



To: General Contractors
From: Greg Shinberg, Project Manager
Re: 645 Congress Addendum # 1
Date: June 09, 2009

The following plans have been revised and are attached:

1. Sheets 1,2,3 and 4 by Mitchell Associates
2. Sheets C1, C2, C3.1, C3.2, and C4 by Casco Bay Engineering
3. Sheets S2.1, S3.3, S4.1, S5.0, S5.4, S5.5 and S5.7 by Price Engineering
4. Sheets A1.00 and A1.01 by CWS Architects
5. Sheets F1, F2, F3 and F4 by Shinberg Consulting

The following plans have been added:

1. Sheets MP1.0, MP1.1, MP1.2, MP1.3, MP1.4, MP1.5 and MP1.6 by Zade Company
2. Sheet PF1 by Shinberg Consulting

The following 8.5" x 11" Sheets have been added:

1. A-S Addendum 01 by CWS Architects
2. Detail Sheets 1-4 by Mitchell Associates
3. Section 15400 1 to 18 Plumbing by Zade Company
4. Section 15500 1 to 30 Fire Protection by Zade Company
5. Section 15500 1 to 30 HVAC by Zade Company

The following are clarifications:

1. It shall be the responsibility of the GC to retain a licensed structural engineer for the design of temporary shoring and bracing. Currently the drawings make reference to this using the phrase "as necessary". Contractor shall not remove or destabilize existing load bearing walls, columns or other load bearing components until the contractor has obtained a stamped Temporary Shoring and Bracing Plan with details, prepared by a structural engineer currently licensed in Maine and retained directly by the contractor. A current copy of the Temporary Shoring and Bracing Plan shall be kept at the jobsite trailer throughout construction and shall be made available to the owner's representative upon request.
2. The old gas boiler and piping associated with same in Mechanical 012 shall be removed by the Owner;
3. The old heat piping in Corridor 016 at the ceiling shall be removed by Owner;
4. The countertops noted in the finish schedule to be Postform 290 standard finish;
5. All bath vanities to be 31" tall and 21" deep;
6. The renovations to Units 405, 406 and 407 were started by Owner. GC to finish units 405 and 406. Owner to complete all the work in unit 407 except the heating and cooling unit to be completed by GC;
7. All fire stopping and penetrations related to electrical work to be the responsibility of the electrician; All holes created by the electrician in any drywall and plaster to be fixed as on a time and material basis with the GC to be negotiated later;
8. Note that in Section 15400-2 # 3 the roof is to remain and no horizontal drain piping is to installed;
9. Note that in Section 15400 -2 # 19 if needed a sump pump to be added that is a Zoeller 20 GPM or equal.

The bid form is amended as noted below.

The proposal must be submitted to Greg Shinberg, Shinberg Consulting, LLC and made to the attention of:

Bayside Maine, LLC
477 Congress Street, Suite 1012
Portland, Maine 04101

Attention: Greg Shinberg, Project Manager Shinberg Consulting, LLC

Name of firm submitting this proposal _____

1. General Requirements:	\$	_____
2. Sitework:	\$	_____
3. Concrete:	\$	_____
4. Masonry:	\$	_____
5. Metals:	\$	_____
6. Wood & Plastic:	\$	_____
7. Thermal & Moisture:	\$	_____
8. Doors & Windows:	\$	_____
9. Finishes:	\$	_____
10. Specialties:	\$	_____
11. Equipment:	\$	_____
12. Furnishings:	\$	_____
13. Special Construction:	\$	_____
14. Conveying Systems:	\$	_____
21. Fire Suppression:	\$	_____
22. Plumbing:	\$	_____
23. HVAC:	\$	_____
31. Site Earthwork:	\$	_____
32. Exterior Improvements:	\$	_____
33. Utilites:	\$	_____
34. Bond	\$	_____

Note – not all columns must be filled in

TOTAL BID: \$ _____

Unit Prices: All work indicated in the construction documents shall be carried in the base bid. In the event changes in scope are requested or required, provide the following unit prices to be used in establishing price for revisions to the scope of work as defined below:

- | | | |
|--|-------|--------------------|
| 1. Removal of unsuitable soils to a place that is within 20 miles of site (dump fee by Owner): | _____ | \$ per cubic yd |
| 2. Structural fill in place: | _____ | \$ per cubic yd |
| 3. Masonry repointing: | _____ | \$ per square foot |
| 4. Soffit wall / ceiling corner: | _____ | \$ per lineal foot |
| 5. riser mid wall: | _____ | \$ per lineal foot |
| 6. 2 x 4 stud wall with 5/8" drywall, paint, 1x4 base both sides painted, 9' tall: | _____ | \$ per lineal foot |
| 7. Mark up % on subcontractors for extra work | _____ | % |

Alternate Prices:

1. Number 1: Complete Repointing of Exposed Masonry as noted in Section 1.13 C of the Basic Requirements. _____ TOTAL COST
2. Number 2: Removal and replacement of North and East and East Façade Windows as noted Section 1.13 C _____ TOTAL COST

Addenda: This proposal includes the following addenda to the Plans and Specifications:

Addendum #_____, dated _____

Addendum #_____, dated _____

Addendum #_____, dated _____

Addendum #_____, dated _____

Signed By: _____

Company: _____

Date: _____

If Bidder is a corporation, write State of Incorporation, and if a partnership, give full name of all partners in the spaces provided below:

A-S Addendum 01

Date: June 8, 2009

To: **Bidding General Contractors** and Registered Plan Holders
From: Ben Walter, CWS Architects
Project: **Renovations to 645 Congress Street** – Portland, Maine
Subject: **A-S Addendum 01**

This addendum applies **ONLY** to the project's **Architectural and Structural (A-S)** design scopes only to be bundled and published along with other addenda items by Shinberg Consulting. Refer to additional addenda information by other design trades published by Shinberg Consulting.

Modify the previously issued documents dated May 27, 2009 and any previously issued addenda, if applicable, as follows:

Bid and Contract Documents:

1. Make the following changes to the Index of Contract Documents:
 - a. Add 1.4 STATEMENT OF STRUCTURAL SPECIAL INSPECTIONS – PRICE (attached) to 00 30 00 INFORMATION AVAILABLE TO BIDDERS.
 - b. Change DOOR HARDWARE SCHEDULE – FLOORS 0 TO 1 to read “DOOR HARDWARE SCHEDULE”. Delete DOOR HARDWARE SCHEDULE – FLOORS 2 TO 6.
 - c. Delete the “(To Follow)” after each specification section issued in this addendum.
2. Delete ARTICLE 7 – CHANGES IN THE WORK in its entirety from the SUPPLEMENTAL GENERAL CONDITIONS. Refer to information provide by owner for additional information regarding markup procedures to be used for changes in the work.
3. Add 1.4 STATEMENT OF STRUCTURAL SPECIAL INSPECTIONS (attached) to Section 00 30 00 INFORMATION AVAILABLE TO BIDDERS.
4. Replace item 1.12. D under UNIT PRICING in Section 01 00 00 – Basic Requirements with the following: “New 9’ Tall Painted Wall with 1x4 Base Board Both Sides – Wall Type 2. Unit Price: Lineal Foot.”
5. Delete items 1.12.F.2, 3 & 4 under UNIT PRICING in Section 01 00 00 – Basic Requirements. Replace item 1.12. F.1 under UNIT PRICING in Section 01 00 00 – Basic Requirements with the following: “8 inch x 8 inch Maximum Size Vertical or Horizontal 5/8” Drywall Corner Soffit for the containment of piping, ductwork or electrical conduit. Include all required framing and painting. Unit Price: Lineal Foot.
6. Revise the title of 1.13 Alternates, C.1 Alternate No. 2 in 01 00 00 – Basic Requirements by Shinberg Consulting to read “**Alternate No. 2: Removal and Replacement of North and West Façade Windows**”.
7. Change the intent of 1.8 Testing and Inspections and 1.34 Testing and Inspection Laboratory Services in 01 00 00 Basic Requirements only so that the Owner is responsible for selecting, procuring, contracting and paying for the Basic Services of testing agencies. The Contractor shall remain responsible for all other components including but not limited to scheduling, coordination and costs associated with re-testing on non-conforming work.
8. Insert Plumbing Fixture Schedule (attached) by Shinberg Consulting at the end of Specification Division 22.
9. Insert Lighting Fixture Schedule (attached) by Shinberg Consulting at the end of Specification Division 26.

Structural Items:

10. Replace the following drawings originally published 5-27-2009 with the attached drawings marked ADDENDUM NO. 1 6/8/2009:

- a. S2.1 FOUNDATION PLANS,
- b. S3.3 MASONRY/CONCRETE FOUNDATION PLANS AND DETAILS,
- c. S4.1 FRAMING PLANS AND DETAILS,
- d. S5.0 REAR ENTRY PLAN AND TYPICAL DETAILS,
- e. S5.4 CONGRESS STREET BRACING ELEVATIONS,
- f. S5.5 CONGRESS STREET BRACING DETAILS,
- g. S5.7 STEEL FRAMING DETAILS.

11. Modify the following Structural Drawings dated 5/27/2009 as follows:

Drawing S1.0:

- a. **General Structural Note A3** – Add the following sentence to the end of note A3, “Contractor shall repair/ repoint existing brick walls if cracking in brick is noted after existing columns have been removed at grid A.”
- b. **Concrete Note C2** – add the following concrete description to the bottom of the table:

Location	f’c	Air Entrainment	Fibers	Max Water/Cement Ratio
Exterior slabs	4000	6% +/- 1.5%	1.5 lb/cy	.42

Drawing S1.1:

- c. **Structural Steel Note G11** – Replace note G11 to read as follows, “Except for welding to existing steel, electrodes for field and shop welding shall conform to E70- XX.
- d. **Structural Steel Note G17** – Replace note G17 to read as follows, “Minimum connection plate thickness and stiffener plate thickness shall be ¼-inch (UON).”
- e. **Structural Steel Note G26(h)** – Add the following subparagraph “h” to note G26: “h. Metal deck supporting exterior slabs shall be galvanized with G-90 coating.”
- f. Note J3 – Add the following to Note J3:
“i. Soil Site Class = B”

Drawing S2.0:

- g. **Plan E1/S2.0** –Revise note at east end of grid G.1 to read as follows: “Sawcut existing CMU wall and pin to new concrete wall in accordance with Detail D1/S3.0”.

Drawing S2.1:

- h. **Plan C1/S2.1** – Revise Plan C1 as specified on attached Drawing S2.1 dated 6/8/09.
- i. **Plan H1/S2.1** – Revise Plan H1 as specified on attached Drawing S2.1 dated 6/8/09. Revise section labeled C8/S3.3 shown at Grid 5.5 to be F5/S3.3.

Drawing S3.1:

- j. **Detail C4/S3.1** –Revise title of Detail C4 to be, “Type 5 Anchor Bolt”

Drawing S3.2:

- k. **Detail H5/S3.2** –Revise Detail H5 such that 1-inch diameter Type 1 anchor bolts are 3’-2” long with 6-inch projection.
- l. **Detail F1/S3.2** – Delete anchor bolt dimensions from detail.

Drawing S3.3:

- m. **Detail F8/S3.3** –Revise Detail F8 as specified on attached Drawing S3.3 dated 6/8/09.
- n. **Detail H8/S3.3** –Revise Detail H8 as specified on attached Drawing S3.3 dated 6/8/09.
- o. **Add Details C5, C8 ,D8, F1 ,F5, H1, H3 and H5** as specified on attached Drawing S3.3 dated 6/8/09.
- p. **Detail C5/S3.3** – Add Note 4 to read, "4. Adjust top of concrete slab elevation as necessary to accommodate brick pavers at sidewalk. New slab shall not be less than 5" thick."

Drawing S4.1:

- q. **Plan H1/S4.1** – Revise Plan H1 as specified on attached Drawing S4.1 dated 6/8/09.

Drawing S5.0:

- r. **Revise Details C1, D1, D3, D6, F1, F3, F5, F6, and F8** as specified on attached Drawing S5.0 dated 6/8/09.

Drawing S5.1:

- s. **Detail F5/S5.1** –Revise Detail F5 such that reference to "W6" is changed to "W8".
- t. **Detail H9/S5.1** –Revise Detail H9 such beam reaction is changed from "Xk" to "8k".
- u. **Detail F3/S5.1** –Revise Detail F3 such that reference to "Brick" is changed to "Masonry (Note 1)"
- v. **Detail F3/S5.1** –Revise Detail F3 by adding note 1 as follows: "Note 1: At CMU masonry fill a minimum of 4 cores below beam bearing with solid grout for a minimum of 5 feet below beam bearing UON".

Drawing S5.2:

- w. **Detail E7/S5.2** –Revise Elevation E7 such that reference to grid "A" is changed to grid "F.1" and reference to grid "B" is changed to grid "E.3".
- x. **Detail H7/S5.2** –Revise Plan H7 such that grid references are changed as follows:
 - change grid "A" to grid "F.1"
 - change grid "B" to grid "E.3"
 - change grid "1" to grid "11"
 - change grid "2" to grid "12"
 - change grid "3" to grid "13"
 - change grid "4" to grid "14"
 - change grid "5" to grid "15"
- y. **Detail H1/S5.2** –Revise Detail H1 such that reference to "Type 1 Baseplate" is changed to "Type BP8 Baseplate".

Drawing S5.4:

- z. **D1/S5.4** – Revise Bracing Elevation D1 as specified on attached Drawing S5.4 dated 6/8/09.
- aa. **D5/S5.4** – Revise Bracing Elevation D5 as specified on attached Drawing S5.4 dated 6/8/09.
- bb. **H5/S5.4** – Revise Bracing Elevation H5 as specified on attached Drawing S5.4 dated 6/8/09.

Drawing S5.5:

- cc. **Revise Details B4, E4, E7, E9, H1, H4, H7, and H9** as specified on attached Drawing S5.5 dated 6/8/09.

Drawing S5.6:

- dd. **Detail B9/S5.6** –Revise Detail B9 by deleting reference to anchor bolt detail "X/S5.4".
- ee. **Detail G3/S5.6** –Revise Detail G3 by adding note 2 as follows: "Note 2. At Detail labeled "SIM", extend gusset plate 1-inch above L4x4 double angle (see section B9/S5.6). GC field verify dimensions."
- ff. **Detail H10/S5.6** – Revise Detail H10 such that reference to "Type X Baseplate" is changed to "Type BP6 Baseplate".

Drawing S5.7:

- gg. **Delete Detail E8/S5.7**
- hh. **Add Column Schedule B1/S5.7** as specified on attached Drawing S5.7 dated 6/8/09.
- ii. **Add Details E1/S5.7, E3/S5.7, G1/S5.7, G3/S5.7, E1/S5.7, E1/S5.7,** as specified on attached Drawing S5.7 dated 6/8/09.
- jj. **Detail E3/S5.7** – Add the following note to Detail E3, "Bottom of Hold-Down Angles shall be at 6-inches above existing basement floor."

Architectural Items:

- 12. Replace the following drawings originally published 5-27-2009 with the attached drawings marked ADDENDUM NO. 1 6/8/2009:
 - a. A1.00 BASEMENT PLAN,
 - b. A1.01 FIRST FLOOR PLAN.
- 13. Replace the related drawing details with the details indicated in the following sketches marked ADDENDUM NO. 1 6/8/2009:

	<u>SKA No.</u>	<u>Affects</u>	<u>Description of Change</u>
a.	SKA-1.1	A1.03	THIRD FLOOR PLAN - 1 BEDROOM 305 - FIRE PLACE/EXTERIOR WALL FURRING
b.	SKA-1.2	A1.02	SECOND FLOOR PLAN - SRO 202 - KITCHEN RELOCATION
c.	SKA-1.3	A1.03	THIRD FLOOR PLAN - SRO 302 - KITCHEN RELOCATION
d.	SKA-1.4	A1.04	FOURTH FLOOR PLAN - SRO 402 - KITCHEN RELOCATION
e.	SKA-1.5	A1.05	FIFTH FLOOR PLAN - SRO 502 - KITCHEN RELOCATION
f.	SKA-1.6	A1.03	THIRD FLOOR PLAN - 1 BEDROOM 304 - KITCHEN RENOVATIONS
g.	SKA-1.7	A1.04	FOURTH FLOOR PLAN - 1 BEDROOM 404 - KITCHEN RENOVATIONS
h.	SKA-1.8	A1.05	FIFTH FLOOR PLAN - 1 BEDROOM 504 - KITCHEN RENOVATIONS
i.	SKA-1.9	D1.01	COLUMN REMOVAL INDICATORS ADDED
j.	SKA-1.10	A1.02-A1.6	FLOORS 2-6 LOCATION OF VERTICAL COMMON SPACE SUPPLY AND RETURN 2 HR RATED DUCTS
k.	SKA-1.11	A4.01	EXISTING AND NEW RATINGS COMMON WALLS AND FLOOR CEILINGS
l.	SKA-1.12	A1.01	BASEMENT CEILING AND FIRST FLOOR CEILING 2 HR RATING.
m.	SKA-1.13	A0.01	FLOOR CEILING ASSEMBLIES

- 14. Detail 11/A8.01 indicates a concrete foundation at the typical exterior storefront sill condition. Actual sill conditions vary. Refer to specific foundation conditions at each storefront location.
- 15. At all window replacements scheduled as ALTERNATE NO. 02 on the north and west facades of the existing building, provide an extruded aluminum filler extension scored and sealed to the existing masonry arched window head opening.
- 16. Change it 1.5.A in 09 30 10 – Exterior Wall Tile to read "Porcelain wall tile and accessories installed as specified herein". Delete "Note to Specifier: The above... etc."
- 17. Replace DOOR SCHEDULE and DOOR HARDWARE SCHEDULE published in Division 8 with the attached DOOR SCHEDULE and DOOR HARDWARE SCHEDULE marked "Revised: Addendum 01,

08 June 2009". Add the attached DOOR AND HARDWARE NOTES marked "Issued: Addendum 01, 08 June 2009".

18. Provide waterproof membrane on new decks and below brick pavers that extend over basement areas in at the south side (Congress Street) sidewalk locations. Overlap adjacent vertical surfaces (above and below) 8" to provide sealed joints. Refer to structural detail H1 on drawing S2.1 and details C5, C8 and F8 on drawing S3.3 for location and extent of brick sidewalks covered basement areas.
19. Strip, prep and paint all existing CMU and Steel surfaces to remain located generally below the second floor level and generally located in on the north side of the building as per 09 90 00 - Painting. Fill and seal existing façade cracks prior to finishing.
20. Add the following to 3.6 SCHEDULE – EXTERIOR SURFACES in 09 90 00 – Painting:

CMU	Satin	Primer / Filler	ICI 4000 Blox-Fil Interior / Exterior Heavy Duty Acrylic Block Filler	1
			ICI 2402 Dulux Professional Exterior 100% Acrylic Satin Finish	2

21. Refer to MP series drawings for location and extent of Corridor Supply and Return vertical ductwork. Provide 2-Hour USG Shaftwall (or equal) shaft enclosures at these vertical shaft locations.

End of A-S Addendum 01

Attachments: (See attached documents, specifications, sketches and drawings listed above, if applicable)

Statement of Structural Special Inspections

Project: *Renovations to 645 Congress Street*
Location: *645 Congress Street; Portland Maine*
Owner: *Bayside Maine, LLC*

Structural Design Professional in Responsible Charge: *David A. Price, PE*

This *Statement of Structural Special Inspections* is submitted as a condition for permit issuance in accordance with the Special Inspection and Structural Testing requirements of the Building Code. It includes a schedule of Structural Special Inspection services applicable to this project as well as the name of the Structural Special Inspection Coordinator and the identity of other approved agencies to be retained for conducting these inspections and tests. This *Statement of Structural Special Inspections* encompass the following disciplines:

Structural Mechanical/Electrical/Plumbing
 Architectural Other: _____

The Structural Special Inspection Coordinator shall keep records of inspections and shall furnish inspection reports to the Building Official and the Registered Design Professional in Responsible Charge. Discovered discrepancies shall be brought to the immediate attention of the Contractor for correction. If such discrepancies are not corrected, the discrepancies shall be brought to the attention of the Building Official and the Registered Structural Design Professional in Responsible Charge. The Special Inspection program does not relieve the Contractor of his or her responsibilities.

Interim reports shall be submitted to the Building Official and the Registered Structural Design Professional in Responsible Charge.

A *Final Report of Structural Special Inspections* documenting completion of required inspections, testing and correction of discrepancies noted in the inspections shall be submitted prior to issuance of a Certificate of Use and Occupancy.

Job site safety and means and methods of construction are solely the responsibility of the Contractor.

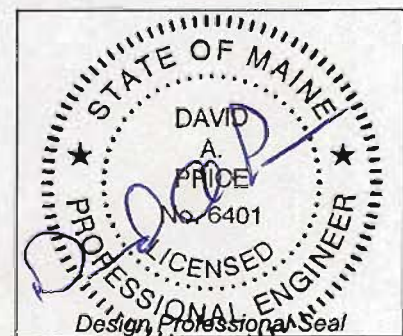
Interim Report Frequency: *As requested by building official* or per attached schedule.

Prepared by:
David A. Price, PE

(type or print name)

David A. Price
Signature

June 2009
Date



Owner's Authorization:

Building Official's Acceptance:

Signature

Date

Signature

Date

Schedule of Structural Inspection and Testing Agencies

This Statement of Special Inspections / Quality Assurance Plan includes the following building systems:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Soils and Foundations | <input type="checkbox"/> Spray Fire Resistant Material |
| <input checked="" type="checkbox"/> Cast-in-Place Concrete | <input checked="" type="checkbox"/> Wood Construction |
| <input type="checkbox"/> Precast Concrete | <input type="checkbox"/> Exterior Insulation and Finish System |
| <input checked="" type="checkbox"/> Masonry | <input type="checkbox"/> Mechanical & Electrical Systems |
| <input checked="" type="checkbox"/> Structural Steel | <input type="checkbox"/> Architectural Systems |
| <input type="checkbox"/> Cold-Formed Steel Framing | <input type="checkbox"/> Special Cases |

Special Inspection Agencies	Firm	Address, Telephone, e-mail
1. Structural Special Inspector	<i>Price Structural Engineers, Inc.</i>	<i>75 Farms Edge Road North Yarmouth, ME 04097 Tel : (207) 846-0099</i>
2. Inspection / Testing	<i>S.W. Cole Engineering</i>	<i>286 Portland Road Gray, ME 04039 Tel : (207) 657.2866</i>
3. Inspection / Testing	<i>Quality Assurance Labs Inc.</i>	<i>80 Pleasant Ave. South Portland, ME 04106 Tel : (207) 799-8911</i>

Note: The inspectors and testing agencies shall be engaged by the Owner or the Owner's Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the Building Official, prior to commencing work.

Quality Assurance Plan

Quality Assurance for Seismic Resistance

Seismic Design Category	B
Quality Assurance Plan Required (Y/N)	No

Description of seismic force resisting system and designated seismic systems:

The main building structure is braced using existing solid brick exterior shearwalls and existing plaster interior shear walls on existing wood framing. Shear walls occur in each orthogonal direction. The existing building is constructed with cast iron columns, steel beams, wood framed joists and a wood diaphragm. New structural steel braced frames are added at the ground floor level only, at the south wall only. A new concrete masonry shear-wall will be constructed in the basement below the new braced frame at the east end of the building.

Inspections and tests for the seismic resisting components are as indicated within the attached schedule and summarized as follows:

- 1. Test compaction of foundation backfill below shearwalls.*
- 2. Visually inspect reinforcement and test concrete at concrete foundations.*
- 3. Visually Inspect reinforcement and test masonry at masonry shear walls.*
- 4. Visually inspect structural steel member sizes, welding and bolting at structural steel framing.*
- 5. Visually inspect fastener spacing and supports at wood framed areas adjacent to new steel bracing.*
- 6. Visually inspect adhesive anchors at existing brick piers*

Quality Assurance for Wind Requirements

Basic Wind Speed (3 second gust)	100 mph
Wind Exposure Category	C
Quality Assurance Plan Required (Y/N)	Yes

Description of wind force resisting system and designated wind resisting components:

The main building structure is braced using existing solid brick exterior shearwalls and existing plaster interior shear walls on existing wood framing. Shear walls occur in each orthogonal direction. New structural steel braced frames are added at the ground floor level only, at the south wall only. A new concrete masonry shear-wall will be constructed in the basement below the new braced frame at the east end of the building.

Inspections and tests for the wind resisting components are as indicated within the attached schedule and summarized as follows:

- 1. Test compaction of foundation backfill below shearwalls.*
- 2. Visually inspect reinforcement and test concrete at concrete foundations.*
- 3. Visually Inspect reinforcement and test masonry at masonry shear walls.*
- 4. Visually inspect structural steel member sizes, welding and bolting at structural steel framing.*
- 5. Visually inspect fastener spacing and supports at wood framed areas adjacent to new steel bracing.*
- 6. Visually inspect adhesive anchors at existing brick piers*

Qualifications of Inspectors and Testing Technicians

The qualifications of all personnel performing Special Inspection and testing activities are subject to the approval of the Building Official. The credentials of all Inspectors and testing technicians shall be provided if requested.

