, Series 300 stainless steel.
   3. Coating: PE with flame retardant.
      a. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
         1) Flame-Spread Index: 25 or less.
         2) Smoke-Developed Index: 50 or less.
   4. Fittings: Copper-alloy mechanical fittings with ends made to fit and listed for use with corrugated stainless-steel tubing and capable of metal-to-metal seal without gaskets. Include brazing socket or threaded ends complying with ASME B1.20.1.
   5. Striker Plates: Steel, designed to protect tubing from penetrations.
   6. Manifolds: Malleable iron or steel with factory-applied protective coating. Threaded connections shall comply with ASME B1.20.1 for pipe inlet and corrugated tubing outlets.

2.2 PIPING SPECIALTIES

A. Appliance Flexible Connectors:
   1. Indoor, Fixed-Appliance Flexible Connectors: Comply with ANSI Z21.24.
   2. Indoor, Movable-Appliance Flexible Connectors: Comply with ANSI Z21.69.
   3. Outdoor, Appliance Flexible Connectors: Comply with ANSI Z21.75.
   4. Corrugated stainless-steel tubing with polymer coating.
   5. Operating-Pressure Rating: 0.5 psig.
   6. End Fittings: Zinc-coated steel.
   7. Threaded Ends: Comply with ASME B1.20.1.
   8. Maximum Length: 72 inches.

B. Quick-Disconnect Devices: Comply with ANSI Z21.41.
   1. Copper-alloy convenience outlet and matching plug connector.
   2. Nitrile seals.
   3. Hand operated with automatic shutoff when disconnected.
   4. For indoor or outdoor applications.
   5. Adjustable, retractable restraining cable.

C. Y-Pattern Strainers:
   1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
   2. End Connections: Threaded ends for 2 inches and smaller; flanged ends for 2-1/2 inches and larger.

D. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

A. Joint Compound and Tape: Suitable for natural gas.

B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. Brazing Filler Metals: Alloy with melting point greater than 1000 deg F complying with AWS A5.8/A5.8M. Brazing alloys containing more than 0.05 percent phosphorus are prohibited.

2.4 MANUAL GAS SHUTOFF VALVES

A. See "Aboveground Manual Gas Shutoff Valve Schedule" Articles for where each valve type is applied in various services.

B. General Requirements for Metallic Valves, 2 inches and Smaller: Comply with ASME B16.33.
   1. CWP Rating: 125 psig.
   2. Threaded Ends: Comply with ASME B1.20.1.
   3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
   4. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
   5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
   6. Service Mark: Valves 1-1/4 inches to 2 inches shall have initials "WOG" permanently marked on valve body.

C. General Requirements for Metallic Valves, 2-1/2 inches and Larger: Comply with ASME B16.38.
   1. CWP Rating: 125 psig.
   2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
   3. Tamperproof Feature: Locking feature for valves indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
   4. Service Mark: Initials "WOG" shall be permanently marked on valve body.

D. Two-Piece, Full-Port, Bronze Ball Valves with Bronze Trim: MSS SP-110.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. BrassCraft Manufacturing Company; a Masco company.
      b. Conbraco Industries, Inc.; Apollo Div.
      c. McDonald, A. Y. Mfg. Co.
   2. Body: Bronze, complying with ASTM B 584.
   3. Ball: Chrome-plated bronze.
   4. Stem: Bronze; blowout proof.
   5. Seats: Reinforced TFE; blowout proof.
   6. Packing: Threaded-body packnut design with adjustable-stem packing.
   7. Ends: Threaded, flared, or socket as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
   8. CWP Rating: 600 psig.
   9. Listing: Valves 1 inch and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
   10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Bronze Plug Valves: MSS SP-78.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Lee Brass Company.
      b. McDonald, A. Y. Mfg. Co.
   2. Body: Bronze, complying with ASTM B 584.
   3. Plug: Bronze.
   4. Ends: Threaded, socket, or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
   5. Operator: Square head or lug type with tamperproof feature where indicated.
   6. Pressure Class: 125 psig.
   7. Listing: Valves 1 inch and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
   8. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

F. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. McDonald, A. Y. Mfg. Co.
   b. Mueller Co.; Gas Products Div.
2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves 1 inch and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

G. Cast-Iron, Lubricated Plug Valves: MSS SP-78.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. McDonald, A. Y. Mfg. Co.
   b. Mueller Co.; Gas Products Div.
2. Body: Cast iron, complying with ASTM A 126, Class B.
3. Plug: Bronze or nickel-plated cast iron.
4. Seat: Coated with thermoplastic.
5. Stem Seal: Compatible with natural gas.
6. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
7. Operator: Square head or lug type with tamperproof feature where indicated.
8. Pressure Class: 125 psig.
9. Listing: Valves 1 inch and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
10. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

2.5 PRESSURE REGULATORS

A. General Requirements:
1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators 2 inches and smaller; flanged for regulators 2-1/2 inches and larger.
5. Each regulator shall be vented independently to the outside atmosphere with an approved vent cap. Verify sizes and venting requirements with the gas company.
6. Gas piping installed in a ceiling air plenum area shall not contain any valves or unions.

B. Service Pressure Regulators: Comply with ANSI Z21.80.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Equimeter.
   b. Rockwell.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.

9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 100 psig.

C. Line Pressure Regulators: Comply with ANSI Z21.80.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Equimeter.
   b. Rockwell.
2. Body and Diaphragm Case: Cast iron or die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
6. Orifice: Aluminum; interchangeable.
7. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
8. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
9. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
10. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
11. Maximum Inlet Pressure: 2 psig or 5 psig.

D. Appliance Pressure Regulators: Comply with ANSI Z21.18.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Equimeter.
   b. Rockwell.
2. Body and Diaphragm Case: Die-cast aluminum.
3. Springs: Zinc-plated steel; interchangeable.
4. Diaphragm Plate: Zinc-plated steel.
5. Seat Disc: Nitrile rubber.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
8. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
9. Maximum Inlet Pressure: 0.5 psig.

2.6 SLEEVES

A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.

B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

2.7 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.

2.8 LABELING AND IDENTIFYING

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

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for natural-gas piping system to verify actual locations of piping connections before equipment installation.

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

3.2 PREPARATION

A. Close equipment shutoff valves before turning off natural gas to premises or piping section.

B. Inspect natural-gas piping according to NFPA 54 and the International Fuel Gas Code to determine that natural-gas utilization devices are turned off in piping section affected.

C. Comply with NFPA 54 and the International Fuel Gas Code requirements for prevention of accidental ignition.

3.3 OUTDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Steel Piping with Protective Coating:
1. Apply joint cover kits to pipe after joining to cover, seal, and protect joints.
2. Repair damage to PE coating on pipe as recommended in writing by protective coating manufacturer.
3. Replace pipe having damaged PE coating with new pipe.

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

D. Aboveground, Exterior-Wall and Slab Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.

E. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

F. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

G. Install pressure gauge upstream and downstream from each service regulator. Pressure gauges are specified in Division 23 Section "Meters and Gauges for HVAC Piping."

3.4 INDOOR PIPING INSTALLATION

A. Comply with NFPA 54 and the International Fuel Gas Code for installation and purging of natural-gas piping.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Arrange for pipe spaces, chases, slots, sleeves, and openings in building structure during progress of construction, to allow for mechanical installations.

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

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

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

G. Locate valves for easy access.

H. Install natural-gas piping at uniform grade of 2 percent down toward drip and sediment traps.

I. Install piping free of sags and bends.

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

K. Install escutcheons at penetrations of interior walls, ceilings, and floors.

L. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping."

M. Verify final equipment locations for roughing-in.

N. Comply with requirements in Sections specifying gas-fired appliances and equipment for roughing-in requirements.

O. Drips and Sediment Traps: Install drips at points where condensate may collect, including service-meter outlets. Locate where accessible to permit cleaning and emptying. Do not install where condensate is subject to freezing.
   1. Construct drips and sediment traps using tee fitting with bottom outlet plugged or capped. Use nipple a minimum length of 3 pipe diameters, but not less than 3 inches long and same size as connected pipe. Install with space below bottom of drip to remove plug or cap.

P. Extend relief vent connections for service regulators, line regulators, and overpressure protection devices to outdoors and terminate with weatherproof vent cap.

Q. Conceal pipe installations in walls, pipe spaces, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.

R. Concealed Gas Supply Piping Locations: A Schedule 40 plastic coated or mill wrapped welded gas casing vent that is a minimum of two times the pipe diameter larger than the supply pipe shall be installed on all concealed gas supply piping, i.e., below floors, in walls, and vented full size directly to atmosphere and terminated with a 90 degree gooseneck fitting and bug screen. The vent pipe shall be sealed around the supply pipe at each point where pipe enters and exits the concealed space. All fittings shall be coated and a test of 50 psi for 10 minutes be made before covering. Installation shall be in accordance with NFPA 54 and the International Fuel Gas Code.

S. All gas valves installed shall be accessible below ceilings outside of concealed areas and no higher than 54 inches AFF.

