

**SECTION 00910 - ADDENDUM NUMBER 1**

PARTICULARS

- 1.01 DATE: May 3, 2012
- 1.02 PROJECT: School of Medicine – CRF/DM Building 104 Mechanical Renovations
- 1.03 PROJECT NUMBER: H27-N257
- 1.04 OWNER: University of South Carolina
- 1.05 ARCHITECT: GMK Associates, Inc.
- 1.06 TO: Prospective Bidders
  - A. This Addendum forms a part of the Contract Documents and modifies the Bidding Documents dated April 11, 2012, with amendments and additions noted below.
  - B. Acknowledge receipt of this Addendum in the space provided in the Bid Form. Failure to do so may disqualify the Bidder.
  - C. This Addendum consists of 3 pages and the following attachments:
    - 1. 6 pages - Pre-Bid Conference Sign In Sheets.
    - 2. 11x17 drawings SD-001, SD-002 and SD-003
    - 3. Revised Specification Section 15182 - Hydronic Piping

CLARIFICATIONS

- 2.01 This is a schedule critical project. The project manual describes requirements for schedule development and coordination of the schedule with the Owner. Bidders should be aware that no deviation of the schedule will be allowed.
- 2.02 The building is located on the USC School of Medicine Campus on Garners Ferry Road in Columbia, SC.
- 2.03 Bidders are encouraged to visit the site prior to bidding the work. However, pre-scheduling of the visit with the Owner is required. Schedule the site visit with Rick Campbell or Larry Knott; contact information is included on the attached meeting sign in sheets.
- 2.04 Nothing orally stated in the pre-bid meeting is enforceable. Only that which is in written form is valid.
- 2.05 The existing building will remain partially occupied during the schedule of the Work.
  - A. Schedule coordination for noisy or malodorous construction activities will be required between the Owner and Contractor.
  - B. The existing building houses students and faculty on a daily basis. There will be strict enforcement of construction personnel conduct and appearance during the schedule of the Work. Anyone violating these requirements will not be allowed on the premises.
- 2.06 The existing roof is a aggregate surfaced built up roof system and will be accessed as part of the work.
  - A. The Contractor is required to protect the existing roof with temporary plywood walkways as required during the schedule of the Work.

- B. A preconstruction roof inspection, with the Owner and Architect in attendance, of the area of the Work to verify existing leaks, if present, will be required. New roof leaks in the area of the Work will be contractor's responsibility.
- C. Any damage to the existing roof that occurs as part of the Work will be the Contractors responsibility.

2.07 Johnson Controls is the existing building HVAC control system.

2.08 USC and/or OSE issue the building permits for the project. There are no permit fees on State Projects.

#### CHANGES TO THE PROJECT MANUAL

3.01 Section 15080 - Delete paragraph 3.03.A.

3.02 Section 15080 - Revise paragraph 3.03.B to read: "All ductwork"

3.03 Section 15080 - Revise paragraph 3.03.B.2 to read: "Hot water supply and return piping"

3.04 Section 15080 - Revise paragraph 3.03.B.2.a to read: "All pipe sizes - 1 1/2" Glass Fiber insulation."

3.05 Section 15182 - Replace section in its entirety revised section 15182.

3.06 Section 15720 - Delete paragraph 1.01.B.

3.07 Section 15720 - All references to rooftop air handler shall be indoor air handler.

3.08 Section 15720 - Delete paragraphs 2.03.G, 2.10, and 3.02

3.09 Section 15720 - Revise paragraph 2.09.A to read: "Provide motorized dampers in outside air and return air duct as indicated on the drawings. Dampers shall be galvanized steel with vinyl bulb edging and edge seals in galvanized frame, with galvanized steel axles in sel-lubricating nylon bearings, in parallel blade arrangement."

3.10 Section 15771 - Delete section in its entirety.

3.11 Section 15926 - Revise paragraph 4.04.B.1 to read: "104-AHU-1".

3.12 Section 15926 - Delete paragraph 4.04.B.2 in its entirety.

3.13 Section 15926 – Add paragraph G to Section 2.02

G. Contractor shall remove pneumatic control lines and cap back at existing control panels for all control points being converted to DDC controls.

