

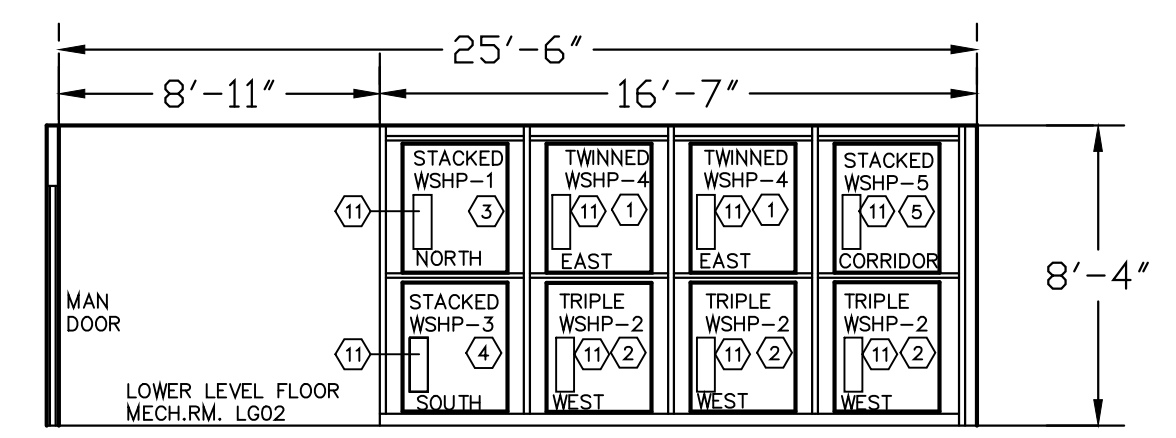
KEY NOTES: FOR WSHP UNITS

- 1 WATER SOURCE HEAT PUMPS (WSHP) TWINNED. ON TOP OF RACK. SERVES EAST ZONE.
- 2 WATER SOURCE HEAT PUMPS (WSHP) TRIPLED ON BOTTON OF RACKS. SERVES WEST ZONE.
- 3 WATER SOURCE HEAT PUMP (WSHP-STACKED BY TWO(2)). SERVES NORTH ZONE.
- 4 WATER SOURCE HEAT PUMP (WSHP-STACKED BY TWO(2)) SERVES SOUTH ZONE.
- 5 WATER SOURCE HEAT PUMP (WSHP-STACKED BY TWO(2)) SERVES LOBBY, RENTAL OFFICE AND 1ST FLOOR AND 5TH FLOOR CORRIDOR.
- 6 MANIFOLD ZONE-1. SEE CIRCUITS FOR MANIFOLD PLAN ON THIS SHEET.
- 7 MANIFOLD ZONE-2. SEE CIRCUITS FOR MANIFOLD PLAN ON THIS SHEET.
- 8 ELECTRICAL WALL HEATERS ARE SHOWN FOR REFERENCE ONLY.
- 9 SERVICE AREA FOR EQUIPMENT 36\"/>