T. All gas piping and equipment regulator vent piping from a point downstream of the gas meter to the final connection to equipment shall be painted yellow.
   1. Prohibited Locations:
      a. Do not install natural-gas piping in or through circulating air ducts, clothes or trash chutes, chimneys or gas vents (flues), ventilating ducts, or dumbwaiter or elevator shafts.
      b. Do not install natural-gas piping in solid walls or partitions.

U. Use eccentric reducer fittings to make reductions in pipe sizes. Install fittings with level side down.

V. Connect branch piping from top or side of horizontal piping.

W. Install unions in pipes 2 inches and smaller, adjacent to each valve, at final connection to each piece of equipment. Unions are not required at flanged connections.

X. Do not use natural-gas piping as grounding electrode.

Y. Install strainer on inlet of each line-pressure regulator.

Z. Install pressure gauge upstream and downstream from each line regulator. Pressure gauges are specified in Division 23 Section "Meters and Gauges for HVAC Piping."

AA. Horizontal runs shall grade down to riser at a pitch of 1/4 inch in 15 feet.

BB. At each point where gas piping connects to equipment and at the bottom of each riser, furnish and install suitable drip leg or moisture pocket comprising drip pocket not les than 12 inches long, unless otherwise indicated, with reducer and 125 lb. black malleable cap for blowing out drip pockets.

CC. Piping systems for natural gas shall be electrically continuous and properly bonded to an approved grounding electrode in accordance with the National Electrical Code, NFPA No. 70.

DD. Gas lines shall be purged to the outside atmosphere before being put into service. Purging must be witnessed by the Architect or an authorized person to witness purging of the lines.

3.5 VALVE INSTALLATION

A. Install manual gas shutoff valve for each gas appliance ahead of corrugated stainless-steel tubing, aluminum, or copper connector.

B. Install regulators and overpressure protection devices with maintenance access space adequate for servicing and testing.

3.6 PIPING JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs.

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

C. Threaded Joints:
   1. Thread pipe with tapered pipe threads complying with ASME B1.20.1.
   2. Cut threads full and clean using sharp dies.
   3. Ream threaded pipe ends to remove burrs and restore full inside diameter of pipe.
   4. Apply appropriate tape or thread compound to external pipe threads unless dryseal threading is specified.
   5. 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.

D. Welded Joints:
   1. Construct joints according to AWS D10.12/D10.12M, using qualified processes and welding operators.
   2. Bevel plain ends of steel pipe.
   3. Patch factory-applied protective coating as recommended by manufacturer at field welds and where damage to coating occurs during construction.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter.

F. Flanged Joints: Install gasket material, size, type, and thickness appropriate for natural-gas service. Install gasket concentrically positioned.

G. Flared Joints: Cut tubing with roll cutting tool. Flare tube end with tool to result in flare dimensions complying with SAE J513. Tighten finger tight, then use wrench. Do not overtighten.

3.7 HANGER AND SUPPORT INSTALLATION

A. Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes:
   1. 1 inch and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch.
   2. 1-1/4 inches: Maximum span, 108 inches; minimum rod size, 3/8 inch.
   3. 1-1/2 and 2 inches: Maximum span, 108 inches; minimum rod size, 3/8 inch.
   4. 2-1/2 to 3-1/2: Maximum span, 10 feet; minimum rod size, 1/2 inch.
   5. 4 and Larger: Maximum span, 10 feet; minimum rod size, 5/8 inch.

B. Install hangers for horizontal, corrugated stainless-steel tubing with the following maximum spacing and minimum rod sizes:
   1. 3/4 inch and Larger: Maximum span, 96 inches; minimum rod size, 3/8 inch.

3.8 CONNECTIONS

A. Connect to utility's gas main according to utility's procedures and requirements.

B. Install natural-gas piping electrically continuous, and bonded to gas appliance equipment grounding conductor of the circuit powering the appliance according to NFPA 70.

C. Install piping adjacent to appliances to allow service and maintenance of appliances.

D. Connect piping to appliances using manual gas shutoff valves and unions. Install valve within 72 inches of each gas-fired appliance and equipment. Install union between valve and appliances or equipment.

E. Sediment Traps: Install tee fitting with capped nipple in bottom to form drip, as close as practical to inlet of each appliance.

3.9 LABELING AND IDENTIFYING

A. Comply with requirements in Division 23 Section "Identification for HVAC Piping and Equipment" for piping and valve identification.Install detectable warning tape directly above gas piping, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.10 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base.
   1. Construct concrete bases of dimensions indicated, but not less than 6 inches larger in both directions than supported unit.
   2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
   3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
   4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   5. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Use 3000-psig, 28-day, compressive-strength concrete and reinforcement as specified.

C. Perform tests and inspections.

D. Tests and Inspections:
   1. Test, inspect, and purge natural gas according to NFPA 54 and the International Fuel Gas Code and authorities having jurisdiction.

E. Natural-gas piping will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

3.11 ABOVEGROUND MANUAL GAS SHUTOFF VALVE SCHEDULE

A. Valves for pipe sizes 2 inches and smaller at service meter shall be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.

B. Valves for pipe sizes 2-1/2 inches and larger at service meter shall be one of the following:
   1. Two-piece, full-port, bronze ball valves with bronze trim.
   2. Bronze plug valve.
   3. Cast-iron, nonlubricated plug valve.

C. Valves in branch piping for single appliance shall be one of the following:
   1. One-piece, bronze ball valve with bronze trim.
   2. Two-piece, full-port, bronze ball valves with bronze trim.
   3. Bronze plug valve.

END OF SECTION 23 11 23

SECTION 23 52 16 - CONDENSING BOILERS

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 packaged, factory-fabricated and -assembled, gas-fired, fire-tube, water-tube, water-jacketed condensing boilers, trim, and accessories for generating hot water.

1.3 SUBMITTALS

A. Product Data: Include performance data, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: For boilers, boiler trim, and accessories. Include plans, elevations, sections, details, and attachments to other work.
   1. Design calculations and vibration isolation base details, signed and sealed by a qualified professional engineer.
      a. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
      b. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails and equipment mounting frames.

C. Manufacturer Seismic Qualification Certification: Submit certification that boiler, accessories, and components will withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment." Include the following:
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
      a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
      b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Operation and Maintenance Data: For boilers to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. ASME Compliance: Fabricate and label boilers to comply with ASME Boiler and Pressure Vessel Code.

C. ASHRAE/IESNA 90.1 Compliance: Boilers shall have minimum efficiency according to "Gas and Oil Fired Boilers - Minimum Efficiency Requirements."

D. DOE Compliance: Minimum efficiency shall comply with 10 CFR 430, Subpart B, Appendix N, "Uniform Test Method for Measuring the Energy Consumption of Furnaces and Boilers."

E. UL Compliance: Test boilers for compliance with UL 795, "Commercial-Industrial Gas Heating Equipment." Boilers shall be listed and labeled by a testing agency acceptable to authorities having jurisdiction.

1.5 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 03.

1.6 WARRANTY

A. Special Warranty
1. The pressure vessel/heat exchanger shall have a 5 year warranty against failure due to condensate corrosion, thermal stress, mechanical defects or workmanship.
2. The control panel shall have a 2 year warranty against failure due to defective materials or workmanships.
3. Provide product warranty period terminating one year after the Date of Substantial Completion, or the date of system start-up, whichever is later.
4. Date of Substantial completion shall be established by the Project Architect; although this project does consists of multiple installation phase time periods, only a single date of Substantial Completion shall established by the Project Architect upon completion of all phases of work which is expected in October of 2018.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Fulton Boiler Works, Inc., Endura Series.
a. Hilliard City Schools is directly purchasing equipment through Trane. Contractor to coordinate with Trane for delivery time, location, etc. Contactor to accept delivery and properly store and protect equipment. Contractor responsible for any costs associated for storing, moving of equipment from storage location to job site, protection of equipment, and any other additional costs. Contractor responsible to install, start up, and maintain equipment per all specifications.

2.2 FIRE-TUBE CONDENSING BOILERS.

A. Description: Factory-fabricated, -assembled, and -tested, fire-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.

B. Heat Exchanger: Nonferrous, corrosion-resistant combustion chamber.

C. Pressure Vessel: Carbon steel with welded heads and tube connections.

D. Burner: Natural gas, forced draft.

E. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

F. Gas Train: Combination gas valve with manual shutoff and pressure regulator.

G. Ignition: Spark ignition with 100 percent main-valve shutoff with electronic flame supervision.

H. Casing:
1. Jacket: Sheet metal or plastic, with snap-in or interlocking closures.
2. Control Compartment Enclosures: NEMA 250, Type 1A.
3. Finish: Baked-enamel or powder-coated protective finish.
4. Insulation: Minimum 2-inch thick, mineral-fiber insulation surrounding the heat exchanger.
5. Combustion-Air Connections: Inlet and vent duct collars.
6. Mounting base to secure boiler.
a. Seismic Fabrication Requirements: Fabricate mounting base and attachment to boiler pressure vessel, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when mounting base is anchored to building structure.