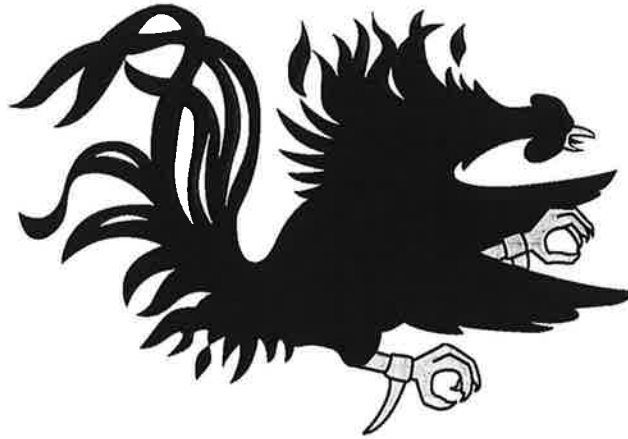
#### CHANGES TO THE DRAWINGS

5.01 Drawing A4.0: Wall Sections, Detail and Floor Plan

- A. Detail #2: The detail call out for 3/A4.0 should be graphically indicated to be lower on the wall (closer to the roof) than is indicated. The detail is for the penetration of the beams through the exterior wall of the penthouse and these penetrations are approximately 24" above the roof rather than high on the wall.
- B. Detail #3: Removal and replacement of existing panel insulation inside the penthouse is required as part of this detail.

- 5.02 Drawing M2.1: Make changes to drawing as indicated in SD-001.
- 5.03 Drawing M7.1: Make changes to air handler configuration detail as indicated in SD-002.
- 5.04 Drawing M7.1: 104-AHU-1 Control Diagram - Delete duct mounted smoke detector downstream of supply fan.
- 5.05 Drawing M7.1 - Revise Air Handler Schedule as indicated in SD-003.

END OF ADDENDUM NUMBER 1



School of Medicine – Bldg. 104 Mechanical Renovations  
Non mandatory pre-bid  
April 26, 2012 @ 2:00pm, Conference Room #53 743 Greene St. Cola, SC 29208

ATTENDEE'S NAME

COMPANY NAME & MAILING ADDRESS

SMILIE CHRISTIE

CHRISTIE BROS HEAT AND AIR, LLC  
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Will Thompson

McCarter Mechanical, Inc.  
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Tom Weiland

EMAIL will + @ McCartermechanical.com  
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School of Medicine – Bldg. 104 Mechanical Renovations  
Non mandatory pre-bid  
April 26, 2012 @ 2:00pm, Conference Room #53 743 Greene St. Cola, SC 29208

ATTENDEE'S NAME

Jody Ricard

COMPANY NAME & MAILING ADDRESS

GMK ASSOC. INC

1201 Main St, Suite 2100

8 Columbia, SC 29201

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PH#

FAX#

EMAIL

PH#

FAX#

EMAIL



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**COMPANY NAME & MAILING ADDRESS**

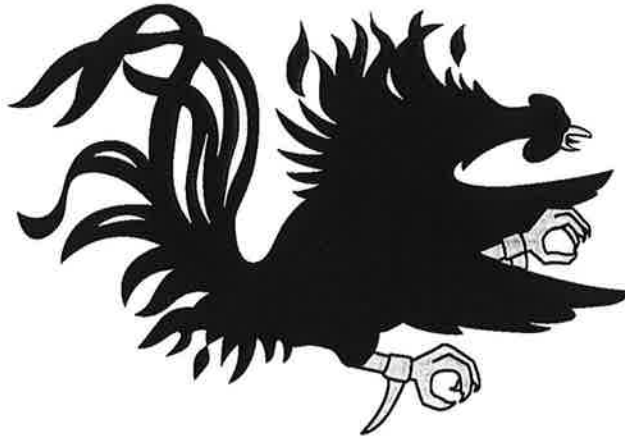
MICHAEL RIBBICH  
(Equip/Controls Vendor only -) <sup>NOT</sup> DIRECT <sub>BID</sub>

JOHNSON CONTROLS  
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COLUMBIA, SC 29212  
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DANA QUATTLEBAUM

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ATTENDEE'S NAME

COMPANY NAME & MAILING ADDRESS

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April 26, 2012 @ 2:00pm, Conference Room #53 743 Greene St. Cola, SC 29208

ATTENDEE'S NAME

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**School of Medicine – Bldg. 104 Mechanical Renovations  
Non mandatory pre-bid**

