CITY OF BEVERLY
ADDENDUM NO. 2, October 28, 2015

RE: **INVITATION FOR BIDS # 15-030**
BUILDOUT OF BUILDING 45

FROM: **David Gelineau**
Purchasing Agent
City of Beverly
191 Cabot Street
Beverly, MA 01915

Please acknowledge receipt via electronic mail, telephone, or facsimile

TO: ALL PROSPECTIVE BIDDERS

This addendum containing 26 pages forms a part of the Invitation for Bids from the City of Beverly for: # 15-030 Buildout of Building 45

The Sub Filed Bid Due Date has been changed from: Friday, October 30, 2015
The Sub Filed Bid Due Date has been changed to:

SUB FILED DATE IS Tuesday, November 3, 2015 @ 2:00 P.M.

The General Bid Due Date has been changed from: Wednesday, November 4, 2015
The General Bid Due Date has been changed to:

GENERAL DATE IS Tuesday, November 10, 2015 @ 11:00 A.M.

Questions:

1. What is the size of the existing panel which we are bringing in the feed to service the house panel of the facility?
2. Can you please provide CAD files for the design built requested with the proposals.
3. Are we providing disconnect switches for any mechanical connections? And if we are can you please supply the connection points and sizes.
4. Please confirm if EC is to supply minimum of ¾" conduit for empty raceways for security, cameras.
5. Tel/data, voice are we to supply racks, patch panels, terminations.
6. Fixture Type Cree L Surface Mounted Fixture where are they being installed?
7. Dwgs are showing just exist signs but no EBU will there be any additional emergency lighting.
8. There are no fire alarm devices indicated in the dwgs. Is there currently an existing Fire Alarm Systems. If so who is the company monitoring it and what type of system it is and should we carry a cost for maintaining it while construction.

Answers:

1. The existing service panel is 400 amp 3 phase.
2. Electronic base files for design build drawings will be provided in AutoCAD format.
3. For the purposes of HVAC equipment, there shall be three interior 2.5 ton air handlers, three exterior 2.5 ton condensing units, a natural gas-fired condensing boiler and an 80 gallon natural gas fired water heater. All code required line voltage wiring and devices for this equipment shall be provided and installed by the electrical sub bidder. In addition, all low voltage transformers and wiring for one thermostat per room, wiring connections for air handler float switches, circulator pumps, and control relays shall be included.
4. Minimum ¾" empty conduit shall be supplied and installed for security devices and cameras by the electrical sub bidder.
5. For telephone, CAT6 data and coaxial wiring, wall boxes, connectors and finish plates shall be installed by the electrical sub bidder; all wiring shall be home runs to the back wall (exterior) of the Utility Room as shown on the drawings. No equipment inside the utility room shall be provided or installed by the electrical sub bidder.
6. The Cree L surface mount fixture goes inside the closet in Municipal Inspections 2.
7. All code required fire detection, signaling, communication and egress lighting devices, emergency back up power and equipment are included in the scope of the Electrical Filed Sub Bid. The egress paths are delineated on the drawings by the exit sign symbols.
8. There is currently no functional fire alarm system in the building.

Question: Please have the architect confirm that the General Contractor will be responsible for providing temp power, temp heat and access to water for the sub-contractors at the Buildout of Building #45 project.

Answer: Amended section 015000 in the project manual, Temporary Facilities and Controls, directs the General Contractor to provide temporary heat and fuel necessary and as required for construction operations. (See Notification and Supplemental Information I, Item 4) This requirement is not part of the lath and plaster filed sub bid.

Question: There are four (4) thermal exterior doors marked "A" with no listed hardware. Please provide a hardware set for these doors.

Answer: The hardware set for A doors is included in Addendum 2 in Section 087100-- Doors and Hardware Section of the specification.

Question: Is there a section number for this file sub-bid?

Answer: The section number is: 087100 in the Project Manual

Question: Is the aluminum storefront finish clear anodized?

Answer: All aluminum storefront framing is clear anodized.

Question: Could you please confirm whether or not, the space above the suspended ceiling will be used or considered an air plenum?

Answer: The space above the ACT ceiling will not be used as a plenum

Please sign this acknowledgement of receipt of the Addendum No.2 and return with your bid.

_____

Signature of Bidder

October 26, 2015

Build Out of Building 45
LP Henderson Road
Beverly, MA 01956

This Notification and Supplemental Information No. I is issued prior to receipt of proposals and hereby becomes part of the bidding documents. In the case of conflict, this addendum shall supersede the original bidding documents dated October 7, 2015 prepared by Brett Thibault Architect.

This notification and supplemental information must be acknowledged on the BID FORM as part of an addendum.

Item 1. Notification: electrical and gas services are located at the northeast corner of the building.