2.3 WATER-TUBE CONDENSING BOILERS

A. Description: Factory-fabricated, -assembled, and -tested, water-tube condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.

B. Heat Exchanger: Finned-copper primary and stainless-steel secondary heat exchangers.

C. Combustion Chamber: Stainless steel, sealed.

D. Burner: Natural gas, forced draft drawing from gas premixing valve.

E. Blower: Centrifugal fan to operate during each burner firing sequence and to prepurge and postpurge the combustion chamber.
1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

F. Gas Train: Combination gas valve with manual shutoff and pressure regulator.

G. Ignition: Silicone carbide hot-surface ignition that includes flame safety supervision and 100 percent main-valve shutoff.

H. Integral Circulator: Cast-iron body and stainless-steel impeller sized for minimum flow required in heat exchanger.

I. Casing:
1. Jacket: Sheet metal, with snap-in or interlocking closures.
2. Control Compartment Enclosures: NEMA 250, Type 1A.
3. Finish: Textured epoxy.
4. Insulation: Minimum 1-inch thick, mineral-fiber insulation surrounding the heat exchanger.
5. Combustion-Air Connections: Inlet and vent duct collars.
6. Mounting base to secure boiler.
a. Seismic Fabrication Requirements: Fabricate mounting base and attachment to boiler pressure vessel, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when mounting base is anchored to building structure.

2.4 WATER-JACKETED CONDENSING BOILERS

A. Description: Factory-fabricated, -assembled, and -tested, water-jacketed condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; water supply, return, and condensate drain connections; and controls. Water heating service only.

B. Heat Exchanger: Stainless-steel primary and secondary combustion chamber.

C. Pressure Vessel: Carbon steel with welded heads and tube connections where not in contact with combustion or flue gases.

D. Burner: Natural gas, forced draft; swing-open front and burner observation port.

E. Blower: Centrifugal fan, forced draft. Include prepurge and postpurge of the combustion chamber.
   1. Motors: Comply with requirements specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
      a. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

F. Gas Train: Combination gas valve with manual shutoff and pressure regulator. Include 100 percent safety shutoff with electronic flame supervision.

G. Ignition: Electric-spark ignition with 100 percent main-valve shutoff with electronic flame supervision.

H. Casing:
   1. Jacket: Sheet metal, with snap-in or interlocking closures.
   2. Control Compartment Enclosures: NEMA 250, Type 1A.
   3. Finish: Powder-coated protective finish.
   4. Insulation: Minimum 4-inch thick, mineral-fiber insulation surrounding the heat exchanger.
   5. Combustion-Air Connections: Inlet and vent duct collars.
   6. Mounting base to secure boiler.
      a. Seismic Fabrication Requirements: Fabricate mounting base and attachment to boiler pressure vessel, accessories, and components with reinforcement strong enough to withstand seismic forces defined in Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment" when mounting base is anchored to building structure.

2.5 TRIM

A. Aquastat Controllers: Operating, firing rate, and high limit.

B. Safety Relief Valve: ASME rated.

C. Pressure and Temperature Gauge: Minimum 3-1/2-inch diameter, combination water-pressure and -temperature gauge. Gauges shall have operating-pressure and -temperature ranges so normal operating range is about 50 percent of full range.

D. Boiler Air Vent: Automatic.

E. Drain Valve: Minimum NPS 3/4 hose-end gate valve.

F. Circulation Pump: Non-overloading, in-line pump with split-capacitor motor having thermal-overload protection and lubricated bearings; designed to operate at specified boiler pressures and temperatures.

2.6 CONTROLS

A. Refer to Division 23 Section "Instrumentation and Control for HVAC."

B. Boiler operating controls shall include the following devices and features:
   1. Control transformer.
   2. Set-Point Adjust: Set points shall be adjustable.
   3. Sequence of Operation: Electric, factory-fabricated and field-installed panel to control burner firing rate to reset supply-water temperature inversely with outside-air temperature. At 0 deg F outside-air temperature, set supply-water temperature at 200 deg F; at 60 deg F outside-air temperature, set supply-water temperature at 140 deg F.
      a. Include automatic, alternating-firing sequence for multiple boilers to ensure maximum system efficiency throughout the load range and to provide equal runtime for boilers.

C. Burner Operating Controls: To maintain safe operating conditions, burner safety controls limit burner operation.
   1. High Cutoff: Automatic reset stops burner if operating conditions rise above maximum boiler design temperature.
   2. Low-Water Cutoff Switch: Electronic probe shall prevent burner operation on low water. Cutoff switch shall be manual-reset type.
   3. Blocked Inlet Safety Switch: Manual-reset pressure switch field mounted on boiler combustion-air inlet.
   4. Audible Alarm: Factory mounted on control panel with silence switch; shall sound alarm for above conditions.

D. Building Management System Interface: Factory install hardware and software to enable building management system to monitor, control, and display boiler status and alarms.
   1. Hardwired Points:
      a. Monitoring: On/off status, common trouble alarm and low water level alarm.
      b. Control: On/off operation.
   2. A communication interface with building management system shall enable building management system operator to remotely control and monitor the boiler from an operator workstation. Control features available, and monitoring points displayed, locally at boiler control panel shall be available through building management system. Communication protocol shall be coordinated with the temperature control contractor for correct communication. BACnet, Lon, or TCP/IP are acceptable as selected by Temperature Control Contractor.

2.7 ELECTRICAL POWER

A. Controllers, Electrical Devices, and Wiring: Electrical devices and connections are specified in Division 26 Sections.

B. Single-Point Field Power Connection: Factory-installed and -wired switches, motor controllers, transformers, and other electrical devices necessary shall provide a single-point field power connection to boiler.
   1. House in NEMA 250, Type 1 enclosure.
   2. Wiring shall be numbered and color-coded to match wiring diagram.
   3. Install factory wiring outside of an enclosure in a metal raceway.
   4. Field power interface shall be to wire lugs.
   5. Provide branch power circuit to each motor and to controls.
   6. Provide each motor with overcurrent protection.

C. Division 26 shall provide a fused disconnect to each boiler. Control voltage transformer shall be provided by unit manufacturer.

2.8 VENTING KITS

A. Kit: Complete system, ASTM A 959, Type 29-4C stainless steel, pipe, vent terminal, thimble, indoor plate, vent adapter, condensate trap and dilution tank, and sealant.

B. Combustion-Air Intake: Complete system, stainless steel, pipe, vent terminal with screen, inlet air coupling, and sealant.

2.9 SOURCE QUALITY CONTROL

A. Burner and Hydrostatic Test: Factory adjust burner to eliminate excess oxygen, carbon dioxide, oxides of nitrogen emissions, and carbon monoxide in flue gas and to achieve combustion efficiency; perform hydrostatic test.

B. Test and inspect factory-assembled boilers, before shipping, according to ASME Boiler and Pressure Vessel Code.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Before boiler installation, examine roughing-in for concrete equipment bases, anchor-bolt sizes and locations, and piping and electrical connections to verify actual locations, sizes, and other conditions affecting boiler performance, maintenance, and operations.
   1. Final boiler locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

B. Examine mechanical spaces for suitable conditions where boilers will be installed.

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

3.2 BOILER INSTALLATION

A. Install boilers level on concrete base. Concrete base is specified in Division 23 Section "Common Work Results for HVAC," and concrete materials and installation requirements are specified in Division 03.

B. Install gas-fired boilers according to NFPA 54.

C. Assemble and install boiler trim.

D. Install electrical devices furnished with boiler but not specified to be factory mounted.

E. Install control wiring to field-mounted electrical devices.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to boiler to allow service and maintenance.

C. Install piping from equipment drain connection to nearest floor drain. Piping shall be at least full size of connection. Provide an isolation valve if required.

D. Connect piping to boilers, except safety relief valve connections, with flexible connectors of materials suitable for service. Flexible connectors and their installation are specified in Division 23 Section "Common Work Results for HVAC."

E. Connect gas piping to boiler gas-train inlet with union. Piping shall be at least full size of gas train connection. Provide a reducer if required.

F. Connect hot-water piping to supply- and return-boiler tappings with shutoff valve and union or flange at each connection.

G. Install piping from safety relief valves to nearest floor drain.

H. Boiler Venting:
   1. Install flue venting kit and combustion-air intake.
   2. Connect full size to boiler connections. Comply with requirements in Division 23 Section "Breechings, Chimneys, and Stacks."

I. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

J. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:
   1. Perform installation and startup checks according to manufacturer's written instructions.
   2. Leak Test: Hydrostatic test. Repair leaks and retest until no leaks exist.
   3. Operational Test: Start units to confirm proper motor rotation and unit operation. Adjust air-fuel ratio and combustion.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
      a. Check and adjust initial operating set points and high- and low-limit safety set points of fuel supply, water level and water temperature.
      b. Set field-adjustable switches and circuit-breaker trip ranges as indicated.