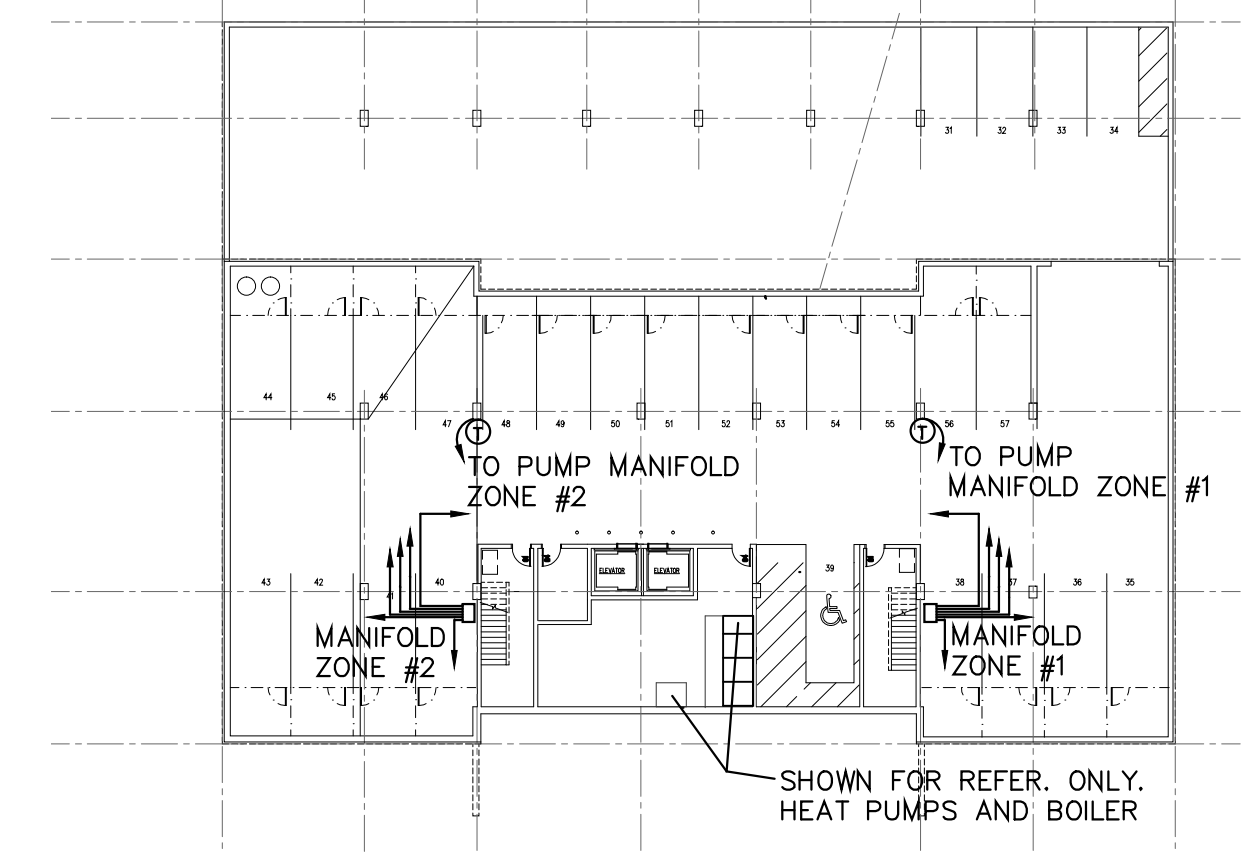
12 PROVIDE 24x24 STEEL MANIFOLD BOX, WITH SOLID STEEL COVER, IN LOCATION INDICATED. MAINTAIN MINIMUM 12\"/>

GENERAL NOTES

A. MECHANICAL CONTRACTOR TO COORDINATE GEOTHERMAL WELL LOCATIONS WITH PLUMBING AND ELECTRICAL DRAWINGS, STRUCTURAL FOOTINGS AND UTILITIES LOCATED UNDER THE SLAB.

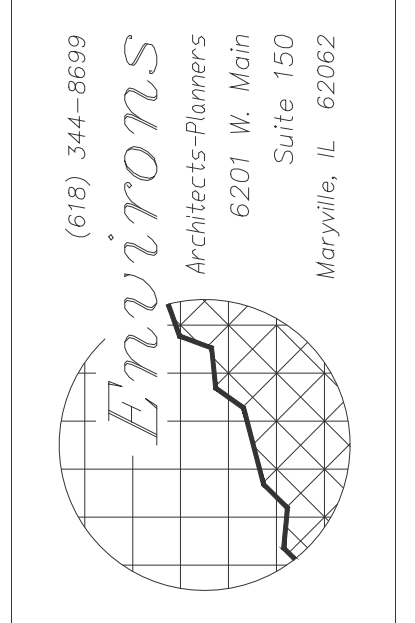
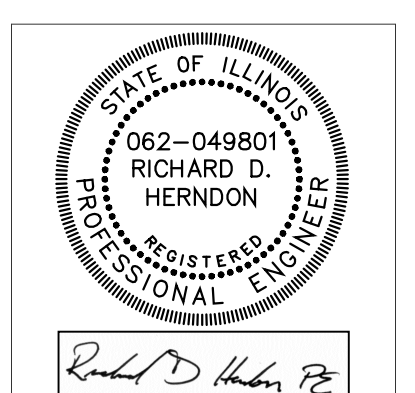