Item 2. Supplemental Information: add document HVAC Design Guidelines as Appendix A to the Project Manual after section 087100

Item 3. Change the General Notes on the Electrical Schedule on sheet A2.0 to the following:

GENERAL NOTES: ALL SWITCHING IS BY OCCUPANCY SENSOR EXCEPT CLOSETS AND CORRIDORS. ALL DEVICES AND TRIM TO BE WHITE UNO; SCHEDULE ABOVE PROVIDES MINIMUM AESTHETIC REQUIREMENTS, AND IS SUPPLEMENTAL TO DELEGATED DESIGN ONLY. ALL ROOMS SHALL BE PRE-WIRED WITH COAXIAL CABLE, CAT 6 NETWORK, SECURITY CAMERA, AND TELEPHONE, WITH (1 EA) TERMINATION EXCEPT MUNICIPAL INSPECTIONS 1&2 WHICH SHALL EACH RECEIVE EIGHT (8) TERMINATIONS FOR CAT6 NETWORK AND TELEPHONE, AND MUNICIPAL INSPECTIONS 3, WHICH SHALL RECEIVE 3 TERMINATIONS FOR CAT6 NETWORK AND TELEPHONE IN LOCATIONS PER OWNER'S REQUIREMENTS. ALLOW FOR A TOTAL OF 9 INSTALLED EMPTY SINGLE GANG BACK BOXES WITH ¾" CONDUIT TO 4" ABOVE ACCESSIBLE CEILING AT ALL EXTERIOR DOORS, CORRIDOR 1 ENTRY DOOR, AND CID 5 ENTRY DOOR. ALL EXPOSED DEVICES SHALL BE BEST QUALITY LEVITON, HUBBEL OR EQUAL; ALL EXPOSED DEVICES SHALL HAVE FINISH TRIM, COVER PLATES, FASTENERS, APPROPRIATE LAMPS TO PROVIDE A MINIMUM OF 30 FC AT 30" AFF INTERIOR, AND OTHER ACCESSORIES TO PROVIDE A FINISHED AND COMPLETE SYSTEM.

Item 4. Add the following to Section 015000 Temporary facilities and Controls, Part I, I.3 Use Charges: C. Temporary Heat: The Contractor shall provide temporary heating equipment and fuel necessary and as required for construction operations.

Item 5. Republish Specification Section 087100 doors and hardware in its entirety. (attached 087100-REV)

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bthibault@thibaultarchitects.com www.thibaultarchitects.com

Item 6. Notification: All bidders must include and acknowledge all scope changes made via Addenda, Notifications and Supplemental Information.

Item 7. The contractor shall include a lump sum allowance of $20,000.00 for miscellaneous wood framing work, and a lump sum allowance of $20,000.00 for miscellaneous selective demolition.

Allowances shall include cost to Contractor of specific products and materials ordered by Owner or selected by Architect under allowance and shall include taxes, freight and delivery to Project site. Use the allowance only as directed by Architect for Owner's purposes and only by Change Orders that indicate amounts to be charged to the allowance.

Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

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

If requested by Architect, retain and prepare unused material for storage by Owner. Deliver unused material to Owner's storage space as directed.

Item 8. Add the following to the contract: One (1) pair of 3'-6"x7'-0" 1 hr rated solid core wood door and steel frame to be installed in Corridor 2. All hardware and leversets in us32d
Doors: maiman thermofused in 7122k empire mahogany factory finished with half glass
Frame: ceco series du steel door frame primed and painted with high performance enamel. Color: black
Hardware set #3.

End of Notification and Supplemental Information

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SECTION 087100
DOORS AND HARDWARE

PART 1 - GENERAL

PART 2 - RELATED DOCUMENTS

2.1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

PART 3 - SUMMARY

3.1 Section Includes

1. Furnishing and installation of all mechanical and electrical finish hardware necessary for all doors, and hardware as specified herein and as enumerated in hardware sets and as indicated and required by actual conditions at the building. The hardware shall include the furnishing of all necessary screws, bolts, expansion shields, drop plates, and all other devices necessary for the proper application of the hardware. Installation shall include field modification and preparation of existing doors and/or frames for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

3.2 Specific Omissions: Hardware for the following is specified or indicated elsewhere, unless specifically listed in the hardware sets:

1. Windows
2. Cabinets of all kinds, including open wall shelving and locks.
3. Signage, except as noted.

PART 4 - REFERENCES

4.1 Applicable state and local building codes and standards.

4.2 FIRE/LIFE SAFETY

1. NFPA - National Fire Protection Association
    a. NFPA 70 – National Electric Code
    b. NFPA 80 - Standard for Fire Doors and Fire Windows
    c. NFPA 101 - Life Safety Code
    d. NFPA 105 - Smoke and Draft Control Door Assemblies

4.3 UL - Underwriters Laboratories

1. UL 10C - Positive Pressure Test of Fire Door Assemblies

2. UL 1784 - Air Leakage Tests of Door Assemblies

3. UL 305 - Panic Hardware

4.4 Accessibility

1. ADA - Americans with Disabilities Act

2. Massachusetts Architectural Access Board Regulation – 521 CMR

4.5 DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware

4.6 ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

PART 5 - SUBMITTALS

5.1 General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Prior to submittal field verify existing doors and/or frames receiving new hardware and/or existing conditions receiving new openings. Verify new hardware is compatible with the existing door/frame preparation and/or existing conditions. Advise architect within the submittal package of incompatibility or issues.

