TOWN OF TEMPLETON, MASSACHUSETTS
160 Patriots Rd., Rm. 6
East Templeton, MA 01438
Invitation for Bids
Police Station – HVAC System

ADDENDUM #2 – September 20, 2022

All bidders are required to acknowledge addenda in the appropriate section of the bid documents. Failure to do so may result in rejection of the bid.

1.) **Within HVAC Police Station Bid Packet "Attachment A Specifications prepared by BLW Engineers, Inc." shall be replaced with the updated "Addendum 2 Attachment A Specifications and Plans" contained herein.**

- End -

ADDENDUM #2

ATTACHMENT A

TABLE OF CONTENTS
TECHNICAL SPECIFICATIONS

DIVISION 01

SECTION 01 00 00

GENERAL REQUIREMENTS

PART 1 - SUMMARY OF WORK

1.1 CONTRACT DOCUMENTS

A. The general provisions of the Contract Documents and General Conditions apply to the work specified in this section.

1.2 SPECIFICATION ARRANGEMENT

A. Titles to and arrangements of sections and paragraphs in these specifications are used merely for convenience and shall not be taken as a correct or complete segregation of the several categories of materials, equipment and labor, nor as an attempt to outline or define jurisdictional procedures.

1.3 INTENT

A. The entire work provided for in these technical specifications and on the Drawings shall be constructed and finished in every respect in a good workmanlike and substantial manner. All parts necessary for the proper and complete execution of the work whether the same may have been specifically mentioned or not, or indicated in a manner corresponding with the rest of the work shall be provided as if the same were particularly described and specifically provided for herein. It is not intended that the Drawings shall show every detailed piece of material or equipment, but such parts and pieces as may be in accordance with the best practices and regulatory requirements, even though not shown, shall be furnished and installed. All materials and equipment shall be new, unless specifically stated otherwise in these Contract Documents.

1.4 SCOPE

A. The work required by these specifications shall include furnishing all labor, skill, supervision, tools, construction plant, equipment and materials and performing all operations necessary for the properly completed contract work as shown on the Drawings, as mentioned in these specifications, and as evidently required, to the complete satisfaction of the Engineer.

1.5 GENERAL DESCRIPTION OF WORK

A. Templeton Police Station, 33 S. Rd, Templeton, MA 01468

1. HVAC: Installation of (2) new hot water reheat coils, energy recovery unit, and associated controls.

1.6 ORDER OF AND COMPLETION OF WORK

A. Upon the award of the contract, the Contractor shall commence work immediately, carry it on with all reasonable and proper activity and dispatch, give all notices, take out all permits and pay all charge, fees and rates therefore, and bring the work to entire completion within the period of time specified in the contract. "Entire Completion" as herein used, shall be construed as meaning the completion of all work as called for by these specifications and the contract executed in accordance herewith and the date when such completion takes place will be decided by the Engineer.

1.7 PROTECTION - IN GENERAL

A. The Contractor is to cover and protect his work and materials from all damage during the process of the work and deliver the whole in a clean perfect condition.

1.8 CONSTRUCTION RISKS

A. The Contractor will understand that the materials, work in place and equipment, are entirely at his risk, including loss by theft or fire during the construction period, and he will be held responsible and liable for its safety.

1.9 SANITARY ACCOMMODATIONS

A. The Contractor shall use a designated toilet within the building.

1.10 UTILITIES

A. Water and electric power shall be available from existing sources where Contractor's use is not excessive and does not interfere with normal use of the building. Where existing utilities of the facility are not adequate or cannot be used, the Contractor is responsible for providing alternative sources, the cost of which is to be included in bid price. The use of the facility's utilities shall be coordinated through the Engineer.

B. Fuel oil, temporary lighting, gas and other utilities (except for heating the building) shall be provided by the Contractor, the cost of which is to be included in the Bid Price.

C. The Contractor shall provide all wiring, cables, hoses, safety devices, switches, etc., necessary for the utilities used by the Contractor and remove the same upon completion.

1.11 RECORD DRAWINGS

A. The Contractor shall maintain at the job site, at all times, a complete and separate set of black line prints of the Drawings on which he shall mark clearly, accurately, and promptly as the work progresses, any changes in the work made by change orders or other instructions issued by the Engineer. These drawings shall be used daily to record the progress of the work by coloring in the various pipes, equipment and associated appurtenances when installed. This progress shall incorporate both the above stated changes together with all other deviations from the design, whether resulting from the job conditions encountered in the field or from any other cause. Principal dimensions of all concealed work and valve numbers shall be recorded as applicable.

B. The marked-up prints shall be used as a guide in determining the progress of work installed. The Engineer will inspect these prints periodically and if found to be inaccurate or incomplete, they shall be corrected immediately.

1.12 At completion of work these marked-up prints shall be the basis of the preparation of the final record drawings. Each drawing shall be marked "RECORD AS BUILT DRAWINGS" and dated when printed. Two complete and reproducible sets of as-built drawings must be submitted before final acceptance of the work. The cost of preparing the record drawings shall be borne by the Contractor.

1.13 ENGINEERING (Refer to "General Specifications")

1.14 OFFICE

A. None required.

1.15 VISITATION TO SITE

A. All bidders shall, before submitting a bid, visit the site to familiarize themselves with existing conditions. Lack of knowledge of on-site conditions shall not be cause for changes to the contract values.

1.16 DISPOSAL OF WASTE MATERIALS

A. The Contractor shall be responsible for the removal of all waste material and equipment from the site.

B. The Contractor shall be responsible for the removal of all hazardous materials and improperly licensed disposal sites, disposal and transportation permits.

1.17 BUILDING SECURITY

A. The Owner will provide security for the building, however, it shall be the responsibility of the Contractor to secure all exit doors in the area where work is to be performed, coordinating same with the chief custodian or an assigned representative of the Owner. The Owner will not provide security or be responsible for the Contractor's property, fixtures, fittings, tools, equipment, etc.

1.18 ACCESS TO BUILDING

A. The building will be opened during regular working hours. Exceptions to this clause may be made by mutual agreement between the Owner and the Contractor in the initial phase of the project.

1.19 PUBLIC PROTECTION

A. While the work is in progress, erect safe barricades to effectively protect persons from injury.

B. Protect all ground areas where stationary equipment is placed and protect wall areas from hoisting or material conveyers.

C. Power-brooming may create a dust problem in finished areas. The Contractor will be responsible for spreading drop cloths or plastic over furniture. Clean up of these areas so affected will be the responsibility of the Contractor.

D. During the demolition and boiler rigging work, plywood barriers shall be installed at all corridors leading to the loading dock.

1.20 CUTTING AND PATCHING

A. General Requirements:

1. All of the contract documents including General and Supplementary Conditions and Division 01 General Requirements, apply to the work of this Section.

B. Work Included:

1. The intent of this Section is to describe, in general, procedures for performance of minor alterations, minor removals, and cutting and patching including:

a. All necessary cutting, coring, drilling, grouting, and patching to fit together the several parts of the work including repairs in kind of disturbed existing surfaces.

b. Where conflicts exist between the requirements specified herein and those of the Technical Trade Sections, those of the Trade Sections shall prevail.

c. The Contractor shall be responsible for all his cutting, coring, drilling, grouting, fitting and patching of the work that may be required to make its several parts come together properly and fit, as shown upon, or reasonably implied by, Drawings and Specifications for completed structure, and he shall make good after them as Engineer may direct.

d. Expense caused by defective or ill-timed work shall be borne by party responsible therefore.

C. Cutting and Patching Operations:

1. Patch and refinish to match adjacent work in quality and appearance at locations where installed work has been installed and requires reworking to accommodate other work, or has been damaged.

2. Patch and match using skilled mechanics. The quality of patched or extended work shall be not less than that specified for new work.

3. Patch or replace any portion of a finished surface which is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.

a. Provide adequate support or substrate prior to patching the finish.

b. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over entire surface.

c. When surface finish cannot be matched, refinish the entire surface to the nearest intersections.

4. Make the transition as smooth and workmanlike as possible. Patched work shall match adjacent work in texture and appearance so that the patch or transition is invisible to the naked eye at a distance of five feet.

END OF SECTION

DIVISION 01

SECTION 01 10 00

SPECIAL CONDITIONS

PART 1 - GENERAL

1.1 RESPONSIBILITY AND COMPLIANCE

A. All requirements set forth under this Section are directed to the General Contractor.

B. Be responsible for arranging for facilities as specified herein and as required for proper and expeditious prosecution of the work. Pay costs for such general services and temporary facilities, except as otherwise specified, until final acceptance of the work, and remove same at completion of work.

C. Comply with applicable OSHA, state, and municipal regulations and requirements for services and facilities required under this section, and in performance of all requirements of this Contract.

1.2 COORDINATION OF THE WORK

A. The Contractor shall coordinate all work with all adjacent work and shall cooperate with all other trades so as to facilitate general progress of the work. Each trade shall afford all other trades every reasonable opportunity for the installation of their respective work and for the storage of their materials and equipment. The Contractor shall be responsible for coordination.

B. The Contractor shall assume responsibility for the correctness and adequacy of his work. The Contractor shall be responsible for and pay for all damages done by his work or his workmen.

C. The Contractor shall cooperate with and provide access and working area to other Owner's contractors for the performance of specific work assigned to them.

1.3 PROJECT MEETINGS

A. The Contractor will be required to meet with the Owner, Engineer and the Owner's representatives, at the site of the work, at regular intervals during the course of the contract for purposes of progress review, coordination of shop schedules, sample submittals, and any other items of work requiring such coordination.

1.4 EXISTING BUILDING CONDITIONS

A. Before ordering any materials or doing any work, verify all measurements and existing building conditions and be responsible for the correctness of same. No extra charge or compensation will be allowed on account of difference between actual dimensions and the measurements indicated on the Drawings; any difference which may be found shall

be submitted to the Engineer in writing for consideration before proceeding with the work.

1.5 PROTECTION OF EXISTING CONDITIONS

A. Take all proper precautions to protect the Owner and adjoining property from injury and unnecessary interference; and replace or put in good condition any existing items which are damaged or injured in carrying out the work, unless designated to permanently be removed or demolished.

B. Keep all access drives and walks clear of debris during building operations. Repair streets, drives, curbs, sidewalks, poles, and the like, where disturbed by building operation and leave them in as good condition after completion of the work as before operations started.

1.6 TESTS AND INSPECTION

A. Make, or have made, such tests and inspections on workmanship and materials as may be required by the building code, state or municipal laws, or as called for under the various sections of this Specification.

B. Bear all expense to such tests and inspections, unless otherwise specified under the various sections of the Specifications and furnish all labor, tools, instruments, water, temporary power and light, construction, and equipment necessary for these tests and inspection. Furnish records of all tests and inspections to the Engineer. Remove all temporary work, materials, and equipment upon completion of tests and inspections.

C. Where, the various sections of the Specifications, inspections and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and testing shall be subject to the approval of the Engineer.

D. Should any material or work be found, after testing or inspections, to be defective or inferior, remove and replace such material and/or work with new sound materials and/or work as approved by the Engineer, and bear all costs thereof.

1.7 FIRE PROTECTION AND PREVENTION

A. Comply with the following minimum requirements for fire prevention:

1. Provide sufficient quantity of carbon dioxide fire extinguishers in all areas of work.

2. Do not permit an accumulation of inflammable rubbish to stay in the building overnight.

3. Store no more than one gallon, in an approved safety can or sealed container, of any volatile inflammable liquid in any portion of the building.

4. Keep all used paint rags in a can with sufficient water to cover.

5. Make arrangements for periodic inspection by local fire protection authorities and insurance underwriters' inspections. Cooperate with said authorities to facilitate proper inspection of the premises. Comply with all applicable laws and ordinances and with the Owner's fire prevention requirements.

6. Ensure that tarpaulins that may be used during construction of work are made of material which is resistant to fire, water, and weather, are U.L. approved, and comply with FS-CCC-D-746.

1.8 ACCIDENT PREVENTION

A. Comply with all federal, state and municipal recommendations and requirements for safety, and accident prevention, and those of the Associated General Contractors of America, and the American Standards Association Standard A10.2. Ensure that the field superintendent conducts regular, frequent inspections of the site for compliance with safety regulations.

B. Neither the Owner nor the Engineer shall be responsible for providing a safe working place for the Contractor, contractors, or their employees, or any individual responsible to them for the work.

1.9 WELDING AND CUTTING

A. Where electric or gas welding or cutting work is done above or within then (10) feet of combustible material or above space that may be occupied by persons, use interposed shields of incombustible material to protect against fire damage or injury due to sparks and hot metal.

B. Place tank supplying gases for gas welding or cutting at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position where practicable. Such tanks, when stored for use, shall be remote from any combustible material and free from exposure to the rays of the sun or high temperatures.

C. Maintain suitable fire extinguishing equipment near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, thoroughly wet down the surroundings adjacent to welding and cutting operations.

D. Station a workman equipped with suitable fire extinguishing equipment near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor or wall openings or lodge in any combustible material. Keep the workman at the source of work which offers special hazards for thirty (30) minutes after the job is completed to make sure that smoldering fires have not been started.

E. Place a qualified electrician in charge of installing and repairing electric or arc welding equipment.

F. All welding and cuttings shall be performed by certified welders.

G. Contractor shall be responsible for all costs associated with fire details required by the Local Fire Department during welding and cutting operations.

1.10 OVERLOADING

A. Do not permit materials and fabricated work to be stacked on, or be transported over, floor and roof construction that would stress any of said construction beyond the designed live loads.

1.11 RUBBISH REMOVAL

A. Ensure that each workman engaged upon the work bears his full responsibility for cleaning up during and immediately upon completion of his work, and removes all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of his work, but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the building and site clean and free of debris, leaving all work in a clean and proper condition satisfactory to the Engineer and/or Owner.

B. Do not permit rubbish to be thrown from the windows of the building.

C. Immediately after unpacking, all packing materials, case lumber, excelsior, wrapping or other rubbish, flammable or otherwise, shall be collected and removed from the building and premises.

1.12 BLASTING

A. No blasting will be permitted.

1.13 WORK AREAS, STORAGE, ACCESS, AND PARKING

A. The Contractor's work areas shall be as designated on the Drawings and shall be strictly adhered to. Access to the existing building shall be kept free of all obstructions at all times. Assume full responsibility for trespass on and/or damage to other property by a person employed on the project.

B. Storage trailer shall be provided by the Contractor for storage of materials on site. Trailer location shall be coordinated with Owner. Storage of materials beyond the designated area will not be permitted.

C. Vehicular access to the site, and parking for employees' vehicles shall be restricted only to the specific areas designated by the Owner.

1.14 TEMPORARY SCAFFOLDING AND CONVEYANCES

A. Furnish, install, maintain, remove and pay for all temporary staging and planking, ladders, hoisting (including operator), rigging, and safety devices for all trades.

B. Staging shall be approved design, erected and removed by experienced stage builders and shall have all accident prevention devices required by state and local laws.

C. Permit no materials to be passed through the finished openings of exterior walls, without first providing protection to the opening thereof of a type as approved by the Engineer.

Be responsible, and bear all costs, for repairs and/or replacement of damaged work caused thereby.

1.15 TEMPORARY PROTECTION

A. Furnish, erect, and maintain for the duration of the work period, temporary fire-retardant, dustproof coverings as required to prevent the spread of dust beyond the immediate area where work is being performed.

1.16 ADVERTISING MATTER

A. Signs or advertisements will not be allowed on building enclosure or premises, unless written approval has been obtained from the Owner.

B. Advertising matter shall not appear on equipment, unless so specified. However, nameplates of a nominal size and inconspicuous nature will be permitted.

1.17 MUNICIPAL POLICE AND FIRE DEPARTMENT SERVICES

A. Make all necessary arrangements with the municipal police and fire departments in advance of times when regular off-duty, or reserve police officers or firemen will be needed for traffic control protection or fire watch, due to the operations performed under this Contract. Pay police officers and firemen at the prevailing wage rates in the municipality for such services. Extend the Workingmen's Compensation Insurance and Employer's Liability Insurance, required under the General Contract to cover police and firemen used on the project.

1.18 USE AND OCCUPANCY PRIOR TO ACCEPTANCE BY THE OWNER

A. Prior to the date of completion as stipulated in the Contract, or authorized extension thereof, the Contractor agrees to permit selected use and occupancy of the building(s) or any portion thereof before final acceptance by the Owner. The building will be occupied, for normal function thereof, during the stipulated construction period.

B. If the project has not been completed and accepted by the Owner, by the date of completion, the Owner at his election may from time to time occupy the building(s) or any portion of any building as the work in connection therewith is completed to such a degree as will, in the opinion of the Owner, permit the use of the building(s) or other portions of the project for the purpose for which they are intended.

C. The Owner will, prior to any such partial occupancy, give notice to the Contractor thereof and such occupancy shall be predicated upon the following items:

1. In the case of partial occupancy prior to the stipulated completed date, the Owner shall secure endorsement from the insurance carrier and consent of the surety permitting occupancy of the building or use of the project during the remaining period of construction.

2. In the case of partial occupancy after the stipulated completion date, the Contractor shall extend all the necessary insurance coverage as stipulated until

the date of final acceptance of the project is issued by the Owner. It is further noted that the use and occupancy prior to the formal acceptance does not relieve the Contractor of his responsibility to maintain the insurance coverage as required under the supplementary conditions.

3. The one-year guarantee period called for in the contract documents shall not commence until the date of Substantial Completion of all work under the Contract, as determined by the Engineer.

4. The occupancy of the building or any portion thereof by the Owner shall not constitute an acceptance of work not performed in accordance with the contract documents or relieve the Contractor of liabilities, to perform any work required by the Contract, but not completed at the time of occupancy.

5. The Contractor shall be relieved of all maintenance costs on the portion of the building occupied under this agreement.

6. The Contractor will not be held responsible for wear and tear or damage resulting solely from temporary occupancy.

1.19 GLASS BREAKAGE

A. The contractor shall be responsible for all breakage of glass as a direct or indirect result of his work or actions of his workmen, from the time the construction operations commence until the project is complete. Replace all broken glass and deliver the building with all glazing intact and clean.

1.20 DAMAGE TO EXISTING SURFACES

A. The Contractor shall be fully responsible for any damage to existing surfaces caused by the operations of this Contract and shall correct all such damage to the Owner's satisfaction, at no additional cost to the Contract.

1.21 FINAL CLEANING

A. Before the final inspection, thoroughly clean the entire exterior and interior areas of the building where construction work has been performed, the immediate surrounding areas, and corridors, stairs, halls, storage areas, temporary offices and toilets, including the following:

1. Remove all construction facilities, debris, and rubbish from the Owner's property and legally dispose of same beyond the site limits.

2. Sweep, dust, wash, and polish all finished surfaces. This includes cleaning of the work of all finished trades where needed, whether or not cleaning for such trades is included in their respective sections.

3. Leave pipe and duct spaces, chases, and furred spaces thoroughly clean.

4. Wash and polish all new glass on both sides, such work being performed by a window cleaning contractor specializing in such work.

5. Clean all new and altered ceilings, wall surfaces, floors, window and door frames, hardware, metal work, glass, glazing, enameled metals, and the like.

END OF SECTION

DIVISION 01

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Use of site.

B. Access to Site.

C. Coordination with occupants.

D. Worker conduct, appearance and Work Rules.

1.2 USE OF SITE

A. Use of, and access to, site will be Subject to special requirements of the Owner, as directed.

1. Prior to beginning the Work of this Contract, the Contractor shall meet with the Owner's Project Manager, and the Engineer to determine procedures regarding access and use of the site, locations and access to staging and storage areas, tree protection, temporary barriers and fencing, and any special site conditions or restrictions regarding the use of the site areas surrounding the construction.

2. Hours of construction, must be verified with the Owner's Project Manager. Provisions for working hours other than those originally agreed upon, must be arranged with the Owner and confirmed 48 hours before the phase of Work requiring special work hours begins.

3. Any work performed beyond regular working hours will be subject to overtime custodial rates.

4. Interior work involving cutting, drilling, hammering or other dust and noise generating procedures must be verified with the Owner.

5. Use of Owner's receiving/shipping areas and loading dock: Contractor is responsible to deliver and receive all materials and equipment. Contractor is not permitted to have supplies or equipment shipped directly to them in care of the Owner.

6. The Owner will supply storage facilities for equipment and furnishings scheduled for salvage and reuse, except equipment scheduled for refinishing or repair.

7. Security: Owner access must be permitted at all times in all construction areas, for purposes of security.

B. The Contractor, subcontractors and their personnel are not permitted to use any of the Building's facilities or be present, unless by specific invitation, in any areas of the building which are under control of, or occupied by the Owner.

C. Confine operations to areas within Contract limits indicated on the Drawings. Portions of the site and building beyond areas in which construction operations are indicated are not to be disturbed.

1. Use of on-site areas for storage of materials must be prearranged with Owner. Schedule deliveries to minimize requirements for storage of materials.

1.3 ACCESS TO SITE

A. The Owner intends to occupy parking areas and access roads during construction. Notify the Owner of work which will affect the use of these areas; coordinate work schedule with Owner. The Contractor shall consult with the Owner on the best ways to provide access and on changes to access areas as the work progresses.

B. Keep all public roads and walks, and access drive to facility clear of debris caused by this Work during building operations.

1.4 COORDINATION WITH OCCUPANTS

A. General: Perform all work in such a manner as to prevent interference with the Owner's functions of the Buildings, nor endanger the health, safety and well-being of the facility, staff and building's occupants.

1. Take all measures to ensure the safety of staff and the general public. The Contractor must take every reasonable precaution and employ all necessary measures including extra cleaning, special supervisory personnel, and additional temporary barriers and signage to facilitate the clean, quiet, safe, and continual operation of the facility.

2. The work will be done in an occupied building, on an active site, that is accessible to the public. It is imperative that the Contractor, its subcontractors and all their personnel treat the building occupants with consideration and respect. No unnecessary noise or disruption of the academic or social activities of the Building will be permitted.

B. Interruption of services: Any major work entailing disruption to heating, lighting, life safety system utility connections or other similar major disruption to building functioning must be coordinated with the Owner, and temporary services, safety precautions, or connections provided. Do not shut down any service without approval of the Owner's Project Manager.

1. Provide both Owner's Project Manager and Engineer with 48 hour notification for any disruption of service; provide notification for connecting, disconnecting, turning on or turning off any service which may affect Owner's operations.

2. Provide 48 hour notice to local fire department of disruptions in electrical services, fire alarm services and emergency power services.

3. Any action either planned or unplanned, by the Contractor which impairs the operation of anyone or the activation of the fire alarm detection and or suppression system shall cause notification of the appropriate party. In case of unplanned, accidental, impairment, the Contractor will immediately notify the Owner's Project Manager. The Contractor should be prepared to provide assistance as required to correct the problem.

1.5 WORKER CONDUCT, APPEARANCE AND WORK RULES

A. The conduct and appearance of each worker at the job site is of paramount importance. The Owner's Project Manager, acting in behalf of the Owner, reserves the right to require any worker to be banished from the Site.

B. Privacy: Conduct all work of the Contract with the maximum effort to maintain the privacy of the Owner's operations and staff. Do not permit the workers to peer into other areas of the building visible from the work area. Invasion of privacy is a major infraction of the work rules.

C. General Conduct and Demeanor: All construction workers shall treat all other workers, Owner's staff and the public with respect and courtesy.

D. Physical Appearance: Require each worker to dress appropriately in a clean, neat, and professional manner. Workers may not be "shirtless" at anytime.

E. Radios and Television: The use of entertainment devices, including personal devices with headphones or earphones is strictly prohibited at all times. Control the volume of communication radios and loudspeakers to avoid creating a nuisance.

F. Smoking: Smoking is strictly prohibited on building property.

G. Language: Foul and rude language is strictly prohibited.

H. Physical Actions: Running, horseplay, fighting, and other unprofessional conduct is prohibited. Fighting is a major infraction of the work rules.

I. Stealing: Stealing of any materials, objects, furnishings, equipment. fixtures, supplies, clothing, or other items will not be tolerated and is a major infraction of the work rules.

J. Sexual Harassment: All forms of physical and verbal sexual harassment will not be tolerated and is a major infraction of the work rules. Sexual harassment includes, without limitation: touching, whistling, sexually explicit stories, jokes, drawings, photos and similar representations, exhibitionism and all other sexually oriented offensive behavior.

K. Employees of the contractor, vendors, sub-contractors, sub-sub contractors and any and all workers shall wear identification badges at all limes during work on the site. Badges shall be issued by the General Contractor.

L. Warnings and Dismissal:

1. For minor infractions of the rules, the Owner's Project Manager may issue a warning. Only one warning will be allowed per worker. A second infraction will result in immediate dismissal of the worker from the Site.

2. For major infractions of the rules, the worker shall be dismissed immediately without warning and is subject to possible criminal prosecution.

M. Notification of Workers: Clearly notify and educate each worker about these Work Rules and the requirements for worker conduct and appearance.

1. Recommendation: The Owner's Project Manager recommends that the Contractor notify each worker of the work rules in writing and obtain a signed acknowledgment of the worker's understanding of the work rules as a condition of employment on this project.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION

DIVISION 01

SECTION 01 31 00

SCOPE OF WORK

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The Contractor, as a minimum, shall fulfill the Contract Schedule specified hereinafter.

B. Provide all necessary manpower, overtime work, materials and equipment, permits, etc., to complete the contract schedule. The building will be available to the Contractor from 7:00 A.M. to 6:00 P.M. If, in the opinion of the Town, the Contractor is disruptive to the station operation or safety of the occupants, the Contractor shall perform all work during non-business hours at no additional cost to the Owner.

C. All cutting in occupied areas shall be performed during non-occupied periods.

D. A legal means of egress shall be maintained during construction at all times.

1.2 SCOPE OF WORK

A. Installation of new hot water reheat coils and associated dehumidification controls for 2 existing air handling units.

B. Furnish and install new energy recovery ventilation unit in attic. Connect to existing ductwork.

C. Existing controls shall remain. New controllers shall be provided for the dehumidification operation and energy recovery unit. A new front end system including dynamic graphics shall be provided. The front end system shall be compatible with the existing Johnson Controls system.

D. Phased renovation areas will be coordinated with the Town of Templeton and Templeton Police Department so as to minimize disruptions to the Police Department operations as much as possible.

1.3 SPECIAL PROJECT REQUIREMENTS

A. Fire Watches:

1. Contractor shall coordinate and pay all associated costs of fire watches required by the Town of Templeton Fire Department.

1.4 INTENT

A. The entire work provided for in these technical specifications and on the Drawings shall be constructed and finished in every respect in a good workmanlike and substantial manner.

All parts necessary for the proper and complete execution of the work whether the same may have been specifically mentioned or not, or indicated in a manner corresponding with the rest of the work shall be provided as if the same were particularly described and specifically provided for herein. It is not intended that the Drawings shall show every detailed piece of material or equipment, but such parts and pieces as may be in accordance with the best practices and regulatory requirements, even though not shown, shall be furnished and installed. All materials and equipment shall be new, unless specifically stated otherwise in these Contract Documents.

END OF SECTION

DIVISION 01

SECTION 01 33 00

SUBMITTALS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The "Town of Templeton Owner and Contractor Contract", along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The sections of these specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01; "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

1.2 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Samples:

1. Samples of sufficient size and quantity shall clearly illustrate:

a. Functional characteristics of product or material, with integrally related parts and attachment devices.

b. Full range or color samples.

B. General Contractor's Responsibilities:

1. Coordinate each submittal with requirements of contract documents.

2. The General Contractor's responsibility for errors and omissions in submittals is not relieved by the Engineer's review and approval of submittals.

3. Notify the Engineer in writing at time of submission, of deviations in submittals from requirements of contract documents or previous submissions.

4. Work that requires submittals shall not commence unless submittals with Engineer's stamp and initials or signature indicating review and approval.

5. After Engineer's review and approval, distribute copies.

C. Submission Requirements:

1. Make submittals promptly in accordance with approved schedules, and in such sequence as to cause no delay in the work.

2. Shop drawings shall be submitted in accordance with Division 01 - Contract Documents.

3. Submit number of samples specified in each Section of the Specification.

4. Forward submittals with transmittal letter, in duplicate.

5. Submittals shall include:

   a. Date and revision dates

   b. Project title and number

   c. The names of:

      1) Engineer

      2) General Contractor

      3) Supplier

      4) Manufacturer

      5) Separate detailer when pertinent

   d. Identification of product or material

   e. Relation to adjacent structure or materials

   f. Field dimensions, clearly identified as such

   g. Specification section number

   h. Applicable standards, such as ASTM number

   i. A blank space, five-inch by four-inch, for designer's stamp

   j. Identification of deviations from contract documents

   k. General Contractor's stamp, initialed or signed certifying review and approval of submittal.

D. Re-submission Requirements:

1. Product Data and Samples: Submit new data and samples as required from previous submittals.

E. Distribution of Submittals After Review and Approval:

1. Distribute copies of shop drawings and product data that display the Engineer's stamp to appropriate Sub-Contractors.

2. Distribute one approved copy of shop drawings and product data to the project manager.

3. Distribute samples as directed by the Engineer.

END OF SECTION

DIVISION 01

SECTION 01 50 00

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The "Town of Templeton Owner and Contractor Contract", along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The sections of these specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01; "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

1.2 REQUIREMENTS

A. Temporary Water

B. Weather Protection

C. Temporary Power

D. Hoisting Equipment and Machinery

E. Staging

F. Maintain Access

G. Dust Control

H. Noise Control

I. Cleaning and Protection During Construction

J. Toilet Facilities

K. Use of Site

1.3 TEMPORARY WATER

A. The Contractor shall arrange with the Owner if he requires water for use during construction. Water will be furnished without cost to the Contractor, but he shall pay for the cost to install, maintain and remove any necessary temporary connections.

B. Use of water may be discontinued by the Owner if, in the opinion of the Owner, it is wastefully used.

C. The General Contractor shall provide an adequate supply of drinking water from approved sources of acceptable quality, satisfactorily cooled, for his employees.

1.4 WEATHER PROTECTION

A. The General Contractor shall provide protection of interior spaces from moisture during inclement weather.

B. Installation of weather protection and heating devices shall comply with all safety regulations including provisions for adequate ventilation and fire protection devices.

1.5 TEMPORARY POWER

A. The General Contractor shall utilize existing 120 volt receptacles and panelboards for any power requirements.

B. The Owner shall pay for the cost of electric energy consumed by himself.

C. The General Contractor shall furnish all extension cords, sockets, motors and accessories required for their work.

1.6 HOISTING EQUIPMENT AND MACHINERY

A. All hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the work shall be furnished, installed, operated and maintained in safe condition by the General Contractor. All costs for hoisting operating services shall be borne by the General Contractor.

1.7 STAGING

A. All staging required to be over eight feet in height, shall be furnished and erected by the general contractor and maintained in safe condition by him.

1.8 MAINTAIN ACCESS

A. The General Contractor shall maintain all entrances and exits from the building for the duration of the contract as well as access to and around the building for vehicular traffic and authorized personnel.

B. All materials resulting from demolition and removal operations shall be transported to the ground into dumpster bodies.

1.9 DUST CONTROL

A. The General Contractor shall provide adequate means for the purpose of preventing dust caused by construction operations throughout the period of the construction contract.

B. The committing of nuisances and creating dust on the land and adjacent property shall be rigorously prohibited and adequate steps taken to prevent it.

C. This provision does not supersede any specific requirements for methods of construction or applicable general conditions set forth in the Contract Articles with added regard to performance obligations of the general contractor.

1.10 NOISE CONTROL

A. Develop and maintain a noise-abatement program and enforce strict discipline over all personnel to keep noise to a minimum.

B. Execute construction work by methods and by use of equipment which will reduce excess noise.

1. Equip air compressors with silencers, and power equipment with mufflers.

2. Manage vehicular traffic and scheduling to reduce noise.

1.11 CLEANING AND PROTECTION DURING CONSTRUCTION

A. Unless otherwise specified under the various trade sections of the specifications, the General Contractor shall perform clean-up operations during construction as herein specified. Location of any dumpsters, storage trailers, or equipment left overnight shall be closely coordinated with and approved by the Owner.

B. Control accumulation of waste materials and rubbish; periodically dispose of off-site. The General Contractor shall bear all costs, including fees resulting from such disposal.

C. Maintain project in accordance with all local, Commonwealth of Massachusetts and Federal Regulatory Requirements.

D. Store volatile wastes in covered metal containers and remove from premises.

E. Prevent accumulation of wastes which create hazardous conditions.

F. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.

1. Do not burn or bury rubbish and waste materials on site.

2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.

G. All areas of the grounds, walks, bushes, etc., shall be restored to their original condition prior to construction and any damage caused by workmen, staging, chemicals, etc., shall be repaired by contractor at no cost to the Owner.

1.12 TOILET FACILITIES

A. The Contractor shall be allowed to use the existing toilet facilities in the building. However, if the Owner determines that the Contractor is not maintaining the facilities,

then the use of the toilets can be revoked and the cost for temporary facilities shall be paid for by the Contractor.

1.13 USE OF SITE

A. New construction and alterations work shall be scheduled and performed in a workmanlike manner. Light, ventilation, power, vehicle access and legal egress shall be maintained in the building at all times.

B. The work schedule shall be conducted generally between the hours of 7:00 A.M. to 5:30 P.M. Monday – Friday; Saturdays between 9:30 A.M. to 5:30 P.M., exclusive of holidays.

C. Any work performed beyond regular working hours will be subject to overtime custodial rates. The custodial overtime rate will be based on $46.00 per hour for time and half occurrences, anything in excess of eight (8) hours in a day or Saturdays, and $60.00 per hour for double time, which will cover Sundays and holidays.

D. Use only those areas so designated for construction and personnel parking, storage needs, etc.

E. Arrange and maintain materials in orderly manner with use of walks, drives, roads, and entrances unencumbered.

F. Before starting work, a barricade or fence shall be erected around the construction area. The barricade shall be moved or relocated from time to time as the work progresses in order to safeguard the town and the public from the hazards of the construction area.

END OF SECTION

DIVISION 01

SECTION 01 60 00

MATERIALS AND EQUIPMENT

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The "Town of Templeton Owner and Contractor Contract", along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The sections of these specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01; "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Comply with industry standards except when more restrictive tolerances or specified requirements indicate more rigid standards or more precise workmanship.

B. Perform work by persons qualified to produce workmanship of specified quality.

C. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, and racking.

2.2 MANUFACTURING INSTRUCTIONS

A. When work is specified to comply with manufacturer's instructions, submit copies as specified in Section 01 33 00 Submittals, and distribute copies to persons involved, and maintain one set in field office.

B. Perform work in accordance with details of instructions and specified requirements.

2.3 TRANSPORTATION AND HANDLING

A. Refer to Contract and General Conditions and Specifications sections for requirements pertaining to transportation and handling of materials and equipment.

B. Transport products by method to avoid product damage; deliver in undamaged condition in manufacturer's unopened containers or packaging, dry.

C. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

D. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct, and products are undamaged.

2.4 STORAGE AND PROTECTION

A. Refer to Contract and General Conditions and Specification section for requirement pertaining to transportation and storage and protection of materials and equipment.

B. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight enclosures; maintain within temperature and humidity ranges required by manufacturer's instructions.

C. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.

D. Arrange storage to provide access for inspection. Periodically inspect to assure that products are undamaged and are maintained under required conditions.

