STATE OF NEW YORK
OFFICE OF GENERAL SERVICES
DESIGN AND CONSTRUCTION GROUP
THE GOVERNOR NELSON A. ROCKEFELLER
EMPIRE STATE PLAZA
ALBANY, NY 12242

ADDENDUM NO. 4 TO PROJECT NO. Q1537

REHABILITATE 2ND FLOOR LOCKER ROOMS
STATE ARMORY
1700 PARKWAY EAST
UTICA, NEW YORK 13501

October 1, 2012

NOTE: This Addendum forms a part of the Contract Documents. Insert it in the Project Manual. Acknowledge receipt of this Addendum in the space provided on the Bid Form.

PLUMBING SPECIFICATIONS

1. Section 099103, Plumbing Painting:

Article 2.03.B, Exterior Finish Types, **ADD** the following:

"1. Paint Type EAL-1: Exterior Acrylic Latex, Flat.
   a. Solids by Weight: 52.0 percent.
   b. Solids by Volume: 32.0 percent.
   c. Solvent: Water.
   d. Vehicle: 100 percent acrylic resin.
   e. Weight Per Gallon: 10.5 lbs.
   f. Wet Film Thickness: 4.0 mils.
   g. Dry Film Thickness: 1.3 mils.
   h. Manufacturers: ICI Dulux, PPG, Sherwin-Williams.

2. Paint Type EAL-2: Exterior Acrylic Latex, Semigloss Enamel.
   a. Solids by Weight: 47.0 percent.
   b. Solids by Volume: 33.2 percent.
   c. Solvent: Water.
   d. Vehicle: 100 percent acrylic resin.
   e. Weight Per Gallon: 10.0 lbs.
   f. Wet Film Thickness: 4.0 mils.
   g. Dry Film Thickness: 1.3 mils.
   h. Manufacturers: ICI Dulux, PPG, Sherwin-Williams.

3. Paint Type EAL-3: Exterior Acrylic Latex, Gloss Enamel.
   a. Solids by Weight: 40.0 percent.

   b. Solids by Volume: 32.0 percent.
   c. Solvent: Water.
   d. Vehicle: 100 percent acrylic resin.
   e. Weight Per Gallon: 10.0 lbs.
   f. Wet Film Thickness: 3.4 mils.
   g. Dry Film Thickness: 1.2 mils.

h. Manufacturers: Benjamin Moore, PPG, Sherwin- Williams."

Article 2.03.C, **ADD** the following:

"4. Gas, Natural and Manufactured: Safety Yellow."

Article 3.03, **ADD** the following:

"B. Exterior Exposed Items: Unless otherwise specified, apply the following paint types with manufacturer's recommended primers on the following exterior substrates:
1. Paint Type EAL-3:
a. Uninsulated piping and ductwork."

2. Section 220523, Valves
ADD attached Section.

3. Section 220529, Pipe Hangers and Supports:
ADD attached Section.

4. Section 220553, Pipe and Valve Identification:
ADD attached Section.

5. Section 221100, Plumbing Piping:
ADD attached Section

HVAC SPECIFICATIONS

1. Section 230924, Modifications to Direct Digital Building Control System
DELETE Section in its entirety and **SUBSTITUTE** revised Section attached.

2. Section 237413, Energy Recovery Units
DELETE Section in its entirety and **SUBSTITUTE** revised Section attached.

CONSTRUCTION WORK DRAWINGS

1. Drawing A101 - Overall First/ Second Floor Plan, Partition Type, Schedule & Details,
DELETE Detail 3A – Pipe Guard Plan, and **SUBSTITUTE** with attached detail ADD4.1 - Pipe Guard Detail

2. Drawing A104 - Enlarged Second Floor RCP, Enlarged Roof Plan, Roof Details
MODIFY Detail 2 – Enlarged Roof Plan, as indicated on the attached drawing ADD4.2 - Partial Enlarged Roof Plan

INSERT Detail 5 as indicated on attached drawing ADD4.3 - Pipe Penetration Detail

HVAC WORK DRAWINGS

1. Drawing M-001, Schedules, Symbol List and Abbreviations:

DELETE ERU Control Diagram and **SUBSTITUTE** revised ERU Control Diagram as shown on attached drawing ADD4.0-H1.

Energy Recovery Unit Schedule (Plate Type): **DELETE** Notes 5 and 6 and **SUBSTITUTE** the following:

"5. ERU-1 Natural Gas Furnace: 3050 CFM, 47ºF EAT, 97ºF LAT, 165 MBH (Output), 0.8" inlet gas pressure.

6. ERU-2 Natural Gas Furnace: 4150 CFM, 47ºF EAT, 97ºF LAT, 225 MBH (Output), 0.8" inlet gas pressure."

2. Drawing M-101, Basement and First Floor Plans – HVAC
   DELETE drawing in its entirety.

3. Drawing M-102, Partial Second Floor Removals and Piping Plans – HVAC
   DELETE drawing in its entirety and **SUBSTITUTE** revised drawing "Partial First and Second Floor Removals Plans – HVAC" attached.

4. Drawing M-103, Partial Second Floor Ductwork Plan and Section:
   DELETE the steam piping to the ERU'S and revise the duct risers to ERU-1 as shown in attached drawing ADD4.0-H2.

5. Drawing M-501, Details – HVAC:
   DELETE drawing in its entirety and **SUBSTITUTE** revised drawing attached.

6. Drawing M-502, Details – HVAC
   DELETE drawing in its entirety

PLUMBING WORK DRAWINGS

1. Drawing P-001, Symbol List and Notes
   ADD attached drawing.

2. Drawing P-101, Basement and First Floor Plans – Plumbing
   ADD attached drawing.

3. Drawing P-102, Partial Second Floor and Roof Plans – Plumbing
   ADD attached Drawing.

4. Drawing P-501, Details – Plumbing
   ADD attached drawing.

ELECTRICAL WORK DRAWINGS

1. Drawing E-102, Second Floor Plan – Electrical
   DELETE drawing in its entirety and **SUBSTITUTE** revised drawing attached.

END OF ADDENDUM

James Dirolf, P.E.
Director of Design

SECTION 220523

VALVES

PART 1 GENERAL

1.01 ABBREVIATIONS

A. IBBM: Iron body, bronze mounted.

B. WOG: Water, oil, gas.

C. WSP: Working steam pressure.

1.02 SUBMITTALS

A. Product Data: Manufacturer's catalog sheets and specifications for each valve type.

B. Valve Schedule: List type of valve, manufacturer's model number, and size for each service application.

1.03 MAINTENANCE

A. Special Tools:
   1. One wrench for each type and size wrench operated plug valve.

PART 2 PRODUCTS

2.01 VALVES - GENERAL

A. Valve Standardization: Valves from one or more manufacturers may be used, however valves supplied for each specific valve type shall be the product of one manufacturer.

B. Valves shall be first quality, free from all imperfections and defects, with body markings indicating manufacturer and rating.

C. Valve parts of same manufacturer, size and type shall be interchangeable.

D. Manually operated gate, globe and angle valves shall be of rising stem type, unless otherwise specified.

E. Valves which use packing, shall be capable of being packed when wide open and under full working pressure.

F. Size valves the same size as the piping in which they are installed, unless specified otherwise.

2.02 PLUG VALVES

A. Type AA: 200 psig WOG, lubricated type with standard port opening, cast iron or semi-steel body, sealed lubrication system with lubricant fitting and dial indicator, cylindrical plug or teflon tapered plug, lubricant grooves in body or plug, threaded or flanged ends depending on size, and capable of lubrication with valve under pressure and plug in any position.
   1. Acceptable Valves:
      a. 1/2 inch to 3 inch size: Homestead 611 & 612, , Resun R1430 & R1431,and Rockwell 142 & 143.
      b. 4 inch size: Homestead 611 & 612, , Resun R1430 & R1431, and Rockwell 142 & 143.

B. Type AB: 100 psig WOG, gas cock type with cast iron or bronze body, bronze plug, square head, wrench operator, and threaded ends. Acceptable Manufacturers: Crane, Eclipse Combustion, and McDonald.

2.03 GAS PRESSURE REGULATORS

A. Provide gas pressure regulators for the building gas supply system.

B. Manufacturers: ITRON, FISHER, SENSUS or accepted equal.

C. Building Gas System: Cast iron body, interchangeable aluminum orifice, spring-loaded, self operated regulator with internal relief, field interchangeable adjustment spring. 2 lb. inlet pressure 7” w.c. outlet pressure. Size as indicated on Drawing. Make equal to ITRON model B34SR Series.

D. Provide gas pressure gauge with lockable shut-off valve on outlet side of each gas regulator to verify and adjust gas flow required for equipment. After regulator is adjusted to proper gas flow, remove pressure gauge and turn over to owner, obtain receipt. Cap or plug shut-off valve outlet and lock shut-off valve closed.

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install valves at locations noted on the drawings or specified.

3.02 VALVE APPLICATION SCHEDULE

A. Schedule of valve applications for the different services is as follows:
   1. Gas - Natural, Manufactured or Mixed Fuel (G) 125 psig and Less:
      a. 2 inch and Less: AB plug valves.
      b. 2-1/2 inch and Up: AA plug valves.

3.03 GAS PRESSURE REGULATORS

A. Install in accordance with manufacturers written instructions.

B. Install in an accessible location.

C. Regulators installed indoors that require venting shall be vented directly to the outdoors.

D. Install a tee fitting with one opening capped or plugged between the regulator and its up stream shut-off valve. Position tee fitting to allow connection of a pressure-measuring instrument and to serve as a sediment trap.

E. Install a tee fitting with one opening capped or plugged not less than 10 pipe diameters downstream of regulator to allow connection of a pressure measuring instrument.

END OF SECTION

SECTION 220529

PIPE HANGERS AND SUPPORTS

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions for each item specified except fasteners.

1.02 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Comply with the applicable requirements of the ASME B31 Piping Codes.
   2. Unless otherwise shown or specified, comply with the requirements of the Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS) Standards SP-58, and SP-69.

PART 2 PRODUCTS

2.01 PIPE HANGERS AND SUPPORTS

A. Pipe Hangers: Height adjustable standard duty clevis type, with cross bolt and nut.
   1. Pipe spreaders or spacers shall be used on cross bolts of clevis hangers, when supporting piping 10 inches in size and larger.
   2. Swivel ring type hangers will be allowed for sprinkler piping up to a maximum of 2 inches in size.

B. Hanger Rods: Mild, low carbon steel, fully threaded or threaded at each end, with two nuts at each end for positioning rod and hanger, and locking each in place.

C. Riser Clamps: Malleable iron or steel.

2.02 ANCHORS AND ATTACHMENTS

A. Self-Drilling Anchors (Group III, Type 1): Ramset's RD Series, or Red Head/Phillips S Series.

B. Non-Drilling Anchors (Group VIII, Type 1): Ramset's Dynaset DS Series, Hilti's HDI Series, or Red Head/Phillips J Series.

C. Stud Anchors (Group VIII, Type 2): Red Head/Phillips JS Series.

D. Beam Clamps: Forged steel beam clamp, with weldless eye nut (right hand thread), steel tie rod, nuts, and washers, Grinnell's Fig No. 292 (size for load, beam flange width, and rod size required).

2.03 FASTENERS

A. Bolts, Nuts, Washers, Lags, and Screws: Medium carbon steel; size and type to suit application; galvanized for high humidity locations, and treated wood; plain finish for other interior locations. Except where shown otherwise on the Drawings, furnish type, size, and grade required for proper installation of the Work.

2.04 SHOP PAINTING AND PLATING

A. Hangers, supports, rods, inserts and accessories used for pipe supports, unless chromium plated, cadmium plated or galvanized shall be shop coated with metal primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper pipe or copper tubing.

B. Hanger supports for chromium plated pipe shall be chromium plated brass.

PART 3 EXECUTION

3.01 PREPARATORY WORK

A. Place inserts into construction form work expeditiously, so as not to delay the Work.

3.02 INSTALLATION

A. Do not hang or support one pipe from another or from ductwork.
   1. Do not bend threaded rod.

B. Support all insulated horizontal piping conveying fluids below ambient temperature, by means of hangers or supports with insulation shields installed outside of the insulation.

C. Space hangers or supports for horizontal piping on maximum center distances as listed in the following hanger schedules, except as otherwise specified, or noted on the Drawings.
   1. For Steel, and Threaded Brass Pipe:

PIPE SIZE (Inches)	MAXIMUM SPACING (Feet)
1 and under	8
1-1/4 and 1-1/2	9
2	10
2-1/2 and up	12

D. Size hanger rods in accordance with the following:

PIPE OR TUBING SIZE (Inches)	SINGLE ROD HANGER SIZE (Inches)		DOUBLE ROD HANGER SIZE (Inches)	
	PIPE	TUBING	PIPE	TUBING
1/2 to 2	3/8	1/4	3/8	1/4
2-1/2 and 3	1/2	3/8	3/8	1/4
4 and 5	5/8	1/2	1/2	3/8

1. Size hanger rods, for piping over 12 inches in size and multiple line supports, based on a safety factor of five for the ultimate strength of the materials being used.
2. Secure hanger rods as follows: Install one nut under clevis, angle or steel member; one nut on top of clevis, angle or steel member; one nut inside insert or on top of upper hanger attachment and one nut and washer against insert or on lower side of upper hanger attachment. A total of four nuts are required for each rod, two at upper hanger attachment and two at hanger.

E. Vertical Piping: Support vertical risers of piping systems, by means of heavy duty hangers installed close to base of pipe risers, and by riser clamps with extension arms at intermediate floors, with the distance between clamps not to exceed 25 feet, unless otherwise specified. Support pipe risers in vertical shafts equivalent to the aforementioned. Install riser clamps above floor slabs, with the extension arms resting on floor slabs. Provide adequate clearances for risers that are subject to appreciable expansion and contraction, caused by operating temperature ranges.

3.03 UPPER HANGER ATTACHMENTS

A. General:
1. Secure upper hanger attachments to overhead structural steel, steel bar joists, or other suitable structural members.
2. Do not attach hangers to steel decks that are not to receive concrete fill.
3. Do not attach hangers to precast concrete plank decks less than 2-3/4 inches thick.
4. Do not use flat bars or bent rods as upper hanger attachments.

B. Attachment to Steel Frame Construction: Provide intermediate structural steel members where required by pipe support spacing. Select steel members for use as intermediate supports based on a minimum safety factor of five.
1. Do not use drive-on beam clamps.
2. Do not support piping over 4 inches in size from steel bar joists. Secure upper hanger attachments to steel bar joists at panel points of joists.
3. Do not drill holes in main structural steel members.
4. Beam clamps, with tie rods as specified, may be used as upper hanger attachments for the support of piping, subject to clamp manufacturer's recommended limits.

C. Attachment to Existing Cast-In-Place Concrete:
   1. For piping up to a maximum of 4 inches in size, secure hangers to overhead construction with self-drilling type expansion shields and machine bolts.
   2. Secure hangers to wall or floor construction with single unit expansion shields or self-drilling type expansion shields and machine bolts.

D. Attachment to Wood Construction: Secure hangers to the sides (only) of wood members, by means of malleable iron side beam connectors, or malleable iron or steel side beam brackets. Do not secure hanger attachments to nailing strips resting on top of steel beams.
   1. Secure side beam connectors to wood members with two No. 18 x 1-1/2 inch long wood screws, or two No. 16 x 1-1/2 inch long drive screws. Do not support piping over 1-1/2 inches in size from side beam connectors. Do not hammer in wood screws.
   2. Secure side beam brackets to wood members with steel bolts or lag screws. Do not use lag screws in wooden members having a nominal thickness (beam face) under 2 inches in size. Install bolts or lag screws, in the sides of a timber or a joist, at the mid-point or above, not less than 2-1/2 inches from the lower edge when supporting branch lines and not less than 3 inches from the lower edge when supporting mains. Install heavy gage steel washers under all nuts.
   3. Secure side beam brackets to wooden beams or joists, with lag screws or bolts of size as follows:

PIPE SIZE (Inches)	LAG SCREW SIZE (Inches)	BOLT DIAMETER (Inches)
2 and under	3/8 diameter x 1-3/4	3/8
2-1/2 and 3	1/2 diameter x 2	1/2
4 and 5	Use Bolt	5/8

      a. Do not support piping larger than 3 inches with lag screws. Pre-drill holes for lag screws 1/8 inch in diameter less than the root diameter of the lag screw thread.
      b. The minimum width of the lower face of wood beams or joints in which lag screws of size as specified may be used is as follows:

LAG SCREW DIAMETER (Inches)	NOMINAL WIDTH OF BEAM FACE (Inches)
3/8	2
1/2	3

   4. Do not secure hanger attachment to the diagonals or vertical members of the trusses.

END OF SECTION

SECTION 220553

PIPE AND VALVE IDENTIFICATION

PART 1 GENERAL

1.01 REFERENCES

A. ANSI A13.1 - Scheme for Identification of Piping Systems.

1.02 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions for each item specified.

PART 2 PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. W.H. Brady Co., Milwaukee, WI.

B. Emed Co., Buffalo, NY.

C. Panduit Corp., Tinley Park, IL.

D. Seton Nameplate Corp., New Haven, CT.

2.02 PIPE MARKERS AND ACCESSORIES

A. Snap-on Marker: One piece wrap around type constructed of precoiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, 3/4 inch adhesive strip on inside edge, and 360 degree visibility.

B. Strap-On Marker: Strip type constructed of precoiled acrylic plastic with clear polyester coating, integral flow arrows, legend printed in alternating directions, factory applied grommets, and pair of stainless steel spring fasteners.

C. Stick-On Marker: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, and integral flow arrows for applications where flow arrow banding tape is not being used.

D. Pipe Marker Legend and Color Field Sizes:

OUTSIDE DIAMETER OF PIPE OR INSULATION (Inches)	LETTER SIZE (Inches)	LENGTH OF COLOR FIELD (Inches)
3/4 to 1-1/4	1/2	8
1-1/2 to 2	3/4	8
2-1/2 to 6	1-1/4	12

E. Banding Tapes: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating.
   1. Plain Tape: Unprinted type; color to match pipe marker background.
   2. Flow Arrow Tape: Printed type with integral flow arrows; color to match pipe marker background.

F. Pipe Size Labels: Pressure sensitive adhesive backed type constructed of vinyl with clear polyester coating, vertical reading pipe size in inches, and legend size matching adjacent pipe marker.

2.03 VALVE SERVICE IDENTIFICATION TAGS

A. Type: No. 19 B & S gage brass, with 1/4 inch high valve service abbreviated lettering on one line over 1/2 inch high valve service chart number, both deep stamped and black filled; and with 3/16 inch top hole for fastener.