Key for Minimum Qualifications of Inspection Agents:

When the Registered Design Professional in Responsible Charge deems it appropriate that the individual performing a stipulated test or inspection have a specific certification or license as indicated below, such designation shall appear below the *Agency Number* on the Schedule.

PE/SE	Structural Engineer – a licensed SE or PE specializing in the design of building structures
PE/GE	Geotechnical Engineer – a licensed PE specializing in soil mechanics and foundations
EIT	Engineer-In-Training – a graduate engineer who has passed the Fundamentals of Engineering examination

American Concrete Institute (ACI) Certification

ACI-CFTT	Concrete Field Testing Technician – Grade 1
ACI-CCI	Concrete Construction Inspector
ACI-LTT	Laboratory Testing Technician – Grade 1&2
ACI-STT	Strength Testing Technician

American Welding Society (AWS) Certification

AWS-CWI	Certified Welding Inspector
AWS – ACWI	Associate Certified Welding Inspector
AWS/AISC-SSI	Certified Structural Steel Inspector

American Society of Non-Destructive Testing (ASNT) Certification

ASNT	Non-Destructive Testing Technician – Level II or III.
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International Code Council (ICC) Certification

ICC-SMSI	Structural Masonry Special Inspector
ICC-SWSI	Structural Steel and Welding Special Inspector
ICC-SFSI	Spray-Applied Fireproofing Special Inspector
ICC-PCSI	Prestressed Concrete Special Inspector
ICC-RCSI	Reinforced Concrete Special Inspector

National Institute for Certification in Engineering Technologies (NICET)

NICET-CT	Concrete Technician – Levels I, II, III & IV
NICET-ST	Soils Technician - Levels I, II, III & IV
NICET-GET	Geotechnical Engineering Technician - Levels I, II, III & IV

Soils and Foundations

Note: Where "periodic inspections" are performed and deficient items are located, additional inspections shall be performed so that extent of deficient areas can be determined and corrected.

Item	Agency # (Qualif.)	Scope
1. Shallow Foundations	Agency #2 (PE/GE or Qualified Technician supervised by PE/GE)	<p><i>Inspect soils below footings for adequate bearing capacity and consistency with geotechnical report.</i></p> <p><i>Inspect removal of unsuitable material and preparation of subgrade prior to placement of controlled fill</i></p>
2. Structural Fill	Agency #2 (PE/GE or Qualified Technician supervised by PE/GE)	<p><i>Verify material properties of crushed stone and structural fill adjacent to foundations and below footings</i></p> <p><i>Inspect placement, lift thickness and compaction of structural fill.</i></p> <p><i>Test density of each lift of fill by nuclear methods (ASTM D2922). Perform sieve tests (ASTM D422 & D1140) and modified Proctor tests (ASTM D1557 adjacent to foundations and below footings.</i></p> <p><i>Verify extent and slope of fill placement.</i></p>

Cast-in-Place Concrete

Note: Where "periodic inspections" are performed and deficient items are located, additional inspections shall be performed so that extent of deficient areas can be determined and corrected.

Item	Agency # (Qualif.)	Scope
1. (a) Mix Design – Before Construction (b) Reinforcement Submittal	Agency #1 (PE/SE)	Review cement certificate of compliance as part of mix design submittal review. Review steel reinforcement submittal
2. Concrete Mix – During Construction	Agency #2 (ACI-CCI)	Review concrete batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.
3. Reinforcement Installation	Agency #2 (ACI- CCI)	Inspect size, spacing, cover, positioning and grade of all reinforcing steel, including dowels for masonry walls. Reinforcement shall conform to stamped structural drawings in addition to what is indicated on reinforcement shop drawings. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar laps and mechanical splices. Verify that bars are adequately tied and supported on chairs or bolsters
4. Formwork	Agency #2 (ACI- CCI)	Inspect formwork dimensions for compliance with foundation drawings. Verify that formwork does not contain debris or ice. Verify foundation wall control joint bondouts conform to G2/S3.0
5. Anchor Rods & Anchor Bolts & Adhesive Anchors	Agency #2 (ACI- CCI)	Inspect size, positioning and embedment of anchor rods/bolts and reinforcement anchorage dowels Inspect concrete placement and consolidation around anchors
6. Concrete Placement	Agency #2 (ACI- CCI)	Inspect placement of concrete. Verify that concrete conveyance and depositing avoids segregation or contamination. Verify that concrete is properly consolidated.
7. Sampling and Testing of Concrete	Agency #2 (ACI- CFTT)	Test concrete compressive strength (ASTM C31 & C39), slump (ASTM C143), air-content (ASTM C231 or C173) and temperature (ASTM C1064).
8. Curing and Protection	Agency #2 (ACI- CCI)	Inspect curing, cold weather protection and hot weather protection procedures.
9. Beam Pockets (F1/S5.2)	Agency #2 (ACI- CCI)	Inspect formwork, bolt layout and reinforcement per detail F1/S5.2 for beam pockets.

Structural Masonry

Note: Where "periodic inspections" are performed and deficient items are located, additional inspections shall be performed so that extent of deficient areas can be determined and corrected.

Item	Agency # (Qualif.)	Scope
1. (a) Grout Mix Design – Before Construction (b) Reinforcement Submittal	Agency #1 (PE/SE)	Review cement certificate of compliance as part of mix design submittal review. Review steel reinforcement submittal
2. Grout Mix – During Construction	Agency #2 (ACI- CFTT)	Review grout batch tickets and verify compliance with approved mix design. Verify that water added at the site does not exceed that allowed by the mix design.
3. Reinforcement Installation	Agency #2 (ACI- CCI)	Inspect reinforcing steel including both wire joint reinforcement and also deformed bar reinforcement. Inspect lap splices and dowels at wall intersections. Inspect size, spacing, positioning and grade of reinforcing steel. Verify that reinforcing bars are free of form oil or other deleterious materials. Inspect bar lap splices. Verify that bars are adequately tied.
4. Concrete Block	Agency #2 (ACI- CCI)	Inspect masonry cores to be sure that hardened mortar does not block cells to be grouted. Verify inspection ports at bottom of vertically grouted cells Perform at least one prism test early in masonry installation to verify concrete block strength
5. Mortar	Agency #2 (ACI- CFTT)	Inspect field preparation of mortar including mortar components, mixing procedures and water content Inspect mortar installation procedure
6. Anchor Bolts and Adhesive Anchors	Agency #2 (ACI- CCI)	Inspect size, positioning and embedment of anchor rods/bolts and reinforcement anchorage dowels
7. Grout Placement	Agency #2 (ACI- CFTT)	Inspect placement of grout. Verify that grout conveyance and depositing avoids segregation or contamination. Verify that grout is properly consolidated. Inspect concrete placement and consolidation around anchors.
7. Sampling and Testing of Grout	Agency #2 (ACI-LTT)	Test grout compressive strength, slump, air-content, and temperature
8. Curing and Protection	Agency #2 (ACI- CCI)	Inspect curing, cold weather protection and hot weather protection procedures.
9. Grout all cores solid where masonry is below grade	Agency #2 (ACI- CCI)	Periodic inspections

Structural Steel

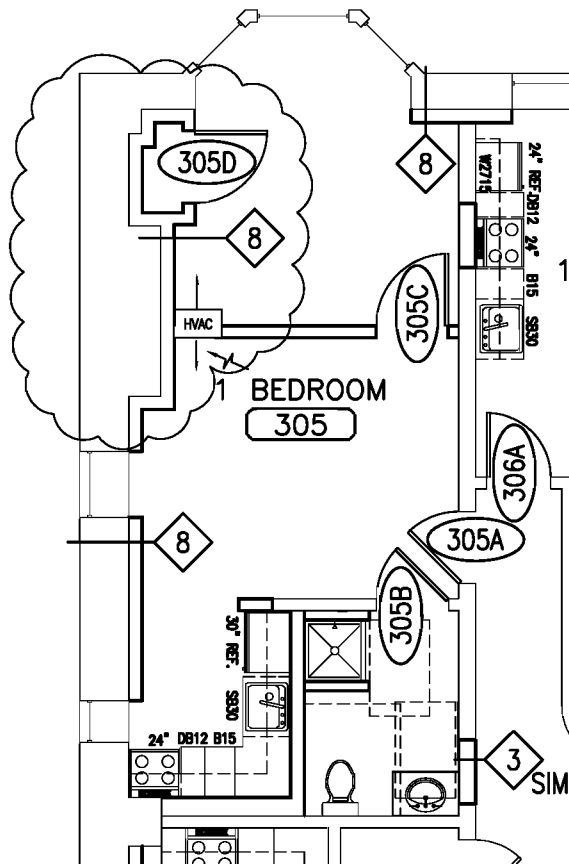
Note: Where "periodic inspections" are performed and deficient items are located, additional inspections shall be performed so that extent of deficient areas can be determined and corrected.

Item	Agency # (Qualif.)	Scope
1. Fabricator Certification	Agency #3 (AWS-CWI)	Review documentation that shop fabricator is an AISC certified plant.
2. Steel Shop Drawings and Material Certification	Agency #1 (PE/SE)	Review Structural steel shop drawings and certificates of compliance as part of structural steel submittal.
3. Leveling Plates below columns	Agency #3 (AWS-ACWI)	Verify that Leveling plates have been grouted as specified prior to placing beams or columns
4. Anchor Rods and Bolts	Agency #3 (AWS-ACWI)	Verify that washers are in place as specified and that nuts are tight at all anchor bolts.
5. Structural Steel components	Agency #3 (AWS-ACWI)	Verify beams and columns have been placed at correct locations based on identification markings and beam depth (or column depth) dimensions.
6. Bolting	Agency #3 (AWS-ACWI)	<p>Inspect high strength bolt material markings for correct bolt type, diameter, storage in lubricated containers and installation / tightening of high-strength bolt.</p> <p>Verify that splines have separated from tension control bolts. Periodically verify proper tightening sequence.</p> <p>Continuously inspect placement of slip critical bolts and faying surfaces prior to bolt placement.</p>
8. Welding	Agency #3 (AWS-CWI)	<ul style="list-style-type: none"> • Visually inspect storage procedures of welding rods. • Review welding certificates of certified welders. • Verify MG-600 rods used at existing steel where specified • Continuously inspect field welding to existing steel with MG-600 electrodes for the first 4 hours(min) and periodic inspections thereafter provided contractor demonstrates adequate understanding of specified welding procedure requirements. • Visually inspect 100% of field welds at structural steel • Periodically pre-heat, post-heat and surface preparation between passes. • Field fillet welds larger than 5/16" or multi-pass welds shall be continuously inspected during weld placement.
8. Metal Deck	Agency #3 (AWS-CWI)	<p>Periodic weld inspection and side-lap fastening of floor deck.</p> <p>Periodic testing of welds.</p>

Rough Carpentry

Note: Where "periodic inspections" are performed and deficient items are located, additional inspections shall be performed so that extent of deficient areas can be determined and corrected.

Item	Agency # (Qualif.)	Scope
1. Framing size, spacing, alignment with truss centerlines, grade	<i>Agency #1 (PE/SE)</i>	<i>Periodic Structural Observations</i>
2. Simpson Hangers- gap distance at hangers, nails (diameter, quantity), ZMAX finish at PT members,	<i>Agency #1 (PE/SE)</i>	<i>Periodic Structural Observations</i>
3. Misc. Framing Details	<i>Agency #1 (PE/SE)</i>	<i>Periodic Structural Observation</i>
4. Diaphragm Connections <ul style="list-style-type: none">• Anchors• Sheathing thickness• Fastener Size / Spacing• Framing @ Sheathing Edges• Stud Spacing• Sheathing material	<i>Agency #1 (PE/SE)</i>	<i>Periodic Structural Observations</i>



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Project:
**RENOVATIONS TO
645 CONGRESS ST.
PORTLAND, ME 04101**

PROJECT #: 08.436

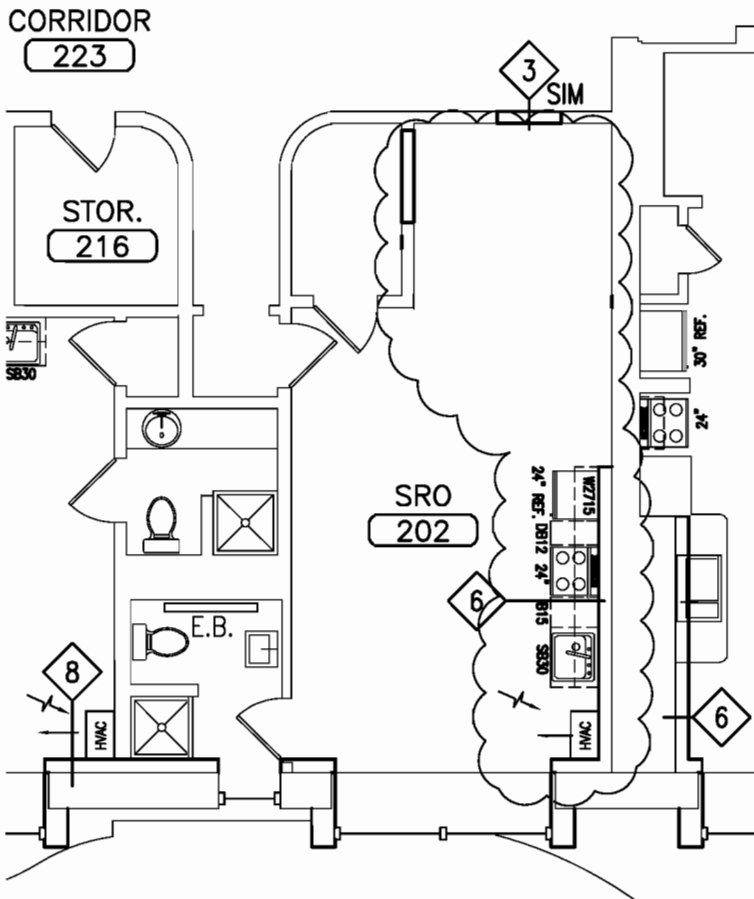
Drawing Title:
**THIRD FLOOR PLAN
1 BEDROOM 305 - FIRE
PLACE / EXTERIOR WALL FURRING**

Scale: 1/8" = 1'-0"

Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.1



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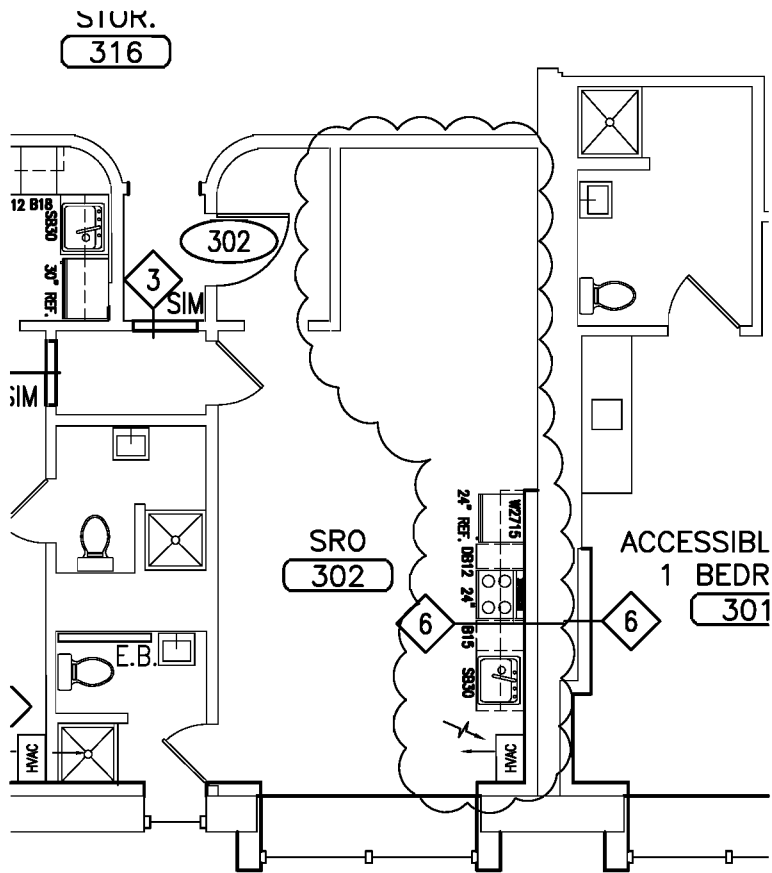
PROJECT #: 08.436

Drawing Title:
**SECOND FLOOR PLAN
 SRO 202 - KITCHEN RELOCATION**

Scale: 1/8" = 1'-0"
 Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.2



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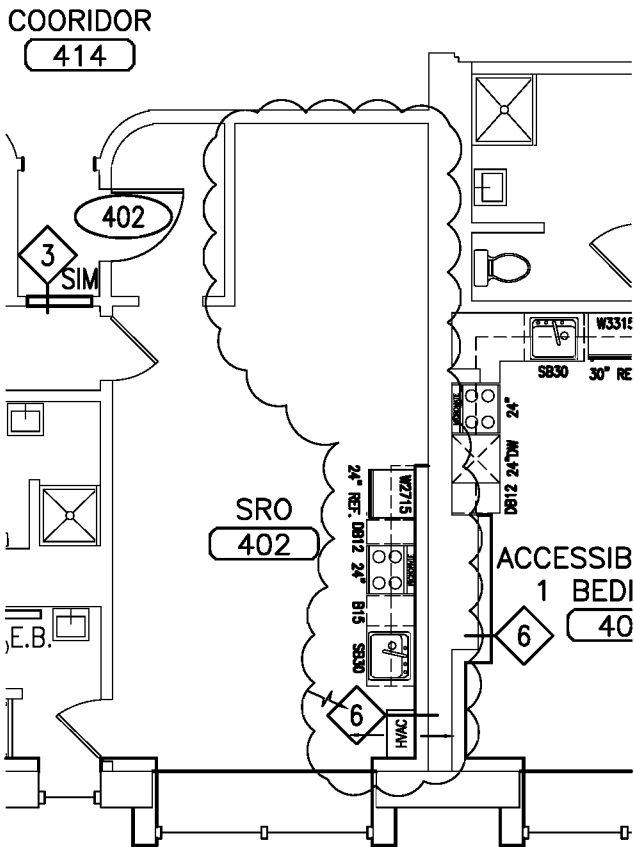
PROJECT #: 08.436

Drawing Title:
**THIRD FLOOR PLAN
 SRO 302 - KITCHEN RELOCATION**

Scale: 1/8" = 1'-0"
 Date: 06/01/2009

Drawing Number:

SKA-1.3



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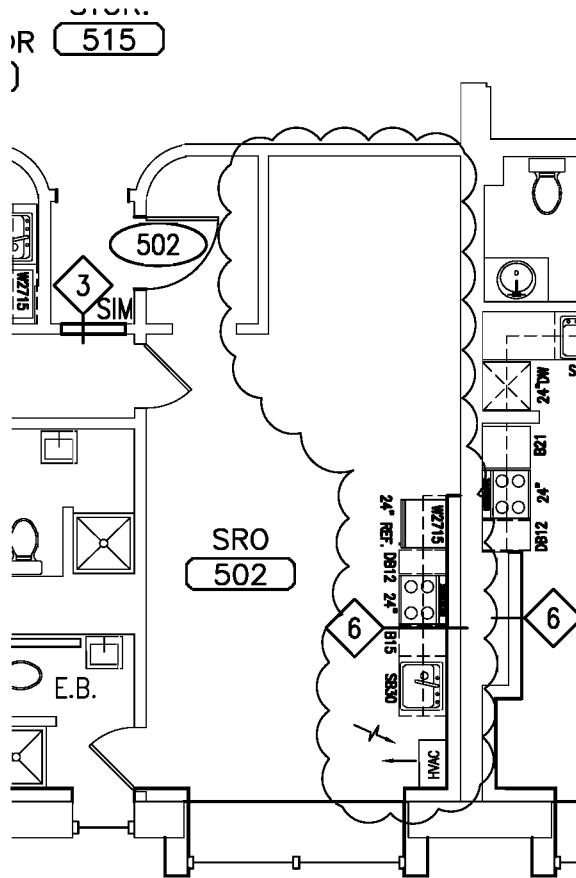
PROJECT #: 08.436

Drawing Title:
**FOURTH FLOOR PLAN
SRO 402 - KITCHEN RELOCATION**

Scale: 1/8" = 1'-0"
Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.4



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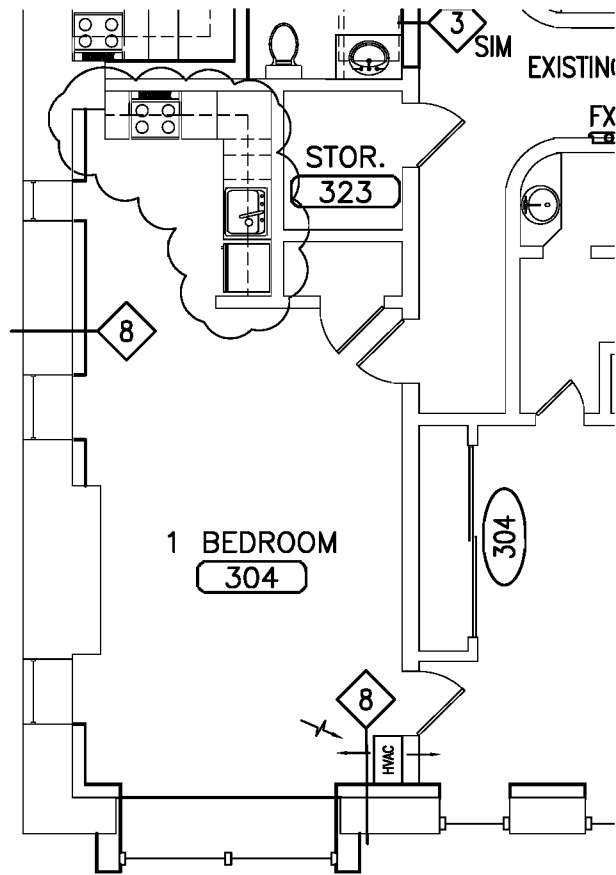
PROJECT #: 08.436

Drawing Title:
**FIFTH FLOOR PLAN
 SRO 502 - KITCHEN RELOCATION**

Scale: 1/8" = 1'-0"
 Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.5



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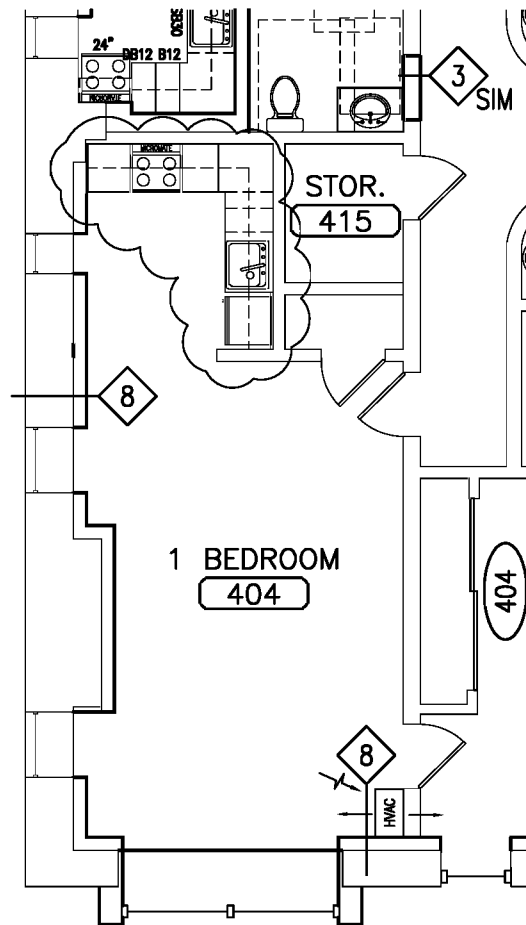
PROJECT #: 08.436

Drawing Title:
THIRD FLOOR PLAN
1 BEDROOM 304 - KITCHEN
RENOVATIONS

Scale: 1/8" = 1'-0"
Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.6



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PROJECT #: 08.436

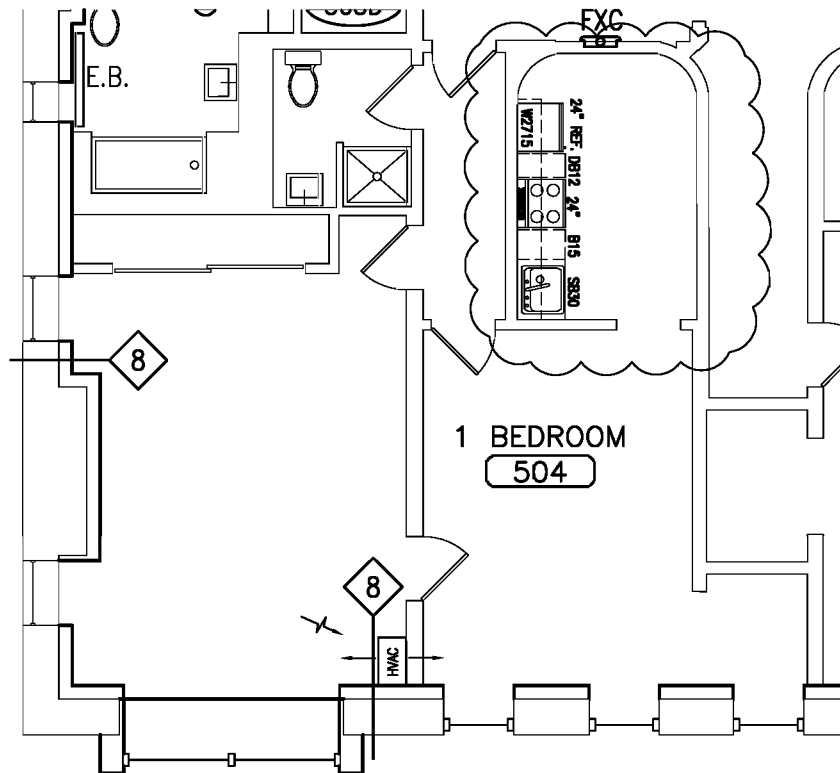
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FOURTH FLOOR PLAN
1 BEDROOM 404 - KITCHEN
RENOVATIONS