C. Remove and replace malfunctioning units and retest as specified above.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain boilers. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 52 16

SECTION 23 65 00 – COOLING TOWERS

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 factory assembled and tested, open circuit mechanical induced-draft vertical discharge cooling tower.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, pressure drop, performance curves with selected points indicated, furnished specialties, and accessories.

B. Shop Drawings: Complete set of manufacturer's prints of evaporative equipment assemblies, control panels, sections and elevations, and unit isolation. Include the following:
   1. Assembled unit dimensions.
   2. Weight and load distribution.
   3. Required clearances for maintenance and operation.
   4. Sizes and locations of piping and wiring connections.
   5. Wiring Diagrams: For power, signal, and control wiring. Differentiate between manufacturer installed and field installed wiring.

C. Operation and Maintenance Data: Each unit to include, operation, and maintenance manual.

1.4 QUALITY ASSURANCE

A. Verification of Performance:
   1. The thermal performance shall be certified by the Cooling Technology Institute in accordance with CTI Certification Standard STD-201. Lacking such certification, a field acceptance test shall be conducted within the warranty period in accordance with CTI Acceptance Test Code ATC-105, by a Certified CTI Thermal Testing Agency. The Evaporative Heat Rejection Equipment shall comply with the energy efficiency requirements of ASHRAE Standard 90.1.
   2. Unit Sound Performance ratings shall be tested according to CTI ATC-128 standard. Sound ratings shall not exceed specified ratings.

B. Unit shall meet or exceed energy efficiency per ASHRAE 90.1.

1.5 WARRANTY

A. Submit a written warranty executed by the manufacturer, agreeing to repair or replace components of the unit that fail in materials and workmanship within the specified warranty period.

B. Parts and labor warranty of 2 years.
   1. Provide product warranty period terminating one year after the Date of Substantial Completion, or the date of tower start-up, whichever is later.
   2. Date of Substantial completion shall be established by the Project Architect; although this project does consists of multiple installation phase time periods, only a single date of Substantial Completion shall established by the Project Architect upon completion of all phases of work which is expected in October of 2018.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide cooling towers manufactured by Trane.
   1. Hilliard City Schools is directly purchasing equipment through Trane. Contractor to coordinate with Trane for delivery time, location, etc. Contactor to accept delivery and properly store and protect equipment. Contractor responsible for any costs associated for storing, moving of equipment from storage location to job site, protection of equipment, and any other additional costs. Contractor responsible to install, start up, and maintain equipment per all specifications.

2.2 THERMAL PERFORMANCE

A. Each unit shall be capable to cool 1,028.50 GPM of water entering at 95.00° F leaving at 85.00° F at a design wet bulb of 78.00° F.

2.3 IBC COMPLIANCE

A. The unit structure shall be designed, analyzed, and constructed in accordance with the latest edition of International Building Code (IBC) for: IP = 1.0, SDS = 0.84, P = 119 psf.

2.4 COMPONENTS

A. Description: Factory assembled and tested, induced draft counter flow cooling tower complete with fan, fill, louvers, accessories and rigging supports.

B. Materials of Construction
   1. All cold water basin components including vertical supports, air inlet louver frames and panels up to rigging seam shall be constructed of Type 304 Stainless Steel. All factory cold water basin seams shall be welded for water tight construction. "Series 300" stainless steel shall not be acceptable as equivalent to Type 304 Stainless Steel.
   2. Upper Casing, channels and angle supports shall be constructed of heavy gauge mill hot-dip galvanized steel. Fan cowl and guard shall be constructed of galvanized steel. All galvanized steel shall be coated with a minimum of 2.35 ounces of zinc per square foot of area (G-235 Hot-Dip Galvanized Steel designation). During fabrication, all galvanized steel panel edges shall be coated with a 95% pure zinc-rich compound.

C. Fan(s):
   1. Fan(s) shall be high efficiency axial propeller type, using a high strength die cast aluminum hub and fiberglass reinforced polypropylene (PPG) wide chord blades. Each fan shall be statically balanced and installed in a closely fitted cowl with venturi air inlet for maximum fan efficiency.

D. Drift Eliminators
   1. Drift eliminators shall be constructed entirely of Polyvinyl Chloride (PVC) in easily handled sections. Design shall incorporate three changes in air direction and limit the water carryover to a maximum of 0.001% of the recirculating water rate.

E. Water Distribution System
   1. Spray nozzles shall be precision molded ABS, large orifice nozzles utilizing fluidic technology for superior water distribution over the fill media. Nozzles shall be designed to minimize water distribution system maintenance. Spray header and branches shall be Schedule 40 Polyvinyl Chloride (PVC) for corrosion resistance with a steel connection to attach external piping.

F. Heat Transfer Media
   1. Fill media shall be constructed of Polyvinyl Chloride (PVC) of cross-fluted design and suitable for inlet water temperatures up to 130° F. The bonded block fill shall be bottom supported and suitable as an internal working platform. Fill shall be self-extinguishing, have a flame spread of 5 under A.S.T.M. designation E-84-81a, and shall be resistant to rot, decay and biological attack.

G. Air Inlet Louvers
   1. The air inlet louver screens shall be constructed from UV inhibited polyvinyl chloride (PVC) and incorporate a framed interlocking design that allows for easy removal of louver screens for access to the entire basin area for maintenance. The louver screens shall have a minimum of two changes in air direction and shall be of a non-planar design to prevent splash-out and block direct sunlight & debris from entering the basin.

H. Electronic Water Level Control
   1. Electronic water level control package shall have five (5) stainless steel water level sensors (one (1) high level, one (1) high level alarm, one (1) low level, one (1) low level alarm and one (1) ground) with a NEMA 4x enclosure mounted in a cleanable Schedule 40 PVC external standpipe with slow closing solenoid valve(s) and "y" strainer(s). Wiring is not included and components must be field mounted. Valves shall be sized for 25 psi minimum to 125 psi maximum pressure. Standpipe may require heat tracing by others in cold weather applications.

I. Pan Strainer
   1. Pan Strainer(s) shall be all Type 304 Stainless Steel construction with large area removable perforated screens.

J. Liquid-Solids Seperation System
   1. Manufacturers
      a. Lakos Filtration System model eTCX-0110
   2. A completely assembled package shall be supplied for the isolated recirculation and particle separation/filtration of the fluid in the cooling tower basin/remote sump in order to prevent troublesome accumulation of solids in the tower basin/sump. Flow through the separator package shall be continuous, without interruption for the periodic evacuation of separated solids. Placement of the separator package's inlet and outlet within the basin/sump shall be strategically determined and supplemented where necessary with specific flow enhancement/agitation devices known as *e*HydroBoosters (provided in cooling towers).
   3. The system will remove unwanted solids from a cooling tower sump/remote basin, or side-stream recirculated cooling water system using a centrifugal-action vortex separator. The liquid-solids separation system will help prevent particle fouling of the cooling system's components reduce maintenance and servicing routines, maintain optimum energy efficiency of the heat exchange process, limit blow down & chemical use practices and control harmful bacteria growth in the basin/sump or cooling water system. Fluid viscosity must be 100 SSU or less.
   4. Performance
      a. In a single pass through the *e*HTX separator system, given solids with a specific gravity of 2.6 and water at 1.0, performance is predictably 98% of 44 microns and larger. Additionally, particles finer in size, heavier by specific gravity and some lighter by specific gravity will also be removed.
      b. In a recirculating system, given solids with a given solids with a specific gravity of 2.6 and water at 1.0, 99% performance is predictable to as fine as 25 microns, with correspondingly higher aggregate performance percentages (up to 80%) of solids as fine as 2 microns.

c. Separator performance must be supported by published independent test results from a recognized and identified agency. Standard test protocol of upstream injection, downstream capture and separator purge recovery is allowed with the 50-200 mesh particles to enable effective, repeatable results. Single pass test performance must be not less than 95% removal. Model tested must be of the same design series as specified unit.