E. No extended storage of materials will be permitted on site. Delivery of materials shall be scheduled in a manner that will limit "on site time" to 30 days or less before installation.

END OF SECTION

DIVISION 01

SECTION 01 70 00

CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 GENERAL CONDITIONS

A. The "Town of Templeton Owner and Contractor Contract", along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The sections of these specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01; "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

1.2 FINAL CLEANING

A. Unless otherwise specified under the various sections of the specifications, the General Contractor shall perform final cleaning operations as herein specified prior to final inspection.

B. Maintain project site free from accumulations of waste, debris, and rubbish, caused by operations. At completion of work, remove water, materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.

C. Cleaning shall include all surfaces, interior and exterior in which the General Contractor has performed work and has used as access to areas where work was performed whether existing or new.

D. Refer to sections of the specifications for cleaning of specific products or work.

E. Use only those materials which will not create hazards to health or property and which will not damage surfaces.

F. Use only those cleaning materials and methods that are recommended by the manufacturer or surface material to be cleaned.

G. Employ experienced workmen, or professional cleaners, for final cleaning operations.

H. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.

I. Repair, patch and touch up marred surfaces to specified finish, to match adjacent surfaces.

J. Prior to final completion, the General Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

K. Broom clean exterior paved surfaces and rake clean other surfaces of the grounds.

1.3 GLASS

A. The General Contractor shall survey the worksite prior to the start of construction and identify all existing broken or cracked glass. All glass broken during performance of the work of this contract shall be replaced at the expense of the General Contractor.

B. Prior to final completion, or User Agency Use and Occupancy, the General Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces, and all work areas, to verify that the entire work is clean.

1.4 RECORD DRAWINGS

A. Record drawings shall consist of all the contract drawings.

B. The General Contractor and all subcontractors shall be required to maintain one set of record drawings, as the work relates to their sections of the specifications at the site.

C. The record drawings shall be stored and maintained in the field apart from other documents used for construction. The record drawings shall be maintained in a clean, dry and legible condition and shall not be used for construction purposes.

D. Record drawings, as submitted by the General Contractor, shall be verified in the field by the Architect. Verification by the Architect shall occur during the construction process and prior to the related work being completed and covered up.

E. The record drawing shall be available at all time for inspection by the Engineers. All deficiencies noted shall be promptly corrected.

F. The following information shall be indicated on the record drawings:

1. Record all changes, including change orders, in the location, size, number and type both horizontally and vertically of all elements of the project that deviate from those indicated on all the contract drawings.

G. The Engineer shall review the drawings and shall verify by letter to Town that the work is accurate. The Contractor shall arrange to have all changes incorporated on the original drawings. The Contractor shall submit to the Engineer, reproducible drawings on AUTOCAD disks and Adobe Acrobat files with two sets of prints to be used for the final inspection of the project. Inaccuracies in record drawings, as determined by the Engineer, may be grounds for postponement of the final inspection until such inaccuracies are corrected.

1.5 OPERATING AND MAINTENANCE REQUIREMENTS

A. At least one month prior to the time of turning over this contract to the Owner for Use and Occupancy or Final Acceptance, the General Contractor shall secure and deliver to the Owner via the Engineer two complete maintenance manuals, shop drawings, and other data.

1. Catalog sheets, maintenance manuals, and approved shop drawings of all equipment, piping and valve tag charts.

2. Names, address and telephone numbers of repair and service companies for each of the major systems installed under this contract.

1.6 CLOSEOUT REQUIREMENTS AND SUBMITTALS

A. Final Inspection:

1. The General Contractor shall submit written certification that:

a. Project has been inspected for compliance with contract documents and has satisfied the Building Department and the Templeton Fire Department.

b. Equipment and systems have been tested in the presence of Engineer and are operational and satisfactory.

c. Project is completed, and ready for final inspection.

2. Building Department Use and Occupancy Permit:

a. Arrange for a final inspection and secure the signed Certificate of Inspection for Use and Occupancy from the Building Department if required.

1.7 GUARANTEES AND WARRANTIES

A. Submit to the Engineer all extended guarantees and warranties that have been specified in various, individual sections of the specifications.

END OF SECTION

DIVISION 02

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. The Contractor, Subcontractors, and/or suppliers providing goods or services referenced in or related to this Section shall also be bound by the Documents identified in Division 01.

1.2 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building or structure, as indicated.

2. Demolition and removal of portions of interior partitions, as indicated.

3. Demolition and removal of finish systems, including ceilings and floor finishes as indicated.

B. Related Sections include the following:

1. Division 01 Section “Alternates” for selective demolition related to alternate scopes of work.

2. Division 01 for use of premises and Owner-occupancy requirements.

3. Division 01 for temporary construction and environmental-protection measures for selective demolition operations.

4. Division 01 for cutting and patching procedures.

5. Division 02 Abatement sections.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property.

C. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.

1.5 PRE-DEMOLITION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Division 01. Review methods and procedures related to selective demolition including, but not limited to, the following:

1. Inspect and discuss condition of construction to be selectively demolished.

2. Review structural load limitations of existing structure.

3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.

4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, for dust control and for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.

2. Interruption of utility services. Indicate how long utility services will be interrupted.

3. Coordination for shutoff, capping, and continuation of utility services.

4. Use of stairs.

5. Locations of proposed dust- and noise-control temporary partitions and means of egress.

6. Coordination of Owner's continuing occupancy of portions of existing building.

7. Means of protection for items to remain and items in path of waste removal from building.

D. Predemolition Photographs or Video: Submit before Work begins.

E. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

F. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: After selective demolition is complete, submit a list of items that have been removed and salvaged.

B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.8 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

1. Comply with waste ban regulations of the Massachusetts Department of Environmental Protection (MassDEP), 310 CMR 19.017, for disposal of asphalt pavement, brick, concrete, metal, and wood.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

1.9 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition

area. Conduct selective demolition so Owner's operations will not be disrupted.

1. Comply with requirements specified in Division 01 Section "Summary."

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: Hazardous materials are not expected to be present in construction to be selectively demolished.

1. Hazardous material remediation is specified in other Division 02 Sections.

2. If unidentified hazardous materials are encountered during the work, do not disturb hazardous materials or items suspected of containing hazardous materials. Stop all work on the project and immediately notify Architect.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Membrane roofing system.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PEFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

1. Comply with requirements specified in Division 01.

2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems, except as noted, indicated to remain and protect them against damage during selective demolition operations.

1. Comply with requirements for existing services/systems interruptions specified in Division 01.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Owner will arrange to shut off indicated services/systems when requested by Contractor.

2. If services/systems are required to be removed, relocated, or abandoned,

before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

3. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC

a. Systems, equipment, and components indicated to be removed.

b. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.

c. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

d. Equipment to Be Removed: Disconnect and cap services and remove equipment. remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.

g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.

2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to

prevent water leakage and damage to structure and interior areas.

3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

4. Cover and protect furniture, furnishings, and equipment that have not been removed.

5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01.

6. Comply with indoor air quality requirements specified in Division 01.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.

2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain adequate ventilation when using cutting torches.

6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials

and promptly dispose of off-site.

7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.

8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

9. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:

1. Clean salvaged items.

2. Pack or crate items after cleaning. Identify contents of containers.

3. Store items in a secure area until delivery to Owner.

4. Transport items to Owner's storage area designated by Owner.

5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.

2. Pack or crate items after cleaning and repairing. Identify contents of containers.

3. Protect items from damage during transport and storage.

4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

5. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

B. Air-Conditioning Equipment: Remove equipment without releasing refrigerants.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them.

1. Do not allow demolished materials to accumulate on-site.

2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property. Separate, salvage, recycle, and legally dispose of materials in accordance with the Commonwealth of Massachusetts Waste Ban, 310 CMR 19.017.

1. Include cost of all transportation and disposal.

2. Provide verification of all disposal trips.

3. Hazardous materials are to be handled and disposed of in accordance with all State, Local, and Federal regulations.

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

DIVISION 09

SECTION 092116

GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Part A and Division 01 of Part B are hereby made a part of this Section.

1.2 GENERAL CONDITIONS

A. The “Town of Templeton Owner and Contractor Contract”, along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The Sections of these Specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01 "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

1.3 WORK INCLUDED

A. Furnish all labor, materials, tools and equipment required for the complete removal of all gypsum wallboard systems as required for the structural work. Include metal stud and furring systems, ceiling systems, gypsum wallboard, gypsum sheathing, and required accessories and fastening devices.

1.4 RELATED WORK IN OTHER SECTIONS

A. Section 26 00 00 - ELECTRICAL

1.5 SAMPLED

A. Samples of the various materials to be furnished and installed under this section shall be submitted to the Engineer for approval before starting the work of this section.

1.6 PROTECTION AND CLEANING

A. Protect existing and new finishes against soiling and damage from the work of this trade.

B. Upon completion, remove all rubbish, debris, scaffolding and tools from the work. Clean off any of the materials of this section from glass, brick, trim and all other finish surfaces, and leave the floors "broom clean."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Materials and methods shall be in accordance with manufacturer's printed recommendations.

B. Wallboard, interior partition framing, furring, ceiling suspension systems, gypsum wallboard, sheathing, joint tape, joint compounds, and other accessories shall be as manufactured by the National Gypsum Co., U.S. Gypsum Co., Johns-Manville, Georgia-Pacific or approved equal. Products of National Gypsum Company are specified to establish type and quality of materials.

2.2 MATERIALS

A. Gypsum Wallboard – thickness and type shall be indicated on the drawing.

B. Steel Studs - 20 gauge galvanized steel non-load bearing standard screw studs; width 3-5/8 inch and 4” for interior partitions unless otherwise specified or noted on the drawings and 6 inch 20 gauge galvanized steel non-load bearing standard screw studs for exterior walls.

C. Screw Stud Track - 25 gauge galvanized steel.

D. Furring channels - 7/8" x 2-3/4" hat type screw furring channels.

E. Runner Angles - 2" x 2" x 20 gauge galvanized steel.

F. Stiffening Channels - 1-1/2 CR channels 475 lbs./1000 LF.

G. Control Joints - E-Z strip expansion joint.

H. Screws

1. Drywall to metal framing; Type S Bugle Head
2. Metal components to Concrete or Masonry; HWH Tapcon Anchors

I. Corner Beads - 1-1/4" x 1-1/4" galvanized standard corner bead with 1/8" ground.

J. Casing Beads - No. 233 with vinyl gasket

K. Acoustical Sealant - US Gypsum, National Gypsum or Tremco.

L. Tape - Gold Bond Joint Tapes

M. Joint Treatment Compound Sta-Smooth Joint Compound and Ready-Mix Topping Compound or approved equal.

N. Adhesive - MC Adhesive.

O. Ceiling and soffit framing screw type furring channels @ 16" o .c. supported by cold rolled channels or steel studs in accordance with manufacturers recommendations based on a 15 PSF load.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS

A. This Contractor shall inspect job conditions and related work and report to the General Contractor conditions affecting his work. Commencement of work will constitute acceptance of conditions.

B. Work under this section shall be properly coordinated with the work of other sections. In no case shall work of other sections that will be concealed by the work of this section be so concealed until it has been inspected and approved.

C. The drawings shall be taken as diagrammatic. This Contractor shall fit his work to the building structure, and other finishes and around mechanical and electrical work previously installed, to produce a finished result.

D. Protect all gypsum materials from moisture both during shipment and in storage. Do not store outdoors or in potentially damp locations. Protect metal goods from rusting.

3.2 INSTALLATION

A. Interior partitions shall be constructed with screw studs, gypsum wallboard as detailed on the drawings.

B. Metal stud framing and wallboard installation shall be in accordance with National Gypsum Co. General Specifications 1 and 2 for Drywall Products and Systems. All studs spaced not over 16 inches o c

C. Gypsum wallboard ceilings and exterior soffits shall be constructed with 7/8" x 2-9/16" galvanized steel hat type screw furring channels, CR channels, strap hangers, and gypsum wallboard and gypsum soffits board.

D. All exterior corners shall be provided with corner beads and where gypsum wallboard abuts dissimilar material a casing bead shall be installed.

E. Gypsum wallboard and soffit board shall be installed and finished in accordance with the National Gypsum Company’s Architectural Specifications/Drywall Products and Systems using the specified materials.

END OF SECTION

DIVISION 09

SECTION 09 90 00

PAINTING

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. Division 01 are hereby made a part of this Section.

1.2 GENERAL CONDITIONS

A. The "General Conditions, Supplementary General Conditions", and DIVISION 01 govern work under this Division, form a part of this specification and contract and shall be carefully examined by each bidder before submitting his proposal.

1.3 RELATED DOCUMENTS

A. The "Town of Templeton Owner and Contractor Contract", along with all Amendments and Supplements as hereinbefore listed, shall apply and are hereby made a part of this section of the Specifications.

B. The sections of these specifications entitled "Special Conditions", "Minimum Wage Determination", and Division 01, "General Requirements" shall apply and are hereby made a part of this section of the Specifications.

C. Examine all Drawings and all other Sections of the Specifications for requirements and provisions affecting the work of this Section.

1.4 WORK TO BE PERFORMED

A. Furnish all labor, materials, services and equipment necessary for the complete application of all painting as indicated on the Drawings and/or as specified herein.

B. The Contractor shall examine the specifications of the various other trades and be thoroughly familiar with all of their provisions regarding painting and understand that all new materials installed that necessitate painting and which are left unfinished by the requirements of said other sections of these specifications shall be painted, finished or treated to completion under this Section.

C. It is required that this Specifications shall cover the painting and finishing as specified on surfaces as to make a thoroughly complete job.

D. The work under this Section shall include, but is not limited to, the following:

1. All new patched surfaces shall be painted to match existing.

1.5 COLOR AND SAMPLES

A. The Owner shall have final approval of all colors for each area and surface. All colors shall be mixed in accordance with manufacturer's instructions.

B. Colors of priming coats (and body coats where specified) shall be lighter than those of finish coat. The Owner shall have unlimited choice of colors without extra cost, including custom accent colors.

C. Colors shall be pure, non-fading pigments, mildew-proof, sun-proof, finely ground-in approved medium. Colors used on masonry or plaster surfaces (as applicable) shall be lime-proof. All materials shall be subject to the Engineer's approval.

D. Samples of all colors, stains, and finishes, where requested, shall be prepared in advance of requirements so as not to delay work and shall be submitted to the Engineer for approval before any work is commenced. Any work done without such approval shall be redone to the Engineer's satisfaction at the Contractor's expense. Samples shall be on separate 8" x 10" x 1/8" tempered hardboard panels.

1.6 SCAFFOLDING

A. Furnish, erect, maintain, and remove, when directed, all scaffolds, staging and rigging where required for painting work complying with all applicable laws and codes.

1.7 PROTECTION

A. Furnish and lay suitable drop cloths in all areas where painting is being done to protect floors and all other surfaces from damage during the work.

B. The Contractor will remove and replace all finish hardware applied to doors, cabinets, etc. The Contractor will remove and replace, where necessary, accessories, plates, lighting fixtures, heating units, and all other finished items.

C. In no case shall the Contractor attempt to paint around finish hardware or other removable items that are already fitted in place.

D. At completion of work in each area, remove all paint spots, oil and stain from all surfaces, including finish hardware.

1.8 STORAGE AND USE OF MATERIALS

A. All materials shall be stored in designated spaces in a manner which meets the requirements of applicable codes and fire regulations. When not in used, such spaces shall be kept locked and inaccessible to those not employed under this SECTION. Each space shall be provided with a fire extinguisher of carbon dioxide or dry chemical type bearing the label of the National Board of Fire Underwriters and tag of recent inspection.

B. All materials shall be brought to the building and stored in manufacturer's original sealed containers bearing the manufacturers standard label indicating type and color.

C. Materials shall be delivered in sufficient quantities in advance of the time needed in order that work will not be delayed in any way.

D. No claim by the Contractor concerning the unsuitability of any material specified, or his ability to produce first class work with same, will be entertained after the Contractor is signed.

E. Before application, painter's materials in containers shall be thoroughly stirred, unless otherwise directed by the manufacturer of the paint used, to ensure uniformity of color and mass, and all paint skins or other materials which would cause lumps of roughness shall be strained out. Materials shall be applied without the addition of any ingredients and without reducing and thinning, except in conformance with the regulations of the Environmental Protection Agency (EPA), subject to the approval of the Engineer.

1.9 COMPATIBILITY OF SHOP AND FIELD PAINTS

A. It is essential that paints applied in the shop and in the field will be mutually compatible. Shop Drawings for fabricated items will indicate manufacturer and type of shop coat applied.

B. The Contractor shall determine that the materials specified in the Painting Schedule are compatible with shops to which these materials are to be applied and he shall bring to the Engineer's attention any condition which may require a change in the Specifications before proceeding with his work. Failure to do so shall be construed as acceptance to the paints specified and the Contractor shall correct, at his own expense, any defects in his work resulting from the use of such materials.

PART 2 - MATERIALS

2.1 MANUFACTURERS

A. When a manufacturer makes more than one (1) grade of any material specified, the Contractor shall use the highest grade of each type whether or not the material is mentioned by any trade name in these Specifications.

B. All paints and finishes used for this project shall be as manufactured by the following manufacturers or equal:

1. Sherwin Williams

2. Glidden Coating Systems

3. P.P.G. Industries

C. To establish a standard of quality and kind of material desired, the schedule is based on products of Sherwin Williams, except where other manufacturers are specifically mentioned. Products of the manufacturers listed above equal to those scheduled herein may be substituted upon submission to the Engineer of equivalent painting schedule and approval thereof.

2.2 PAINTING SCHEDULE

A. All patch areas:

1. Masonry, Concrete and Aluminum:

a. First coat: Self-prime

b. Second coat: DTM Acrylic Gloss

c. Third coat: DTM Acrylic Gloss

2. Steel:

a. First Coat: DTM Acrylic Primer/Finish

b. Second Coat: DTM Acrylic Gloss

c. Third Coat: DTM Acrylic Gloss

3. Concrete Block:

a. First Coat: Heavy Duty Block Filler

b. Second Coat: DTM Acrylic Gloss

c. Third Coat: DTM Acrylic Gloss

B. Gas Piping: Yellow

1. First Coat: DTM Acrylic Primer/Finish

2. Second Coat: DTM Acrylic Gloss

3. Third Coat: DTM Acrylic Gloss

C. Color shall be as selected by the Owner.

PART 3 - INSTALLATION

3.1 PREPARATION OF SURFACES AND WORKMANSHIP

A. The surfaces are to be clean, smooth and thoroughly dry.

B. The starting of work under this SECTION will be construed as acceptance of such surfaces as being satisfactory and any defects in work resulting from such accepted surfaces shall be corrected by the Contractor at his own expense.

C. All spaces shall be broom-clean and all surfaces dry before painting is started. All dust, dirt, plaster, grease and other extraneous matter affecting the finish work shall be removed prior to the commencement of painting.

D. No varnish, lacquer, or enamel finish shall be applied where room or exterior temperature is below the standard temperature in ºF as recommended by the paint manufacturers.

E. All nail holes and cracks on both exterior and interior work shall be carefully putty colored to match. Puttying shall be done after primer coat or sealer coat has been applied.

F. Remove blisters or other imperfections in previous coats caused by foreign substances or paint skins from all painted surfaces before the subsequent coat is applied. Smooth-finished surfaces shall be sanded before finishing and between coats as required to smooth out rough areas and to assure smooth, even finish. All surfaces to receive paint shall be smooth and free of all sandpaper scratches, mill marks and other imperfections and, except for coats applied in shop, shall be inspected and approved by the Engineer before application of prime and finish coats.

G. No painter's finish shall be applied until the preceding coat is thoroughly dry and, in no case, in less than two (2) days for interior work, except for surfaces coated with latex base material which may be re-coated the next day.

H. Touch up finish coats of factory finished items that become damaged before completion of the building. Sand damaged areas smooth and apply specified primer before applying finish coat. Where touch-up cannot be done neatly and blended smooth with other finish material, repaint entire surface or panel as approved by the Engineer.

3.2 COMPLETION

A. Cleaning – At the completion of the work, the Contractor shall remove all paint spots and oil or grease stains caused by his work from all surfaces including floors, fixtures, hardware and equipment, leaving their finishes in satisfactory condition. He shall remove all his staging equipment, all debris and materials and leave the work in a clean condition as far as his work is concerned.

B. NOTE: Any retouch work required after painted surfaces have been accepted by the Engineer in writing shall be at the Owner's expense.

3.3 PROTECTION AND CLEAN UP

A. Properly protect adjacent surfaces and equipment from any damage or spotting due to work performed under this SECTION.

B. Upon completion of all work required under this SECTION, clean up all refuse incurred and thoroughly clean any adjacent surfaces defaced or otherwise spotted from the painting and finishing applications.

END OF SECTION

DIVISION 23

SECTION 23 00 00

HEATING, VENTILATING AND AIR CONDITIONING

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. The GENERAL REQUIREMENTS, DIVISION 01, and PROCUREMENT AND CONTRACTING REQUIREMENTS, DIVISION 01, are hereby made a part of this Specification Section.

B. Examine all Drawings and all Sections of the Specifications for requirements therein affecting the work and this Section.

1.2 SCOPE OF WORK

A. The work under this Section shall include the furnishing of all materials, labor, equipment and supplies and the performance of all operations to provide complete working systems, in general, to include the following items:

1. Automatic Temperature Controls
2. BMS programming for integration within building management system.
3. Piping Specialties
4. Piping Hangers/Supports
5. Hot Water Coils
6. Insulation
7. Hydronic Pipe & Fittings
8. Energy Recovery Ventilators
9. Hydronic Valves & Specialties
10. Sheet Metal Ductwork
11. Duct Fittings
12. Access Panels
13. Vibration Isolation

B. Provide any other component or related system (whether or not listed) which is part of the overall design and basic equipment and deemed necessary for its completion, thoroughness and readiness for operation in perfect condition.

C. Furnish, set up and maintain all derricks, hoisting machinery, scaffolds, staging and planking as required for the work.

D. Supply the service of an experienced and competent supervisor who shall be in charge of the HVAC contractor's work at the site.

E. The HVAC contractor shall be held responsible for subletting any work shown or specified herein, but not classified as HVAC work in order to avoid any jurisdictional disputes and work stoppage arising therefrom.

F. All electrical apparatus and controls furnished as a part of the HVAC work shall conform to applicable requirements under SECTION 26 00 00 - ELECTRICAL.

G. All work shall be coordinated with the Construction Schedule.

1.3 EXAMINATION OF SITE AND DOCUMENTS

A. Bidders are expected to examine and to be thoroughly familiar with all contract documents and with the conditions under which work will be carried out. The Awarding Authority (Owner) will not be responsible for errors, omissions and/or charges for extra work arising from failure to familiarize themselves with the Contract Documents or existing conditions. By submitting a bid, the Bidder agrees and warrants that he has had the opportunity to examine the site and the Contract Documents, that he is familiar with the conditions and requirements of both and where they require, in any part of the work a given result to be produced, that the Contract Documents are adequate and that he will produce the required results.

B. Pre-Bid Conference: Bidders are strongly encouraged to attend the Pre-Bid conference; refer to Advertisement for Bids for time and date.

1.4 CODES, ORDINANCES, AND PERMITS

A. Installation of systems and equipment provided under this section shall be done in strict accordance with Massachusetts Department of Public Safety Codes, Massachusetts Department of Environmental Protection, Massachusetts State Building and Mechanical Code, and Town of Templeton Regulations having jurisdiction.

B. All pressure vessels shall conform to ASME and state codes and regulations.

C. All work, where applicable, shall conform to NFPA codes and all material shall be U.L. approved.

D. All electrical apparatus furnished under this section shall be approved by the U.L. and shall be so labeled or listed where such is applicable. Where custom-built equipment is specified and the U.L. label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by U.L. where such is applicable to the component.

E. Give notices, file plans, obtain permits and licenses, pay fees and obtain necessary approvals from authorities having jurisdiction. Deliver certificates of inspection to Engineer. No work shall be covered before examination and approval by Engineer, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work conforming to requirements, satisfactory to Engineer, and without extra cost to the Owner. If work is covered before due inspection and approval, the installing contractors shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

1.5 RECORD DRAWINGS

A. Refer to DIVISION 01 - GENERAL REQUIREMENTS, of the Specifications for record drawings, closeout procedures and closeout submittals to be provided under this section.

1.6 CLEANING

A. During the progress of the heating, ventilating and air conditioning work, clean up and remove all oil, grease and other debris caused by this work. At completion, the Contractor shall clean all equipment, piping and duct systems and leave all work in perfect operating condition.

1.7 RESPONSIBILITY

A. The structure and its appurtenances, clearances and the related services, such as plumbing, heating, ventilation and electric service have been planned to be legal, adequate and suitable for the installation of equipment specified under this section. The Owner will not assume any increase in cost caused by differing requirements peculiar to a particular make or type of equipment, and any incidental cost shall be borne by the HVAC Contractor. He shall be responsible for the proper location of his required sleeves, chases, inserts, etc., and see that they are set in the forms before the concrete is poured. He shall be responsible for his work and equipment furnished and installed by him until the completion and final acceptance of this contract, and he shall replace any work which may be damaged, lost or stolen, without additional cost to the Owner.

1.8 PROTECTION OF MATERIALS, WORK, AND GROUNDS

A. Materials, fixtures and equipment shall be properly protected and all pipe and duct openings shall be temporarily closed so as to prevent obstruction and damage.

B. Protect and preserve all materials, supplies and equipment of every description and all work performed. Protect all existing equipment and property of any kind from damage during the operations. Damage shall be repaired or replaced promptly by the Contractor at his expense.

1.9 DRAWINGS

A. It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation. Any apparatus, appliance, material or work not shown on the Drawings, but mentioned in the Specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not

particularly specified, shall be provided by the Contractor without additional expense to the Owner.

B. The Drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the project and shall have the approval of the Engineer before being installed. The Contractor shall follow Drawings, including his shop drawings, in laying out work and shall check the Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Engineer before proceeding with the installation. The Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

C. Size of pipes and methods of running them are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the true intent and purpose of the Drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge. All work shall be installed in such a manner as to avoid being unsightly.

D. All measurements shall be taken at the building by the Contractor, prior to purchasing and installing the equipment and piping.

1.10 SHOP DRAWINGS

A. HVAC contractor shall provide a complete set of shop drawings as described below to the engineer for review and approval prior to purchasing any materials or equipment. Provide (5) sets of shop drawings for materials indicated below:

1. Hot Water Coils
2. Insulation
3. Hydronic Pipe & Fittings
4. Energy Recovery Ventilators
5. Hydronic Valves & Specialties
6. Sheet Metal Ductwork
7. Duct Fittings
8. Access Panels
9. Automatic Temperature Controls components complete with wiring diagrams for complete point to point controls diagram indicating systems product components.
10. Sequence of Controls

1.11 OPERATING AND MAINTENANCE INSTRUCTIONS

A. Submit operation and maintenance data complete with at least the following:

1. Table of Contents

2. Introduction:

a. Explanation of manual and its use

b. Description of all systems

3. Plant Operation:

a. Operating instructions for all HVAC apparatus.

4. Maintenance:

a. Maintenance and lubricating chart: Furnish three sets of charts indicating equipment tag number, location of equipment, equipment service, greasing and lubricating requirements, lubricants and intervals of lubrication.

b. Recommended list of spare parts: Furnish two typed sets of instructions for ordering spare parts with sectional views of the fittings or equipment showing parts numbered or labeled to facilitate ordering replacements, including a list with itemized prices of those parts recommended to be kept on hand as spares, as well as the name and address of where they may be obtained.

c. Valve Chart

5. Manufacturer’s Literature:

a. Automatic Temperature Controls

b. Sequence of Controls

c. Energy Recovery Units

d. Hot water reheat coils

1.12 UNDERWRITERS' LABEL AND LISTING

A. All electrical apparatus furnished under this Section shall be approved by the UL and shall be labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

1.13 CUTTING AND PATCHING

A. All cutting, patching and painting associated with demolition work and necessary for the proper installation of work to be performed under this Section and subsections shall be provided by the HVAC Contractor.

B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.

C. The contractor shall see that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and shall consult with the Engineer in reference to this work. In so doing, he shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Engineer.

D. Carefully fit around, close up, repair, patch, and point around the work specified herein to the entire satisfaction of the Owner and Engineer. Finished work appearance shall match or exceed existing conditions where cutting/patching has occurred for final approval by Owner and Engineer.

E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment by himself, his contractors or other filed contractors.

F. All of this work shall be carefully done by workmen competent to do such work and with the proper and smallest tools applicable.

G. Any cost caused by defective or ill-timed work shall be the contractor’s responsibility therefore. Engineer retains the right to deem patch work acceptable. Worked deemed unacceptable to the satisfaction of engineer and owner shall be re-finished to achieve acceptable appearance at the contractor’s expense.

H. The existing fire resistance rating of floors, walls, and ceilings shall be maintained. Firestopping media shall be installed in accordance with manufacturer’s written instructions.

1.14 GUARANTEE

A. Guarantee that all work installed will be free from any and all defects in workmanship and/or materials and that all apparatus will develop capacities and characteristics specified.

B. If, during a period of one year from the date of final completion and acceptance of the work, any such defects in workmanship, material or performance appear, the HVAC Contractor will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from the Architect.

C. Provide all refrigeration compressors with the manufacturer's extended replacement warranty for a total of five years. All warranties must have been submitted prior to Final Payment.

D. Correct all damage to insulation, paint or building caused by defects in his work, equipment, and its operation. Guarantee shall include startup, shutdown, maintenance, and 24-hour service during the guarantee period.

E. Any apparatus that requires excessive service during the warranty period will be considered defective and shall be replaced.

1.15 ELECTRICAL

A. All electrical apparatus and controls furnished as a part of this Section shall conform to applicable requirements under SECTION 26 00 00 - ELECTRICAL.

B. All motors furnished under this Section shall be furnished by the manufacturer of the equipment served and shall be mounted and aligned so as to run free and true. Each motor shall be built to conform to the latest applicable NEMA, ANSI and IEEE standards for the type and duty of service it is to perform.

C. Each motor shall be designed to operate on 60 Hz, and each shall be expressly wound for the voltage specified. Each motor shall operate satisfactorily at rated load and frequency with a voltage variation no greater than plus or minus 10 percent of voltage specified. Dual voltage 208/220 motors will not be accepted.

D. All motors shall be provided with adequate starting and protective equipment and each shall have a terminal box of adequate size to accommodate the required conduit and wires.

E. Motor controllers shall be equipped with all poles, auxiliary contacts and other devices necessary to permit the interlocking and control sequences required. Controller operating coils shall be generally designed for 120 volt operation, and 3 phase motors shall be provided with thermal overload protection in all phases.

F. Furnish all magnetic starters for each and every motor furnished under this section of the specification, except where otherwise indicated. The Electrical Contractor shall install and wire the starter. The Contractor shall provide disconnects for all HVAC equipment. The Electric Contractor shall install and wire all disconnects. All starters for motors over 10 HP shall be solid state with reduced inrush design. The maximum allowable inrush shall be 2.5 times running load amperage. All starters for fractional HP motors shall be provided with manufacturer’s standard motor starter.

G. Furnish and install all low voltage and/or line voltage control wiring for the boiler/burner units, rooftop units, heat recovery unit, pumps, fans, and all equipment provided in this section. All wiring shall be performed by a licensed electrician.

1.16 VERIFYING CONDITIONS

A. Before commencing any work under this section, verify all governing dimensions and examine all adjoining work on which this work is in any way associated or connected. Failure to visit the jobsite will in no way relieve the Contractor from installing the work according to the intent of these specifications and at no additional cost to the Owner.

B. Each bidder shall visit the site and inspect conditions affecting the proposed work. Failure to do so and misinterpretation of the Plans and Specifications resulting therefrom shall be entirely the responsibility of the bidder.

C. Each bidder shall make note of the existing conditions affecting hauling, rigging, transportation, installation, etc., in connection with his work and shall make all provisions for transportation of all materials and equipment.

D. Where field conditions require, the Contractor shall arrange for equipment to be shipped to the job, dismantled and assembled in place.

E. Remove walls, window assemblies/glass and floor structures where necessary to install and remove equipment as shown. The Contractor shall reinstall such displaced structures to their original condition.

1.17 PAINTING

A. See requirements outlined within SECTION 09 90 00.

1.18 STANDARDS

A. The latest published issue of the standards, recommendations, or requirements of the following listed societies, associations, or institutes in effect at the date of Contract are part of this Specification. These shall be considered as minimum requirements; specific requirements of this specification and/or associated drawings shall have precedence. In case of conflict between published requirements, the Owner's representative shall determine which is to be followed.

1.	AMCA	Air Moving and Conditioning Association
2.	ANSI	American National Standards Institute
3.	ASHRAE	American Society for Heating, Refrigerating, and Air Conditioning Engineers
4.	ASME	American Society of Mechanical Engineers
5.	ASTM	American Society for Testing and Materials
6.	FIA	Factory Insurance Association
7.	IEEE	Institute of Electrical and Electronic Engineers
8.	MCAA	Mechanical Contractors Association of America
9.	NEMA	National Electrical Manufacturers Association
10.	NFPA	National Fire Protection Association
11.	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association

12.	UL	Underwriters' Laboratories, Inc.
13.	OSHA	Occupational Safety and Health Act
14.	NEC	National Electric Code

1.19 COOPERATION AND COORDINATION WITH OTHER TRADES

A. The work shall be so performed that the progress of the entire building construction including all other trades, shall not be delayed nor interfered with. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as desired.

B. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Architect for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Architect's satisfaction, at no expense to the Owner.

C. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section will interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. Prepare and submit for approval 3/8 inch scale or larger working drawings and sections, clearly showing how this work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.

D. Keep fully informed as to the shape, size and position of all openings required for all apparatus and give information in advance to build openings into the work. Furnish and set in place all sleeves, pockets, supports and incidentals.

E. All distribution systems which require pitch or slope such as storm and sanitary drains and water piping shall have the right of way over those which do not. Confer with other trades as to the location of pipes, lights and apparatus and install work to avoid interferences.

F. This contractor shall, with the approval of the Architect and without extra charge, make reasonable modifications in his work as required by normal structural interferences, or by interference with work of other trades, or for proper execution of the work.

G. This contractor shall protect all materials and work of other trades from damage that may be caused by his work and shall make good any damages so caused.

1.20 SEISMIC RESTRAINT REQUIREMENTS

A. For each seismic restraint, provide certified calculations to verify adequacy to meet the following design requirements:

1. Ability to accommodate relative seismic displacements of supported item between points of support.

2. Ability to accommodate the required seismic forces.

B. For each respective set of anchor bolts provide calculations to verify adequacy to meet combined seismic-induced sheer and tension forces.

C. For each weldment between structure and item subject to seismic force, provide calculations to verify adequacy.

D. Calculations shall be stamped by a professional engineer who is registered in the State of Massachusetts and has specific experience in seismic calculations.

E. Restraints shall maintain the restrained item in a captive position without short circuiting the vibration isolation.

F. Provide seismic restraints for all piping, ductwork and equipment in accordance with the requirements of the International Building Code and NFPA.

1.21 OWNER TRAINING

A. Prior to Final Inspection and Acceptance; the contractor shall provide one (1) three hour training session to provide the Owner Representative and their facilities personnel (if requested) with system training and preventative maintenance overview for all new HVAC system installations that are within project scope. Provide training for new Building Management System including initial dashboard and login configurations as required for owner programming and scheduling adjustments.