5.2 Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.

5.3 Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:

1. Door Index; include door number, heading number, and Architects hardware set number.

2. Opening Lock Function Spreadsheet; list locking device and function for each opening.

3. Type, style, function, size, and finish of each hardware item.

4. Name and manufacturer of each item.

5. Fastenings and other pertinent information.

6. Location of each hardware set cross-referenced to indications on Drawings.

7. Explanation of all abbreviations, symbols, and codes contained in schedule.

8. Mounting locations for hardware.

9. Door and frame sizes and materials.

10. Name and phone number for the local manufacturer's representative for each product.

11. Operational Description of openings with any electrified hardware (locks, exits, electromagnetic locks, electric strikes, automatic operators, door position switches, magnetic holders or closer/holder units, and/or access control components). Operational description should include how the door will operate on egress, ingress, and/or fire/smoke alarm connection.

5.4 Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28 “Recommended Practices for Keying Systems” as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.

5.5 Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.

1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.

5.6 Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.

5.7 Operations and Maintenance Data: Provide in accordance with Division 1 and include the following:

1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.

2. Catalog pages for each product.

3. Name, address, and phone number of local representative for each manufacturer.

4. Parts list for each product.

5. Copy of final approved hardware schedule, edited to reflect "As installed."

6. Copy of final keying schedule.

7. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.

8. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.

5.8 Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

PART 6 - QUALITY ASSURANCE

6.1 Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 1 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.

6.2 Supplier Qualifications: A recognized architectural hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.

6.3 Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.

6.4 Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwrites Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

6.5 Electronic Security Hardware: When electrified hardware is included in the hardware specification, the hardware supplier must employ an individual knowledgeable in electrified components and systems, who is capable of producing wiring diagrams and consulting as needed. Coordinate installation of the electronic security hardware with the Architect and electrical engineers and provide installation and technical data to the Architect and other related subcontractors. Upon completion of electronic security hardware installation, inspect and verify that all components are working properly.

PART 7 - DELIVERY, STORAGE, AND HANDLING

7.1 Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.

7.2 Each article of hardware shall be individually packaged in manufacturer's original packaging.

7.3 Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

7.4 Items damaged in shipment shall be replaced promptly and with proper material and paid for by whomever did the damage or caused the damage to occur.

7.5 Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.

7.6 No direct shipments will be allowed unless approved by the Contractor.

PART 8 - WARRANTY

8.1 Provide manufacturer's warranties as specified in Division 1 and as follows:

1. Closers: 10 years.

2. Locksets: 3 years.

3. Other hardware: 1 year.

8.2 No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.

8.3 Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

PART 9 - MAINTENANCE

9.1 Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 10 - PRODUCTS

PART 11 - MANUFACTURERS

11.1 Approval of manufacturers other than those listed shall be in accordance with paragraph 1.05.A.

11.2 Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.

Item	Scheduled Manufacturer	Acceptable Substitute
Hinges	Ives (IVE)	Hager, Stanley
Pivots	Ives (IVE)	Dorma, Rixson
Locksets	Schlage (SCH)	Best, Sargent (SAR)
Door Closers	Falcon (FAL)	Norton, Stanley
Door Trim	Ives (IVE)	Burns, Rockwood
Protection Plates	Ives (IVE)	Burns, Rockwood
Overhead Stops	Glynn-Johnson (GLY)	Rixson, Sargent
Stops & Holders	Ives (IVE)	Burns, Rockwood
Gasketing	National Guard Products (NGP)	Reese, Zero
Silencers	Ives (IVE)	Burns, Rockwood
Cylinders & Keying	Schlage (SCH)	Best, Sargent
Flush Bolts Security Locks	Deltana (DELT) Southern Steel (SOU)	Rockwood
Institutional hinge Weatherstripping (var)	Southern Steel (SOU) Zero International (ZER)	
Transfer Hinge	McKinney (MCK)	
Wiring Harnesses	McKinney (MCK)	

11.3 Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.

11.4 Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

PART 12 - MATERIALS

12.1 Fasteners

1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.

2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.

3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in

other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.

4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

12.2 Hinges

1. Provide five-knuckle, ball bearing hinges of type, material, and height as outlined in the following guide for this specification:

   a. 1-3/4 inch thick doors, up to and including 36 inches wide:
   Interior: standard weight, steel, 4-1/2 inches high
   b. 1-3/4 inch thick doors over 36 inches wide:
   Interior: heavy weight, steel, 5 inches high

2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.

3. Where new hinges are specified for existing doors and/or existing frames, the new hinge size must be identical to hinge preparation present in the existing door and/or existing frame.

4. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:

   a. Steel Hinges: Steel pins
   b. Out-Swinging Interior Lockable Doors: Non-removable pins
   c. Interior Non-lockable Doors: Non-rising pins

5. The width of hinges shall be 4-1/2 inches at 1-3/4 inch thick doors, and 5 inches at 2 inches or thicker doors. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.