Scale: 1/8" = 1'-0"

Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.7



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PROJECT #: 08.436

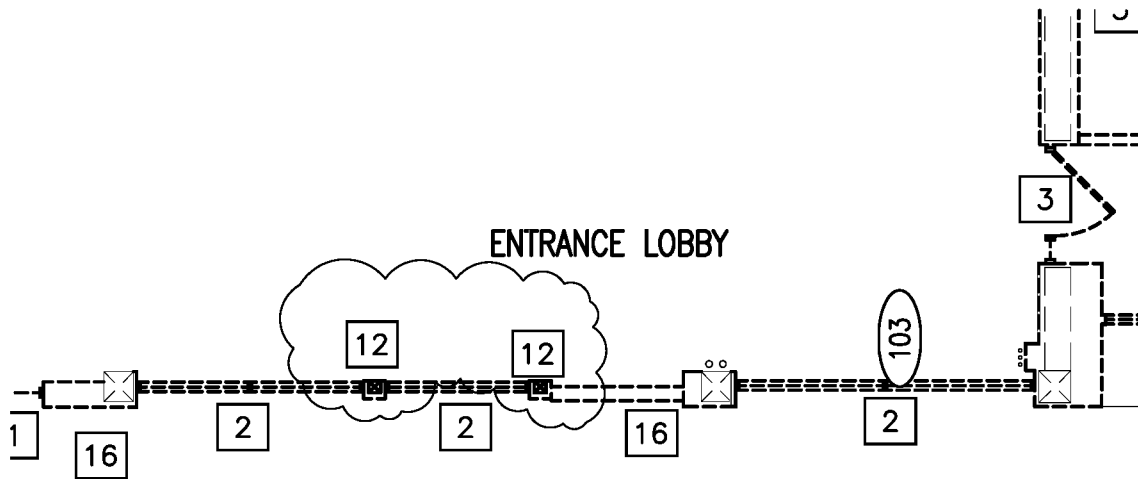
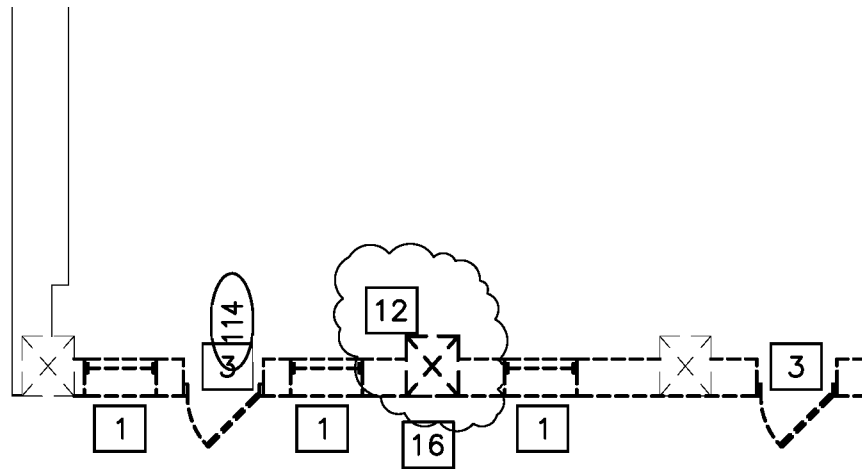
Drawing Title:
**FIFTH FLOOR PLAN
1 BEDROOM 504 - KITCHEN
RENOVATIONS**

Scale: 1/8" = 1'-0"

Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.8



ENTRANCE LOBBY



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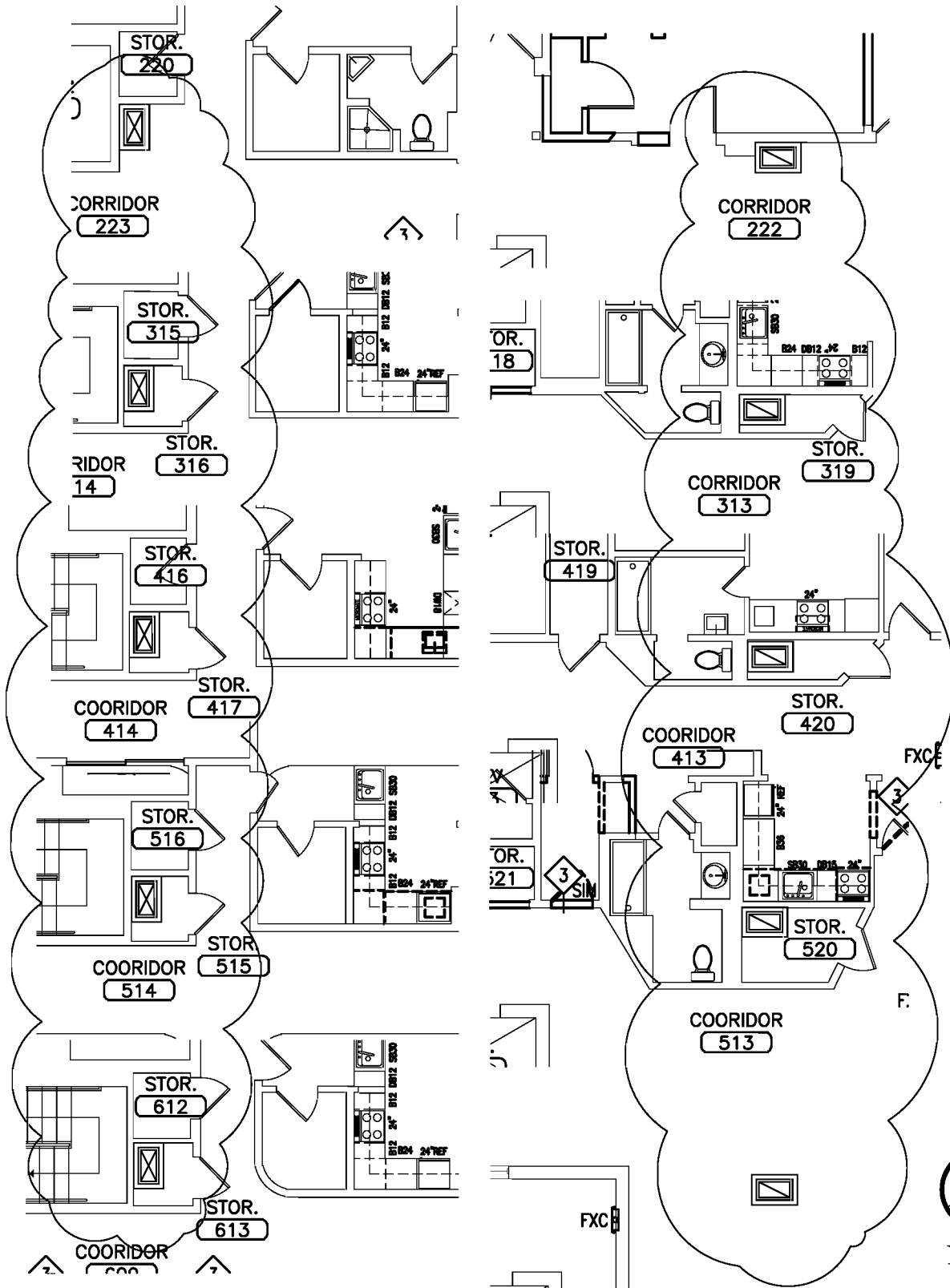


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Project:
**RENOVATIONS TO
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PORTLAND, ME 04101
PROJECT #: 08.436

Drawing Title:
FIRST FLOOR REMOVALS NOTE
Scale: 1/8" = 1'-0"
Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:
SKA-1.9

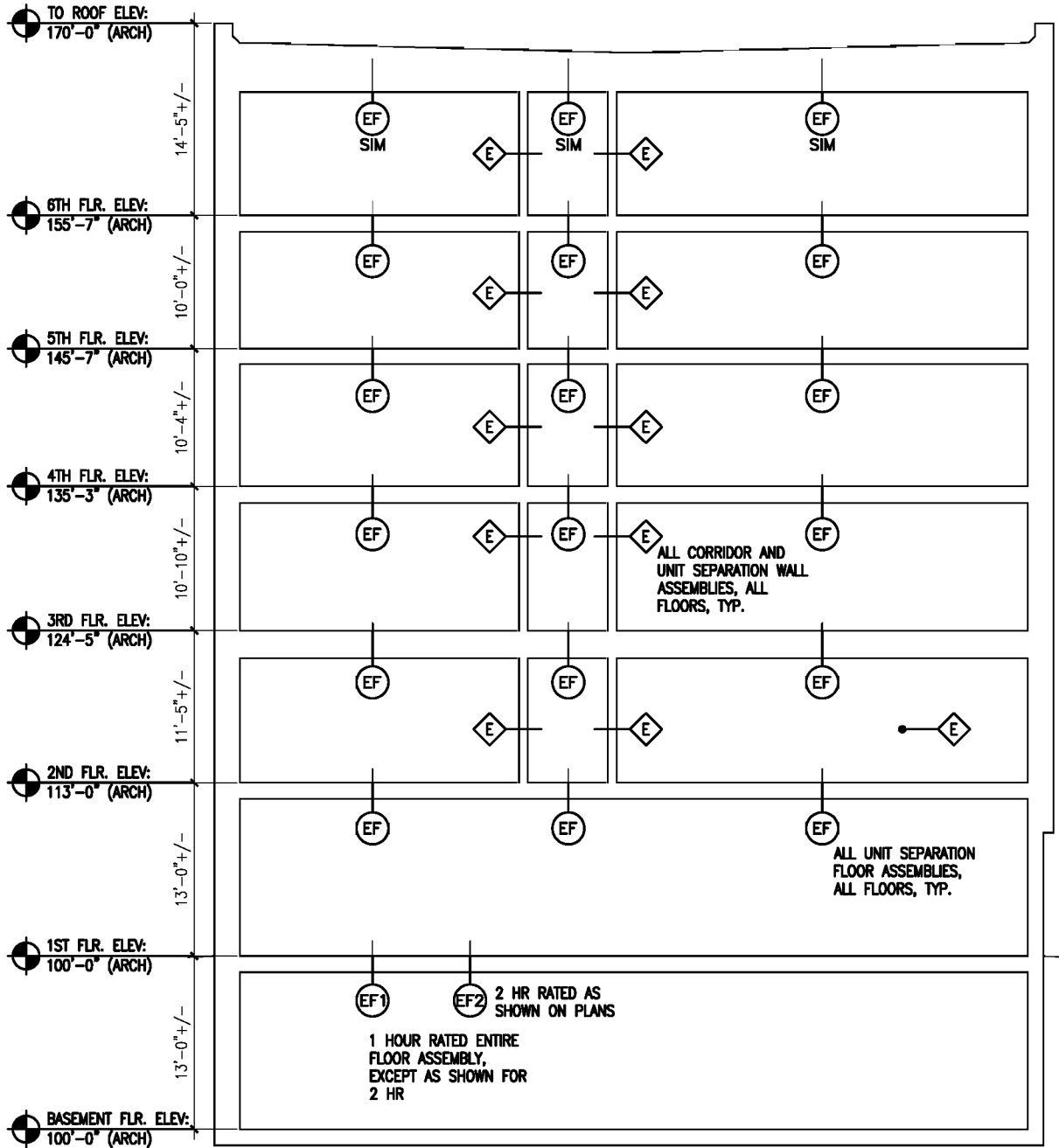


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Project:
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 PROJECT #: 08.436

Drawing Title:
**FLOORS 2-6 LOCATION OF
 VERTICAL COMMON SPACE SUPPLY
 AND RETURN 2 HR RATED DUCTS**
 Scale: 1/8" = 1'-0"
 Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:
SKA-1.10



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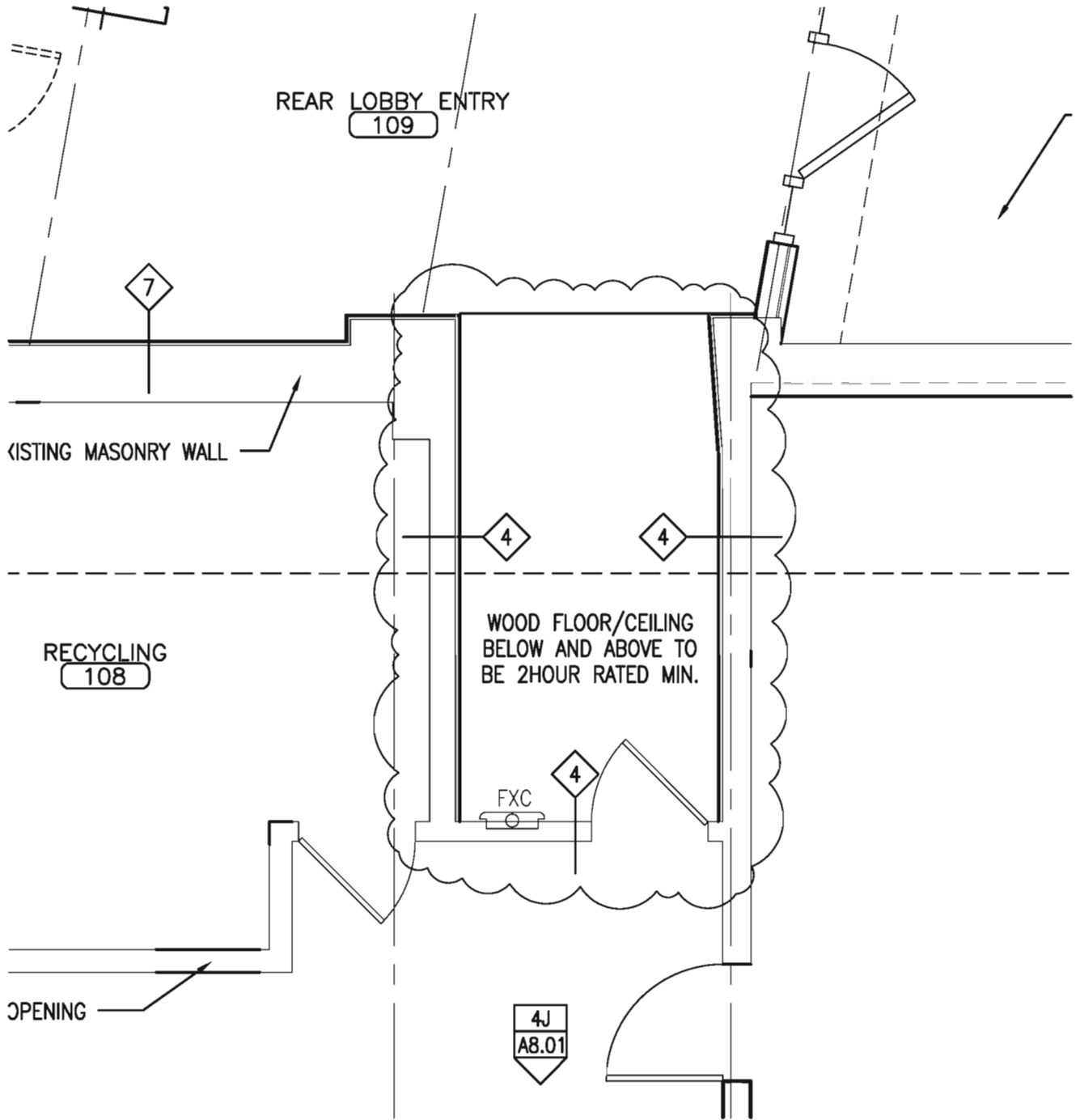
PROJECT #: 08.436

Drawing Title:
**EXISTING AND NEW RATINGS
COMMON WALLS AND FLOOR
CEILINGS**

Scale: NTS
Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.11



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Project
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PROJECT #: OB.436

Drawing Title:

**BASMENT CEILING AND FIRST
 FLOOR CEILING 2HR RATING**

Scale: 1/8" = 1'-0"

Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.12

FLOOR TYPE	FLOOR ASSEMBLY TYPES		PARTITION TYPE
	GENERAL WALL DESCRIPTION	GENERAL PICTORIAL	
EF	<p>TYPICAL EXIST. 1 HOUR FIRE RATED UNIT SEPARATION FLOOR ASSEMBLY: SIM TO 1 HOUR FIRE RATED U.L. DESIGN #: L535</p> <p>1/2" (AVG.) WOOD UNDERLAYMENT 1/2" (AVG.) WOOD SUBFLOOR 12"± WOOD FLOOR JOISTS @ 16"± O.C. 1/2" (AVG.) WOOD STRAPPING 3/8"± WOOD OR METAL LATH 1/2"± PLASTER</p>		1
EF1	<p>TYPICAL EXIST. PLUS NEW 1 HOUR FIRE RATED UNIT SEPARATION FLOOR ASSEMBLY: SIM TO 1 HOUR FIRE RATED U.L. DESIGN #: L535</p> <p>1/2" (AVG.) WOOD UNDERLAYMENT 1/2" (AVG.) WOOD SUBFLOOR 12"± WOOD FLOOR JOISTS @ 16"± O.C.</p> <p>ADD NEW TO EXISTING 1/2" MIN. RESILIENT CHANNELS (1) LAYER 5/8" TYPE "X" GWB SEALED AT ALL JOINTS AND WALL INTERSECTIONS.</p>		1A 2
EF2	<p>TYPICAL EXIST. PLUS NEW 2 HOUR FIRE RATED UNIT SEPARATION FLOOR ASSEMBLY: SIM TO 2 HOUR FIRE RATED U.L. DESIGN #: L511</p> <p>1/2" (AVG.) WOOD UNDERLAYMENT 1/2" (AVG.) WOOD SUBFLOOR 12"± WOOD FLOOR JOISTS @ 16"± O.C. 1/2" (AVG.) WOOD STRAPPING 3/8"± WOOD OR METAL LATH 1/2"± PLASTER</p> <p>ADD NEW TO EXISTING 1/2" MIN. RESILIENT CHANNELS (1) LAYER 5/8" TYPE "X" GWB SEALED AT ALL JOINTS AND WALL INTERSECTIONS.</p>		3
TYPE	3N NO. NCS JUSTICAL	WALL PARTITION SCHEDULE F	



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Project:
**RENOVATIONS TO
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PORTLAND, ME 04101

PROJECT #: 08.436

Drawing Title:
FLOOR CEILING ASSEMBLIES

Scale: 1/8" = 1'-0"
Date: ADDENDUM NO. 1 6/8/2009

Drawing Number:

SKA-1.13

645 Congress Street - Portland Hall											CWS Architects		
Portland, Maine											Revised: Addendum 01, 08 June 2009		
Door Schedule:													
No.	Location	Opening	W	H	T	Door Material	Door Type	Glass Type	Frame Type	Lock Function	Hardware	Label	Notes
BASEMENT LEVEL													
001A	Elev Lobby to Laundry	New	36	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Lockset 1	Closer, Kickplate	45 min	
001B	Elev Lobby to Laundry	New	36	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Lockset 1	Closer, Kickplate	45 min	
002A	Elev Lobby to Basement Retail	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Entrance	Closer, Kickplate	45 min	
002B	Stair 1 to Basement Retail	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Entrance	Closer	90 min	
005	Stair 1 to Sprink	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Storeroom Lock 1	Closer	90 min	Confirm Existing
006	Elevator Lobby to EMR	Existing								Storeroom Lock 2	Existing Closer	90 min.	Confirm Existing
007	Elevator Lobby to Stair 1	Existing								Passage 1	Existing Closer	90 min.	Confirm Existing
009	Basement 010 to Electrical Room	New	(2) 36	84	1-3/4	Hollow Metal	Flush		KD Steel	Panic 1	Closer	45 min	Provide removable center astrigal
009B	Basement 010 to Electrical Room	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Panic 1	Closer	45 min	
011	Corridor to Stair 5	New	42	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Passage 1	Closer	90 min	
011B	Exterior to Stair 5	New	42	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Lockset 1	Closer	90 min	
0012	Corridor to Mechanical	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Storeroom Lock 1	Closer	45 min	
0013	Bike storage to Corridor	New	42	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Storeroom Lock 1	Closer, Kickplate	45 min	
016A	Elev Lobby to Corridor 016	New	36	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Passage 1	Closer, Kickplate	45 min	
016B	Basement 008 to Corridor 016	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Passage 1	Closer	45 min	
017	Basement 015 to Jan 017	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Storeroom Lock 1	Closer	45 min	
018	Corridor to Jan 018	New	36	84	1-3/4	Hollow Metal	Flush		KD Steel	Storeroom Lock 1	Closer		
FIRST FLOOR													
100	Exterior to Resident's Lobby	New	39	84		Storefront	Med. Style	Full Glass	Storefront	Panic 2	Storefront System, Closer, Threshold 1		Proximity Card, Electric Strike, Confirm Compatibility of Door Hardware with Door Type
101	Exterior to ATM	New	36	84		Storefront	Med. Style	Full Glass	Storefront	Lockset 1	ATM Card Strike, Closer, Threshold 1		Electric Strike
102	Resident's Lobby to ATM Room	New	36	84	1-3/4	Hollow Metal	Flush		Welded Steel	Storeroom Lock 1	Closer		
103	Exterior to Retail 3	New	42	84		Storefront	Med. Style	Full Glass	Storefront	Entrance Lock by Storefront Provider	Storefront System, Push Bar, Pull Handle, Deadbolt, Closer, Threshold 1		
103B	Retail 3 to Exterior	New	36	84	1-3/4	Insulated Steel	Flush		Welded Steel	Lockset 1	Closer, Kickplate, Threshold 2		
104	Retail Lobby to Mail	New	36	84		Storefront	Med. Style	Full Glass	Storefront	Lockset 1	Closer, Kickplate		Postal Keying
105	Retail Lobby to Mail Room	New	42	84	1-3/4	Hollow Metal	Flush		Welded Steel	Lockset 1	Closer, Kickplate		Proximity Card, Electric Strike, Confirm
106A	Elevator Lobby to Resident's Lobby	New	36	84		Storefront	Med. Style	Full Glass	Storefront	Panic 2	Storefront System, Closer		Compatibility of Door Hardware with Door Type
106B	Elevator Lobby to Retail Lobby	New	36	84		Storefront	Med. Style	Full Glass	Storefront	Panic 2	Storefront System, Closer		Proximity Card, Electric Strike, Confirm
107	Retail 3 to Retail Lobby	New	36	84	1-3/4	Hollow Metal	Flush	NVL	Welded Steel	Lockset 1	Closer, Kickplate	45 min	
107B	Retail 2 to Retail Lobby	New	36	84	1-3/5	Hollow Metal	Flush	NVL	Welded Steel	Lockset 1	Closer, Kickplate	45 min	
108	Recycling to Retail Lobby	New	36	84	1-3/5	Hollow Metal	Flush	NVL	Welded Steel	Storeroom Lock 1	Closer, Kickplate, Threshold 2	45 min	

645 Congress Street - Portland Hall											CWS Architects		
Portland, Maine											Revised: Addendum 01, 08 June 2009		
Door Schedule:													
No.	Location	Opening	W	H	T	Door Material	Door Type	Glass Type	Frame Type	Lock Function	Hardware	Label	Notes
109	Exterior to Rear Lobby Entry	New	42	84		Storefront	Med. Style	Full Glass	Storefront	Panic 2	Storefront System, Closer, Threshold 1		Proximity Card, Electric Strike, Confirm Compatibility of Door Hardware with Door Type
109B	Retail Lobby to Rear Retail Lobby	New	36	84	1-3/5	Hollow Metal	Flush	NVL	Welded Steel	Storeroom Lock 1	Closer, Kickplate	90 min	
110	Exterior to Stair 4	New	42	84		Storefront	Med. Style	Full Glass	Storefront	Panic 2	Storefront System, Closer, Threshold 1		Proximity Card, Electric Strike, Confirm Compatibility of Door Hardware with Door Type
111A	Corridor 111 to Rear Lobby Entry	New	36	84	1-3/4	Hollow Metal	Flush	NVL	KD Steel	Storeroom Lock 1	Closer, Kickplate, Threshold 2		
111B	Retail 2 to Corridor 111	New	36	84	1-3/4	Hollow Metal	Flush	Welded Steel	Welded Steel	Lockset 1	Closer, Kickplate	90 min	
111C	Exterior to Corridor 111	New	36	36	1-3/4	Insulated Steel	Flush		Welded Steel	Storeroom Lock 1	Closer, Threshold 2	90 min	Elevated Sill, Coordinate with Waste Management
111D	Exterior to Corridor 111	New	36	84	1-3/4	Insulated Steel	Flush		Welded Steel	Lockset 1	Closer, Kickplate, Threshold 2		
111E	Stair 2 to Corridor 111	New	36	84	1-3/4	Hollow Metal	Flush	NVL	Welded Steel	Storeroom Lock 1	Closer, Kickplate		
113	Exterior to Retail 2	New	42	84		Storefront	Med. Style	Full Glass	Storefront	Entrance Lock by Storefront Provider	Storefront System, Push Bar, Pull Handle, Deadbolt, Closer, Threshold 1		
114	Exterior to Retail 1	New	42	84		Storefront	Med. Style	Full Glass	Storefront	Entrance Lock by Storefront Provider	Storefront System, Push Bar, Pull Handle, Deadbolt, Closer, Threshold 1		
114B	Retail 114 to Stair 2	Existing								Lockset 1	Existing Closer	90 min	Confirm Existing Temp. Rise Rating
114C	Retail 114 to Exterior	Existing								Lockset 1	Existing Closer, Existing Threshold		
115	Existing Stair 115 to Resident's Lobby	Existing								Storeroom Lock 1	Closer, Kickplate	90 min.	Confirm Existing Temp. Rise Rating