B. Owner Training shall be performed after completed and approved Owner Maintenance manuals have been provided to Owner’s Representative.

1.22 FINAL ACCEPTANCE

A. Final acceptance of Ownership of the HVAC system installed within this scope of work shall be contingent on passing a satisfactory system pressure test, mechanical performance test and cooling and heating function test to determine that the system will perform according to the contract requirements. The above tests shall be witnessed by the Engineer and the Owner at his option and acceptance will only be granted in writing by the Owner after receipt of certification from the Engineer that the design criteria have been met.

B. The work shall be so performed that the progress of the entire building construction, including all other trades, shall not be delayed or interfered with. Materials and apparatus shall be installed as fast as conditions permit and must be installed promptly when and as desired.

C. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Engineer for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Engineer's satisfaction, at no expense to the Owner.

D. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section will interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. If so directed, prepare and submit for approval 3/8 inch scale or larger working drawings and sections, clearly showing how this work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.

1.23 SEQUENCING

A. Coordinate work of this Filed Subcontract with that of other trades, affecting or affected by this work, and cooperate with the other trades as is necessary to assure the steady progress of work.

B. Do not order or deliver any materials until all submittals, required in the listed Specification Sections included as part of this Filed Subcontract, have been received and approved by the Architect.

C. Before proceeding with installation work, inspect all project conditions and all work of other trades to assure that all such conditions and work are suitable to satisfactorily receive the work of this Section and notify the Architect in writing of any which are not. Do not proceed further until corrective work has been completed or waived.

PART 2 - PRODUCTS

2.1 ENERGY RECOVERY VENTILATORS

A. Manufacturers: Subject to compliance with specifications contained within this document, manufacturers offering products that may be incorporated into the work include, but are not limited to:

1. Renewaire

2. Greenheck Fan Corporation

3. Valent

4. York

5. or approved equal

B. Manufactured Units

1. Packaged Air-to-Air Energy Recovery Units shall be fully assembled at the factory and consist of an insulated metal cabinet, motorized insulated low leakage intake damper, filter assemblies for both intake and exhaust air, energy wheel, supply air blower assembly, insulated low leakage exhaust air damper, exhaust air blower assembly electrical control unit with all specified components and internal accessories factory installed and tested and prepared for single-point

high voltage connection. Entire unit with the exception of field-installed components shall be assembled and test operated at the factory.

C. Cabinet

1. Materials: Formed, insulated double wall construction, fabricated to permit access to internal components for maintenance.

2. Outside casing: 20 gauge, galvanized (G90) steel meeting ASTM A653 for components that do not receive a painted finish.

3. Access doors shall be hinged with airtight closed cell foam gaskets. Door pressure taps, with captive plugs, shall be provided for cross-core pressure measurement allowing for accurate airflow measurement.

4. Cabinet Insulation: Unit walls and doors shall be insulated with 1 inch, 4 pound density, foil/scrim faced, high density fiberglass board insulation, providing a cleanable surface and eliminating the possibility of exposing the fresh air to glass fibers, and with a minimum R-value of 4.3 (hr-ft^2-°F/BTU).

5. Enthalpy core: Energy recovery core shall be of the total enthalpy type, capable of transferring both sensible and latent energy between airstreams. Latent energy transfer shall be accomplished by direct water vapor transfer from one airstream to the other, without exposing transfer media in succeeding cycles directly to the exhaust air and then to the fresh air. No condensate drains shall be allowed. The energy recovery core shall be designed and constructed to permit cleaning and removal for servicing. The energy recovery core shall have a ten year warranty. Performance criteria are to be as specified in AHRI Standard 1060.

6. Control center / connections: Energy Recovery Ventilator shall have an electrical control center where all high and low voltage connections are made. Control center shall be constructed to permit single-point high voltage power supply connections to the disconnect.

7. Passive Frost Control: The ERV core shall perform without condensing or frosting under normal operating conditions (defined as outside temperatures above -10ºF and inside relative humidity below 40%). Occasional more extreme conditions shall not affect the usual function, performance or durability of the core. No condensate drains will be allowed.

8. Motorized dampers / Exhaust Air, Intake Air, Motorized dampers of insulated low leakage type shall be factory installed.

D. Blower Section

1. Blower section construction, Supply Air and Exhaust Air: Blower assemblies consist of a 208V 1 Phase 60 HZ, TEFC motor, and a belt driven forward-curved blower.

2. Blower assemblies: Shall be statically and dynamically balanced and designed for continuous operation at maximum rated fan speed and horsepower.

E. Motors

1. Blower motors shall be Premium Efficiency, EISA compliant for energy efficiency. The blower motors shall be totally enclosed (TEFC) and be shall be supplied with factory installed motor starters.

2. Belt drive motors shall be provided with adjustable pulleys and motor mounts allowing for blower speed adjustment, proper motor shaft orientation and proper belt tensioning

3. Motors shall be 60 cycle, 1 phase 208 volts.

F. Unit Controls

1. The ERV shall be constructed so that it can function as a stand-alone system controlled by factory-supplied controllers, thermostats and sensors controlled by a Building Management System (BMS).

G. Filter Section

1. ERV shall have 2" thick MERV 13 disposable pleated filters located in the outdoor air and exhaust airstreams. All filters shall be accessible from the exterior of the unit.

2.2 PIPE HANGERS, SUPPORTS, INSERTS

A. Carpenter and Patterson, Grinnell, Calco, or approved equal. Figure numbers listed are Carpenter and Patterson numbers.

B. General: Piping systems shall be supported in accordance with ANSI B31.1 so as to maintain required pitch of lines, prevent vibration, and provide for expansion and contraction movement.

C. Piping hangers and supports shall be furnished and installed for piping. Provide all components (i.e., inserts, rods, clamps, hangers, washer, lock nuts, rollers, etc.) necessary for a complete installation.

D. Hangers:

1. Hangers for hot water supply, dual water and chilled water piping shall be Figure 100SH refrigeration hanger and shield.

2. Hangers for all other piping shall be Figure 1A Bands.

3. All hangers shall be with supporting rods and nuts. Rod sizes shall be as follows:

a. Hangers for pipes 4" and larger 5/8"

b. Hangers for pipes 2-1/2" and 3 " 1/2"

c. Hangers for pipes 2" and smaller 3/8"

E. Pipe covering protection saddles shall be Series 350 galvanized steel and shall be furnished for installation at each hanger where pipes are insulated.

F. Upper Attachments to Building Structure:

G. Reinforced Concrete Construction: Upper attachment welded or clamped to steel clip angles which are expansion-bolted to the concrete. Expansion bolting shall be located so that piping loads place bolts in shear.

H. Structural Framing: Upper attachments welded or clamped to structural steel members. Additional steel members may be necessary in some support locations where piping locations differ from that known on contract drawings.

I. Submit details for approval.

J. Expansion Fasteners and Power Set Fasteners: In concrete ceiling construction, expansion fasteners may be used for hanger loads up to one-third the manufacturer's rated strength of the expansion fastener. Power set fasteners may be used for loads up to one-fourth of rated load. When greater hanger loads are encountered, additional fasteners may be used and interconnected with steel members combining to support the hanger.

2.3 HYDRONIC PIPE AND FITTINGS

A. Furnish all pipe and fittings required for the HVAC systems, including hot water supply (HWS), hot water return (HWR), drain (D), and cold water make-up piping.

B. All hot water supply (HWS) and hot water return (HWR), piping 2-1/2″ and larger shall be Schedule 40 seamless black steel pipe and shall conform to ANSI B-36.10 and ASTM A-53, grade A or B with Schedule 40 seamless steel fittings and, welded or mechanical connections. All piping 2″ and below shall be Type L hard drawn copper, ASTM B88 with 95/5 solder fittings.

C. Unions for use with steel piping shall be 300 pound malleable iron, ground joint, or 2,000 pound forged steel, 600 psi WOG, sweat or thread end as required. Unions for copper pipe shall be bronze, ground joint, 600 psi WOG, sweat or thread end as required.

D. Drain (D) and Cold water make-up piping shall be Type L hard drawn copper, ASTM B88 with wrought copper ANSI B16.22 fittings. Joints shall be soldered, ASTM B32, with 95/5 solder.

E. Chemical Feed (CF) Piping shall be seamless steel; ASTM A106, Grade A or B; Schedule 10 with threaded, 300 pound malleable iron, ANSI B16.3 fittings. Unions shall be 300 pound malleable iron, ground ball joint with all iron seats, ANSI B16.39; or 2000 pound non-shock WOG forged steel, ASTM A105.

F. Provide dielectric unions at all connections of dissimilar metals. Dielectric unions shall be factory certified to withstand a minimum of 600 volts on a dry line with no flashover, rated 250 psig and conforming to ANSI B16.39. Dielectric union and flange pipe threads shall conform to ANSI B2.1.

2.4 HYDRONIC VALVES & SPECIALTIES

A. Gate valves, globe valves and butterfly valves shall be Powell, Lunkenheimer, Crane, or approved equal. Figure numbers herein are Powell numbers.

1. Gate valves 2-1/2" and larger shall be Figure 1793, 125#, I.B.B.M., solid wedge, O S & Y, rising spindle, flanged end.

2. Globe valves 2-1/2" and larger shall be Figure 241, 125#, I.B.B.M., O S & Y with regrind - renew beveled bronze disc and seat ring, flanged end.

3. Butterfly valves 2-1/2" and larger shall be Figure 1572, 125#, API 609, carbon steel body and seat, stainless steel disc, PTFE packing/gasket, gear operator and lug or flanged style.

4. Where isolation valves are indicated on plans either gate or butterfly valves will be acceptable.

B. Check valves and draw-off valves shall be Powell, Lunkenheimer, Crane, or approved equal. Figure numbers herein are Powell numbers.

1. Check valves 2-1/2" and larger shall be Figure 559, 125#, I.B.B.M., horizontal swing type, with regrind-renew bronze seat ring and disc, flanged end.

2. Check valves 2" and smaller shall be Figure 578, 125# bronze, horizontal swing type with regrinding bronze seat and disc, screwed end.

3. Draw-off valves shall be Figure 503H, bronze, screwed inlet, hose outlet.

C. Balancing valves shall be Taco Model CS, Bell & Gossett, Armstrong, or approved equal, circuit setter

1. Ball valve construction, Teflon seats, calibrated nameplate, Schrader valve connections, cast bronze.

D. Valves 2" and smaller shall be ball valves. Ball valves shall be Jenkins Figure 32-A, Crane, Stockham or approved equal, bronze ball valves with bronze ball, Teflon seats, brass stem and cadmium plated steel handle with plastic grips.

E. Pressure-reducing Valves

1. Bell and Gossett, Armstrong, Taco or equal.

2. Diaphragm operated pressure-reducing valve with low inlet pressure check valve and inlet strainer. The strainer shall be easily removable without system shutdown. The valve seat, strainer and stem shall be removable and of non-corrosive material. The body shall be brass. The valve shall be full line sized as shown on the Drawings. Pressure setting to be minimum system operating pressure.

F. Multi-Purpose Pump Discharge Valves (furnish at the discharge of all hydronic heating pumps)

1. Bell and Gossett, Armstrong, Taco or Equal

2. Valves to be designed to permit tight system shutoff and then return to original balance point after shutdown, to perform as a spring-loaded non-slam check valve and to perform as a plug-type flow control valve. Valve to be able to be repacked under full pressure. Valve to be suitable for use in heating systems with working temperatures up to 230 ° F.

3. Valve to have flanged, ductile-iron body, bronze disc and seat, stainless steel stem and spring. Valve body to be furnished with two 1/4" plugged drain tappings.

4. Valves shall be equipped with Schrader valve metering connections to facilitate differential pressure readings across the valve orifice for accurate system balancing.

5. Each valve to be furnished with a pre-formed removable PVC insulation jacket with high density fiberglass insulation suitable for temperatures up to 230 ° F continuous.

G. Combination Balancing/Shutoff Valves: Furnish and install circuit balancing valves as shown on plans and in accordance with the manufacturer's installation instructions.

1. Bell and Gossett, Armstrong, Flow Design or Equal

2. Each valve shall have two 1/4" NPT brass metering ports with Nordel check valves and gasketed caps located on both sides of valve seat. Two additional 1/4" NPT connections with brass plugs are to be provided on the opposite side of the metering ports for use as drain connections. Drain connections and metering ports are to be interchangeable to allow for measurement flexibility when valves are installed in tight locations.

3. Valves are to be of the "Y" pattern, modified, equal percentage globe style and provide three functions: precise flow measurement; precision flow balancing; positive drip tight shut off.

4. Valve shall provide multi-turn, 360 degree adjustment with a micrometer type indicator located on valve handwheel. Valve handwheel shall have hidden memory feature which will provide a means for locking the valve position after the system is balanced.

5. Valve body for valves 1/2" to 2" size shall be bronze with ultra-high strength engineered resin plug. The plug shall have precision-contoured channels to distribute flow uniformly across valve seat. Bronze stem and high strength resin hand-wheel and sleeve. Valves shall have a minimum of four full 360 degree hand-wheel turns. Connections to be thread or sweat.

6. Valve body for 2-1/2" and larger size valves shall be ductile iron with flanged ends. Valve stem and plug disc shall be bronze. Hand-wheel shall be ergonomically designed providing ease of adjustment. Valve body to be

convertible in the field from straight to 90 degree change of flow. Field conversion shall not affect valve accuracy.

7. Valve shall be installed with flow in the direction of the arrow on the valve body and installed at least five pipe diameters downstream from any fitting, and at least ten pipe diameters downstream from any pump. Two pipe diameters downstream from the valve should be free of any fittings. When installed, easy and unobstructed access to the valve hand-wheel and metering ports for adjustment and measurement are to be provided. Mounting of valve in piping must prevent sediment build-up in metering ports.

8. Provide all balancing valves with molded removable pre-formed insulation with PVC jacket.

9. Valve size to match pipe size.

2.5 HOT WATER COILS

A. Acceptable Manufacturers: Greenheck, Trane, Carrier, McQuay, or approved equal.

B. Unit Casing

1. The coil case shall be constructed of G90 galvanized steel. Casing finished to meet ASTMB 117 250-hour salt-spray test. The removal of side panels shall not affect the structural integrity of the unit. All removable panels shall be gasketed to minimize air leakage. Contractor shall be responsible to provide connection flanges and all other framework that is needed to properly support the unit.

2. Insulation - High density, matte faced - Interior surface of unit casing acoustically and thermally. Insulation shall have a minimum R-value of 4 and shall be UL listed. The installation shall comply with NFPA-90A and B requirements.

C. Coils: Coils shall be manufactured by the supplier of the air handling unit. Coils shall be installed such that headers and return bends are enclosed by unit casings. Coils shall be removable by unbolting the wall panels in the coil section. Coil connections shall be clearly labeled on outside of units. Coils shall have aluminum plate fins and seamless copper tubes. Fins shall have collars drawn, belled, and firmly bonded to tubes by mechanical expansion of the tubes. Soldering or tinning shall not be used in the bonding process. Fin surfaces shall be cleaned prior to installation in the unit to remove any oil or dirt that may have accumulated on the fin surfaces during manufacturing of the coil. Capacities, pressure drops, and selection procedure shall be certified in accordance with ARI Standard 410.

2.6 STRAINERS

A. Bell and Gossett, Armstrong, Watts or Equal

B. Provide a "Y" type full size strainer as indicated on the Drawings.

C. An approved dirt blowout connection shall be made to each strainer, with 1" Jenkins Figure 372 and Figure 658 cap and chain; the valve located six inches to twelve inches below the strainer. In the case of strainers under full water pressure, the blowout connection shall terminate at a point where there will be no risk of flooding or damage.

D. Strainers 2" diameter and smaller shall have screwed ends. Strainers 2-1/2" diameter and larger shall have flanged ends.

E. Strainers 2" and smaller shall be full size, bronze, "Y" pattern: Tate Temco Figure IY, Spirax Sarco, Mueller or approved equal.

F. Strainers 2-1/2"or larger shall be cast steel body, "Y" type; Tate Temco figure IY, Spirex Sarco, Mueller or approved equal, 150 psi rating.

G. Total open area of basket perforations shall be at least three times the inside area of pipes.

H. Strainer baskets shall be stainless steel with 1/16" perforations (up to 2" size) and 1/8" perforations (2-1/2" and larger).

2.7 THERMOMETERS AND PRESSURE GAUGES

A. Thermometers and pressure gauges shall be Trerice, Ashcroft, Taylor or approved equal complete with all required wells. Model numbers used are Trerice numbers.

B. Thermometers shall be Model BX9, industrial thermometers, adjustable angle, 9" case.

C. Thermometer ranges shall be 0 °F to 200 °F for use in hot water piping.

D. Pressure gauges shall be Model 500 X.

2.8 FLEXIBLE PIPE CONNECTIONS

A. Provide 125-lb working pressure flexible pipe connections with corrugated metal core and high-tensile tubular braided jacket. Provide units of bronze construction on copper piping and stainless steel units with carbon steel ends on steel piping for 250° F. service. Flange or threaded ends to match connecting pipe.

2.9 THERMOMETERS AND PRESSURE GAUGES

A. Thermometers and pressure gauges shall be Trerice, Ashcroft, Taylor or approved equal complete with all required wells. Model numbers used are Trerice numbers.

B. Thermometers shall be Model BX9, industrial thermometers, adjustable angle, 9" case. Thermometer ranges shall be 0 ºF to 100 ºF for use in chilled water piping.

C. Pressure gauges shall be Model 500 X with 4-1/2" case. Ranges shall be 0 to 100 psi. Furnish a Model 865 gauge cock with each gauge.

2.10 SLEEVES

A. Furnish pipe sleeves for all pipes which pass through masonry floors and walls. Sleeves shall be Schedule 10 steel pipe. Sleeves shall be of the first possible size larger than the outside of the insulation jacket on covered piping and the first possible size larger than the outside of the piping on uncovered pipes.

B. Sleeves shall be of sufficient length so as to be flush on either side of masonry walls, flush on underside of masonry floor and extend 2 inch above the finished floor.

2.11 ESCUTCHEON PLATES

A. Escutcheon plates shall be chromium plated, cast brass split type escutcheons.

2.12 INSULATION

A. Furnish all insulation required for the air-conditioning system, including:

1. Pipe insulation for:

a. Hot water supply (HWS), hot water return (HWR), including fittings, valves, strainers, etc.

2. Duct insulation for:

a. All supply, return, fresh air and exhaust air to ERV ductwork.

B. Piping, Interior: Insulate the piping, fittings, including the air separator, and valve bodies with 6 PCF fiberglass with a 20 mil PVC jacket cemented. Provide PVC molded fittings at fittings and valve bodies. Insulation wall thickness shall be 1-1/2" wall thickness for all HWS,R and HWS,R piping 1-1/4" and smaller, and 2" wall thickness for all piping 1-1/2" and larger.

C. PVC jackets shall meet ASTM D1784, Class 14253-C have a flame spread of 25 or less, have a smoke developed rating of 50 or less. PVC jackets shall be joined and sealed by applying continuous PVC cement along all seams.

D. NOTE: All new piping within the mechanical room shall be provided with color coded PVC jackets, color as selected by Engineer/Architect.

E. Exterior pipe insulation shall be weatherproofed with Childers, Monville, Ferro Corp., or approved equal, aluminum jacketing. The jacketing shall be manufactured from T/3003 aluminum and shall have a factory attached moisture barrier continuously laminated across the full width of the jacketing. Jacket thickness shall be 0.016".

F. Duct Insulation, Interior: Insulate the ductwork with 2" thick, 3/4 lb. density fiberglass duct insulation, ASTM C533, maximum service temperature 450º F, with factory applied flame retardant PSK facing (UL labeled). Conditioned space duct insulation shall have a minimum insulation value of R-6 and unconditioned space duct insulation shall have a minimum insulation value of R-12.

G. Exterior Ductwork: Ductwork to be installed outdoors shall be insulated R-12 min., 2" thick, 1.5 lb. Density polyolefin foam insulation. Joints to be sealed per manufacture’s

recommendation. Insulation shall then be wrapped with COMPOSITE MEMBRANE CONSISTING OF AN EMBOSSED UV-RESISTANT ALUMINUM OUTER LAYER LAMINATED TO A MULTI-PLY CROSS-LAMINATED POLYETHYLENE FILM. Exterior Ductwork shall be manufactured by Thermaduct or approved equal.

H. Fiberglass Insulation

1. Fiberglass shall meet ASTMC 335 for thermal efficiency.

2. Ends of insulation shall be sealed with material as recommended by the manufacturer.

3. A complete moisture and vapor seal shall be provided wherever insulation terminates against metal hangers, anchors and other projections through insulation on cold surfaces.

4. Fire Hazard Rating: Insulation materials, coatings and other accessories shall individually have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed. Ratings shall be determined by U.L. "Test Method for Fire Hazard Classification of Building Materials", No. 823 or NFPA No. 225 or ASTM E84.

5. Identification: Furnish and apply piping identification to all piping, showing direction of flow approximately 30 foot - 0 inch O.C. on bottom, side or top of all pipes. Furnish and apply name or classification of service adjacent to each arrow. Piping identification shall be plastic cloth pipe markers.

2.13 VIBRATION ISOLATION

A. General

1. All vibration isolators shall be the product of a single approved manufacturer.

2. Model numbers hereinafter specified are from Mason Industries. Other equivalent units by Consolidated Kinetics, Vibration Mountings and Controls or approved equal are acceptable.

3. All vibration isolators for mechanical equipment hung in ceiling shall be selected in accordance with the weight distribution of the equipment to be served so as to produce a uniform deflection. Deflections shall be as hereinbefore specified.

4. Submittals shall include all spring deflections, spring diameters, scale drawings, attachment details, and rated capacity indicating adequacy for each piece of equipment served.

2.14 AUTOMATIC TEMPERATURE CONTROL

A. Scope:

1. Provide new Johnsons Controls Building Management System, including BACNET interface, controllers, programing, graphics, wire, etc. for a complete operational system.
2. Provide new controls for energy recovery unit.
3. Provide new controller for dehumidification operation of existing air handling units.
4. The control system provided to consist of all controllers, transformers, transducers, relays, thermostats, dampers, damper operators, and all other necessary control components, along with a complete system, interlocking and communication wiring to fill the intent of the specification and provide for a complete and operable system. Provide damper operators as required.
5. The ATC Contractor to review and study all HVAC, Electrical and HVAC drawings and entire specification to familiarize himself with the equipment and system operation and to verify the quantities and types of dampers, operators, alarms, etc., he has to provide.
6. All interlocking wiring and installation of all required control devices associated with exhaust fans, etc., to be provided by the ATC Contractor. Close coordination to be exercised between the ATC Contractor and the HVAC Contractor and equipment manufacturers so that installation will be provided in a manner to result in fully operable systems, as intended in these specifications.
7. The ATC Contractor shall furnish all required controllers and miscellaneous control devices to the manufacturers of the following equipment for installation by the respective manufacturer at the factory.
8. The ATC Contractor shall provide all power wiring, conduit, etc. for all his components requiring such. Provide power wiring from breakers in electric panels to ATC panels. All wiring to be done in strict conformance with Division 26.

B. Incidental Work By Others:

1. The following incidental work to be furnished by the designated Contractor under the supervision of the ATC Contractor:

    a. The HVAC contractor to coordinate required work with ATC and, without limiting the generality thereof, the work he is to perform for ATC to include the following:

        1) Install equipment that are specified to be supplied by the ATC Contractor.

        2) Provide, on magnetic starters furnished, all necessary auxiliary contacts, with buttons and switches in required configurations.

        3) Install all automatic dampers and install duct smoke detectors to control air handling unit shutdown, where applicable.

        4) Provide necessary blank-off plate (safing) required to install dampers that are smaller than duct size.

5) Provide access doors or other approved means of access through ceiling and walls for service to control equipment.

b. The Electrical Subcontractor to:

1) Provide all power wiring (110 VAC or greater) to motors. Provide "spare" breakers in electric panels to be used as a power source by ATC Contractor for ATC panels.

2) Provide power sources for use of the ATC contractor where shown on the electrical plans for ATC compliance with Paragraph E below. In general, this will be used for powering terminal controllers and actuators.

C. Electric Wiring:

1. All electric wiring, wiring connections and all interlocking required for the installation of the temperature control system, as herein specified, to be provided by the ATC Contractor, unless specifically shown on the Electrical drawings or called for in the Electrical Specifications, Division 26. Power to actuators to be by the ATC Contractor, except as specifically noted in the Electrical drawings and specifications.

2. All wiring and wiring methods to comply with the requirements of the Electrical Section of the specifications.

3. Provide, on magnetic starters, all necessary auxiliary contacts, with buttons and switches in required configurations.

D. Equipment:

1. Dampers

a. General:

1) Automatic dampers, furnished by ATC Contractor, shall be single or multiple blade as required and/or shown on the drawings.

2) Numerous references are made in this specification as to the responsibility of furnishing and installation of dampers and operators. The ATC Contractor shall closely coordinate his work with the HVAC Contractor to assure that all dampers are provided as required, and he shall examine all pertinent specification sections to assure that all dampers required but not provided by equipment manufacturers are provided under this contract.

3) All blank-off plates and conversions necessary to install smaller than duct sized dampers are the responsibility of the HVAC Contractor.

4) Dampers shall be installed by the HVAC Contractor under the supervision of the ATC Contractor.

5) Operators shall be provided by the ATC Contractor for all types of dampers whether they are provided by equipment manufacturer or by the ATC Contractor.

b. Dampers:

1) All damper frames shall be constructed of 13-gauge galvanized sheet metal and shall have flanges for duct mounting. Dampers installed in stainless steel and aluminum duct work shall be constructed of type 316L stainless steel (frame and blades).

2) Damper blades shall not exceed six (6) inches in width. All blades shall be of corrugated type construction, fabricated from two (2) sheets of 22-gauge galvanized sheet steel, spot welded together, blades shall be suitable for high velocity performance. Damper leakage shall be 2% or less at 5 inches W.C.

3) All damper bearings shall be made of nylon. Bushings that turn in the bearings shall be oil impregnated sintered metal.

4) Leakage and flow characteristic charts must be submitted to the Engineer prior to installation.

2. Actuators And/Or Operators:

a. All damper actuators/operators shall be fully proportioning, unless otherwise specified. They shall be quiet in operation and shall have ample power to overcome friction for damper linkage and air pressure acting on louvers to position dampers accurately and smoothly. The damper actuator/operator mounting arrangement shall be outside the airstream wherever possible, with a maximum of 16 square feet per actuator/operator.

b. The actuators/operators shall be capable of operating at varying rates of speed to correspond to the dictates of the controllers and variable load requirements. The actuators/ operators shall be capable of operating in sequence when required by the sequence of operation. The actuators/operator shall have external adjustable stops to limit the stroke in either direction. The actuator/operator linkage arrangement shall be such as to permit normally open or normally closed positions of dampers as required.

c. All dampers sequenced with dampers shall be furnished with pilot positioners or panel mounted positive positioning relays to ensure proper control sequencing.

d. For exact requirement and quantities of actuators/operators, see plans and coordinate with the HVAC Contractor.

3. Miscellaneous Control Panels: Locations of each panel shall be convenient for adjustment and service. All manual switches shall be flush mounted on the hinged door.

4. All electrical devices within the panels shall be factory pre-wired to a numbered terminal strip. All wiring within the panel shall be in accordance with NEMA and UL Standards and shall meet all Local Codes. All wiring in occupied spaces shall be concealed whenever possible. Any exposed wiring shall be enclosed in painted wiremold, color.

5. Sequences of Operation: Provide control components for each system as required for the sequence of operation indicated on the contract drawings.

2.15 SHEET METAL DUCTWORK

A. Furnish all sheet metal work and accessories specified herein.

B. References to "Duct Manual" herein refer to the First Edition- 1995 - HVAC Duct Construction Standards as published by the Sheet Metal and Air Conditioning Contractor National Association, Inc.

C. All ducts shall be of galvanized steel construction. Ducts shall be properly stiffened to prevent drumming when the fans are in operation.

D. All galvanized duct thicknesses shall be as follows:

1. Longest duct dimension up to 12" - 26 gauge

2. Longest duct dimension 13" through 24" - 24 gauge

3. Longest duct dimension 25" through 30" - 22 gauge

4. Longest duct dimension over 31"- 20 gauge

E. Seal all low pressure duct joints (Class B) with sealant as manufactured by Minnesota Mining Company, Foster, General Electric, or approved equal. Excess sealant must be removed immediately to provide a neat appearance.

F. All low pressure ducts shall be fabricated for 2 inches water gauge pressure. Low pressure ducts shall include all ductwork.

G. All ducts shall be constructed in accordance with Table 1 and Figure 1-5 through 1-13 of the Duct Manual.

H. Duct joints shall be constructed in accordance with Fig. 1-4 of the Duct Manual.

I. Duct seams shall be constructed in accordance with Fig. 1-5 of the Duct Manual.

J. Duct reinforcement shall be per Table 1-18, Figures 1-9, 1-10 and 1-11 of the Duct Manual.

K. Fittings and special installations shall be constructed in accordance with Figure 2-1 through 2-10 of the Duct Manual.

L. Register and grille connections shall be in accordance with Figure 2-16 of the Duct Manual.

M. Flexible connections shall be 4" wide connections, in accordance with Fig. 2-19 of the Duct Manual, constructed of Ventglass heavy glass fabric double coated with neoprene and shall be as manufactured by Vent Fabrics, Inc. Flexible connections shall meet the requirements of the National Board of Fire Underwriters. Exterior flexible connection shall be weathertight.

N. Hangers and supporting systems shall be in accordance with Figure 4-1 through 4-8 and Tables 4-1 through 4-3 of the Duct Manual.

2.16 DUCTWORK ACCESSORIES

A. Manual Volume Dampers

1. Manual volume dampers shall be provided where shown on the Drawings at every branch take off from the main duct, and elsewhere as required by the Balancing Contractor, and shall be single or multiple blade type with sleeve bearings, galvanized steel interlocking blades and a galvanized steel frame. In ducts over 15" deep provide multiple opposed blade type, gang operated dampers with a maximum blade width of 8". Damper blades shall be fabricated of 16 gauge steel with hemmed edges, and a maximum length of 48". Damper operating rod shall be full blade length extended through the duct to externally mounted bearing plates. On insulated ductwork, bearing plates shall be installed flush with insulation finish and fastened to the duct. Operating lever shall be of the indicating type with locking quadrant.

B. Fire Dampers

1. Provide fire dampers at all fire walls and floors, where required by Code and as indicated. Fire damper construction and installation shall meet the requirements of the NFPA 90A, and shall be UL labeled, tested and inspected in accordance with UL 555. Fire dampers shall be as manufactured by Air Balance, Inc., Penn Ventilator Company, Ruskin or approved equal.

2. An access door shall be provided at each damper to service and inspect the fusible link.
3. Ducts shall be enlarged where fire dampers are installed to maintain the same free area through the damper as in the duct run. Provide all required sleeves, angles, and connectors as detailed on the Drawings.

C. Volume Extractors

1. Shall be manufactured by the drum louver or supply air register manufacturer of all aluminum construction. Position adjustment operator shall be key-operated screw with access through face of register. Extractor blades shall be spaced 1" on center.

D. Blank-off Plates

1. Any blank-off plates or conversions required for mounting control dampers or coils shall be the responsibility of the Sheet Metal Sub subcontractor.

E. Insulated Metal Panels

1. Provide 18 gauge, insulated double wall sandwich construction, 1½" thick where called for on the Drawings and for blanking off unused portions of wall louvers.

F. Access Doors

1. In ductwork up to 2" pressure class.

2. Frame: 24 gauge galvanized steel with seal

3. Door: hinged, with 24 gage galvanized steel exterior and interior panels.

4. Locks: doors 16" and under, one lock doors over 16", two locks

5. Seals: foam gasket

G. Radiation Dampers

1. Radiation Dampers: Radiation damper construction and installation shall meet the requirements of the NFPA 90A, and shall be UL labeled, tested and inspected in accordance with UL 555.

2. Provide radiation dampers in each apartment unit where the supply and return air registers penetrates the ceiling/floor assembly.

2.17 SCAFFOLDS AND STAGING

A. General: Obtain required permits for, and provide scaffolds, staging, and other similar raised platforms, required to access their Work.

1. Scaffolding and staging required for use by this Filed Subcontractor pursuant to requirements of Section 01 50 00 - Temporary Facilities and Controls shall be furnished, erected, maintained in a safe condition, and dismantled when no longer required, by this Filed Sub-Trade requiring such scaffolding.

2. Each contractor is responsible to provide, maintain and remove at dismantling, all tarpaulins and similar protective measures necessary to cover scaffolding for inclement weather conditions.

3. Furnishing portable ladders and mobile platforms of all required heights, which may be necessary to perform the work of this trade, are the responsibility this Filed Subcontractor.

2.18 HOISTING MACHINERY AND EQUIPMENT

A. All hoisting equipment, rigging equipment, crane services and lift machinery required for the work by this contractor shall be furnished, installed, operated and maintained in safe conditions by this contractor.

PART 3 - EXECUTION

3.1 GENERAL

A. Install all items specified under PART 2 - PRODUCTS, according to the applicable manufacturer's recommendations and shop drawings, the details shown on the drawings and as specified under this section. Provide all required hangers and supports.

B. All welding done under this section shall be performed by experienced welders in a neat and workmanlike manner. All welding done on piping, pressure vessels and structural steel under this section shall be performed only by persons who are currently qualified in accordance with ANSI Code B31.1 for Pressure Piping and certified by the American Welding Society, ASME or an approved independent testing laboratory; and each such welder shall present his certificate attesting his qualifications to the Engineer's representative whenever requested to do so on the job.

C. All pipe welding shall be oxyacetylene or electric arc. High test welding rods suitable for the material to be welded shall be used throughout. All special fittings shall be carefully laid out and joints shall be accurately matched intersections. Care shall be exercised to prevent the occurrence of protruded weld metal into the pipe. All welds shall be of sound metal free from laps, cold shots, gas pockets, oxide inclusions and similar defects.

D. All necessary precautions shall be taken to prevent fire or damage occurring as the result of welding operations.

3.2 PIPING

A. Provide and erect in a workmanlike manner according to the best practices of the trade, all piping shown on the plans or required to complete the installation intended by these specifications.

B. This contractor shall inform himself from the Architect's specifications and detailed drawings of the exact dimensions of finished work in all rooms where equipment or pipes are to be placed, and arrange his work accordingly, assuming all responsibility for conformity with the surrounding work.

C. In the erection of mains, special care must be used in their support and proper allowance shall be made for expansion.

D. All steel piping larger than 2 inches shall have welded joints made by experienced pipe welders. The joints shall all be well filled with metal without interior projections. After

welds are made, this contractor shall thoroughly clean inside and leave a smooth bore. Where connections are made on runs, weld-o-lets or thread-o-lets are to be used.

E. All other connections are to be made with screwed fittings.

F. In making welds, this contractor is to have the end of the pipe properly beveled and perfectly lined up.

G. Keep plugged or capped all openings in pipes or fittings.

H. Connections to mains are to be provided with swing arms to provide for expansion.

I. Make such offsets as are shown or required to place pipes on risers in proper position or to avoid other work. Make such offsets neatly and properly locate them to the satisfaction of the Architect.

J. All pipe lines are to be provided with sufficient number of flange fittings or unions to make possible the taking down of the pipes without breakage of fittings. Lines 2 inches in diameter and less may be connected by R & L couplings, unless otherwise required by the Architect. All of the piping shall be erected so as to provide for the easy flow of water and noiseless circulation. Whenever pipes are cut, three wheel cutters are to be used and the pipes are to be carefully reamed out.