6. Acceptable manufacturers and/or products: Ives 5BB series, Hager BB series, Stanley FBB Series.

12.3 Pivot Sets

1. Provide pivot sets complete with oil-impregnated top pivot, unless indicated otherwise.

2. Where offset pivots are specified, Provide one intermediate pivot for doors less than 91 inches high and one additional intermediate pivot per leaf for each additional 30 inches in height or fraction there of. Intermediate pivots spaced equally not less than 25 inches or not more than 35 inches on center, for doors over 121 inches high.

3. Provide lead-lined model where pivot sets are specified at lead-lined doors.

4. Acceptable manufacturers and/or products: Ives, Dorma, Rixson.

12.4 Cylindrical Locks - Grade 2

1. Provide cylindrical locks conforming to ANSI A156.2 Series 4000, Grade 2. Cylinders: Refer to 2.04 KEYING.

2. Provide locks with a standard 2-3/4 inches backset, unless noted otherwise, with a 1/2 inch latch throw. Provide 2-3/8 inches backset where noted of if door or frame detail requires. Provide proper latch throw for UL listing at pairs.

3. Provide locksets with a separate anti-rotation throughbolts, and shall have no exposed screws. Levers shall operate independently, and shall have two external return spring cassettes mounted under roses to prevent lever sag.

4. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.

5. Lever trim shall be solid cast levers without plastic inserts, and wrought roses on both sides. Locksets shall be thru-bolted to assure proper alignment.

   a. Lever design shall be Schlage Jupiter.
   b. Lever trim on the secure side of doors serving rooms considered by the authority having jurisdiction to be hazardous shall have a tactile warning.

6. Acceptable manufacturers and/or products: Schlage AL series, Best 73K series, Sargent 7-Line.

12.5 Door Closers

1. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Closers shall be ISO 9000 certified. Units shall be stamped with date of manufacture code.

2. Door closers shall have fully hydraulic, full rack and pinion action with an aluminum cylinder. Closer body shall be 1-1/2 inch diameter, and heat-treated pinion journal shall be 11/16 inch diameter.

3. Provide hydraulic fluid requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to 10 degrees F. Fluid shall be fireproof and shall pass the requirements of the UL10C “positive pressure” fire test.

4. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Hydraulic regulation shall be by tamper-proof, non-critical valves. Closers shall have separate adjustment for latch speed, general speed, and backcheck.

5. Closers shall not incorporate Pressure Relief Valve (PRV) technology.

6. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.

7. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.

8. Door closers meeting this specification: Falcon SC70 series, Norton 7500 series, Stanley D-4550 series.

12.6 Door Trim

1. Provide push bars of solid bar stock, diameter and length as scheduled. Push bars shall be of sufficient length to span from center to center of each stile. Where required, mount back to back with pull.

2. Provide offset pulls of solid bar stock, diameter and length as scheduled. Where required, mount back to back with push bar.

3. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

12.7 Protection Plates

1. Provide kick plates, minimum of 0.050 inch thick as scheduled. Furnish with machine or wood screws, finished to match plates. Sizes of plates shall be as follows:

   a. Kick Plates – 10 inches high x 2 inches less width of door on single doors, 1 inch less width of door on pairs

2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

12.8 Overhead Stops

1. Provide heavy duty concealed mounted overhead stop as specified for exterior and interior vestibule single acting doors.

2. Acceptable manufacturers and/or products: Glynn-Johnson, Rixson, Sargent.

12.9 Door Stops and Holders

1. Provide door stops for all doors in accordance with the following requirements:

   a. Provide wall stops wherever possible. Provide convex type where mortise type locks are used and concave type where cylindrical type locks are used.
   b. Where wall stops cannot be used, provide dome type floor stops of the proper height.
   c. At any opening where a wall or floor stop cannot be used, a medium duty surface mounted overhead stop shall be used.

2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

12.10 Thresholds, Seals, Door Sweeps, Automatic Door Bottoms, and Gasketing

1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems (including smoke, sound, and light) as specified and per architectural details. Match finish of other items as closely as possible.

2. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.

3. Acceptable manufacturers and/or products: Reese, National Guard, Zero.

12.11 Silencers

1. Provide "Push-in" type silencers for each hollow metal or wood frame. Provide three for each single frame and two for each pair frame. Omit where gasketing is specified or required by code.

2. Acceptable manufacturers and/or products: Ives, Burns, Rockwood.

PART 13 - FINISHES

13.1 Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:

1. Pivots: US32D (BHMA 630).

2. Pulls, and Push Bars: US32D (BHMA 630).

3. Protection Plates: US32D (BHMA 630).

4. Overhead Stops: US32D (BHMA 630).

5. Door Closers: Powder Coat to Match.

6. Wall Stops: US32D (BHMA 630).

7. Flush Bolts: US32D (BHMA 630)

PART 14 - KEYING

14.1 Provide a new key system from the same manufacturer as the locks conforming to the following requirements:

1. Provide conventional cylinders at all keyed items.

2. Provide permanent cylinders keyed by the manufacturer or authorized distributor as directed by the Owner. Provide owner with a copy of the bitting list, return receipt requested.