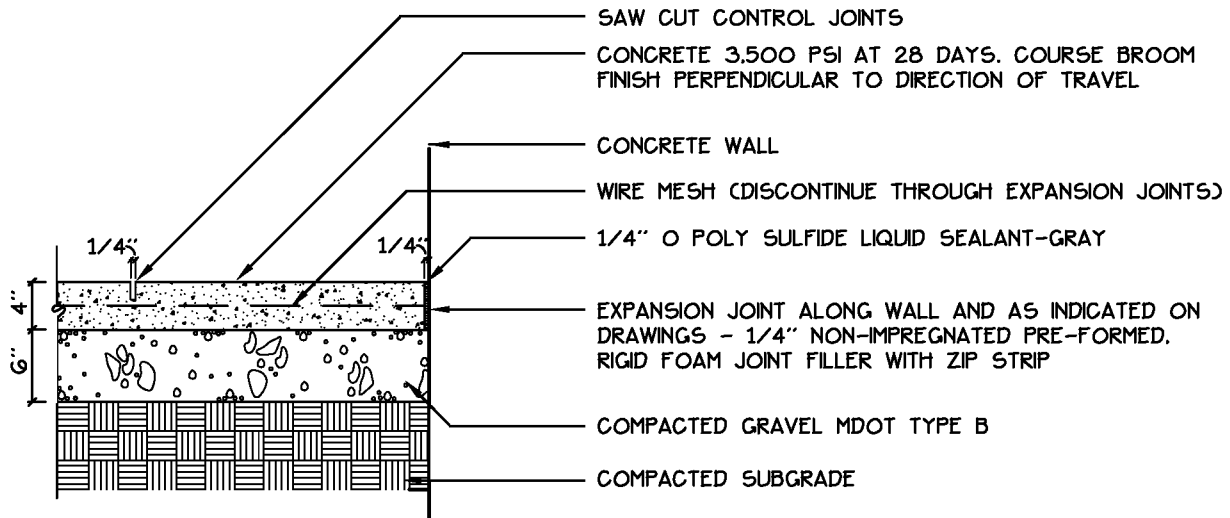
645 Congress Street - Portland Hall		CWS Architects		
Portland, Maine		Revised: Addendum 01, 08 June 2003		
Hardware Schedule				
Item/function	Manufacturer	Model No.	Finish	Remarks
Lockset 1	Sargent	10-10G05-LB	US10B / 613	Public entrance - lever handle
Lockset 2	Sargent	10G05-LB	US10B / 613	Apartment Entrance Lock - lever handle (replace existing)
Passage 1	Sargent	10U15-LB	US10B / 613	Public passage - lever handle
Passage 2	Sargent	65G15-LB	US10B / 613	Apartment passage - lever handle
Privacy 1	Sargent	10U65-LB	US10B / 613	Public privacy - lever handle
Privacy 2	Sargent	65U65-LB	US10B / 613	Apartment privacy - lever handle
Storeroom Lock 1	Sargent	10-10G04-LB	US10B / 613	Public storeroom - knurled lever
Panic 1	Sargent	8906 ETL	US10B / 613	Mortise panic device - knurled knob
Panic 2	Sargent	8715 ETL	US10B / 613	Vertical surface rod panic device - lever handles
Closer	Sargent	281	US10B / 612	Door Mount, Interior Drs.: O Arm w/ SS Hardware, Exterior Drs: Top Jamb Application, match door hardware color
Door Operator	Sargent	Mpower 4000	US10B / 613	ADA compliant
Mag Holder	Sargent	1560 series	US10B / 613	Coordinate with fire alarm system
Electric Strike	HES	1006 series	US10B / 613	continuous duty rated
Threshold 1	National Guard	See 08 41 13	US10B / 613	ADA compliant - maximum 1/2" height - at Aluminum Storefront Doors
Threshold 2	National Guard	Submit for Review	US10B / 613	ADA compliant - maximum 1/2" height - thermally broken below door, full coverage aluminum
Hinges	McKinney	Full mortise	US10B / 613	Match lockset finish. Provide only ball bearing hinges at doors with closers.
Floor Stop	Ives	436	US10B / 613	
Wall Stop	Ives	406 1/2	US10B / 613	
Roller Bumper	Ives	471	US10B / 613	
Kickplate	Ives	8400	US10B / 613	On push side of Door
Viewer	Ives	U969	US10B / 613	
Door Hardware Notes				
1.) Provide new high security masterkey system, with construction keying system. Consult with Owner for instructions on keying.				
2.) Products of one or more manufacturers are listed to establish quality and performance characteristics. Products of other manufacturers may be accepted subject to judgement solely by Architect of equivalent quality, performance and appearance.				
Acceptable Manufacturers:				
Locksets:	Sargent, Schlage, Corbin			
Closers:	Sargent, LCN, Norton, Rixson			
Hinges:	Hager, McKinney, Stanley			
Thresholds:	National Guard Products, Pemko, Reese, Zero			
Accessories:	Ives, Rockwood, Hiawatha			

DOOR AND HARDWARE NOTES

- Notes:**
1. Review and confirm all hardware functions, hardware and finishes with owner prior to placing order.
 2. See Floor Plans for total number of doors.
 3. See drawing A8.01 for door and door frame elevations - typical.
 4. Provide concave wall mounted door stops at all doors opening against an adjacent wall or door. Ives No. 406 1/2 or equal.
 5. Provide a door mounted roller bumper at all doors opening against an opposite hand door (1 per pair). Ives No. 471 or equal.
 6. Provide floor stops at all doors where wall stops or roller stops are not appropriate. Ives No. 436 or 438.
 7. All insulated steel doors as per specification.
 8. All solid core wood doors as per specification.
 9. Provide stainless steel pan flashing below sill at all exterior doors. Seal to exterior substrate.
 10. Provide solid wood blocking at all locations of wall mounted door stops.
 11. NVL: 6"x30" Narrow Vision Lite
 12. Provide welded frames, masonry anchors and grout frame solid to CMU.

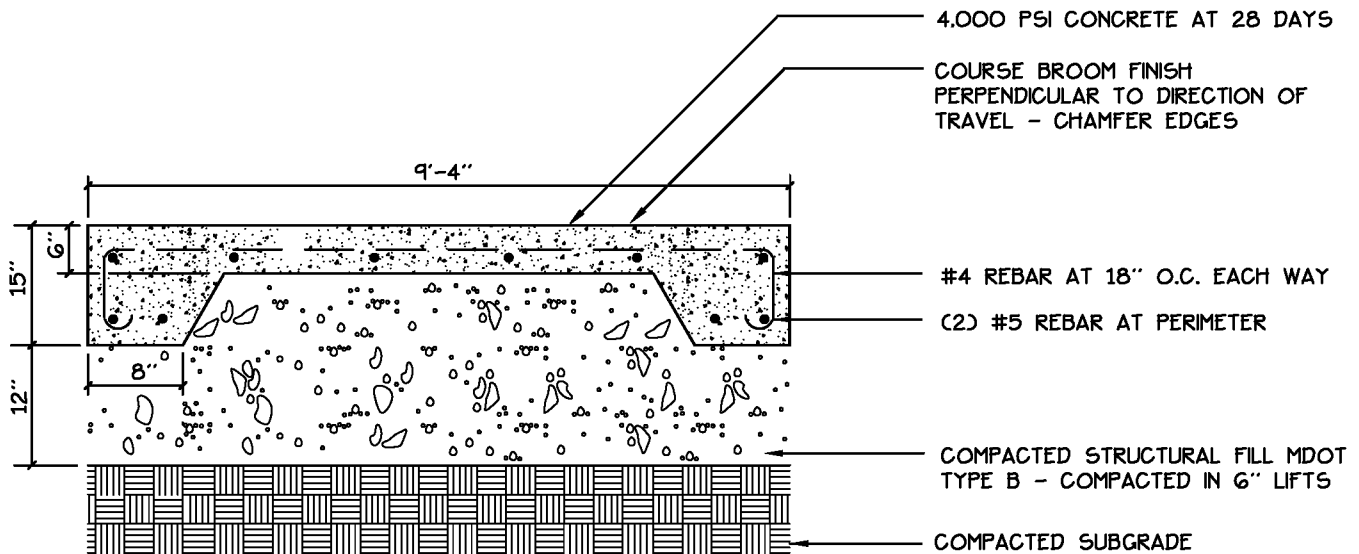
Door Glazing Types:

- A: 1/4" NFPA Approved Wire Glass - Sec. 08-80-00 2.3B at interior door locations requiring wire glass.
- B: 1" Double Pain Insulated Glass - Sec. 08-80-00 2.6 at all exterior door locations.
- C: Tempered Glass - Sec. 08-80-00 2.4 at all interior door locations not requiring wire glass.



CONCRETE PAVEMENT DETAIL

NOT TO SCALE



CONCRETE PAD DETAIL (AT TRASH COMPACTOR)

NOT TO SCALE

**Mitchell
& Associates**

LANDSCAPE ARCHITECTS

70 Center Street
Portland, Maine 04101

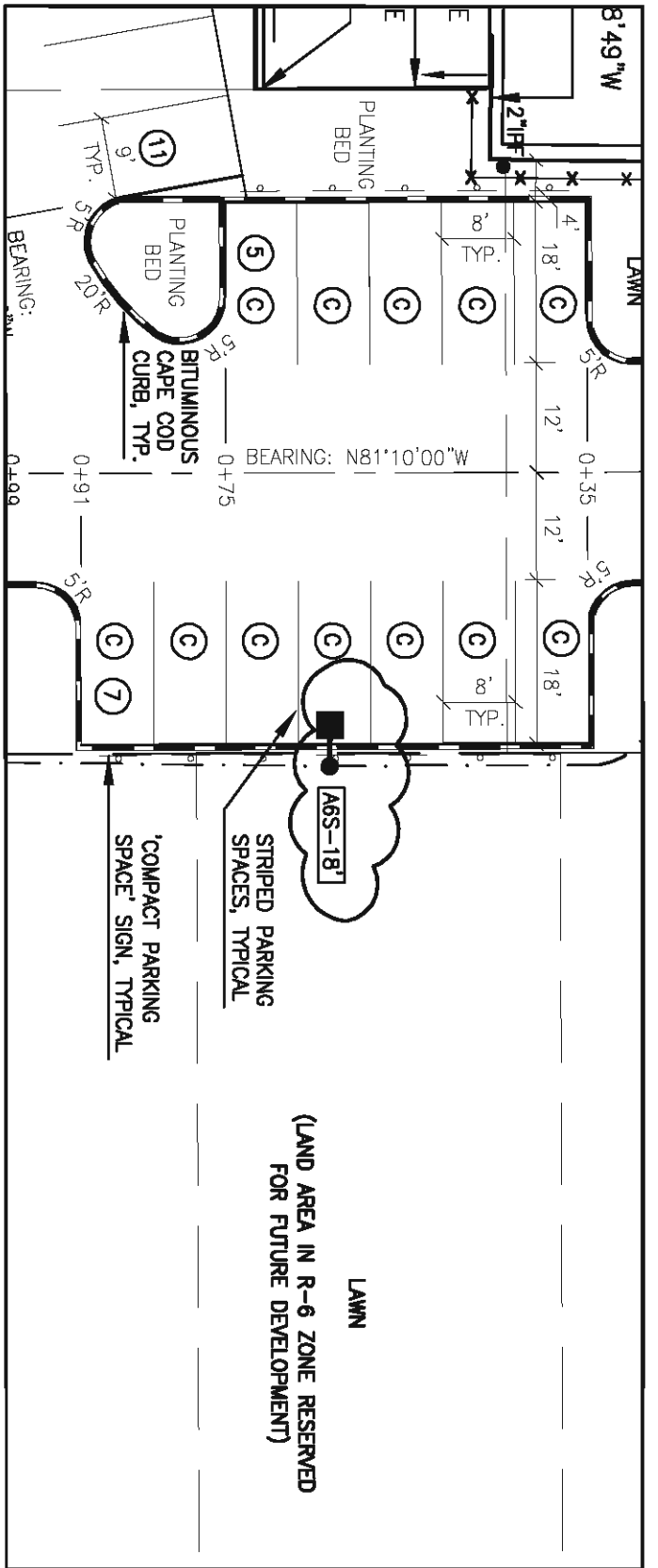
Tel: (207) 774-4427
Fax: (207) 874-2460

Title: CONCRETE PAVEMENT DETAIL
CONCRETE PAD DETAIL (AT TRASH COMPACTOR)

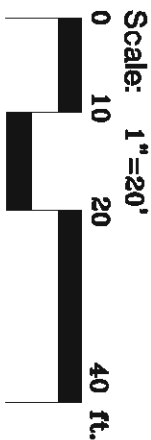
Date: JUNE 2, 2009

Project: 645 CONGRESS STREET

**ADDENDUM
#1**



LAYOUT, LIGHTING AND PLANTING PLAN



SITE LIGHTING

QTY	SYMBOL	MANUFACTURER	PART
1	A3-20'	KIM FIXTURE SPAULDING POLE	1SA/SAR3/150PMHXXX/DB-P SSS20-40-1-*1-DB (DRILLED FOR KIM 1SA)
2	A4-16'	KIM FIXTURE SPAULDING POLE	1SA/SAR4/150PMHXXX/DB-P SSS16-40-1-*1-DB (DRILLED FOR KIM 1SA)
4	A6S-18'	KIM FIXTURE SPAULDING POLE	1SA/SAR4/150PMHXXX/NFS/DB-P SSS18-40-1-*1-DB (DRILLED FOR KIM 1SA)
2	A6S-20'	KIM FIXTURE SPAULDING POLE	1SA/SAR4/150PMHXXX/NFS/DB-P SSS20-40-1-*1-DB (DRILLED FOR KIM 1SA)
5	WD4	KIM	WD14D4/150PMHQUAD/DB

Mitchell & Associates
LANDSCAPE ARCHITECTS

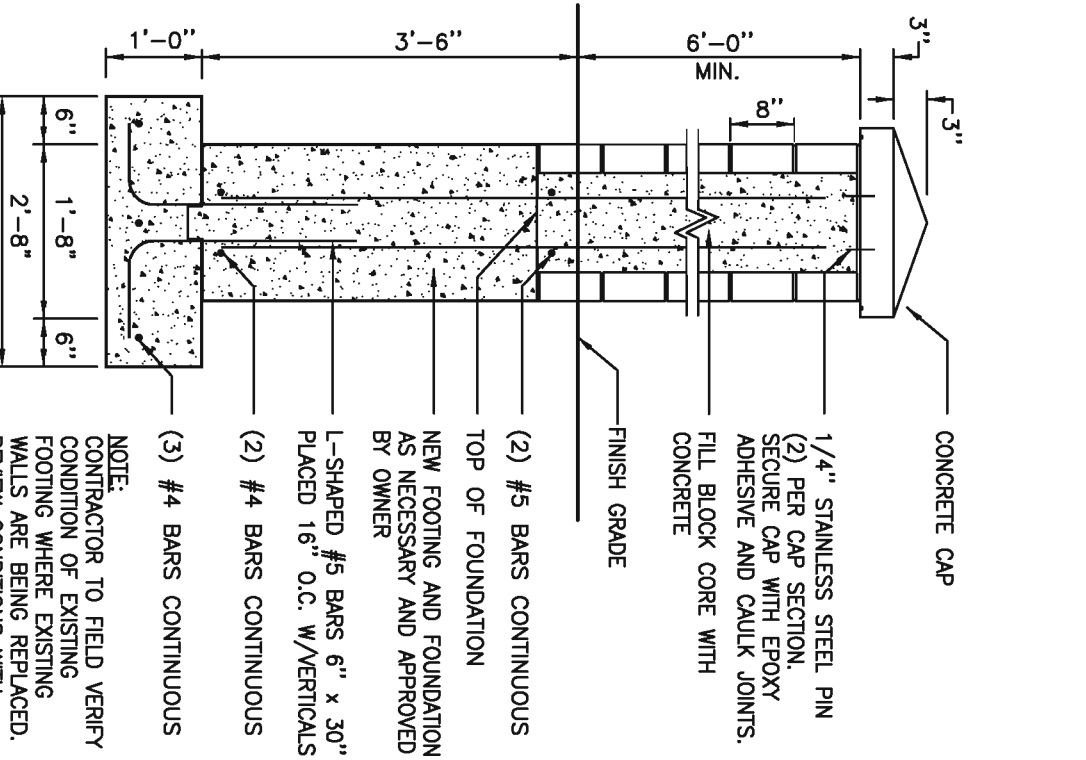
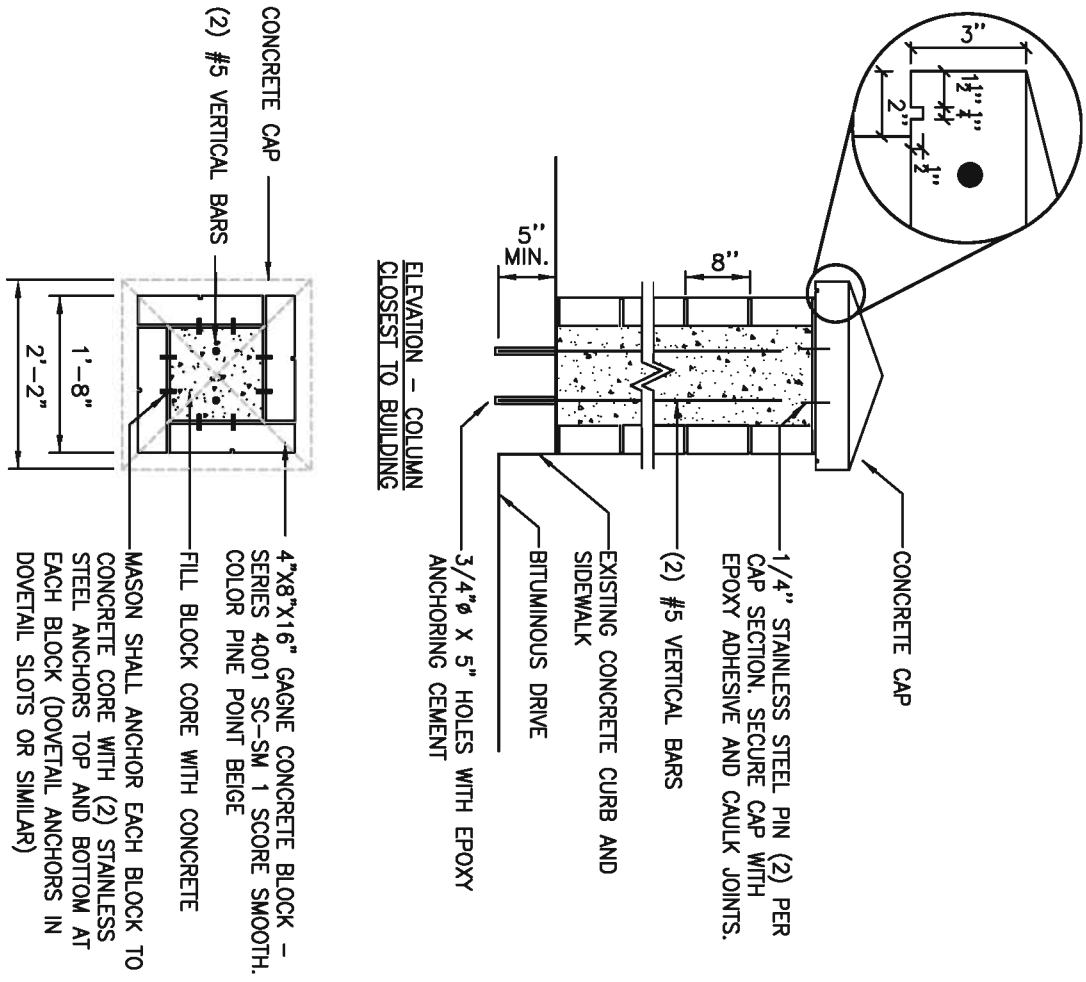
70 Center Street
Portland, Maine 04101
Tel: (207) 774-4427
Fax: (207) 874-2460

Title: SITE LIGHTING POLE BASE

Date: JUNE 8, 2009

Project: 645 CONGRESS STREET

ADDENDUM
#1



CONCRETE CAP

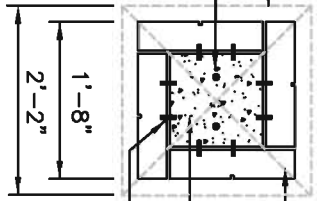
(2) #5 VERTICAL BARS

4"x8"x16" GAGNE CONCRETE BLOCK - SERIES 4001 SC-SM 1 SCORE SMOOTH. COLOR PINE POINT BEIGE

FILL BLOCK CORE WITH CONCRETE

MASON SHALL ANCHOR EACH BLOCK TO CONCRETE CORE WITH (2) STAINLESS STEEL ANCHORS TOP AND BOTTOM AT EACH BLOCK (DOVETAIL ANCHORS IN DOVETAIL SLOTS OR SIMILAR)

PLAN



8
3

MASONRY COLUMN DETAIL
NOT TO SCALE

Title: MASONRY COLUMN DETAIL

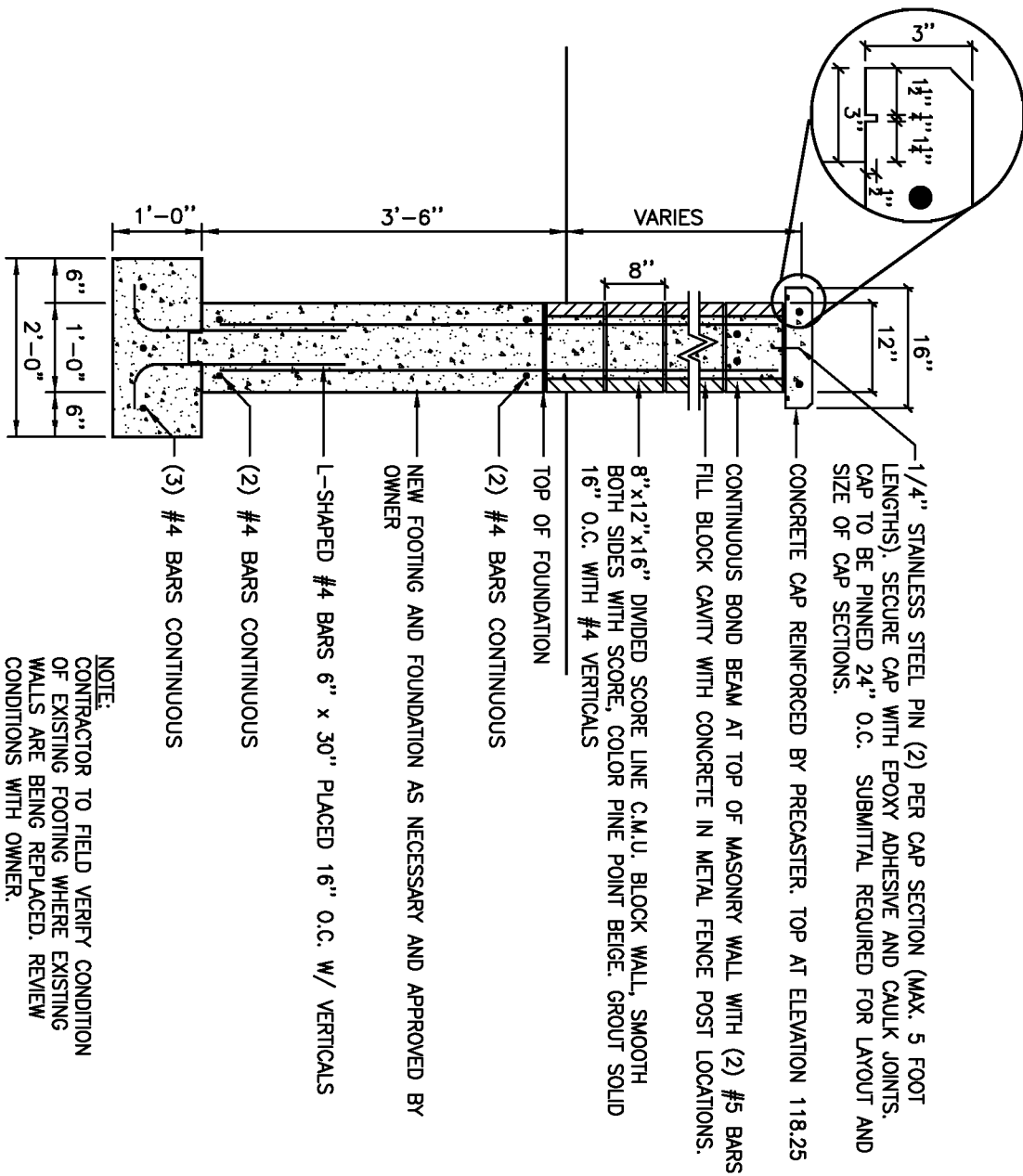
Date: JUNE 8, 2009

Project: 645 CONGRESS STREET

Mitchell & Associates
LANDSCAPE ARCHITECTS

70 Center Street Tel: (207) 774-4427
Portland, Maine 04101 Fax: (207) 874-2460

ADDENDUM
#1



1/4" STAINLESS STEEL PIN (2) PER CAP SECTION (MAX. 5 FOOT LENGTHS). SECURE CAP WITH EPOXY ADHESIVE AND CAULK JOINTS. CAP TO BE PINNED 24" O.C. SUBMITTAL REQUIRED FOR LAYOUT AND SIZE OF CAP SECTIONS.