LOWER LEVEL GEO-THERMAL HEAT PUMPS ELEVATION PLAN
SCALE: 3/16\"/>



MANIFOLDS FOR SLAB RADIANT CIRCUITS PLAN
SCALE: 1/32\"/>

LOWER LEVEL GEO-THERMAL PARKING PLAN
SCALE: 1/8\"/>



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

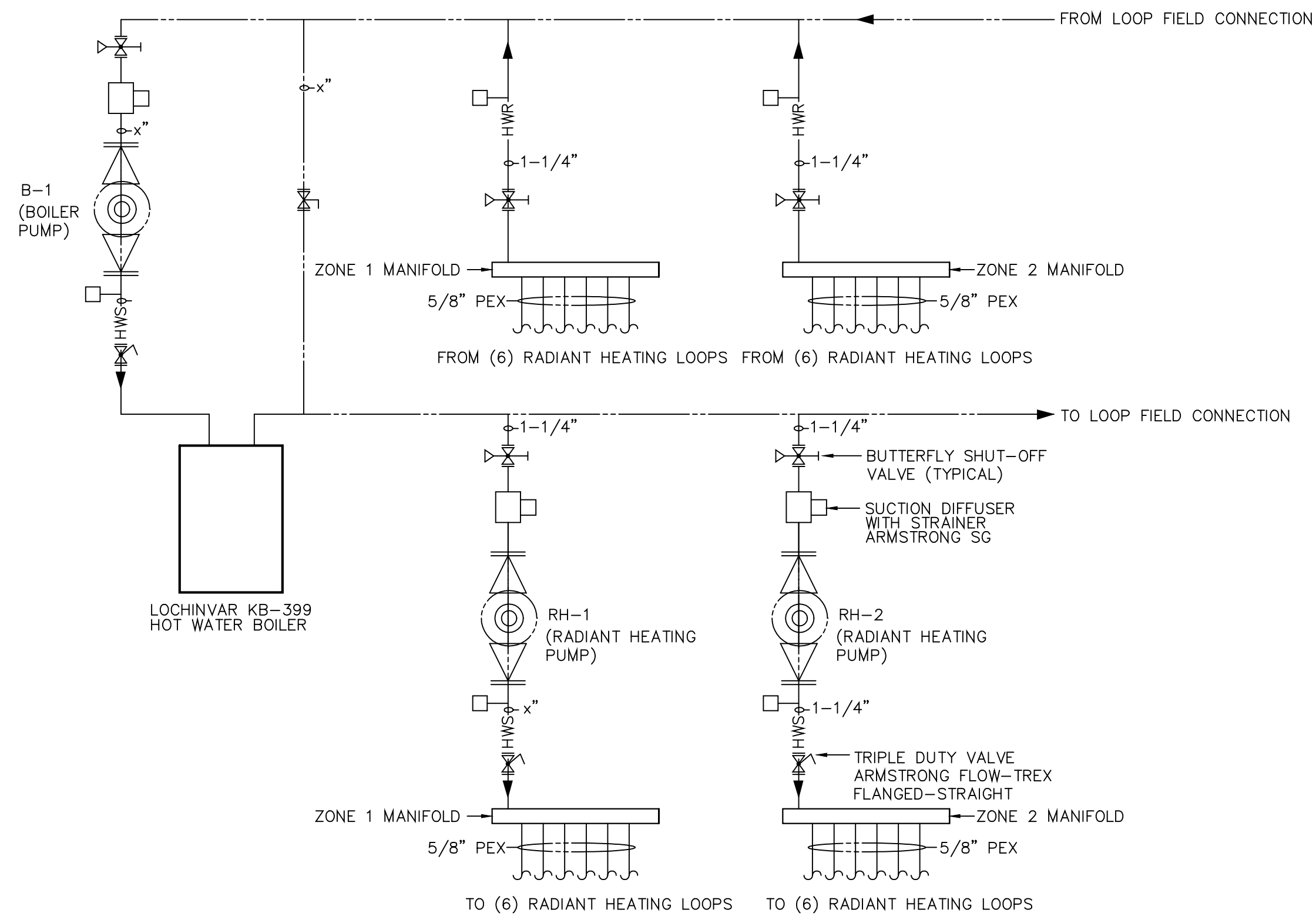
REVISED:
FEBRUARY 20, 2014



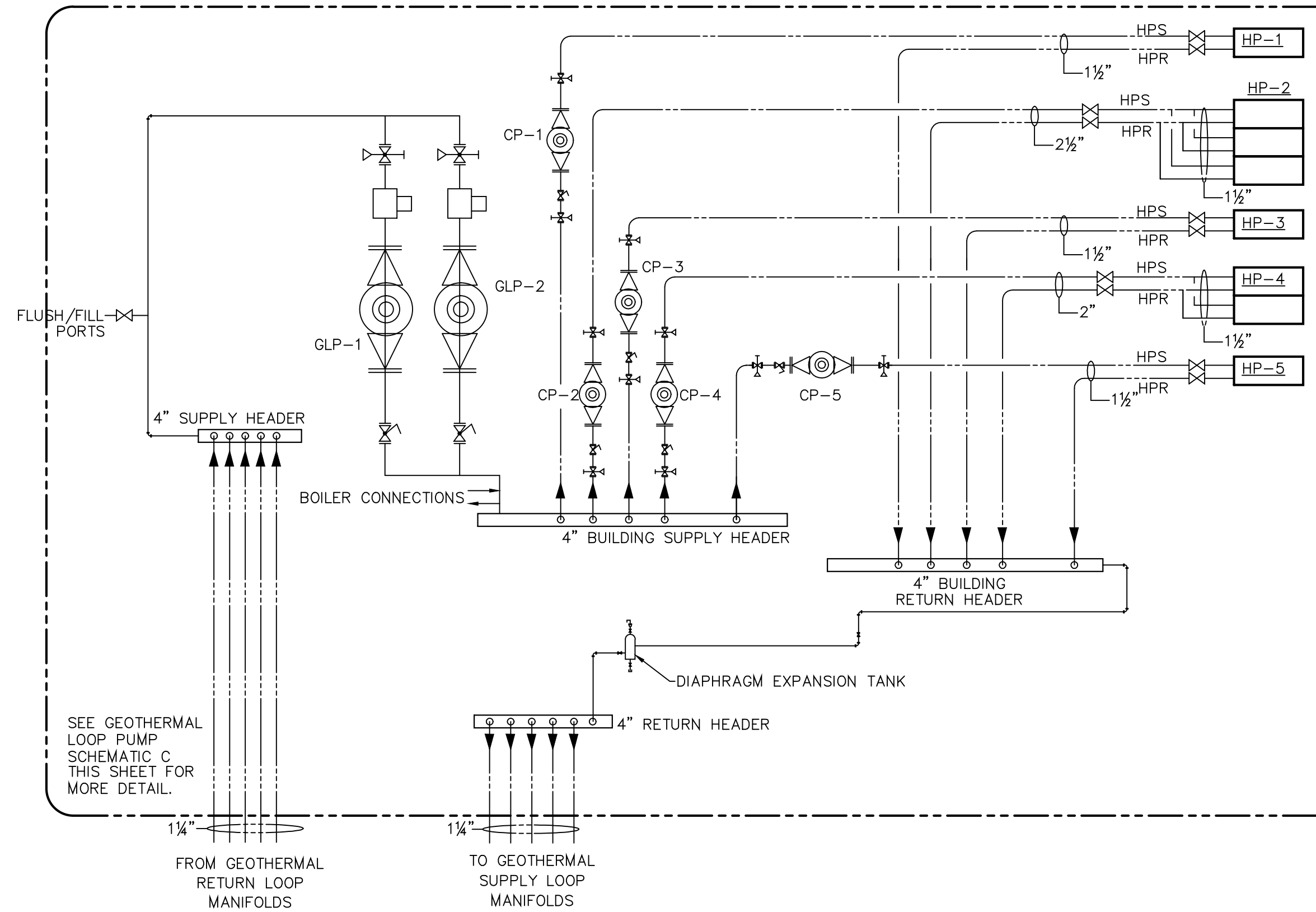
SHRINAY CORPORATION
WWW.SHRINAY.COM
TEL - 847-754-1064

A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
MUNDELEIN, ILLINOIS
MCKINLEY + ANTHONY AVE.