**April 26, 2012 @ 2:00pm, Conference Room #53 743 Greene St. Cola, SC 29208**

**ATTENDEE'S NAME**

**COMPANY NAME & MAILING ADDRESS**

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PETE FISHER

USC FACILITIES

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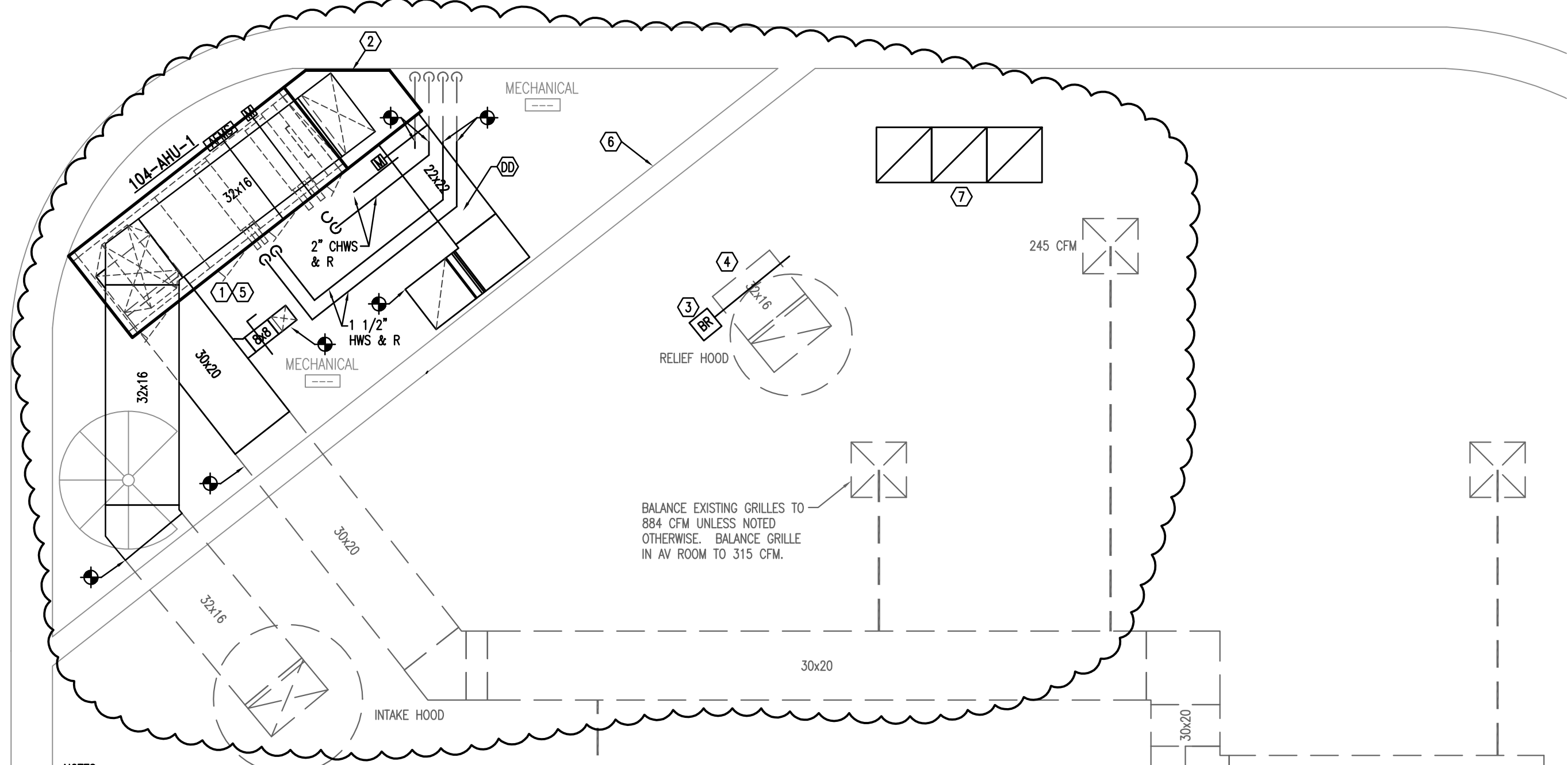
Steeles Heating and Air

John Duke

PH# 803-285-8431

FAX# 803-295-4362

EMAIL jwduke@me.com



BALANCE EXISTING GRILLES TO 884 CFM UNLESS NOTED OTHERWISE. BALANCE GRILLE IN AV ROOM TO 315 CFM.