B. Sizes:
   1. Plumbing Use: 1-1/2 inch hexagon.

C. Fasteners: Brass “S” hook or brass jack chain of size as required for valve stem or handle to which tag is attached.

2.04 VALVE SERVICE IDENTIFICATION CHART FRAMES

A. Type: Satin finished extruded aluminum frame with rigid clear plastic glazing, size to fit 8-1/2 x 11 inches valve chart.

PART 3 EXECUTION

3.01 PREPARATION

A. Complete testing, insulation and finish painting work prior to completing the Work of this Section.

B. Clean pipe surfaces with cleaning solvents prior to installing piping identification.

C. Remove dust from insulation surfaces with clean cloths prior to installing piping identification.

3.02 INSTALLATION

A. Install the Work of this Section in accordance with the manufacturer's printed installation instructions, unless otherwise specified.

B. Stick-On Pipe Markers:
   1. Install minimum of 2 markers at each specified location, 90 degrees apart on visible side of pipe.
   2. Encircle ends of pipe markers around pipe or insulation with banding tape with one inch lap. Use plain banding tape on markers with integral flow arrows, and flow arrow banding tape on markers without integral flow arrows.

C. Pipe Size Labels: Install labels adjacent to each pipe marker and upstream from flow arrow. Install a minimum of 2 pipe size labels at each specified location, 90 degrees apart on visible side of pipe.

D. Pipe Service Identification Tags: Attach tags to piping being identified with "S" hooks or jack chains.

3.03 PIPING IDENTIFICATION SCHEDULE

A. Piping Identification Types:
   1. Piping or Insulation under 3/4 inch od: Pipe identification tags.
   2. Piping or Insulation 3/4 inch to 5-7/8 inch od: Snap-on marker or stick-on marker.
   3. Piping or Insulation 6 inch od and Larger: Strap-on marker or stick-on marker.

B. Identify exposed piping, bare or insulated, as to content, size of pipe and direction of flow, with the following exceptions:
   1. Piping in non-walk-in tunnels or underground conduits between manholes.
   2. Piping in furred spaces or suspended ceilings, except at valve access panels where valves and piping shall be identified as specified for exposed piping systems.
   3. Piping in finished spaces such as offices, class rooms, wards, toilet rooms, shower rooms and spaces as specified.

C. Locate piping identification to be visible from exposed points of observation.
   1. Locate piping identification at valve locations; at points where piping enters and leaves a partition, wall, floor or ceiling, and at intervals of 20 feet on straight runs.
   2. Where 2 or more pipes run in parallel, place printed legend and other markers in same relative location.

3.04 VALVE IDENTIFICATION SCHEDULE

A. Valve Service Identification Tags:
   1. Tag control valves, except valves at equipment, with a brass tag fastened to the valve handle or stem, marked to indicate service and numbered in sequence for the following applications:
      a. Gas valves controlling mains, risers, and branch runouts.

B. Valve Service Identification Charts:
   1. Provide 2 framed valve charts for each piping system specified to be provided with valve identification tags. Type charts on 8-1/2 x 11 inches heavy white bond paper, indicating valve number, service and location.
   2. Hang framed charts at locations as directed.

END OF SECTION

SECTION 221100

PLUMBING PIPING

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Through Penetration Firestops: Section 078400.

B. Plumbing Painting: Section 099103.

1.02 SUBMITTALS

A. Product Data:
1. Catalog sheets and specifications indicating manufacturer name, type, applicable reference standard, schedule, or class for specified pipe and fittings.
2. Material Schedule: Itemize pipe and fitting materials for each specified application in Pipe and Fittings Schedule in Part 3 of this Section. Where optional materials are specified indicate option selected.

PART 2 PRODUCTS

2.01 STEEL PIPE AND FITTINGS

A. Steel Pipe for Threading: Standard weight, Schedule 40, black or galvanized; ASTM A 53 or ASTM A 135.

B. Malleable Iron, Steam Pattern Threaded Fittings:
1. 150 lb Class: ASME B16.3.
2. 300 lb Class: ASME B16.3.

C. Cast Iron Fittings:
1. Drainage Pattern, Threaded: ASME B16.12.
2. Steam Pattern, Threaded: ASME B16.4.
   a. Standard Weight: Class 125.
   b. Extra Heavy Weight: Class 250.
3. Flanged Fittings and Threaded Flanges: ASME B16.1.
   a. Standard Weight: Class 125.
   b. Extra Heavy: Class 250.

D. Unions: Malleable iron, 250 lb class, brass to iron or brass to brass seats.

E. Couplings: Same material and pressure rating as adjoining pipe, conforming to standards for fittings in such pipe. Use taper tapped threaded type in screwed pipe systems operating in excess of 15 psig.

F. Nipples: Same material and strength as adjoining pipe, except nipples having a length of less than one inch between threads shall be extra heavy.

2.02 JOINING AND SEALANT MATERIALS

A. Thread Sealant:
   1. LA-CO Industries', Slic-Tite Paste with Teflon.
   2. Loctite Corp.'s No. 565 Thread Sealant.
   3. Thread sealants for potable water shall be NSF approved.

B. Thread Sealant (Natural Gas Piping): Rectorseal Corp.'s T Plus 2 non-hardening pipe dope with teflon.

2.03 PACKING MATERIALS FOR BUILDING CONSTRUCTION PENETRATIONS

A. Mechanical Modular Seals: Thunderline Corp.'s Link Seal wall and floor seals designed for the service of piping system in which installed.

2.04 DIELECTRIC CONNECTORS

A. Dielectric Fitting: Bronze ball valve with end connections and pressure rating to match associated piping.
   1. Nipples with inert non-corrosive thermoplastic linings are not acceptable.

B. Flange Electrical Insulation Kit: Consisting of dielectric sleeves and washers, and dielectric gasket.
   1. Rated 150 psi at 250 degrees F: ANSI Class 150, full faced neoprene gasket with bolt holes, double phenolic washers, and mylar sleeves; Model 150 by APS, Lafayette, LA 70596, (337) 233-6116.

2.05 PIPE SLEEVES

A. Type A: Schedule 40 steel pipe.

B. Type B: No. 16 gage galvanized sheet steel.

C. Type C: Schedule 40 steel pipe with 1/4 inch steel collar continuously welded to pipe sleeve. Size steel collars as required to span a minimum of one cell or corrugation, on all sides of the rough opening thru the metal deck.

D. Type D: No. 16 gage galvanized sheet steel with 16 gage sheet steel metal collar rigidly secured to sleeve. Size metal collars as required to span a minimum of one cell or corrugation, on all sides of the rough opening thru the metal deck.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install piping at approximate locations indicated, and at maximum height.

B. Install piping clear of door swings, and above sash heads.

C. Make allowances for expansion and contraction.

D. Allow for a minimum of one inch free air space around pipe or pipe covering, unless otherwise specified.

E. Install horizontal piping with a constant pitch, and without sags or humps.

F. Install vertical piping plumb.

G. Use fittings for offsets and direction changes.

H. Cut pipe and tubing ends square; ream before joining.

I. Threading: Use American Standard Taper Pipe Thread Dies.
   1. Thread brass pipe with special brass threading dies.

3.02 NATURAL GAS PIPING SYSTEM

A. Install gas piping system in conformance with the National Fuel Gas Code, NFPA 54, or as required by the serving gas supplier.

B. Use non-hardening pipe dope on threads. Do not use thread seal tape.

3.03 PIPE JOINT MAKE-UP

A. Threaded Joint: Make up joint with a pipe thread compound applied in accordance with manufacturer's printed application instructions for the intended service.
   1. Chrome Plated Brass Pipe: Tighten joint with a strap or Parmalee wrench; do not mar pipe finish. Install piping so that no threads are visible.

B. Hydraulic Pressed Joint: Follow manufacturer's printed installation instructions.

3.04 PIPING PENETRATIONS

A. Sleeve Schedule: Unless otherwise shown, comply with the following schedule for the type of sleeve to be used where piping penetrates wall or floor construction:

	CONSTRUCTION	SLEEVE TYPE
1.	Frame construction.	None Required
2.	Non-waterproof interior walls.	B*
3.	Non-waterproof interior floors on metal decks.	D*
4.	Non-waterproof interior floors not on metal decks.	B*
5.	Floors over mechanical equipment, steam service, machine, and boiler rooms.	A
6.	Floors finished or to be finished with latex composition or terrazzo, and on metal decks.	D*

*Core drilling is permissible in lieu of sleeves where marked with asterisks.

B. Diameter of Sleeves and Core Drilled Holes:
   1. Unless otherwise specified, size holes thru floors and walls in accordance with the through penetration fire stopping system being used.
   2. Size holes thru exterior walls or waterproofed walls above inside earth or finished floors, and exterior concrete slabs in accordance with the following:
      a. Uninsulated (Bare) Pipe: Inside diameter of sleeve or core drilled hole 1/2 inch greater than outside diameter of pipe, unless otherwise specified.
      b. Mechanical Modular Seals: Size holes in accordance with the manufacturer's recommendations.

C. Length of Sleeves (except as shown otherwise on Drawings):
   1. Walls and Partitions: Equal in length to total finished thickness of wall or partition.
   2. Floors, Finished: Equal in length to total finished thickness of floor and extending 1/2 inch above the finished floor level, except as follows:
      a. In furred spaces at exterior walls, extend sleeve one inch above the finished floor level.

D. Packing of Sleeves and Core Drilled Holes:
   1. Unless otherwise specified, pack sleeves or cored drilled holes in accordance with Section 078400 - FIRESTOPPING.

E. Weld metal collars of Type C and D sleeves to the upper surface of the metal deck. Seal voids under the metal collar as recommended by the manufacturer of the metal deck.

3.05 PIPE AND FITTING SCHEDULE

A. Where options are given, choose only one option for each piping service. No deviations from the selected option will be allowed.

B. Natural Gas Piping:
   1. Inside Building: Standard weight black steel pipe, with 150 lb malleable iron fittings, and threaded joints.

END OF SECTION

SECTION 230924

MODIFICATIONS TO DIRECT DIGITAL BUILDING CONTROL SYSTEM

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Basic Electrical Materials and Methods for Direct Digital Building Control System: Section 260502.

1.02 ALLOWANCES

A. An allowance for the following portions of the Work of this Section is included in Section 012100:
   1. Services of the Company Field Advisor as described in QUALITY ASSURANCE.
   2. All items listed in SUBMITTALS.
   3. Engineering and reprogramming associated with the installation of the new equipment and updating existing information.
   4. All products listed in PART 2 of this Section except:
      a. Dampers.
      c. Electric switching relays.
      d. Markers and nameplates.
      e. Labor for installation of the materials shall be included in the Contract Sum (not the allowance).

1.03 DESCRIPTION OF EXISTING SYSTEM

A. The existing system is manufactured by Alerton.

1.04 MODIFICATIONS TO EXISTING SYSTEM

A. Add DCP and TECs to serve the Locker Room Modifications. Modify the existing controls as required to accommodate components installed under this project. Update graphics on the existing workstation (POS).

1.05 SUBMITTALS

A. Waiver of Submittals: The “Waiver of Certain Submittal Requirements” in Section 013300 does not apply to this Section.

B. Preliminary Submittal: Existing system test report.

C. Submittals Package: Submit the shop drawings, product data, and quality control submittals specified below at the same time as a package.

D. Shop Drawings:
   1. Composite wiring and/or schematic diagrams of the modifications as proposed to be installed (standard diagrams will not be acceptable).

E. Product Data:
   1. Catalog sheets, specifications and installation instructions.
   2. Bill of materials.
   3. Detailed description of system operation.

F. Quality Control Submittals:
   1. Company Field Advisor Data: Include:
      a. Name, business address and telephone number of Company Field Advisor secured for the required services.
      b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
      c. Services and each product for which authorization is given by the Company, listed specifically for this project.

G. Contract Closeout Submittals:
   1. System acceptance test report.
   2. Certificate: Affidavit, signed by the Company Field Advisor and notarized, certifying that the system meets the contract requirements and is operating properly.
   3. Operation and Maintenance Data:
      a. Deliver 2 copies, covering the installed products, to the Director's Representative. Include:
         1) Operation and maintenance data for each product.
         2) Complete point to point wiring diagrams of entire system as installed. Number all conductors and show all terminations and splices. (Numbers shall correspond to markers installed on each conductor.)

1.06 QUALITY ASSURANCE

A. Company Field Advisor: Secure the services of a Company Field Advisor from the Company of the existing system for a minimum of 24 working hours for the following:
   1. Render advice and witness test of existing system.
   2. Render advice regarding modifications to the system.
   3. Assist in reprogramming of the system.
   4. Witness final system test and then certify with an affidavit that the modifications were installed in accordance with the contract documents and are operating properly.

PART 2 PRODUCTS

2.01 DISTRIBUTED CONTROL PROCESSORS (DCPs)

A. Microprocessor based, with operating system (OS) and energy management system (EMS) programs, data file and control programs, 72 hour battery backed real time clock.

B. DCPs shall operate stand alone and independent of a central computer for all specified control applications.

C. DCPs not utilizing “Smart Devices”, shall be modular and configured to accommodate analog and digital input and output boards to meet specific application requirements, including spares as specified.

D. The DCPs including accessory devices such as relay, power supplies, etc., shall be factory mounted, wired and housed in a steel enclosure with a hinged door panel. LEDs and switches shall be visible without opening the panel door, but not accessible without opening the panel door.

E. DCPs shall be equipped with LEDs for indication of power and operational status, status of each input and output, and diagnostic LED indicators.

F. Separate discreet DCPs shall be provided to support each major HVAC system. In all cases where primary and back-up systems are specified, a single DCP shall not be used to control both primary and secondary systems. In addition, a single DCP shall not be used to control two or more major HVAC systems (i.e., chillers and heat exchangers controlled by one single panel.)

2.02 TERMINAL EQUIPMENT CONTROLLERS (TECs)

A. TEC Controller types shall support remote I/O modules and air handler applications.

B. TECs shall be modular, field modifiable, expandable, and configured with an array of analog and digital inputs and outputs, and pulse counting totalizers to meet the application requirements.

C. The TECs shall be factory mounted on the equipment, wired, and housed in a steel enclosure.

D. TECs shall be able to operate at 90percent to 110percent of nominal voltage rating and shall perform an orderly shut-down below 80percent. Operation shall be protected against electrical noise of 5-120 Hz and from keyed radios up to 5 watts at 3 feet.

2.03 DCP AND TEC SOFTWARE

A. Energy Management Application Programs:

1. Optimum Start, Night Cycling and Night Purge for free cooling shall address the unique requirement of each systems Unoccupied Period, which may include one or more of the following as specified:
   a. Optimum start program shall delay equipment start-up based on global outdoor temperature, and system response to assure that comfort conditions are reached at scheduled occupancy time (occupancy schedules are defined under time programs), and operate in both heating and cooling cycles. In all cases, the optimum start program shall operate fully stand-alone in the local DCP.
   b. Night Cycle program shall apply to heating cycle only (or both heating and cooling cycle) with the outdoor air dampers closed. The space temperature shall be used to determine the “fan on” and/or “supply heat” command to maintain a low limit of 50-55 degrees for the heating cycle and the “fan on” and “supply cooling” command to maintain 82 degrees for the cooling cycle.
   c. Night Purge program shall apply to cooling cycle only. Night Purge shall introduce 100 percent outdoor air any time the outdoor air is above 50 degrees F, the space temperature is above 75 degrees F, and the outdoor air dewpoint is less than 60 degrees. Purging shall stop when outdoor air is below 50 degrees F, or space temperature is below 75 degrees F, or outdoor temperature is less than 5 degrees cooler than space temperature, or outdoor air dewpoint, is greater than 60 degrees.
2. A load reset program shall be provided to assure that only the minimum amount of heating, cooling, and electrical energy is supplied to satisfy zone temperature requirements. The program shall be applicable where specified to hot decks, cold decks, chilled water supply, and AHU static pressure. Individual programs are to be provided each sensing the worst case zone requirements and providing only the minimum energy source media to satisfy the need.

B. Control Software:

1. Each DCP shall contain up to 20 unique user modifiable time programs (TP):
   a. Each TP shall consist of daily, weekly, and annual programs plus a “TODAY” temporary function.
   b. DAILY programs shall be definable for day types such as working day, half day, holiday, weekend, etc. Each daily program shall allow a list of tome based (or optimum time based analog and digital commands to be issued to user selected plant elements and points.
   c. WEEKLY programs shall allow a user selected set of daily programs to be defined for each day of the week, Monday through Sunday.

d. The ANNUAL program shall initially be an automatic compilation of 52 weekly programs. Selecting a date of the ANNUAL program shall allow modification of the daily selection entered into the weekly program, such as changing Dec. 25 from a working day to a holiday.

2. Control Application Software shall be customized strictly to meet the detailed requirements of the "Sequence of Operation" specified in PART 3. DCPs shall be fully programmable. Initial software shall be fully modifiable, and not restricted by vendor's specific configuration guidelines.

C. Management Software:

1. Each DCP shall be provided with a trend archive of at least the last 200 events, digital transitions or analog value changes, of any user selected group of points. A stored event shall include date and time, and value or status. Events occurring in excess of 200 shall overwrite the oldest events, except where a modem module is specified, events shall be uploaded to the modem module. Point events shall be displayable at the POS as trend logs for evaluation of control system performance.
2. Each DCP shall monitor all analog input points and specified digital points for off-normal conditions. Each alarm shall have an "alarm delay" attribute which shall determine how long, in seconds, a point must be in an off-normal state prior to being considered in an alarm state. Alarms shall be displayable at the POS.
3. DCPs managing sub-networks of TECs shall report TEC alarms and shall be programmed to perform data reduction, sorting, and AHU DCP optimizing routines. In no case shall mass TEC optimizing data be allowed on the peer bus.

D. Communications Software:

1. BACnet, Arcnet, or Ethernet shall be used for communication between DCPs, and between operator interfaces. Each DCP shall have a full master peer-to-peer communications module to support all global data sharing, hierarchical control, and global control strategies specified. In addition, certain DCPs shall have hardware and software to support manage a secondary 9600 baud minimum bus of TECs, including hierarchical control specified, management, alarm processing and prioritization.

E. TEC Software:

1. BAS/EMS Vendor Terminal Equipment Controllers (TECs) will operate on a peer-to-peer communications network. TEC Software shall be configured to meet the detailed requirements of the Sequence of Operation, and shall be field reconfigurable if required to accommodate future functional or additional I/O requirements. TEC software shall be compatible with all the requirements set forth in the POT specification regarding TEC data display and modification. TEC software shall support full PID control.

2.04 DATA COMMUNICATIONS

A. POS and DCPs shall directly reside on a primary peer communication bus such that communications may be executed directly between POS and DCPs, and directly between DCPs on a peer to peer basis, via fiber optic cable or via electronic cable, and routers as needed.