5. *e*HTX Series Liquid-Solids Separator
   a. Tangential inlet and mutually tangential internal accelerating slots shall be employed to promote the proper velocity necessary for the removal of the separable solids. The internal accelerating slots shall be spiral-cut for optimal flow transfer, laminar action and particle influence into the separation barrel. The separator's internal vortex shall allow this process to occur without wear to the accelerating slots.
   b. Separated particle matter shall spiral downward along the perimeter of the inner separation barrel, in a manner which does not promote wear of the separation barrel, and into the solids collection chamber, located below the vortex deflector stool.
   c. To insure maximum particle removal characteristics, *e*HTX Series Separator shall incorporate a enhanced vortex-induced pressure relief line *(Vortube),* drawing specific pressure and fluid from the separator's solids collection chamber via the outlet flow's vortex/venturi effect, thereby efficiently encouraging solids into the collection chamber without requiring a continuous underflow or excessive system fluid loss.
   d. System fluid shall exit the separator by following the center vortex in the separation barrel and spiral upward to the separator outlet.
   e. The separator shall feature the following access capabilities for either inspection or the removal of unusual solids/debris:
      1) A hand-hole port at the collection chamber (*e*HTX models 3-1/2" and 4" only).
      2) An upper chamber full sized grooved coupling or flanged top to allow complete access to the inlet chamber, acceleration slots, and internal separation barrel.
   f. The separator shall be of unishell construction with SA-36, SA-53B or equivalent quality carbon steel, minimum thickness of .25 inches (6.35 mm). Maximum operating pressure shall be 150 psi (10.3 bar), unless specified otherwise.
   g. Paint coating shall be oil-based enamel, spray-on, and gloss black.
   h. Pressure gauges shall be included for the inlet/outlet of the separator.
6. Purging & Solids Handling
   a. Separated solids are continuously purged under controlled flow into a 304 stainless steel Solids Recovery Vessel (SRV-833) equipped with one 33" 10-micron polyester solids collection bag. Solids collection capacity: 732 cubic inches (12 liters). Excess liquid shall pass through the bag and return to system flow via piping connected to the system pump's suction line. The system shall include an air/pressure relief line for the vessel. System will also include and indicator package (SRI) that includes: manual isolation valves for use when servicing the collection bag; annunciator for indicating when the collector bag needs cleaning/replacement; flow control orifice to minimize fluid volume/velocity through the vessel and collector bag.
   b. As an alternative evacuation of separated solids may be accomplished automatically, employing an electric actuated fail safe ball valve (EFS) with integrally-equipped programming for controlling the frequency and duration of solids purging; brass ball valve assembly; battery backup style fail safe control.
7. Suction Diffuser
   a. Provided with system to protect system pump from damage or fouling by larger solids or debris.
   b. Cast-iron housing; manual-cleaning; 1/8-inch (3.2 mm) or larger minimum mesh rating; stainless steel screen.
8. Pump
   a. End-suction, single stage; Premium Efficiency TEFC motor; cast iron housing; bronze or cast iron impeller; mechanical shaft seal (Viton-Silicon Carbide); flooded suction required

9. Piping
    a. Schedule 40 galvanized carbon steel; reinforced rubber hose to solids recovery vessel; Piping on larger systems to be fabricated carbon steel pipe, painted or coated; Larger systems will require field assembly of piping between separator skid and pump skid.
10. Electrical Control
    a. IEC starter with overload module; HOA selector switch; NEMA-4X UL Listed enclosure; re-set/disconnect/trip switch; 120 volt, single phase control voltage; includes provision for using EFS purge valve assembly and timer; built-in amp meter; automatic low flow shutdown; BACnet and Modbus optional; 15 fault log memory.
11. Valves
    a. Ball valves on purge line for isolation of solids-handling/purging equipment. Optional inlet/outlet butterfly valve kit is available.
12. Skid Plate
    a. Stainless steel, 3/16-inch (5 mm) minimum thickness on system up to *e*TCX-0410
13. *e*Hydrobooster
    a. Provided in the cooling tower (Sump Sweeper Piping w/ High Flow Eductors).

2.5 MOTORS AND DRIVES

A. General requirements for motors are specified in Division 23 Section “Motors”

B. Fan Motor
1. Fan motor(s) shall be totally enclosed, ball bearing type electric motor(s) suitable for moist air service. Motor(s) are Premium Efficient, Class F insulated, 1.15 service factor design. Inverter rated per NEMA MG1 Part 31.4.4.2 and suitable for variable torque applications and constant torque speed range with properly sized and adjusted variable frequency drives.
    a. Variable frequency controller to be provided by contractor.

C. Fan Drive
1. The fan drive shall be multigroove, solid back V-belt type with QD tapered bushings designed for 150% of the motor nameplate power. The belt material shall be neoprene reinforced with polyester cord and specifically designed for evaporative equipment service. Fan sheave shall be aluminum alloy construction. Belt adjustment shall be accomplished from the exterior of the unit.

D. Fan Shaft
1. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.

E. Fan shaft shall be solid, ground and polished steel. Exposed surface shall be coated with rust preventative.
1. Fan Shaft Bearings shall be heavy-duty, self-aligning ball type bearings with extended lubrication lines to grease fittings located on access door frame. Bearings shall be designed for a minimum L-10 life of 100,000 hours.

2.6 MAINTENANCE ACCESS

A. Fan Section
1. Circular access door shall be located in the fan section for fan drive and water distribution system access. Swing away motor cover shall be hinged for motor access.

B. Basin Section
1. Framed removable louver panels shall be on two (2) sides of the unit for pan and sump access.

2.7 ACCESSORIES

A. Basin Heater Package
   1. Cold water basin shall be fitted with Type 304 Stainless Steel element, electric immersion heater(s) with a separate thermostat and low water protection device. Heaters shall be selected to maintain +40° F pan water at -20° F ambient temperature.
   2. Electric immersion heater package shall include a factory-supplied NEMA 4x enclosure containing a magnetic contactor with 120 VAC control circuit, transformer, and main power disconnect. Control package wired by others.

B. Sump Sweeper Piping
   1. Cold water basin shall be fitted with schedule 80 PVC sump sweeper piping complete with high-flow eductor nozzles to facilitate basin cleaning. The system shall contain one inlet connection and one outlet connection per basin.

C. Piping Connections
   1. Cold water basin shall be provided with external connections to equalize basin water levels.
   2. Inlet and outlet connections shall be flanged Class 150#.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before cooling tower installation, examine roughing-in for tower support, anchor-bolt sizes and locations, piping, and electrical connections to verify actual locations, sizes, and other conditions affecting tower performance, maintenance, and operation.
   1. Cooling tower locations indicated on Drawings are approximate. Determine exact locations before roughing-in for piping and electrical connections.

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

3.2 INSTALLATION

A. Coordinate with the installing contractor to ensure equipment is installed in conformance with manufacturer's recommendations and those found in the specification.

B. If deficiencies are noted by the field service representative, the contractor shall make the necessary corrections and the manufacturer's field service personnel will visit the installation site and oversee any corrections and or modifications required. A written report shall be filed with the Engineer at each visit.

C. Make-up water for the condenser water system shall be provide inside the building. The only connections required at the cooling tower are the inlet and outlet condenser water connections. All other pipe connection that the cooling tower may be equipped with shall be capped.

D. As detailed on the hydronic flow diagram of the condenser water system, a full-sized air vent shall be installed downstream of the cooling tower discharge connection to allow an outlet for entrapped, just prior to entering the building. Tee connection to (common) cooling tower outlet(s) shall be as far from cooling tower outlet(s) as possible, outside building.

E. Install tower on structural supports elevating the tower to the necessary installation elevation described by the Project Drawings for gravity flow to the indoor condenser water pumps.
   1. A detailed structural mounting drawing shall be provided by the contractor for the chosen cooling tower manufacturer. Drawing shall detail the weights and dimensional locations of the supports, cooling tower in-ground foundation piers required for the specific unit provided for this project.

a. Mounting structure shall be constructed of corrosion resistive materials, all metal components shall be stainless steel or hot-dipped in a zinc rich galvanized solution to attain an averaged coverage of G210, or higher. Galvanizing treatment shall be completed after all fabrication of the steel components is completed, prior to assembly.

2. Coordinate cooling tower mounting structure layout requirements with the location of the in-ground concrete foundation piers indicated on the project drawings. Foundation piers shall be designed for the specific footing size and distributed weight of the selected cooling tower.

3. Cooing tower support shall be fastened to the provided in-ground foundation piers with corrosion resistive fasteners and vibration dampening pad.

F. Maintain manufacturer's recommended clearances for service and maintenance.

G. Loose Components: Install electrical components, vibration switch, and other devices and accessories that ship loose.

3.3 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. Connection at the cooling tower shall be flanged or grooved.

B. If more than one cooling tower cell is utilized and/or the cooling tower has more than one set of outlet connections, a motor operated isolation valve shall be installed for each outlet connection to enable the Controls Contractor to stage the operation of multi-cell towers.

C. Install piping adjacent to cooling towers to allow service and maintenance.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to perform field tests and inspections.

B. Perform tests and inspections.

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

C. Tests and Inspections: Comply with CTI ATC 105, "Acceptance Test Code for Water Cooling Towers."

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Inspect field-assembled components, equipment installation, and piping and electrical connections for proper assemblies, installations, and connections.

C. Obtain performance data from manufacturer.

1. Complete installation and startup checks according to manufacturer's written instructions and perform the following:
   a. Clean entire unit including basins.
   b. Verify that accessories are properly installed.
   c. Verify clearances for airflow and for cooling tower servicing.
   d. Check for vibration isolation and structural support.
   e. Lubricate bearings.
   f. Verify fan rotation for correct direction and for vibration or binding and correct problems.

g. Operate variable-speed fans through entire operating range and check for harmonic vibration imbalance. Set motor controller to skip speeds resulting in abnormal vibration.
h. Check vibration switch setting. Verify operation.
i. Verify water level in tower basin. Fill to proper startup level.
j. Verify that cooling tower air discharge is not recirculating air into tower.
k. Replace defective and malfunctioning units.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain cooling towers.