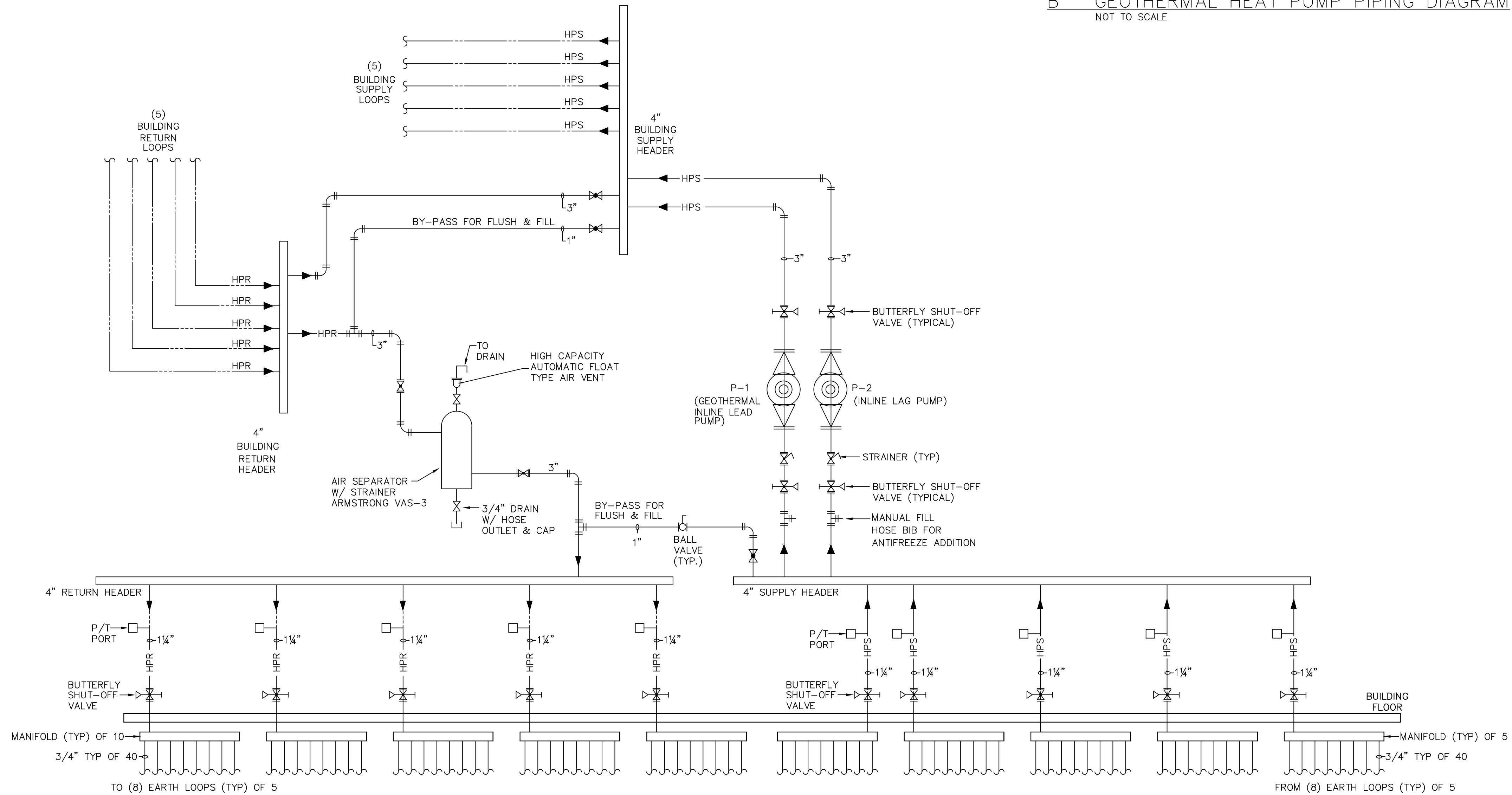
SHEET
M1.0
OF



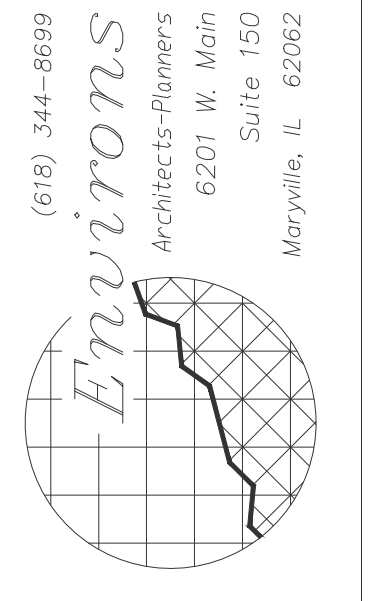
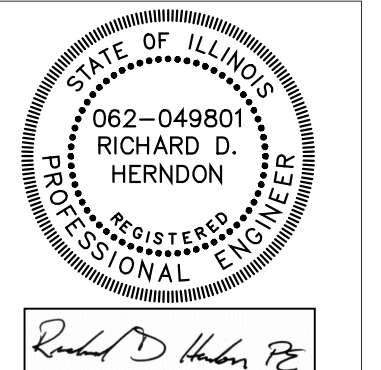
A RADIANT HEATING PIPING DIAGRAM
NOT TO SCALE