**NOTES:**

- ① PROVIDE DEEP SEAL P-TRAP FULL SIZE OF UNIT CONNECTION AND SPILL CONDENSATE FROM UNIT TO NEAREST FLOOR DRAIN.
- ② FIELD FABRICATED PLENUM. CONSTRUCT PLENUM TO ALLOW CONNECTION OF 22X22 RETURN DUCT. FIELD VERIFY PLENUM CONFIGURATION WITH EXISTING CHILLED WATER RISER AND ROOM GEOMETRY. PLENUM SHALL BE INSULATED AS SPECIFIED FOR RETURN DUCTS.
- ③ PROVIDE A NEW BAROMETRIC RELIEF DAMPER AND INSTALL IN THE EXISTING RELIEF DUCT. FIELD VERIFY RELIEF DUCT SIZE PRIOR TO ORDERING DAMPER.
- ④ PROVIDE WIRE GRILLE OVER DUCT OPENING. SEE WIRE GRILLE DETAIL FOR ADDITIONAL INFORMATION.
- ⑤ EXTEND HOUSEKEEPING PAD AS REQUIRED TO FIT THE FOOTPRINT OF THE NEW UNIT.
- ⑥ PATCH EXISTING WALL OPENING WITH METAL STUDS AND DRYWALL. SEAL OPENING AIR TIGHT.
- ⑦ PROVIDE (3) PRICE APPDR RETURN GRILLES (OR EQUAL) AND INSTALL IN LAY-IN CEILING. GRILLE SIZE SHALL BE 24X24 WITH 22X22 NECK.
- ⑧ COORDINATE PIPE AND DUCT ROUTING WITH ACCESS HATCH LADDER.

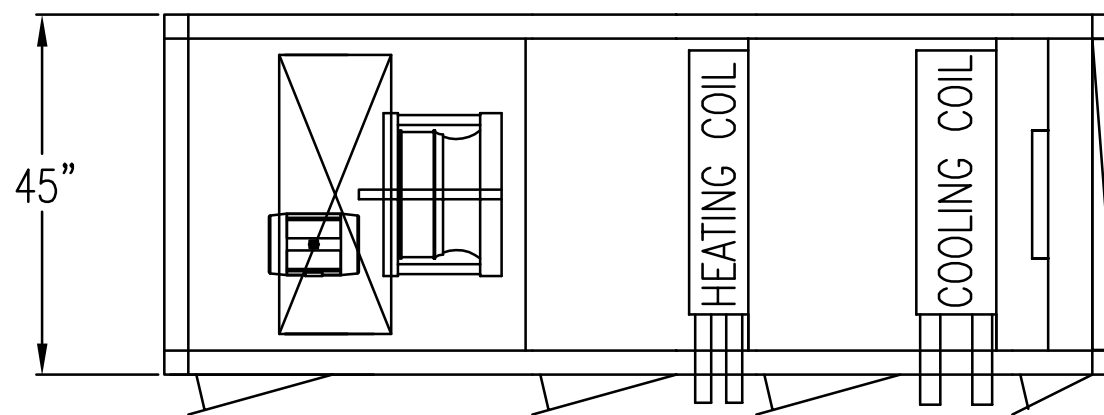
**1 FIRST FLOOR PLAN – HVAC RENOVATION PLAN**  
1/4"=1'-0"

**GMK**  
ASSOCIATES, INC.  
Design/Planning/Construction  
1201 Main Street, Suite 2100  
Columbia, S.C. 29201  
tel. 803-256-0000  
fax 803-255-7243