END OF SECTION 23 65 00

SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

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 split-system air-conditioning and heat pump units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

E. Warranty: Special warranty specified in this Section.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete."

B. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Division 07 Section "Roof Accessories."

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion.
   2. Provide product warranty period terminating one year after the Date of Substantial Completion, or the date of system start-up, whichever is later.
   3. Date of Substantial completion shall be established by the Project Architect; although this project does consists of multiple installation phase time periods, only a single date of Substantial Completion shall established by the Project Architect upon completion of all phases of work which is expected in October of 2018.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Filters: One set of filters for each unit.
   2. Fan Belts: One set of belts for each unit.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Trane Company (The); Unitary Products Group.
      a. Hilliard City Schools is directly purchasing equipment through Trane. Contractor to coordinate with Trane for delivery time, location, etc. Contactor to accept delivery and properly store and protect equipment. Contractor responsible for any costs associated for storing, moving of equipment from storage location to job site, protection of equipment, and any other additional costs. Contractor responsible to install, start up, and maintain equipment per all specifications.

2.2 CONCEALED EVAPORATOR-FAN COMPONENTS

A. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
   1. Insulation: Faced, glass-fiber duct liner.
   2. Drain Pans: Galvanized steel, with connection for drain; insulated.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Water Coil: Copper tube, with mechanically bonded aluminum fins spaced no closer than 0.1 inch; leak tested to 300 psig underwater; and having a two-position control valve.

D. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

E. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

F. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
   1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

G. Disposable Filters: 1 inch thick, in fiberboard frames.

H. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS

A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Direct drive, centrifugal fan.

E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Filters: Permanent, cleanable.

2.4 CEILING-MOUNTING, EVAPORATOR-FAN COMPONENTS

A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contactors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Direct drive, centrifugal fan and integral condensate pump.

E. Fan Motors: Comply with requirements in Division 23 Section "Common Motor Requirements for HVAC Equipment."
1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Filters: Permanent, cleanable.

2.5 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gauge ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
1. Compressor Type: Reciprocating or scroll.

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid subcooler.

D. Heat Pump Components: Reversing valve and low-temperature air cut-off thermostat.

E. Fan: Aluminum-propeller type, directly connected to motor.

F. Motor: Permanently lubricated, with integral thermal-overload protection.

G. Low Ambient Kit: Permits operation down to 45 deg F.

H. Mounting Base: Polyethylene.

2.6 ACCESSORIES

A. Control equipment and sequence of operation are specified in Division 23 Sections "Instrumentation and Control for HVAC" and "Sequence of Operations for HVAC Controls."

B. Thermostat: Low voltage or wireless infrared to control compressor and evaporator fan.
1. Compressor time delay.
2. 24-hour time control of system stop and start.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection, including auto setting.

C. Automatic-reset timer to prevent rapid cycling of compressor.

D. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground-mounting, compressor-condenser components on 4-inch thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 03 Section "Cast-in-Place Concrete." Coordinate anchor installation with concrete base.

D. Install roof-mounting compressor-condenser components on equipment supports specified in Division 07 Section "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.

E. Install seismic restraints.

F. Install compressor-condenser components on restrained, spring isolators with a minimum static deflection of 1 inch. Refer to Division 23 Section "Vibration and Seismic Controls for HVAC Piping and Equipment."

G. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
   1. Water Coil Connections: Comply with requirements in Division 23 Section "Hydronic Piping." Connect to supply and return coil with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
   2. Remote Water-Cooled Condenser Connections: Comply with requirements in Division 23 Section "Hydronic Piping." Connect to supply and return with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
   3. Steam Coil Connections: Comply with requirements in Division 23 Section "Steam and Condensate Heating Piping." Connect to steam piping with shutoff valve and union or flange; for condensate piping, starting from the coil connection, connect with union or flange, strainer, trap, and shutoff valve.

B. Install piping adjacent to unit to allow service and maintenance.

C. Duct Connections: Duct installation requirements are specified in Division 23 Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Division 23 Section "Air Duct Accessories."

D. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

E. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace malfunctioning units and retest as specified above.

3.4 STARTUP SERVICE

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

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 23 81 26

RFI Log

Hilliard City Schools
New Middle School

Elford RFI #	Company/Individual	Question	Answer	Date Received From Sub	Date Sent to Architect	Date Answer Rec'd From Architect	Date Answer Sent to Sub	Addendum / Bid Clarification #	Notes
B001	Altman/Heather Curphey	For the Hilliard Middle School project, is it acceptable to put in a combination bid for more than one bid package?	Refer to Addendum #2	01/20/17	01/20/17		02/03/17	2	
B002	Oakland Nursery/Gary Huston	It says that the sitework contractor is responsible for the topsoil respread along the building pad to the parking lot. Is the landscape contractor to respead topsoil to the site perimeter and the parking lot islands? It would be more economical for the site contractor to respreads the topsoil around the perimeter of the site and islands.	Refer to Addendum #4 - bid form	01/20/17	01/20/17		02/03/17	4	
B003	Knoch Corporation/Eric Binsley	Is the General Allowance of $20,000 and the General Flooring Prep Allowance of $15,000 listed in the General Trades Scope of Work under item "N" the same as Allowance 8 for $35,000 in specification section 01 21 00 Allowances or is it another allowance?	Addendum#4	01/24/17	01/25/17		02/03/17	4	
B004	Knoch Corporation/Eric Binsley	Where can I find the Matrix of Owner provided equipment installed by the General Trades Contractor that is listed under Special Considerations item "I"?	Refer to Addendum #4 - Refer updated section 01 10 00	01/24/17	01/25/17		02/03/17	4	
B005	Knoch Corporation/Eric Binsley	Why is specification section 11 05 13 Common Motor Requirements for Equipment part of our scope? What motors is this for?	Specification 11 05 13 applies to all motors installed as part of your scope package.	01/24/17	01/25/17	02/01/17	02/03/17		
B006	Knoch Corporation/Eric Binsley	Will combination bids be allowed for this project?	Refer to Addendum #2 and #4	01/24/17	01/25/17		02/03/17	2	
B007	Chemcote/Craig Pettit	I see the stone is being placed by the site contractor and we are to provide the tonnage listed at the parking, roads and track. What package is the gravel shoulder in? It is listed as Keynote 21 on page G3.0.	Refer to Addendum #4	01/25/17	01/25/17		02/03/17	4	
B008	Vaughn Industries/Cindy Hagerty	Our insurance/bonding agent is asking for approximate estimates for the HVAC and the Electrical on this project.		01/25/17	01/25/17				
B009	Vaughn Industries/Cindy Hagerty	She is also asking about a couple of the insurance requirements: 11.1.2.1, #1 Independent Contractors Protective Liability. She is asking if you want an OCP Policy, a separate policy in the Owner's name. She needs an estimate and duration to quote this for us. 11.1.2.1, #3 Professional Liability – will Vaughn be required to carry this, or is this in reference to the A/E? 11.1.2.1 #1 in reference to the Ohio Intentional Tort Endorsement-will Vaughn be required to carry this?		01/25/17	01/25/17				
B010	Buckeye Aluminum Glass/Timothy Van Atta	Can I Get Clarification on the Aluminum Windows. The Drawings A6.01 show a fixed Aluminum Window on W1, W2, W3, W4. The Details on A6.03 show Operable details, and also in the specs under 085113-4 2.1 B Fixed and Outward Projected. 085113-6 2.5 A Frames shall be same configuration for operable Units. Also on 085113-6 2.6 A 1 Applied Muttins can be applied. Note, if they do want Vent or Operable Windows there will need to be a Horizontal, as the sizes are to large.	Refer to Addendum #2	01/25/17	01/25/17	01/30/17	02/03/17	2	
B011	Buck and Sons Landscape/Jared Buck	Is there a bid form for the Hilliard middle school project. Can we drop off our bid at 2140 Atlas St any day before the 9th? thank you in advance.	Refer to Addendum #3 and #4	01/26/17	01/27/17		02/03/17	3	
B012	Rezod, LLC/Bill Staton	Our bid package includes Residential Appliances "per the schedule on the drawings". However, I don't see anywhere in Spec Section 11 31 00.00 Residential Appliances, that identifies the Flat Screen TV's (or any other spec section for that matter). So my question is simply this, is the owner providing or installing the Flat Screen TV's?	Monitors provided by the project are noted on T sheets and in spec section 27 41 43; all others are provided by the owner	01/27/17	01/27/17	01/31/17	02/03/17		
B013	Rezod, LLC/Bill Staton	There are multiple murals throughout the project, so do these fall under one of the painting specs or one of the signage specs?	Both the signage and painting specs are in the General Trades scope of Work.	01/27/17	01/27/17		02/03/17		
B014	Rezod, LLC/Bill Staton	Spec Section 10 28 00: The owner is furnishing several items, so our question is this, are they also installing these items or do we need to figure to receive, unload, inventory, distribute, and install these items or is this being handled by the owner as well?	Refer to Addendum #3;General Requirements 01 10 00	01/27/17	01/27/17		02/03/17	4	
B015	Rezod, LLC/Bill Staton	The note in Bid Package 6.0 for Div. 08 – Item IV says to "Provide 25 – 2' x 2' access doors and frames. The specifications list (4) different types of access panels that all have different costs, so can you clarify how many of each we need to include in this pricing?	See updated scope addendum #4	01/27/17	01/27/17		02/03/17	4	
B016	Rezod, LLC/Bill Staton	Bid Package 6.0: Spec Section 10 56 34 Specialty Storage Cabinets includes the Acid/Corrosives Safety Storage Cabinet and the Flammable Liquids Safety Storage Cabinet. However, on the drawings, these are listed under the Science Equipment Schedule, along with the Germicidal Goggle Sanitizer Cabinet and the Double-Sided Fume Hood. We know that we owe the Acid/Corrosives Safety Storage Cabinet and the Flammable Liquids Safety Storage Cabinet per the spec, but who is responsible for the Germicidal Goggle Sanitizer Cabinet and the Double-Sided Fume Hood?	See updated scope addendum #4	01/27/17	01/30/17		02/03/17	4	