B GEOTHERMAL HEAT PUMP PIPING DIAGRAM
NOT TO SCALE



C GEOTHERMAL LOOP PUMP SCHEMATIC
NOT TO SCALE



JOB NO.
13027

DATE:
NOVEMBER 15, 2013
REVISED:

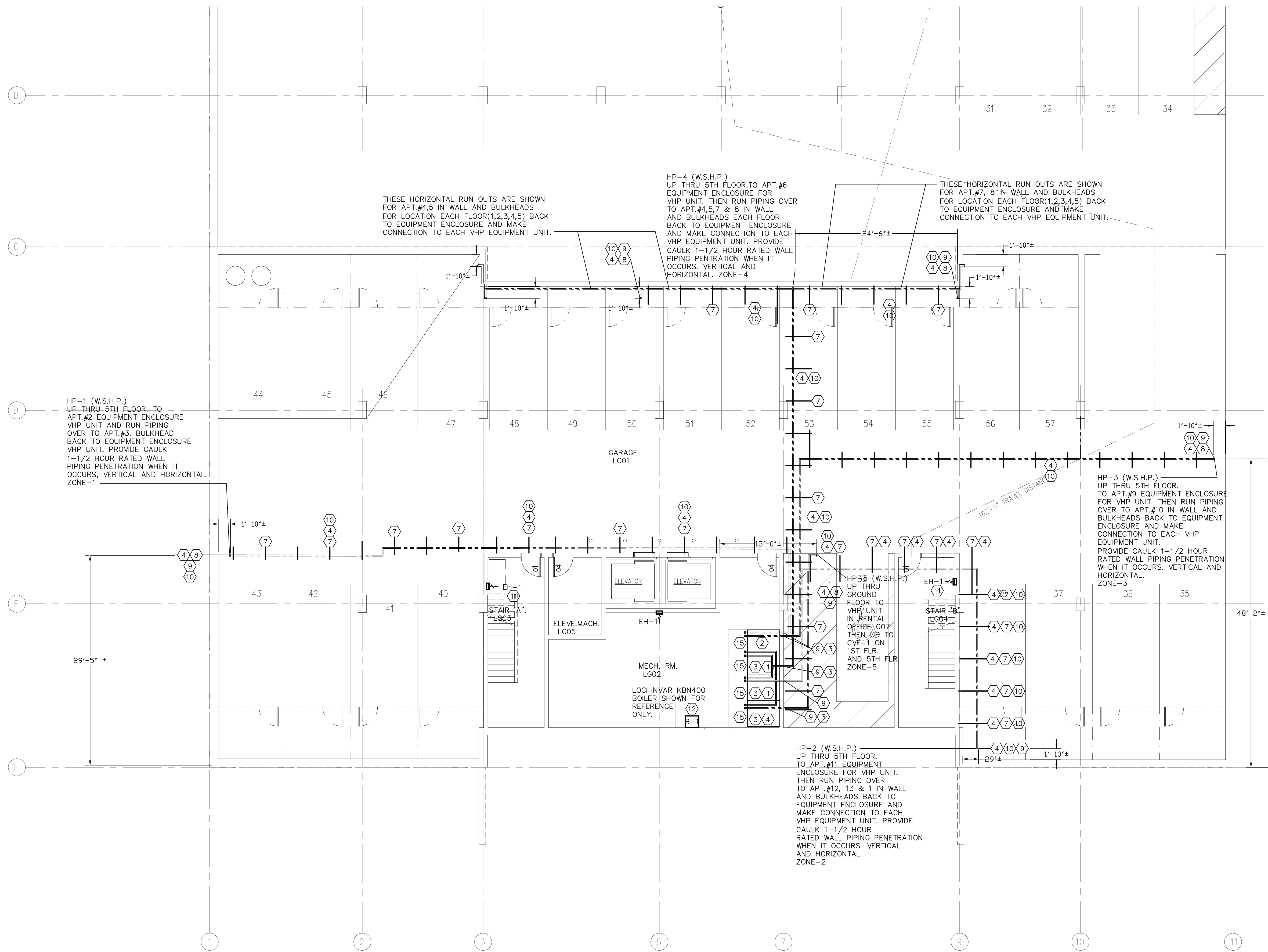


A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
MCKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

SHEET
M1.1
OF

F:\HES\Projects\3058 Cardinal Square Apartments - Any Electric.Dwg\MFP3058.dwg, M1.1, 12/16/2013 12:21:15 PM, bduim, DWG To PDF.pc3, ARCH expand D (36.00 x 24.00 Inches), 1:1

© 2013 ENVIONS ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.