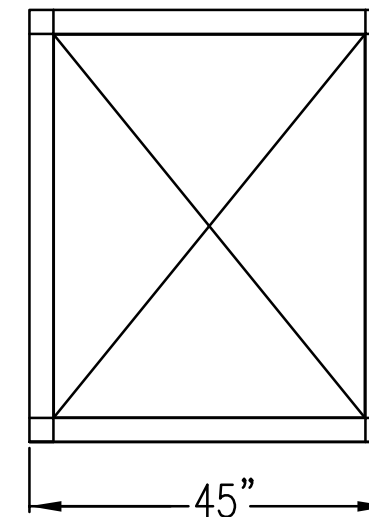
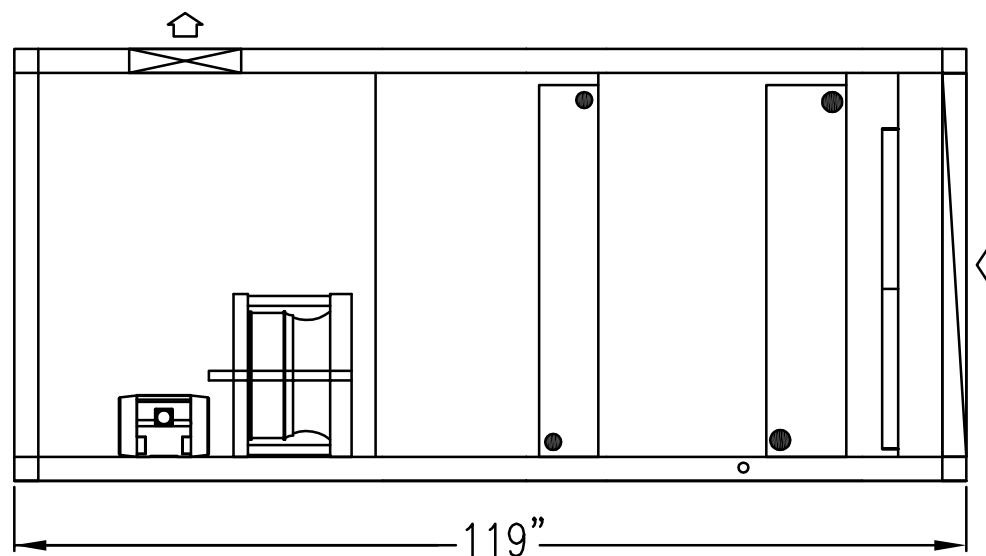
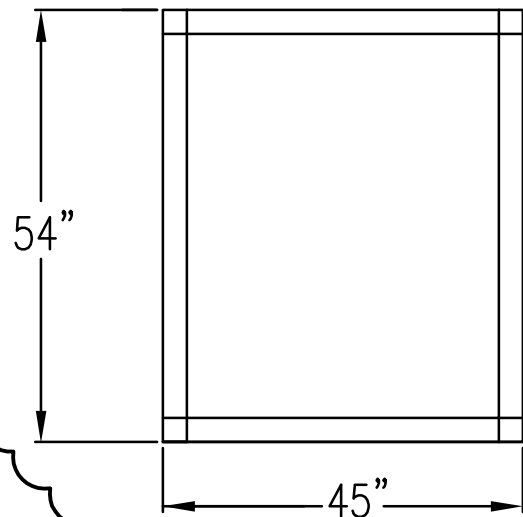


project name  
School of Medicine – CRF/DM  
Building 104 Mechanical Renovations  
State Project # H27-N257  
A/E project number  
11060.02

title **FIRST FLOOR PLAN – HVAC RENOVATION PLAN**  
issued for **ADDENDUM NO. 1** date **05/03/12**  
from **M2.1**  
drawn by **JDR** **SD-001**



PLAN VIEW



1 104-AHU-1 CONFIGURATION DETAIL  
NTS

**GMK**  
ASSOCIATES, INC.  
Design/Planning/Construction  
1201 Main Street, Suite 2100  
Columbia, S.C. 29201  
tel. 803-256-0000  
fax 803-255-7243



project name  
School of Medicine – CRF/DM  
Building 104 Mechanical Renovations  
State Project # H27-N257  
A/E project number  
11060.02

title 104-RTU-1 CONFIGURATION DETAIL

issued for **ADDENDUM NO. 1** date **05/03/12**

from **M7.1**

drawn by **JDR**

**SD-002**

## COIL SCHEDULE

TAG	LOCATION	LOCATION	CAPACITY CFM	MAX. AIR VELOCITY (FPM)	MIN. FACE AREA (SQ. FT.)	AIR PRESS DROP (IN. WG.)	CAPACITY			AIR TEMPERATURE				WATER			MAXIMUM NO. OF FINS/IN.	NOTES	
							TOTAL MBH	SENS. MBH	KW	ENTERING		LEAVING		ENTERING TEMP. °F	LEAVING TEMP. °F	GPM			PRESS DROP (FT. WATER)
										DB °F	WB °F	DB °F	WB °F						
CC-1	104-AHU-1	MECH ROOM	5300	500	10.3	0.59	269.3	172.5	---	80.0	67.0	50.0	49.8	44	58	40.0	5.5	11	
RH-1	104-AHU-1	MECH ROOM	5300	500	10.3	0.14	201.1	---	---	50.0	---	85.0	---	180	160	20.0	5.9	9	1