CONCRETE CAP REINFORCED BY PRECASTER. TOP AT ELEVATION 118.25

CONTINUOUS BOND BEAM AT TOP OF MASONRY WALL WITH (2) #5 BARS
 FILL BLOCK CAVITY WITH CONCRETE IN METAL FENCE POST LOCATIONS.

8"x12"x16" DIVIDED SCORE LINE C.M.U. BLOCK WALL, SMOOTH BOTH SIDES WITH SCORE, COLOR PINE POINT BEIGE, GROUT SOLID 16" O.C. WITH #4 VERTICALS

TOP OF FOUNDATION
 (2) #4 BARS CONTINUOUS

NEW FOOTING AND FOUNDATION AS NECESSARY AND APPROVED BY OWNER

L-SHAPED #4 BARS 6" x 30" PLACED 16" O.C. W/ VERTICALS

(2) #4 BARS CONTINUOUS

(3) #4 BARS CONTINUOUS

NOTE:
 CONTRACTOR TO FIELD VERIFY CONDITION OF EXISTING FOOTING WHERE EXISTING WALLS ARE BEING REPLACED. REVIEW CONDITIONS WITH OWNER.

4
 3

MASONRY WALL DETAIL
 NOT TO SCALE

Mitchell & Associates
 LANDSCAPE ARCHITECTS
 70 Center Street
 Portland, Maine 04101
 Tel: (207) 774-4427
 Fax: (207) 874-2460

Title: MASONRY WALL DETAIL
 Date: JUNE 8, 2009
 Project: 645 CONGRESS STREET

ADDENDUM #1

ADDENDUM #1

SECTION 12 93 00

SITE FURNISHINGS

1 PART 1 GENERAL

1.1 SUBMITTALS:

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

1. Bicycle Racks:

d. Maintenance Data: For each bicycle rack. Include recommended methods for repairing damage to the finish. **Provide Owner with manufacturer touch-up paint kit.**

SECTION 32 31 00

FENCES AND GATES

2 PART 2 PRODUCTS

2.1 MANUFACTURER:

B. Solid Wood Fence listed as follows as provided by Katahdin Cedar Fence and distributed by E. A. Burns' Fencing, Inc., 14 Rochester Street, P.O. Box 395, Westbrook, ME 04098 (800) 327-5057. Fax: (207) 854-3636 Website: www.burnsfencing.com. Product of other manufacturers may be considered subject to compliance with the requirements as judged by the Landscape Architect and or Owner's Representative.

2.2 MATERIALS:

B. Solid Wood Fence shall be **Rockport style, universal construction 1x5 V-match tongue and groove boards sandwiched with 5/4" and 1" frame, standard width 91"** a total of eight (8) feet in height, white cedar fence, **or approved equal.** ~~Posts shall be white cedar 5x5. All Cedar shall be Grade #1.~~

Section – 15000
FIRE PROTECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and the "Conditions of Contract" including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this Section.
- B. Examine all drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section whether or not such work is specifically mentioned in this Section.

1.02 DESCRIPTION OF WORK

- A. This is a design build project. The contractor shall hire Registered Professional engineer (Maine State registration required) to prepare drawings and calculations for the owner's approval. Engineer will provide \$1,000,000.00 liability insurance. The engineer shall provide during the construction two site visits and submit report verifying that the sprinkler system has been installed in compliance with the design. The engineer will also provide a final punch list and report. The engineer shall also provide all the site visits required by the inspection agencies and building department.
The work covered in this section of the specifications consists of furnishing all labor, equipment, appliances and material and in performing all operations in connection with this Fire Protection System, complete, in strict accordance with this Section of the specifications.
- B. The sprinkler system shall be designed and hydraulically calculated per NFPA 13 and NFPA 14.
- C. General Requirements:
 - a) The intention is to provide complete sprinkler system as required by NFPA 13 and NFPA 14 including the design drawings and calculations.
 - b) If any contradiction, ambiguity, error, inconsistency, omission or incomplete system appears in or between any contract documents, the contractor shall before submitting the final bid and signing the contract for construction, notify the architect and request a written resolution as to which methods or materials will be required. If the contractor fails to make a request for interpretation or resolution, no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the architect. This generally means the use of the highest quality material, most expensive way of performing the work and providing complete functioning system for proper operation.
 - c) Each and every trade or subcontractor will be deemed to have familiarized themselves with all the contract documents of this projects, including architectural, structural, mechanical, electrical,

and site work, and to have visited the site, so as to avoid error, omissions and misinterpretations. Related information may be provided on contract documents other than those associated with the subcontractor's trade. The contractor is responsible for coordinating related work of all the contract documents. No additional compensation will be authorized for alleged errors, omissions or misinterpretations whether they are a result of failure to observe this requirement or not.

- d) All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air infiltration. Coordinate with fire stopping requirements.
- e) No component of any system shall run through the stair enclosure that does not relate to or serve the stair enclosure. Sprinkler piping excluded.
- f) Refer to architectural drawings for type and location of all fire rated walls. Any penetration through wall bottom or top plates shall be Fire Stopped. Any penetration the fire rated wall shall be Fire Caulked. Refer to section 7250 for procedure. Provide submittals of UL designs selected and the product information for approval.
Without limitation pay attention to the following items:
 - a. Chases behind bathroom (wall between corridor and bathroom) and walls between units are fire rated. Fire Caulk all penetration.
 - b. Top and bottom wall plates at ceiling and at floor are part of fire separation. Fire Stop all penetrations through plates.
- g) Any wall location changes shall be coordinated through the G.C for review with the architect.
- h) Sprinkler Contractor to coordinate with the General Contractor the flushing requirements for the fire mains.

Provide the following systems complete with all accessories:

New backflow preventer and shut off valves

Wet alarm valves.

Fire department connection.

Shut-off valves with tamper switches.

Standpipes and zone valves.

Modify existing sprinklers to comply with NFPA 13 for the entire building. Visit site and review existing conditions and compare with architectural demolition and reconstruction plans to identify the scope of the work. Review zone valve locations and sprinkler head types and age. Coordinate with fire department for their requirements and include all requirements in the contract price, **including the replacement of all the heads to residential type. The stairs do not have standpipe. Provide standpipe for these stairs.**

The sprinkler zone flow switches do not have shut of valve and test connection with drain as required by code. Provide as required.

The corridor ceilings are new. All sprinkler heads will be relocated at new ceiling heights.

In the living rooms the ceiling will be dropped to allow electrical wiring to be run. Review room by room, exposed sprinkler piping location and determine what adjustments has to be done to sprinkler piping and heads and include in the bid price.

In bedrooms soffits will be added on both sides of the room to allow electric wiring run. Review exposed sprinkler and include cost of necessary adjustments in the bid price.

G.C will repair and add sheetrock to complete fire separation between floors. Some of the sprinkler piping may have to be rehung. Coordinate with G.C

In retail areas coordinate with fire department and turn heads up if requested.

Provide sprinkler coverage for all concealed spaces containing combustible material.

Sprinkler layout drawings stamped by registered professional engineer.

Perform hydraulic calculations, flow test.
Seismic Constraints.

Spare sprinkler cabinet with 6 sprinklers of each type and necessary wrench.

Painting of all exposed piping as directed by architect.

Dry sprinkler heads in all loading docks.

At the end of project a set of as build drawings shall be provided. All drawings shall be prepared on ACAD 2004 or higher version.

There should be no exposed piping in finished areas. All exposed piping will be painted. Coordinate with G.C for the scope.

- D. Before buying or installing any equipment, complete working plans shall be submitted and approved by the insuring agency. The word "approved", as used in these specifications, means acceptable to the insuring agency and local Fire Department.
- E. After approval of working plans has been received, submit copies in accordance with Section 01600 to the Architect for comments.

1.03 RELATED WORK

- A. The following items are to be done under other Sections:
 - 1. Electrical wiring.
 - 2. Cutting and patching.
 - 3. Water service.

1.04 REGULATIONS, FEES AND PERMITS

- A. All materials and installation shall conform to the requirements of the State of Maine Building Code, local codes and applicable sections of NFPA.
- B. The subcontractor shall give the proper authorities all required notices, pay all fees, and obtain official licenses, and permits. He shall prepare detailed drawings and have them approved by the local Fire Department.

1.05 DRAWINGS

- A. This is a design build project. The contractor shall hire Registered Professional engineer (Maine State registration required) to prepare drawings and calculations in compliance with NFPA 13 and NFPA 14 for the owner's approval.
- B. The sprinkler system shall be designed and hydraulically calculated per NFPA 13 & NFPA 14.
- C. Drawings shall be coordinated through the General Contractor with all other trades including structure prior to completion.
- D. Should any contradiction, ambiguity, error, inconsistency, omission or incomplete system appear in or between any of the Contract Documents, the Contractor shall, before submitting the final bid and signing the contract for construction, notify the General contractor and request a written resolution as to which methods or materials will be required. In the event of conflicting requirements of standards, drawings or specifications, the Contractor shall comply with the more stringent requirements. Before submitting the final bid and signing the contract for construction the Contractor shall obtain a written interpretation from the Architect. In no case shall the Contractor proceed with the affected work until advised by the Architect.
If the Contractor fails to make a request for interpretation or resolution no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the Architect. This generally means the use of the highest quality material, most expensive way of performing work and providing complete functioning systems for proper operation, Each and every trade or Subcontractor will be deemed to have familiarized themselves with all Contract Documents of this project,

including Architectural, Structural, Mechanical, Electrical and Site Work, and to have visited the site, so as to avoid errors, omissions and misinterpretations. Related information may be provided on Contract Documents other than those associated with the Subcontractor's trade. The Contractor is responsible for coordinating related work of all the Contract Documents. No additional compensation will be authorized for alleged errors, omissions and misinterpretations, whether they are a result of failure to observe this requirement or not.

1.06 INSPECTION OF SITE

- A. This Contractor shall prior to submitting his bid, visit the site and inspect conditions affecting the proposed work. Failure to visit the site and misinterpretation of the drawings and specifications resulting therefrom shall be entirely the responsibility of the bidder. No claims based on lack of knowledge or difficulties resulting from same shall be allowed.

1.07 GUARANTEE

- A. All equipment, labor, and materials furnished under this section of the specifications shall be guaranteed for a period of one year from the date of beneficial occupancy thereof against defective materials, design and workmanship. Materials and/or equipment found defective shall be replaced with new materials and/or equipment at this Subcontractor's expense. This Subcontractor shall guarantee that all elements of the system are of sufficient capacity to meet the requirements set forth herein. Upon receipt of notice from the Owner or Architect of any failure during the guarantee, the defect shall be remedied promptly by and at the expense of this Subcontractor.
- B. This Subcontractor shall see that there is no conflict in the work and no conflict with the work of other trades. Any conflict shall be immediately brought to the attention of the Architect.
- C. In general, the plumbing piping and ventilation systems shall be given the right of way. All piping shall be installed to conform with finished work as shown on the Architectural drawings, and shall be installed to clear all electrical equipment indicated.

1.08 SUBMITTAL

- A. Submit appropriate drawings and descriptive literature giving performance data, physical size, material, etc. for all items under this Section, including the following:

Fire department connection.

OS&Y valves.

Waterflow alarm switches.

Sprinkler heads.

Piping and sprinkler heads layout drawings with hydraulic calculations.

Fire stopping methods.

1.09 AS BUILT DRAWINGS

- A. At completion of the job, a set of blue lines shall be provided correct and complete, showing locations of piping, valve, drains and sprinkler heads.

1.10 CERTIFICATES OF APPROVAL

- A. Certificates of approval of the completed installation by the insuring agency and the local fire department shall be furnished to the Architect.

PART 2 - PRODUCTS

2.01 PIPE AND FITTINGS

- A. All piping for the sprinkler system 2 inches and smaller in size, shall be Schedule 40 black steel pipe with threaded ends conforming to ASTM Standard A120. Latest Amendment, approved for use in Fire Protection Systems. All piping inside the building, 2 1/2" and larger in size, unless otherwise noted, shall be Schedule 10 black steel pipe with rolled groove ends, approved for use in Fire Protection Systems. CPVC pipe (Blaze master) can be used at the contractors option where allowed by code.
- B. Fitting for the sprinkler systems may be either cast iron or malleable iron. Cast iron fittings shall be extra heavy pattern for pipe sized larger then two inches (2"). Malleable iron fittings of standard weight pattern will be acceptable in sizes up to six inches (6"). U.L. approved and F.M. listed groove fittings will be allowed. All fittings shall be approved by Underwriter Laboratories for use in sprinkler system and shall be designed and guaranteed for a working pressure of not less then 174 psi cold water pressure.
- C. All close and shoulder nipples shall be of corresponding materials as the pipe and shall be extra heavy pattern. All pipe shall be run true to line and grade and, in general, parallel to walls and ceilings. All open ends of the pipe lines, equipment, etc., shall be properly capped and plugged during the installation in order to keep dirt of foreign materials out of the system. All work shall be performed in a practical manner and according to the highest standards of workmanship.
- D. All threaded pipes shall have full tapered threads with ends reamed out after threading and cutting.
- E. The interior of all pipes and fittings shall be cleaned before assembling. All pipe threads (not fitting) shall have a thorough application of approved pipe joint cement before assembling. Any leaky joints shall be remade, as caulking will not be permitted. All pipe shall be pitched as required. Means shall be provided to completely drain the system.

2.02 SPRINKLER HEADS

- A. Sprinkler heads shall be wet Type and the latest designs by Grinnell, Reliable, Automatic Sprinkler Co., Central Sprinklers Co. or approved equal.

2.03 VALVES

- A. Except for miscellaneous small valves, all valves shall be plainly marked with the name or trade-mark of the manufacturer, the year of the manufacture, and the Factory Mutual identification mark. All gate valves controlling water flow shall be OS&Y with tamper switch suitable for 150 lb. working pressure. Valves 2" and smaller shall have bronze bodies and bonnets with screwed ends. Valves 2-1/2" and larger shall be flagged. All gate and seat rings shall be machined bronze. Stems shall be bronze and of a design so that the stuffing box may be repacked under pressure

when the valve is wide open. All hand wheels shall be marked with an arrow and the word "OPEN". Listed butterfly valves can be used.

2.04 FIRE DEPARTMENT CONNECTION

- A. 4" Storz type or as required by the local fire department.

2.05 WET ALARM VALVE

- A. Wet alarm valve shall be constant pressure type, positive-locking clapper, fast-acting, two piece construction permitting quick, easy maintenance and replacement of internal valve parts. All working parts shall be bronze or brass. Provide with retard chamber, electric alarm gong, pressure switch.
- B. Make: Viking, Star, Reliable.

2.06 PENETRATION AND FIRESTOPPING

- A. All metal pipe penetrating through a fire-rated wall assembly shall have the space between the conduit and the fire rated membrane (drywall) filled with a UL approved fire caulk installation.
- B. All metal pipe penetrating through fire-rated floor assembly shall have the space between the pipe and the fire rated membrane (drywall, concrete or plywood decking) filled with a UL approved fire caulk installation.
- C. Install a UL approved fire caulk installation where any pipe penetrates a fire stop (top and bottom wall framing plates) inside the walls.
- D. Large openings in slabs, which accommodate many pipes, shall be filled with concrete so that the rodent protection of the slab is maintained.
- E. All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air filtration through or around penetration. Coordinate with fire stopping requirements.
- F. Large openings in slabs, which accommodate many pipes, shall be filled with concrete so that the rodent protection of the slab is maintained.
- G. All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air filtration through or around penetration. Coordinate with fire stopping requirements

PART 3 - EXECUTION

3.01 INSTALLATION

- A. All pipe shall be new, of weights specified and scale free. Pipe lines shall be made up with as few joints as possible. Threads shall be clean cut of full length. The ends of all pipe shall be reamed after cutting and all burrs and fins removed. The inside of all pipes shall be thoroughly cleaned and straightened before erection. All welding shall conform strictly to the code of the American Welding Society and shall be tested as prescribed by the Code. In general, pipe shall pitch so as to afford complete drainage of all parts of the system.
- B. Joints: All screwed joints shall be made up with suitable compound applied to the pipe in all cases and never to the fittings. If it becomes necessary to back off a fitting after it has once been made up with compound, the threads shall be cleaned and new compound applied before remaking the joint. All flagged joints shall be made up with appropriate screwed cast iron companion flanges and drilled to American Standard, machine steel with square heads and cold pressed hexagonal nuts. Gaskets shall be 1/16" red rubber, ring type with outside diameter tangent to the bolts.
- C. Drain connections: Provisions shall be made to drain all low points or pockets occurring in the systems. Drain valves shall be hose end gate valves, straight or angle pattern.
- D. Test connection: A test gauge connection shall be provided at the highest or at the most remote point in the system whichever is calculated to show the east pressure under normal flow conditions.
- E. Valve signs: All control valves shall be marked with properly designated signs.
- F. The installation shall be coordinated with other trades to allow space allocations and avoid conflicts during construction.

3.02 TESTS

- A. When work is completed, each system shall be subjected to a test pressure of 100 psi water pressure at topmost outlet and held for two hours. 200 psi at the Fire Department connections, and held for two hours. After completion of tests and approval by the Architect, this Subcontractor shall furnish the Architect a certificate as required by Pamphlet Nos. 13, 14 and 20 of the National Fire Protection Association.

END OF THIS SECTION

SECTION – 15400
PLUMBING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. The drawings, General and Supplementary Conditions of the Contract and Division 1 General Requirements apply to the work of this Section.
- B. Examine all drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

1.02 DESCRIPTION OF WORK

- A. This is a design build project. The contractor shall hire Registered Professional Engineer (Maine State registration required) to prepare drawings and calculations for the owner's approval. Engineer will provide \$1,000,000.00 liability insurance. The engineer shall provide during the construction two site visits and submit report. The engineer will also provide a final punch list and report. The engineer shall also provide all the site visits required by the inspection agencies and the building department. The work covered in this section of the specifications consists of furnishing all labor, equipment, appliances and material and in performing all operations in connection with this Plumbing System, complete, in strict accordance with this Section of the specifications and without limiting the generality thereof includes:

1. General Requirements:

- a) The intention is to provide complete installed plumbing systems as required by Maine State Plumbing Code, Maine State Building Code and these specifications including drawings and calculations prepared by a Registered Professional Engineer (Maine State registration required).
- b) If any contradiction, ambiguity, error, inconsistency, omission or incomplete system appears in or between any contract documents, the sub contractor shall before submitting the final bid and signing the contract for construction, notify the general contractor and request a written resolution as to which methods or materials will be required. If the contractor fails to make a request for interpretation or resolution, no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the architect. This generally means the use of the highest quality material, most expensive way of performing the work and providing complete functioning system for proper operation.
- c) Each and every trade or subcontractor will be deemed to have familiarized themselves with all the contract documents of this projects, including architectural, structural, mechanical, electrical, and site work, and to have visited the site, so as to avoid error, omissions and

misinterpretations. Related information may be provided on contract documents other than those associated with the subcontractor's trade. The contractor is responsible for coordinating related work of all the contract documents. No additional compensation will be authorized for alleged errors, omissions or misinterpretations whether they are a result of failure to observe this requirement or not.

- d) All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air infiltration. Coordinate with fire stopping requirements.
 - e) No component of any system shall run through the stair enclosure that does not relate to or serve the stair enclosure.
 - f) Refer to architectural drawings for type and location of all fire rated walls. Any penetration through wall bottom or top plates shall be Fire Stopped. Any penetration the fire rated wall shall be Fire Caulked. Refer to section 7250 for procedure. Provide submittals of UL designs selected and the product information for approval.
Without limitation pay attention to the following items:
 - a. Chases behind bathroom (wall between corridor and bathroom) and walls between units are fire rated. Fire Caulk all penetration.
 - b. Top and bottom wall plates at ceiling and at floor are part of fire separation. Fire Stop all penetrations through plates.
 - g) Any wall location changes shall be coordinated through the G.C for review with the architect.
 - h) Plumbing Contractor to coordinate with the General Contractor the flushing requirements for the water mains.
 - i) All roof penetrations shall be on the back slope of the roof minimum 10 ft. away from ridge.
2. Sanitary, vents, water and gas systems as described below: Review both demolition and construction drawings to identify the bath and kitchen revisions and all other plumbing work to be done. In general all the bathrooms are to be renovated and some bathrooms to be reconfigured. For renovated bathrooms where the fixtures are to be replaced in place remove old fixtures and dispose and provide new fixtures and fittings including new toilet flange. In renovated kitchens, remove old kitchenette and provide new fixtures and fittings. Modify rough in all the bathrooms and kitchens where fixtures positions are reconfigured.
3. Roof drainage system shall remain as is. If the roof is to be replaced, replace roof drains. **Insulate all horizontal drain piping.**
4. Gas piping to boilers, roof top HVAC units, retail spaces. Provide individual meters for housing and retail for each retail space. Repipe existing restaurant service only. Coordinate with HVAC contractor prior to bid.

5. Gas piping design shall be based on low pressure gas.
6. Sub meters for city water shall be provided for each dwelling unit, each retail space and common areas. Plumbing contractor shall coordinate all work with G.C.
7. Provide central hot domestic hot water heating system with recirculation loop per code. The capacity will be minimum 600,000 BTH with 400 gallon storage tank and Holby mixing valve.
8. Stub up sanitary and water piping for future retail space plumbing. Terminate at the retail premises. ~~Provide check meter for each retail.~~
9. Elevator sump pump (Oil/Minder) installed and piped per code.
10. Plumbing fixtures.
11. Pipe insulation.
12. Testing, sterilization per Code and local water department requirements.
13. Access panels if required.
14. Permits and fees except fees for utility connections.
15. Exterior non-freeze, key type wall hydrants per Code.
16. Back flow preventors per code.
17. Pressure reducing valves as required by the local utility company.
18. Pressure tasting of the systems per Code and manufacturers recommendations.
- 19. Provide hose bib and floor drain for the laundry room.**
- 20. There is a 4" service and (2) meters. Change 4" main valve and provide individual meters for each retail tenant and also for residential units. Repipe system.**

1.03 RELATED WORK IN OTHER SECTIONS

- A. The following items shall be furnished or performed under other Sections of these Specifications:

Excavation and backfill	Section 02200	
Power Wiring	Section	16000
Water Service	Section	15400
Access panels	Section	08305

1.04 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. Material and apparatus shall be installed as fast as conditions of the building will permit and must be installed promptly when and as desired.
- B. Check with Heating, Ventilating and Air Conditioning work, and Electrical work, as to location of pipes, ducts, slights and apparatus, and install Plumbing in such a manner as to avoid interference with other trades.

1.05 MATERIAL AND EQUIPMENT STANDARDS

- A. All material shall be new and of the best quality. Where no specific make of material is mentioned, any first class product of a reputable manufacturer may be used provided it conforms to the drawings and specifications and has the approval of the Architect.
- B. Materials and equipment offered for approved equal shall be equal to those specified in type, size, quality, capacity, space requirements, and power requirements. The request for each substitution must be accompanied by complete specifications of the materials or equipment offered, altogether with drawings, or samples where necessary to properly appraise the materials and equipment. No equipment or material shall be used unless previously approved by the Architect. When one or more manufacturer's names are given for a product, and these names are not followed by the words "or approved equal", the bid shall be based on the equipment named in the specifications.