K. Due to the extreme limited headroom, all water mains shall be installed perfectly level or with minimum pitch. Install air vents on all high points and drawoff valves on all low points throughout the entire system.

L. The entire piping system shall be provided with shutoff valves and drawoff valves so that sections of the system may be drained without interrupting the entire system.

M. Extreme care shall be exercised in the location of all piping.

N. No crosses or bull head tees shall be used in any part of the work.

O. Piping connections to all equipment shall be made with companion flanges or unions for ease in removal of equipment.

P. Provide approved pipe identification markers and flow direction arrows on all piping. Markers to be at 30 foot intervals, except in boiler room where they shall be at 10 foot intervals.

3.3 VALVES

A. Valves shall be installed where shown on plans and elsewhere as necessary for the proper operation or balancing of the systems.

B. At completion, this Contractor shall install stamped brass tag on each valve held on with brass drain (except on fan-coil unit valves) with numbers. This contractor is to make up schedule with number of each valve. Schedule to describe use of each valve. One copy of schedule to be framed under glass and hung in boiler room. Two more copies are to be supplied to the Architect.

C. Extreme care must be used in locating fin tube radiation valves and fittings in order that they shall be installed so as to be readily accessible.

D. Install on each coil a key type compression air valve.

3.4 PIPE HANGERS

A. Pipe hangers of the types specified shall be installed for the support of all piping. Maximum center-to-center hanger spacing shall be as follows, except as otherwise indicated on the Drawings.

Pipe Size	Max. Spacing
Up to 1-1/4″	5′-0″
1-1/2″ and 2″	8′-0″
2-1/2″ and 3″	8′-0″
Over 4″	10’-0″

3.5 SLEEVES

A. Sleeves shall be installed for each pipe passing through masonry floors or walls.

3.6 ESCUTCHEON PLATES

A. Escutcheon plates shall be installed on all piping passing through finished floors, walls or ceilings. Escutcheon plates shall be sized for outside diameter of insulation and installed after insulation is completed.

3.7 INSULATION

A. All of the insulation work shall be done by contractors regularly engaged in this type of work in a neat and workmanlike manner. All insulation shall be completely sealed with no glass fibers exposed to the air.

3.8 VIBRATION ABSORPTION

A. All equipment and piping shall operate without objectionable or unusual noise or vibration, as judged by the Engineer.

B. Rotating equipment shall be fitted with such vibration-absorbing facilities as will be required to limit the transmission of vibration to the building and to the attached piping and breaching. The facilities shall be generally designed to limit this transmission to a maximum of 2%, but a greater amount will be allowed if it does not prove objectionable. The facilities shall also be designed to limit equipment floor loadings to 500 lb/sq. ft. or less. If, in order to accomplish this, the equipment requires the job installation of isolation mountings, inertia blocks, special hangers or other arrangements, these shall be carefully and specifically selected for each piece of equipment.

C. Motor driven equipment shall have the motor, equipment and drive mounted on a common base. Hollow bed plates shall be grouted with a rich cement mortar.

D. Submit shop drawing data for approval by the Engineer showing the make, type, and size of isolation mountings, flexible pipe connectors, and other facilities to be provided, including any concrete inertia blocks that may be required. The data shall clearly indicate that the isolating arrangements can and will limit the transmission of vibration as specified.

3.9 MISCELLANEOUS IRON AND STEEL

A. Provide steel supports and hangers required to support fans, tanks, air handling units, pipe, ductwork, and other equipment or materials. Submit details of steel supports and method of fabrication for approval.

B. All work shall be cut, assembled, welded and finished by skilled mechanics. Welds shall be ground smooth. Stands, brackets, and framework shall be properly sized and strongly constructed.

C. Measurements shall be taken on the job and worked out to suit adjoining and connecting work. All work shall be by experienced metal working mechanics. Members shall be straight and true and accurately fitted. Scale, rust, and burrs shall be removed. Welded joints shall be ground smooth where exposed. Drilling, cutting and fitting shall be done as required to properly install the work and accommodate the work of other trades as directed by them.

D. Members shall be generally welded, except that bolting may be used for field assembly where welding would be impractical. Welders shall be skilled.

E. All shop-fabricated iron and steel work shall be cleaned and dried and given a shop coat of paint on all surfaces and in all openings and crevices.

3.10 EQUIPMENT

A. Equipment shall be installed complete with all required hangers and supports in accordance with the manufacturer's recommendations.

B. Furnish and install all steel structural support members for proper hanging and support of equipment. Provide vibration isolation on all hangers.

C. All equipment shall be installed in strict accordance with manufacturer’s written installation instructions.

D. All equipment and associated components requiring access for periodic inspection, filter changes, or maintenance shall be located over accessible ceilings; if located above inaccessible ceilings with approval of Architect and Engineer, provide access panels with appropriate fire ratings for required access at no additional cost to the project.

3.11 AUTOMATIC TEMPERATURE CONTROLS

A. System shall be complete with all control wiring, switches, relays, transformers, and other accessories.

B. The Control System herein specified shall be free from defects in workmanship and material under normal use and service. After completion of the installation, regulate and adjust all thermostats, control valves, control motors, and other equipment provided and/or wired under this contract. If within twelve (12) months from the date of completion, any of the system herein described is proved to be defective in workmanship or materials, it will be replaced or repaired free of charge.

C. Provide any service incidental to the proper performance of the Control System under guarantees outlined above for the period of one year. Normal maintenance of the system or adjustments of components is not to be considered part of the guarantee.

3.12 WATER TREATMENT

A. General:

1. Provide, where shown on the drawings and as specified hereinafter, the necessary apparatus to provide cleaning water treatment and complete water treatment services for the hot water and chilled water system.

2. A contract agreement satisfactory in form and substance to the Owner shall be executed between the Contractor and the water treatment company through its authorized agents, binding the water treatment company to provide supervisory service to assure the use of proper chemical treatment to the system for a period of one year from the date of the initial system start and treatment thereof. The contract shall be assigned to the Owner on the date that the building is accepted by the Owner so that water treatment will continue uninterrupted during the one year life of the contract. The water treatment company shall perform the following consulting analysis service.

3. Supervise the cleaning and flushing out of the system.

a. After completing the installation or modification of the system, it shall be properly flushed out prior to start-up. Flush-out chemicals and procedures shall be furnished by the water treatment company.

b. Tests shall be made following the flush-out procedure and a written report submitted to the Engineer, Owner and Contractor stating that the flushing-out has been completed satisfactorily. Residual chemical levels shall be limited as follows:

1) phosphate – zero

2) alkalinity to 100 ppm max.

3) suspended solids – zero

4) pH value of 8.4 or less

c. All side loops and low points shall be drained and flushed.

1) Systems shall then be refilled and treated chemically in accordance with recommendation of the water treatment company. The Contractor shall notify the water treatment contractor at least 48 hours in advance of initial system fill.

2) It shall be the responsibility of the Contractor to secure an agreement between the chiller manufacturer, circulating pump manufacturer and the water treatment company as to the proper level of treatment to be maintained in the system to avoid damage to chiller, pumps and pump seals. A letter stating such understanding shall be submitted to the Engineer before approval of the pumps and the water treatment program.

4. Supervise and instruct the Owner′s operating personnel in the following:

a. initial introduction of water treatment to all systems and the control thereof;

b. chemical product literature, identification for use and application procedure;

c. testing procedure and interpretation of test results and proper control limits for each constituent; and

d. log sheets with instructions in correct entry procedure.

5. Provide service calls at frequency of not less than one call per month thereafter.

6. Furnish all required chemicals for proper treatment of the system for the one-year period together with the necessary control testing kit or apparatus and reagents for field analysis of the water during the aforementioned one-year period.

7. Provide written reports of water analysis results with recommendations.

8. Provide a quarterly review of conditions with the Owner.

9. The Contractor shall assume responsibility for the field testing and control and the regular addition of chemical treatment.

B. Qualifications of the Water Treatment Company:

1. The water treatment company shall have a minimum of five years of experience in the water treatment business, have laboratory facilities and staff capable of performing all necessary analyses relating to this job, and the treatment programs shall be under the direction of a graduate chemist or licensed professional engineer.

C. Cleaning and Flushing:

1. Exercise every precaution to avoid introducing foreign matter such as welding beads and slag or dirt into the piping system. All completed welds shall be hammered to loosen debris. All piping, valves and fittings shall be internally cleaned of oil, grease or dirt, prior to assembly into system by use of wire brush and swab.

2. All cleaning and flushing work shall be coordinated with and supervised by the water treatment company for chemicals and procedures to be followed.

3. Following the successful testing of the piping systems, they shall be cleaned under the supervision of the water treatment company.

4. Before submitting piping systems for acceptance, all strainers shall be inspected and thoroughly cleaned.

5. Cleaning shall be started only after all piping has been hydrostatically tested and all systems have been completely connected up.

6. Operate pumps and circulate water throughout system for period of three 8-hour days. At the end of each day of circulation, remove and clean all strainer baskets and blow off all low points.

D. Closed Recirculation Systems:

1. The piping system shall be thoroughly flushed and cleaned with Dearborn BC-45 Cleaner, Dow, Barclay or approved equal, and charged with Dearborn B-329 Nitrite Corrosion Inhibitor, Dow, Barclay or approved equal, after cleaning. Control limits of 800 to 1,000 ppm shall be maintained. The bypass shall be piped across the suction/discharge pipes of the system.

3.13 START-UP

A. Contractor shall provide manufacturer's start-up and functional performance testing for all equipment installed as part of this work. Contractor shall be responsible for all labor, materials and equipment required to accomplish this service.

B. Contractor shall complete start-up reports and documentation for all equipment.

3.14 BALANCING, ADJUSTING, OPERATING, AND INSTRUCTIONS

A. The HVAC contractor shall engage the services of an independent firm to perform testing, adjusting and balancing of the HVAC systems.

B. Engage a balancing company to adjust, balance, and operate the heating, ventilating and air-conditioning system and thoroughly instruct the Owner's personnel in all phases of care and operation of the systems. The Balancing Company shall be certified by Associated Air Balance Council or by the National Environmental Balancing Bureau.

C. Before the air systems are tested and balanced, ducts and equipment shall be thoroughly cleaned by the contractor so that no dirt, dust, or other foreign matter will be deposited in

or carried through the systems. For this purpose, cheesecloth shall be placed over each opening for entraining such particles during the cleaning operation.

D. The Contractor as a part of this contract shall provide all materials, labor, and service of all contractors for fulfillment of air and water balancing of all systems. The Balancing Company shall inform Contractor of all requirements ahead of time.

E. All equipment shall be operated and adjusted and all air and water systems shall be adjusted and balanced, readings taken and recorded on an approved form submitted to the Engineer for approval, readjusted and rebalanced in accordance with the Engineer's review comments and resubmitted.

F. Air Systems:

1. Contractor shall test and record existing Air Handling Unit (AHU) supply airflow rates prior to reheat coil installation and modified ductwork construction. Record findings and report existing AHU supply airflow rates to engineer in writing.

2. Adjustments shall be made to the existing AHU supply air fan motor assembly post-installation of modified cooling coil installations. Contractor shall adjust supply air motor assemblies to target CFM airflow rates to maintain existing supply air rates that occurred prior to intake duct modifications. Report supply airflow rates in writing to engineer for review.

G. Water Systems:

1. Water circulating system shall be adjusted and balanced by the Balancing Company so that water quantities circulated through all coils, pumps, equipment, etc., will be as specified.

2. Where no meters are provided, the adjustment of individual coil circuits shall be based on return water temperature, provided air balancing and adjusting has been satisfactorily completed first. Temperature control valves on each branch shall be wide open during the balancing. Adjustment of water flows through coils shall be based on manufacturers pressure drop data. Balancing cocks and valves shall be set. The settings of cocks, valves, etc., shall be permanently marked so that they can be restored if disturbed at any time.

3. The following shall be established and listed:

a. Temperatures and water flow at each coil after each complete system has been balanced and adjusted.

b. Pressure drops, manufacturer's ratings, and water flow at each coil after each complete system has been balanced and adjusted.

c. Suction and discharge pressures at each pump after each complete system has been balanced and adjusted.

d. Motor amperage for each phase and voltage at each pump.

H. The Balancing Company shall provide all instruments and accessories required to perform the tests.

3.15 TESTING

A. All hot water piping in whole or in part, prior to insulating and being closed in, shall be subject to a hydrostatic test pressure of 100 psig for eight hours without a pressure drop at the end of the test period. All leaks that occur shall be repaired by removing the joints in their entirety, rejoining, and test repeated as often as necessary until the piping system or systems are absolutely tight.

B. Furnish all necessary equipment to conduct the testing of the piping system.

C. Two pressure gauges shall be used whose range shall not exceed 0 to 150 psig, nor be less than 0 to 120 psig. Evidence of leakage or pressure drop shall be cause for rejection.

D. A log of all tests shall be kept by the Contractor. The log shall provide a description of the test or inspection, the date performed, and the signatures of the responsible contractor's person performing the work and the witnessing engineer. This log shall form part of the final documentation. Failure to maintain this log will result in re-inspection or testing at the Contractor's expense.

3.16 PLACING IN SERVICE

A. At the completion of performance tests and following approval of test result, recheck all equipment to see that each item is adequately lubricated and functioning correctly.

END OF SECTION

DIVISION 26

SECTION 26 00 00

ELECTRICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. Furnish all labor, materials, equipment and incidentals necessary to provide complete electrical system as shown on the Drawings and as specified herein. The major items of work shall generally consist of:

1. Electrical Demolition: Demolition/removal of existing branch circuitry for the existing Boiler Feed Units and associated pump as indicated on the electrical drawings.

2. New Electrical Work in Boiler Room, including providing new branch circuitry to power new Boilers and new pumps. The existing emergency panel EPA shall be replaced with new panel. Both existing boiler room panels EP1 and EP2 shall be fed from new emergency panel A. The work shall generally consist of providing:

a. Raceways, Fittings and Supports

b. Wire and Cable

c. Disconnect Switches

d. Feeder Circuit Wiring and Connections for new equipment.

e. Grounding

f. Electrical Identification (name plates and labeling)

g. All Fees and Permits

h. Testing

i. Operations and maintenance manuals.

j. Circuit breakers for existing panelboard.

B. Furnish all labor and materials to perform demolition work as shown on the Drawings and as specified hereinafter.

C. During final inspection, the Electrical Sub-Contractor shall be available to the mechanical and electrical engineers to open all electrical/control panels for inspectional purposes.

1.2 RELATED WORK PROVIDED BY THE GENERAL CONTRACTOR

A. Concrete Work

B. Carpentry Work

C. Temporary Heating

D. Control Wiring

1.3 CODES, ORDINANCES, AND PERMITS

A. Installation of systems and equipment provided under this section shall be done in strict accordance with Massachusetts Department of Public Safety Codes, Massachusetts Department of Environmental Protection, Massachusetts State Building Code, the Massachusetts Electrical Code, the National Electrical Code (most recent editions) and the City of Boston Codes and Regulations having jurisdiction.

B. All work, where applicable, shall conform to NFPA codes and all material shall be U.L. approved.

C. All electrical apparatus furnished under this section shall be approved by the UL and shall be so labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

D. No work shall be covered before examination and approval by Engineer, inspectors, and authorities having jurisdiction. Replace imperfect or condemned work conforming to requirements, satisfactory to Engineer, and without extra cost to the Owner. If work is covered before due inspection and approval, the installing contractors shall pay costs of uncovering and reinstalling the covering, whether it meets contract requirements or not.

E. In the event local inspectors or codes require a change in the material, design, or involve additional labor, all such changes shall be submitted to the Engineer for approval before proceeding with the work. Comply with all local codes and inspections.

1.4 RECORD DRAWINGS

A. Refer to Section 01 70 00, Project Closeout, of the Specifications for record drawings and procedures to be provided under this section.

1.5 CLEANING

A. During the progress of the electrical work, the Electrical Sub-Contractor shall clean up and remove all scrap, demolition material, and other debris caused by the Contractor. At completion, the Electrical Sub-Contractor shall clean all electrical equipment, wiring and raceway systems and leave all work in perfect operating condition.

1.6 COORDINATION AND RESPONSIBILITY

A. The structure and its appurtenances, clearances and the related services, such as plumbing, heating, ventilation and electric service have been planned to be legal, adequate and suitable for the installation of equipment specified under this section. The Owner will not assume any increase in cost caused by differing requirements peculiar to a particular make or type of equipment, and any incidental cost shall be borne by the Electrical Sub-Contractor. He shall be responsible for the proper location of his required sleeves, chases, inserts, etc., and see that they are set in the forms before the concrete is poured. He shall be responsible for his work and equipment furnished and installed by him until the completion and final acceptance of this contract, and he shall replace any work which may be damaged, lost or stolen, without additional cost to the Owner.

1.7 PROTECTION OF MATERIALS, WORK, AND GROUNDS

A. Materials, fixtures and equipment shall be properly protected and all raceway openings shall be temporarily closed so as to prevent obstruction and damage.

B. Protect and preserve all materials, supplies and equipment of every description and all work performed. Protect all existing equipment and property of any kind from damage during the operations. Damage shall be repaired or replaced promptly by the Electrical Sub-Contractor at his expense.

1.8 DRAWINGS

A. It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation. Any apparatus, appliance, material or work not shown on the Drawings, but mentioned in the Specifications or vice-versa, or any incidental accessories necessary to make the work complete in all respects and ready for operation, even if not particularly specified, shall be provided by the Electrical Sub-Contractor without additional expense to the Owner.

B. The Drawings are generally diagrammatic. The locations of all items that are not definitely fixed by dimensions are approximate only. The exact locations must be determined at the project and shall have the approval of the Engineer before being installed. The Electrical Sub-Contractor shall follow Drawings, including his shop drawings, in laying out work and shall check the Drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions. Where space conditions appear inadequate, notify the Engineer before proceeding with the installation. The Electrical Sub-Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

C. Size of raceways and methods of running them are shown, but it is not intended to show every offset and fitting, nor every structural difficulty that may be encountered. To carry out the true intent and purpose of the Drawings, all necessary parts to make complete approved working systems ready for use, shall be furnished without extra charge. All work shall be installed in such a manner as to avoid being unsightly.

D. All measurements shall be taken at the building by the Electrical Sub-Contractor, prior to purchasing and installing the equipment and raceways.

1.9 APPROVAL OF MANUFACTURERS AND SHOP DRAWINGS

A. Submit five (5) copies of the following in accordance with Section 00 70 00.

1. Disconnects and Safety Switches

2. Wire and Cable

3. Conduit and Raceways

4. Circuit Breakers

B. Individual information shall be submitted for each type of equipment. Where multiple products of various sizes, capacities or ratings are indicated on the same page of a submittal, the Electrical Sub-Contractor shall clearly identify which items are being submitted. Unmarked submittals will be returned without action. Additional requirements for shop drawings may be contained under individual items.

1.10 UNDERWRITERS' LABEL AND LISTING

A. All electrical apparatus furnished under this Section shall be approved by the UL and shall be labeled or listed where such is applicable. Where custom-built equipment is specified and the UL label or listing is not applicable to the completed product, all components used in the construction of such equipment shall be labeled or listed by UL where such is applicable to the component.

1.11 CUTTING AND PATCHING

A. All cutting and patching necessary for the proper installation of work to be performed under this Section shall be performed by the General Contractor.

B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.

C. All of this work shall be done by careful workmen competent to do such work and with the proper and smallest tools applicable.

D. Any cost caused by defective or ill-timed work shall be borne by the contractor responsible.

1.12 GUARANTEE

A. The Electrical Sub-Contractor shall guarantee, in writing, all work and all materials provided under this Section in accordance with the provisions of the printed form of Contract and the General Conditions.

1.13 ELECTRICAL

A. All furnished electrical apparatus and controls shall conform to applicable requirements under DIVISION 26 - ELECTRICAL.

B. The General Contractor shall furnish all magnetic starters for each and every motor furnished under other sections of the specification, except where otherwise indicated. The Electrical Sub-Contractor shall install and wire the starter.

C. The General Contractor shall furnish and install all low voltage and/or line voltage control wiring for the boiler/burner unit and the induction fan unless indicated otherwise.

1.14 VERIFYING EXISTING CONDITIONS

A. Before commencing any work under this section, verify all governing dimensions and examine all adjoining work on which this work is in any way associated or connected. Failure to visit the jobsite will in no way relieve the Electrical Sub-Contractor from installing the work according to the intent of these specifications and at no additional cost to the Owner.

B. Each bidder shall visit the site and inspect conditions affecting the proposed work. Failure to do so and misinterpretation of the Plans and Specifications shall be entirely the responsibility of the bidder, and will not be a basis for claim for extra compensation.

C. Each bidder shall make note of the existing conditions affecting hauling, rigging transportation, installation, etc., in connection for his work and shall make all provisions for transportation such of all materials and equipment.

D. Where field conditions require, the Electrical Sub-Contractor shall arrange for equipment to be shipped to the job, dismantled and assembled in place.

1.15 CONCRETE WORK

A. All masonry and concrete pads shall be provided by the General Contractor.

1.16 PAINTING

A. All finish field painting shall be provided by the General Contractor.

1.17 REFERENCE STANDARDS

A. The latest published issue of the standards, recommendations, or requirements of the following listed societies, associations, or institutes in effect at the date of Contract are part of this Specification. These shall be considered as minimum requirements; specific requirements of this specification and/or associated drawings shall have precedence. In case of conflict between published requirements, the Engineer and/or Owner's representative shall determine which is to be followed.

B. Electrical equipment, installation and workmanship shall conform to the latest editions of the applicable codes and standards of the following organizations.

1. Institute of Electrical and Electronic Engineers (IEEE)

2. American National Standards Institute (ANSI)

3. National Fire Protection Association (NFPA)

4. Massachusetts and National Electrical Code (MEC/NEC)

5. Underwriters' Laboratories (UL)

6. National Bureau of Standards (NBS)

   a. H33-Safety Rules-Electrical Utilization Equipment.

   b. H51-Safety Rules-Installation and Maintenance of Electric Supply and Communication Lines.

7. National Electrical Manufacturers Association (NEMA)

8. American Society for Testing and Materials (ASTM)

9. Insulated Power Cable Engineers Association (IPCEA)

10. Occupational Safety and Health Act (OSHA)

1.18 COOPERATION WITH OTHER TRADES

A. The work shall be so performed that the progress of the entire building construction, including all other trades, shall not be delayed or interfered with. Materials and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as desired.

B. Confer with all other trades relative to location of all apparatus and equipment to be installed and select locations so as not to conflict with work of other Sections. Any conflicts shall be referred immediately to the Engineer for decision to prevent delay in installation of work. All work and materials placed in violation of this clause shall be readjusted to the Engineer's satisfaction, at no expense to the Owner.

C. Where work of this section will be installed in close proximity to work of other sections or where there is evidence that the work of this section will interfere with work of other sections, assist in working out space conditions to make satisfactory adjustment. If so directed by the Engineer, prepare and submit for approval 1/8 inch scale or larger working drawings and sections, clearly showing how this work is to be installed in relation to the work of other sections. If the work of this section is installed before coordinating with other trades or so as to cause interference with work of other trades, make changes necessary to protect conditions without extra charge.

1.19 WORKING CONDITIONS AND SAFETY

A. Whereas the building may be occupied during the construction period, it is of utmost importance that student and faculty safety and the educational process be maintained. The Electrical Sub-Contractor shall not disrupt the normal operations of the building and shall be required to cease work during occupied hours if, in the opinion of the Owner's Representative or the Engineer, the work creates a disruption to education. The Electrical

Sub-Contractor will then be required to perform such disruptive work during unoccupied business hours. No work shall commence until the site has been properly prepared.

1.20 MATERIAL AND WORKMANSHIP

A. All material provided shall be new and approved for the intended service.

B. Defective equipment or equipment damaged in the course of installation or testing shall be replaced by the Electrical Sub-Contractor at no cost to the District.

C. All work shall be executed in the best and most thorough manner known to each trade. Employ careful, competent, experienced journeymen, and insofar as possible, keep the same foreman and workmen from the beginning to the completion of the job.

1.21 PRODUCT HANDLING AND STORAGE

A. Arrange for, and provide, a storage space or area at the job site for all electrical equipment and materials to be installed or reinstalled in the project. The exact location of portable storage vans at the job site or protected storage areas within the building construction, conditions permitting, shall be arranged with the Engineer.

B. All electrical equipment and materials, upon receipt at the job site shall be thoroughly inspected as to their type and condition and the quantity received.

C. After inspection, all electrical equipment and materials shall be moved to the storage area designated.

1.22 TEMPORARY FACILITIES

A. The Electrical Sub-Contractor shall be responsible for maintaining all temporary power and lighting throughout the project. Existing light and power shall be utilized for temporary lighting and power usage. The Electrical Sub-Contractor shall coordinate with the General Contractor regarding requirements for light and power.

1.23 OUTAGES

A. The Electrical Sub-Contractor shall coordinate all power outages with Owner's Representative.

B. Outages confined to the new boiler room shall be coordinated with the general contractor.

1.24 HOISTING, SCAFFOLDING, STAGING AND PLANKING

A. Provide, set up and maintain all required derricks, hoisting, machinery, scaffolding, staging and planting for the work of this section.

B. Scaffolding is to have solid backs and floors to prevent dropping materials to the floors or ground.

PART 2 - MATERIALS

2.1 RACEWAYS AND FITTINGS

A. General:

1. All wiring shall be installed in conduit or wireways, unless otherwise indicated. All conduit shall be minimum 3/4" commercial trade size, unless otherwise specified or indicated on the drawings. Metallic conduit fittings shall be made of steel or malleable iron only. Die-cast zinc-alloy fittings and fitting made of inferior materials, such as “pot metal”, shall not be used.

B. Rigid Steel Conduit:

1. Rigid Steel, Galvanized

a. Full weight galvanized steel conforming with UL 6 and ANSI C80.1.

2. Terminations

a. Double locknutted with insulated throat bushings in dry locations.

b. Insulated, gasketed hub connectors in damp/wet locations.

3. Fittings and Conduit Bodies

a. Fittings and conduit bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.

C. Metal Clad Cable (MC)

1. Where indicated on the drawings, type MC Cable shall be provided.

D. Liquid-Tight Flexible Metal Conduit

1. Flexible galvanized steel tubing over which is extruded a liquid-tight jacket of polyvinyl chloride (PVC). 1-1/4" size and smaller shall be provided with a continuous copper bonding conductor.

2. Connectors shall be steel or malleable iron with insulated throats.

E. Wireways

1. Wireways, auxiliary gutters, and associated fittings shall comply with UL 870.

2. Wireways shall be of the screw-cover type, and of sizes indicated or as required by NEC.

3. Wireways shall be of raintight construction in wet locations.

4. Finish shall be paint, manufacturer’s standard.

2.2 OUTLET BOXES

A. Outlet boxes for exposed conduit work shall be cast aluminum alloy with cast aluminum alloy covers.

B. Switch boxes, receptacle boxes and other outlet boxes shall be standard 4" square with plaster rings or gang covers as required.

C. Outlet boxes for various systems and components shall be as required by manufacturer.

D. Provide screw-joint outlet boxes, with gasketed weatherproof covers in locations, where exposed to moisture, or next to water or steam connections, and where indicated as weatherproof on Drawings.

E. Provide only enough conduit openings to accommodate conduits at individual location. Each box shall be large enough to accommodate number and sizes of conduits, wires and splices to meet NEC requirements, but shall be at least size shown or specified. Necessary volume shall be obtained by using boxes of proper dimensions.

2.3 DEVICE, PULL AND JUNCTION BOXES

A. The Electrical Sub-Contractor shall provide junction boxes, pull boxes, terminal boxes and fittings as indicated on drawings, specified herein or wherever necessary to facilitate pulling or splicing of wires and cables of all electrical systems, and/or required by code.

B. Junction or pull boxes not over l00 cubic inches in size shall be standard outlet boxes, except as noted otherwise. Junction and pull boxes over l00 cubic inches in size shall be constructed of code gauge sheet steel with screw covers and gaskets and shall be fabricated from approved detailed working drawings. Finish shall be paint over zinc chromate primer.

C. Outlet boxes in unfinished areas shall be cast metal with threaded conduit hubs.

2.4 WIRE AND CABLE

A. Wire and cable of sizes, quantities and types shown on drawings, schedules or specified herein shall be provided by the Electrical Sub-Contractor. All wire and cable shall be installed in raceways, unless otherwise indicated.

B. Wire and cable work shall be in strict accordance with requirements of National Electrical Code and its latest revisions, both with respect to material and workmanship, except where insulation thickness and covering are required by these Specifications in excess of Code requirements.

C. Minimum size wiring, unless otherwise indicated, for power and lighting branch circuit shall be #l2 AWG.

D. Branch circuit power, and control wiring, except as otherwise noted, shall have type THWN-THHN, 600 volts insulation. Unless otherwise noted, feeder wiring and branch circuit wiring sizes #6 AWG AND LARGER shall be Type XHHW, #8 AWG and smaller type shall be THWN-THHN.

E. Wires and cables shall be single conductor. Conductors of sizes #8 AWG and larger shall be stranded; wires smaller than #8 AWG shall be solid. Conductors shall be soft drawn copper and have a conductivity of not less than 98% of ASTM standards for annealed copper. Aluminum conductors will not be accepted.

F. Sizes 12 and 10 AWG wire and cable shall be factory color-coded with a separate color for each phase of each system voltage used consistently throughout power systems. Size 8 AWG and larger shall be completely colored with vinyl tape wherever accessible. Colors shall be in accordance with those listed in Section 3 of this specification.

G. Grounding conductors and equipment grounds unless bare, shall have a GREEN covering or shall be completely marked with green tape at boxes, conduit bodies or where otherwise accessible.

H. Cables ties and straps shall be self-clinching types of one piece molded construction. Bodies shall be of nylon and clinching clips shall be spring bronze. Ties and straps shall be Thomas & Betts Company, Types TY-25 and TY-35 or approved equal.

I. Splices and taps in wires #8 and larger shall be made with solderless mechanical compression connectors designated for the purpose. Splices and taps shall be taped with approved tapes providing insulation not less than that of the conductors. Joints for wires #10 AWG and smaller shall be made with spring type screw-on connectors.

J. Splicing tape shall be vinyl plastic tape 8.5 mils minimum thickness, flame retardant, abrasion, ultra-violet, moisture, alkali, acid, and corrosion resistant.

2.5 WIRE PULLING EQUIPMENT

A. Provide polyethylene ropes for pulling wire.

2.6 DISCONNECT SWITCHES

A. All safety switches shall be NEMA type “HD”, heavy duty and shall meet or exceed NEMA Standard KS-1 for type HD switches, and meet or exceed Federal Specification W-S-865C for HD switches.

B. Enclosed disconnect switches shall have the following features:

1. Quick-make, Quick-break Switch Mechanism

2. Padlockable Door and Handle

3. Positive Type Interlocked Door

4. 250 volt AC Rating

5. Visible On-off Indication

6. NEMA l Surface Enclosure in Dry Locations

7. CO/ALR Cable Lugs

8. Horsepower Rated (note that HP rating of switch must be equal to or greater than HP rating of motor or equivalent equipment loads.

2.7 GROUNDING

A. Cables shall be of solid or stranded copper size as specified on the drawings. Cables shall be bare when installed in soil or in open air, and shall be insulated with 600 volt green jackets in all runs installed in conduit.

B. The grounding conductor bonding jumper shall be attached to the circuits, conduits, cabinets, equipment and the like, which are to be grounded by means of suitable lugs, pressure connectors and clamps.

C. All feeder and three phase motor circuits shall be provided with an appropriately sized grounding conductor. Sizes shall be based on NEC Table 250-95. Grounding conductors shall also be provided wherever the raceway is not a suitable grounding conductor.

2.8 CIRCUIT BREAKERS

A. Shall be bolt on type.

B. Thermomagetic trip.

C. UL Listed compatible with existing.

2.9 IDENTIFICATION

A. Wire and Cable Identification

1. Conductor labels shall be white, adhesive self-laminating type. All text shall be typed. String tags shall not be accepted. Temporary tagging during construction shall be allowed, but all permanent adhesive tags shall be in place prior to requesting final acceptance.

PART 3 - EXECUTION

3.1 RACEWAYS AND FITTINGS

A. Conduits usage shall be as follows:

LOCATION	EXPOSED/ CONCEALED	SUBJECT TO DAMAGE, Y/N	WET/DAMP OR DRY	PERMITTED CONDUITS
Interior	Exposed	No	Dry	RGS
Interior	Exposed	No	Wet	RGS
Interior	Exposed	Yes	Dry	RGS

Interior	Exposed	Yes	Wet	RGS

*RGS - Rigid Galvanized Steel

B. The following areas shall be considered damp/wet locations, and raceways installed according to NEC requirements for such locations:

1. Boiler Room Exterior Locations.

C. All conduit shall be cut square and reamed at the ends. All joints shall be drawn tight. Exposed conduit shall be run parallel to or at right angles to the lines of the building. Right angle bends in exposed conduit shall be made with standard elbows, conduit body fittings, or conduit bent to radii not less than those of standard elbows. All bends shall be free from dents or flattening.

D. Conduit shall be made mechanically and electrically continuous from service entrance to all outlets

E. Conduit connected to wall outlets shall be run in such a manner that they will not cross water, steam or waste pipes wherever possible. Overhead conduits shall be run above water, steam or waste lines wherever possible.

F. Liquid-tight flexible conduits shall be used for connection to motors and other electrical equipment when it is subject to movement, vibration, misalignment or cramped quarters or where noise transmission is to be eliminated or reduced. Proper angle connectors (straight, 45 degree, 90 degree) shall be used for the installation. Improperly installed connectors are not allowed.

G. Pipe straps and hanger rods shall be fastened to concrete by means of inserts or expansion bolts, to brickwork by means of expansion bolts and to hollow masonry by means of toggle bolts. Hanger rods shall be fastened to beams and joists by means of swivel type beam clamps. Wooden plugs and shields and powder driven fasteners shall not be used.

H. Individual horizontal conduits shall be supported by one hole pipe straps or separate pipe hangers for sizes 1-1/2" and smaller. Spring steel fasteners may be used for sizes 1-1/2" and smaller in dry locations only. Hanger rods used with spring steel fasteners shall be minimum 1/4" diameter.

I. Where two or more horizontal conduits run parallel and at the same elevation, they shall be supported on multiple pipe hangers. Conduit shall be secured to the horizontal hanger member.

J. Pullboxes shall not be utilized for the vertical support of conduits.

K. Every conduit system shall be installed complete and blown through and swabbed before conductors are installed.

L. Wireways shall be used for mounting groups of disconnects and/or starters, or where shown on the drawings.

3.2 DEVICE, PULL AND JUNCTION BOXES

A. Boxes shall be installed in rigid and satisfactory manner supported by bar hangers in frame constructions or fastened directly with wood screws on wood; bolts to hollow expansion shields on concrete or brick, toggle bolts on hollow masonry units and machine screws or welded threaded studs on metal. Threaded studs provided with lock washers and nuts are acceptable for mounting of outlets on concrete construction.

B. Location of devices shown on the Drawings is approximate. When necessary, devices shall be relocated at no extra cost within a 10'-0" radius to avoid conflicts with structural conditions or equipment of other trades. Outlets shall be symmetrically located according to room layouts.