1. COIL IN REHEAT POSITION

## AIR HANDLER UNIT SCHEDULE

TAG	CAPACITY CFM	MINIMUM O.A.	SUPPLY FAN						ELECTRICAL			AIR VOLUME CONTROL	COOLING COIL EQ. NO.	FIRST STAGE FILTER EQ. NO.	REHEAT COIL EQ. NO.	MANUFACTURER	REMARKS
			FAN CFM	FAN TYPE	SP (IN. W.G.)		MOTOR		VOLTS/PHASE	UNIT CIRCUIT							
					TOTAL	EXT	BHP	HP		FLA	MCA						
104-AHU-1	5300	1165	5300	AF	4.0	2.50	7.25	10.0	460/3	9.0	---	VFD	CC-1	F-1A	RH-1	JCI SOLUTION INDOOR AHU	1

1. SINGLE POINT CONNECTION

**SECTION 15182 - HYDRONIC PIPING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Pipe and pipe fittings for:
  - 1. Heating water piping system.
  - 2. Chilled water piping system.
  - 3. Equipment drains and overflows.
- B. Valves:
  - 1. Gate valves.
  - 2. Globe or angle valves.
  - 3. Ball valves.
  - 4. Butterfly valves.
  - 5. Check valves.

**1.02 RELATED REQUIREMENTS**

- A. Section 15075 - Mechanical Identification.
- B. Section 15073 - Vibration and Seismic Controls for HVAC Piping and Equipment.
- C. Section 15183 - Hydronic Specialties.
- D. Section 15189 - Chemical Water Treatment: Pipe cleaning.

**1.03 REFERENCE STANDARDS**

- A. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers; 2007.
- B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).
- C. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005) (ANSI B16.18).
- D. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings; The American Society of Mechanical Engineers; 2001 (R2005).
- E. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2004 (ANSI/ASME B31.9).
- F. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.
- G. ASTM A 234/A 234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2007.
- H. ASTM B 32 - Standard Specification for Solder Metal; 2004.
- I. ASTM B 88 - Standard Specification for Seamless Copper Water Tube; 2003.
- J. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2005.
- K. AWS A5.8/A5.8M - Specification for Filler Metals for Brazing and Braze Welding; American Welding Society; 2004 and errata.

- L. AWWA C606 - Grooved and Shouldered Joints.
- M. AWWA C606 - Standard Specification for Grooved and Shouldered Joints; American Water Works Association; 2006.

#### 1.04 SYSTEM DESCRIPTION

- A. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing are consistently provided.
- B. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.
- C. Use non-conducting dielectric connections whenever jointing dissimilar metals.
- D. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.
- E. Use ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- F. Use globe valves for throttling, bypass, or manual flow control services.
- G. Use plug cocks for throttling service. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.
- H. Use only butterfly valves in chilled water systems for throttling and isolation service.
- I. Use lug end butterfly valves to isolate equipment.
- J. Use 3/4 inch gate valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment. Pipe to nearest floor drain.

#### 1.05 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Product Data: Include data on pipe materials, pipe fittings, valves, and accessories. Provide manufacturers catalogue information. Indicate valve data and ratings.
- C. Welders Certificate: Include welders certification of compliance with ASME (BPV IX).
- D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- E. Project Record Documents: Record actual locations of valves.
- F. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.
- G. Operation and Maintenance Manuals: Include in manuals the information listed below. For information on how to prepare and submit manuals see section 1780 (Closeout Submittals).
  - 1. Recommended spare parts
  - 2. Spare parts lists
  - 3. Maintenance instructions, including preventative and corrective maintenance
  - 4. Shop drawings and product data

#### 1.06 QUALITY ASSURANCE

- A. Welder Qualifications: Certify in accordance with ASME (BPV IX).

#### 1.07 REGULATORY REQUIREMENTS

- A. Conform to ASME B31.9 code for installation of piping system.
- B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.
- C. Provide certificate of compliance from authority having jurisdiction, indicating approval of welders.

#### 1.08 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
- B. Provide temporary protective coating on cast iron and steel valves.
- C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

### PART 2 PRODUCTS

#### 2.01 HYDRONIC SYSTEM REQUIREMENTS

- A. Comply with ASME B31.9 and applicable federal, state, and local regulations.
- B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
  - 1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
  - 2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
  - 3. Grooved mechanical joints may be used in accessible locations only.
    - a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.
    - b. Use rigid joints unless otherwise indicated.
  - 4. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.
- C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges or unions to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.
- D. Valves: Provide valves where indicated and as follows:
  - 1. Provide drain valves where indicated, and if not indicated provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.
  - 2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.
  - 3. For throttling, bypass, or manual flow control services, use globe, ball, or butterfly

valves.