3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware. Submit a keying schedule to Architect for approval.

4. Provide cylinders, unless noted otherwise, operated by a Master Key System to be established for this project. Allow for two-hundred changes under the master key. All cylinders shall be keyed in alike or different sets as noted by their respective key set number. Do not use the letter "I" or “O” in the master key set.

5. Provide keys as follows

   a. Ten master keys for each set.
   b. Three keys per cylinder.

6. Visual key control:

   a. Keys shall be stamped with their respective key set number and stamped “DO NOT DUPLICATE".
   b. Master keys shall be stamped with their respective key set letters.
   c. Do not stamp any keys with the factory key change number.

7. Deliver master keys, change keys, and/or key blanks from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.

8. Approved products: Schlage Classic, Best, Sargent.

PART 15 - EXECUTION

PART 16 - EXAMINATION

16.1 Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

PART 17 - INSTALLATION

17.1 Coordination:

1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training;

provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

17.2 Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.

17.3 Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.

17.4 Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.

17.5 Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.

17.6 Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.

17.7 Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

17.8 Existing Doors and/or Frames: Remove existing hardware being replaced, tag, and store according to contract documents. Field modify and prepare existing door and/or frame for new hardware being installed. Provide necessary fillers, Dutchmen, reinforcements, and fasteners for mounting new hardware and to cover existing door/frame preps.

PART 18 - ADJUSTING, CLEANING, AND DEMONSTRATING

18.1 Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.

18.2 Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

18.3 Clean adjacent surfaces soiled by hardware installation.

18.4 Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

PART 19 - FIELD QUALITY CONTROL

19.1 Prior to Substantial Completion, the installer, accompanied by representatives of the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:

1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.

2. Consult with and instruct Owner's personnel in recommended additions to the maintenance procedures.

3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.

4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.

5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner's personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

PART 20 - PROTECTION

20.1 Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

PART 21 - HARDWARE SCHEDULE

21.1 Provide hardware for each door to comply with requirements of Section "Finish Hardware," hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.

21.2 It is intended that the following schedule includes complete items of finish hardware necessary to complete the work. If a discrepancy is found in the schedule, such as a missing item, improper hardware for a frame, door or fire codes, the preamble will be the deciding document.

21.3 Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

21.4 Hardware Sets

Hardware Group No. 01 (SINGLE WITH PASSAGE SET)

For use on mark #(s):
MUNICIAPL INSPECTIONS 1

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	PASSAGE SET	AL10S JUP	626	SCH
1	EA	STOP	WS407/FS436 AS SPECIFIED	626	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

Hardware Group No. 02 (SINGLE WITH PRIVACY SET X CLOSER X INSWING)

For use on mark #(s):
BATHROOMS

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	PRIVACY LOCK	AL40S JUP	626	SCH
1	EA	SURFACE CLOSER	SC71 RW/PA	689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS407/FS436 AS SPECIFIED	626	IVE
1	EA	SEALS	5020	BRN	NGP

Hardware Group No. 03 (INTERIOR WOOD PAIR WITH LOCKSET)

For use on mark #(s):
CLOSET

Qty		Description	Catalog Number	Finish	Mfr
6	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	CLASSROOM LOCK	AL70PD JUP	626	SCH
2	EA	FLUSH BOLT	6FBS32D	630	DELT
2	EA	STOP	WS407/FS436 AS SPECIFIED	626	IVE
6	EA	SILENCER	SR64-1	GRY	IVE

Hardware Group No. 05 (SINGLE WITH CLASSROOM LOCKSET)

For use on mark #(s):
OFFICES D; UTILITY B

Qty		Description	Catalog Number	Finish	Mfr
3	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	CLASSROOM LOCK	AL70PD JUP	626	SCH
1	EA	STOP	WS407/FS436 AS SPECIFIED	626	IVE
3	EA	SILENCER	SR64-1	GRY	IVE

Hardware Group No. 06 - (EXTERIOR SINGLE 2” THICK DETENTION HOLLOW METAL DOOR)

For use on mark#: CID7, TRAFFIC 1

Provide each SGL door(s) with the following:

3	EA	INSTITUTIONAL HINGE	204FMSS	630	SOU
1	EA	ELEC. MORTISE LOCK	8217 FREEWHEELING OPTION	626	SAR
1	Ea	4.5X4.5 QC8 TRANS HINGE	TA2714	626	MCK
1	EA	DOOR HARNESS	QC-300		MCK
1	EA	FRAME HARNESS	1500P		MCK
1	EA	OVERHEAD STOP	SURFACE HEAVY DUTY 90S SERIES	630	GLY
1	EA	SURFACE CLOSER	SC70FA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	DRIP CAP	142A	AL	ZER
1	EA	SEALS	429A	AL	ZER
1	EA	DOOR SWEEP	8198AA	AL	ZER
1	EA	THRESHOLD	8655A (VERIFY JAMB DEPTH)	AL	ZER
1	EA	DOOR CONTACT	BY SECURITY VENDOR		SCE

ALL WIRING AND CONNECTIONS BY ELECTRICAL SUB BIDDER.
OPERATIONAL DESCRIPTION:
DOOR CONTACT CONNECTED TO BUILDING'S SECURITY SYSTEM.