1.06 DRAWINGS

- A. This is a design build project. The contractor shall hire Registered Professional engineer (Maine State registration required) to prepare drawings and calculations in compliance with Maine State Plumbing Code, Maine State Building Code and these specifications.
- B. Drawings shall be coordinated through the General Contractor with all other trades including structure prior to completion.
- C. The design should incorporate freezing prevention for all water, sanitary and storm drain piping in unheated spaces including garage. Heat trace and insulation alone will not be accepted.
- D. Should any contradiction, ambiguity, error, inconsistency, omission or incomplete system appear in or between any of the Contract Documents, the Contractor shall, before submitting the final bid and signing the contract for construction, notify the General contractor and request a written resolution as to which methods or materials will be required. In the event of conflicting requirements of standards, drawings or specifications, the Contractor shall comply with the more stringent requirements. Before submitting the final bid and signing the contract for construction the Contractor

shall obtain a written interpretation from the Architect. In no case shall the Contractor proceed with the affected work until advised by the Architect.

If the Contractor fails to make a request for interpretation or resolution no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the Architect. This generally means the use of the highest quality material, most expensive way of performing work and providing complete functioning systems for proper operation,

Each and every trade or Subcontractor will be deemed to have familiarized themselves with all Contract Documents of this project, including Architectural, Structural, Mechanical, Electrical and Site Work, and to have visited the site, so as to avoid errors, omissions and misinterpretations. Related information may be provided on Contract Documents other than those associated with the Subcontractor's trade. The Contractor is responsible for coordinating related work of all the Contract Documents. No additional compensation will be authorized for alleged errors, omissions and misinterpretations, whether they are a result of failure to observe this requirement or not.

1.07 GUARANTEE

- A. The Plumbing Contractor shall guarantee to make good all faults and defects in the plumbing system due to defective or improper materials or workmanship that may appear within one year from the date of final acceptance of the work and make all repairs, replacements, and changes, within the guarantee period which are required to put the systems in proper operation and condition, without cost to the Owner.

1.08 PROTECTION AND CLEANING

- A. The Plumbing Subcontractor shall take effective measures to protect all materials, fixtures and fittings from loss or damage; and all pipe openings from obstructions, throughout the construction.
- B. All dirt and debris resulting from the work shall be thoroughly taken up and removed from the premises. All fixtures, exposed trim and equipment shall be cleaned and polished to leave for inspection and use in the best possible condition.

1.09 PUTTING EQUIPMENT IN OPERATION

- A. All mechanical equipment installed in connection with Plumbing work shall be put in operation in the presence of duly authorized representatives of the Owner with 24-hour notice given the Owner's representative for each appointment. Instructions shall be given to the Owner's employee appointed to familiarize himself with the systems and equipment. Two copies of the operating manual, parts list, and bulletins shall be delivered to the Owner for each item of equipment.

1.10 INSPECTION OF SITE

- A. This Subcontractor shall, prior to submitting his bid, visit the site and inspect conditions affecting the proposed work. Failure to visit the site and

misinterpretation of the drawings and specifications resulting therefore shall be entirely the responsibility of the bidder. No claims based on lack of knowledge or difficulties resulting from same shall be allowed.

1.11 MISCELLANEOUS IRON AND STEEL

- A. Provide steel supports and hangers as shown on drawings or as required to support piping, pumps, tanks or other equipment.
- B. All work shall be cut, assembled, welded and finished by skilled mechanics. All shop fabricated iron and steelwork shall be cleaned and dried and given a shop coat of paint on all surfaces and in all openings.

1.12 REGULATIONS, FEES AND PERMITS

- A. All materials and the installation thereof shall conform to the requirements of the State Building Code, all State and local laws, rules and regulations and codes pertaining thereto and also to the requirements of the National Board of Fire Underwriters and all applicable Sections of the NFPA. Where provisions of the contract drawings conflict with any codes, rules or regulations, the latter shall govern.

Where the contract requirements are in excess of applicable codes, rules and regulations, the contract provisions shall govern unless the Engineer rules otherwise.

- B. All legally imposed charges made by local authorities for the work of this Section involving the connection, inspection and approval services of all bureaus administering all applicable codes and regulations shall be provided hereunder at no additional expense to the Owner.
- C. The Plumbing Contractor shall give the proper authorities all required notices or information relating to work in his charge, pay all fees, obtain all official licenses, permits and certificates, and comply with the rules of the Department of Public Safety.

1.13 RECORD DRAWINGS

- A. Record drawings shall be kept on the job site and updated continuously by the Contractor as the work progresses.
- B. Record drawings shall show exact locations and sizes of all the work to be concealed. Especially note the location of the valves, clean outs etc.
- C. Non-availability of the updated record drawings or inaccuracies therein shall be grounds for cancellation and/or postponement of any final inspection by the Engineer.
- D. The record drawings required to be furnished under this Section are of drawings numbered P-#.

1.14 ELECTRICAL WORK

- A. Power wiring to pumps and disposers will be furnished and installed by the Electrical Contractor.
- B. All wiring, motors and controls furnished under this Section shall be in accordance with the Electrical Work Section of these Specifications, the National Electrical Code, and applicable local codes. All 110V, 24V control wiring for the aquastats shall be by the plumbing contractor.

1.15 SUBMITTAL

- A. Submit appropriate shop drawings or descriptive literature giving performance data, physical size, wiring diagrams, configuration, capacity, materials, etc. for all items under this Section including the following:
 - 1. Piping, valves and plumbing fixtures.
 - 2. Mixing valves
 - 3. Insulation
 - 4. Fire stopping methods.

1.16 CUTTING AND PATCHING

- A. The Plumbing Contractor shall be responsible for all required cutting and drilling associated with his work but in no case shall cut into any structural elements without the written approval of the Architect.

1.17 ACCESS PANELS

- A. The Plumbing Contractor shall provide all required access panels and shall be responsible for providing locations and quantities of the access panels the General Contractor. General Contractor. and install all access panels.

PART 2 - PRODUCTS

2.01 HANGERS AND SUPPORTS

- A. Furnish and install all hangers and supports and all steel framework required for the support of various systems. All piping shall be supported from the building structure by means of approved hangers as manufactured by Carpenter-Patterson, Grinnell Co., or Fee & Mason.
- B. Horizontal piping shall be hung with adjustable wrought iron or malleable iron pipe hangers, spaced as follows:

<u>PIPE SIZE</u>	<u>COPPER</u>	<u>STEEL</u>	<u>ROD SIZE</u>
3/4" to 1"	6 ft.	8 ft.	3/8"
1-1/4" to 2"	8 ft.	10 ft.	3/8"
2-1/2" to 4"	10 ft.	14 ft.	1/2"

- C. Copper tube straps may be used on water lines up to 1-inch for wood joist construction only. Bands or rings supporting copper tubing shall be heavily copper plated.
- D. Hangers shall be located not more than 4 feet from elbow or 10 feet on screwed piping. Hangers for piping, sizes 4" and smaller, shall be Carpenter-Patterson No. 1A Band Type, Grinnell Co., or Fee & Mason black steel with hanger rods with machine threads. For copper tubing, the hangers shall be copperized. Hangers for piping larger than 4" shall be adjustable clevis, wrought iron or malleable iron.
- E. Chain, strap, perforated bar or wire hangers will not be approved. Approved gang hangers may be used in lieu of separate hangers on pipes running parallel to each other and close together. Where used for copper tubing, the gang hangers shall have copper saddles or shall be sheet-lead coated.
- F. Vertical stacks of soil, waste, vent and conductor piping shall have friction clamps on each floor. Vertical supply risers shall be supported at each floor by friction clamps or inserting around the supply pipe, a coupling, which shall rest on pipe sleeve. Soil, waste and conductor stacks shall be firmly supported at their base, either by a suitable hanger placed on the horizontal line near the riser, or by a base fitting set on a pedestal or foundation carried down to a firm bearing. Copper piping shall be secured every 6 feet.

2.02 CROSS CONNECTIONS

- A. No piping shall be installed in a manner to permit backsiphonage or any flow or polluted water or other liquid into water service or distribution piping under any conditions.

- B. Air gaps, receptor type drains, approved back-flow preventors and approved vacuum breaking devices shall be provided as required by State and local codes and ordinances. Piping to inlets below fixture overflow shall have vacuum breakers of make, design, size and location approved by the Inspector of Plumbing. Breakers shall not be concealed. Breakers shall be full size of pipe and shall be Beaco, Chicago, or Watts.

2.03 VALVES

- A. The entire plumbing installation shall be provided with valves located to permit easy operation, replacement and repair. Valves shall be the product of one manufacturer except as noted. Jenkins Bros., Hammond, Walworth, Nibco, shall be the standard required.
- B. Valves shall be bronze, except as otherwise specified. Valves on each hot water recirculation branch line shall be combination balancing and stop type, all bronze, or ball valves. All shut-off valves shall be bronze ball valves.
- C. Domestic water mixing valve shall be self-contained, thermostatic type, including hot water temperature limit, check valves, strainers, and stop valves. Valve shall be selected for low pressure differential at required flow.
- D. Make: Leonard, Watts, Symmons, Powers, Johnson.

2.04 UNIONS AND FLANGES

- A. Unions and flanges shall be furnished and installed at all pieces of equipment to allow for easy removal and dismantling of equipment. No general dismantling of piping systems will be allowed for removal of equipment. Unions shall be the product of Hammond Co., Jamesbury, or Hancock.

2.05 VALVE TAGS AND PIPE MARKING

- A. All valves in mechanical room shall have 1-1/2" tags attached to stem of each valve. Each tag shall be stamped clearly with large letters and numbers to designate the valve number and the service. A printed or typewritten list or schedule of all valves shall be made which shall give the number, service and location of each valve. The above list shall be mounted in fused plastic in a location directed by the Architect. All valve numbers shall correspond to numbers indicated for valves on the record drawings.
- B. All piping in mechanical room and corridors except sanitary, vent and storm water, shall be marked with Seton "Set Mark" or approved equal pipe markers showing the directions of flow and pipe service after pipe is insulated and/or painted. Use a brass tag that is secured to the valve with numbers, and charts are placed in the

mechanical room area in a black framed 8 x 11 frame, also has contact information to contractor.

2.06 PENETRATION AND FIRESTOPPING

- A. All metal pipe penetrating through a fire-rated wall assembly shall have the space between the conduit and the fire rated membrane (drywall) filled with a UL approved fire caulk installation.
- B. All metal pipe penetrating through fire-rated floor assembly shall have the space between the pipe and the fire rated membrane (drywall, concrete or plywood decking) filled with a UL approved fire caulk installation.
- C. Install an expandable collar where a PVC pipe penetrates each membrane of a fire rated wall assembly.
- D. Install expandable collar where a PVC pipe penetrates each membrane of a fire rated floor/ceiling assembly.
- E. Install a UL approved fire caulk installation where any pipe penetrates a fire stop (top and bottom wall framing plates) inside the walls.
- F. Large openings in slabs, which accommodate many pipes, shall be filled with concrete so that the rodent protection of the slab is maintained.
- G. All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air filtration through or around penetration. Coordinate with fire stopping requirements

2.07 WATER METER

- A. Furnish and install water meter and check meters at the equipment rooms. Meter shall comply with the requirements of the local Water Department. Install gate valve on each side of meter.

For meters 3-inches and larger provide strainer on the inflow side of the meter. In the absence of local water department preference, use a Rockwell or Hersey turbine type meter for 3" and larger service.

2.08 HOT WATER CIRCULATION

- A. Provide per code.

2.09 MISCELLANEOUS FIXTURES AND ACCESSORIES

- A. Wall Hydrant: 3/4" hose thread, non-freeze bronze hydrant, automatic draining, integral vacuum breaker and "T" handle.

- B. Make: J.R.Smith 5609, Josam, Zurn, Nibco, Woodford 65C key type.
- C. Hose Bibb: Woodford Model No. 24 or equal including vacuum breaker, 3/4" hose thread on spout, polished chrome finish.
- D. Vacuum Relief Valve: For installation in cold water supply line to heaters and storage tanks. Valve shall comply with ANSI Z21.22, State Plumbing Code and shall be A.G.A. certified. Valve shall have a cross sectional area equal to one pipe size smaller than the supply pipe. Use multiple valves in large systems. Make: Watts No. 36A, A.W. Cash, Beeco, Chicago.
- E. Combination P&T Valve: Self-closing, 150 psi setting, 210 degree. F with test lever and thermostat with non-metallic protective coating. Valve shall meet ANSI standard Z21.22 and shall be A.G.A. certified. Size per State Plumbing Code. Make: Watts Type 40 through 340, A.W. Cash, Taco, B&G.
- F. Pressure Gauges: U.S. Gauge P1525 or approved equal, Marsh, Terice, 2-inch dial, stainless steel bulb, range 0 to 100. Install with stock cock.
- G. Laundry Valve: Sioux Chief with CPVC connections, 1-1/2" combination drain and valve assembly. Provide one for each wash machine.
- H. Backflow Preventor: Continuous pressure, for installation in boiler feed line. Brass body, integral strainer, union connections, double check valves. Make: Watts No. 909D or equal, A.W. Cash, Beeco.
- I. Thermometers: Adjustable angle, 7-inch aluminum case, separable socket, H.O. Terice Co., or equal.

2.10 CLEANOUTS, COVERS AND FRAMES

- A. Floor cleanout: Duco cast iron with tapered cleanout plug. Adjustable scoriated polished bronze top for concrete finished floors; recess type top for tile or Terrazzo floors. Provide cleanout stainless steel marker for cleanouts that occur in carpeted floors.
- B. Make: J.R.Smith, Fig. 4720, Zurn, Josam.
- C. Wall cleanout: Cleanout plugs concealed in walls shall be made accessible with chrome plated bronze round or square frame and cover secured with slotted screws.
- D. Make: J.R.Smith Fig. 4720, Zurn, Josam.

2.11 DRAIN

- A. General Use Drain: Cast iron drain with double flange, weep-holes, caulk bottom outlet, adjustable polished brass strainer, J.R. Smith, 2010-A, or approved equal, Zurn, Josam. Provide flashing clamp for drains in slabs above ground floor level. Use for laundry rooms and other finished areas.
- B. Drains in Boiler Rooms, shall be J.R. Smith #2230 or equal Zurn, Josam with cast iron grate and sediment. Watts is acceptable product.

2.12 INSULATING FITTINGS

- A. Furnish and install patented type dielectric fittings or couplings, Epco, Vallett, Watts in pipe systems wherever dissimilar metals are joined.
- B. Dielectric fittings shall not be concealed within walls or ceilings.

2.13 INSULATION

- A. All insulation when installed shall have composite fire and smoke hazard ratings as tested by Procedure ASTM-E-84, NFPA-255, and UL-723, not exceeding a flame spread of 25 and smoke developed of 50 when compared with red oak as 100, as approved under NFPA and NBFU Pamphlet No. 90A and No. 90B standards.
- B. Insulation material and application shall be in accordance with the State Building Code and NFPA.
- C. Cold water: Piping shall be insulated with 1/2" thick, fiberglass insulation with factory-applied all-service jacket secured in place with self-sealing laps. Fittings shall be insulated with premolded PVC fitting covers secured in place with stainless steel tacks.
- D. Hot water: Piping shall be insulated with fiberglass pipe insulation with factory-applied all-service jacket secured in place with outward clinching staples. Fittings shall be insulated with premolded PVC fitting covers secured in place with stainless steel stacks.
- E. Piping, insulation materials as manufactured by Gustin-Bason, Johns-Manville, Owens-Corning, Knauf, or Certain Teed.
- F. Insulate the following:
 - 1. All cold water piping: 1/2" thick rubber .
 - 2. Hot water piping: 1" thick rubber on all piping
 - 3. Hot water recirculation: 1"

4. Horizontal rain leaders: ½" fiberglass
5. All piping under handicapped lavatories and sinks with premolded True-Bro Basin Guard or Lav shield Guard.

2.14 PIPE, FITTINGS AND FABRICATION

- A. All piping materials for the various systems specified under this Section shall conform to the standards listed below. (Refer to system materials for type of pipe to be used.)
 1. Bell and spigot, cast iron, service weight, both pipe and fittings products of one manufacturer; Combustion Engineering, Central Foundry, Russell, Alabama Foundry, or Charlotte Foundry. Piping shall be coated with asphaltum or coal tar pitch inside and outside.
 2. Hubless cast iron, service weight, ASTM-A-74, manufactured and installed in accordance with C.I.S.P.I. Standard 301-75 and Pamphlet 100.
 3. DWV copper tubing with cast brass or wrought copper drainage pattern fittings.
 4. Type "L" copper tubing (hard temper), ASTM-B-88, manufacturers as listed above, used with cast brass or wrought copper solder fittings.
 5. Black steel pipe, Schedule 40 CW/ERW black steel pipe with welded joints for 2-1/2" and larger, Schedule 40 CW/ERW with screwed malleable fittings for 2" and under as manufactured by Stockham, Wheatland Tube, U.S. Steel or Republic.
 6. Ductile iron, cement lined, 150 psi pressure rated pipe, ANSI A21-51, with ductile iron fittings conforming to ANSI A21.10.
- B. Piping Joints
 1. Joints in cast iron bell and spigot piping shall be caulked and made gas and watertight, firmly packed with picked oakum to a depth of 1-1/2 inch, and secured with pouring of molten virgin lead. Joints for Titon or Push Joints will be as per manufacturer's recommendations.
 2. Joints for hubless cast iron pipe and fittings shall be made with double clamp retainer sleeve and neoprene gasket as manufactured by MG or Clamp-All and approved by State Plumbing Code.
 3. Joints in plastic piping (except special wastes) shall be made with solvent cement manufactured specifically for the materials to be joined.

4. Joints in copper tubing shall be properly fluxed and made with 95-5 solder.
5. Joints in threaded steel shall be for National taper screw thread with approved compound applied to male thread, and with pipe ends reamed.
6. Joints between copper tubing and cast iron soil pipe shall be made with cast iron bronze or brass adapters for leading into bell and soil pipe.
7. Joints on cast iron water pipe shall be made with cast iron, Dresser, Smith-Blair, or Adams coupling.

C. System Materials:

Sanitary and vent: Below Ground: Sch.40 PVC with solvent joints.

Above Ground: Sch.40 PVC with solvent joints.Foam Core

Water Piping: Corzan and Flowguard CPVC

Gas Piping: Schedule 40 ER/ERW black steel with threaded joints or welded or Tracpipe per Code.

2.15 PLUMBING FIXTURES (TO BE VERIFIED)

- A. See attached plumbing fixture schedule:

PART 3 - EXECUTION

3.01 SERVICES AND SYSTEMS

A. Water System:

1. Piping shall be run parallel with the lines of the building; well supported from the structure; free from pockets and sags; pitched to drain points; and installed with pipe expansion loops, mechanical expansion joints, pipe guides, offsets and anchors to adequately care for thermal expansion.
2. Piping shall be installed to provide not less than 3/4" spacing from finished covering to other covering or surfaces of other construction.
3. All piping shall be protected from water hammer or shocks by approved water hammer arrestor. Air cushion shall be provided at tops of risers, and mechanical arrestor at all quick closing or solenoid valve equipped apparatus.
4. Drain points at bottom of all risers shall have 3/4" bronze hose and drawoff, cap and chain.
5. Valves shall be installed as indicated on riser diagrams, on branches leaving mains, at base of risers, at branches to large groups of fixtures and at single fixtures when trim does not include stops.
6. Final connections shall be made to all fixtures, appliances, or equipment with plumbing connections whether furnished by this contractor or by others.
7. Sterilization: Before any use of water system is made for domestic purposes, sterilize the entire water distribution system.
8. Arrange for installation of domestic water service. Assist the general contractor to make all necessary applications and secure all approvals from local Water Department.
10. Water piping shall be covered as specified except where chrome plated piping is used, or other notation is made.
11. The installation shall be coordinated with other trades through G.C. to allow space allocations and avoid conflicts during construction.

B. Drainage System:

1. The interior drainage systems shall be constructed using materials and methods as specified and/or indicated.
2. Provide properly trapped and vented waste connections to fixtures, floor drains, and special equipment. Each drain leaving the building shall have cleanout installed to meet the approval of the Plumbing Inspector.
3. Drain piping shall be uniformly pitched to conform with local and state code requirements; the inverts indicated on drawings shall be checked and accurately set. In the absence of invert elevations, check site utility drawings and verify location, size, and elevation of street sewers before proceeding.
4. Cleanouts shall be installed at the base of all stacks, beyond running traps, at changes in direction of more than 45 degrees, at not over 50 foot intervals in horizontal runs. Cleanout tees shall not be used where it is possible to use a straight tee.
5. Traps of material and design approved by local or State Plumbing Inspector shall be furnished and installed by the Plumbing Contractor for all equipment and appliances. All traps shall have the bottom cleanouts where access can be provided.
6. Vents through roof shall be base flashed by roofer. Vents shall extend at least two feet above the roof.
7. Carefully inspect for damaged materials. Run piping as shown on the drawings, making changes in direction with long sweep, 1/8 and/or 1/16 bends. Make connections to horizontal lines with Y's and 1/8 bends. Connections to stacks may be with sanitary T-fittings.
8. Clamps on hubless cast iron type joint shall be tightened to not less than 48 pound of torque. A calibrated present torque wrench developed by pipe manufacturers shall be used.
9. Hubless type joints suspended more than 1/8 inches below the floor slab shall be provided with sway bracing.
12. Plastic piping shall be protected from damage due to thermal expansion. Install expansion fittings as required by code and in accordance with the manufacturer's recommendations. System to meet State of Maine Plumbing Codes
13. The installation shall be coordinated with other trades through G.C. to allow space allocations and avoid conflicts during construction.

C. Gas Systems:

1. Handle owner's application for gas service and meter to the gas Company. Any fees and costs incurred shall be paid by the owner.
2. All gas piping from master meter to equipment shall be by Plumbing Contractor.
3. Pipe dope shall be for natural gas service. Pitch all piping to low points with 6" long drip pockets and removable caps at low points. Minimum pitch 1/4" in 15'-0".
4. Take branch lines from top or sides of horizontal lines, not the bottom. Provide a cock, dirt leg and suitable pressure regulator at each gas utilization device, except for devices furnished with regulators
5. The gas system installation shall include all pipe, fittings, valves and all accessories and incidentals to conform with code requirements.
6. All piping shall be level and true and shall be installed in accordance with all State and Local Code requirements including NFPA Pamphlet No. 54 and State Gas Regulatory Board.
7. Gas valves 2-1/2" and larger including main shutoff shall be lubricated wrench operated plug valve with round post opening and flanged ends.
8. Gas valves 2" and smaller shall be bronze body ball valves with lever handle, approved by local and State Codes. Gas system will be installed to meet State Gas Codes and Manufacturer's recommendations
9. The installation shall be coordinated with other trades through G.C. to allow space allocations and avoid conflicts during construction.

3.02 TESTING

- A. Testing of all systems shall be done at the expense of the Plumbing Subcontractor, and with equipment furnished by him. Testing shall be done in the presence of duly authorized inspectors and the Owner's representative with 48-hour notice given these authorities. All systems shall be repaired and retested until requirements are met, without additional expense to the Owner.
- B. Sanitary and vent piping shall be tested by plugging where leaving the building at outlets on the system; filling the system by section and proving tight, without addition of water of one hour duration. Systems tested by sections shall be subjected to a water pressure of 10 psi gauge and proven tight for one hour or by similar test required by the Inspector of Plumbing. Install necessary test plugs in stacks during installation.
- C. Interior water piping shall be tested to meet codes and Inspector will be notified to

inspect and approve installation on phases

- D. Gas piping shall be tested with air pressure at 15 inches of mercury for 2 hours, or as required by local authority. All systems will be tested to meet codes and Inspector will be notified to inspect and approve installation on phases

3.03 STERILIZATION

- A. The entire potable water distribution system shall be thoroughly disinfected per code and inspector requirements.

3.04 COMPLETION

- A. Provide properly executed certificate of inspection from authorities having jurisdiction.
- B. Instruct such persons as the Owner designates in the proper operation and maintenance of the systems and their parts. Submit to the Architect a letter naming the person or persons so instructed and the dates of such instruction.
- C. Prepare and deliver literature showing operating, service and replacement data for all equipment which will require periodic maintenance or replacement.
- D. Verify that project record documents are complete as specified under Submittal and Record Documents.

END OF THIS SECTION

SECTION – 15500
HVAC

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the printed form of Contract and General Conditions, Supplementary Conditions, and Division 1 which are hereby made a part of this Section of the Specifications will be negotiated with G.C.
- B. Examine all drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.

1.02 DESCRIPTION OF WORK

- A. This is a design build project. The contractor shall hire Registered Professional engineer (Maine State registration required) to prepare drawings and calculations for the owner's approval. Engineer will provide \$1,000,000.00 liability insurance. The engineer shall provide during the construction two site visits and submit report. The engineer will also provide a final punch list and report. The engineer shall also provide all the site visits required by the inspection agencies and the building department. The work covered in this section of the specifications consists of furnishing all labor, equipment, appliances and material and in performing all operations in connection with this HVAC System, complete, in strict accordance with this Section of the specifications and without limiting the generality thereof includes:

1. General Requirements:

- a) The intention is to provide complete installed HVAC systems as required by Maine State Mechanical Code, Maine State Building Code, ASHRAE standards and these specifications including drawings and calculations prepared by a Registered Professional Engineer (Maine State registration required).
- b) If any contradiction, ambiguity, error, inconsistency, omission or incomplete system appears in or between any contract documents, the contractor shall before submitting the final bid and signing the contract for construction, notify the general contractor and request a written resolution as to which methods or materials will be required. If the contractor fails to make a request for interpretation or resolution, no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the architect. This generally means the use of the highest quality material, most expensive way of performing the work and providing complete functioning system for proper operation.
- c) Each and every trade or subcontractor will be deemed to have familiarized themselves with all the contract documents of this projects, including architectural, structural, mechanical, electrical, and site work, and to have visited the site, so as to avoid error, omissions and misinterpretations. Related information may be provided on contract

documents other than those associated with the subcontractor's trade. The contractor is responsible for coordinating related work of all the contract documents. No additional compensation will be authorized for alleged errors, omissions or misinterpretations whether they are a result of failure to observe this requirement or not.