LOWER LEVEL PARKING PLAN - PIPING HVAC
SCALE: 1/8" = 1'-0"

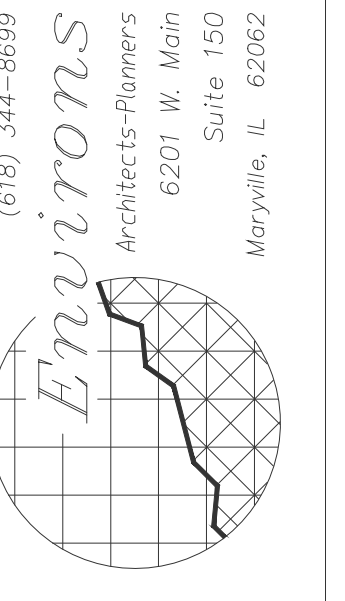
EVERY WHERE THE REFRIGERATE PIPING PASS THRU A FIRE RATED ASSEMBLIES THE OPENINGS MUST BE SEALED WITH THE APPROPRIATE FIRE RATED CAULK.

KEY NOTES: FOR WSHP UNITS

- 1 WATER SOURCE HEAT PUMPS (WSHP) TWINNED.
- 2 WATER SOURCE HEAT PUMP (WSHP)-STACKED BY TWO(2).
- 3 WATER SOURCE HEAT PUMP (WSHP) TIPPED.
- 4 WATER SOURCE HEAT PUMP (WSHP) SINGLE OVER TRIPPLED.
- 5 REFRIGERANT LINES TO RUN THROUGH BACK OF WALL NEXT TO UNDERSIDE OF GROUND FLOOR SLAB THEN TO SPOT SHOWN ON DRAWING UP AT THIS PLACE TO EQUIPMENT ENCLOSURE ON 1ST FLOOR.
- 6 PROVIDE AT LEAST R-6 INSULATION ON REFRIGERANT LINES IN UNCONDITIONED SPACE LIKE PARKING GARAGE SPACES.
- 7 PROVIDE EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS. SEE EQUIPMENT SCHEDULE FOR INFORMATION.
- 8 PROVIDE ELECTRICAL WALL HEATER FOR STAIRWELLS SEE EQUIPMENT SCHEDULE FOR INFORMATION.
- 9 USED U-STRUT TO SUPPORT WATER SOURCE LIQUID PIPING AT 6" MIN. BELOW GROUND FLOOR SLAB.
- 10 HVAC CONTRACTOR TO FIELD VERIFY LOCATIONS OF VERTICAL PIPING FROM LOWER LEVEL TO 5TH FLOOR. SO PIPING COMES OUT IN ENCLOSURE FOR VERTICAL HEAT PUMPS ON EACH FLOOR.
- 11 FIRE CAULK ALL PIPE PENETRATIONS IN WALL WITH 3 HOUR CAULK.
- 12 THIS IS THE ROUTING OF REFRIGERANT PIPING. SYSTEM IS 2- PIPE SYSTEM SUPPLY AND RETURN.
- 13 SEE EQUIPMENT SCHEDULE FOR MORE INFORMATION.
- 14 SERVICE AREA AROUND BOILER.
- 15 W/LO CP-1 THRU 5 PUMPS LOCATED ON WATER SOURCE HEAT PUMPS (WSHP). SEE SHEET M1.1 AND M15.0 EQUIPMENT SHEET FOR MORE INFORMATION.



Richard D. Herndon, P.E.