Hardware Group No. 07 - (INTERIOR SINGLE 2” THICK DETENTION HOLLOW METAL DOOR)

For use on mark#: CID5

Provide each SGL door(s) with the following:

3	EA	INSTITUTIONAL HINGE	204FMSS	630	SOU
1	EA	ELEC. MORTISE LOCK	8217 FREEWHEELING OPTION	626	SAR
1	EA	4.5X4.5 QC8 TRANS HINGE	TA2714	626	MCK
1	EA	DOOR HARNESS	QC-300		MCK
1	EA	FRAME HARNESS	QC 1500P		MCK
1	EA	SURFACE CLOSER	SC70FA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS407	630	IVE
1	SET	SEALS	488S		ZER

ALL WIRING AND CONNECTIONS BY ELECTRICAL SUB BIDDER.
OPERATIONAL DESCRIPTION:
DOOR CONTACT CONNECTED TO BUILDING'S SECURITY SYSTEM.

Hardware Group No. 08 - (INTERIOR WOOD DOOR HALF GLASS)

For use on mark#: CORRIDOR 1-D

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 SERIES AS SPECIFIED	652	IVE
1	EA	ELEC. MORTISE LOCK	8217	626	SAR
1	EA	4.5X4.5 QC8 TRANS HINGE	TA2714	626	MCK
1	EA	DOOR HARNESS	QC-300		MCK
1	EA	FRAME HARNESS	QC 1500P		MCK
1	EA	SURFACE CLOSER	SC70FA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS407	630	IVE

Hardware Group No. 09 – (EXTERIOR GLAZED ALUMINUM FRAMED)

For use on mark#: A

Provide each SGL door(s) with the following:

3	EA	HINGE	5BB1 SERIES NON-REM PIN	652	IVE
1	EA	ELEC. MORTISE LOCK	8217	626	SAR
1	EA	4.5X4.5 QC8 TRANS HINGE	TA2714	626	MCK
1	EA	DOOR HARNESS	QC-300		MCK
1	EA	FRAME HARNESS	QC 1500P		MCK
1	EA	SURFACE CLOSER	SC70FA	689	LCN
1	EA	KICK PLATE	8400 10" X 2" LDW	630	IVE
1	EA	STOP	WS407	630	IVE
1	EA	THRESHOLD	BY ALUMINUM DOOR SUPPLIER		

END OF SECTION

APPENDIX A

HVAC DESIGN GUIDELINES

Build Out of Building 45

Beverly, MA 01915

October 26, 2015

Build Out of Building 45
Beverly, MA 01915
HVAC DESIGN GUIDELINES

I. INTRODUCTION

The purpose of these design guidelines is to present consistent criteria for design issues typically encountered in commercial office buildings. The criteria have been developed to provide the basis for an acceptable system for the project. This document is not all-inclusive and is not intended to cover all requirements necessary to provide a fully operational, efficient and durable system. Where specific design or equipment criteria is in question and is not included in this document, it is the responsibility of the design-build consultant/contractor to discuss the situation with the Owner; a minimum of one mandatory design meeting will be held with the Owner prior to submittal of review documents. This review does not relieve the design-build consultant/contractor of responsibility for accurately determining capacities, loads, sizes and code compliance in order to meet program requirements.

II. UNACCEPTABLE SYSTEMS AND DESIGN PRACTICES

The following systems and design practices are not acceptable for use on the project unless the application for these systems has been discussed with the Owner and prior approval has been received in writing from the Owner and/or architect.

A. Rooftop air handling systems
B. Outdoor air-cooled chillers
C. Electric heat of any type
D. Two-pipe heating/cooling systems
E. Unit ventilators
F. Window air conditioning units
G. Package terminal air conditioner (PTAC) units
H. Electric control systems
I. Duct liner except fiber-free, closed cell elastomeric products.
J. Fiberboard ductwork
K. Direct buried underground ductwork.
L. Use of chase or shaft wall construction for air ducting or plenums. Air must be ducted within shafts
M. Air conditioning mechanical rooms and primary electrical rooms.
N. Locating supply, return and/or transfer ductwork in unauthorized spaces
O. Locating HVAC heating and/or cooling equipment in unauthorized spaces.

II. SYSTEM COMPONENTS

A. Piping Systems, Valves and Accessories:

1. Connect closed hot water system make up to the domestic soft water system where available. All piping systems shall be of compatible materials

B. Ductwork Systems and Duct Accessories:

1. Fiberboard ductwork is not allowed on the project.
2. Building chases, shafts, tunnels and mechanical rooms shall not be used as supply or return air plenums. Air shall be ducted within these spaces. This criteria is not meant to prohibit the use of ceiling return air plenums.
3. Where return air ceiling plenums are used:

a. Return air plenums shall not be used where above ceiling construction has spray-on cellulose or mineral fiber fireproofing or exposed fiberglass building insulation.
b. Coordinate fire and smoke rating of all components and insulation above the ceiling to meet plenum rating with the General Contractor.
c. Collect return air at multiple central locations to avoid severe short circuiting of air from large floor areas with single point return.
d. Provide transfer openings to allow plenum air to transfer freely. Provide smoke and fire dampers in transfer openings where required by partition rating.