C. Boxes shall be secure to conduit by means of double steel locknuts (inside and outside) and malleable iron or steel insulated throat bushings.

3.3 WIRE AND CABLE

A. 250 Volt Systems:

1. Conductors shall not be installed in a manner which will injure their insulation or covering. Conduit system shall be complete before any conductors are installed. Conductors shall not be installed until such time that the conductors can be suitably protected against the elements and damage.

2. Provide and use suitable cable pulling winches or equipment of adequate capacity in order to insure a steady, continuous pull. Before any wires or cables are drawn into conduits, the conduit shall be cleaned out by pulling a swab through the conduit with fish tape, and wires shall be pulled through conduit in such a manner as to avoid kinking or injuring the insulation. Only non-metallic approved cable lubricants shall be used when necessary. Cable lubricants shall be completely removed at panelboards, pull and junction boxes and other accessible locations.

3. All feeder cables shall be continuous from origin to panel or equipment terminations without running splices in intermediate pull or splice boxes. Where taps and splices are deemed necessary by job conditions, they shall first be approved by the Engineer and shall be made in approved splice boxes with suitable connectors as noted herein. Special note is to be made when extending existing feeders.

4. No splices or joints shall be permitted in branch circuits except within accessible junction boxes. Splices in junction boxes shall be with enough spare wire to enable two or more splices to be remade with the same wire in event of a fault. When a bolted splice or connection presents an irregular surface, duct seal compound shall be molded around the joint. It shall make a smooth taping surface and prevent the formation of air pockets.

5. Use solderless pressure connectors on conductors of No. 8 AWG and larger and tape to provide insulation not less than that of the conductor. Solderless connectors shall be of rugged construction with multi-point contact on cable, ground contact

surfaces for low resistance and low temperature rise, and with high pull-out strength. On conductors of 250 MCM or larger provide not less than 2 pressure connectors.

6. On conductor sizes No. 10 or smaller, connectors shall be molded composition with metal thread-on core.

7. At panelboards, junction boxes, conductors shall be identified with circuit numbers by applying suitable marking.

8. Neatly train all wiring within equipment boxes and panelboards.

9. Inspect all wire and cable for damage after installation. Replace all damaged conductors or insulation. Megger test all feeder conductors and record results in accordance with Section 01700 of this specification. Verify all phasing of conductors and equipment.

10. Conductor color coding for power circuits shall be as follows:

Phase	120/208 volts
A	Black
B	Red
C	Blue
Neutral	White
Ground	Green

3.4 PANELBOARDS

A. Circuit breakers and switches used as a motor disconnecting means, and not in sight of the motor and the driven machinery location, shall be capable of being locked in the open position. Door locks shall be keyed alike. Nameplates shall be as approved. Directories shall be typed to indicate loads served by each circuit and mounted in a holder behind a clear protective covering. Busses shall be copper.

3.5 DISCONNECT SWITCHES

A. Provide manufacturer's nameplates for front cover indicating the following information:

1. Switch Type

2. Catalog Number

3. H.P. Rating

4. Voltage Rating

5. Current Rating

B. Provide safety disconnect switches at all locations as shown on drawings. Disconnects shall be mounted within sight, and proximate to the load served. Disconnects are to be mounted 48" AFF, unless otherwise noted.

C. Provide engraved phenolic (white lettering/black field) nameplate indicating load being fed.

3.6 GROUNDING

A. The entire electrical wiring raceway system of this project shall be made to form a continuous, permanent and effective equipment grounding circuit which shall be installed as follows:

1. All metallic threaded couplings and conduits shall be wrench-tight.

2. All termination of rigid conduits at all boxes, cabinets, and other enclosures shall be made with double locknut arrangement and a bushing. Bushings shall be insulating type.

3. All flexible metallic conduit and liquid-tight flexible conduits over 6' long or with conductors carrying over 20 amps shall have proper size ground conductor jumper bonded to the rigid conduit system and to the electrical equipment.

4. All electrical, metallic enclosures shall be effectively bonded by a separate green colored bonding screw. The use of a mounting screw for grounding will not be accepted.

5. All sections of wiring gutters and wireways, all outlet boxes and receptacle grounding terminals, all metal sections of continuous rigid cable supports and fittings and cable bus, and other built-up enclosures with bolted joining of sections shall be firmly bonded and effectively grounded. Conduit expansion fittings shall have factory furnished bonding jumpers.

END OF SECTION

TOWN OF TEMPLETON
POLICE DEPARTMENT
DEHUMIDIFICATION IMPROVEMENTS

TOWN OF TEMPLETON POLICE DEPARTMENT
33 South Road
Templeton, Massachusetts 01468

PLAN NO.	DESCRIPTION
T0.01	TITLE SHEET
H0.01	HVAC LEGEND AND NOTES
H0.02	HVAC SCHEDULES & SEQUENCES
H0.03	HVAC DETAILS
HD1.00	HVAC BASEMENT DEMO PLAN
HD2.00	HVAC FIRST FLOOR DEMO PLAN
HD3.00	HVAC ATTIC DEMO PLAN
H1.00	HVAC BASEMENT NEW WORK PLAN
H2.00	HVAC FIRST FLOOR NEW WORK PLAN
H3.00	HVAC ATTIC NEW WORK PLAN

PLAN NO.	DESCRIPTION
E0.1	ELECTRICAL LEGEND, NOTES, DETAILS & SCHEDULES
E0.2	ELECTRICAL DETAILS & FA RISER
ED0.1	ELECTRICAL DEMO PLAN
ED0.2	ELECTRICAL DEMO PLAN
ED0.3	ELECTRICAL DEMO PLAN
E1.1	ELECTRICAL LOWER LEVEL NEW WORK PLAN
E1.2	ELECTRICAL UPPER LEVEL NEW WORK PLAN
E1.3	ELECTRICAL ATTIC NEW WORK PLAN

Seal:

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	SWD
Checked By:	MG
Scale:	As Noted

Title:

TITLE SHEET

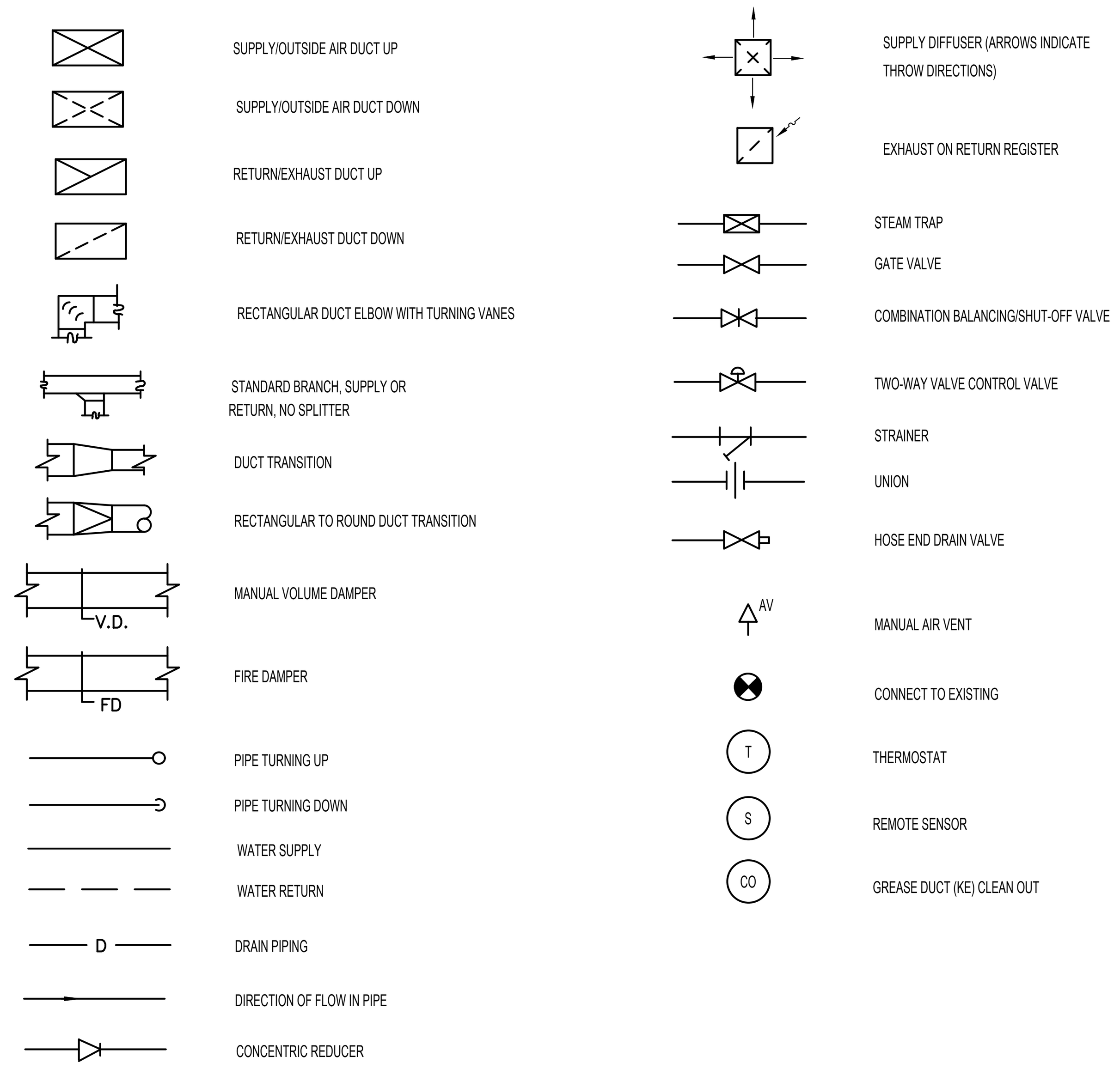
Drawing No.:

T0.1

HVAC ABBREVIATIONS

AFF	= ABOVE FINISHED FLOOR
AMP	= AMPERE
APD	= AIR PRESSURE DROP
ATC	= AUTOMATIC TEMPERATURE CONTROL
AV	= AIRVENT
BTU	= BRITISH THERMAL UNIT
BTUH	= BTU PER HOUR
CFM	= CUBIC FEET PER MINUTE
CO	= CLEAN OUT
DB	= DRY BULB
DEG	= DEGREE
DIA	= DIAMETER
DIFF	= DIFFERENCE OR DELTA
DN	= DOWN
DW	= DISHWASHER
EA	= EACH
EAT	= ENTERING AIR TEMPERATURE
ESP	= EXTERNAL STATIC PRESSURE
EWT	= ENTERING WATER TEMPERATURE
EXIST'G	= EXISTING
F	= FAHRENHEIT
FC	= FLEXIBLE CONNECTOR
FPM	= FEET PER MINUTE
FPS	= FEET PER SECOND
FT	= FEET
FTR	= FIN TUBE RADIATION
GA	= GAGE
HP	= HORSEPOWER
HWR	= HOT WATER RETURN
HWS	= HOT WATER SUPPLY
HZ	= FREQUENCY (CYCLES PER SECOND)
IN	= INCH
KH	= KITCHEN HOOD
LAT	= LATENT OR LEAVING AIR TEMPERATURE
LD	= LINEAR DIFFUSER
LPC	= LOW PRESSURE CONDENSATE
LPS	= LOW PRESSURE STEAM
LRA	= LOCKED ROTOR AMPS
LVG	= LEAVING
LWT	= LEAVING WATER TEMPERATURE
MBH	= THOUSAND BTUH
NTS	= NOT TO SCALE
OA	= OUTSIDE AIR
PH	= PHASE (ELECTRICAL)
R	= RETURN
RA	= RETURN AIR
RG	= RETURN GRILLE
RR	= RETURN AIR REGISTER
RLA	= RUNNING LOAD AMPS
RPM	= REVOLUTIONS PER MINUTE
SA	= SUPPLY AIR
SD	= SUPPLY AIR DIFFUSER
SEN	= SENSIBLE
SP	= STATIC PRESSURE
SR	= SUPPLY REGISTER
TA	= TRANSFER AIR
TR	= TRANSFER REGISTER
TSP	= TOTAL STATIC PRESSURE
TYP	= TYPICAL
VAV	= VARIABLE AIR VOLUME TERMINAL UNIT
V.D.	= MANUAL VOLUME DAMPER
W	= WATT OR WIDE
WB	= WET BULB
WC	= WATER COLUMN
WG	= WATER GAUGE

HVAC LEGEND



HVAC GENERAL NOTES

1. ALL PIPING AND DUCTWORK SHOWN IS DIAGRAMMATIC ONLY. DETERMINE THE EXACT LOCATION IN THE FIELD.
2. REFER TO ARCHITECTURAL DRAWINGS FOR NEW CONSTRUCTION DETAILS.
3. REVIEW ALL DRAWINGS BEFORE STARTING WORK TO BECOME FAMILIAR WITH THE DETAILS OF CONSTRUCTION, AND COORDINATE WITH OTHER TRADES TO ELIMINATE CONFLICTS.
4. OBTAIN ALL REQUIRED PERMITS AND PAY ALL FEES RELATED TO SAME.
5. PROVIDE ALL NECESSARY PIPING, EQUIPMENT AND SUPPORTS AS WELL AS ANY ADDITIONAL EQUIPMENT, ETC. NOT SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS BUT NECESSARY TO PROVIDE COMPLETE AND WORKABLE SYSTEMS.
6. PROVIDE ACCESS TO ALL EQUIPMENT REQUIRING PERIODIC SERVICE AND MAINTENANCE.
7. INSTALL ALL WORK IN ACCORDANCE WITH STATE AND LOCAL CODES.
8. DO NOT SCALE THESE DRAWINGS. TAKE ALL MEASUREMENTS IN THE FIELD IN COORDINATION WITH ALL EQUIPMENT AS APPROVED AND WITH ALL OTHER TRADES.
9. ALL DUCTWORK SHALL BE INSTALLED ON ACCORDANCE WITH THE LATEST EDITION OF SMACNA.
10. ALL ROTATING EQUIPMENT SHALL HAVE FLEXIBLE PIPE ON DUCT CONNECTIONS AND APPROVED VIBRATION ISOLATORS.
11 PROVIDE AIRTIGHT ACCESS DOOR FOR INSPECTION OF FIRE DAMPERS, FILTERS, COILS.
12. CONTRACTOR SHALL VERIFY DUCT, PIPING AND EQUIPMENT LOCATIONS FOR INTERFERENCES BEFORE INSTALLATION.
13. COORDINATE AIR OUTLET AND EQUIPMENT LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLAN.
14. PROVIDE VERTICAL SUPPORTS FOR PIPING AT THE MAXIMUM INTERVALS INDICATED IN THE SPECIFICATIONS.

HVAC SPECIFICATIONS

PART 1 - GENERAL

1.01 WORK INCLUDED:

A. THE WORK UNDER THIS SECTION SHALL INCLUDE THE FURNISHING OF ALL MATERIALS, LABOR, EQUIPMENT AND SUPPLIES AND THE PERFORMANCE OF ALL OPERATIONS TO PROVIDE COMPLETE WORKING SYSTEMS AS INDICATED ON THE CONTRACT DRAWINGS.

B. FURNISH, SET UP AND MAINTAIN ALL DERRICKS, HOISTING MACHINERY, SCAFFOLDS, STAGING AND PLANKING AS REQUIRED FOR THE WORK.

1.02 CODES, ORDINANCES, AND PERMITS: INSTALLATION OF SYSTEMS AND EQUIPMENT PROVIDED UNDER THIS SECTION SHALL BE DONE IN STRICT ACCORDANCE WITH MASSACHUSETTS DEPARTMENT OF PUBLIC SAFETY CODES, MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION, MASSACHUSETTS STATE BUILDING CODE AND TOWN REGULATIONS HAVING JURISDICTION.

1.04 RECORD DRAWINGS: FURNISH UPON COMPLETION OF ALL WORK, RECORD DRAWINGS OF THE WORK OF THIS SECTION.

1.05 SHOP DRAWINGS: PROVIDE SHOP DRAWINGS TO THE ENGINEER FOR APPROVAL OF ALL EQUIPMENT, MATERIALS SPECIFIED AND AUTOMATIC TEMPERATURE CONTROLS.

1.06 OPERATING AND MAINTENANCE INSTRUCTIONS: FURNISH UPON COMPLETION OF ALL WORK, OPERATION AND MAINTENANCE DATA FOR ALL EQUIPMENT PROVIDED UNDER THIS SECTION.

1.07 CUTTING AND PATCHING: ALL CUTTING AND PATCHING NECESSARY FOR THE PROPER INSTALLATION OF WORK TO BE PERFORMED UNDER THIS SECTION AND SUBSECTIONS SHALL BE PERFORMED BY THE CONTRACTOR.

1.08 SEISMIC RESTRAINT REQUIREMENTS: ALL WORK INDICATED ON THESE DRAWINGS SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF THE MASSACHUSETTS STATE BUILDING CODE, 780 CMR, 6TH EDITION, AND REFERENCED REQUIREMENTS OF BOCA AND NFPA.

1.09 SUBSTITUTIONS

A. IF MATERIALS OR EQUIPMENT ARE SUBSTITUTED FOR SPECIFIED ITEMS THAT ALTER THE SYSTEMS SHOWN OR ITS PHYSICAL CHARACTERISTICS, OR WHICH HAVE DIFFERENT OPERATING CHARACTERISTICS, CLEARLY NOTE THE ALTERATIONS OR DIFFERENCE AND CALL IT TO THE ATTENTION OF THE A/E. UNDER NO CIRCUMSTANCES SHALL SUBSTITUTIONS BE MADE UNLESS MATERIAL OR EQUIPMENT HAS BEEN SUCCESSFULLY OPERATED FOR AT LEAST THREE CONSECUTIVE YEARS.

B. ANY MODIFICATIONS TO THE DESIGN, AS A RESULT OF APPROVING A SUBSTITUTION, SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR. ANY ADDITIONAL COST TO THIS CONTRACTOR OR ANY OTHER CONTRACTOR, DIRECTLY OR INDIRECTLY, AS A RESULT OF SUCH SUBSTITUTIONS, SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

PART 2 - PRODUCTS

2.01 SHEET METAL WORK

A. GALVANIZED SHEET METAL - ALL SUPPLY, RETURN, OUTDOOR, AND EXHAUST (SA, RA, OA, EA)

1. ALL DUCTS SHALL BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA. ALL DUCTWORK SHALL BE GALVANIZED STEEL. SEAL ALL LOW PRESSURE DUCT JOINTS (CLASS B). EXCESS SEALANT MUST BE REMOVED IMMEDIATELY TO PROVIDE A NEAT APPEARANCE.

2. ALL LOW PRESSURE DUCTS SHALL BE FABRICATED FOR 2 INCHES WATER GAUGE PRESSURE.

3. PROVIDE ACOUSTIC LINING FOR ALL RETURN AIR DUCTWORK.

4. ALL EXPOSED SUPPLY AIR DUCTWORK SHALL BE EITHER DOUBLE WALL OR INTERNALLY LINED WITH MINIMUM R6 INSULATION.

2.02 DUCTWORK ACCESSORIES

A. MANUAL VOLUME DAMPERS: MANUAL VOLUME DAMPERS SHALL BE PROVIDED WHERE SHOWN ON THE DRAWINGS AND AT EVERY BRANCH TAKE OFF FROM THE MAIN DUCT.

B. FIRE DAMPERS: PROVIDE AND INSTALL FIRE DAMPERS AT ALL FIRE WALLS AND FLOORS, WHERE REQUIRED BY CODE AND AS INDICATED. FIRE DAMPER CONSTRUCTION AND INSTALLATION SHALL MEET THE REQUIREMENTS OF THE NFPA 90A, AND SHALL BE UL LABELED, TESTED AND INSPECTED IN ACCORDANCE WITH UL 555. AN ACCESS DOOR SHALL BE PROVIDED AT EACH DAMPER TO SERVICE AND INSPECT THE FUSIBLE LINK. PROVIDE FIRE DAMPERS IN EACH APARTMENT UNIT WHERE THE SUPPLY AIR DUCTWORK PENETRATES THE CEILING/FLOOR ASSEMBLY.

C. FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET IN TOTAL LENGTH AND SHALL HAVE A MINIMUM INSULATING VALUE OF R-5.

2.03 ACOUSTIC LINING

A. PROVIDE ON ALL RETURN AIR DUCTWORK.

2.04 AIR OUTLETS

A. PROVIDE ALL AIR OUTLETS AS SHOWN ON PLANS AND AS SCHEDULED. PROVIDE PAINTED FINISH OPTIONS, COLORS SHALL BE SELECTED BY THE ARCHITECT.

2.05 INSULATION

A. SUPPLY, RETURN, AND OUTDOOR AIR DUCTWORK

1. INSULATE SUPPLY, RETURN, OUTDOOR AIR DUCTWORK PER INSULATION SCHEDULE

2. PROVIDE ACOUSTIC LINING ON ALL RETURN AIR DUCTWORK.

2.06 EQUIPMENT

A. PROVIDE ALL EQUIPMENT WITH ACCESSORIES AS SCHEDULED. CONTRACTOR TO PROVIDE SUBMITTALS FOR ALL EQUIPMENT, ISOLATORS & HANGERS PRIOR TO INSTALLATION.

2.07 PIPING

A. PROVIDE HOT WATER PIPING MATERIALS AND SIZES AS SCHEDULED AND SHOWN ON PLANS

2.08 AUTOMATIC TEMPERATURE CONTROL

A. PROVIDE CONTROL COMPONENTS AND LOW VOLTAGE WIRING FOR EACH SYSTEM AS REQUIRED FOR THE SEQUENCE OF OPERATION INDICATED. PROVIDE ALL CONTROL COMPONENTS FOR NEW SEQUENCES OF CONTROL INCLUDING REQUIRED INTERCONNECTING WIRING AND APPURTENANCES TO PROVIDE A COMPLETE AND OPERABLE SYSTEM.

B. EXISTING AHU CONTROLS SHALL BE REVIEWED TO PROVIDE OPERATION FOR FULLY FUNCTIONAL HEATING, COOLING, AND DEHUMIDIFICATION SYSTEMS FOR E.AHU-1,2.

PART 3 - EXECUTION

3.01 GENERAL: INSTALL ALL ITEMS SPECIFIED UNDER PART 2 - PRODUCTS, ACCORDING TO THE APPLICABLE MANUFACTURER'S RECOMMENDATIONS AND SHOP DRAWINGS, THE DETAILS SHOWN ON THE DRAWINGS AND AS SPECIFIED UNDER THIS SECTION. PROVIDE ALL REQUIRED HANGERS AND SUPPORTS.

3.02 EQUIPMENT

A. EQUIPMENT SHALL BE INSTALLED COMPLETE WITH ALL REQUIRED HANGERS AND SUPPORTS IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

B. FURNISH AND INSTALL ALL STEEL STRUCTURAL SUPPORT MEMBERS FOR PROPER HANGING AND SUPPORT OF EQUIPMENT. PROVIDE VIBRATION ISOLATION ON ALL HANGERS.

C. ALL EQUIPMENT SHALL BE INSTALLED IN STRICT CONFORMANCE WITH MANUFACTURER'S WRITTEN RECOMMENDATIONS.

3.03 MISCELLANEOUS IRON AND STEEL: PROVIDE STEEL SUPPORTS AND HANGERS REQUIRED TO SUPPORT EQUIPMENT, DUCTWORK, AND OTHER EQUIPMENT OR MATERIALS. SUBMIT DETAILS OF STEEL SUPPORTS AND METHOD OF FABRICATION FOR APPROVAL.

3.04 BALANCING

A. THE HVAC CONTRACTOR SHALL ENGAGE THE SERVICES OF AN INDEPENDENT FIRM TO PERFORM ADJUSTING AND BALANCING OF THE HVAC SYSTEMS. SYSTEMS SHALL BE ADJUSTED AND BALANCED SO THAT QUANTITIES ARE AS INDICATED ON THE DRAWINGS AND SO THAT THE DISTRIBUTION FROM SUPPLY OUTLETS IS FREE FROM DRAFTS, AND UNIFORM OVER THE FACE OF EACH OUTLET. AFTER COMPLETION OF THE TESTING, BALANCING AND ADJUSTING OF THE AIR SYSTEMS, A BALANCING REPORT SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL. A COPY SHALL ALSO BE SUBMITTED TO BUILDING MANAGER AND ENGINEER FOR RECORD WHEN CONSTRUCTION IS COMPLETE.

B. BALANCING REPORT SHALL INCLUDE AIRFLOW READINGS AT EACH OF THE FOLLOWING;

B.A. EXISTING SUPPLY/RETURN - REGISTERS/DIFFUSERS
B.B. ERV AIRFLOW - ERV SA,RA,EA,OA
B.C. E.AHU-1 OA, SA, RA AIRFLOWS
B.D. E.AHU-2 OA, SA, RA AIRFLOWS
B.E. HYDRONIC HOT WATER COIL WATER FLOWS - HHC-1,2

3.05 HVAC PROTECTION

A. MERV 8 FILTERS AT RETURN AIR OPENING. BLANK OFF AND DO NOT OPERATE FANS DURING CONSTRUCTION, UNLESS NEEDED TO CONDITION TENANT SPACE.

B. SUPPLY AND RETURN AIR OPENINGS DURING CONSTRUCTION-SEE ABOVE

3.06 COMMISSIONING

A. THE OWNER SHALL ENGAGE THE SERVICES OF AN INDEPENDENT FIRM TO COMMISSION THE HVAC SYSTEMS.

Seal:

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:	
PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC LEGEND AND SPECIFICATIONS

Drawing No.:
H0.01

HVAC SCHEDULES

ENERGY RECOVERY UNIT SCHEDULE

TAG NO.	MANUFACTURER (AS STANDARD)	MODEL NO. (AS STANDARD)	LOCATION SERVED	SUPPLY FAN DATA CFM (OA)	ESP ("W.C.)	RPM	HP	EXHAUST FAN DATA CFM (EA)	ESP ("W.C.)	RPM	HP
ERV-1	RENEWAIRE	HE1.5JINV-S15EE-DGNTF--L1	SEE PLANS	1000	0.85	-	1.0	356	0.5	-	1.0

TAG NO.	ENERGY RECOVERY SECTION TYPE	WINTER SUPPLY AIR CFM	EAT DB(°F)	LAT DB(°F)	PD ("W.C.)	WINTER RETURN AIR CFM	EAT DB(°F)	LAT DB(°F)	PD ("W.C.)	MBH RCVD
ERV-1	DIRECT	1200	0	44.5	-	1000	70.0	-	-	72.6

TAG NO.	SUMMER SUPPLY AIR CFM	EAT DB(°F)	EAT WB(°F)	LAT DB(°F)	LAT WB(°F)	PD ("W.C.)	SUMMER RETURN AIR CFM	EAT DB(°F)	EAT WB(°F)	LAT DB(°F)	LAT WB(°F)	PD ("W.C.)	MBH RCVD
ERV-1	1200	91.0	73.0	80.8	68.6	-	1000	75.0	62.6	-	-	-	-

TAG NO.	ELECTRICAL DATA VOLTS	PHASE	HZ	HP	MCA (A)	MOCP (A)	FILTER TYPE	WEIGHT (LBS)	REMARKS
ERV-1	208	1	60	-	9.9	15	MERV 8	504	[1] [2] [3] [4] [5] [6] [7] [8]

NOTES:
1) COORDINATE ALL ELECTRICAL REQUIREMENTS WITH EC PRIOR TO INSTALLATION.
2) PROVIDE ELECTRICAL DISCONNECT SWITCH.
3) PROVIDE MOUNTING EQUIPMENT, VIBRATION ISOLATION.
4) PROVIDE BALANCING DAMPERS ON ALL AIR OUTLETS.
5) PROVIDE 3' OF ACOUSTICAL FLEX DUCT ON SUPPLY AND RETURN AIR CONNECTIONS OFF ERV (FA & RA).
6) AIR LEAKAGE FROM THE OUTSIDE AIR AND EXHAUST AIR SHOULD BE LESS THAN 5% FOR ALL ERV'S.
7) PROVIDE MOTORIZED DAMPERS FOR EA AND OA DUCTS PRIOR TO LOUVER PLENUM.
8) THE UNIT SHALL BE PROVIDED WITH MEANS OF FROST CONTROL TO PREVENT FREEZING OF CORE

EXISTING AIR HANDLING UNIT SCHEDULE

TAG No.	LOCATION(S) SERVED	MANUFACTURER (AS STANDARD)	MODEL NO. (AS STANDARD)	DX COOLING DATA EAT (°F) (DB/WB)	LAT (°F) (DB/WB)	TOTAL (MBH)	SENS. (MBH)	REF. TYPE	SST (°F)
E.AHU-1	1ST FLOOR	DAIKIN	LAH0051	77.0/64.6	48.2/46.0	96.2	59.7	R-410A	45.9
E.AHU-2	BASEMENT	DAIKIN	LAH005A	76.5/64.1	51.9/47.7	98.9	58.5	R-410A	47.9

TAG No.	HP HEATING DATA EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	TOTAL (MBH)	GPM	PD (FT)	AIR HANDLING DATA AIRFLOW (CFM)	OA (CFM)	ESP ("W.C.)
E.AHU-1	180.0	157.9	98.4	92.4	98.4	9.8	4.0	1900	650	1.0
E.AHU-2	180.0	157.9	70.0	86.1	99.2	9.0	3.3	2200	550	0.5

TAG No.	ELECTRICAL DATA VOLTS	PHASE	HZ	HP	MCA	MOCP	WEIGHT (LBS)	REMARKS
E.AHU-1	208	3	60	2	-	-	547	[1] [2] [3] [4] [5]
E.AHU-2	208	3	60	3	-	-	566	[1] [2] [3] [4] [5]

NOTES:
1) UNIT IS EXISTING TO REMAIN.
2) PROVIDE NEW CONTROLS TO THE UNIT TO FACILITATE UNIT FUNCTION PER EXISTING AIR HANDLER UNIT SEQUENCE OF OPERATION.
3) UNIT OUTDOOR AIR DAMPER TO BE RE-BALANCED TO THE AIRFLOW LISTED ON THIS SCHEDULE, SUPPLIED BY NEW ERV-1.
4) PROVIDE NEW EXTERNALLY MOUNTED HOT WATER HEATING COIL FOR DEHUMIDIFICATION OPERATION. SEE HOT WATER HEATING COIL SCHEDULE FOR DETAILS.
5) PROVIDE MAINTENANCE / REPAIR WORK TO ACCU-1 AND ACCU-2 AS NEEDED FOR FULLY OPERATIONAL SYSTEM.

HOT WATER HEATING COIL SCHEDULE

TAG No.	LOCATION(S) SERVED	MANUFACTURER (AS STANDARD)	MODEL NO. (AS STANDARD)	DIMENSIONS (L X W X H)"	EWT (°F)	LWT (°F)	EAT (°F)	LAT (°F)	TOTAL (MBH)	GPM	PD (FT)	AIRFLOW (CFM)	ROWS	FPI	WEIGHT (LBS)	REMARKS
HHC-1	BASEMENT	DAIKIN	5BS0901B	28.9" X 15.7" X 5.5"	180.0	158.8	50.0	76.6	98.4	5.2	13.2	1900	1	9	18	[1] [2] [3]
HHC-2	FIRST FLOOR	DAIKIN	5BS0801C	28.9" X 15.7" X 5.5"	180.0	158.4	50.0	76.9	64.8	6.0	15.4	2200	1	8	18	[1] [2] [3]

NOTES:
1) NEW HOT WATER HEATING COIL SHALL BE INSTALLED OUTSIDE THE AIR HANDLER'S CABINET TO SUPPLY AIR DUCTWORK MAIN PRIOR TO DUCT BRANCH TAKEOFFS.
2) CONTRACTOR SHALL VERIFY MOUNTING LOCATION, AND HOT WATER COIL DIMENSIONS IN FIELD PRIOR TO RELEASE.
3) PROVIDE NEW HOT WATER CONTROL VALVE FOR REHEAT OPERATION PER EXISTING AIR HANDLING UNIT SEQUENCE OF OPERATION.

HVAC POWER EQUIPMENT SCHEDULE

TAG NO.	DESCRIPTION	LOCATION	MANUFACTURER (AS STANDARD)	MODEL No. (AS STANDARD)	SERVING EQUIPMENT TAG	FIRE ALARM CONNECTION	ELECTRICAL DATA VOLTS	PHASE	HZ	REMARKS
M	MOTORIZED DAMPER	SEE PLANS	-	-	-	NO	120	1	60	PROVIDE MODULATING OPERATION ACTUATORS (0-10 V) FOR ALL MOTORIZED DAMPERS

DUCT INSULATION SCHEDULE

SYSTEM/SERVICE	LOCATION	INSULATION TYPE	MINIMUM INSTALLED R-VALUE	REMARKS
SUPPLY, RETURN & OUTDOOR AIR	CONDITIONED SPACE	2" FIBERGLASS WRAP WITH FSK FACING	6	--
SUPPLY, RETURN & OUTDOOR AIR	UNCONDITIONED SPACE	3" FIBERGLASS WRAP WITH FSK FACING	12	--
ERV EXHAUST AIR (FROM UNIT TO OUTLET)	CONDITIONED SPACE	2" FIBERGLASS WRAP WITH FSK FACING	6	--

PIPE MATERIAL TABLE

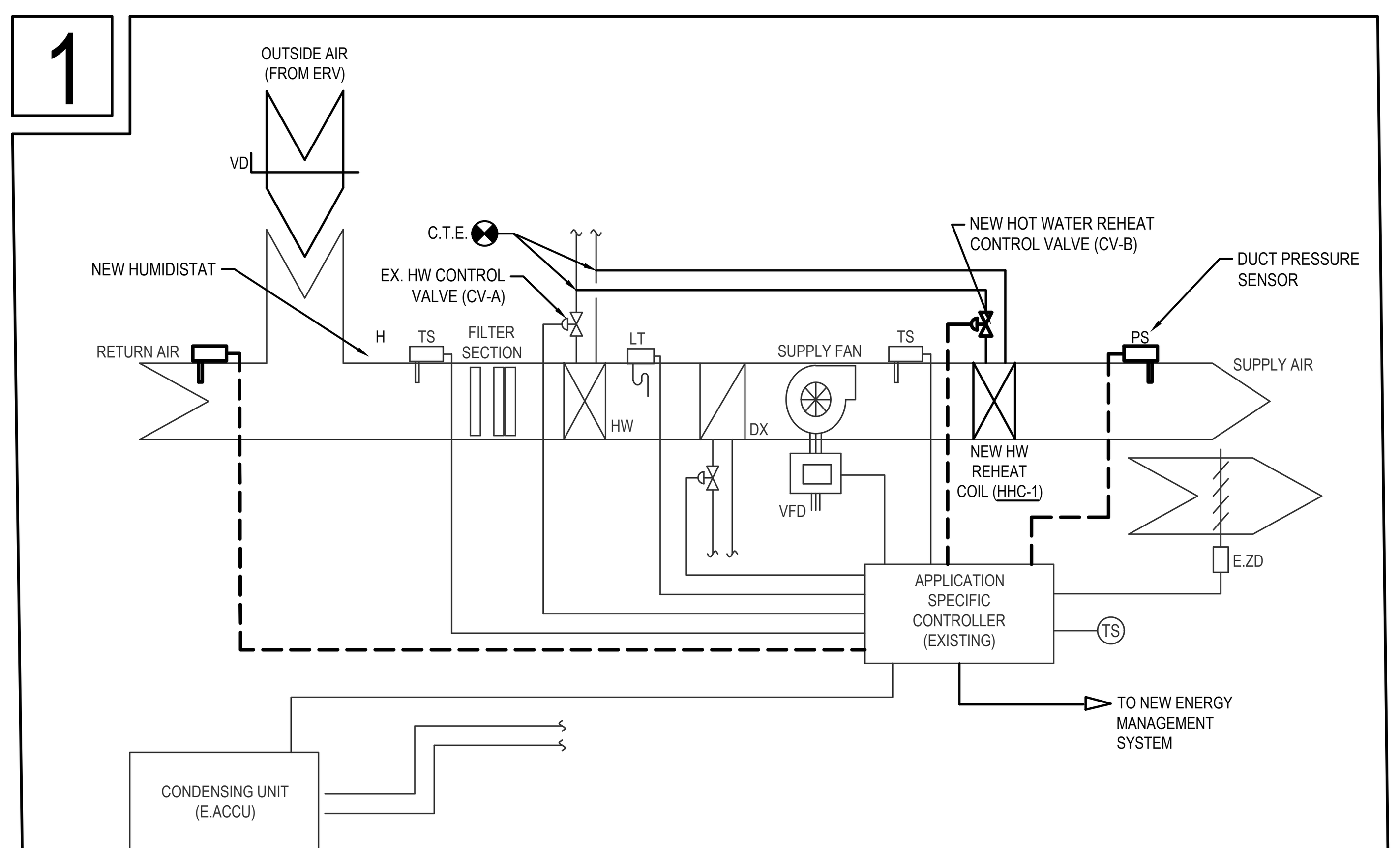
SYSTEM/SERVICE	LOCATION	PIPING	FITTINGS	JOINTS
HYDRONIC HOT WATER & 2-1/2" AND SMALLER	ABOVE GRADE	TYPE "L" SEAMLESS COPPER	WROUGHT COPPER	SWEAT SOLDER
CONDENSATE DRAIN (CD)	ABOVE GRADE	TYPE 'L' COPPER	WROUGHT COPPER, NO LEAD	95/5 NO-LEAD SOLDER

PIPE INSULATION SCHEDULE

SYSTEM/SERVICE	INSULATION TYPE	FITTINGS INSULATION TYPE	INSULATION WALL THICKNESS (IN.) PIPE DIAMETER (IN.) Ø<1	1≤Ø<1½	1½<Ø≤4	4<Ø
HOT WATER SUPPLY & RETURN PIPING	FIBERGLASS W/ ALL SERVICE JACKET	ZESTON	1 1/2"	1 1/2"	2"	2"
CONDENSATE PIPING (CD)	ELASTOMERIC	ELASTOMERIC	1/2"	1/2"	3/4"	3/4"

HVAC SEQUENCES OF OPERATION

1



APPLICATION TABLE
AIR HANDLING UNITS
E.AHU-1,2; E.ACCU-1,2

EXISTING AIR HANDLING UNIT SEQUENCE OF OPERATION

THE AIR HANDLING UNIT(S) SHALL BE CONTROLLED THROUGH THE ZONE DAMPER TEMPERATURE SENSOR, RETURN AIR HUMIDISTAT, AND THE EXISTING AIR HANDLING UNIT CENTRAL CONTROLLER. THE SEQUENCE LISTED BELOW IS REVERSIBLE UNLESS NOTED OTHERWISE.