B. TECs shall be connected together via peer-to-peer secondary communication network managed by the DCPs.

C. Protect communication lines against incorrect wiring, static transients and induced magnetic interference.
   1. Provide static, transient, and short circuit protection on all inputs and outputs.
   2. AC couple, or optically isolate bus connected devices so that any single device failure will not disrupt or halt bus communication.

2.05 OPERATOR INTERFACE SOFTWARE

A. Operator station software shall include as a minimum the Operating System (OS), Data Base Manager, Communications Control, Operator Interface (OI), Trend and History Files, Report Generator, Support Utilities, Scheduler and Time and Event Support Programs.

B. Provide a hierarchical linked dynamic graphic operator interface for accessing and displaying system data and commanding and modifying equipment operation. The interface shall utilize a mouse, pull-down menus, dialog boxes, zoom, coloration and animation to facilitate operator understanding of the system. A minimum of 20 levels of graphic penetration shall be provided with the hierarchy operator assignable (for example, area, building, wing, floor, air handler, sequence of operation pages, dynamic program display, point group). Dynamic system data points shall be assignable to each penetration level. Descriptors for graphics, points, alarms, etc. shall be modified through the operator's station under password control.
   1. Operator access to the system is to be under password and personal ID control. Operators shall be able to access data from any operator's station in the system by entry of proper password and ID. Sign off from an operator's station shall be a manual operation. If no mouse or keyboard activity takes place, within an assignable time period an automatic Sign Off shall occur. All sign on/sign off activity is to be recorded on the system printer.

C. A graphics mode of operation shall be provided allowing full color displays of building floor plan, HVAC system, equipment, hot water and chilled water system configuration.
   1. All graphic displays shall be online programmable via keyboard, trackball, or mouse selection of graphic library stored symbols and system profiles. Provide, in addition, the capability to create custom symbols, system profiles, floor plans, etc. and to store them in the graphics library.

2. Penetration within a graphic hierarchy shall display each graphic name as graphics are selected to facilitate operator understanding. A backtrack shall permit the operator to move upward in the hierarchy by mouse click on the backtrack. The backtrack shall show at least the previous 4 penetration levels. The operator shall be provided the option of showing each graphic full screen size with the backtrack as the horizontal header or by showing a stack of graphics, each with a backtrack.
3. All operator accessed data shall be displayed on the color monitor. The operator shall select further penetration via mouse click on an area, building, floor, fan, etc. The defined linked graphic below that selection shall then be displayed. Dynamic data shall be assignable to any and all graphics.
4. The operator shall be provided with means to directly access any graphic or any point without going through the penetration path.
    a. Direct access to graphics shall be menu selectable wherein the operator may optionally enter the name of the graphic system desired or select the desired graphic via cursor positioning on a scroll bar listing of all graphics, or may be selected via keyboard entry.
5. Points (physical and pseudo) shall be displayed with dynamic data provided by the system with appropriate text descriptors, status or value, and engineering unit. Coloration shall be used to denote status and alarm states. Coloration conventions shall be variable for each class of points. In addition, there shall be clear indication of latest status (e.g., fan rotation, damper position, fluid flow, etc.) where specified. All points shall be dynamic with update rates user adjustable on a per point basis from 20 seconds to 120 seconds depending upon the process dynamics.
6. For operators with the appropriate privilege(s), points shall be commanded directly from the color monitor via mouse selection. For a digital command point such as a state (e.g., CLOSED) and the operator could select OPEN via mouse click. For most operations, a keyboard equivalent shall be available for those operators with that preference. Upon selection of analog commandable points (such as discharge air static pressure), a dialog box shall appear containing the following:
    a. The decimal value of the set point with adjacent up-down arrows.
    b. The operator shall be afforded three methods of analog commanding from which to choose as follows:
        1) Click the cursor on the decimal set point value, and enter a new set point value via the keyboard decimal keypad.
        2) Drive the decimal value up or down via the up-down arrows.
        3) “Drag” the set point arrow up or down by moving the cursor to the desired position and clicking.
    c. The bar chart shall also have an associated colored scale showing the current position (scaled value) of the alarm limits.

7. An operator shall be permitted to split or resize the viewing screen to show one graphic on the left half of the screen and another graphic, spreadsheet, bar chart, word processing, curve plot, etc., on the right half screen, to allow real time monitoring of one part of the system while displaying other parts of the system or data from the system to facilitate system operation.
8. An on-line context-sensitive "help" utility shall be provided to facilitate operator training and understanding. The document shall contain text and graphics to clarify system operation. At a minimum, help shall be available for every menu item and dialog box.
9. Sample graphics are appended to the end of this Section.

D. Site Specific Customizing Software:
1. Provide all hardware and software required for complete system programming including system schematic development, I/O hardware point definition, hardware and software text point descriptors, DDC algorithmic development, a controller software loading utility, and a live programming test facility. Color conventions shall be used throughout to support ready recognition of inputs, outputs, plant heating/cooling devices, control function modules, etc. Provide all hardware and software required for the modification of existing graphics and for the construction of new graphics.
2. Provide software which will allow the user to modify and tailor the DDC system to the specific and unique requirements of the equipment installed, the programs implemented, and to staffing and operational practices. Online modification of system configuration, program parameters, and data base shall be provided via menu selection and keyboard entry of data into preformatted self-prompting templates. As a minimum, the following modification capability shall be provided.
   a. Operator assignment capability shall include designation of operator passwords, privilege(s), starting graphic and auto sign off duration.
   b. Peripheral assignment capability shall include assignment of segregation groups to consoles and printers, and designation of backup printers.
   c. System configuration/diagnostic capability shall include communications and peripheral port assignments, DCP enable/disable, assignment of command trace to points and initiation of diagnostics.
   d. System text add/change capability shall include action messages for alarms and run time, and trouble condition messages.
   e. Time/Schedule change capability shall include time/date set, time/occupancy schedules, holiday schedules, and daylight savings time schedules. All time and calendar scheduling and schedule modification shall be accomplished graphically via color bars and calendars in a hardware independent manner.

f. Points shall be uniquely defined as to coloration, animation (when used), flashing rate and duration, audible rate and duration, point descriptors, operator messages (480 characters minimum), printer options, alarm archival option, alarm and warning limits, and engineering units. All messages specified and all physical and pseudo point descriptors shall be entered by the Company producing the system.

g. Point related change capability shall include system/point enable/disable; run time enable/disable; assignment of points to point classes, analog value offset, lockout, run time limits, and setting a fixed input value or output status.

h. All adjustable setpoints shall be resettable from a graphic.

E. Alarm handler software shall respond to alarm conditions sensed and transmitted from DCPs and TECs. First in, first out handling of alarms in accordance with alarm priority ranking is required with buffer storage for a minimum of 20 alarms in case of simultaneous multiple alarms. Alarm handler shall be active in both the Signed On and Signed Off modes to assure that alarm will be processed even though and operator is not currently signed on.

1. Alarms shall be displayed in a dialog box of the color monitor. Display shall include as a minimum:

   a. Indication of alarm condition; i.e., ABNORMAL Off, HI ALARM/LO ALARM, analog value or status, and English point identification.

   b. A unique per point alarm action message; i.e., “The fan has shutdown due to an excessively high discharge duct pressure, There is a strong indication of a system malfunction such as an inlet vane drive failure, or major fire damper closure. The switch should not be manually reset until a thorough check of the cause is conducted” of up to 480 characters.

2. Alarms are to be directed to appropriate operators, operator stations, and printers for segregation assignments as specified in previous sections of this specification.

3. Alarm silencing shall be by selecting the “silence” button or by authorized operator’s acknowledgment. In all cases, alarm acknowledgment shall only be allowed by operators authorized to acknowledge a point in alarm.

4. Each point shall be assigned to an alarm class, with no limit to the quantity of alarm classes. Each alarm class shall be uniquely assignable to any combination of the following alarm processing attributes:

   a. Audible beep duration: none, 10 seconds, 20 seconds, continuous.

   b. Audible beep rate (slow-medium-fast).

   c. Alarm historically archived (yes or no).

   d. Alarm printed, with printer ID.

   e. Associated coloration with any of 256 colors with separate brightness control, assignable to each alarm state (high alarm, etc.) and similarly be distinguished with different colors for each possible state.

5. Alarms shall be displayed and/or printed at each peripheral to which its segregation allows, but only those operators having proper privilege level will be allowed to acknowledge alarms.
6. An unacknowledged alarm indicator shall be provided on the color monitor display to alert the operator that there are unacknowledged alarms in the system.
7. Symbols for points in a graphic display that are in an unacknowledged alarm state shall flash red; when in an acknowledged state, the symbol shall be non-flashing-red.
8. Run time limit messages shall be presented and processed as alarm messages except the action message shall be of a maintenance directive nature.

F. Standard reports shall be provided which shall be operator selectable to appear on the operator station, any selected printer or both. A "terminate report" command shall be available to allow the operator to stop any report in the process of being printed. In the event of failure of any printer, subsequent reports directed to that printer shall be automatically redirected to an operator preassigned backup printer dedicated at the operator station. The following standard pre-formatted reports shall include:

1. Point summary reports may be requested at any penetration level (building, area, system) and shall include only points at and below that level. Point summary reports shall include the current value/status and condition, English system and point descriptors for all points. Point summary reports shall be selectable for all points, only those points in alarm, fixed points, disabled points, locked out points, locked out and in alarm points, analog input or output points, digital input or output points. All reports shall be capable of being scheduled to run at a specific time and/or interval via an operator function supported by necessary data entry templates and interactive prompts.
2. Dynamic trends shall show real time activity of the associated points. This information shall be printed and/or displayed in numeric, bar chart, curve plot, pie chart, etc., as selected by the operator. Graphic plots shall allow a unique color for each point. As new point values are sampled, they shall be processed, scaled, and dynamically appended to any plot being displayed. Sample interval of points selected for dynamic trend shall by user selectable from five seconds to sixty minutes.
3. Alarm and run time reports shall be automatically issued to assigned printers immediately upon occurrence, and shall consist of the point descriptor, the status or value of the point with engineering unit, the time and date, and an action taking alarm message.
4. The user shall be provided with a command trace feature selectable on a per point basis allowing the archiving of all commands issued to each point. The archived trace shall include the command, the command source, the point ID, and the time and date. Command trace reports shall be output upon operator demand.

5. A custom report capability shall be provided to allow the user to format reports of any mix of text, points with status/value and descriptors, and points with status/value only. Custom reports may be scheduled or requested manually. A spreadsheet program similar to Microsoft Excel shall be provided fully integrated with the DDC system data base, and available to the user. Spreadsheet packages which require offline execution or manual translation of data files from one program format to another are not acceptable.

G. Trend reports shall allow the operator to randomly select logical arrays of points to be recorded at selectable time intervals.

1. Trend point archival - Each DCP trend point system (hardware and software) shall be assignable to PC archive files at user definable time intervals. Trend data sample resolution shall be a minimum of one degree or one percent of the points range, whichever is smaller. Each point trend file shall have a user assignable selectable archive duration of a day, a week, a month, or a year. For any duration period selected, the file shall retain one full duration period while it collects another (i.e., after collecting data for May, May is retained in total as June data is accumulated).
2. Trend display points shall be subsequently printed/ displayed individually or in logical groups of up to any eight points in any group. Points may be assignable to multiple trend groups. The system shall have up to 500 trend groups which may be predetermined by the user for a unique set of logical points and display characteristics.
   a. Single Point Displays: Single point trend reports shall be displayable by selecting the desired point from any system graphic upon which it is displayed or by entering its keyname. Display characteristics shall be user predeterminable for any desired display range (X-Axis period) and any desired data manipulation within the selected range.
   b. Template-selectable display range options shall be “current”, “previous”, or “date range” with range and appropriate data intervals. “Current” ranges shall be time periods of one hour, two hours, etc., up to one year. Starting at the beginning of the range (i.e., a display of the “current” month shall start at 00:01AM the first day of the month and display selected values up to the present time). Data intervals within the selected ranges shall be selectable from ten seconds to one month, dependent upon the sample intervals. The X-Axis resolution shall accommodate up to 100 data values. “Previous” ranges shall be similar to current ranges, except that a full “range” of data (such as a full seven days of data for the past week, up to the Present time) shall be provided. Selectable range, data intervals, and X-Axis resolution shall be as specified for the “current” display range. “Date range” selection shall provide templated for the entry of year, month, date, hour, and minute for the beginning and the end of X-Axis data. Selectable data intervals and X-Axis resolution shall be as specified for the “current” range.

c. Data Manipulation: Within the selected X-Axis intervals of the selected A-Axis range of data, data manipulation options shall be template selectable as the actual, last, highest, lowest, or average of the actual data samples within each interval. For example, for data sampled every five minutes one might select the highest value within every two hours for the past week. From that display, noting the two hour period with the peak value, the operator may subsequently request a display of actual values every five minutes for the related two hour period.

d. Point Group Displays: Point group displays shall be set-up by selecting each point desired to be displayed in a logical trend group and either setting up a new group with appropriate group name (such as AHU RETURN AIR TEMPS) or selecting an existing group from a drop-down menu. Group displays shall then be initiated by selecting a top-level menu-bar option trend, and selecting a trend group from a subsequent drop-down menu. From this point, template selectable display options shall be as specified for single point displays (i.e., current, previous, date range, actual, highest, lowest, average).

3. Trend Presentation Options: After defining a desired trend display as above, selectable presentation options of display, print, or spreadsheet shall be available.

a. Display: Selecting “Print” shall initiate an immediate printout of the same data values used to construct the above curve plot. Print format shall include a header with a time column and eight eight-digit value columns of data. The appropriate engineering unit shall be at the head of each column. The print header shall include a column point descriptor legend and an English description of the trend display set-up options as specified for the “display” option.

b. Spreadsheet: Selecting the spreadsheet option shall present the display values (after data manipulation) in a spreadsheet (Microsoft Excel) format. From this screen, the user may edit the values to correct problems (missing data, failed sensors, errors). After editing, display or print options specified above may be executed, or any other standard spreadsheet data manipulation options may be exercised.

2.06 DATA AND CONTROL (D/C) SUMMARY

A. Each analog point shall have unique DCP and TEC resident dual high and dual low limit alarm thresholds set in engineering units. Where specified, floating (a band above and below a set point) alarm limits shall be provided.

B. Each digital output shall have a software-associated monitored input. Any time the monitored input does not track its associated command output within a programmable time interval, a “command failed” alarm shall be reported.

C. Where calculated points (such as CFM) are shown, they shall appear in their respective logical groups. The respective unconditioned raw data (such as logarithmic differential pressure) points shall also be grouped into a special group for display and observation independent of the logical groups.

2.07 VARIABLE SPEED FAN CONTROL

A. Temperature Transmitter: Selectable span to meet the individual application requirements.

B. Optical Loop Isolator: To provide protection against RFI and signal line spike interference.

C. Power Supply: 120 V ac to a maximum of 35 V dc while supplying the current necessary for the transmitter, receiver, and indicator.

D. Receiver Controller: Input of 4 to 20 mA, adjustable output zero and span; proportional direct or reverse acting output of a signal level and type as required as an input to the fan speed controller; grounded or ungrounded output as needed by the drive, capable of PID control.

E. Signal Selection: Low signal discrimination so that the drive is operated from the point in the hydronic system with the greatest offset below the set point temperature.

F. Indication: The temperature at each transmitter shall be indicated at the receiver controller.

G. Operation: Each noted point in the system shall have a receiver controller and a separate set point. The fan drive, speed, shall be automatically adjusted to maintain the temperature to satisfy the controlling set point. The speed of the drive shall ramp in the direction of large changes and shall soft start the fan.

H. Signal Wire ,20 gauge shielded twisted pair: Provide signal wire as recommended by the Company producing the system. Soft ground the wire shield.

2.08 MISCELLANEOUS ELECTRIC/ELECTRONIC AND MECHANICAL DEVICES

A. Input/output sensors and devices shall be closely matched to the requirements of the DCP for accurate, response, noise free signal input/output. Control input response shall be high sensitivity and matched to the loop gain requirements for precise and responsive control.
   1. In no case shall computer inputs be derived from pneumatic sensors or thermocouples.

B. All electric switch devices shall be selected for the applied load and UL listed for the application.

C. Provide NEMA 1 enclosures for all switching devices.

D. Unless otherwise specified or indicated, the following features are required for the equipment specified:

1. Safety low limit shall be manual reset twenty foot limited fill type responsive to the coolest section of its length.
2. Temperature sensors shall be Resistance Temperature Detector (RTD) type with 500 ohm balco, 100 or 3000 ohm platinum.
   a. Resistance shall be 100 ohms at 32 degree F with a minimum accuracy of 0.5 degree F through the range of 32 degree F to 212 degree F.
   b. Space temperature sensors shall be provided with vandal resistant type locking covers.
   c. Duct temperature sensors shall be averaging type elements for sensing mixed air temperatures in ductwork, with sufficient length or sufficient number of elements, so as to efficiently measure the air temperature through the entire cross section of duct.
   d. Water temperature sensors shall be provided with a separable copper, monel or stainless steel well.
   e. Outside air wall mounted sensors shall be provided with a sun shield.
3. Thermistors:
   a. Precision thermistors may be used in temperature sensing applications below 200 degrees F, as identified on the project drawings or where allowed in this specification.
   b. Sensor accuracy over the application range shall be 0.36 degrees F or less between the range of 32 degrees F to 150 degrees F. Sensor manufacturer shall utilize 100 percent screening to verify accuracy. Thermistors shall be pre-aged, and inherently stable. Stability error of the thermistor over five years shall not exceed 0.25 degrees F cumulative.
   c. Sensor element and leads shall be encapsulated. Bead thermistors shall not be allowed. A/D conversion resolution error shall be kept to 0.1 degrees F. Total error for a thermistor circuit shall not exceed 0.5 degrees F, which includes sensor error and Control Unit A/D conversion resolution error.
   d. Provide thermistor and Control Unit manufacturer documentation including Contractor's engineering calculations, which support the proposed thermistor input circuit will have a total error of 0.5 degrees F or less.
4. Differential and Static Pressure Sensors and Switches:
   a. Air flow and static pressure analog sensors shall be high accuracy suitable for the low velocity pressures to be encountered, be selected for approximately 50 percent over range, and have a 4 to 20 mA output. These differential pressure sensors shall be connected to the air flow measuring station with valved lines for testing and calibration, and shall have adjustments for zero and span.

b. Pressure Transducer: All pressure transducers for sensing static pressure in ductwork shall be of the electronic type and provide an output signal of zero to ten volts DC, two to ten volts DC, or four to twenty milliamps. All transducers shall provide an accuracy of 2 percent of full scale or better, a repeatability of 0.5 percent of full scale or better, and a hysteresis of 1 percent or less. The effect of ambient temperature variations shall be less than 2 percent of full scale for ambient temperature changes from 10 degrees C to 40 degrees C (50 degrees F to 104 degrees F). The effects of variation in line voltage shall be less than 1 percent of full scale for voltage changes corresponding to 10 percent of the nominal line voltage. The span of each transducer shall be as indicated on the drawings. Each transducer shall have a zero and span adjustment.