4. Duct systems shall be designed using radius elbows without turning vanes wherever possible. Branch takeoffs shall be designed with conical fittings or 45 degree entry taps.
5. Flexible duct is allowed at connections to supply diffusers and grilles. Maximum length of flexible duct is limited to 5 feet.
6. Manual balance dampers shall be shown at each major branch takeoff and at run outs to diffusers and grilles of supply, return and exhaust ductwork. Locate balance dampers back from diffusers and grilles as far as possible to reduce damper generated noise. Avoid the use of registers in grilles wherever possible.
7. Transfer ducts shall be sized for a duct velocity of 300-500 fpm.
8. All duct systems shall be sealed and pressure tested per industry standards.
9. Design and size ductwork systems using SMACNA and ASHRAE criteria for velocities and fitting losses. Do not oversize ductwork unnecessarily to avoid performing sound calculations. Duct layouts should be optimized to minimize static pressure.
10. All outside air intake louvers should be located at the highest level possible.
11. Arrange intake louvers and associated duct connections to get even air velocities across entire louver area. Design louvers for the following maximum free area velocities
    a. 350 fpm for intake louvers on systems with over 75% minimum outside air.
    b. 450 fpm for intake louvers on constant volume systems with outside air economizer.
    c. 500 fpm for intake louvers on variable air volume systems with outside air economizer.
    d. Size relief and exhaust louvers for a reasonable pressure drop.
12. Snow intake must be considered when locating and designing outside air intakes. For high percentage outside air systems, provide large protective enclosures to shield the intake from snow and allow snow to drop out of the air before entering the air handler intake.
13. Provide duct pressure relief doors on VAV duct systems to protect ductwork from damage during control malfunctions. Design relief or provide additional relief from mechanical spaces to prevent mechanical spaces from being over pressurized

C. Insulation:

1. Internal duct lining is allowed only in the following locations:
    a. Five feet immediately downstream of air terminal unit booster coils.
    b. Transfer ducts.
    c. Downstream of air handling unit discharge where required for acoustical purposes. Duct shall be dual wall - internal lined with perforated sheet metal exposed to air stream.
    d. In return air ducts upstream of air handling units where required for acoustical purposes. Note - air handling unit coils must be protected by filters.
2. Pipe insulation shall be complete, continuous without gaps of any kind, and shall be of elastomeric (rubber) material or fiberglass with reinforced cover with the highest R-value available. Use all available accessories to provide a complete insulation system, including but not limited to pre-formed shapes for elbows, valves and tees.

D. Vibration and Sound Control:

1. In general, follow an industry standard vibration isolation schedule for isolation types used for specific equipment. Where manufacturer's recommendations differ from the schedule, specify the manufacturer's isolation for the application.
2. Sound calculations are expected to be performed for all major sound producing equipment and air terminal units.

3. Use ASHRAE sound criteria for space NC levels.
4. Consider all sound paths when performing ductwork sound calculations: radiated, duct transmitted, duct breakout, etc.

III. EQUIPMENT

A. General

1. The system shall have a minimum of three zones, each served by a separate air handler. All air handlers shall be located in the utility room unless the consultant/contractor's design cannot be accomplished with this stipulation. If air handling equipment must be located in the attic, the HVAC contractor shall provide and install all mounting hardware, flooring, temporary access, registers, hardware and finish items and other logistical requirements to accommodate their design.
2. All hangers, accessories, fasteners and other items necessary to provide a complete and functioning HVAC system shall be provided by the HVAC contractor.

B. Air Conditioning Equipment

1. Cooling equipment shall have air cooled condensers. Utilize high-efficiency fans, and do not locate condensing units below glazed openings or within 20'-0" of doorways. Provide protection from falling ice and weather run-off.
2. Split system air cooled condensing units with DX air handling unit coils shall be used.
3. Minimum SEER rating of condensing units shall be 13.

C. Heating Equipment

1. Heating system shall be high efficiency 95%+ AFUE gas fired condensing hot water boiler and high efficiency electronic controls and ignition, direct vent, and sealed combustion. Acceptable manufacturers include Peerless, Lochinvar and Weil McLain.
2. Venting and condensate management shall be high grade stainless steel. Condensate shall be piped to a location approved by the Owner.
3. Heating coils shall be as described under Heating and Cooling Coils.

C. Unitary Equipment

1. In general, the following types of unitary equipment are not acceptable for use on the project:
   a. Package thru-the-wall air conditioners (PTACs).
   b. Fan coil units used as the primary heating and/or cooling system.