RFI Log

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B0017	North Central Fabrication/Paul Kelly II	John Leuthold and I are looking at the Hilliard Middle School. We have the following question: This would be typical at all areas similar in condition to this and at hallways. Please see attachment.	Pour stops are not structurally required between the metal deck and the inside face of the CMU wall shown in section 6/S7.02 (and similar). The deck should be placed tight to the side of the wall to prevent leakage of wet concrete. The contractor is welcome, however, to provide a continuous filler plate or bent pour stop plate at their option.	01/30/17	01/31/17	02/01/17	02/03/17		
B018	Strawser Paving/Don Bynner	Section 32 12 16 Asphalt Paving Part 3.6 Paragraph B lists Herbicide Treatment and Paragraph C lists Cutback Prime Coat. These items are not included in the Paving Sections detailed on Plan Sheet G4.1. Are these items to be included in the bid? Are they to be inluded in Bid Package No. 32.0 Asphalt or were they included in Bid Package No. 1.0 Early Site and Utility?	Refer to addendum 4	01/31/17	01/31/17	02/01/17	02/03/17	4	
B019	Outdoor Aluminum, Inc./Linda Santini	What is the timeline for installation for this portion of work?	Refer to Addendum #4	01/31/17	01/31/17		02/03/17	4	
B020	Outdoor Aluminum, Inc./Linda Santini	I see where the project completion is May 2018, but was curious when the bleacher work is expected to be completed.	Refer to Addendum #4	01/31/17	01/31/17		02/03/17	4	
B021	The Altman Company/Heather Curphey	A8.12-Corridor signs that say Memorial Jaguars. They do not specify size. These go on the corridor walls (vinyl)	All dimension are provided on A8.12 with the excpetion of "jaquars" on elevation B. This is to be 16 inches and coordinated with submittals for final review.	01/31/17	01/31/17	02/01/17	02/03/17		
B022	The Altman Company/Heather Curphey	Volume C Q-1 Concession Stand signs. They tell us to refer to the sign types page, but RSB, RSF, RSE1 and RSE2 are not listed on there.	Refer to A7.00B for Room Sign Types, B, F, E1 and E2. The "RS" is an abbreviation Room Sign.	01/31/17	01/31/17	02/01/17	02/03/17		
B023	The Altman Company/Heather Curphey	G3.2 Exterior Traffic Signs. There are 3 signs that are large and attached to 2 posts. Parent Drop Off, Buses Only, and the actual school sign that says Hilliard Memorial Middle School. The material is not specified. Is the school name sign a monument type sign? Or just aluminum attached to U channel posts?	Refer to Specifications Section 10 14 26, Post and panel Sign.	01/31/17	01/31/17	02/01/17	02/03/17		
B024	The Altman Company/Heather Curphey	Again on exterior signs, they note address #'s. Did not give size. They called them House Number signs. I don't see where they are using those?	Detail on G4.4, 6" letters per Fire Department. Located on G3.0, near South/West entry/exit near school identification sign note 29.	01/31/17	01/31/17	02/01/17	02/03/17		
B025	Sightlines Athletic Facilities/Jeff Giffen	The substantial completion is 499 days? Does this schedule include the grandstand/press box? Is the final completion day of April 27th 2018? What target you are looking for or are we complete by the upcoming football season?	refer to addendum #4	01/31/17	01/31/17		02/03/17	4	
B026	Preconstruction Specialist/Paul Riedinger	In your bid documents for the bleacher and press box specifications 13 34 16.53 – 6, at 2.6 B 1 Finish: Mill finished (for the aluminum risers). Is it the intention of the architect and owner to have mill finished risers? Almost 99% of the time bleacher risers (and seat boards) are either powder coated or anodized to prevent ugly staining that will occur with mill finished risers.	provide as specified	02/01/17	02/01/17	02/02/17	02/03/17		
B027	Quality Welding/Steve Ambos	Can you provide us with a column to beam connection at roof and second floor?	There is not enough information to respond to this RFI.	02/01/17	02/01/17	02/02/17	02/03/17		
B028	Strawser Paving/Don Bynner	Section 32 13 13 Concrete Paving Part 2.9 lists specifications for Wheel Stops and Wheel Stops are shown on Plan Sheet G3.0. Please advise which Bid Package is to include supply and install Wheel Stops.	Refer to Addendum #4	02/01/17	02/01/17		02/03/17	4	
B029	North Central Fabrication/Paul Kelly II	Is it correct to assume that the masonry contractor will be installing any veneer support steel? Please see attached.	As noted in scope of work	02/01/17	02/01/17		02/03/17	4	
B030	North Central Fabrication/Paul Kelly II	Who is to furnish the pipe gate shown in detail 5 on sheet G4.2?	Refer to Addendum #4	02/01/17	02/01/17		02/03/17	4	
B031	Midwest Graphics/Gayle May	I don't see where the size of the dedication bronze plaque is listed?	Typical plaque is 20 inches wide by 18 inches tall	02/01/17	02/02/17		02/03/17	4	
B032	Columbus Heating & Ventilating/Greg Yoak	On drawing M2.07 there are supply air and exhaust air ducts serving the Locker Room area (air handling unit is tagged "Locker-1"). Spec section 233113-3.1B6a tells us to make both of "heavy gauge aluminum or stainless steel". There does not appear to be anything in the specification defining construction standards for either of these products. Can something be provided?	As noted in Section 233113, Article 2.2, A - Compy with SMACNA duct construction standards utilizing the materials indicated for this unique application.	02/01/17	02/02/17	02/03/17	02/03/17		
B033	Elford, Inc./Joanne Centa	The MEP Schedule on the drawings references the following spec sections: 23 82 19, 23 62 00, and 26 29 23 that were not included in the specifications. Please advise if the mechanical schedule is to be revised or are they to be added.	Sections 236200 and 238219 are incorrectly reference; reference should read 238126 for both. Reference to Section 262923 was not found, please provide a more specific description of where it is being observed.	02/02/17	02/02/17	02/03/17	02/03/17		
B034	Strawser Paving Co./Don Bynner	Section 32 12 16 Asphalt Paving Part 2.6 A notes that mix designs shall comply with State Department of Transportation Standard Specifications, but the specifications listed do not comply with ODOT requirements, as noted in the attached email from our asphalt supplier, Shelly Materials, Inc. Please confirm that ODOT specifications are acceptable for the project asphalt mix designs. Please see attachment.	Provide Asphalt Concrete Paving meeting Ohio DOT Specifications as follows: 441 Surface Course, Type 1 (448), PG64-22 and 441 Intermediate Course ,Type 2 (448)	02/02/17	02/02/17	02/09/17	02/09/17		