5. Air Flow Sensor: IAQ Enforcer, by EBTRON Inc., 1663 Hwy. 701 South, Lork, SC 29569.

a. Air Flow and Temperature Measurement: Thermal anemometer using instrument grade self heated thermistor sensors with thermistor temperature sensors. Flow measurement drift shall not exceed Manufacturers repeatability statement for the life of the equipment. Vortex shedding arrays are not acceptable. Pitot tube and differential pressure sensing arrays are not acceptable. Auto zeroing sensors are not acceptable.

1) Flow Station Construction

a) Type: Duct Mounted.

b) Sensor: Glass excapsulated self heated thermistor and epoxy encapsulated temperature sensor.

c) Sensor Housing: Noryl standard.

d) Sensors per satellite probe: 1 to 8.

e) Support Struts: Tubular aluminum 6061 standard.

f) Supporting Bracket: Aluminum 6063 standard.

2) Electronics:

a) Type: Microprocessor Based, totally solid state, industrial grade integrated circuits.

b) Electrical Connections Electronics to IAQ Enforcer Panel: 3 conductor, 22 AWG.

c) Enclosure: Aluminum.

3) Performance:

a) Electronics temperature range: -20 degrees F to 160 degrees F.

b) Flow station temperature range: -20 degrees F to 160 degrees F.

c) Flow station velocity range: 0 to 5000 ft/min.

d) Flow station pressure drop: less than 0.005 inch wg at 2000 ft/min.

e) Flow station humidity range: 0 to 99 percent RH (non condensing).

f) Digital Output Signals to IAQ Enforcer:
(1) Sensor velocity accuracy: +/- 10 ft/min. >500 ft/min., +/- 2 percent reading <500 ft/min.
(2) Sensor temperature accuracy: typical 0.18 degrees F, max. 0.36 degrees F.
(3) Repeatability, +/- 0.2 percent scale.

b. Ebtron Series- P Duct Mounted Satellite Sensor:
1) Flow Station Construction:
a) Type: Duct Mounted.
b) Sensors: Glass encapsulated self heated thermistor and epoxy encapsulated temperature sensor.
c) Sensor Housing: Noryl standard.
d) Sensor per satellite probe: 1 to 8.
e) Support Struts: Tubular aluminum 6061 standard.
f) Supporting Bracket: Aluminum 5052 standard.
g) Connecting Cable: Plenum Rated PVC. UL Standard 13, Type CL2P with twist lock connector to remote electronic panel.
2) Electronics:
a) Type: Microprocessor Based, totally solid state, industrial grade integrated circuits.
b) Electrical Connections Electronics to IAQ Enforcer Panel: 3 conductor, 22 AWG.
c) Enclosure: Aluminum.
3) Performance:
a) Electronics temperature range: -20 degrees F to 160 degrees F.
b) Flow station temperature range: -20 degrees F to 160 degrees F.
c) Flow station velocity range: 0 to 5000 ft/min.
d) Flow station pressure drop: less than 0.005 inches wg at 2000 ft/min.
e) Flow station humidity range: 0 to 99 percent RH (non condensing).
f) Digital Output Signals to IAQ Enforcer:
(1) Sensor velocity accuracy: +/- 10ft./min. >500 ft./min, +/- 2 percent reading <500 ft./min.
(2) Sensor temperature accuracy: typical 0.18 degree F, max. 0.36 degree F.
(3) Repeatability: +/- 0.2 percent scale.

c. Ebtron Series-Fan Inlet Satellite Sensor.
1) Flow Station Construction:
a) Type: Fan Inlet.
b) Sensors: Glass encapsulated self heated thermistor and epoxy encapsulated temperature sensor.

c) Sensor Housing: Nylon.
d) Sensors per inlet: 2 sensors.
e) Support Struts: Steel, adjustable to fit inlet.
f) Supporting Bracket: Nylon.

2) Electronics:
a) Type: Microprocessor Based, totally solid state, industrial grade integrated circuits.
b) Connecting Cable Flow Sensor to Electronics: Plenum Rated, NEC Type CL2P.
c) Electrical Connections Electronics to IAQ Enforcer Panel: 3 conductor, 22 AWG.
d) Enclosure: Aluminum.

3) Performance:
a) Electronics temperature range: -20 degrees F to 160 degrees F.
b) Flow station temperature range: - 20 degrees F to 160 degrees F.
c) Flow station velocity range: 0 to 10,000 ft. min
d) Flow station humidity range: 0 to 99 percent RH non condensing.
e) Digital Output Signal to IAQ Enforcer:
(1) Sensor velocity accuracy: +/- 10 ft./min. >500 ft. min., +/-2 percent reading <500 ft./min.
(2) Sensor temperature accuracy: typical 0.18 degree F, max. 0.36 degree F.
(3) Repeatability: +/- 0.2 percent scale.

6. Temperature or humidity control equipment with sensing elements or probes for insertion in insulated equipment or insulated ductwork: Provide flanges or sockets of the extension neck type, so as to finish flush with final insulated surface.

7. Current Sensor for Fan:
a. Unit Status: Solid-State Status Sensor.
1) Output rating: 0.2 A at 30 Vdc.
2) Input rating: 0 to 135 ampere continuous.
3) Sensor supply current induced from monitored conductor. Minimum conductor current required 1A. Maximum rating 135.
4) Isolation: 600 Vac RMS.
5) Trip set-point: Adjustable to +1 percent.
6) Temperature range: -15 degrees C to 85 degrees C.
7) Humidity range: 0 to 95 percent non-condensing.

b. Motor Amperage: Analog Current Sensor.
1) Sensor Output rating: 0 to 5 Vdc.
2) Monitor amperage 0 to 60 ampere continuous.
3) Sensor supply current induced from monitored conductor.
4) Isolation: 600 Vac RMS.
5) Span: 0 to 10 ampere min., maximum 0 to 60 amperes.

6) Accuracy: 2 percent, all scales, when current greater than 10 percent of scale.
7) Humidity range: 0 to 95 percent non-condensing.

2.09 AUTOMATICALLY OPERATED DAMPERS

A. Dampers:
1. Size dampers for linear flow output, with a maximum damper leakage of 30 cfm per square foot of projected area at 3 inch static pressure.
2. Provide dampers and seals suitable for service from -40 degrees F to 200 degrees F, with closed cell neoprene edging seals, spring loaded stainless steel side seals and adjustable baffles for full size adjustment.
3. Provide dampers in 2 inch size increments from 8 inches horizontal and vertical to 48 inches. For requirements over 48 inches in size provide standard modules with interconnecting hardware.
4. Dampers shall be of the multiple interlocking V-grooved blade type with nylon or oil impregnated bronze bearings, zinc plated steel shafts and hardware with a corrosion resistant finish. Provide blades a maximum of 8 inches in width with the overall construction designed to prevent leakage in the closed position, complete with solid stops.
5. Fabricate frames in steel ductwork from No. 13 USS gage galvanized steel and blades of No. 16 USS gage galvanized steel, with a factory baked black enamel finish.
6. Fabricate frames in aluminum ductwork from No. 14 B & S gage extruded aluminum and blades of No. 14 B & S gage aluminum.
7. Proportional control dampers shall be rated by the manufacturer as suitable for use at 3000 fpm face velocity.
8. Equipped with electric/electronic actuator.

2.10 ACTUATORS

A. Type: All actuators shall be electric/electronic.

B. Actuators shall be factory selected, mounted and tested for proper operation based on unit size, type, and torque requirements.

C. Electric/Electronic Actuators:
1. Damper Actuators:
a. Electric/Electronic, positive positioning, spring return, sized to stroke damper smoothly throughout its range.
1) All outdoor air dampers shall fail closed upon electric power loss.
b. Actuator response shall be linear in response to sensed load.
c. Voltage to suit system voltage.

2.11 MARKERS AND NAMEPLATES

A. Markers: Premarked self-adhesive; W.H. Brady Co.'s B940, Thomas and Betts Co.'s E-Z Code WSL self-laminating, Ideal Industries' Mylar/Cloth wire markers, or Markwick Corp.'s permanent wire markers.

B. Nameplates: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high.
   1. Phenolic: Two color laminated engraver's stock, 1/16 inch minimum thickness, machine engraved to expose inner core color (white).
   2. Aluminum: Standard aluminum alloy plate stock, minimum .032 inches thick, engraved areas enamel filled or background enameled with natural aluminum engraved characters.
   3. Materials for Outdoor Applications: As recommended by nameplate manufacturer to suit environmental conditions.

2.12 ACCESSORIES

A. Include accessories required to perform the functions specified and indicated on the drawings.

2.13 WIRING

A. See Section 260519, WIRING, GENERAL - 600 VOLTS AND UNDER

2.14 THERMOSTAT/TEMPERATURE SENSOR GUARDS

A. Model TG Series 16 by Shaw Perkins:
   1. Cover: Top, front and bottom, 16 gauge perforated steel, 1/8 inch perforations on 3/16 inch centers.
   2. Sides and mounting frame: 14 gauge steel.
   3. Fastener: 1/4x3/8 inch tamper resistant torx or allen head center post.
   4. Finish: Baked enamel finish.

PART 3 EXECUTION

3.01 VERIFICATION OF CONDITIONS

A. Test of Existing System:
   1. Prior to modifying the system, test portions of the existing system to ascertain their operating condition. Specifically, test:
      a. Active points which will be modified.
      b. Primary operators station (POS) and distributed control processor (DCP) functions associated with the modifications.
   2. Prepare a written report for the Director's Representative indicating the repairs required, if any, to make the existing system function properly.
   3. Repairs to the existing system are not included in the Work unless requested by Order on Contract.

3.02 INTERRUPTIONS TO EXISTING SYSTEM

A. Maintain the existing system in its present condition to the extent possible while installing new Work.

B. Prior to making changes relative to the existing system, notify the Director's Representative and have procedures approved.

3.03 INSTALLATION

A. Install the Work in accordance with the Company's printed instructions unless otherwise indicated.

B. Reprogram the system to include new sensor and control points and update existing system program to include changes and additions requested by facility
   1. Obtain from the facility personnel through the Director's Representative, a list of desired system program changes, additions, etc.

C. Identification, Labeling, Marking:
   1. Identification of Circuits: Identify wires, cables, and tubing by system and function in interconnection cabinets, POSs and DCPs to which they connect with premarked, self-adhesive, wraparound type markers. Designations shall correspond with point to point wiring diagrams.

3.04 FIELD QUALITY CONTROL

A. Preliminary System Test:
   1. Preparation: Have the Company Field Advisor adjust the completed system and then operate it long enough to assure that it is performing properly.
   2. Run a preliminary test for the purpose of:
      a. Determining whether the system is in a suitable condition to conduct an acceptance test.
      b. Checking and adjusting equipment.

B. System Acceptance Test:
   1. Preparation: Notify the Director's Representative at least 3 working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
   2. Make the following tests:
      a. Test system operational functions associated with the modifications.
      b. Test each monitor and control device connected or added under this project.
   3. Supply all equipment necessary for system adjustment and testing.
   4. Submit written report of test results signed by Company Field Advisor and the Director's Representative. Mount a copy of the written report in a plexiglas enclosed frame assembly adjacent to the POS.

3.05 POINT DESCRIPTION, PROGRAM LIST AND SEQUENCES

A. ERU Points List:

Description	Points				Notes
	Input		Output		
	Binary	Analog	Binary	Analog	
Supply Fan Start / Stop			X		Trend Point
Supply Fan VFD Signal				X	Trend Point
Supply Fan Status	X				Trend Alarm Point
Exhaust Fan Start / Stop			X		Trend Point
Exhaust Fan VFD Signal				X	Trend Point
Exhaust Fan Status	X				Trend / Alarm Point
Outdoor Air Damper Open / Close				X	Trend Point
Outdoor Air Damper Open Status	X				Trend Point
Exhaust Air Damper Open / Close				X	Trend Point
Exhaust Air Damper Open Status	X				Trend Point
Temperature Low Limit Status	X				Alarm Point
Face and Bypass Damper Position				X	Trend Point
Natural Gas Burner Capacity				X	Trend Point
Supply Filter Differential Pressure		X			Trend Point
Return Filter Differential Pressure		X			Trend Point
Space Temperature		X			Trend / Alarm Point
Space Relative Humidity		X			Trend / Alarm Point
Discharge Air Temperature		X			Trend / Alarm Point
Return Air Temperature		X			Trend Point
Exhaust Air Temperature		X			Trend Point
Supply Duct Static Pressure		X			Alarm Point
Return Duct Static Pressure		X			Alarm Point
Outside Air Temperature		X			Trend Point
Outside Air Relative Humidity		X			Trend Point

B. Variable Volume Heat Recovery Air Handling Unit Control Sequences (ERU-1&2):

1. Occupied/Unoccupied Control: During the occupied mode the heat recovery unit supply fan and associated exhaust fan shall be enabled and will run continuously. In the unoccupied mode the outdoor air and exhaust air dampers shall be closed and the unit supply fan and associated exhaust fan shall recirculate.

2. Discharge Air Control: Upon proof the outside air and exhaust air dampers are opened, the supply fan and exhaust fan shall start. At outdoor air temperatures below 60F, the natural gas burner shall modulate to maintain the discharge air temperature at its setpoint. The discharge air setpoint will be scheduled with the outdoor air temperature and reset based upon space temperature. At outdoor air temperatures above 60F the natural gas burner shall be disabled.
3. During the heating season, the supply air temperature shall be reset from a minimum of 65ºF (at outside air temperatures of 60ºF or above) upward to a maximum of 80ºF (at outside air temperatures of 10ºF or below). The set point shall be easily adjustable. If any of the space temperatures deviate more than 3ºF from setpoint, the discharge air setpoint shall be reset to satisfy the sensor.
4. Humidity Control: The exhaust/return air and representative space humidity levels shall be monitored to operate the system as required to maintain the humidity level below 60% (occupied and un-occupied).
5. Equipment Lockout: On a loss of supply or exhaust fan status, the outdoor and exhaust air dampers will close and the natural gas burner will be locked out.
6. A 20’ capillary type manual reset low limit thermostat shall stop the supply and exhaust fans, close the outdoor and exhaust air dampers and alarm at EMS should the discharge air temperature fall below 38°F.
7. A static pressure high limit, located immediately after the supply fan, will shutdown the supply and exhaust fans if the duct static pressure exceeds it’s setpoint (3.0” WG, adj.).
8. A static pressure low limit, located immediately upstream of the exhaust fan, will shut down the supply and exhaust fans if the duct static pressure drops below the minimum setpoint (-1.5” wg, adjustable).
9. Exhaust air fan shall be interlocked with the supply fan. The status of each fan shall be a measured input to the control routine.
10. Filter Bank Differential Pressure: Provide at each filter bank to determine when filters need changing. At 0.5" (adjustable differential pressure, an alarm is sent to the operator's work station).
11. During the defrost mode, outdoor air bypasses the heat exchanger and the face & bypass damper modulates to maintain the exhaust air temperature leaving the heat exchanger at 38F (adjustable).

END OF SECTION

SECTION 237413

ENERGY RECOVERY UNITS

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Pipe and Pipe Fittings: Section 232000.

B. Metal Ductwork: Section 233113.

C. Air Filters: Section 234100.

D. Temperature Control Systems: Section 230924.

E. Wiring for Motors and Motor Controllers: Section 260523.

F. Motors and Motor Controllers: Section 260221.

1.02 SUBMITTALS

A. Shop Drawings: Submit drawings for each size of factory fabricated roof curb.

B. Product Data: Manufacturer's catalog sheets, brochures, performance charts, standard schematic drawings, specifications and installation instructions for each size unit
   1. Name, address, and telephone number of nearest fully equipped service organization.

C. Contract Closeout Submittals:
   1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Director's Representative.

1.03 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Unit shall be factory tested and the design, construction and installation shall be in accordance with the following: ARI Standard 210, NFPA, UL, ASHRAE 15, Safety Code for Mechanical Refrigeration, and all State and Local codes or regulations having jurisdiction.
   2. Rate cooling capacities in accordance with ARI Standard 210.
   3. Electrical components shall be UL listed.
   4. Provide gas fired heating modules, for installation in combination gas fired heating and cooling units, certified by the AGA. specifically for outdoor applications.

1.04 PRODUCT DELIVERY

A. Deliver each unit as an integral factory packaged assembly.

1.05 MAINTENANCE

A. Maintenance Service: A fully equipped authorized service organization capable of guaranteeing response within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

B. Extra Materials: Provide with each unit, one spare set of air filters. Suitable box and label spare filters as to their usage.

PART 2 PRODUCTS

2.01 ENERGY RECOVERY UNITS

A. General Design: Provide combination heating and cooling units, specifically designed for installing totally exposed on roof surface. Units shall consist of a sectional type sheet metal casing, totally enclosing the heating section, supply air section, return air section, filter section, evaporator coil and fan section; all heating, operating controls, totally wired and complete with all internal piping and ductwork. Upon installation in their permanent locations on the roof a building, connections to service piping, electrical service and ductwork shall only be required to put units in operation.

B. Unit Casing: Fabricate from G90 galvanized sheet steel. Floor fabricated of 16 gauge inner floor and 22 gauge sub-floor with 2” rigid insulation in between. Roof and walls fabricated of 22 gauge inner panel and 18 gauge outer panel with 2” rigid insulation in between. The drain pan under the heat exchanger shall be fabricated of 304 stainless steel, double sloped with welded seams and with a NPT drain connection. The casing shall be properly reinforced for maximum strength and rigidity, with all welded steel angle and channel framework as required. Casing shall be complete with hinged, gasketed access panels with fastening devices for ease in servicing all components. Outdoor construction shall consist of sloped roof panels with rain gutters, capped roof seams, and intake and exhaust hoods with bird screens. All casing joints shall be rendered watertight. Chemically pretreat and factory finish the entire casing with a corrosion-resistant acrylic finish.

C. Cooling Section: Factory sealed refrigerant cooling coil intended for future use.

D. Heating Section: An Indirect Gas-fired Duct Furnace Heat Module(s) as manufactured by Heatco Inc shall be factory furnished and installed.