- d) All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air infiltration. Coordinate with fire stopping requirements.
 - e) No component of any system shall run through the stair enclosure that does not relate to or serve the stair enclosure.
 - f) Refer to architectural drawings for type and location of all fire rated walls. Any penetration through wall bottom or top plates shall be Fire Stopped. Any penetration the fire rated wall shall be Fire Caulked. Refer to section 7250 for procedure.
 - g) Refer to architectural drawings for type and location of all fire rated walls. Any penetration through wall bottom or top plates shall be Fire Stopped. Any penetration the fire rated wall shall be Fire Caulked. Refer to section 7250 for procedure. Provide submittals of UL designs selected and the product information for approval. Without limitation pay attention to the following items:
 - a. Chases behind bathroom (wall between corridor and bathroom) and walls between units are fire rated. Fire Caulk all penetration.
 - b. Top and bottom wall plates at ceiling and at floor are part of fire separation. Fire Stop all penetrations through plates.
 - h) Any wall location changes shall be coordinated through the G.C for review with the architect.
 - i) All roof penetrations shall be on the back slope of the roof minimum 10 ft. away from ridge.
 - j) Immediately following installation cover all duct openings with plastic cover to protect it from building dust and debris. Cover ends if duct until connected to grills. Upon connection to grills provide dust cover over grills. The plastic cover shall remain in place until building is pressure tested. If this is not provided contractor will be required to clean the inside of the ductworks.
2. Remove existing boilers and pumps and piping serving the retail area. Provide modular high efficiency boilers (minimum 90% efficiency) to serve the retail areas and residential areas. The capacities shall be as listed below:
- a) The systems shall be designed to maintain 75 degree winter inside temperature with -20 outside temperature. Submit heat loss

calculations.

- b) The system for the residential areas shall be two pipe change over type vertical fan coil units with fan cycle controls (Whalen or equal). System shall be designed for future chiller installation on roof. All piping shall be sized for chilled water and insulated vapor tight for chilled water. We estimate 400 CFM unit for each apartment. Submit proposed fan coil unit for each typical unit. Submit calculations. Run condensate drain to storm system in basement. Provide electric baseboard for all exterior unit toilets and also toilets with roof. Interior toilets do not require heat.
- c) Provide toilet exhaust shaft and toilet exhaust fan with radiation damper.
- d) Provide corridor ventilation system.
- e) Ceiling registers shall be Metal Aire Model V4004D or equal Hart and Cooley with radiation dampers.
- f) Return grille shall be Metal Aire Model RH or equal Hart and Cooley.
- g) Diffusers shall be Model Metal Aire 5500-15 or equal Hart and Cooley with radiation dampers.
- h) Fire dampers shall be provided at the fire rated ceilings and fire rated shafts.
- i) Ductwork shall be A combination of galvanized metal and insulated flexible per SMACNA
- j) Flexible ducts shall be insulated Buck duct or equal.
- k) 90 Degree sharp elbows will be avoided for flexible ducts. If it cannot be avoided, hard metal elbows shall be provided.
- l) Supply ductwork in the ceiling space will be insulated.
- m) Provide cabinet heaters with remote wall mounted thermostats for stairs, entries.
- n) Dryer exhaust system and dryer box shall be provided.
- o) Toilet exhaust fan shall be Model Panasonic FV-08VF2 with radiation damper single speed or equal 1.0 sones or less.
- p) Dwelling unit Kitchen exhaust shall be recirculating type by G.C
- q) All equipment shall be installed per manufacturers recommendations. Contractor will provide vibration isolation system as required for quiet operation.
- r) Provide toilet exhaust for all public toilets and janitors closet.

- s) Provide exhaust for laundry room.
 - t) Provide combustion air for gas fired dryers.
 - u) Provide exhaust and make up (via heat recovery unit for the storage rooms)
 - v) Provide hot water unit heaters for the storage rooms.
 - w) Provide heat for common toilets.
 - x) Provide make up air and exhaust provision for future restaurant.
3. Corridor ventilation system shall be provided with roof top gas fired units. Provide minimum (2) units. Each unit will have 4 ton capacity. In general the ducts shall run in ceiling space, if ductwork has to run on roof due to ceiling space restrictions it shall be protected by the HVAC contractor EPDM roofing or another acceptable means.
 4. Elevator lobbies and vestibules will be heated. Heater shall be electric by HVAC contractor. Wiring by Electrical contractor.
 5. **Temporarily provide hot water unit heaters for the retail area and connect to residential loop. In the future retail tenants shall have their own boilers and hot water loop system. When laying out the boiler room consider future tenants.**
 6. Stairs and storage rooms and all non-air-conditioned areas will be heated with **Hot water type** heaters with remote wall mounted thermostats. **Provide heat recovery unit to supply and exhaust air from basement storage rooms, corridors and all common areas.**
 7. Air to air heat pump for the elevator machine rooms will be provided.
 8. Elevator shaft will be ventilated per Code. Provide fail safe motorized damper interlocked with fire alarm system, coordinate with electrical contractor.
 9. **Trash room shall be exhausted to back of building.**
 10. Ductwork, grilles and registers, fire and smoke dampers.
 11. Temperature controls and control wiring shall be provided. Thermostat shall be Honeywell non-programmable digital heating cooling thermostat.
 12. Testing adjusting and balancing shall be done by the HVAC contractor. Independent balancing contractor shall not be used.
 13. **Bathroom electric baseboard heaters shall have aluminum covers for rust resistance.**
 14. **The 2-pipe change over mains will run at first floor ceiling. Design system**

as reverse return system.

15. **Piping will be suspended under fire rated sheetrock under the joists. Coordinate hanger locations prior completion of sheet rock.**
16. **Provide 24X18 boiler room ventilation fan with supply fan and motorized dampers to cool the boiler room. Fan shall have 2,000 CFM capacity. It shall be 2-speed direct drive propeller fan. Provide gas fired unit heater for the boiler room heat.**
17. **Exhaust janitor's closet to the back of the building.**
18. **Provide exhaust system for the laundry room. And Exhaust dryers to outside (back of the building).**
19. **All tenant bathrooms shall be exhausted to the back of the building. Provide 4" wall caps with back draft damper, insulate exhaust duct for condensation and include cost of coring thru brick wall. At the contractor's option top floor can be exhausted thru roof.**
20. **For residential lobby provide split type AC unit with hot water coil.**
21. **For ATM room provide Air to Air split heat pump.**

B. Related Work: The following work is not included in this Section and is to be performed under the designated Sections:

- | | | | |
|----|---------|-------|--------------------------------|
| 1. | SECTION | | FLASHING FOR ROOF CURBS |
| 2. | SECTION | | ELECTRICAL WIRING AND STARTERS |
| 3. | SECTION | 03300 | CONCRETE PADS |
| 4. | SECTION | | LOUVERS |
| 5. | SECTION | 02200 | EXCAVATION AND BACKFILL |
| 6. | SECTION | 08305 | INSTALLATION OF ACCESS DOORS |
| 7. | SECTION | 02200 | ROUGH GRADING AND PATCHING |

1.03 DEFINITIONS

- A. "The Contractor" or "this Contractor" means specifically the Subcontractor working under his respective Section of the Specifications.
- B. "Furnish" or "provide" means to supply, erect, install and connect up complete in readiness for regular operation of the particular work referred to, unless otherwise specified.

1.04 INTENT

- A. It is the intention of these Specifications to provide the equipment to be furnished complete in every respect, and this Contractor shall furnish all equipment needed and usually furnished in connection with such systems. Equipment, materials and articles incorporated in the work shall be new and of the best grade of their respective kinds for the type of work involved.

1.05 CODES, ORDINANCES AND PERMITS

- A. All work shall be installed in accordance with the laws, ordinances, rules and regulations of all local and State Authorities, having jurisdiction and the rules and regulations of the National Board of Fire Underwriters.
- B. All motors and motor control equipment shall meet the requirements of the National Electrical Code, and comply with the requirements of the NEMA and the local public utility furnishing current to the building.
- B. This Contractor shall apply and pay for inspection, permits, certificates of inspection, and license fees in connection with his work, and shall deliver same to the Architect at the completion of the work.
- D. All diagrams required by local or State Authorities shall be supplied by this Contractor.

1.06 INSTRUCTIONS TO THE OWNER

- A. All mechanical equipment installed in connection with this Section shall be put in operation in the presence of duly authorized representatives of the Owner with 24-hour notice given the Owner's representative for each appointment. Instructions shall be given to the Owner's employee appointed to familiarize himself with the systems and equipment. Three copies of the operating manual, parts list, and bulletin, shall be delivered to the Architect for approval.
- B. The Manual shall include the following:
 - 1. Summary description of the systems' operation.
 - 2. Manufactures' literature, illustrations and technical data.
 - 3. Guarantee and warranty data.
 - 4. Parts list and parts numbers.
 - 5. (3) Three copies of Maintenance, lubrication and replacement charts.
 - 6. Trouble-shooting charts.
 - 7. Fire stopping methods.

1.07 BASES AND SUPPORTS

- A. Furnish and install all supplementary steel required for setting and/or hanging all piping and equipment.
- B. Wherever necessary, this Contractor shall provide all bases and supports not part of the building structure, or required size, type, and strength, as approved by the Architect, for all equipment and materials furnished by him.
- C. All equipment, bases and supports shall be adequately anchored to the building structure to prevent shifting of position under operating conditions.
- D. Concrete piers and bases will be furnished by the General Contractor, except where otherwise noted.

1.08 EXAMINATION OF SITE

- A. Before submitting his proposal, this Contractor shall visit the site, examine the condition, and thoroughly acquaint himself with the obstacles and advantages for performing the work. He shall also study the drawings and specifications explanatory of the work to be performed and compare them with the information gathered by the examination of the site.
- B. This Contractor shall not be allowed to charge for extra work caused by his unfamiliarity with the site, drawings, specifications or rules of the various governing authorities.

1.09 SHOP DRAWINGS

- A. Submit for approval copies of descriptive literature giving performance data, physical size, wiring diagrams, capacity, materials, etc., for all items listed below:
 - 1. All equipment.
 - 2. Refrigerant and Water Piping and ductwork.
 - 3. Duct and pipe Insulation.
 - 4. Temperature control equipment and diagrams.
 - 5. Submit all fire stopping methods for approval

1.10 SUBSTITUTIONS

- A. Substitutions of equipment or materials other than those shown on the drawings or named in the specifications may be made only with the written approval of the Architects, who reserve the right to require adequate proof of the quality of the substitute before permitting its use. Prior signing contract, contractor shall

provide list of all major items to be or may be substituted for review.

- B. Where a Contractor proposes to use an item of equipment other than that specified or detailed on the drawings, which requires any redesign of the structure, partitions, foundations, piping, wiring, or of any other part of the mechanical, electrical or architectural layout, all such redesign, and all new drawings and detailing required therefore shall with the approval of the Architect be prepared by this Contractor at his own expense.

1.11 APPROVALS

- A. Engineers approval of the system, equipment, and shop drawings shall not relieve this Contractor from the responsibility for deviations from contract documents, unless he has in writing called attention to such deviations, at the time of submission and secured written approval, not shall it relieve him from responsibility for errors in submittal.

1.12 PERMITS, FEES, AND TAXES

- A. This Contractor shall apply, pay all Plumbing and HVAC fees and taxes and prepare all required documents necessary to obtain required permits and certificates.

1.13 COORDINATION OF TRADES

- A. Where the work of this Contractor will be installed in close proximity to work of other trades, or where there is evidence that the work of this Contractor will interfere with work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment. If so directed by the Architect, this Contractor shall prepare composite working drawings and sections at a suitable scale designated by the Architect clearly showing how his work is to be installed in relation to the work of other trades.
- B. If this Contractor installs his work before coordinating with other trades or so to cause interferences with work of other trades, he shall make necessary changes in his work to correct the condition without extra charge.

1.14 TEMPORARY OPENINGS

- A. This Contractor shall ascertain, from his examination of the architectural drawings, whether any special temporary openings in the building will be required for the admission of apparatus furnished under his contract, and he shall notify the Architect accordingly. In the event of failure of this Contractor to give sufficient notice to the Architect in time to arrange for these openings during construction, this Contractor shall assume all costs of providing such openings thereafter.

1.15 OPENINGS IN EXTERIOR WALLS

- A. Openings in exterior walls and roofs shall be kept properly plugged and caulked at all times, except when being worked on, to preclude the possibility of flooding due to storms or other causes. After completion of the work, openings for which this Contractor is responsible shall be permanently sealed and caulked in a manner approved by the Architect.

1.16 ACCESSIBILITY

- A. All work shall be installed so that all parts required are readily accessible for inspection, operating, maintenance, and repair. Minor deviations from the drawings may be made to accomplish this, but changes to magnitude shall not be made without prior written approval from the Architect.

1.17 CUTTING AND PATCHING

- A. The Heating and Ventilating Contractor shall be responsible for all required cutting and drilling associated with his work, but in no case shall cut into any structural elements without the written approval of the Architect.
- B. All rough patching and finish patching shall be provided by the General Contractor.

1.18 GUARANTEE

- A. Guarantee in accordance with requirements of contract form. Partial approval of a portion of work does not affect the validity of the guarantee.
- B. This Contractor shall guarantee that all work installed will be free from any and all defects in workmanship and/or materials that all apparatus will develop capacities and characteristics specified.
- C. If, during a period of one year from the date of completion and acceptance of the work, any such defects in workmanship, materials or performance or unauthorized deviation from contract documents appear, he will, without cost to the Owner, remedy such defects within a reasonable time to be specified in notice from the Architect.
- D. He shall correct all damage to insulation, paint, woodwork, 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 required excessive service during the first year of operation will be considered defective and shall be replaced.

1.19 RECORD DRAWINGS

- A. Record drawings shall be kept on the job site and updated continuously by the Contractor as the work progresses.

- B. Record drawings shall show exact locations and sizes of all the work to be concealed. Especially note the location of the valves, volume dampers, fire dampers, etc.
- C. Non-availability of the updated record drawings or inaccuracies therein shall be grounds for cancellation and/or postponement of any final inspection by the Engineer.
- C. The record drawings required to be furnished under this Section are of drawings numbered H-#

1.20 ELECTRIC WORK

- A. Power wiring will be furnished and installed by the Electrical Contractor.
- B. HVAC contractor shall coordinate with electrical contractor and provide requirements for line voltage wiring requirements--Lack of coordination will not be an extra to owner
- C. All wiring furnished under this Section shall be in accordance with the Electrical Work Section of these Specifications, the National Electric Code, and applicable local codes.

1.21 TESTING AND ADJUSTMENTS

- A. After the installation is completed and ready for operation, this Contractor shall test the system under normal operating conditions. Whenever the equipment or system under test is interrelated with and depends upon the operation of other equipment, systems and controls for proper operation, functioning and performance, the latter shall be operated simultaneously with the equipment or system being tested.
- B. All defective work shall be promptly repaired or replaced and the tests shall be repeated until the system or components parts thereof receive the approval of the Architect. Any damage resulting from tests shall be repaired and damaged materials replaced, all to the satisfaction of the Engineer.
- C. Tests shall be performed in the presence of and to the satisfaction of the Engineer and such other parties as may have legal jurisdiction.
- D. Labor, materials, instruments and power required for testing shall be furnished by this Contractor unless otherwise indicated under another Section of the Specifications.
- E. After completion of the installation work called for in this Specification, this Contractor shall furnish necessary mechanics or engineers for the adjustment and operation of the system to the end that the system may be adjusted and turned over to the Owner in perfect working order.
- F. All piping and connected equipment shall be tested to 100 pounds hydrostatic pressure and proven tight before installation of equipment.

- G. Test and balance the entire system. Submit written report to the Engineer for approval.

1.22 TEMPORARY HEATING

- A. Special reference is made to "Heating During Construction", Section 1 of the SUPPLEMENTARY CONDITIONS.
- B. The Heating and Ventilating Contractor shall coordinate his work with the progress of construction so that the permanent heating system will be ready to provide Temporary Heating as soon as possible.
- D. The General Contractor shall pay the cost of temporary heating. The HVAC contractor shall thoroughly clean and put in first-class condition any portion of the permanent heating system used for Temporary Heating.

1.23 ACCESS PANELS

- A. The Heating and Ventilating Contractor shall provide all necessary access panels and be responsible for providing locations and quantities of the access panels to the G.C. to install all access panels. The spin collars will not have dampers and will not require access doors.

1.24 DRAWINGS

- A. This is a design build project. The contractor shall hire Registered Professional engineer (Maine State registration required) to prepare drawings and calculations in compliance with Maine State Mechanical Code, Maine State Building Code, ASHRAE standards and these. Specifications.
- B. Drawings shall be coordinated through the General Contractor with all other trades including structure prior to completion.
- C. The design should incorporate freezing prevention for all piping and systems. Coordinate with other trades through G.C.. Heat trace and insulation alone will not be accepted.
- D. All ductwork penetrating a fire rated wall shall have a fire damper. These shall be reviewed and coordinated through G.C. with the Architect.
- E. All ceiling registers and grilles penetrating a dwelling unit drywall ceiling shall have ceiling radiation dampers.
- F. Should any contradiction, ambiguity, error, inconsistency, omission or incomplete system appear in or between any of the Contract Documents, the Contractor shall, before submitting the final bid and signing the contract for construction, notify the General contractor and request a written resolution as to which methods or materials will be required. In the event of conflicting requirements of standards, drawings or specifications, the Contractor shall comply with the more stringent requirements. Before submitting the final bid and signing the contract for construction the Contractor

shall obtain a written interpretation from the Architect. In no case shall the Contractor proceed with the affected work until advised by the Architect.

If the Contractor fails to make a request for interpretation or resolution no excuse will be accepted for failure to carry out the work in a satisfactory manner, as interpreted by the Architect. This generally means the use of the highest quality material, most expensive way of performing work and providing complete functioning systems for proper operation,

Each and every trade or Subcontractor will be deemed to have familiarized themselves with all Contract Documents of this project, including Architectural, Structural, Mechanical, Electrical and Site Work, and to have visited the site, so as to avoid errors, omissions and misinterpretations. Related information may be provided on Contract Documents other than those associated with the Subcontractor's trade. The Contractor is responsible for coordinating related work of all the Contract Documents. No additional compensation will be authorized for alleged errors, omissions and misinterpretations, whether they are a result of failure to observe this requirement or not.

1.25 DEMOLITION

- A. Disconnect and remove all piping, ductwork, equipment shown on Drawings. Cap-off all ducts and pipe ends. All equipment and material remains Owner's property. Any equipments and materials not wanted by the Owner shall be removed from the site and be disposed of per State, Local and E.P.A regulations at this Contractors expense.

PART 2 - PRODUCTS

2.01 PIPE CLASSES

- A. Class I piping shall be Schedule 40 seamless black steel, ASTM A53, Grade A pipe and fittings.
- B. Class II piping shall be Type L copper pipe per ASTM B88.
- C. Class III piping shall be Schedule 40 PVC with solvent joints.
- D. Class IV grooved piping system in mechanical rooms and unfinished basements, for piping system in sized 2-«" and above, the Victaulic grooved piping may be used in lieu of welding/flanging. The temperature range of the system is between -30oF to +230oF, couplings, fittings, valves, strainers suction diffusers shall be used in mechanical rooms and other exposed areas. Refer to manufacturers latest instructions for hanging and supporting.

2.02 PIPE JOINTS

- A. Solder joints shall be made with (95-5) tin-antimony solder with non-corrosive flux.
- B. Threaded joints shall conform to ANSI Standard B2 and shall be made with permacel tape or approved joint compound applied to male thread only.
- C. Welded joints shall be made by qualified welders meeting the requirements of the Section IX of the ASME Boiler and Pressure Vessel Code. Welding shall be done by metal-arc welding process.
- D. Flanged joints shall be made with carbon steel bolts per ASTM A-307, Grade B gaskets.
- E. Piping joints for dissimilar materials shall be made with dielectric unions.

2.03 VALVES

- A. Furnish valves as manufactured by Milwaukee (numbers listed) Lunkenheimer, Crane, Nibco.
- B. Application of the valves shall be as follows. Milwaukee Numbers given to establish quality.

PIPING CLASS VALVE TYPE	SIZE	CLASS I	CLASS II
Gate	2" and smaller	1151	1169
	2-1/2" and above	F-2885-M	1149

Globe	2" and under 2-1/2" and above	590-T F-2981-M	1589-T F-2981-M
Check Valve	2" and under 2-1/2" and above	509T F-2974-M	1590T F-2974-M
Non-Slam Check Valve	2" and under	548A	1400
Ball Valves	2" and under	BA-100	BA-150

C. Miscellaneous valves:

VALVE TYPE	SIZE	MODEL
Strainer	2" and under 2-1/2" and above	Spence Type V or V2 Spence Type V2
Combination Balancing and Shut-off	2" and under 2-1/2" and above	Illinois Series 4000 Illinois Series 5000
Plug Valve	2" and under 2-1/2" and above	Rockwell Figure 114 Rockwell Figure 115
Butterfly Valve	All sizes	Rockwell LFW 2.04

2.03 HANGERS AND SUPPORTS

- A. Provide all hangers and supports in conformance with ANSI B31-1 for the various parts of the mechanical work. For insulated pipes, hangers shall be of size and shape so that insulation be continuous through hangers.
- B. Pipe hangers, supports, hanger rods, protection saddles and inserts shall be as manufactured by Carpenter and Patterson, Inc. (Figure numbers given) or Grinnell, Fee and Mason. Concrete inserts- Figures 20, 300, 500, 650, 510 and 108 Clamps Figures 14, 15, 45, 47, with 22 Spring hangers-Figures 445, 450, 468, 482, and 498 Pipe guides- Figures 1001 Clevis pipe hangers-Figures 100, 265, 286 Swivel pipe hangers-Figures 16
Pipe roll hangers-Figures 17, 53, 63, 142, or 183

C. Pipe Support Spacing:

PIPE SIZE	STEEL PIPE MAXIMUM SPAN	COPPER PIPE MAXIMUM SPAN	ROD DIAMETER (INCHES)
1/2" to 1"	7 ft.	6 ft	3/8"
1-1/4" to 2"	10 ft.	6 ft.	3/8"
2-1/2" to 4"	12 ft.	10 ft	1/2"
5" to 6"	14 ft	10 ft	3/4"
8" to 12"	20 ft	10 ft.	7/8"

Plaster Pipe shall be supported as recommended by the manufacturer.

2.05 APPLICATION OF PIPING CLASSES

A. The applications for the piping classes shall be as follows:

SYSTEM	PIPING CLASS
Hot/Chilled Water	I or II
Condensate Drain	PVC

2.06 SLEEVES

- A. Approved sleeves for the passage of all piping through foundation walls, floors and partition walls shall be furnished by the HVAC Contractor and set into the construction by the trade involved.
- B. Sleeves for passage of pipes through waterproofed walls or floors and through foundation walls below outside grade shall be approved castings with collar or fin for embedding in the construction, or wrought iron pipe sleeve with welded fin (assembly galvanized), or cast iron with brazed fin. Pipes shall be lead caulked in sleeves and the whole installation made watertight.
- C. Sleeves through masonry walls shall be Schedule 40 steel pipe. Sleeves through non-bearing walls shall be galvanized metal 24 gauge.
- D. Sleeves through concrete floors shall have anchoring rings or lugs to hold sleeve in floor construction.
- E. Sleeves shall be at least two sizes larger than the pipe accommodated, and sized to permit continuous insulation on pipes with at least 1/4" clearance around covering.
- F. Sleeves shall have spaces between pipe and sleeve sealed with a polysulfide sealant.
- G. Escutcheons shall be installed around all exposed pipe passing through finished floor, wall or ceiling. Escutcheons shall be chrome plated, secured in place by set screw or clips.

2.07 WATER SPECIALTIES

- A. Automatic air vents shall be Sarco 13W or Armstrong 21-AR with 3/4" pipe connections.
- B. Pressure gauges shall be 4-1/2" diameter, east aluminum case, phosphor, bronze tube, H.O. Trerice Co., Model 500X, Crosby-Ashton, Moeller.
- C. Thermometers shall be 9" cast aluminum case, separable socket, H.O. Trerice Co., Model BX, Crosby-Ashton, Moeller.
- D. Flexible connectors shall be neoprene spool type expansion joints with one corrugation, metal retaining rings control unit and constructed in accordance with pipe

class specification designed for continuous temperatures up to 250oF.

- E. Expansion joints shall be Belmont No. 3190 reinforced TFE expansion joint constructed in accordance with the pipe class specifications with white virgin TFE fluorocarbon resin bellows.
- F. Cold water make-up pressure regulating valve shall be Watts.