OCCUPIED HOURS:

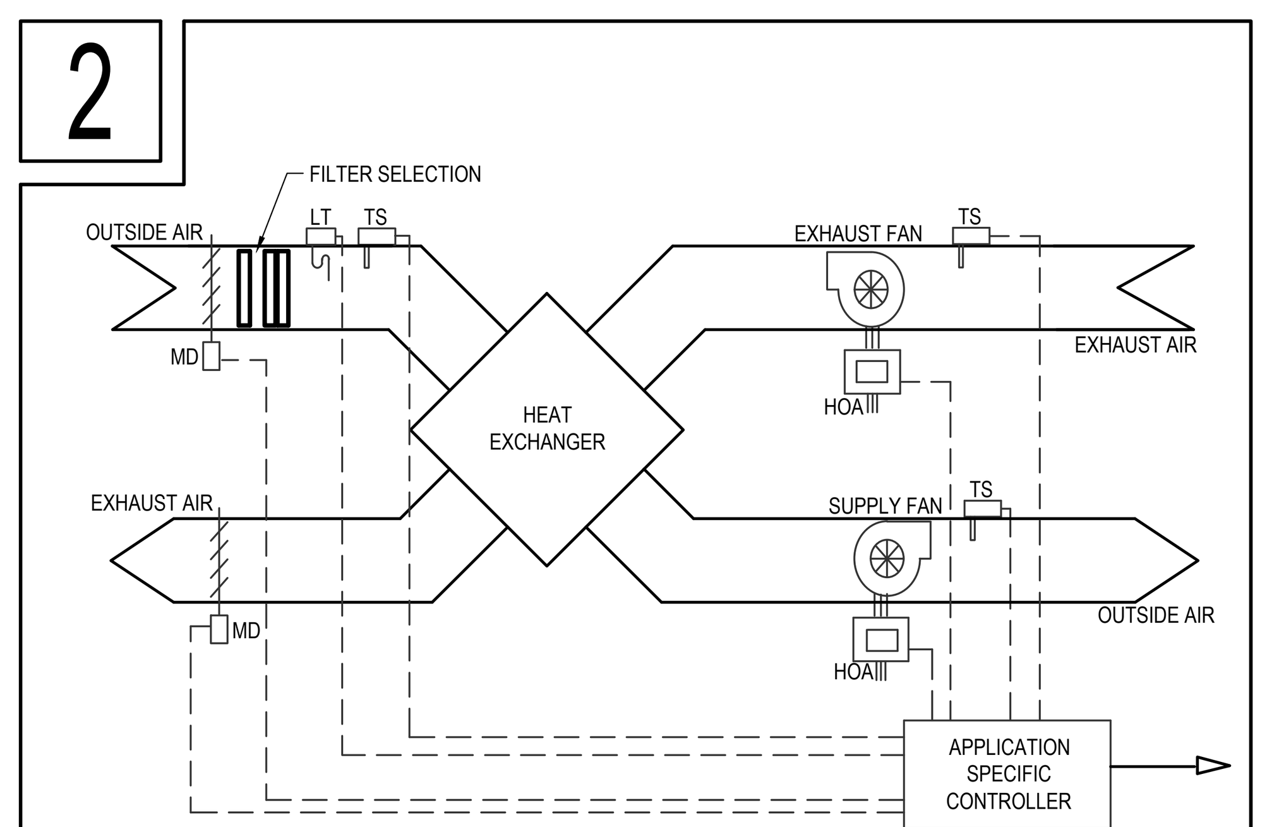
AIR HANDLING UNIT: THE UNIT'S SUPPLY FANS SHALL BE ENERGIZED AND OPERATE CONTINUOUSLY; THE FAN VFD'S SHALL MODULATE AIRFLOW TO MAINTAIN CONSTANT SUPPLY AIR DUCTWORK PRESSURE. THE OUTDOOR, AIR DAMPER SHALL BE OPENED TO THE MINIMUM VENTILATION POSITION (SCHEDULED OA).

IF HEATING IS REQUIRED, THE TWO WAY CONTROL (CV-A) VALVE SHALL MODULATE OPEN TO MAINTAIN THE SPACE TEMPERATURE SETPOINT OF 70°F (ADJ).

IF COOLING IS REQUIRED THE UNIT'S CORRESPONDING AIR COOLED CONDENSING UNIT ACCU) SHALL BE ENERGIZED AND SHALL OPERATE THE STAGES OF DX COOLING TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

UPON SENSING A RELATIVE HUMIDITY ABOVE THE ROOM'S SETPOINT (50%ADJ), THE PRIMARY TWO WAY CONTROL VALVE (CV-1) SHALL CLOSE, THE ACCU SHALL ENERGIZE AND OPERATE TO MAINTAIN SPACE HUMIDITY, AND HOT WATER REHEAT CONTROL VALVE (CV-B) SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR DISCHARGE TEMPERATURE AS DETERMINED BY THE P.I.D. LOOP.

2



APPLICATION TABLE
ENERGY RECOVERY VENTILATOR
ERV-1

ENERGY RECOVERY VENTILATOR SEQUENCE OF OPERATION

THE ENERGY RECOVERY VENTILATOR SHALL BE CONTROLLED THROUGH THE APPLICATION SPECIFIC CONTROLLER. THE SEQUENCE LISTED BELOW IS REVERSIBLE UNLESS NOTED OTHERWISE.

THE UNITS SUPPLY AND EXHAUST FANS SHALL BE ENERGIZED AND OPERATE CONTINUOUSLY; AND THE OUTDOOR AIR AND EXHAUST AIR DAMPERS SHALL BE OPEN.

Seal:

COMMONWEALTH OF MASSACHUSETTS ERIK [illegible] MECHANICAL No. 48162 REGISTERED PROFESSIONAL ENGINEER

BLW

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

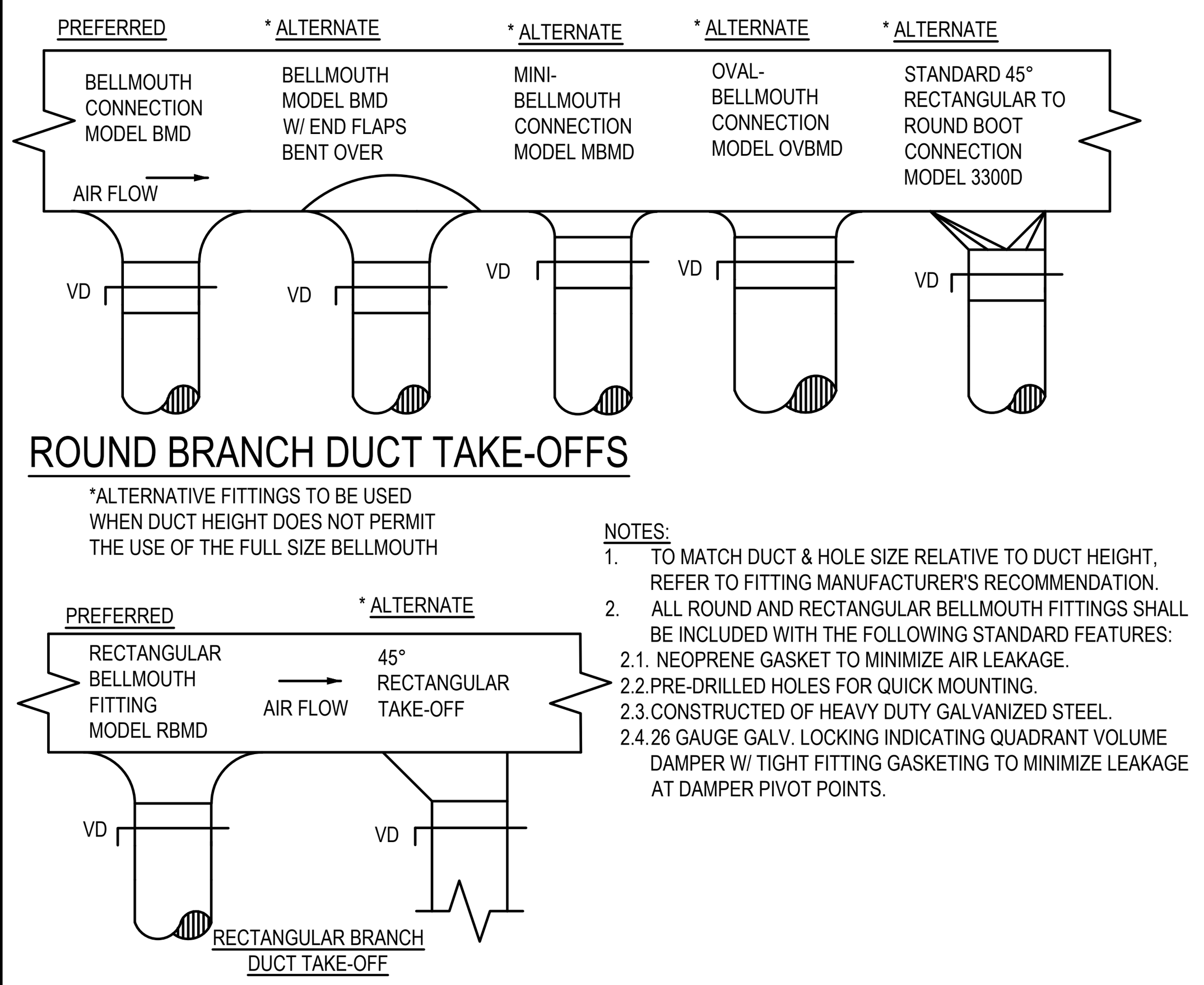
TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC SCHEDULES & SEQUENCES

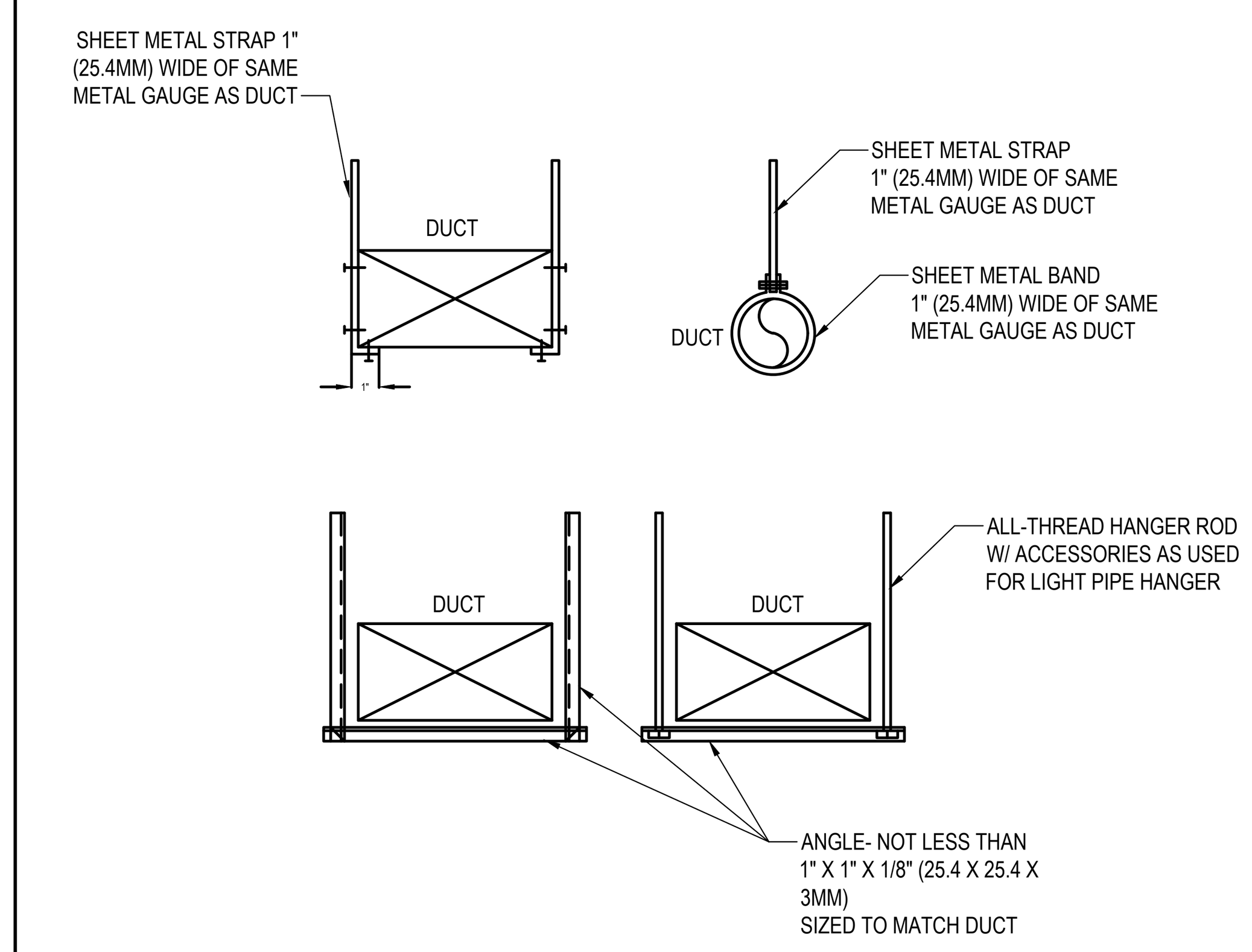
Drawing No.:
H0.02

HVAC DETAILS

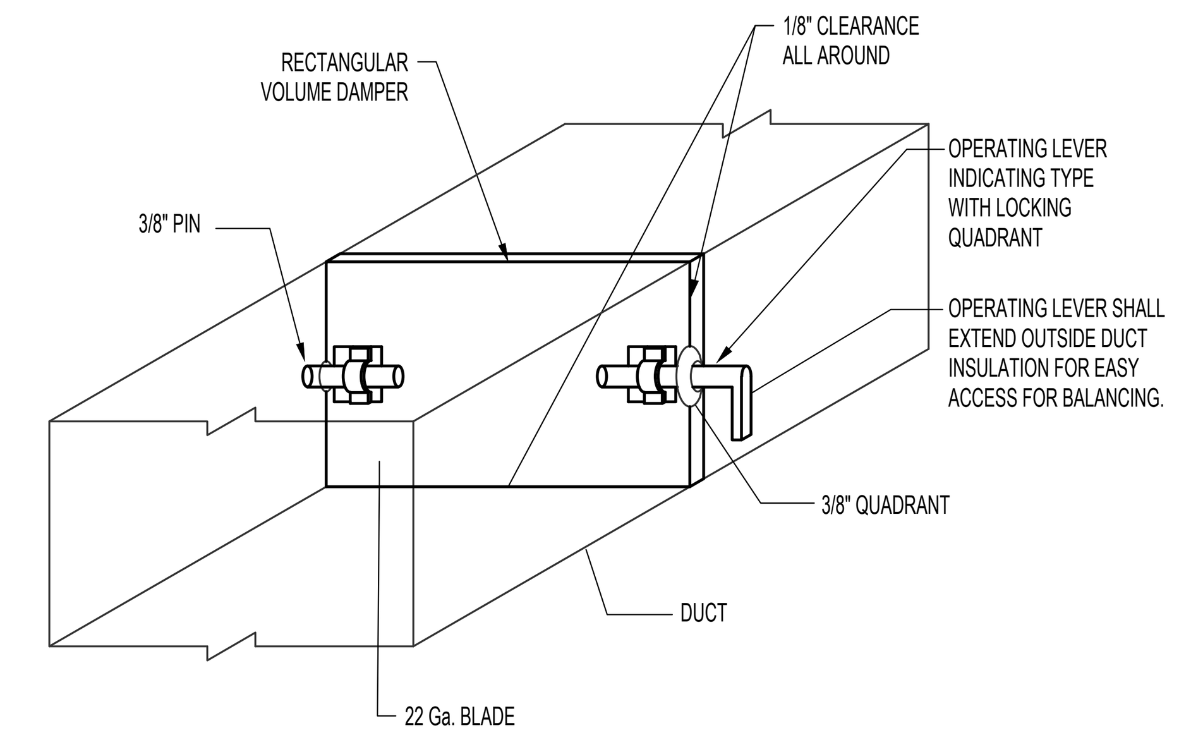


NOTES:
1. TO MATCH DUCT & HOLE SIZE RELATIVE TO DUCT HEIGHT, REFER TO FITTING MANUFACTURER'S RECOMMENDATION.
2. ALL ROUND AND RECTANGULAR BELLMOUTH FITTINGS SHALL BE INCLUDED WITH THE FOLLOWING STANDARD FEATURES:
2.1. NEOPRENE GASKET TO MINIMIZE AIR LEAKAGE.
2.2. PRE-DRILLED HOLES FOR QUICK MOUNTING.
2.3. CONSTRUCTED OF HEAVY DUTY GALVANIZED STEEL.
2.4. 26 GAUGE GALV. LOCKING INDICATING QUADRANT VOLUME DAMPER W/ TIGHT FITTING GASKETING TO MINIMIZE LEAKAGE AT DAMPER PIVOT POINTS.

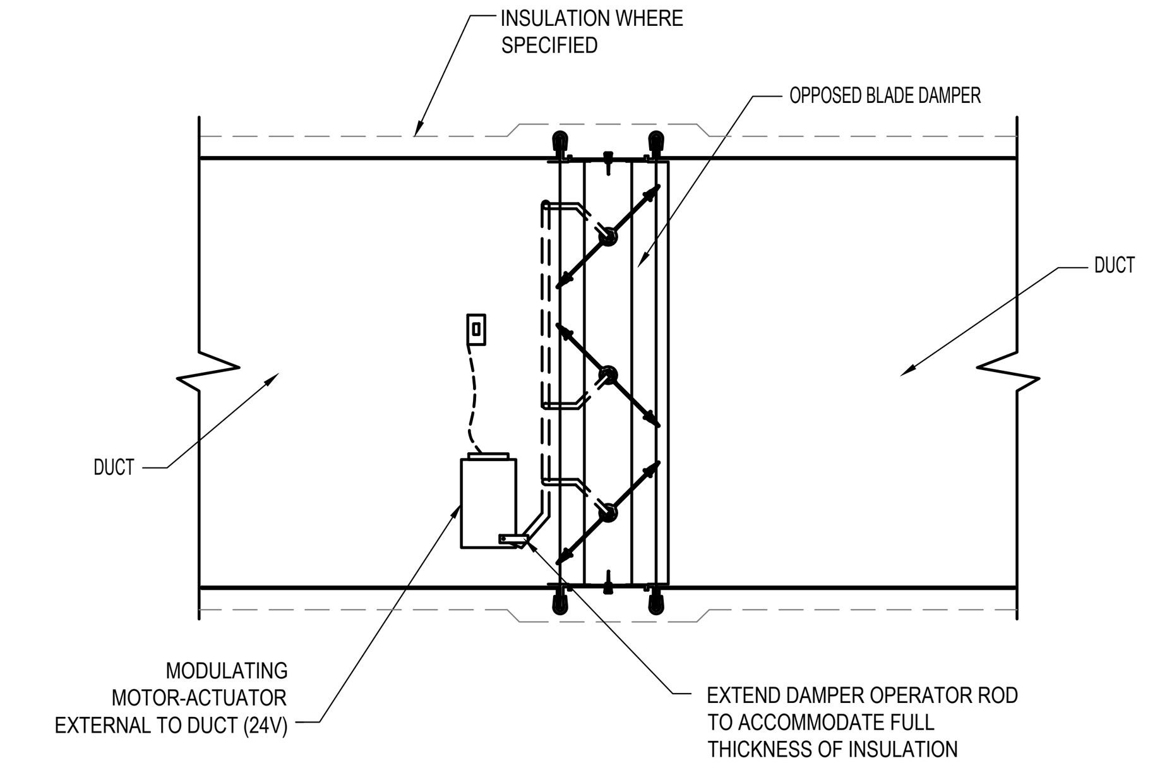
1 BRANCH TAKE-OFF'S — N.T.S.



2 SHEET-METAL DUCT HANGER DETAIL — N.T.S.

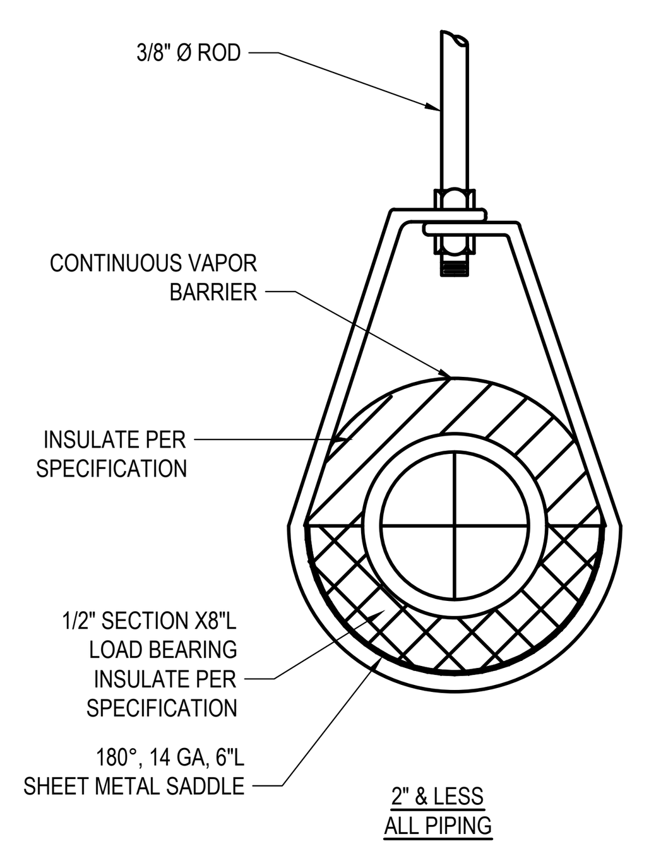


3 TYPICAL VOLUME DAMPER DETAIL — N.T.S.

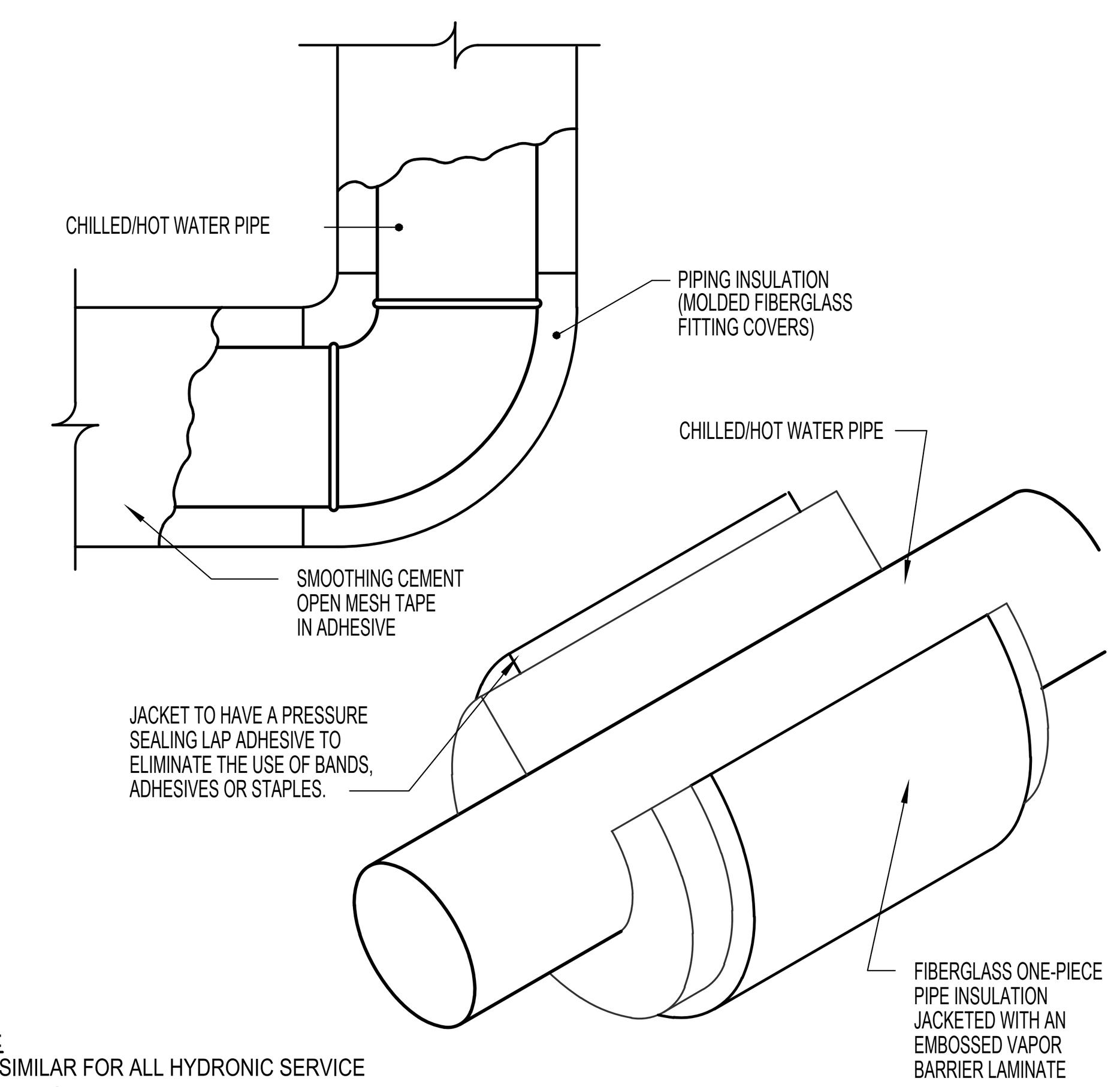


GENERAL NOTES:
1) DUCT SHALL BE SUPPORTED FROM BUILDING STRUCTURE AND ON BOTH SIDES OF DAMPER
2) PROVIDE ACCESS TO ALL DAMPER ACTUATORS, IDENTIFICATION TAG SHALL BE VISIBLE FROM ACCESS POINT

4 TYPICAL MOTORIZED DAMPER DETAIL — N.T.S.



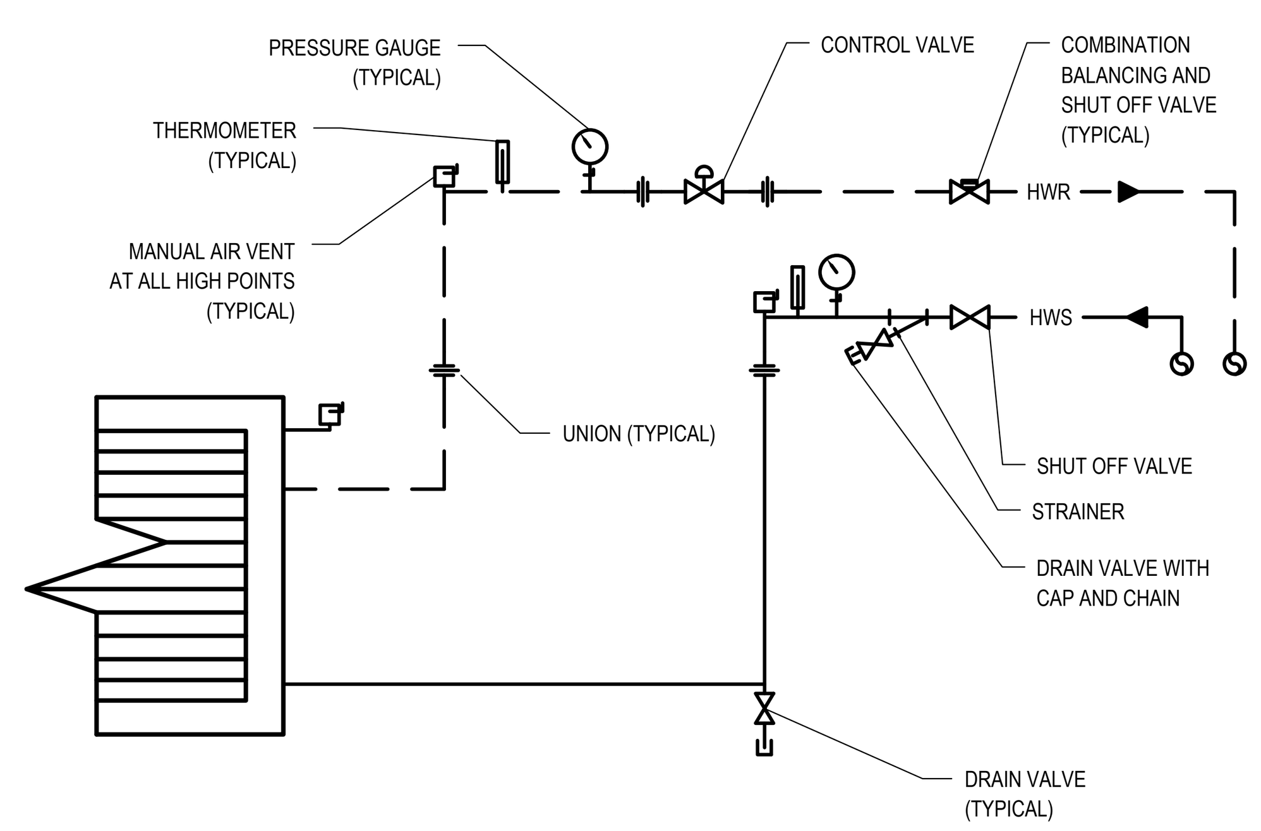
5 2" OR LESS PIPE HANGER DETAIL — N.T.S.



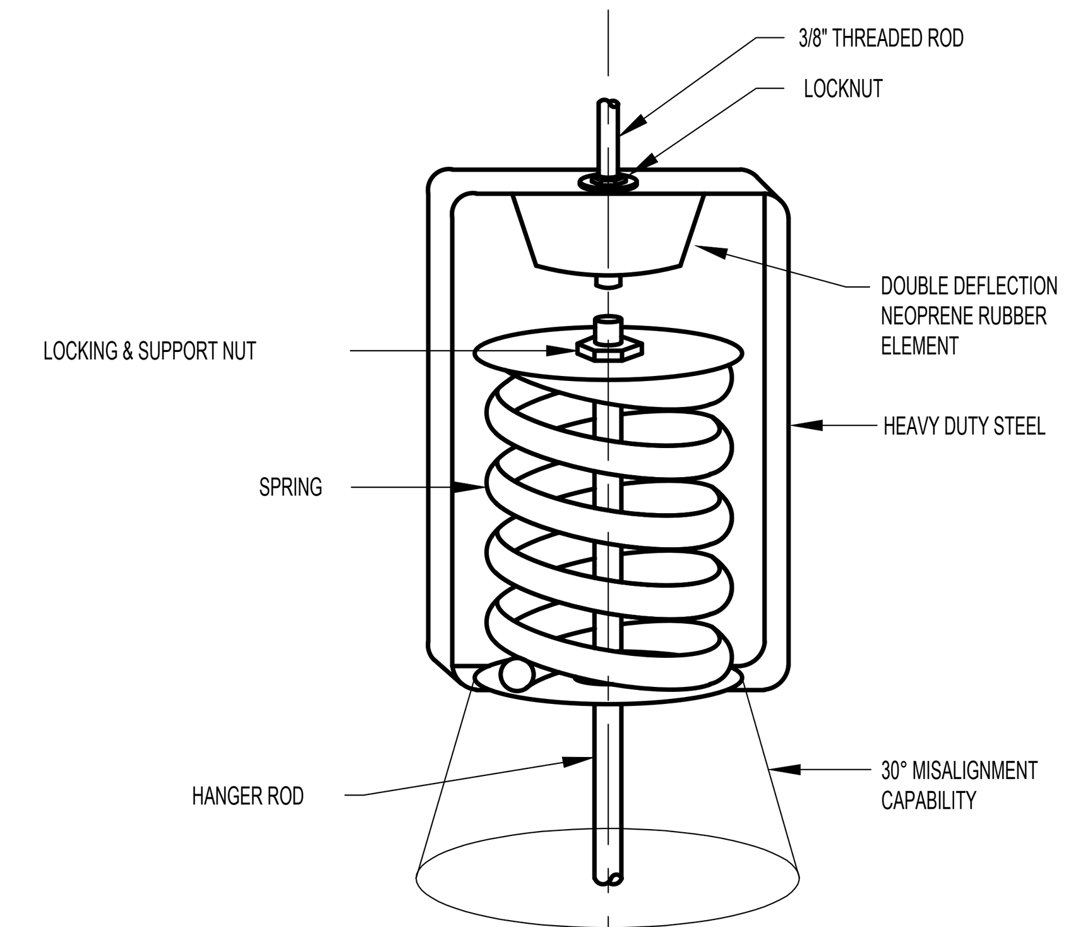
NOTES:
1. SIMILAR FOR ALL HYDRONIC SERVICE PIPING

6 TYPICAL CHILLED/HOT WATER PIPING INSULATION DETAIL — N.T.S.

NOTE:
1. POSITION PIPE HANGERS TO BEAR FULL WEIGHT OF PIPING. NO LOAD ON COIL BODY.
2. LOCATE UNIONS AND ARRANGE PIPING TO FACILITATE COIL REMOVAL AND TO AVOID BLOCKING ACCESS DOORS FOR SERVICING OF FILTERS, VALVES, MOTORS, ETC...
3. CONTROL VALVE TO FAIL TO FULL FLOW THROUGH COIL.