1. The heat exchanger shall be tubular type constructed of 16 gauge, minimum, type 304 stainless tubes, 2 ¼" diameter having a minimum wall thickness of 0.049" with a draft inducer assembly to provide for positive venting of flue gasses. Tubes shall be produced to ASTM A249 construction standards for heat exchanger application. Tubes shall employ integral formed-dimple restrictors to eliminate noise associated with expansion and contraction of internal baffles during heating cycles, and to provide for unobstructed drainage of condensate that occurs in the tubes during cooling operation. Drainage shall be configured so that burners and burner surfaces are not exposed to condensate during cooling system operation.
2. Burners: Burner assemblies shall employ inshot type burners constructed of aluminized steel body and sintered metal flame holder with integral carryover plenum. Provide burner with combination gas valve and pressure regulator incorporating manual shut-off, pilot valve, automatic 100 percent shut-off and thermo-couple pilot safety device, electronic pilot ignition.
3. Burner Operating Controls:
   1) Duct thermostat: Cycles burner to maintain supply air temperature setting.
   2) High Limit Control: Fixed stop at maximum permissible setting, de-energized burner on high bonnet temperature and re-energizes when temperature drops to lower value.
4. All gas piping shall enter the unit cabinet at a single location.

E. Air Handling Section:

1. Supply Fan: Provide one double width double inlet, forward curved centrifugal fan, with adjustable drive sheaves and two grease lubricated shaft ball bearings. Isolate entire fan assembly, including motor, from unit frame by means of double deflection rubber-in-shear isolators. Statically and dynamically balance fans at factory.
2. Filter Section: Provide filter racks integrally mounted within unit, with hinged access doors. Filters shall be of the type in size and number, as noted on the drawings.
3. Return Air: Provide the following return air system:
   a. Pressure Relief: Dampers open to relief positive pressure in building. Provide exhaust hood with rain gutter inside unit casing.
   b. Fan System: Provide one double width doubleinlet forward curved centrifugal fan with adjustable drive sheaves and two grease lubricated ball bearings. Isolate entire fan assembly, including motor, from unit frame with vibration isolators. Statically and dynamically balance fans at factory. Return air system shall include exhaust damper assembly that functions in conjunction with return air dampers. Provide exhaust hood with rain gutter inside unit casing.

4. Outside Air: Provide the following outside air system:
   a. Manually controlled damper system for use with a maximum of 25 percent fresh air.
   b. Remote control of return air and outside air up to a maximum of 100 percent fresh air, utilizing motor operated dampers and rheostat. Motors shall be spring return type.
   c. Economizer Cycle: Provide dampers and controls to provide for the use of outside air for cooling, with control by space thermostat. Controls shall automatically modulate return and outside air dampers, to maintain proper discharge air into conditioned space. Provide an outside air lockout control to prevent intake of outside air, when outside air temperature is too high. Provide all dampers with spring return feature.

F. Control Panel: Provide a dual compartment control panel section, as an integral part of the unit. One compartment shall house the controls and the other compartment the fan variable frequency drives and unit electrical control panel. Electrical control panel shall include a unit-mounted unfused main disconnect switch and 120 volt convenience outlet. The following energy recovery controls shall be factory provided and installed:
   1. Units shall be provided with a Face-and-Bypass Damper and Modulating Actuator.
   2. Frost control shall be provided by the frost control analog electronic temperature controller.
   3. Economizer control shall be provided by the economizer analog electronic temperature controller.
   4. Cooling Mode control shall be provided by the cooling mode analog electronic temperature controller install controls for integration in the future with a DX air cooled condensing unit

   The unit shall be provided with factory-installed, microprocessor based controls and associated electronic and electrical hardware. The unit controls shall be configured to allow remote control of the unit via the DDC Control system.

G. Roof Curbs: 24” inch high with continuously welded seams, built-in cant strip, one inch R5 rigid insulation and curb bottom and factory installed standard nailer strip. Roof curb shall be furnished by the unit manufacturer.

H. Air-to-Air Flat Plate Heat Exchanger: Air-to-air heat exchanger shall be a stationary aluminum flat plate heat exchanger. Heat transfer surface shall be formed aluminum plates with enhanced surface corrugation for increased performance. Exchanger shall be capable of withstanding a pressure difference between airflows of up to 7.2” w.c. without deforming air passages. Unit shall be capable of operating in temperatures up to 190°F. Standard cell construction shall have a maximum cross contamination between airflows of 0.01% of total airflow. The entire cell shall be capable of being visibly inspected and cleaned as required.

I. Dampers:
   1. Dampers shall have heavy duty extruded aluminum frames and 4" extruded aluminum air-foil blades mounted on brass shafts and supported and inter-connected by nylon gears. The side casings shall enclose the gears with ABS plastic covers that also serve as seals in the closed position.
   2. Outside air dampers shall be mounted on the inlet of the unit and operated by a spring return direct-coupled actuator with an end switch to be interlocked with the supply air motor relay.
   3. Return air shut-off dampers shall be mounted on the outlet of the unit and operated by a spring return direct-coupled actuator with an end switch to be interlocked with the exhaust air motor relay.
   4. Face-and-bypass dampers shall be operated by a modulating direct-coupled actuator. They shall also be interlocked so that when the face damper is open the bypass damper shall be closed.
   5. Recirculation air dampers shall be mounted between the return air and the supply air streams and operated by a spring return direct-coupled actuator.
   6. Exhaust air backdraft damper to be parallel blade.

J. Manufacturers: Xetex (basis of design), Heatex, Haakon or accepted equal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Roof Curbs:
   1. Deliver roof curbs to construction contractor for installation.

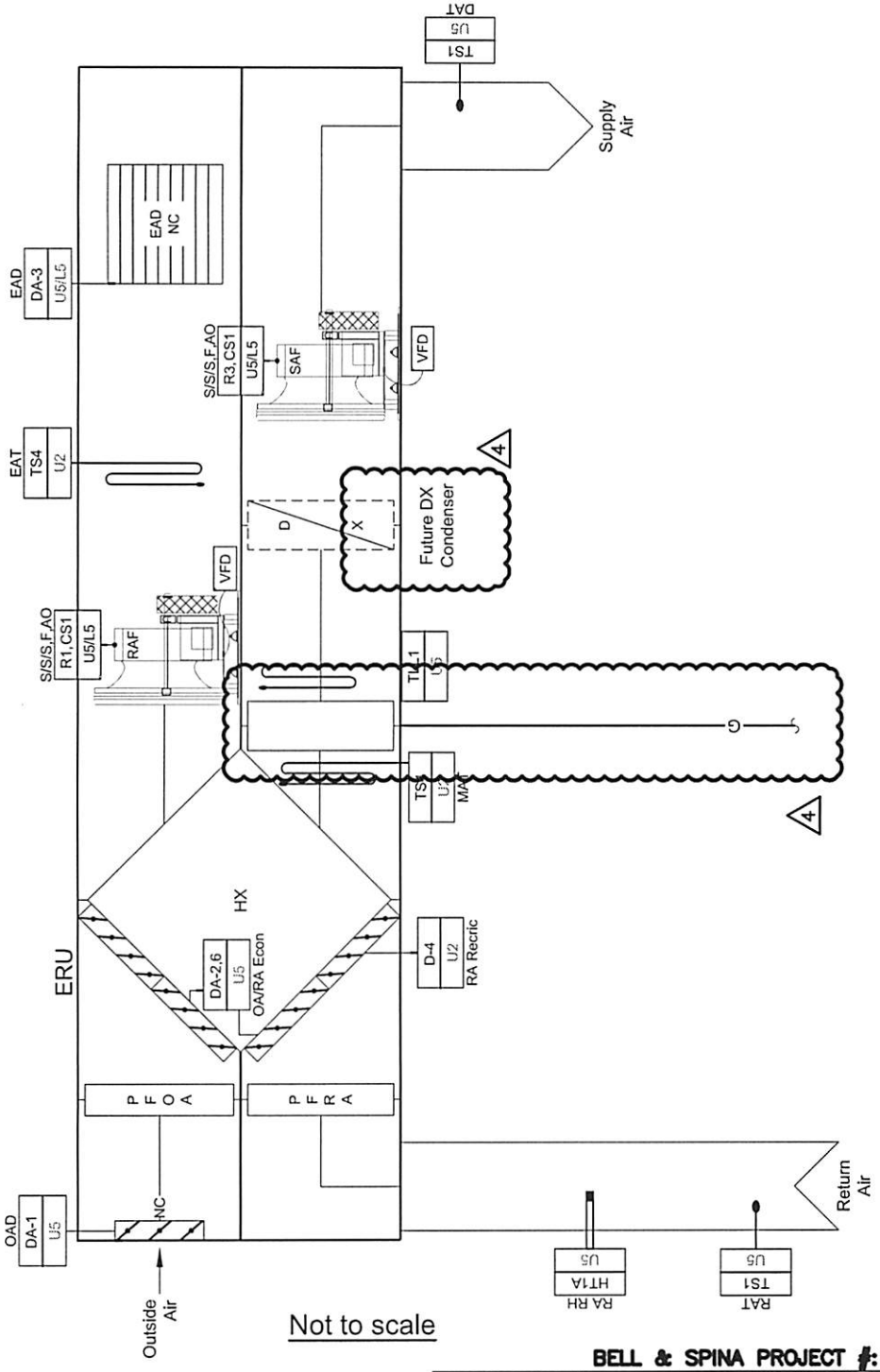
B. Energy Recovery Units:
   1. Install energy recovery units on roof curbs in complete accordance with the manufacturers' printed instructions, and as indicated.
   2. Provide all piping, electrical and ductwork connections to air conditioners through roof curb openings under units.

3.02 FIELD QUALITY CONTROL

A. Preliminary Requirements: Employ the services of a Company Field Advisor of the rooftop unit manufacturer for the following:
   1. Inspect unit installations prior to start-up.
   2. Supervise initial start-up of machine.
   3. Instruction of State Personnel.
   4. Service.

B. Pre-Start-Up, Start-Up and Instruction: Upon completion of the installation of the energy recovery unit to the satisfaction of the Company Field Advisor, start-up and preliminary testing shall be accomplished under the Company Field Advisor's supervision. When all necessary adjustments have been made and air conditioner is properly operating, the Company Field Advisor shall instruct State Personnel in the operation and maintenance of the air conditioner and accessories. Provide a minimum of 4 hours for instruction purposes exclusive of all pre-start-up and start-up time.

END OF SECTION



Not to scale

BELL & SPINA PROJECT #: 344-12-001

ADDENDUM #4 **REFERENCE DRAWING: M-001**

SHEET TITLE: **ERU CONTROL DIAGRAM**

PROJECT: **REHABILITATE SECOND FLOOR LOCKER ROOMS UTICA STATE ARMORY**

NYS OFFICE OF GENERAL SERVICES
Serving New York

STATE OF NEW YORK
RAM RAMAN
No. 066343
LICENSED PROFESSIONAL ENGINEER

CONTRACT:	
PROJ. NO:	Q1537
DATE:	10/1/12
DRAWN:	DDL
APPROVED:	TAM

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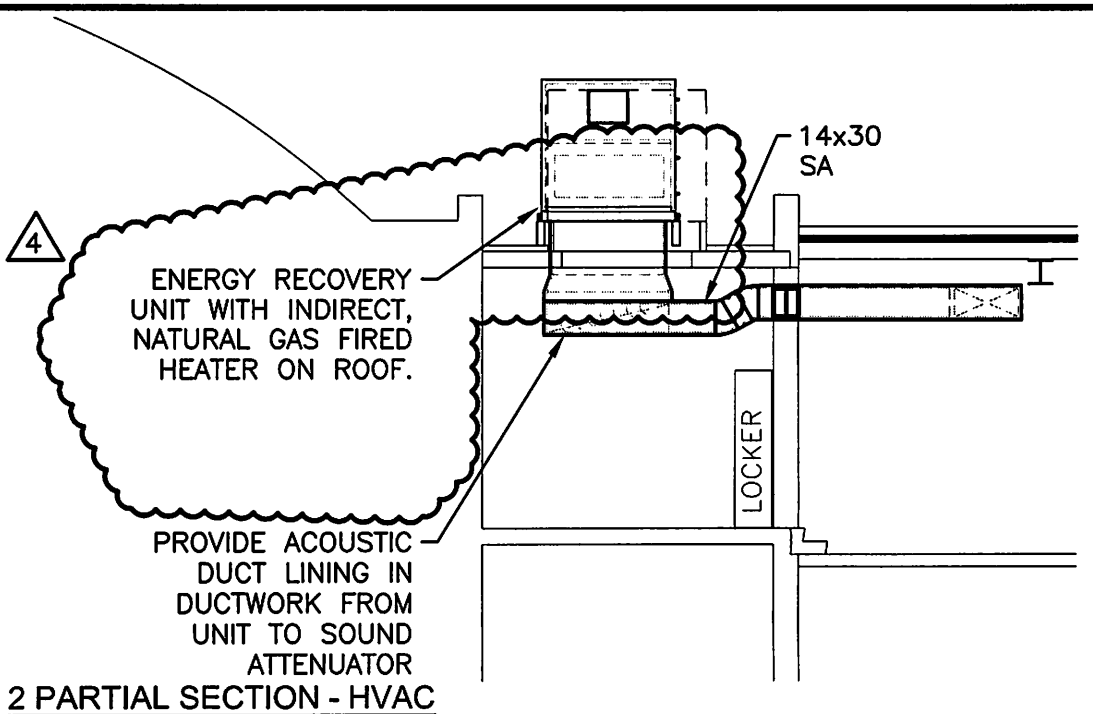
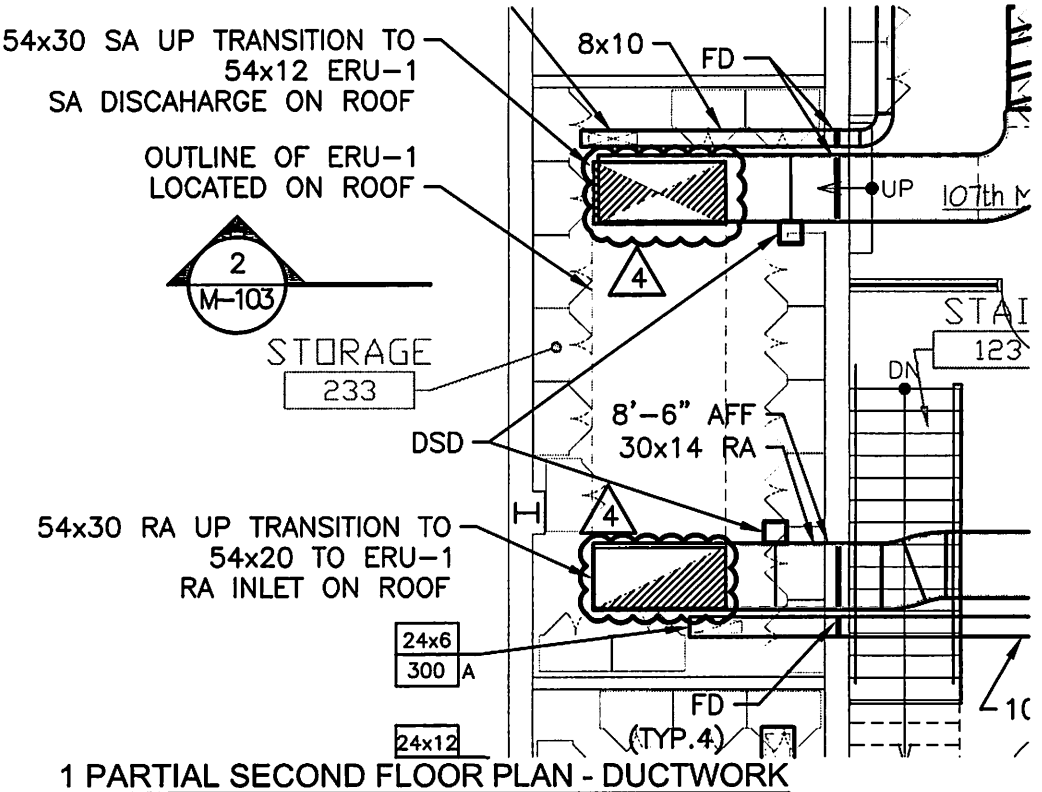
DWG NO: **ADD4.0-H1**



2 PARTIAL SECTION - HVAC



1 PARTIAL SECOND FLOOR PLAN - DUCTWORK

BELL & SPINA PROJECT #: 344-12-001

ADDENDUM #4 REFERENCE DRAWING: M-103

NYS OFFICE OF GENERAL SERVICES
Serving New York

STATE OF NEW YORK
DAVID TAMAN
No. 066343
LICENSED PROFESSIONAL ENGINEER

SHEET TITLE: PARTIAL SECOND FLOOR DUCTWORK PLAN AND SECTION – HVAC

PROJECT: REHABILITATE SECOND FLOOR LOCKER ROOMS UTICA STATE ARMORY

CONTRACT:	
PROJ. NO:	Q1537
DATE:	10/1/12
DRAWN:	DDL
APPROVED:	TAM

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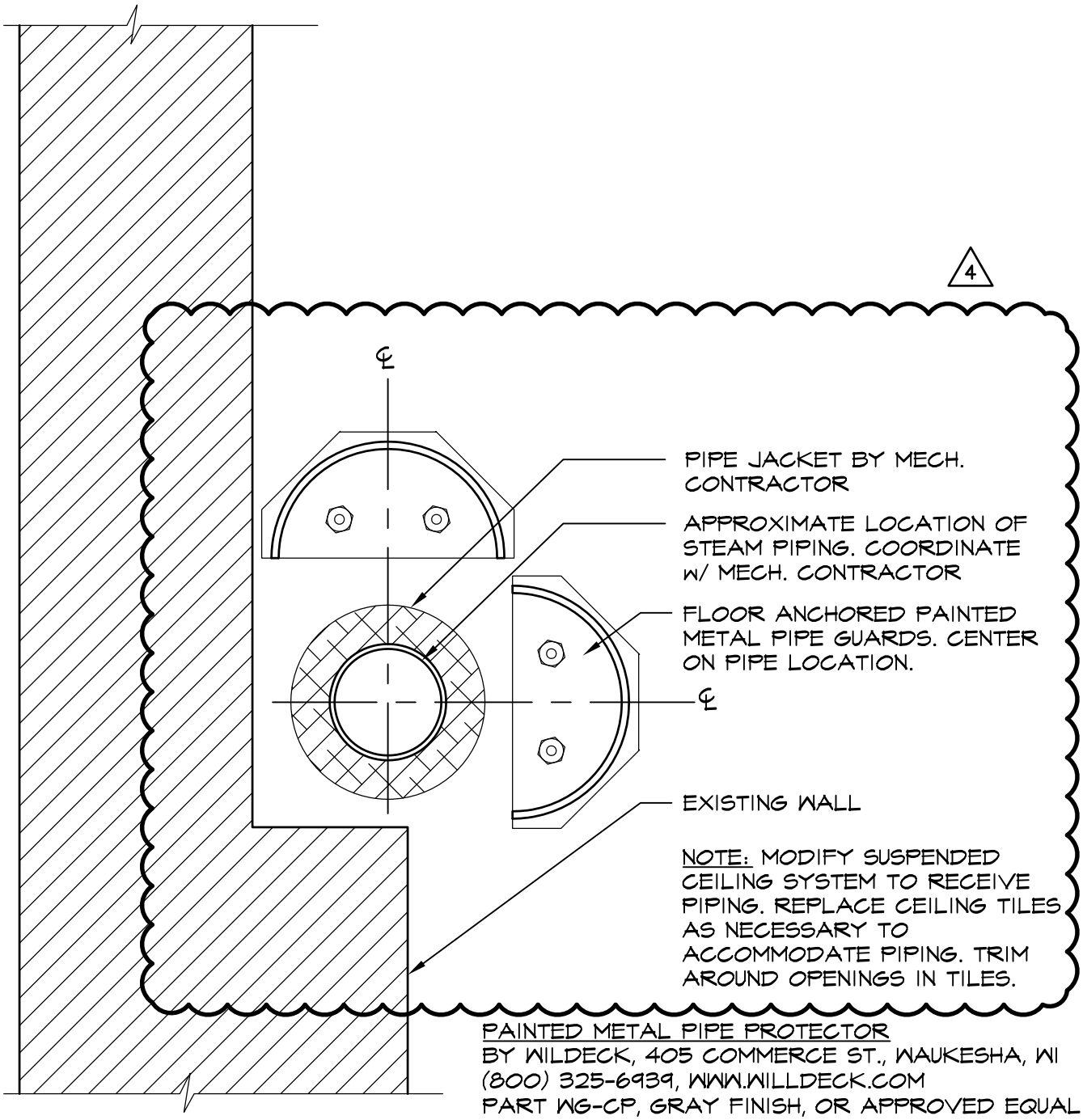
DWG NO: ADD4.0-H2