4. In chilled water systems, butterfly valves may be used interchangeably with gate and globe valves.
5. For shut-off and to isolate parts of systems or vertical risers, use gate, ball, or butterfly valves.
6. For throttling service, use plug cocks. Use non-lubricated plug cocks only when shut-off or isolating valves are also provided.

E. Welding Materials and Procedures: Conform to ASME (BPV IX).

## 2.02 HEATING WATER PIPING, ABOVE GROUND

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:
  1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.
  2. Threaded Joints: ASTM B16.3, malleable iron fittings.
  3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn, using one of the following joint types:
  1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
    - b. Braze: AWS A5.8/A5.8M BCuP copper/silver alloy.
  2. Grooved Joints: AWWA C606 grooved tube, fittings of same material, and copper-tube-dimension mechanical couplings.
- C. Joints: Vic Press 304™

## 2.03 CHILLED WATER PIPING, ABOVE GRADE

- A. Steel Pipe: ASTM A53/A53M, Schedule 40, black; using one of the following joint types:
  1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1 welded.
  2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
  3. Fittings: ASTM A 234/A 234M, wrought steel; ASTM A 395 and A 536, ductile iron; or ASTM A 53, (fabricated from carbon steel pipe), grooved end or welding type
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), hard drawn; using one of the following joint types:
  1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22, solder wrought copper fittings.
    - a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
    - b. Braze: AWS A5.8/A5.8M BCuP copper/silver alloy.
  2. Grooved Joints: AWWA C606 grooved tube, fittings of same material, and copper-tube-dimension mechanical couplings.
  3. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.



4. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

#### 2.04 EQUIPMENT DRAINS

- A. Steel Pipe: ASTM A53/A53M, Schedule 40 galvanized; using one of the following joint types:
  1. Threaded Joints: Galvanized cast iron, or ASME B16.3 malleable iron fittings.
  2. Joints: Threaded, or grooved mechanical couplings.
- B. Copper Tube: ASTM B88 (ASTM B88M), Type K (A), drawn; using one of the following joint types:
  1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.
  2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
  3. Joints: Solder, lead free, ASTM B 32, HB alloy (95-5 tin-antimony), or tin and silver.

#### 2.05 PIPE HANGERS AND SUPPORTS

- A. Conform to ASME B31.9.
- B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel, split ring.
- C. Hangers for Cold Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
- D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
- E. Vertical Support: Steel riser clamp.
- F. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
- G. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.
- H. Inserts: Malleable iron case of galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.

#### 2.06 UNIONS, FLANGES, AND COUPLINGS

- A. Unions for Pipe 2 Inches and Under:
  1. Ferrous Piping: 150 psig malleable iron, threaded, or type 304/304L stainless steel, threaded type, with Vic Press 304™ ends.
- B. Flanges for Pipe Over 2 Inches:
- C. Ferrous Piping: 150 psig forged steel, slip-on.
  1. Gaskets: 1/16 inch thick preformed neoprene.
- D. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
  1. Dimensions and Testing: In accordance with AWWA C606.
  2. Housing Material: Malleable iron or ductile iron, galvanized.
  3. Housing Clamps: Ductile iron galvanized, in accordance with ASTM A 153, to engage and lock, designed to permit some angular deflection, contraction, and expansion.

- a. Rigid Type: Housings cast with offsetting, angle-pattern bolt pads shall be used to provide system rigidity and support and hanging in accordance with ANSI B31.1 and B31.9.
  - b. Flexible Type: Use in locations where vibration attenuation and stress relief are required. Three (3) Flexible couplings may be used in lieu of flexible connectors at equipment connections. (Couplings shall be placed in close proximity to the vibration source.)
- E. Dielectric Connections: Union or waterway fitting with water impervious isolation barrier and one galvanized or plated steel end and one copper tube end, end types to match pipe joint types used.

## 2.07 GATE VALVES

- A. Manufacturers:
  - 1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  - 2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Up To and Including 2 Inches:
  - 1. Bronze body, bronze trim, screwed bonnet, non-rising stem, lockshield stem, inside screw with backseating stem, solid wedge disc, alloy seat rings, solder ends.
- C. Over 2 Inches:
  - 1. Iron body, bronze trim, bolted bonnet, rising stem, handwheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends.