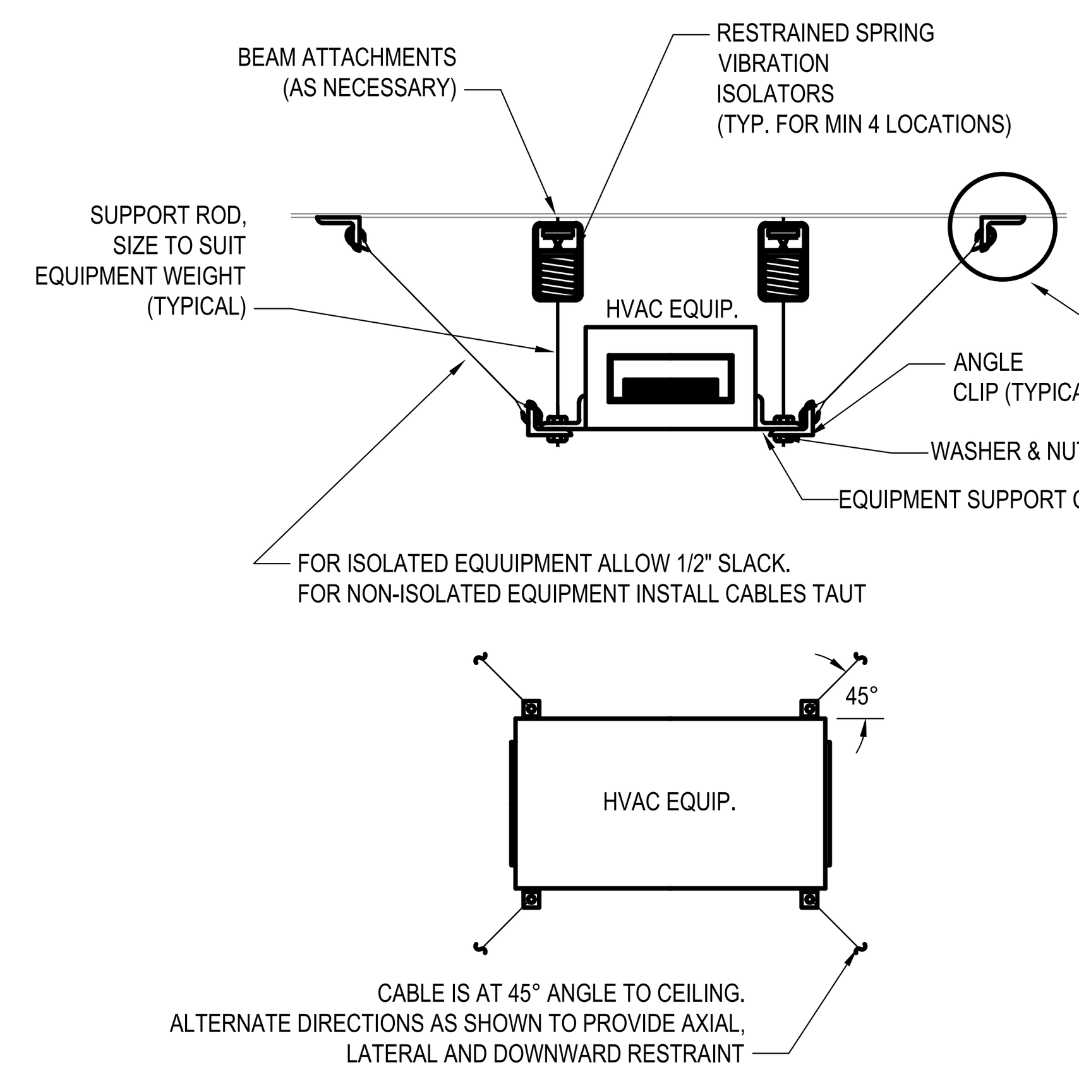


7 TYPICAL HOT WATER HEATING COIL DETAIL — N.T.S.



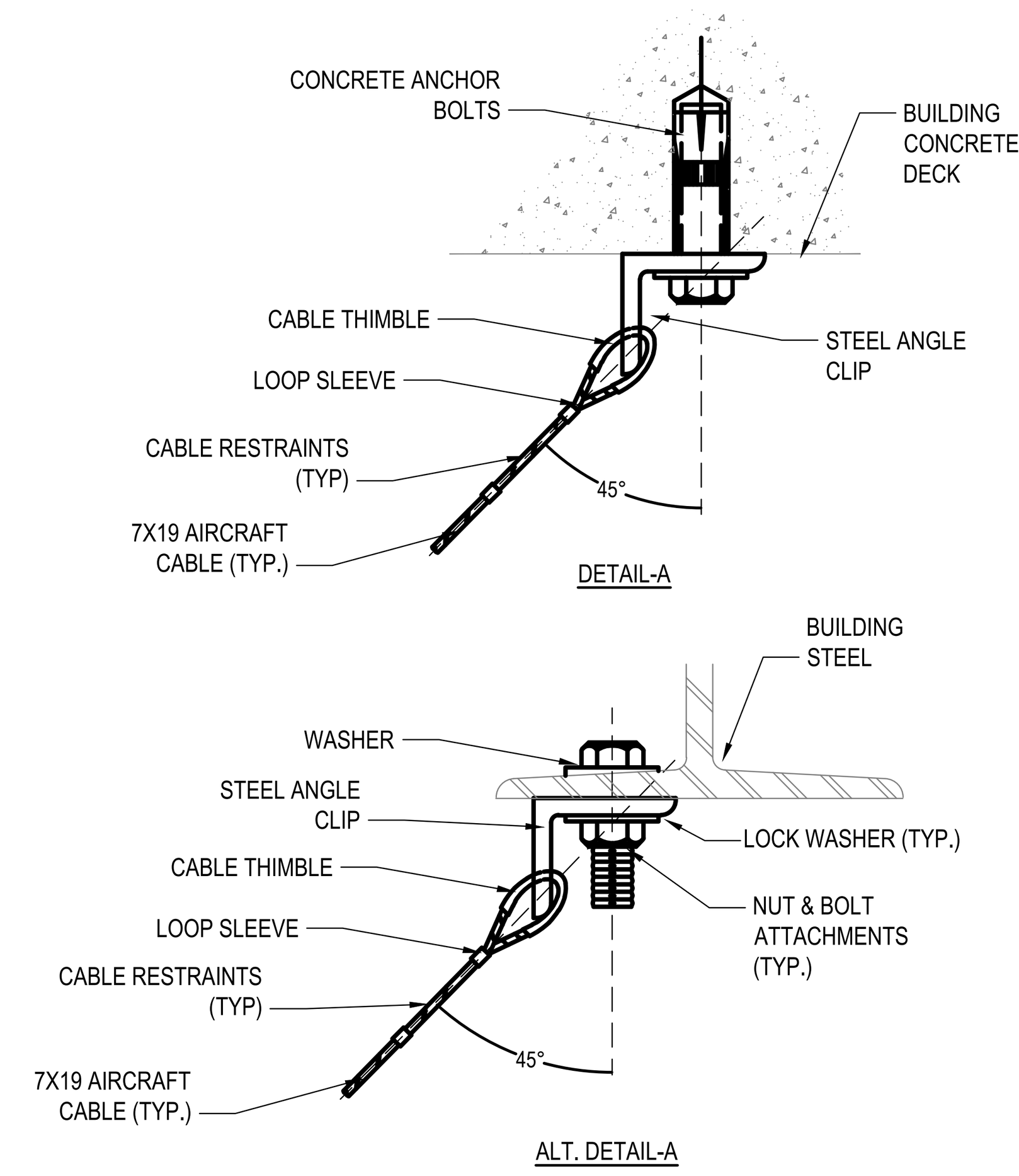
NOTE:
1. ALL AIR HANDLING EQUIPMENT SUSPENDED FROM STRUCTURES AND ALL STEAM AND CHILLED WATER PIPING IN MECHANICAL ROOMS SHALL BE HUNG WITH VIBRATION ISOLATORS.
2. HANGER SIZE SHALL BE AS PER MANUFACTURER'S RECOMMENDATION AND ACCORDING TO THE LOAD OF THE EQUIPMENT.

8 TYPICAL SPRING VIBRATION ISOLATION DETAIL — N.T.S.

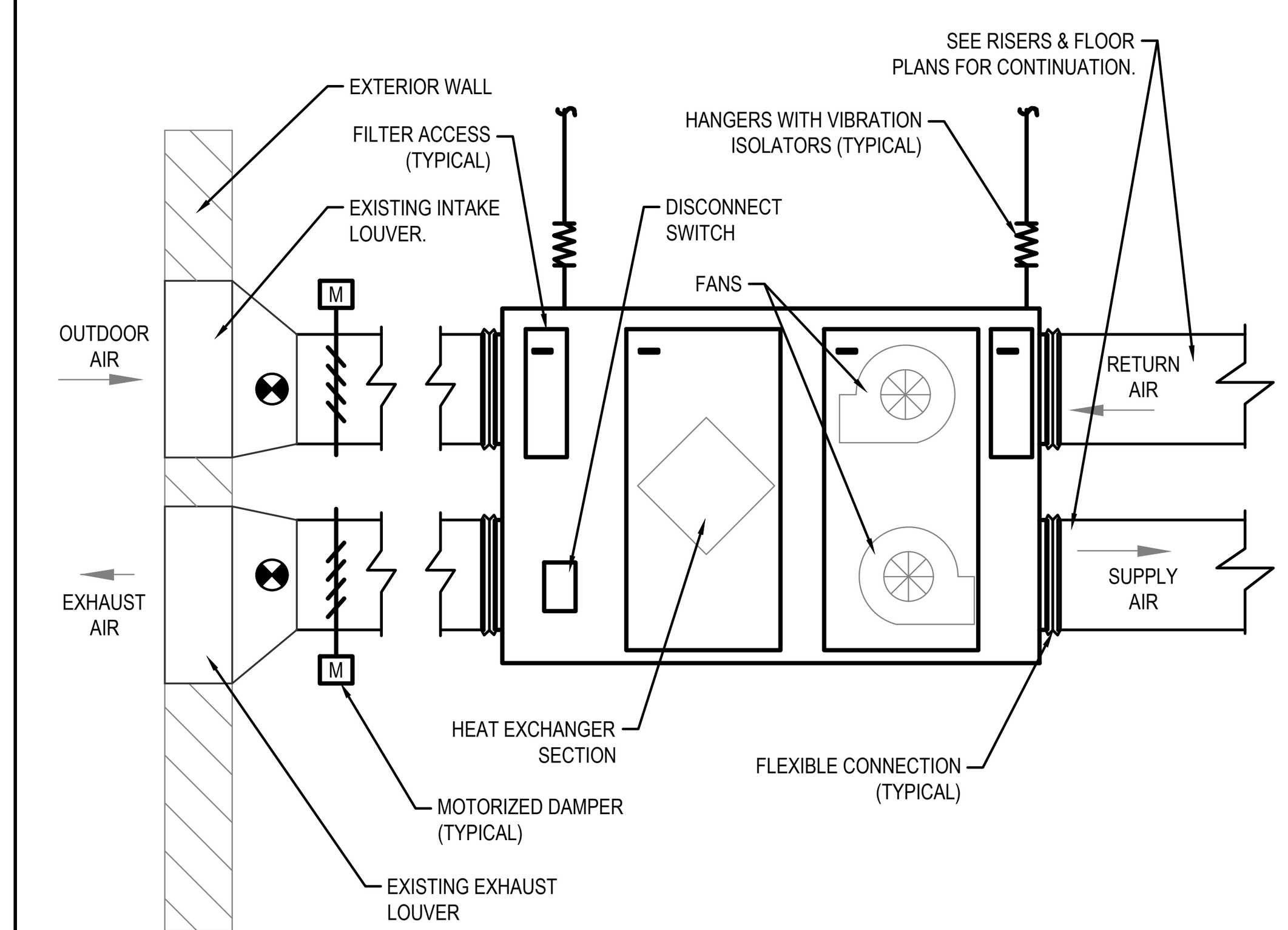


NOTES:
1) CONTRACTOR SHALL PROVIDE SUPPLEMENTARY STEEL ANGLE(S) OR CHANNEL SUPPORT(S) WELDED TO BEAM FLANGE AS NECESSARY.
2) ALL CONNECTED DUCTWORK AND PIPING SHALL BE INDEPENDENTLY SUPPORTED FROM STRUCTURE.

9 TYPICAL HVAC EQUIPMENT SUSPENSION DETAIL — N.T.S.



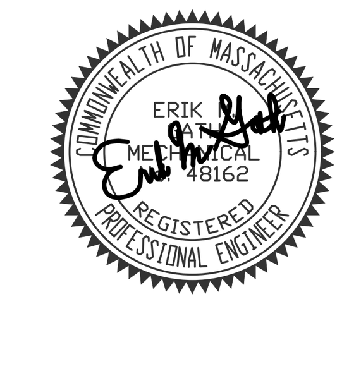
10 "DETAIL-A" RESTRAINTS



NOTES:
1) IF ERV UNIT CABINET DOES NOT ALLOW FOR INTEGRAL FILTERS ON OA AND EA AIRSTREAM INLETS, CONTRACTOR SHALL PROVIDE SHEET METAL FILTER BOXES PRIOR TO FLEXIBLE DUCT CONNECTIONS ON BOTH AIRSTREAMS. FILTER ACCESS DOOR SHALL BE CONSTRUCTED WITH FULL LENGTH PIANO HINGE ON THE LONGEST SIDE AND BE COMPLETELY GASKETED.
2) SIMILAR FOR ROOF INTAKE AND/OR DISCHARGE, SEE VENT W/ DAMPER DETAIL FOR TERMINATIONS

11 ENERGY RECOVERY VENTILATOR CONNECTION DETAIL — N.T.S.

Seal:



BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

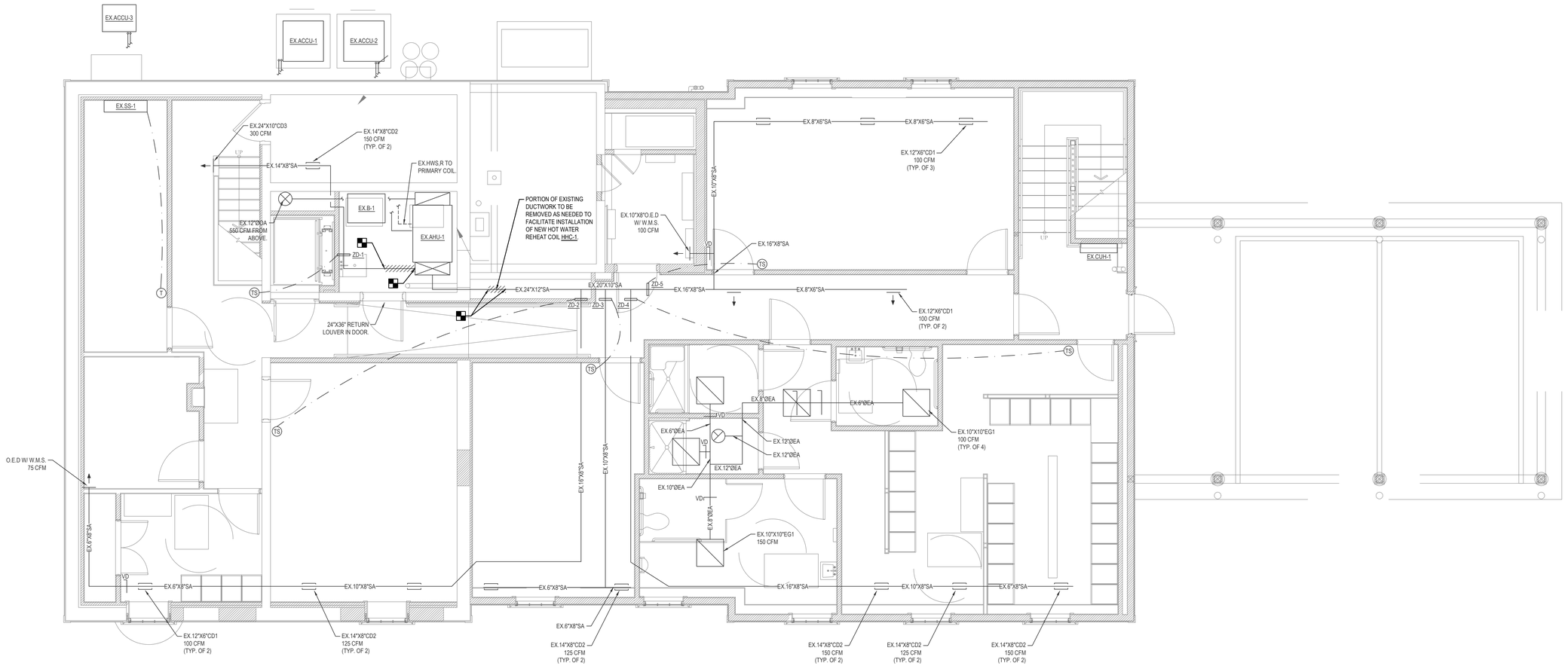
Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:

HVAC DETAILS

Drawing No.:

H0.03



1 Basement Plan

SCALE: 1/4"=1'-0"

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK M. LARSON
No. 48162
REGISTERED PROFESSIONAL ENGINEER

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:	
PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

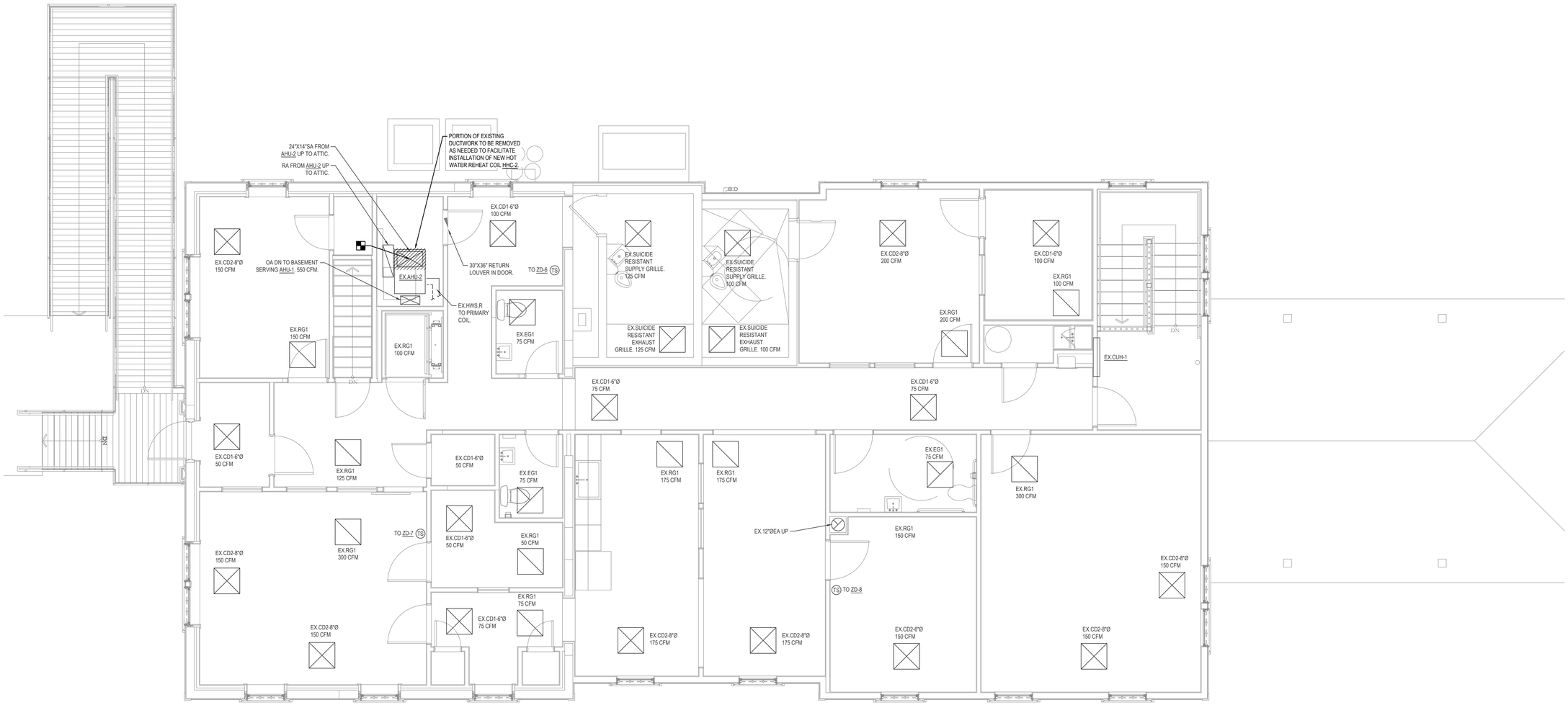
TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
BASEMENT
DEMO PLAN

Drawing No.:

HD1.00



1 First Floor Plan

SCALE: 1/4"=1'-0"

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK M. LARSON
No. 48162
REGISTERED PROFESSIONAL ENGINEER

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:	
PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

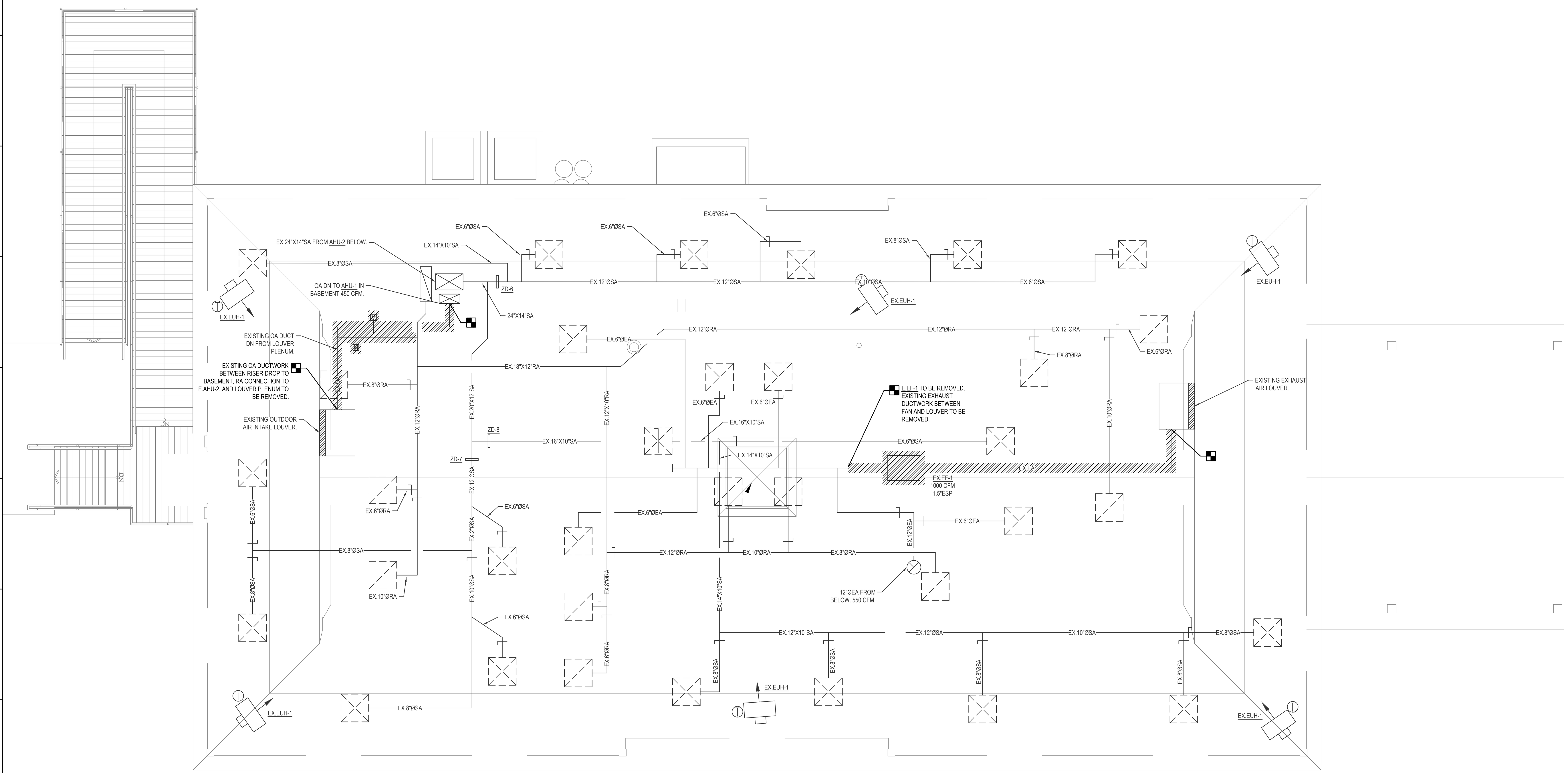
Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
FIRST FLOOR
DEMO PLAN

Drawing No.:
HD2.00



1 Attic Plan
SCALE: 1/4"=1'-0"

Seal:

BLW

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

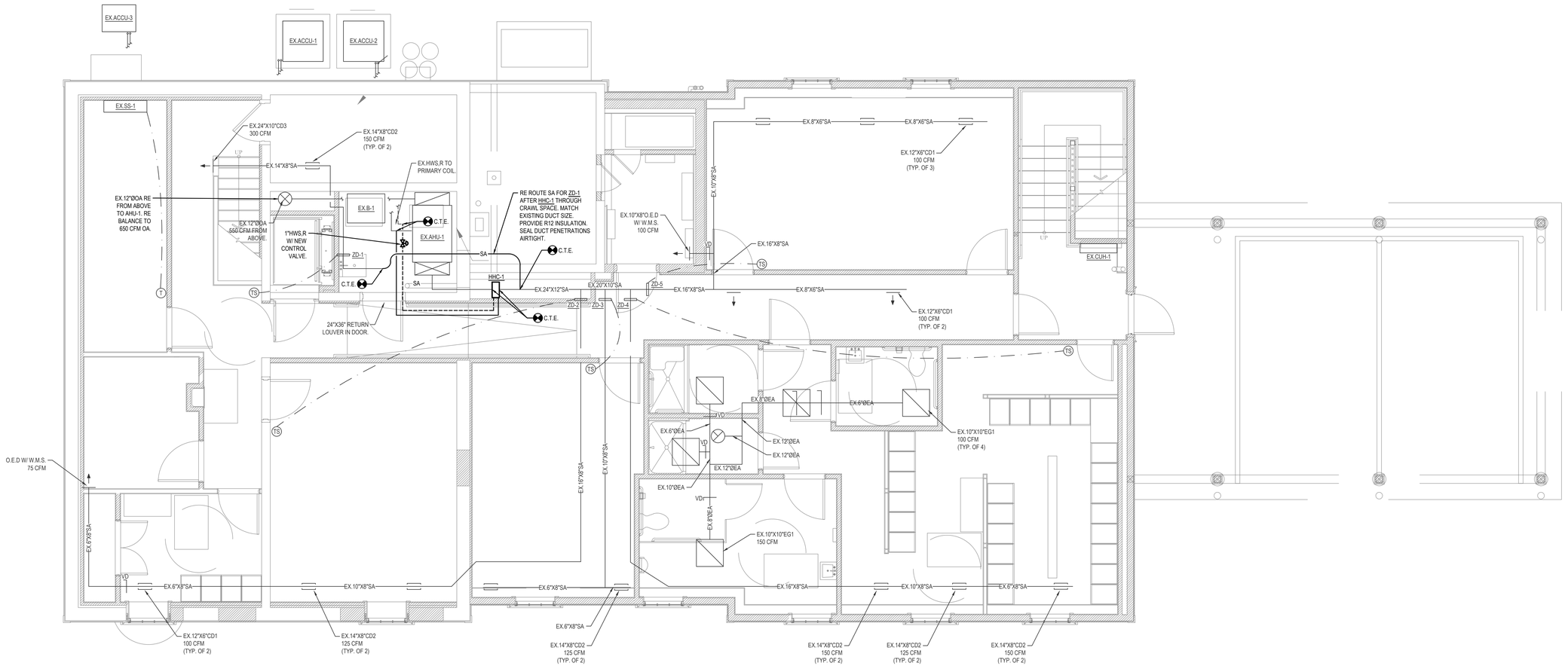
Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
ATTIC
DEMO PLAN

Drawing No.:
HD3.00



1 Basement Plan

SCALE: 1/4"=1'-0"

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK M. GUSTAFSON
No. 48162
REGISTERED PROFESSIONAL ENGINEER

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

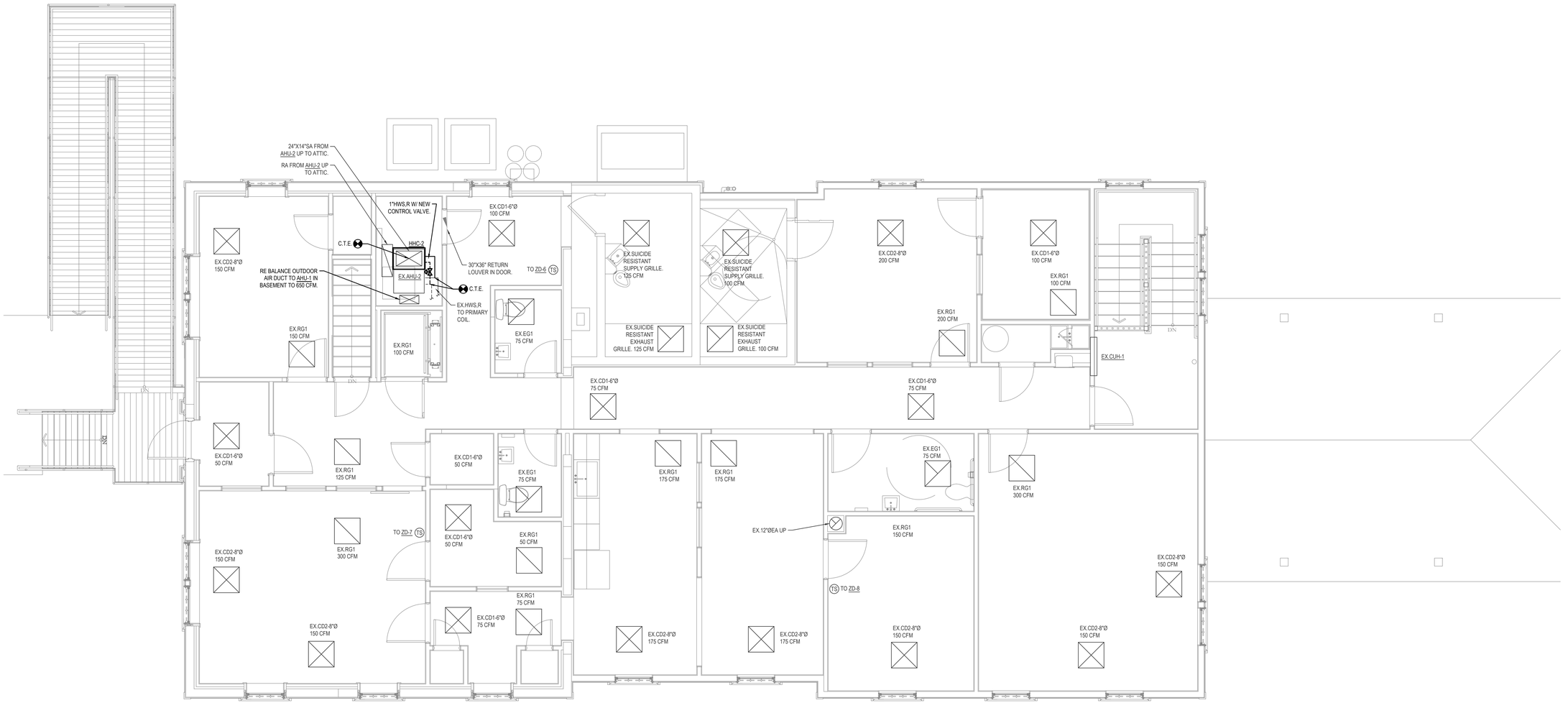
Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
BASEMENT
NEW WORK PLAN

Drawing No.:
H1.00



1 First Floor Plan

SCALE: 1/4"=1'-0"

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK M. GUSTAFSON
No. 49162
REGISTERED PROFESSIONAL ENGINEER

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:	
PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

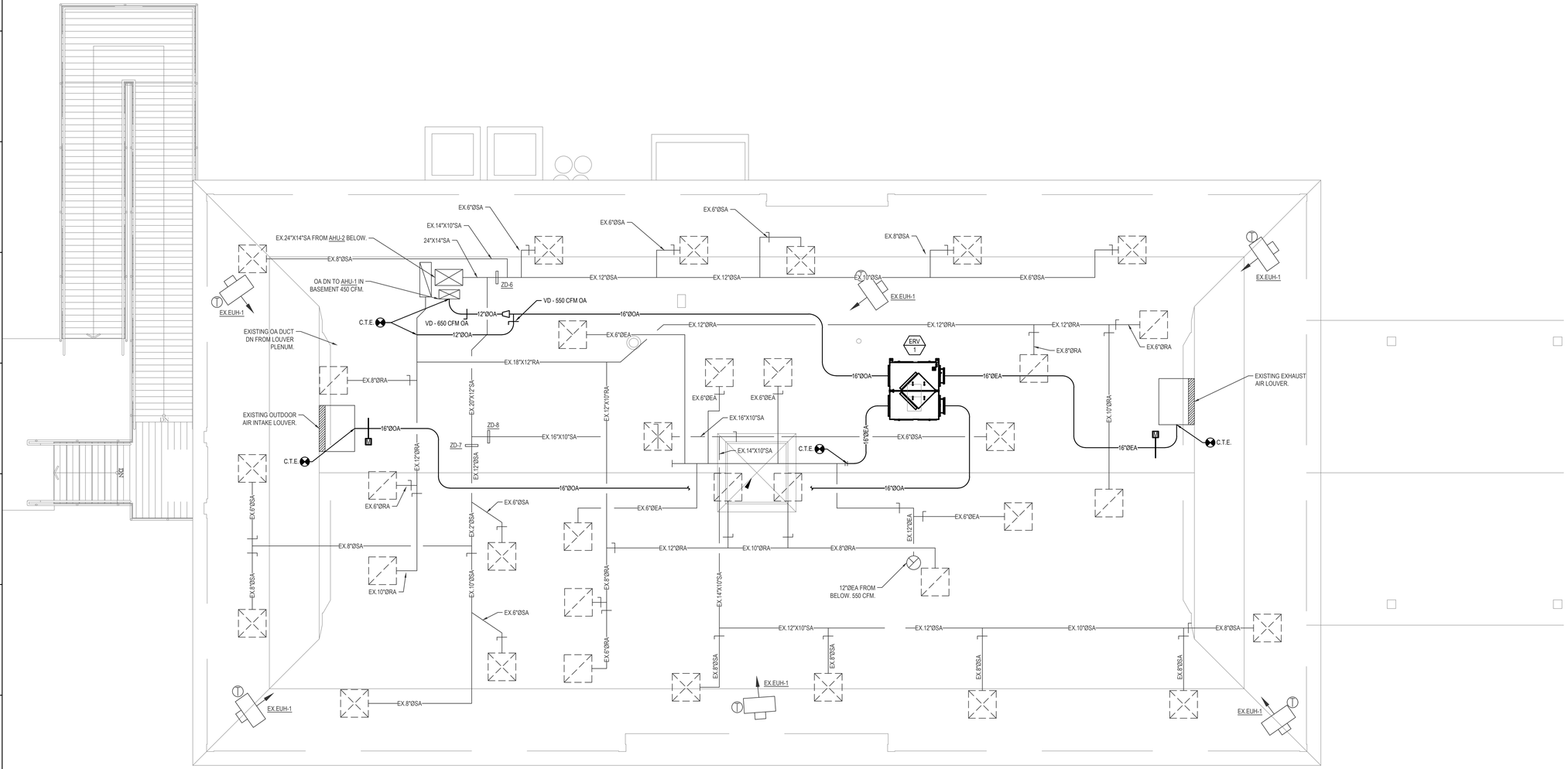
TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
FIRST FLOOR
NEW WORK PLAN