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BY WILDECK, 405 COMMERCE ST., WAUKESHA, WI
(800) 325-6939, WWW.WILLDECK.COM
PART WG-CP, GRAY FINISH, OR APPROVED EQUAL

3A. PIPE GUARD PLAN

BELL & SPINA PROJECT #: 344-12-001

ADDENDUM #4 REFERENCE DRAWING: A-101

NYS OFFICE OF GENERAL SERVICES
Serving New York

REGISTERED ARCHITECT DENNIS C. SPINA No. 014303 STATE OF NEW YORK

CONTRACT:	S5729
PROJ. NO:	Q1537-C
DATE:	10/01/2012
DRAWN:	DMKS
APPROVED:	DKA

SHEET TITLE: PIPE GUARD PLAN

SCALE: 1 1/2" = 1'-0"

PROJECT: REHABILITATE SECOND FLOOR LOCKER ROOMS UTICA STATE ARMORY

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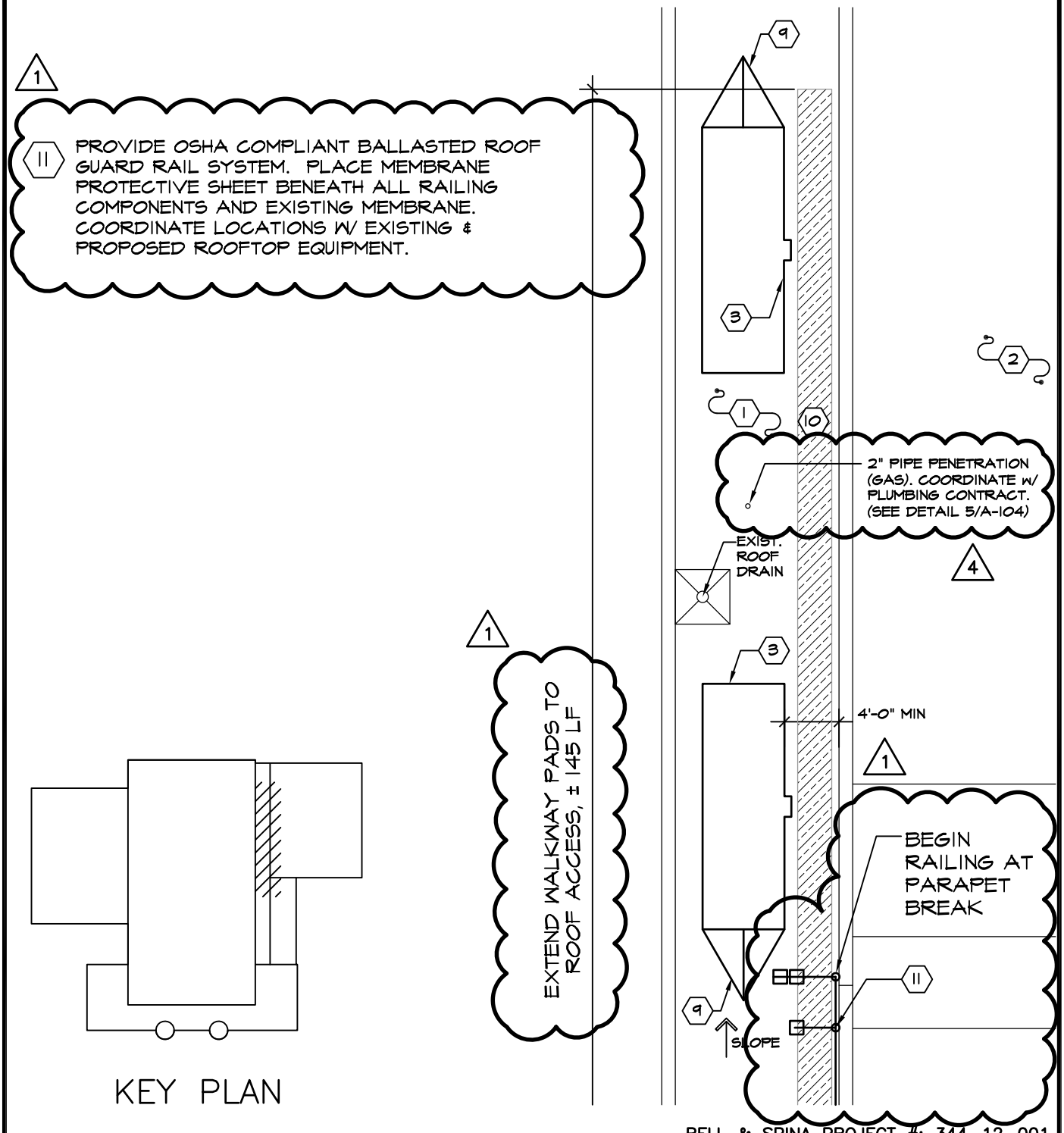
DWG NO: ADD4.1



KEY PLAN

BELL & SPINA PROJECT #: 344-12-001

ADDENDUM #4 REFERENCE DRAWING: A-104

SHEET TITLE: PARTIAL ENLARGED ROOF PLAN
SCALE: 3/32" = 1'-0"

PROJECT: REHABILITATE SECOND FLOOR LOCKER ROOMS
UTICA STATE ARMORY

NYS OFFICE OF GENERAL SERVICES
Serving New York

CONTRACT:	S5729
PROJ. NO:	Q1537-C
DATE:	10/01/2012
DRAWN:	DMKS
APPROVED:	DKA

REGISTERED ARCHITECT DENNIS C. SPINA No. 014303 STATE OF NEW YORK

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DWG NO: ADD4.2

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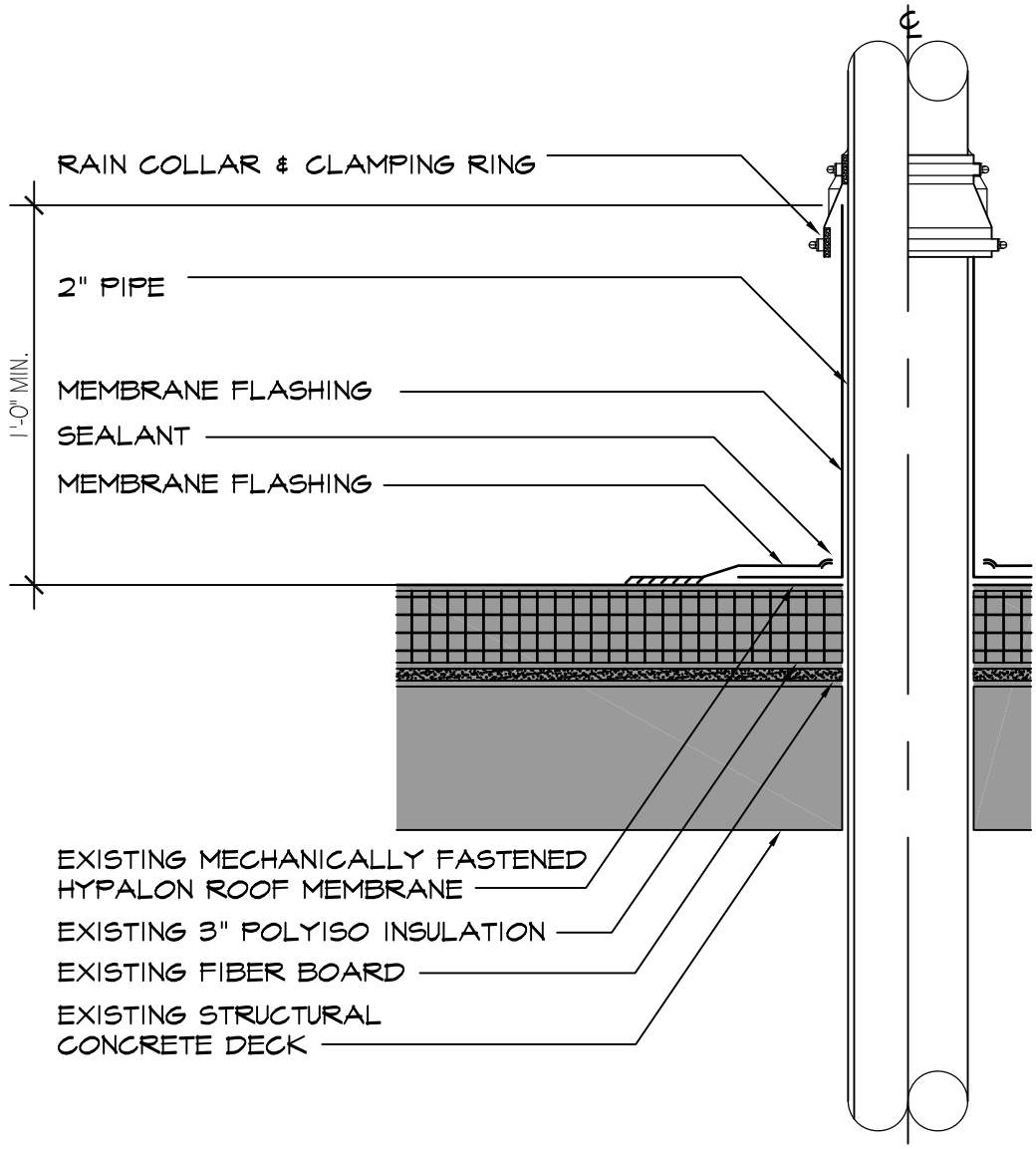


5 | PIPE PENETRATION DETAIL | SCALE: 1 ½" - 1'-0"

BELL & SPINA PROJECT #: 344-12-001

ADDENDUM #4 REFERENCE DRAWING: A-104

NYS OFFICE OF GENERAL SERVICES
Serving New York

REGISTERED ARCHITECT DENNIS C. SPINA No. 014303 STATE OF NEW YORK

CONTRACT:	S5729
PROJ. NO:	Q1537-C
DATE:	10/01/2012
DRAWN:	DMKS
APPROVED:	DKA

SHEET TITLE: PIPE PENETRATION DETAIL

SCALE: 1 1/2" = 1'-0"

PROJECT: REHABILITATE SECOND FLOOR LOCKER ROOMS UTICA STATE ARMORY

WARNING: THE ALTERATION OF THIS MATERIAL IN ANY WAY, UNLESS DONE UNDER THE DIRECTION OF A COMPARABLE PROFESSIONAL, I.E. ARCHITECT FOR AN ARCHITECT, ENGINEER FOR AN ENGINEER OR LANDSCAPE ARCHITECT FOR A LANDSCAPE ARCHITECT, IS A VIOLATION OF THE NEW YORK STATE EDUCATION LAW AND/OR REGULATIONS AND IS A CLASS 'A' MISDEMEANOR.

DWG NO: ADD4.3

DRAWING NOTES:

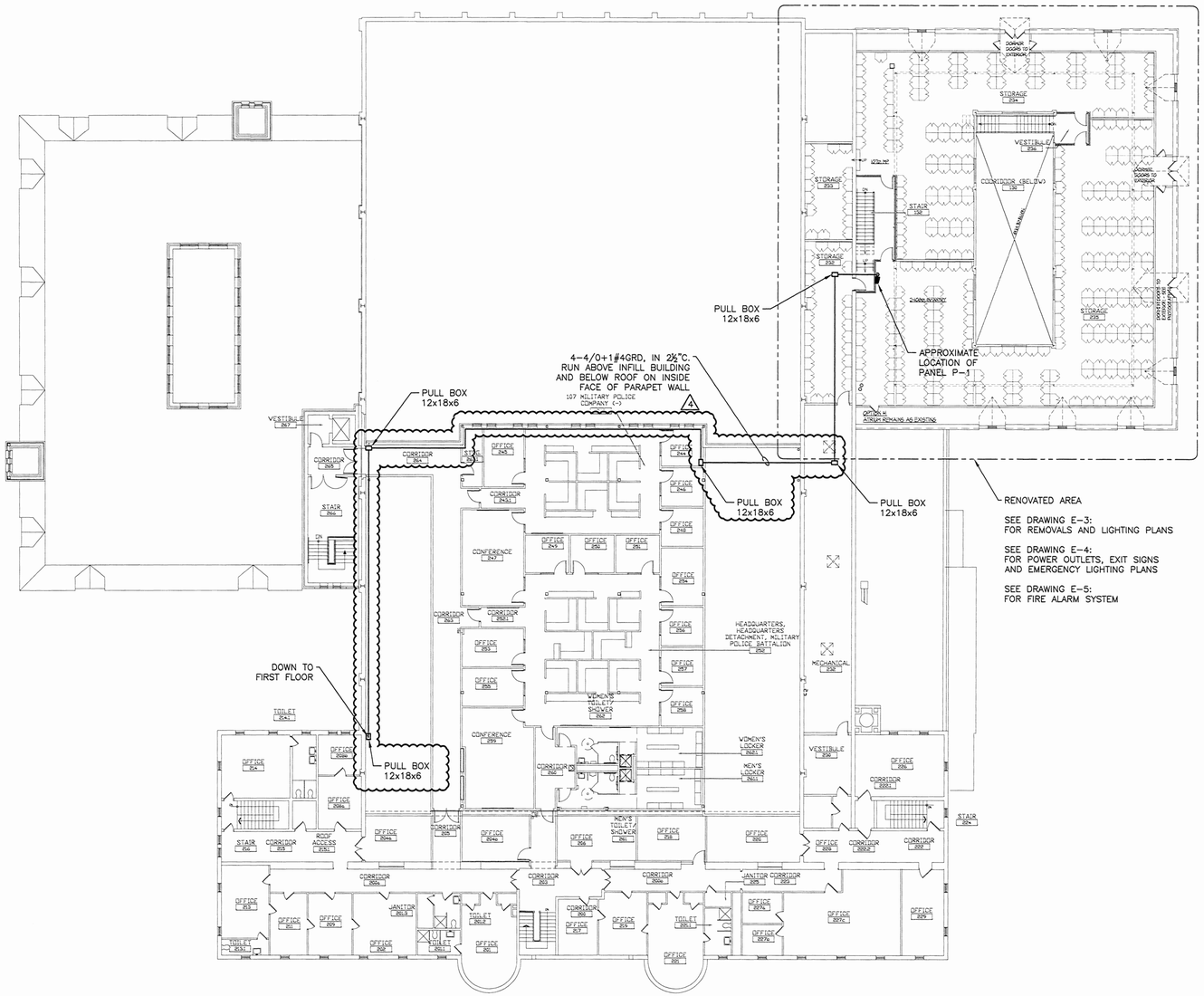
A. PROVIDE ALL CUTTING, PATCHING AND FIRESTOPPING REQUIRED TO ACCOMPLISH WORK SHOWN. PATCH OPENINGS TO MATCH EXISTING WALLS, FLOORS, CEILINGS, ETC.

B. UNLESS OTHERWISE DIRECTED BY ARCHITECT, CONCEAL ALL CIRCUITRY IN FINISHED SPACE. CUT AND PATCH WALLS AS REQUIRED TO DO SO.

C. THE CONTRACTOR SHALL POSSES A LICENSE TO SPECIFICALLY INSTALL FIRE ALARM FOR THIS PROJECT.

D. EXISTING FIRE ALARM SYSTEM SHALL REMAIN OPERATIONAL DURING REMOVAL AND INSTALLATION OF NEW DEVICES. IF, DURING CONSTRUCTION FOR A PERIOD OF TIME, THE EXISTING FIRE ALARM SYSTEM NEEDS TO BE TAKEN OUT OF SERVICE DURING SYSTEM MODIFICATION INSTALLATION, ADVISE THE OCCUPANT A MINIMUM OF 5 DAYS IN ADVANCE SO THEY CAN PROVIDE A FIRE WATCH AS REQUIRED BY SECTION 901.7 OF THE FIRE CODE OF NEW YORK STATE.

E. THE EXISTING NOTIFIER FIRE ALARM SYSTEM IS A MULTIPROCESSOR-BASED FIRE ALARM SYSTEM. THE INSTALLING COMPANY IS NOTIFIER OF NEW YORK, INC. (315-492-1794), CONTACT MR. MICHAEL SKVARCH.