D. Air Handling Equipment

1. Air handling equipment used on the project shall be indoor type. Air handling systems and make-up air units manufactured for outside and/or rooftop installation are not allowed.
2. Air handling equipment Basis of Design is First Company VMB series air handler with programmable, variable speed fan motors, and all standard equipment. Condensate pans with float switches shall be installed, and piped to a location approved by the Owner.
3. Design must allow adequate space for proper design of outside air and return air mixing. This includes space required for air blending devices that should be employed to prevent stratification where ideal mixing cannot be accomplished with ducting arrangement alone. Packaged mixing boxes from AHU manufacturers do not provide adequate mixing on their own. The importance of this criteria cannot be overemphasized since cold air stratification is a leading cause of frozen coils and nuisance low-limit freeze protection trips. The preferred method is to connect outside air and return ducts together prior to the AHU so mixing occurs in the mixed air duct prior to the AHU.

E. Heating and Cooling Coils

1. Water coil selection shall meet ARI requirements including a minimum water tube velocity of 3 feet per second at design conditions.

2. Cooling coils shall be sized for a maximum of 550 fpm air velocity for vav return air systems, and 400 fpm on systems with over 75% minimum outside air.
3. The desired maximum fins is 8 fins per inch. If more than two rows are required to meet heating loads on heating coils or if more than 8 rows are required to meet the cooling load on cooling coils, then the fins may be increased up to a maximum of 12 fins per inch as needed to keep the rows at 2 for heating 8 for cooling.
4. Air Handling Unit Preheat Coils:
   a. Where coil entering air temperatures are below freezing, a hot water face and bypass or pumped coil shall be used.
   b. All face and bypass coils shall include a two-way control valve to modulate hot water when outside air temperatures are above 40 degrees F. Below 40 degrees F, the control valve will be fully open and the face and bypass shall provide the temperature control.
5. Direct expansion cooling coils, where allowed by Owner, shall be sized for a minimum air velocity of 350 fpm.
6. The minimum acceptable reheat coil size is 8 inches x 8 inches.

F. Filtration Equipment

1. Specify air filtration equipment in accordance the following guidelines and discuss with Owner.
   a. Filtration efficiency for air handling systems serving occupied spaces should not be less than 30% dust spot efficiency per ASHRAE 52.
   b. Filtration for ventilation systems serving mechanical spaces or unoccupied areas may have efficiencies less than 30%.
2. Provide 1" thick throw away filters on intake air where outside air is used to ventilate utility and similar spaces (to prevent entry of insects).

G. Air Terminal Units

1. Size air terminal units for maximum and minimum airflows and inlet static pressures that are within the controllable range of the velocity reset controller.
2. Reheat coils shall be mounted separately from air terminal units with a 12-18" section of discharge duct or vav box extension between the air terminal unit and the reheat coil. Provide duct access panels adequately sized for inspection and cleaning of coil in ductwork upstream and downstream of coil. Where necessary, detail or specify multiple access panels for larger size reheat coils.
3. The minimum acceptable reheat coil size is 8 inches x 8 inches.
4. Dual duct and fan powered air terminal units are not allowed without Owner approval.

IV. LOAD CALCULATIONS AND VENTILATION GUIDELINES

A. Load Calculations

1. Prior to starting load calculations, obtain the anticipated building envelope configuration and materials from the architect and obtain the anticipated lighting design or density from the lighting designer. Continue to provide feedback to architect and electrical engineer on issues that impact cooling and heating loads.

2. Use the following indoor design conditions for cooling and heating load calculations:
   -Winter indoor 68 deg F
   -Summer indoor 76 deg F

Review winter humidification requirements with the Owner on a case by case basis. If the building program requires space conditions other than indicated above, then review requirements with Owner.

B. Ventilation

1. Provide design ventilation rates in compliance with AHRAE 62.1.
   Ventilation rates shall be 7.5 cfm per person.

   For all applications, utilize occupancy sensing and/or occupancy level indexing strategies to reduce the outside air ventilation at times when spaces are partially occupied or vacant.

V. SPECIAL SYSTEM DESIGN GUIDELINES

A. Variable Air Volume Systems

1. Variable Air Volume air handling systems shall be designed with a minimum outside air duct/control damper and a maximum (economizer) outside air duct/control damper. The minimum outside air duct shall be sized for the minimum system outside air cfm and shall be provided with an air flow measuring device for verifying outside air flow rate. Air handling unit controls shall be employed to sequence the outside air damper and return dampers to maintain the minimum outside air flow rate.

VII. GENERAL REQUIREMENTS

A. All details and equipment schedules that shall be utilized on the project shall be reviewed by the Owner prior to procurement and installation. Pipe drawing standards: On ¼" scale drawings show all piping 4" and above double line. On 1/8" scale drawings show all piping 8" and above double line.

B. Three (3) complete sets of operation and maintenance manuals shall be provided to the owner at close out.

C. Complete layout, piping and equipment specifications shall be submitted for review and approval prior to procurement.

VIII. GENERAL SPECIFICATION REQUIREMENTS

A. Utilize Master Specifications format for the project. Submit 50% review specifications to the Owner and Architect and allow a minimum of three days for review.

B. Provide Owner with all relevant energy rebate materials, and assist Owner in procuring the greatest and most comprehensive rebates available.

END OF HVAC DESIGN GUIDELINES