Drawing No.:

H2.00



1 Attic Plan

SCALE: 1/4"=1'-0"

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK M. GUSTAFSON
No. 48162
REGISTERED PROFESSIONAL ENGINEER

BLW

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:	
PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	CAW
Checked By:	EMG
Scale:	As Noted

Title:
HVAC
ATTIC
NEW WORK PLAN

Drawing No.:
H3.00

GENERAL NOTES

1. REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR MOUNTING HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.
2. PERFORM WORK AND PROVIDE MATERIALS AND EQUIPMENT TO MAKE INSTALLATION COMPLETE IN EVERY DETAIL UNDER THIS CONTRACT WHETHER OR NOT SPECIFICALLY SHOWN ON DRAWINGS.
3. ALL CONDUIT, WIRING AND ELECTRICAL EQUIPMENT SHALL BE INSTALLED AND GROUNDED IN ACCORDANCE WITH THE LATEST STANDARDS OF THE NATIONAL & STATE ELECTRICAL CODES AND ANY APPLICABLE LOCAL REGULATIONS.
4. ALL FLOOR, MASONRY WALLS AND STRUCTURAL CEILING PENETRATIONS SHALL BE SLEEVED.
5. PROVIDE FIRE/MOISTURE SEAL FOR WALL, FLOOR OR CEILING PENETRATIONS.
6. DO NOT LAY CABLES OR RACEWAY ON, OR SUPPORT FROM SUSPENDED CEILING OR PIPING AND DUCTWORK.
7. OUTLET BOXES SHALL BE MOUNTED FLUSH. CONDUIT SHALL BE RUN CONCEALED. WHERE WALLS ARE BLOCK, DEVICES AND WIRING SHALL BE SURFACE MOUNTED. PROVIDE WIREMOLD OR EQUAL TO SURFACE MOUNTED RACEWAY WITH FINISHED BOXES.
8. NO CONDUIT SMALLER THAN 3/4 INCH ELECTRICAL TRADE SIZE SHALL BE USED, UNLESS SPECIFICALLY CALLED FOR ON THE DRAWINGS.
9. ALL WIRING WITHIN UTILITY CLOSETS MAY BE IN SURFACE MOUNTED CONDUIT. EMT MAY BE UTILIZED.
10. FLEXIBLE CONDUIT CONNECTIONS SHALL BE A MAXIMUM OF 6'-0".
11. MC TYPE CONDUCTOR WITH INTEGRAL GROUND WIRE MAY BE UTILIZED FOR POWER AND LIGHTING CIRCUITS. MC CABLE SHALL BE UTILIZED ONLY WHERE COMPLETELY CONCEALED AND INSTALLED IN ACCORDANCE WITH CODE.
12. STEEL OR FIRE-RATED ELECTRICAL BOXES (SWITCHES, OUTLETS, JUNCTION BOXES, ETC.) SHALL BE PROVIDED AND INSTALLED IN ALL FIRE RATED ASSEMBLIES AS IN ACCORDANCE WITH BUILDING AND ELECTRICAL CODES. UL LISTED MOLDABLE PUTTY PADS OR FIREBLOCK/SPRAY FOAM INSULATE SHALL BE USED TO SEAL ALL ANNULAR SPACES/PENETRATIONS AROUND OUTLET BOXES. FIRE RATED ASSEMBLIES INCLUDE EXTERIOR WALLS, FIRE-RATED WALLS, FLOOR/CEILING ASSEMBLIES AND ROOF/CEILING ASSEMBLIES.
13. RECESSED ELECTRICAL ENCLOSURES SUCH AS BUT NOT LIMITED TO; PANELBOARDS, LOW VOLTAGE MEDIA CENTERS, ETC. SHALL BE PROVIDED WITH FIRE-RATED BOXES WHERE INSTALLED IN FIRE-RESISTANCE-RATED ASSEMBLIES. REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF FIRE-RATED ASSEMBLIES.
14. ALL EQUIPMENT AND WIRING ON DWGS IS SHOWN DIAGRAMMATICALLY. EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD, EXCEPT WHERE SPECIFIC DIMENSIONS AND DETAILS ARE SHOWN. ALL CONDUIT RUNS SHALL BE RIGIDLY SUPPORTED.
15. COORDINATE WITH ARCHITECTURAL FURNITURE LAYOUTS FOR EXACT LOCATION OF WALL MOUNTED POWER AND COMMUNICATIONS DEVICES. COORDINATE ALL LIGHTING FIXTURES, UNDER CABINET LIGHTING FIXTURES AND SWITCH LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS.

DEMOLITION NOTES

1. REFER TO THE ARCHITECTURAL DRAWINGS FOR THE FULL EXTENT OF THE SCOPE OF DEMOLITION. DISCONNECT AND MAKE SAFE ALL ELECTRICAL EQUIPMENT IDENTIFIED FOR REMOVAL ON THE HVAC, PLUMBING AND FIRE PROTECTION PLANS. THE ELECTRICAL SCOPE MAY EXTEND BEYOND THE AREA DEFINED BY THE ARCHITECTURAL DEMOLITION LIMITS TO FULLY COMPLY WITH VARIOUS REQUIREMENTS DEFINED BY THESE NOTES.
2. THE ELECTRICAL DEMOLITION PLANS AND DETAILS INDICATE THE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO THE SUBMISSION OF BIDS TO BECOME FAMILIAR WITH THE ACTUAL CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALLS AND/OR CEILINGS TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE OWNER'S REPRESENTATIVE OF ANY UNANTICIPATED HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.
3. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE REPAIR OF ALL SYSTEMS OR BUILDING COMPONENTS DAMAGED DURING THE EXECUTION OF THE WORK. DAMAGE SHALL INCLUDE BUT NOT BE LIMITED TO DESTRUCTION OR DISPOSAL OF ITEMS INTENDED TO REMAIN OR TO BE SALVAGED.
4. THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN THE AREA OF DEMOLITION SCOPE PRIOR TO DE-ENERGIZING AND DISCONNECTION. ALL CIRCUITS WITHIN PANELBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE LIMIT IS AFFECTED.
5. THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS, WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT APPROVAL FROM THE OWNER'S REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT MANNER.
6. THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS TO THEIR POINTS OF ORIGIN WITHIN THE AREA OF DEMOLITION SCOPE. ITEMS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SCOPE SHALL BE DE-ENERGIZED AND LABELED SPARE.
7. THE ELECTRICAL CONTRACTOR SHALL TEMPORARILY SUPPORT ALL ITEMS TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALLS, CEILINGS, ETC.). TEMPORARILY SUPPORTED ITEMS SHALL BE PERMANENTLY SUPPORTED AND INSTALLED WHEN FINALIZED STRUCTURES ARE IN PLACE.
8. ALL REMOVED ITEMS SHALL BE LEGALLY DISPOSED OF UNLESS IDENTIFIED FOR REUSE. THE OWNER'S REPRESENTATIVE SHALL INSPECT ALL RETAINED ITEMS PRIOR TO PLACEMENT IN THE IDENTIFIED STORAGE LOCATION BY THE ELECTRICAL CONTRACTOR.
9. THE EXISTING FIRE ALARM SYSTEM SHALL REMAIN FULLY FUNCTIONAL DURING THE ENTIRE DEMOLITION AND CONSTRUCTION PERIOD. REUSE OF EXISTING FIRE ALARM SYSTEM RACEWAYS SHALL NOT BE ALLOWED. ALL REQUIRED SYSTEM SHUTDOWNS SHALL BE COORDINATED WITH AND APPROVED BY THE OWNER'S REPRESENTATIVE AND THE AUTHORITY HAVING JURISDICTION. DEMOLITION OF THE EXISTING SYSTEM SHALL NOT COMMENCE UNTIL THE NEW SYSTEM HAS BEEN COMPLETELY INSTALLED, TESTED AND APPROVED BY THE AUTHORITY HAVING JURISDICTION.
10. ALL DEMOLITION SCOPE ASSOCIATED WITH LOW VOLTAGE SYSTEMS INCLUDING BUT NOT LIMITED TO TELEPHONE, DATA, SECURITY, PAGING, CCTV, ETC. SHALL BE INCLUDED IN THIS CONTRACT.
11. REMOVED FLUORESCENT AND HID LAMPS AND BATTERIES SHALL BE RECYCLED BY A FACILITY APPROVED BY THE OWNER'S REPRESENTATIVE. A UNIFORM HAZARDOUS WASTE MANIFEST SHALL BE PREPARED FOR ALL DISPOSALS AND RETURNED WITH ALL APPLICABLE SIGN OFF'S PRIOR TO APPLICATION FOR FINAL PAYMENT.
12. ALL BALLAST IN LIGHTING FIXTURES TO BE DISPOSED SHALL BE VERIFIED TO BE PCB FREE. ALL BALLAST MANUFACTURED PRIOR TO 1979 AND NOT LABELED AS PCB FREE SHALL BE CONSIDERED TO CONTAIN PCBs. PROVIDE WRITTEN VERIFICATION TO THE OWNER'S REPRESENTATIVE THAT CONFIRMS PCB FREE WASTE. WHERE PCB FREE WASTE CANNOT BE VERIFIED, BALLAST SHALL BE RECYCLED BY A FACILITY APPROVED BY THE OWNER'S REPRESENTATIVE, WITH PCB COMPONENTS ELIMINATED BY A HIGH TEMPERATURE INCINERATION. A UNIFORM HAZARDOUS WASTE MANIFEST SHALL BE PREPARED FOR ALL DISPOSALS AND RETURNED WITH ALL APPLICABLE SIGN OFF'S PRIOR TO APPLICATION FOR FINAL PAYMENT. ALL HANDLING SHALL CONFORM TO EPA REQUIREMENTS. PROVIDE BREAKOUT COST FOR THIS SCOPE.

POWER NOTES

1. ALL CONDUITS ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATION AND METHOD OF SUPPORT SHALL BE DETERMINED IN THE FIELD, EXCEPT WHERE SPECIFIC DIMENSIONS AND DETAILS ARE SHOWN. ALL CONDUIT RUNS SHALL BE RIGIDLY SUPPORTED.
2. NEC - 406.12 TAMPER-RESISTANT RECEPTACLES - IN ALL AREAS SPECIFIED IN 406.12 PARAGRAPHS (1-7) AND ASSEMBLY SUBSETS LISTED IN NEC 518.2, ALL NONLOCKING-TYPE, 125 VOLT, 15 AND 20 AMPERE RECEPTACLES SHALL BE LISTED TAMPER RESISTANT RECEPTACLES.
3. CONDUCTORS AND CABLE SHALL BE MINIMUM #12 AWG, 600 VOLT, COPPER WITH TYPE THHN/THWN INSULATION. PROVIDE SEPARATE GREEN GROUND IN ALL FEEDERS. WIRE SIZE #8 AWG AND LARGER SHALL BE STRANDED, #10 AWG AND SMALLER SHALL BE SOLID. COLOR CODE CONDUCTORS BLACK, RED, BLUE, WITH WHITE NEUTRAL AND GREEN GROUND EXCEPT AS NOTED FOR 120 VOLT.
4. ELECTRICAL CONTRACTOR SHALL CONFIRM ALL NEMA CONFIGURATIONS AND REQUIRED ELECTRICAL REQUIREMENTS OF ALL EQUIPMENT SPECIFICATIONS PRIOR TO ROUGH-IN.

EXISTING EQUIPMENT DESIGNATIONS

X	EXISTING TO BE REMOVED, REMOVE ALL ASSOCIATE CONDUIT AND CONDUCTORS
XM	EXISTING TO REMAIN
XN	EXISTING EQUIPMENT TO BE REPLACED WITH NEW, CONNECT NEW EQUIPMENT TO EXISTING CIRCUIT
XR	EXISTING EQUIPMENT TO BE RELOCATED, JUNCTION AND EXTEND EXISTING CONDUIT AND CONDUCTORS
XC	NEW EQUIPMENT TO BE CONNECTED TO NEAREST AVAILABLE BRANCH CIRCUIT, PROVIDE NEW BRANCH CIRCUITRY FROM NEAREST EXISTING DEVICE (TO REMAIN) TO NEW DEVICE AS REQUIRED
XL	NEW LOCATION OF EXISTING EQUIPMENT, JUNCTION AND EXTEND CONDUIT AND CONDUCTORS AS REQUIRED

ABBREVIATIONS

A/AMP	AMPERE	IMC	INTERMEDIATE METALLIC CONDUIT
AC	ALTERNATING CURRENT	JB	JUNCTION BOX
AF	AMPERE FRAME	KVA	KILOVOLT-AMPERE
AFF	ABOVE FINISHED FLOOR	KW	KILOWATT
AFG	ABOVE FINISHED GRADE	LTG	LIGHTING
AIC	AMPERE INTERRUPTING CAPACITY	MCB	MAIN CIRCUIT BREAKER
AL	ALUMINUM	MCC	MOTOR CONTROL CENTER
AT	AMPERE TRIP	MEC	MASSACHUSETTS ELECTRICAL CODE
ATS	AUTOMATIC TRANSFER SWITCH	MLO	MAIN LUGS ONLY
AWG	AMERICAN WIRE GAUGE	MTD	MOUNTED
C	CONDUIT	MTG	MOUNTING
CB	CIRCUIT BREAKER	NEC	NATIONAL ELECTRICAL CODE
CKT	CIRCUIT	No., #	NUMBER
CL	CENTERLINE	NS	NON-SYSTEM
CU	COPPER	NTS	NOT TO SCALE
DC	DIRECT CURRENT	PC	PLUMBING CONTRACTOR
DE	DUAL ELEMENT	PWR	POWER
DWG	DRAWING	RGS	RIGID STEEL CONDUIT
EC	ELECTRICAL CONTRACTOR	RMS	ROOT MEAN SQUARE VALUE
EMH	ELECTRICAL MANHOLE	RPM	REVOLUTIONS PER MINUTE
EMT	ELECTRIC METALLIC CONDUIT	SF	SQUARE FOOT
EWC	ELECTRIC WATER COOLER	SN	SOLID NEUTRAL
G/GND	GROUND	ST	SHUT TRIP CIRCUIT BREAKER
GC	GENERAL CONTRACTOR	SWBD	SWITCHBOARD
GE	GROUND-FAULT PROTECTION FOR EQUIPMENT (GFPE CB)	TYP	TYPICAL
GP	GROUND-FAULT PROTECTION FOR PERSONNEL (GFCI CB)	V	VOLTS
GFCI	GROUND-FAULT CIRCUIT-INTERRUPTER	VA	VOLT-AMPERE
HP	HORSEPOWER	VFD	VARIABLE FREQUENCY DRIVE
HVAC	HEATING, VENTILATION AND AIR CONDITIONING	WP	WEATHERPROOF

BRANCH CIRCUIT AND FEEDER SYMBOLS

PP1-2
PP1-2,4,6
HOMERUN TO PANELBOARD "PP1", CIRCUIT NUMBER "2
REFER TO PANEL SCHEDULE FOR BREAKER SIZE AND NUMBER OF POLES
CONCEALED UNLESS OTHERWISE NOTED
NUMBER OF ARROWS INDICATES NUMBER OF INDIVIDUAL HOMERUNS "2", "4", AND "6"
UNLESS NOTED OTHERWISE, WIRING FOR EACH CIRCUIT SHALL BE:
20A/1P - 2#12,#12G-¾"C
20A/2P - 3#12,#12G-¾"C
20A/3P - 4#12,#12G-¾"C
WIRING FOR MULTIPLE HOMERUNS MAY BE COMBINED IN CONDUIT IN ACCORDANCE WITH NEC REQUIREMENTS

4#1,#6G-1½"C
HOMERUN FEEDER / BRANCH CIRCUIT CALLOUT:
INDICATES (3) #1 AWG (PHASE), (1) #1 AWG (NEUTRAL), (1) #6 GROUND IN A 1½" CONDUIT

BRANCH CIRCUIT OR FEEDER CONCEALED UNLESS OTHERWISE NOTED. BRANCH CIRCUIT DIAGONAL LINES INDICATE NUMBER OF CONDUCTORS, GROUND WIRE(S) NOT INDICATED. MINIMUM SIZE CONDUCTOR #12 AWG AND 3/4" CONDUIT, UNLESS OTHERWISE NOTED.

FLEXIBLE CONNECTION TO MOTOR OR EQUIPMENT

RECEPTACLES AND DEVICES

TYPICAL RECEPTACLE ANNOTATION:
"5" INDICATES CIRCUIT NUMBER
"WP" INDICATES WEATHERPROOF IN-USE COVER
"FBI" INDICATES FLOOR BOX CONFIGURATION, REFER TO FLOOR BOX SCHEDULE / DETAILS FOR ADDITIONAL INFORMATION
REFER TO SPECIFICATIONS FOR ADDITIONAL RECEPTACLE AND DEVICE DETAILS

5 — DUPLEX CONVENIENCE RECEPTACLE OUTLET

DUPLEX GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE OUTLET

DUPLEX GROUND FAULT CIRCUIT INTERRUPTING RECEPTACLE OUTLET, COUNTERTOP MOUNTING

J — JUNCTION BOX, COORDINATE MOUNTING HEIGHT WITH ARCHITECT, "HT" INDICATES HEAT TRACE

MOTORS AND CONTROLS

(½) — MOTOR, NUMERAL INDICATES HORSEPOWER

S_M — MANUAL MOTOR STARTER, RATED 20A, 250V, COORDINATE MOUNTING HEIGHT IN FIELD, MOUNTING HEIGHT SHALL NOT EXCEED 6'-7" AFF

60A 3R — DISCONNECT SWITCH RATED 30A, 3-POLE, IN NEMA TYPE 1 ENCLOSURE, UNLESS OTHERWISE NOTED
"3R" INDICATES NEMA TYPE 3R ENCLOSURE
"2P" INDICATES 2-POLE, SINGLE PHASE DISCONNECT
"60A" INDICATES 60A SWITCH

60AF 40AT 3R — FUSED DISCONNECT SWITCH RATED 30A, 3-POLE, IN NEMA TYPE 1 ENCLOSURE, UNLESS OTHERWISE NOTED
"3R" INDICATES NEMA TYPE 3R ENCLOSURE
"2P" INDICATES 2-POLE, SINGLE PHASE DISCONNECT
"60AF" INDICATES 60A FUSE SIZE
"40AT" INDICATES 40A TRIP RATING

PANELBOARD AND TERMINAL CABINET

120/208V PANEL, SURFACE MOUNTED, REFER TO PANEL SCHEDULES

120/208V PANEL, RECESSED MOUNTED, REFER TO PANEL SCHEDULES

ANNOTATIONS

ECH 1 — MECHANICAL EQUIPMENT TAG, REFER TO MECHANICAL EQUIPMENT COORDINATION SCHEDULE FOR ELECTRICAL REQUIREMENTS

1 — REVISION TAG

Seal:

COMMONWEALTH OF MASSACHUSETTS
ERIK S. KOUTOUVIDES
ELECTRICAL
REGISTERED
PROFESSIONAL ENGINEER

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

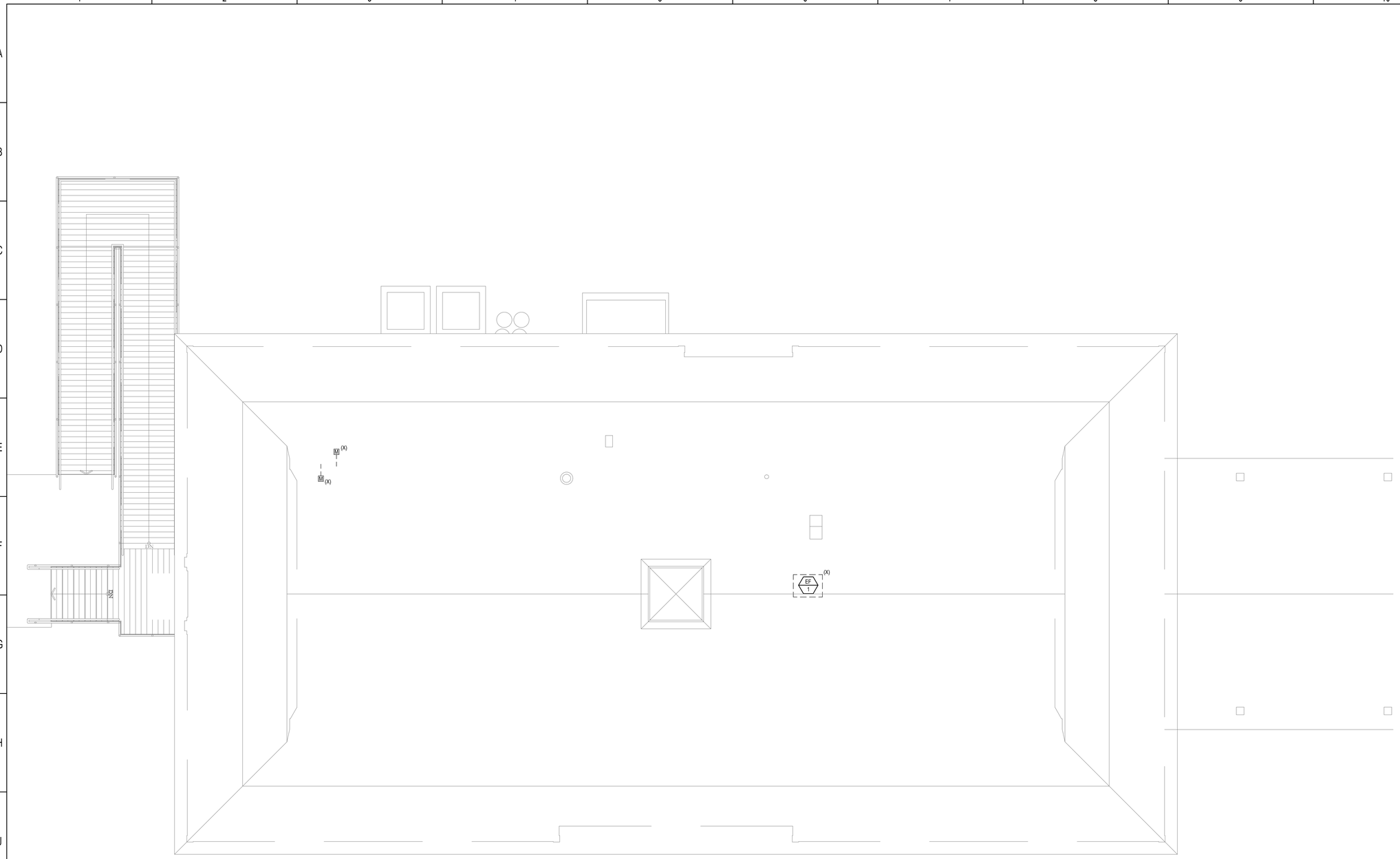
Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	SWD
Checked By:	MG
Scale:	As Noted

Title:
HVAC LEGEND AND SPECIFICATIONS

Drawing No.:
E0.01



1 Attic - Demolition Power Plan
SCALE: 1/4"=1'-0"

Seal:

BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

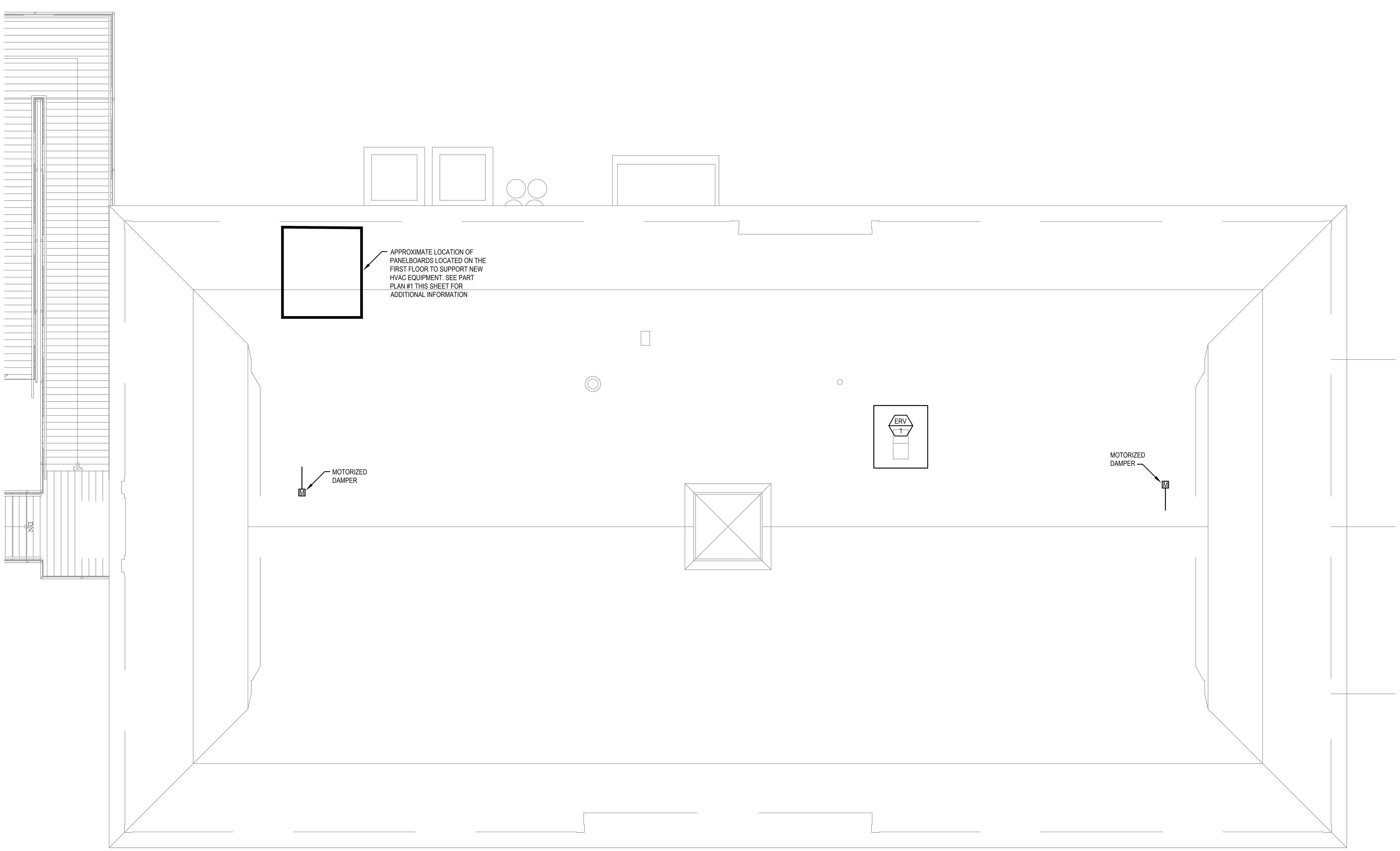
Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

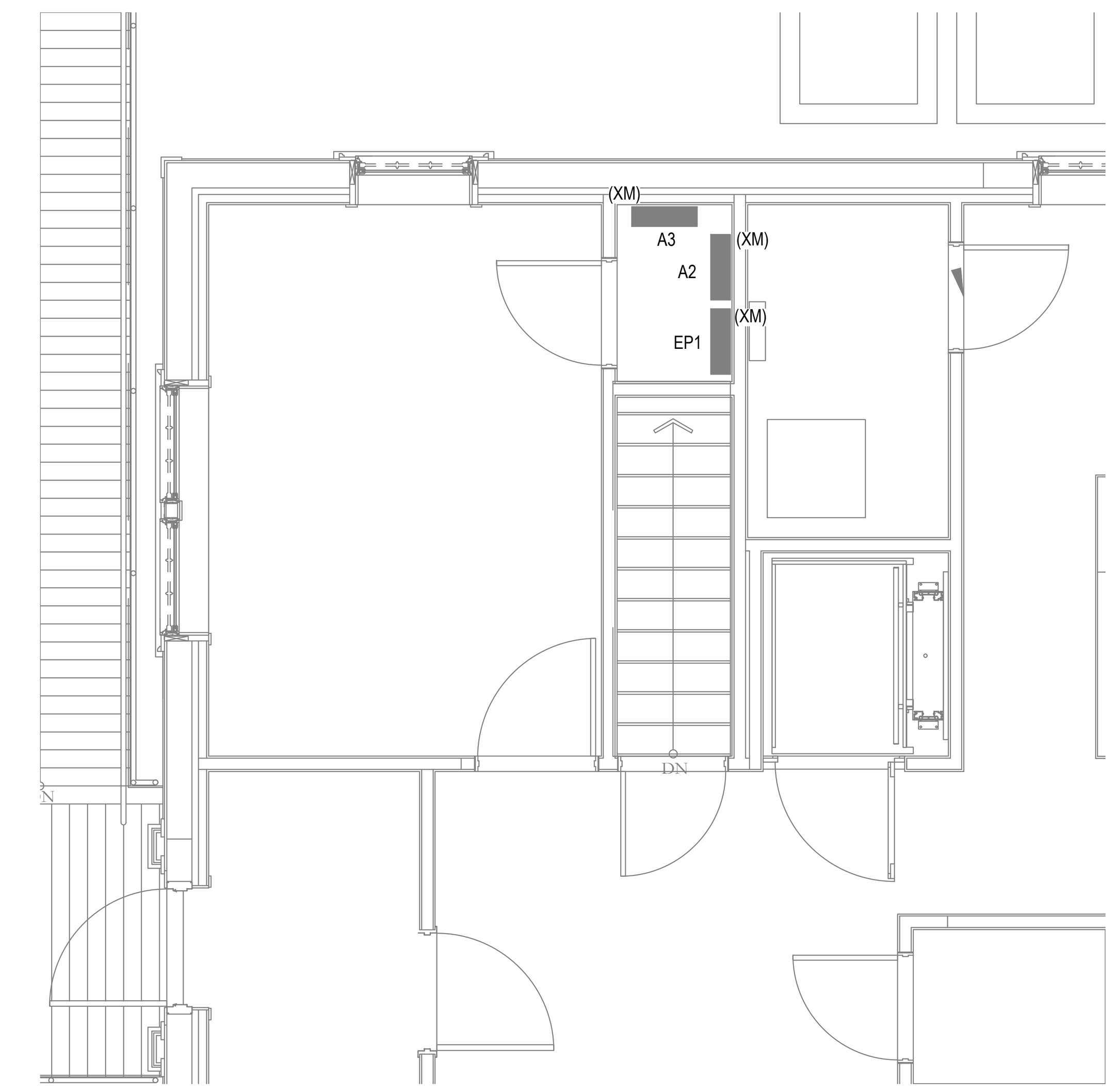
Project No.:	22252
Drawn By:	SWD
Checked By:	MG
Scale:	As Noted

Title:
ELECTRICAL
ATTIC
DEMO PLAN

Drawing No.:
ED1.00



2 Attic - New Work Power Plan
SCALE: 1/4"=1'-0"



1 First Floor - Power Part Plan
SCALE: 1/4"=1'-0"

MECHANICAL EQUIPMENT COORDINATION SCHEDULE

EQUIP. TAG	EQUIPMENT DESCRIPTION	HP	MCA	kVA	VOLT	PHASE	PANEL CIRCUIT No.	CIRCUIT BREAKER	FEEDER	S_M	⊠	⊏	⧄	∿	WP	ⓢD	SEE NOTE
ERV-1	ENERGY RECOVERY UNIT		9.9	1.65	208	1	A3(25,27)	15A/2P	3#12,1#12G-¾"C			✓	30AF/15AT	✓			1
M	MOTORIZED DAMPERS		5.0	0.48	120	1	A3(19)	20A/1P	2#12,1#12G-¾"C	✓				✓			2

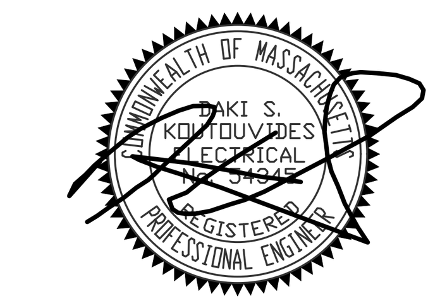
MECHANICAL SCHEDULE NOTES:

1. PROVIDE NEW CIRCUIT BREAKER AS INDICATED AND MOUNT IN AVALBLE POLE SPACE. NEW CIRCUIT BREAKER SHALL MATCH EXISTING IN STYLE, TYPE AND ITERRUPTING CAPACITY. EXISTING PANELBOARD MANUFACTURED BY SQUARE D
2. RE-USE EXISTING CIRCUIT BREAKER MOUNTED IN POLE SPACE AS INDICATED.

SCHEDULE NOTES:

1. EQUIPMENT LOCATIONS SHOWN ON ELECTRICAL PLANS ARE APPROXIMATE LOCATIONS ONLY. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATIONS.
2. REFER TO MECHANICAL SCHEDULES FOR ADDITIONAL INFORMATION AND DETAILS
3. ALL CONDUCTOR SIZES ARE FOR COPPER CONDUCTORS.

Seal:



BLW Engineers, Inc.
311 Great Road, Post Office Box 1551
Littleton, Massachusetts 01460
T: 978.486.4301 F: 978.428.0067
www.blwengineers.com
HVAC * ELECTRICAL * PLUMBING * FIRE PROTECTION

Client:

TEMPLETON POLICE DEPARTMENT
33 SOUTH ROAD
TEMPLETON, MA 01488

Submission:

PRICING	06/24/22
ADDENDUM	09/20/22

Revision:

Project:

TEMPLETON POLICE DEPARTMENT
HVAC REVNOVATIONS
33 SOUTH ROAD
TEMPLETON, MA 01468

Project No.:	22252
Drawn By:	SWD
Checked By:	MG
Scale:	As Noted

Title:
ELECTRICAL
ATTIC
NEW WORK PLAN

Drawing No.:
E1.00