1 SECOND FLOOR PLAN - ELECTRICAL

SCALE: ⅛" = 1'-0"

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STATE OF NEW YORK · TAM · 066338 · LICENSED PROFESSIONAL ENGINEER

CONTRACT:
ELECTRICAL

TITLE:
REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION:
Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT:
Division of Military and Naval Affairs

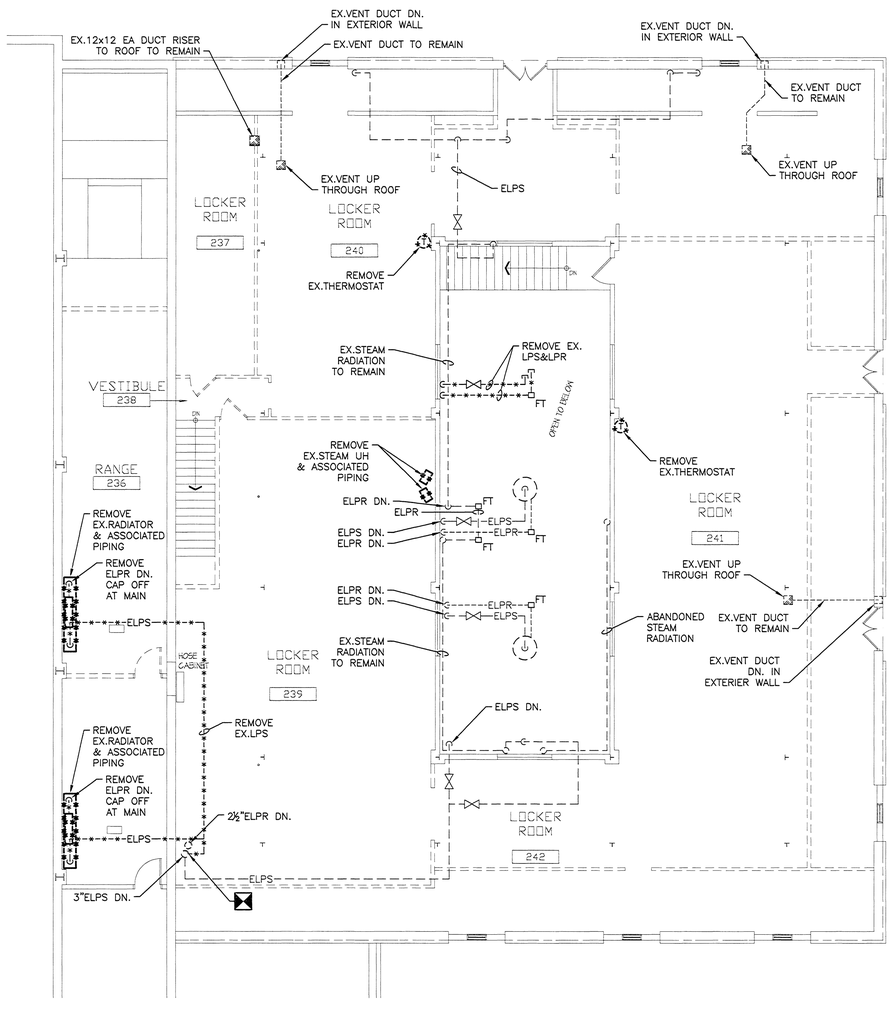
MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

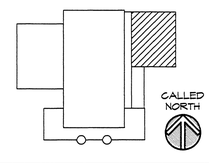
PROJECT NUMBER:	Q1537 - E
DESIGNED BY:	LMH
DRAWN BY:	DDL
FIELD CHECK:	TAM
APPROVED:	TAM

SHEET TITLE:
SECOND FLOOR PLAN - ELECTRICAL

DRAWING NUMBER:
E-102

SHEET 7 OF 7





2 PARTIAL SECOND FLOOR PLAN - HVAC REMOVALS

SCALE: ⅛" = 1'-0"

DRAWING NOTES REMOVALS:

A. DISCONNECT AND REMOVE ALL EXISTING EQUIPMENT AND DEVICES AS REQUIRED BACK TO THE POINT OF CONNECTION INDICATED TO ACCOMPLISH WORK SHOWN ON PLANS.

B. CONDUCT ALL REMOVAL WORK TO MINIMIZE INTERFERENCE WITH ADJACENT AND OCCUPIED BUILDING AREAS. COORDINATE ALL WORK WITH OWNER'S REPRESENTATIVE.

C. PROVIDE ALL CUTTING, PATCHING AND FIRESTOPPING REQUIRED TO ACCOMPLISH WORK SHOWN. PATCH AND SEAL OPENINGS TO MATCH ADJACENT WALLS, FLOORS, CEILINGS, ETC., UNLESS OTHERWISE INDICATED.

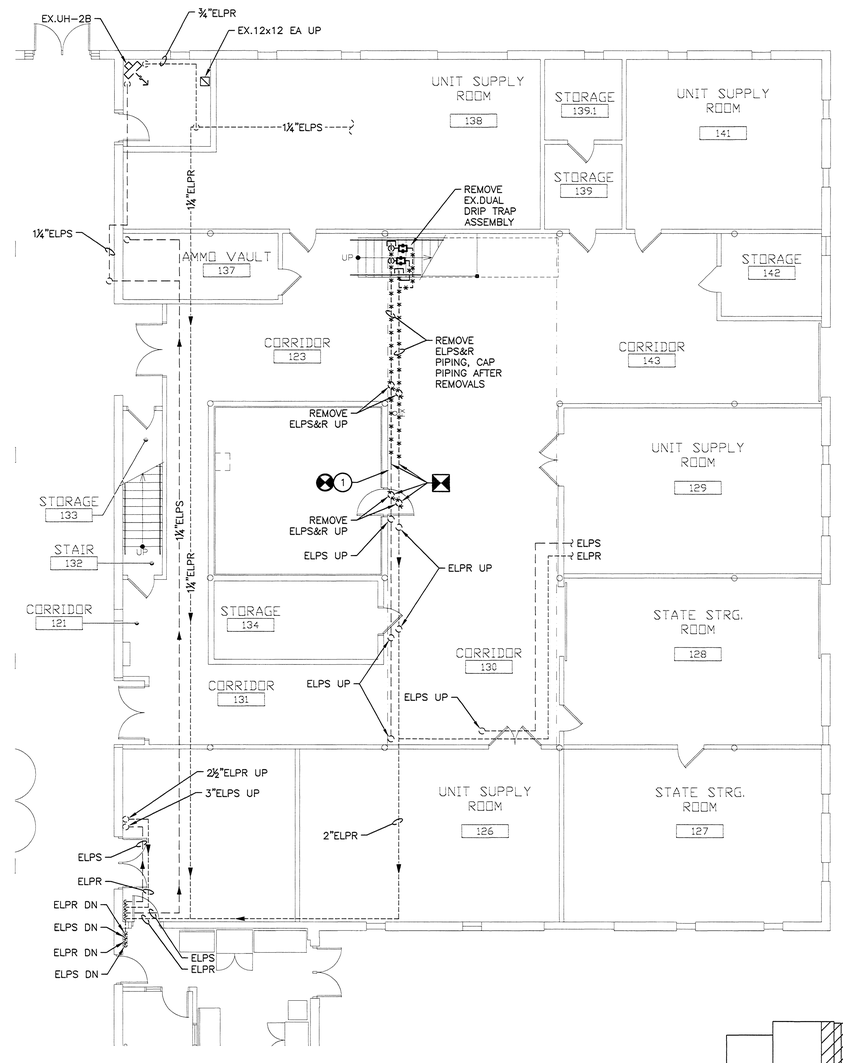
D. FIELD VERIFY ALL LOCATIONS, DIMENSIONS AND EXISTING CONDITIONS (PIPING, DUCTWORK, STRUCTURAL ELEMENTS, ETC.) PRIOR TO STARTING WORK.

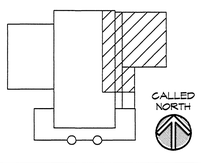
E. MAINTAIN THE INTEGRITY OF ALL EXISTING EQUIPMENT AND SYSTEMS LOCATED OUTSIDE THE WORK AREA AND INTERRUPTED BY THE REMOVALS WORK. PROVIDE ALL ADDITIONAL PIPING, FITTINGS, DUCTWORK, ACCESSORIES, ETC. REQUIRED TO EXTEND AND RECONNECT REMAINING EQUIPMENT AND SYSTEMS.

F. EXISTING EQUIPMENT LOCATIONS, DUCT SIZES AND PIPE SIZES SHOWN ARE APPROXIMATE AND NEED TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO STARTING THE WORK. NOT ALL EXISTING HVAC EQUIPMENT, DUCTWORK AND PIPING IN THE WORK AREA HAS BEEN SHOWN. FIELD VERIFY ACTUAL EXTENT OF REMOVALS WORK AT SITE.

KEYED NOTES: (#)

1. PROVIDE DUAL DRIP TRAP ASSEMBLY, SEE DETAIL.





2 FIRST FLOOR PLAN - HVAC REMOVALS

SCALE: ⅛" = 1'-0"

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STATE OF NEW YORK · DAVID A. PAPA · No. 066343 · LICENSED PROFESSIONAL ENGINEER

CONTRACT: MECHANICAL

TITLE: REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION: Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT: Division of Military and Naval Affairs

MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

PROJECT NUMBER:	Q1537 – H
DESIGNED BY:	DFB
DRAWN BY:	DDL
FIELD CHECK:	TAM
APPROVED:	TAM

SHEET TITLE: PARTIAL FIRST AND SECOND FLOOR REMOVALS PLANS – HVAC

DRAWING NUMBER: M–102

SHEET 5 OF 7

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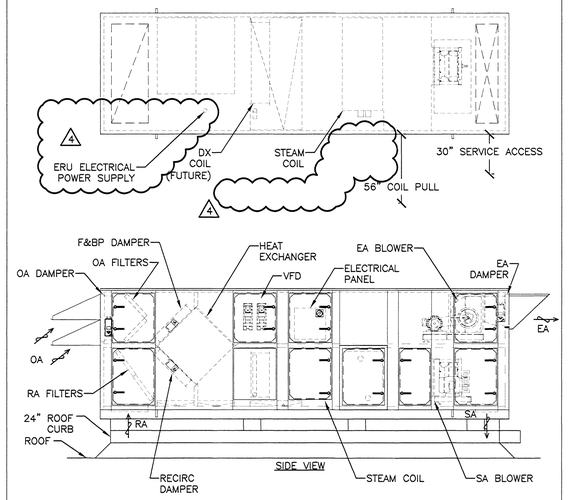
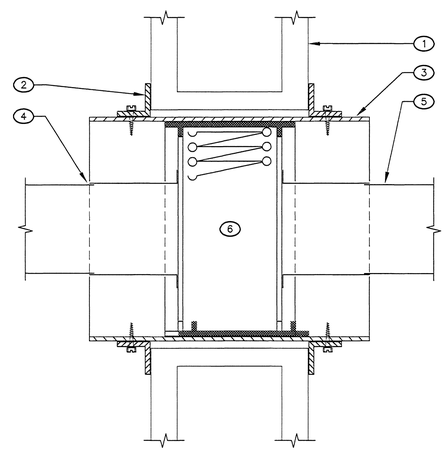


NOT TO SCALE

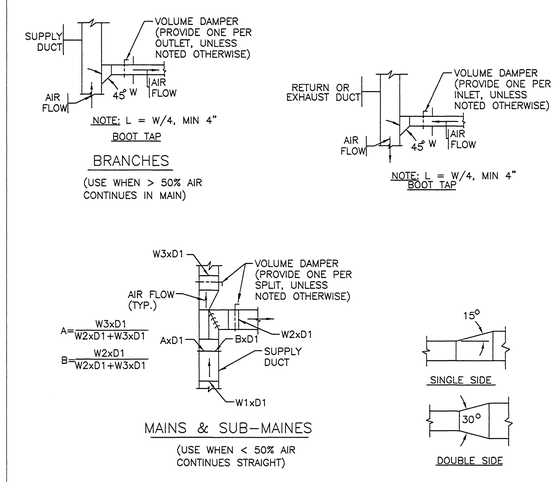
ROOF MOUNTED ENERGY RECOVERY UNIT DETAIL



NOT TO SCALE

Mark	Description
1.	WALL OR FLOOR.
2.	ANGLES CONTINUOUS ALL FOUR SIDES, DO NOT ATTACH OR SECURE TO WALL, SECURE TO SLEEVE ONLY. MINIMUM SIZE 1½" x 1½" 14 GAUGE. ATTACH TO SLEEVE PER MANUFACTURER RECOMMENDATIONS.
3.	SLEEVE, MINIMUM 12 GAUGE EXTEND MINIMUM 4" BEYOND WALL OR FLOOR ON EACH SIDE.
4.	DUCT CONNECTION PER MANUFACTURERS RECOMMENDATIONS.
5.	DUCT, PROVIDE ACCESS DOOR. ACCESS DOOR SHALL BE LABELED "FIRE DAMPER" PER SPECIFICATIONS.
6.	FIRE DAMPER, ATTACH TO SLEEVE ONLY, DO NOT SECURE TO WALL. SECURE TO SLEEVE PER MANUFACTURERS RECOMMENDATIONS.
7.	INSTALL ALL FIRE DAMPERS PER NFPA 90A, UL 555, SMACNA AND MANUFACTURER RECOMMENDATIONS.
8.	SUBMIT DETAILED DRAWING FOR EACH APPLICATION.

FIRE DAMPER DETAIL



NOTE: PROVIDE VOLUME DAMPERS IN MAINS ONLY AS SHOWN ON PLANS.

NOT TO SCALE

DUCTWORK CONNECTION DETAIL

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STATE OF NEW YORK · THOMAS A. SPINA · LICENSED PROFESSIONAL ENGINEER · No. 066343

CONTRACT:
MECHANICAL

TITLE:
REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION:
Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT:
Division of Military and Naval Affairs

MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

PROJECT NUMBER:	Q1537 - H
DESIGNED BY:	DFB
DRAWN BY:	DDL
FIELD CHECK:	TAM
APPROVED:	TAM

SHEET TITLE:
DETAILS

DRAWING NUMBER:
M-501

SHEET 6 OF 7

DRAWING NOTES:

A. PROVIDE ALL CUTTING, PATCHING & FIRESTOPPING REQUIRED TO ACCOMPLISH WORK SHOWN. PATCH AND SEAL OPENINGS TO MATCH ADJACENT WALLS, FLOORS & CEILINGS. UNLESS OTHERWISE INDICATED, CONCEAL ALL WORK IN FINISHED AREAS UNLESS OTHERWISE INDICATED OR DIRECTED BY ARCHITECT.

B. CONTRACTOR SHALL PROVIDE ALL FITTINGS, PIPING, OFFSETS & ELEVATION CHANGES AND PIPE REROUTING TO MINIMIZE CONFLICTS WITH OTHER DIVISIONS.

C. CONTRACTOR SHALL PROVIDE ALL SLEEVES, CORE DRILLING, WATER, SMOKE AND FIRE SEALING OF ALL PIPING PENETRATIONS THROUGH RATED WALLS/PARTITIONS.

D. ALL INSTALLATIONS SHALL BE PER THE PLUMBING CODE OF NEW YORK STATE, LATEST EDITION.

E. COORDINATE ALL PLUMBING WORK WITH OTHER DIVISIONS. ANY DISCREPANCIES, CONFLICTS OR CHANGES ON THE DRAWINGS, NOTES, SPECIFICATIONS OR DURING CONSTRUCTION SHALL BE BROUGHT IMMEDIATELY TO THE ATTENTION OF THE OWNER'S REPRESENTATIVE FOR COORDINATION PRIOR TO STARTING WORK.

PLUMBING SYMBOL LIST

SYMBOL	DESCRIPTION	ABBREVIATION
	CHECK VALVE	CV
	EXISTING PLUG VALVE	BV
	PLUG VALVE –GAS	PV
	GATE VALVE	GV
	PRESSURE REDUCING STATION	---
	PLUGGED OR CAPPED OPENING	---
	PIPE UP	UP
	PIPE DOWN	DN
—G—	GAS PIPING (½ PSI)	G
—HPG—	GAS PIPING (1 PSI)	HPG
—EX—	EXISTING PIPING TO REMAIN	EX
FFE	FINISHED FLOOR ELEVATION	FFE
	POINT OF CONNECTION TO EXISTING	---
EX	EXISTING	EX

4

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STATE OF NEW YORK · TAM · 66343 · LICENSED PROFESSIONAL ENGINEER

CONTRACT:
PLUMBING

TITLE:
REHABILITATE 2ND FLOOR
LOCKER ROOMS

LOCATION:
Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT:
Division of Military
and Naval Affairs

MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

PROJECT NUMBER:	Q1537 – P
DESIGNED BY:	PWB
DRAWN BY:	PWB
FIELD CHECK:	
APPROVED:	TAM

SHEET TITLE:
SYMBOL LIST AND
NOTES –
PLUMBING

DRAWING NUMBER:
P–001

SHEET 1 OF 7

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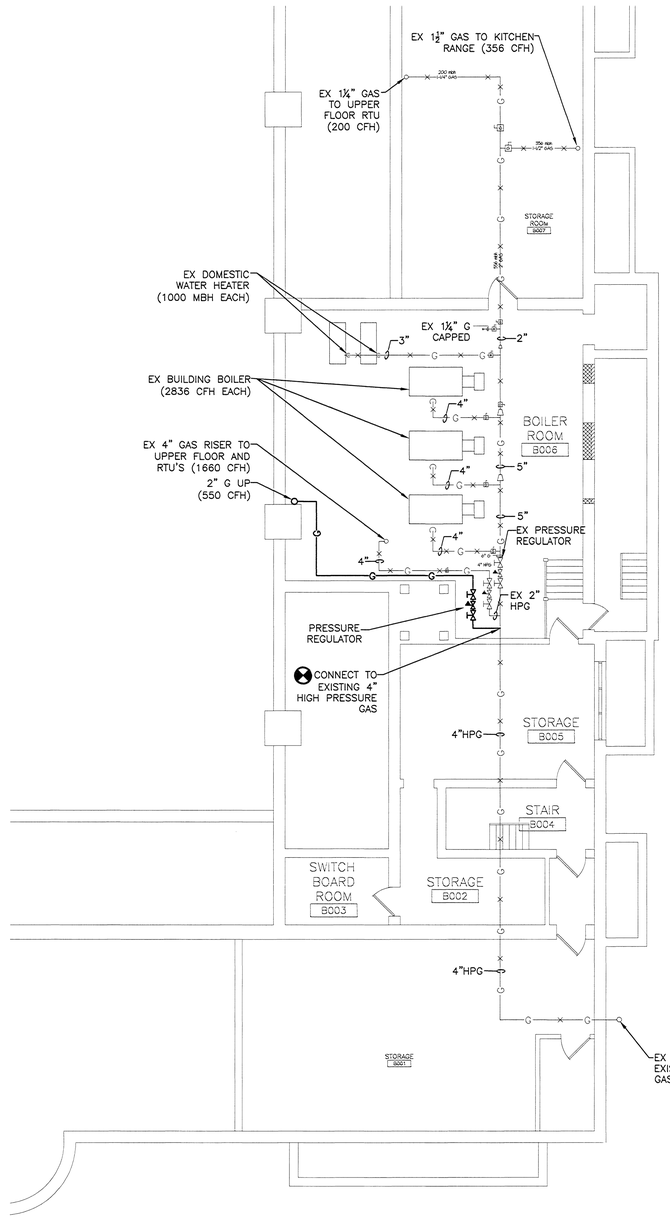
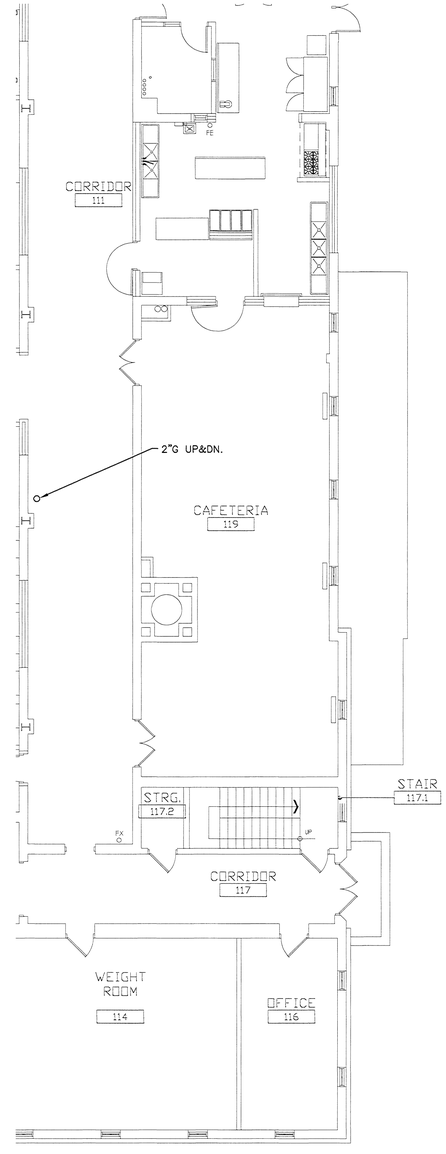


1 BASEMENT FLOOR PLAN - PLUMBING

SCALE: ⅛" = 1'-0"



2 FIRST FLOOR PLAN - PLUMBING

SCALE: ⅛" = 1'-0"

DRAWING NOTES:

A. PROVIDE ALL CUTTING, PATCHING AND FIRESTOPPING REQUIRED TO ACCOMPLISH WORK SHOWN. PATCH AND SEAL OPENINGS TO MATCH ADJACENT WALLS, FLOORS, CEILINGS, ETC. UNLESS OTHERWISE INDICATED. CONCEAL ALL WORK IN FINISHED AREAS UNLESS OTHERWISE INDICATED OR DIRECTED BY ARCHITECT.