## 2.08 GLOBE OR ANGLE VALVES

- A. Manufacturers:
  - 1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  - 2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
- B. Up To and Including 2 Inches:
  - 1. Bronze body, bronze trim, screwed bonnet, rising stem and handwheel, inside screw with backseating stem, renewable composition disc and bronze seat, solder ends.
- C. Over 2 Inches:
  - 1. Iron body, bronze trim, bolted bonnet, rising stem, handwheel, outside screw and yoke, rotating plug-type disc with renewable seat ring and disc, flanged ends.

## 2.09 BALL VALVES

- A. Manufacturers:
  - 1. Conbraco Industries: [www.conbraco.com](http://www.conbraco.com).
  - 2. Nibco, Inc: [www.nibco.com](http://www.nibco.com).
  - 3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
  - 4. Substitutions: See Section 01600 - Product Requirements.
- B. Up To and Including 2 Inches:
  - 1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

C. Over 2 Inches:

1. Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, flanged.

2.10 BUTTERFLY VALVES

A. Manufacturers:

1. Hammond Valve: [www.hammondvalve.com](http://www.hammondvalve.com).
2. Crane Co.: [www.cranevalve.com](http://www.cranevalve.com).
3. Milwaukee Valve Company: [www.milwaukeevalve.com](http://www.milwaukeevalve.com).
4. Substitutions: See Section 01600 - Product Requirements.

B. Body: Cast or ductile iron with resilient replaceable EPDM seat, wafer or lug ends, extended neck.

C. Disc: Aluminum bronze.

D. Operator: 10 position lever handle.

PART 3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare piping connections to equipment with couplings, flanges or unions.
- E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.
- F. After completion, fill, clean, and treat systems.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install chilled water piping to ASME B31.9 requirements.
- C. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- D. Install piping to conserve building space and to avoid interfere with use of space.
- E. Group piping whenever practical at common elevations.
- F. Sleeve pipe passing through partitions, walls and floors.
- G. Slope piping and arrange to drain at low points.
- H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- I. Inserts:
  1. Provide inserts for placement in concrete formwork.
  2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

- J. Pipe Hangers and Supports:
  - 1. Install in accordance with ASME B31.9.
  - 2. Support horizontal piping as scheduled.
  - 3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
  - 4. Place hangers within 12 inches of each horizontal elbow.
  - 5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
- K. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 15080.
- L. Vic Press 304™ Installation:
  - 1. Pipe shall be certified for use with the Vic Press 304™ system. Pipe shall be square cut, +/- 0.030", properly deburred and cleaned.
  - 2. Pipe ends shall be marked at the required location using a manufacturer's supplied gauge to ensure full insertion into the coupling or fitting during assembly.
  - 3. Use a Victaulic 'PFT' series tool with the proper sized jaw for pressing.
- M. Grooved End Installation:
  - 1. All grooved couplings, fittings, valves, and specialties shall be the products of a single manufacturer. Grooving tools shall be of the same manufacturer as the grooved components.
  - 2. Grooved ends shall be clean and free from indentations, projections, and roll marks in the area from pipe end to groove.
- N. Provide access where valves and fittings are not exposed.
- O. Use eccentric reducers to maintain top of pipe level.
- P. Install valves with stems upright or horizontal, not inverted.

### 3.03 SCHEDULES

- A. Hanger Spacing for Copper Tubing.
  - 1. 1/2 inch and 3/4 inch: Maximum span, 5 feet; minimum rod size, 1/4 inch.
  - 2. 1 inch: Maximum span, 6 feet; minimum rod size, 1/4 inch.
  - 3. 1-1/2 inch and 2 inch: Maximum span, 8 feet; minimum rod size, 3/8 inch.
- B. Hanger Spacing for Steel Piping.
  - 1. 1/2 inch, 3/4 inch, and 1 inch: Maximum span, 7 feet; minimum rod size, 1/4 inch.
  - 2. 1-1/4 inches: Maximum span, 8 feet; minimum rod size, 3/8 inch.
  - 3. 1-1/2 inches: Maximum span, 9 feet; minimum rod size, 3/8 inch.
  - 4. 2 inches: Maximum span, 10 feet; minimum rod size, 3/8 inch.
  - 5. 2-1/2 inches: Maximum span, 11 feet; minimum rod size, 3/8 inch.
  - 6. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
  - 7. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.

**END OF SECTION**