RFI Log

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B035	Dunlop and Johnston/Rick Noviks	We are submitting a proposal for pkge. 6.0 General Trades and considering combination bid option 2 and 3 as mentioned in Addendum #2. When will you have the revised bidform out for bidders?	Refer to Addendum #4	02/02/17	02/02/17		02/03/17	4	
B036	Dunlop and Johnston/Rick Noviks	Any thoughts of a bid extension?	Refer to Addendum #3	02/02/17	02/02/17		02/03/17	3	
B037	Chemcote/Craig Pettit	In Section 2.6 (A) it states :"All mix design parameters shall be measured in accordance and comply with State Department of Transportation Standard Specifications". They then list individual specifications that are not similar to ODOT'S. Spec List / ODOT Binder / ODOT Surface VMA 15 / 13 / 16 Air Voids 3.5 / 4.0 / 3.5 Flow 2.0-4.0mm / 8-16mm / 8-16mm	Provide Asphalt Concrete Paving meeting Ohio DOT Specifications as follows: 441 Surface Course, Type 1 (448), PG64-22 and 441 Intermediate Course ,Type 2 (448)	02/02/17	02/02/17	02/09/17	02/09/17		
B038	Buckeye Power Sales/Harold Gilbert	I have a question on the Addendum 1 one line drawing Change: The change from a 200Amp Breaker to an 200 amp Fused Disconnect whom is to provide the Fused disconnect and where is it to be mounted.	NEMA 3R Fused disconnect to be mounted to the generator cabinet.	02/02/17	02/02/17	02/03/17	02/03/17		
B039	Buckeye Power Sales/Harold Gilbert	I have a question on the Addendum 1 one line drawing Change: The Rating on the Transfer show 200Amp one showing 3 pole and one show 4 pole which is correct and is the AIC 50,000AIC: the SB switch would need to be 260amp to meet that requirement. This switch is only seed with 60Amp Breaker.	Transfer Switch to be changed to 60 amp, see addendum #5.	02/02/17	02/02/17	02/09/17	02/09/17	5	
B040	Quality Welding/Steve Ambos	Can you provide us with a column to beam connection at roof and second floor? Column line A-8.7 would like to know connections at roof and 2nd floor.	All beam-to-column connections are to be bolted simple shear plate connections unless noted or detailed otherwise. Final details of connection (bolt quantity, plate thickness, etc.) is to be determined by the steel detailer and delegated design engineer (051200-1.4-A).	02/02/17	02/02/17	02/09/17	02/09/17		
B041	Dunlop and Johnston/Rick Noviks	Please clarify which Allowances are correct for Bid Package 6.0 is it the Scope of Work or spec section 01 21 00-3?	See addendum #4	02/02/17	02/03/17		02/03/17	4	
B042	Dunlop and Johnston/Rick Noviks	Please clarify if the $15,000 Allowance for general flooring prep is to be included in the General Trades and not in the Flooring Pkge?	See addendum #4	02/02/17	02/03/17		02/03/17	4	
B043	The Knoch Corp/Eric Binsley	Will there be another addendum that will revised the bid form to address the combination bid listed in Addendum 2?	See addendum #4	02/03/17	02/03/17		02/03/17	4	
B044	The Knoch Corp/Eric Binsley	Will the bidders questions (RFI's) and answers be sent out in a future addendum so we all have the same information?	See addendum #4	02/03/17	02/03/17		02/03/17	4	
B045	Radico/Brett Williams	Is plumbing scope of work shown on drawings MP1 and MP2 in Volume C to be included in the plumbing bid? Please advise.	See Addendum 5	02/03/17	02/03/17	02/09/17	02/09/17	5	
B046	Altman/Heather Curphey	I am being told that a couple of the models listed in the drawings for appliances have been discontinued. Will you be offering alternative model numbers in an addendum or do you want us to bid the replacement model from the manufacturer?	This is typical as model numbers change frequently. Please bid replacement model form manufacturer.	02/03/17	02/07/17	02/09/17	02/09/17		
B047	WARDCO/Bill Ward	What is the size of the Plaque?	see above reponse B031	02/03/17	02/07/17	02/09/17	02/09/17		
B048	WARDCO/Bill Ward	Is there a difference between the M2A and the M2B Mirrors…Size wise?	No, refer to A1.11. A&B refer to mounting heights.	02/03/17	02/07/17	02/09/17	02/09/17		
B049	WARDCO/Bill Ward	I've counted Room signs and found NO "L" signs…With the curvy arrows?	Delete sign type "L"	02/03/17	02/07/17	02/09/17	02/09/17		
B050	WARDCO/Bill Ward	Is there only -1- (one) Projection screen?	Yes	02/03/17	02/07/17	02/09/17	02/09/17		
B051	D.J. Fett/Setterlin	Sheet G3.0 – Note 54 – Is this included in the BP No. 1.0 storm system or is this part of BP No. 3.0?	See Addendum 5	02/06/17	02/07/17	02/09/17	02/09/17	5	
B052	D.J. Fett/Setterlin	Sheet G3.0 – Notes 18, 22, 23, & 56 – Are these items in BP No. 1.0?	See Addendum 5	02/06/17	02/07/17	02/09/17	02/09/17	5	
B053	D.J. Fett/Setterlin	Sheet G3.0 – Note 21 – Which Bid Package is providing this item?	See Addendum 4	02/06/17	02/07/17	02/09/17	02/09/17	4	
B054	D.J. Fett/Setterlin	Sheet G3.0 – Note 37 – I was searching to see who was responsible for the concrete wheel stops. I found them in specifications section 32 12 13. Then I realized that this specification section along with section 32 13 73 are not included in any of the bid packages except that the early site bid package states that it includes all of division 32. Please clarify.	See Addendum 4	02/06/17	02/07/17	02/09/17	02/09/17	4	
B055	D.J. Fett/Setterlin	Sheet S0.01 – Reinforced Concrete – Item 3. Contingencies states "PROVIDE LEAN CONCRETE (CLASS VI) UNDER FOUNDATIONS FOR ACCIDENTAL OVER EXCAVATION, SOFT SPOTS, AND UTILITY TRENCHES." Please clarify this item. How many yards are we to include for this contingency? Is this item for bid package No 3.0? Does it also pertain to the bid packages that have utility trenches?		02/06/17	02/07/17	02/09/17	02/09/17		
B056	D.J. Fett/Setterlin	4/G4.2 – Who is responsible for the excavation, stone base, and 4" concrete runway under the synthetic surface?	See Addendum 5	02/06/17	02/07/17	02/09/17	02/09/17	5	

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B057	Buckeye Power Sales/Harold Gilbert	The one line now shows 200Amp Fussed disconnect I need to know who is responsible for providing the disconnect.		02/06/17	02/07/17	02/09/17	02/09/17		
B058	Buckeye Power Sales/Harold Gilbert	The one line now shows a 60amp Line breaker powering a 200amp Transfer switch is this correct.	Transfer Switch to be changed to a 60 amp Switch. See addendum #5.	02/06/17	02/07/17	02/09/17	02/09/17	5	
B059	Buckeye Power Sales/Harold Gilbert	The one line now shows one switch being 3 pole and the other showing 4 pole which is correct.	They are both correct, delta transformer and a neutral needed panel.	02/06/17	02/07/17	02/09/17	02/09/17		
B060	Buckeye Power Sales/Harold Gilbert	The ACI Rating is shown as 50000AIC is this correct.	This is a place holder until the short circuit study is complete.	02/06/17	02/07/17	02/09/17	02/09/17		
B061	Buckeye Power Sales/Harold Gilbert	The Spec is calling for Both Manual And Automatic Which is correct.	Automatic.	02/06/17	02/07/17	02/09/17	02/09/17		
B062	Timberwood Landscape/Sam Duff	Is there any seeding required directly around the football field? Inside fence?	See Section 01 12 00 - 32.1 Landscaping and Final Sitework	02/06/17	02/07/17	02/09/17	02/09/17		
B063	Miles-McClellan/Steve Sausman	Is the concrete under the bleachers part of Bid Package 3.0? If so, please supply some details for this area.	See Addendum 5	02/07/17	02/07/17	02/09/17	02/09/17		
B064	Setterlin/DJ Fett	What is the ceiling finish in room 151 and S6? The RCP does not appear to be correct. Cannot see why the architect wants DEFS in these locations, should most likely be painted exposed deck.	This is exposed pre-cast plank, to be painted	02/07/17	02/07/17	02/09/17	02/09/17		
B065	C & T Design/Brian Huston	on the bid date for Hilliard. We see addendum 3 changed the bid date to 2/14. However, addendum 4 still referenced 2/9 on page 4 of the instructions to bidders. Could you confirm which date is correct?	See Addendum 4/5	02/07/17	02/07/17	02/09/17	02/09/17		
B066	miles-McClellan/Toni Callahan	Is there was a schedule for this project?	See Section 01 32 00. Only milestone dates are identified.	02/07/17	02/07/17	02/09/17	02/09/17		
B067	Setterlin/DJ Fett	Please see attachments from Setterlin	Concession Building Coiling Counter Doors A102B and A012C - Provide Cornell Slip-In Counter Door ESC20 with integral frame and sill as specified or equal with other manufactures listed. Counter door coil and housing shall be face mounted above opening.	02/07/17	02/07/17	02/09/17	02/09/17		
B068	Rezod, LLC/Bill Staton	Per Addendum #3, Spec Section 01 10 00, General Requirements 1.5, we are assuming that the Item No. 1 items (Trane Mechanical Equipment) that is being supplied by the owner is to be received and installed per Bid Package 23.0, and that BP 6.0 will be responsible for receiving and installation of the Item No. 2 items (Toilet, Bath, and Laundry Accessories) and receiving and installation of the Item No. 3 items (Interior and Exterior Scoreboards), with final power connections to the scoreboards by Bid Package 26.0. Is this assumption correct?	Yes.	02/07/17	02/08/17	02/09/17	02/09/17		
B069	Vaughn Industries/Jamie Herring	Spec Section 23 11 23 states that all natural gas piping downstream of the gas meter is to be installed by the HVAC contractor but all gas piping is shown on the plumbing drawings. Please specify who is responsible for the installation of the natural gas piping.	Section 23 11 23 is in the HVAC scope of work.	02/07/17	02/08/17	02/09/17	02/09/17	5	