2.08 AIR SEPARATORS

- A. Air separators for piping system 2-1/2" and above shall have tangential inlet and outlet connections, constructed per ASME for 125 psig working pressure and ASME stamped. Provide with blowdown connection, less strainer.

Make: Bell and Gossett "Rolairtrol", Taco, or Armstrong.

- B. Air separator for piping system 2" and smaller shall be equal to Taco air extractor with hi-vent or equal.

2.09 EXPANSION TANK

- A. Expansion tank shall be constructed in accordance with ASME Code for 125 lbs. working pressure. Tank shall be of the size indicated on the drawings and shall include sight glass, airtrol fitting and drain cock. Tank shall be supported from floor or ceiling structure. Tank shall be Bell and Gossett, or Taco.

2.10 BASE MOUNTED PUMPS

- A. Base mounted pumps shall be single stage, vertical split case and suction type.
- B. Pump casing shall be cast iron, bronze fitted construction, serviceable without disturbing piping connections or motor.
- C. The impeller shall be bronze with double wear rings, hydraulically and dynamically balanced.
- D. Make: Bell and Gossett Series 80, Taco, Aurora.

2.10 INLINE PUMPS

- A. Inline pumps shall be single stage, vertical split case and suction type.
- B. Pump casing shall be cast iron, bronze fitted construction, serviceable without disturbing piping connections or motor.
- C. The impeller shall be bronze with double wear rings, hydraulically and dynamically balanced.
- D. Make: Bell and Gossett , Taco, Aurora.

2.11 CONVECTORS

- A. Elements shall be copper tubes, extended into cast iron headers, aluminum fins, ribbed steel side plates and fin tube supports.
- B. Front and top panels shall be 14 gauge steel. End panels shall be 18 gauge reinforced steel. Cabinet shall be phosphatized, galvanized and painted with primer and finished with baked enamel finish.
- C. Recessed cabinet type units shall have fronts sealed with 3/8" sponge rubber. Provide carlock type access door.

2.12 WATER TREATMENT

- A. This Contractor shall retain the services of a qualified water treatment subcontractor who will analyze the water and recommend a chemical treatment.
- B. During the first year, after the initial treatment, the Water Treatment Subcontractor shall visit the installation twice and submit report about the condition of the system.
- C. Provide sufficient chemicals for one year's water treatment. For each water system, provide four (4) quart capacity chemical feeder and pipe to each water system.
- D. Water treatment shall be provided for all water systems including make-up water to cooling tower. Water treatment Sub-contractor shall provide all necessary tests and equipment for a complete water treatment.

2.15 UNIT HEATERS

- A. Factory assembled unit consists of heating element, fan, motor, adjustable louvers. Vertical or horizontal air flow type as scheduled.
- B. Heavily braced cabinet, painted with primer and finished with baked enamel.
- C. Coils shall be copper tube with aluminum fins tested at 300 psig.
- D. Motors shall be shaded pole or permanent split capacitor type with sleeve bearings.
- E. Make: Trane, Airtherm, McQuay.

2.16 CABINET HEATERS

- A. Factory assembled unit consisting of chassis, heating coil, fan board and fan, motor and insulation, filter.
- B. Cabinets shall have 16 gauge steel front panels and 18 gauge steel end and top panels. Front panel shall be insulated over entire coil section. Access door for coil connection side. Cabinet shall be phosphatized and flow-coated with based on enamel. Submit color chart for selection.
- C. Coils shall be 1-inch OD seamless copper tubes with aluminum fins. Maximum

working pressure 75 psig. Leak tested under water with air at 250 psig.

- D. Fans shall be centrifugal, forward curved, double width type.
- E. Motors shall be permanent split capacitor type with integral thermal overload protection.
- F. Filters shall be 1-inch throw away type.
- G. Accessories: Motor starters, transformer, extended motor oilers.
- H. Make: Trane, Airtherm, McQuay.

2.17 SHEET METAL WORK

- A. Sheet metal work shall be fabricated and installed in accordance with the applicable recommendations of the "Duct Manual and Sheet Metal Construction for Ventilation and Air Conditioning Systems" published by the National Association of Sheet Metal and Air Conditioning Contractors.
- B. Sheet metal ductwork shall be fabricated from galvanized steel of lock forming quality or aluminum of the following gauges:

Up to 12"	26 USS Gauge
13" to 30"	24 USS Gauge
31" to 54"	22 USS Gauge
55" and up	20 USS Gauge
Round	22 USS Gauge
- C. Kitchen exhaust duct shall be 16 gauge black iron with welded joints.
- D. Clothes dryers vent duct shall be minimum 24 USS gauge or aluminum. Sheet metal screws or other fastening means which extend into the duct shall not be used.
- E. Longitudinal duct seams shall be Pittsburgh lock type. Transverse joints shall be secured with sheet metal screws or bolts. No button punching will be allowed. All joints shall be taped in an approved manner to prevent leakage, or sealed with duct sealer.
- F. Branches to and from the main trunk shall be made at an angle approved by the Architect but shall in no case exceed 45 degrees to the line of the main trunk. Changes in size shall be made with tapered connection approved by the Engineer but shall in no case exceed 30 degrees to the line of air flow. For all changes in direction where the center line radius is less than 1-1/2 times the width of the duct, turning vanes shall be provided. These shall be double vane type as manufactured by Barber-Colman Company, Aero- Dyne Company, Air Filter Corporation, or Harrington Bros.
- G. Ductwork shall be rigidly supported and secured to a substantial portion of the building's construction, reinforced and braced as necessary to be free from vibration, rattle and noise. Hangers shall be galvanized and securely suspended from the building. Drilling of structural steel will not be permitted.

- H. Splitter and volume dampers shall be two gauges heavier than the ducts in which they are installed. Damper blades shall be riveted to the supporting rod. Cast or malleable brackets riveted to the side of the ducts shall be used to support the damper rod. Splitter dampers shall be sufficiently long to extend the full width of the branch duct to which attached. Locking quadrants shall be as manufactured by the Mastro Machine Company or equal.
- I. Fire dampers and smoke dampers shall be constructed and installed in accordance with the standards of the NBFU, shall be U.L.labeled, as manufactured by Ruskin, Phillips, Air Balance, Prefco Company.
- J. Access doors shall be pan type with a minimum of two window jamming locks each, and felted sealing strips at edges. Doors on insulated or lined ducts shall have insulation within the panel. Doors shall be prefabricated type, Model FSA-100, as manufactured by Air Balance, Inc., Harrington Bros. or approved equal.
- K. Flexible connections shall be Bent-Vinyl as manufactured by Vent Fabrics, Inc. or "Thermfab" as manufactured by Duro-Dyne Corp. tightly secured with metal bands. Flexible duct length shall not exceed 6 feet.
- L. All ductwork dimensions shown on drawings are clear inside dimensions.

2.18 REGISTERS AND GRILLES

- A. Registers and grilles shall be manufactured by Titus Manufacturing Company, Agitair. Each register and grille shall include sponge rubber gasket, opposed blade damper, and baked enamel, off-white finish.
- B. Supply air registers shall have front blades parallel to the short dimension. Supply registers shall be four-way adjustable. Return registers shall have fixed, 30-degree fixed louvers.
- C. The right is reserved to vary the dimensions and locations of grilles, registers, and diffusers to a reasonable extent as necessary as the work progresses.

2.19 FAN-COIL UNITS

- A. Cabinet of 22 gauge galvanized steel, acoustically and thermally insulated with vapor-proof insulation.
- B. Seamless copper tube-aluminum fin coil, centrifugal type fan, shaded pole motor, 1/2" thick throw-away filter, aluminum double deflection supply grilles, drain pan and condensate drain pipe.
- C. Line voltage thermostat and integral fan speed switch. Thermostat shall be mounted at 60" above floor to centerline.
- D. Unit shall be factory tested and wired. Power wiring shall be by Section 16. Unit shall include electric heating coil and face and bypass damper.
- E. Make: Whalen Co., Airtherm, Trane, Carrier.

2.20 FANS

- A. Centrifugal fans shall be of the type as scheduled on the drawings. All fans shall be statically and dynamically balanced. Fan housing shall be heavy gauge reinforced steel. Fan bearings shall be grease lubricated ball bearings selected for 200,000 hours average life. Provide extended grease line. Provide fan belt cover for belt drive fans.
- Make: Carrier, Trane, York.
- B. Propeller fans shall have high efficiency and low noise type air foil blades.
- Wheels shall be statically and dynamically balanced. Fan panels shall be square die-formed steel with pre-punched holes for mounting. Motor shall be installed on a slotted base supported by a heavy gauge steel plate base securely attached to fan panel. Motor shall be open drip-proof. Provide galvanized black iron wire mesh fan and drive guard, electric or gravity shutter as scheduled on drawings. Make: Penn Ventilator Co., Loren Cook Company or Greenheck.
- C. Roof Fans: Aluminum housing, direct or belt-drive non-overloading balanced aluminum fan, motor out of air stream, vibration isolators, disconnect switch, ball bearings, spring loaded automatic belt tightener, and aluminum bird screen. Provide and mount on prefabricated aluminum curb insulated with 2.0 pounds per cubic foot density sprayed urethane foam. Automatic operated damper, to open when fan starts, separateline.
- D. Make: Jenn-Air, B.G. Industries, Coo, Exit-Aire, or approved equal.
- E. Small package fans shall be centrifugal type ceiling mounted or in-line and shall include acoustical insulation, backdraft damper, UL labeled and permanently lubricated bearings.
- F. Make: Nutone, Penn Ventilator Co., Loren Cook Co.

2.22 GAS FIRED ROOFTOP HVAC UNIT

- A. Single-package heating and cooling unit, outdoor curb mounted, utilizing semihermetic reciprocating type compressor for cooling duty and gas combustion for heating duty.
- B. Unit cabinet shall be constructed of galvanized steel, bonderized and coated with a baked enamel finish. Unit shall consist of evaporator fan section, condenser section and fans, compressors, evaporator and condenser coils, economizer, with enthalpy controller, barometric damper, gas heating section, filters, roof curbs and heating/cooling thermostat.
- C. Indoor evaporator fan shall be forward-curved, centrifugal, belt driven type, statically and dynamically balanced. Fan bearings shall have 200,000 hours average life. Provide extended grease line.
- D. Coils shall be constructed of aluminum fins mechanically bonded to seamless copper tubes and shall be leak-tested at 150 psig and pressure tested at 450 psig.

- E. Make: Carrier, Trane or York.

2.24 ELECTRICAL WORK FOR TEMPERATURE CONTROLS

- A. Electrical contractor shall only provide power wiring to motors. All other line voltage or low voltage wiring, interlock wiring, transformers, relays, time clocks and wiring, switches, and accessories shall be provided by the temperature control contractor.

2.25 MOTOR, DISCONNECTS, FUSES AND STARTERS

- A. Furnish and install disconnects, fuses and magnetic starters required for the particular motor horsepower and voltage.
- B. All fractional horsepower manual starters shall be double-pole type with thermal overload relay and indicating pilot light.
- C. All manual motor starting switches shall be toggle operated two or three-pole switch mounted in NEMA 1 enclosure or for outdoor applications in NEMA 3R enclosure. All enclosed starters shall be furnished with a handle guard having locking provisions.
- D. All magnetic motor starters except otherwise specified shall be across the line type rated with NEMA Standards, sizes and horsepower ratings. Starters shall be mounted in general purpose enclosures except otherwise noted on drawing. Provide H-O-A selector switch and auxiliary relays for all starters.
- E. Coils shall be of molded construction. All coils shall be replaceable from the front without removing the starter from the panel. Overload relays shall be the melting alloy type. All starters shall be suitable for the addition of at least three external auxiliary contacts of any arrangement normally open or normally closed. Overload relays shall be adjustable and manually reset.
- F. Motor starters shall be as manufactured by Square D, ITE and General Electric.
- G. All starters in general shall be located in the vicinity of the panel feeding the starter.
- H. Provide starters for all fans, pumps, HV units and automatic controlled equipment.
- I. For small fans used exhausting storage rooms, conference rooms and alike provide wall switches.

2.26 BOILERS AND ACCESSORIES

- A. High efficiency boilers with minimum 90% efficiency.
- B. Furnish with water temperature sensor, control panel, and all required components.
- C. Make Weil-McLain Ultra, Lochinvar Knight

2.27 BREECHING AND CHIMNEY

- A. As recommended by the manufacturer. Run flues to side wall of boiler room.

2.28 ROTARY ROOF VENTILATORS (SPINNERS)

- A. Spinners shall be galvanized steel construction, braced on the outside with aluminum bracing. Unit shall have ball bearings for silent operation.
- B. Make: Empire or approved equal.

2.29 INSULATION

- A. All insulation when installed shall have composite fire and smoke hazard ratings as tested by Procedure ASTM E-84, NFPA 255, and UL-723, not exceeding a flame spread of 25 and smoke developed or 50 when compared with red oak as 100, as approved under NFPA Pamphlet No. 90A and 90B.
- B. Insulation shall not be applied to any system until the system has been tested and approved for release to be insulated. All insulation shall be kept dry and clean for application. All surfaces shall be clean and dry before application or insulation.
- C. Piping shall be insulated with preformed, fiberglass pipe insulation with white, embossed, vinyl-coated self-sealing ASJ jacket. Fittings and valves shall be insulated with equal thickness of preformed or precut fiberglass sections and finished with PVC jackets as manufactured by Zeston, or approved equal. Exposed ends shall be similarly covered with PVC end closures.
- D. Supply ductwork shall be insulated with 1" thick fiberglass duct wrap with vapor barrier. Supply and return ductwork shall be lined with 1" fiberglass liner 15 ft. distance from the rooftop unit.
- E. Insulation materials shall be Owens-Corning, Johns Manville, Gustin-Bacon or approved equal.
- F. The following systems shall be insulated.
 - 1. Hot/Chille water mains: 1-1/2"
 - 2. Hot/chilled water branches: 1-1/2"
 - 3. Supply ductwork: 1"
 - 4. Supply and return ductwork lining: 1"
- G. Insulation shall be continuous through hangers and sleeves. Provide saddle between insulation and hangers.

2.31 AUTOMATIC TEMPERATURE CONTROL SYSTEM

- A. Automatic temperature control system shall be electrical as manufactured by Honeywell, Barber-Coleman, Johnson Control Company or approved equal.
- B. With the exception of valves and dampers, all control equipment and electric wiring in connection with the temperature control system shall be installed by the control equipment manufacturer. Automatic valves shall be furnished by the control equipment manufacturer and installed by the Heating and Ventilating Contractor under his

supervision. Automatic dampers shall be furnished by the control equipment manufacturer and installed by the Sheet Metal Subcontractor under his supervision. The temperature control system shall consist of all thermostats, valves, relays, control panels, dampers, damper motors, switches, piping, wiring and other accessories necessary to fulfill the intent of the Specifications.

- C. Space thermostats shall be low voltage type adjustable throttling range, locking covers concealed adjustments, and include thermometers.
- D. Insertion thermostats shall be remote bulb or rod-and-tube type, and shall include separable well when installed in water lines.
- E. Freeze protection thermostats shall be 20' capillary type secured to coil face with copper wire, manual reset type.
- F. Damper and valve motors shall be capable of providing smooth proportional control under all operating conditions. All activators shall be provided with positive positioning, relays or sequencing relays. Control valves shall have self-adjusting packing, equal percentage throttling plugs, stem travel indicators, removable discs, screwed body for 2" and smaller, flanged body for 2-1/2" and larger and shall be sized by the manufacturer for the design conditions.
- G. Automatically controlled dampers shall be louver type if two-position, opposed blade if modulating, 10" maximum width 16 gauge galvanized steel roll formed blade, 2" channel frame, 9brass or nylon bearings and hot dip galvanized outdoor air and exhaust relief damper. Blades shall have low leakage blow-up seals equal to Honeywell D642A.
- H. Duct and immersion thermostats of the single input type shall have integral setpoint adjustments and throttling ranges adequate for the application. Duct thermostats shall have sensing elements of sufficient length and accuracy to measure average duct temperature in each location.
- I. Aquastats - shall be line voltage type with single pole, single throw switching. Switches shall have an adequate rating for the applied load. j. Time clocks shall be electronic with battery back up, 7-Day programmable type.
- J. Sequence of operation:
 - 1. Hot water boilers: Install factory provided controls. Install outdoor thermostat to modulate the main loop water temperature between 100 degrees F to 140 degrees F, when outside temperature 60 degrees F to 0 degrees F. All settings are adjustable.
 - 2. One of the hot water circulating pump shall run when outside air temperature below 60 degrees F (adjustable). One pump shall be stand-by. Provide alternator and controls for the pumps.
 - 3. Fan coil units in dwelling units will have unit-mounted thermostats. The system shall be fan cycling type with 3-speed switch.
 - 4. Cabinet Heater and wall heater Control: Thermostat shall cycle the fan.

5. Rooftop HVAC Units: Install heating/cooling thermostat and wire to the unit. Economizer with enthalpy controller is provided with each unit. Economizer shall operate when outside temperature allows.
6. Exhaust Fans : HVAC contractor shall provide time clock to control their operations.

2.32 SMOKE AND FIRE STOPPING

- A. Floor and corridor walls are fire rated. All pipes passing through these elements will be fire stopped per UL System #49 by filling the annular space with mineral wool and covering with 3M Fire Barrier CP25 S/L or N/S caulk. Comply with manufactures installations instructions.

2.01 PENETRATION AND FIRESTOPPING

- A. All metal pipe penetrating through a fire-rated wall assembly shall have the space between the conduit and the fire rated membrane (drywall) filled with a UL approved fire caulk installation.
- B. All metal pipe penetrating through fire-rated floor assembly shall have the space between the conduit and the fire rated membrane (drywall, concrete or plywood decking) filled with a UL approved fire caulk installation.
- C. Install a UL approved fire caulk installation where any pipe penetrates a fire stop (top and bottom wall framing plates) inside the walls.
- D. Large openings in slabs, which accommodate many pipes, shall be filled with concrete so that the rodent protection of the slab is maintained.
- E. All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air filtration through or around penetration. Coordinate with fire stopping requirements.
- F. Large openings in slabs, which accommodate many pipes, shall be filled with concrete so that the rodent protection of the slab is maintained.
- G. All penetrations of assemblies exposed to the exterior environment shall be sealed with foam sealant or equivalent sealer to provide zero air filtration through or around penetration. Coordinate with fire stopping requirements

PART 3 - EXECUTION

PART 3 - EXECUTION

3.01 PIPING (GENERAL)

- A. Verify all existing conditions before proceeding with the work.
- B. Install piping in a next manner with lines straight and parallel or at right angles to walls. Coordinate with other trades.
- C. Use full length of pipe. Cut pipe square and clean before installing. Do not use bushings. Use reducers to facilitate air removal and water drainage from system.
- D. Erect piping with proper provisions for expansion and contraction. Provide all required offsets, swing joints, expansion loops, anchors and guides. At expansion loops the elbow radius shall be equal to six times of the pipe diameter. Do not use miter elbows for expansion loops.
- E. Where steel flanges are bolted to flat face cast-iron flanges the raised face shall be removed.

3.02 HANGERS

- A. Do not use hangers, supports or equipment of the other trades to support piping systems.
- B. All hanger rods shall be hung from inserts in concrete or from I-beam clamps on steel beams. Clamps shall have retaining clips and locknut. If inserts have not been provided, hangers shall be through bolted or inch or slug-in expansion bolts may be used with the permission of the Engineer. When pipe or equipment is hung or supported, no part of any equipment furnished by this Contractor or any part of the building shall be stressed beyond its normal allowable working strength. Drilling of building structural steel for attachment of hangers or supports is not permitted.
- C. When two or more pipes run parallel, they may be supported with trapeze hangers with individual pipe supports.
- D. Vertical piping passing through slabs shall be supported with riser clamps installed above slab and resting on floor sleeve.
- E. All hangers and supports for copper tubing shall be heavily copper plated and sized for copper tubing.
- F. Hangers for cold water piping or piping supported on roll hangers shall be sized

for pipe insulation.

- G. Insulation protection saddles shall be provided on all piping supported by all hangers.
- H. Duct and immersion thermostats of the single input type shall have integral setpoint adjustments and throttling ranges adequate for the application. Duct thermostats shall have sensing elements of sufficient length and accuracy to measure average duct temperature in each location.
- I. Aquastats shall be line voltage type with single pole, single throw switching. Switches shall have an adequate rating for the applied load.

3.03 VALVES

- A. Locate all valves in accessible locations with stems up position.
- B. Provide shut-off valves for all equipment and risers.

3.04 SLEEVES AND ESCUTCHEONS

- A. Furnish and install sleeves on all pipes passing through walls, partitions, floors, foundations, etc. Sleeves for copper tubing shall be Type "L" hard tempered; for steel pipe, 26 gauge galvanized in frame partitions, Schedule 40 elsewhere. Caulk sleeves in fire walls with asbestos and cement.
- B. Sleeves shall be sized to accommodate the covering and to provide 1/4" annular space.
- C. Provide chrome-plated brass escutcheon plates over sleeve ends in finished areas.
- D. The subcontractor is responsible for accurate location of setting of sleeves.
- E. Steel sleeves will not be allowed in contact with copper pipe.

3.05 TAGS, CHARTS AND PIPE MARKING

- A. Provide all valves in mechanical rooms laminated plastic tags with stamped numerals and name of service. Tags shall be attached to valve handles or stem necks with brass hooks or chains and properly secured.
- B. Numbers shall correspond to the as-built drawings and a printed list. Printed list shall state numbers and location of each valve and control, equipment which the valve controls and other necessary information such as requiring opening or closing of another valve when one is to be opened or closed.
- C. All piping in the mechanical rooms shall be marked with "Set-Mark" or approved

equal pipe markers showing direction of flow and pipe service after pipe is insulated and/or painted.

3.06 UNIONS

- A. Provide unions between the shut-off valve and equipment connection.
- B. Provide dielectric unions when joining dissimilar materials.

3.07 WATER PIPING

- A. Water piping shall have a uniform grade of 1 inch per 40 ft. in direction of flow.
- B. Vent all high points with manual vents. Provide automatic vents at the top of risers.
- C. Provide drain valves with hose ends at all low points and equipment.

3.08 TESTING, ADJUSTMENT AND BALANCING (WATER SYSTEMS)

- A. Refer to Part I for additional requirements.
- B. Provide services of independent and balancing agency to test and balance the water systems. Balancing work shall not begin until all HVAC systems have been completed, cleaned, tested and are in operating order.
- C. Submit report for each system and equipment and element listing its name, function, size, model, electrical, and mechanical design conditions and actual design conditions.
- D. All systems shall be balanced to +/-5% of its design requirements.

3.09 PUMPS

- A. Base mounted pumps shall be leveled by means of properly spaced metal blocks or wedges located directly under the part of the baseplate carrying the greatest weight and spaced closely enough to give uniform support. Pumps shall be bolted down firmly and grouted in. Pump and motor alignment shall be made before and after the grout is poured, and again after the piping is connected.
- B. Small in-line pumps shall be supported by the piping. Large in-line pumps shall be supported in such a way that pump shall not carry the weight of motor.
- C. All pumps shall be provided with isolating gate valves, discharge throttling valves, pressure gauges tapped onto inlet and outlet flanges, flexible connectors. Flexible connectors shall be pipe size.

3.11 DUCTWORK

- A. Ductwork shall be installed per recommendations of SMACNA. Seal all duct seams with duct sealer to limit the system leakage to 5% of total capacity.
- B. Provide splitter or balancing damper at every branch and as required to facilitate the systems balancing.
- C. Provide fire damper with access door at all fire walls and floors.
- D. Provide motor operated smoke and fire damper at all fire/smoke walls.
- E. Provide access doors for servicing dampers, filters, coils controls, motors, etc. Minimum access door size shall be 14" x 14".
- F. Provide flexible connectors at all fan, air handling and other equipment inlet and discharge connections.
- G. Before the duct system is tested and balanced, the interior of all ducts shall be cleaned thoroughly by blowing through the system with the ventilating fan. Do not operate system without filters in air handling units. Provide clean set of filters prior to acceptance of the building by the owner.

3.12 EQUIPMENT INSTALLATION

- A. Install all fans, air handling units on spring isolator or suspended from building structure with approved hangers, attachments, and vibration eliminators to minimize sound and vibration transmission to the building structure.
- B. All suspension platforms shall be braced to prevent swaying.
- C. Rooftop units shall be installed on roof curbs.

3.13 TESTING, ADJUSTING AND BALANCING

- A. After the testing and adjusting work specified in Part I has been completed, provide services of an independent testing and balancing agency to test the operation of the entire system and balance the system.
- B. Without limiting the testing and balancing, Contractor shall check operation of every fan, motor, drive, damper, damper operator. Make all required adjustments to bring the system to design conditions.
- C. The testing and balancing Contractor then shall balance the entire system, including but not limited to fans main duct branches, supply/return/exhaust outlets, air handling units, etc., to +/- 5% of their design quantities.

- D. The testing and balancing Contractor shall for each system prepare a balancing report listing for each equipment, air outlets, its name, service, mechanical and electrical specifications, design and actual measured quantities. Submit balancing report for approval.

END OF THIS SECTION