B. FIELD VERIFY ALL LOCATIONS, DIMENSIONS AND EXISTING CONDITIONS (PIPING, DUCTWORK, STRUCTURAL ELEMENTS, ETC.) PRIOR TO STARTING WORK, CONTRACTOR SHALL COORDINATE INSTALLATION OF EQUIPMENT, PIPING AND DUCTWORK WITH EXISTING CONDITIONS. PROVIDE FITTINGS, TRANSITIONS, OFFSETS, ELEVATION CHANGES, ETC. TO MINIMIZE CONFLICTS WITH EXISTING CONDITIONS.

C. MAINTAIN THE INTEGRITY OF ALL EXISTING EQUIPMENT AND SYSTEMS LOCATED OUTSIDE THE WORK AREA AND INTERRUPTED BY THE RENOVATION WORK.

D. SCHEDULE SYSTEMS SHUTDOWNS WITH OWNER. PROVIDE A MINIMUM OF 72 HOUR NOTICE. SYSTEM SHUTDOWNS SHALL NOT INTERFERE WITH BUILDING OPERATIONS. PROVIDE TEMPORARY SYSTEMS DURING SHUTDOWNS AS REQUIRED BY OWNER. MAINTAIN EXISTING SYSTEMS OPERATIONAL PER THE OWNER'S REQUIREMENTS.

E. SYSTEMS INDICATED ON DRAWINGS SHALL BE INSTALLED AS SHOWN. ADJUSTMENT TO THE LOCATION OF VARIOUS ITEMS MAY BE REQUIRED DUE TO FIELD CONDITIONS AND COORDINATION WITH THE WORK OF OTHER TRADES. VERIFY PRIOR TO INSTALLATION.

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STATE OF NEW YORK · TIMOTHY A. MAHAN · No. 066342 · LICENSED PROFESSIONAL ENGINEER

CONTRACT: PLUMBING

TITLE: REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION: Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT: Division of Military and Naval Affairs

MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

PROJECT NUMBER:	Q1537 – P
DESIGNED BY:	PWB
DRAWN BY:	PWB
FIELD CHECK:	TAM
APPROVED:	TAM

SHEET TITLE: BASEMENT AND FIRST FLOOR PLANS – PLUMBING

DRAWING NUMBER: P–101

SHEET 2 OF 7

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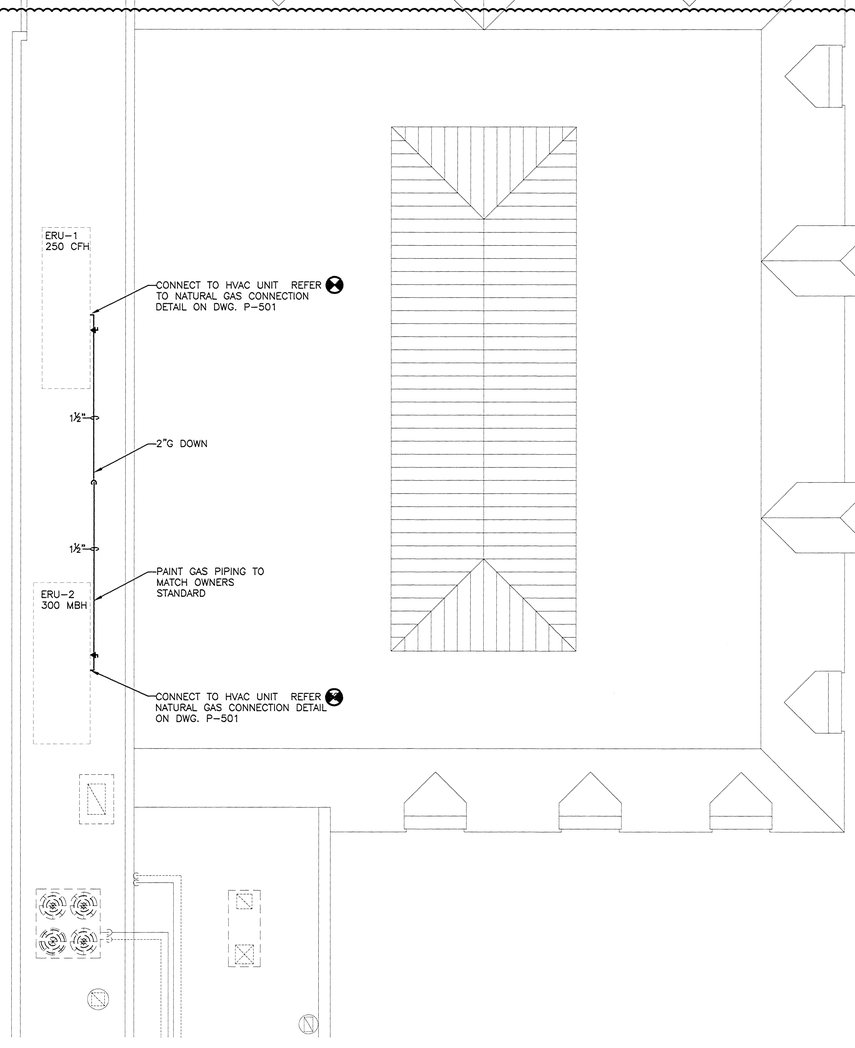
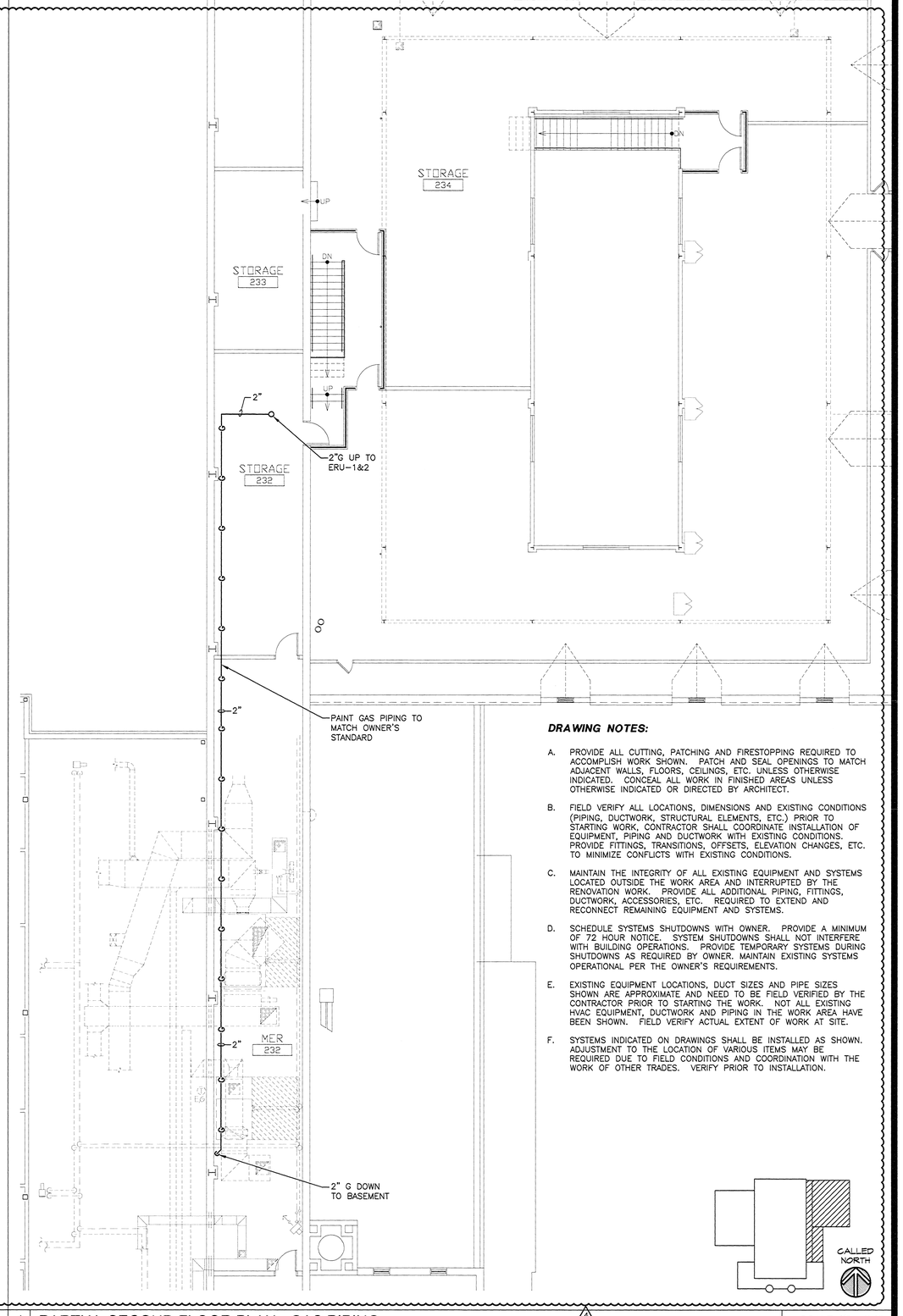


2 PARTIAL ROOF PLAN - GAS PIPING

SCALE: ⅛" = 1'-0"



1 PARTIAL SECOND FLOOR PLAN - GAS PIPING

SCALE: ⅛" = 1'-0"

DRAWING NOTES:

A. PROVIDE ALL CUTTING, PATCHING AND FIRESTOPPING REQUIRED TO ACCOMPLISH WORK SHOWN. PATCH AND SEAL OPENINGS TO MATCH ADJACENT WALLS, FLOORS, CEILINGS, ETC. UNLESS OTHERWISE INDICATED. CONCEAL ALL WORK IN FINISHED AREAS UNLESS OTHERWISE INDICATED OR DIRECTED BY ARCHITECT.

B. FIELD VERIFY ALL LOCATIONS, DIMENSIONS AND EXISTING CONDITIONS (PIPING, DUCTWORK, STRUCTURAL ELEMENTS, ETC.) PRIOR TO STARTING WORK, CONTRACTOR SHALL COORDINATE INSTALLATION OF EQUIPMENT, PIPING AND DUCTWORK WITH EXISTING CONDITIONS. PROVIDE FITTINGS, TRANSITIONS, OFFSETS, ELEVATION CHANGES, ETC. TO MINIMIZE CONFLICTS WITH EXISTING CONDITIONS.

C. MAINTAIN THE INTEGRITY OF ALL EXISTING EQUIPMENT AND SYSTEMS LOCATED OUTSIDE THE WORK AREA AND INTERRUPTED BY THE RENOVATION WORK. PROVIDE ALL ADDITIONAL PIPING, FITTINGS, DUCTWORK, ACCESSORIES, ETC. REQUIRED TO EXTEND AND RECONNECT REMAINING EQUIPMENT AND SYSTEMS.

D. SCHEDULE SYSTEMS SHUTDOWNS WITH OWNER. PROVIDE A MINIMUM OF 72 HOUR NOTICE. SYSTEM SHUTDOWNS SHALL NOT INTERFERE WITH BUILDING OPERATIONS. PROVIDE TEMPORARY SYSTEMS DURING SHUTDOWNS AS REQUIRED BY OWNER. MAINTAIN EXISTING SYSTEMS OPERATIONAL PER THE OWNER'S REQUIREMENTS.

E. EXISTING EQUIPMENT LOCATIONS, DUCT SIZES AND PIPE SIZES SHOWN ARE APPROXIMATE AND NEED TO BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO STARTING THE WORK. NOT ALL EXISTING HVAC EQUIPMENT, DUCTWORK AND PIPING IN THE WORK AREA HAVE BEEN SHOWN. FIELD VERIFY ACTUAL EXTENT OF WORK AT SITE.

F. SYSTEMS INDICATED ON DRAWINGS SHALL BE INSTALLED AS SHOWN. ADJUSTMENT TO THE LOCATION OF VARIOUS ITEMS MAY BE REQUIRED DUE TO FIELD CONDITIONS AND COORDINATION WITH THE WORK OF OTHER TRADES. VERIFY PRIOR TO INSTALLATION.

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STATE OF NEW YORK · TIMOTHY A. MARAN · 066345 · LICENSED PROFESSIONAL ENGINEER

CONTRACT: PLUMBING

TITLE: REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION: Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT: Division of Military and Naval Affairs

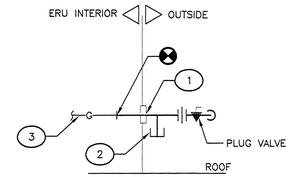
MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

PROJECT NUMBER:	Q1537 - P
DESIGNED BY:	PWB
DRAWN BY:	PWB
FIELD CHECK:	TAM
APPROVED:	TAM

SHEET TITLE: PARTIAL SECOND FLOOR AND PARTIAL ROOF PLANS - PLUMBING

DRAWING NUMBER: P-102

SHEET 3 OF 7



NOT TO SCALE

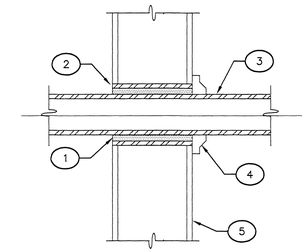
KEYED NOTES:

1. WATER PROOF GROMMET SEAL FOR ERU–1&2.
2. 6" DIRT LEG AND CAP.
3. TO ERU ON ROOF.

GENERAL NOTE:

A. COORDINATE ACTUAL LOCATION AND ELEVATION OF GAS SUPPLY TO ROOF TOP UNIT WITH THE MANUFACTURERS INSTALLATION INSTRUCTIONS

NATURAL GAS CONNECTION DETAIL



INTERIOR WALLS

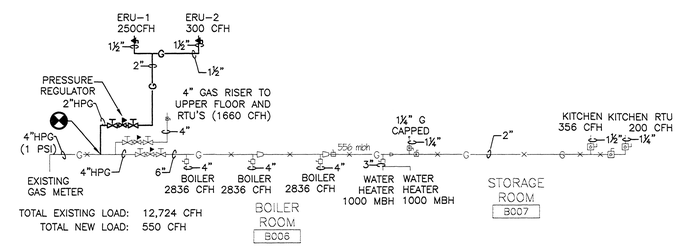
NOT TO SCALE

KEYED NOTES:

1. SEAL OR CAULK PENETRATIONS THRU WALLS, WITH FIRESTOPPING ON BOTH SURFACES..
2. TERMINATE SLEEVE FLUSH WITH FINISHED WALL SURFACES..
3. PIPE TO BE CENTERED IN SLEEVE – DO NOT SUPPORT PIPE FROM SLEEVE..
4. FINISHED ESCUTCHEON PLATE FLUSH AGAINST WALL AND OF SIZE TO COMPLETELY COVER OPENING (IF PIPING IS EXPOSED).
5. FINISHED WALL SURFACE.

1 HR. RATING: UL# C–AJ–1318

INTERIOR WALL SLEEVE DETAIL



NOT TO SCALE

GAS RISER DIAGRAM

GAS PRESSURE REGULATOR SCHEDULE

GAS PRESSURE		CONNECTION		MANUFACTURER	MODEL NO.
INLET	OUTLET	INLET	OUTLET		
1 PSI	7" W.C.	2"	2"	ITRON, INC	B34S

4

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CONSULTANT

bell & spina
215 Wyoming Street
Suite 201
Syracuse, NY 13204
315-488-0377

1151 Pittsford-Victor Rd.
Suite 125
Pittsford, NY 14534
585-200-5038

RAM-TECH ENGINEERS
Syracuse, NY • Buffalo, NY • Philadelphia, PA
RAM-TECH Engineers of Syracuse, P.C.
phone: 315-463-7716
fax: 315-463-7758
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STATE OF NEW YORK
TAM
LICENSED PROFESSIONAL ENGINEER
066343

CONTRACT:
PLUMBING

TITLE:
REHABILITATE 2ND FLOOR LOCKER ROOMS

LOCATION:
Utica State Armory
1700 Parkway East
Utica, New York 13501

CLIENT:
Division of Military and Naval Affairs

MARK	DATE	DESCRIPTION
4	10/1/2012	ADDENDUM

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SHEET TITLE:
DETAILS – PLUMBING

DRAWING NUMBER:
P–501

SHEET 4 OF 7

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Sep 28,2012 – 3:03pm
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36x24 PLOT SHEET