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:

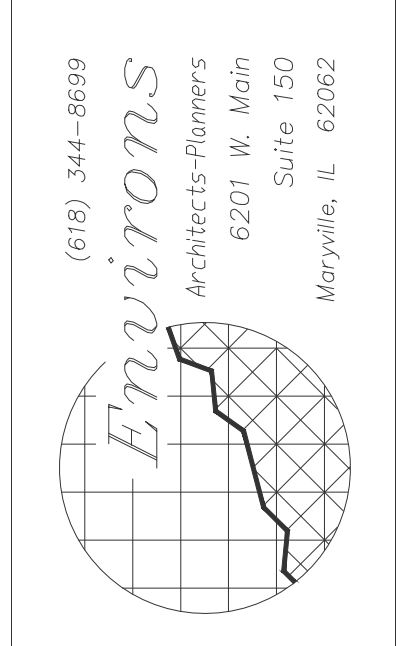
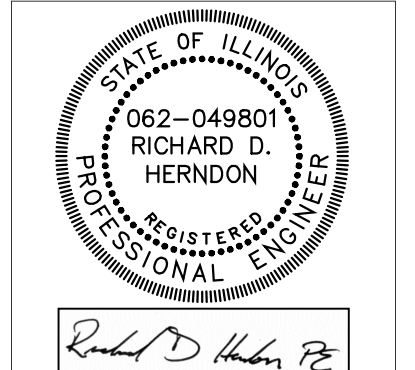


A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.2
OF

F:\HES\Projects\3058 Cardinal Square Apartments - Amy Electric\Drawings\MFP\3058.dwg, M1.2, 12/16/2013 12:21:26 PM, bddm, DWG To PDF.pc3, ARCH expand D (36000 x 24100 inches), 11

© 2013 ENVIRON ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:

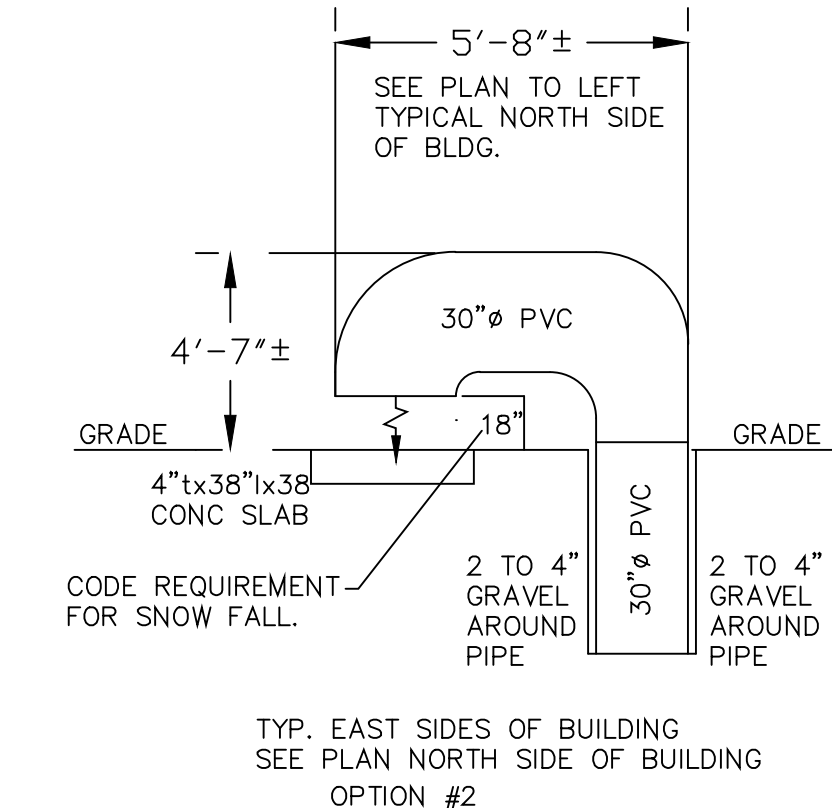


A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.3A
OF

KEY NOTES: FOR PARKING LEVELS VENTILATION

- 1 PROVIDE SUPPLY VENTILATION FAN-1. GREENHECK-SBS-1H48-10. QUANTITY OF 2 FANS @ 15,500 EACH @ ESP. 0.2.
- 2 PROVIDE EXHAUST VENTILATION FAN-2. REENHECK-SBE-3L50-10. QUANTITY OF 2 @ 7,200 CFM EACH @ ESP 0.3.
- 3 PROVIDE GAS DETECTOR (GSE-1) MODEL GSE-CN-1 BRASCH.
- 4 PROVIDE CONC BALLARD 6"Ø AS SHOWN TO PROTECT FANS.

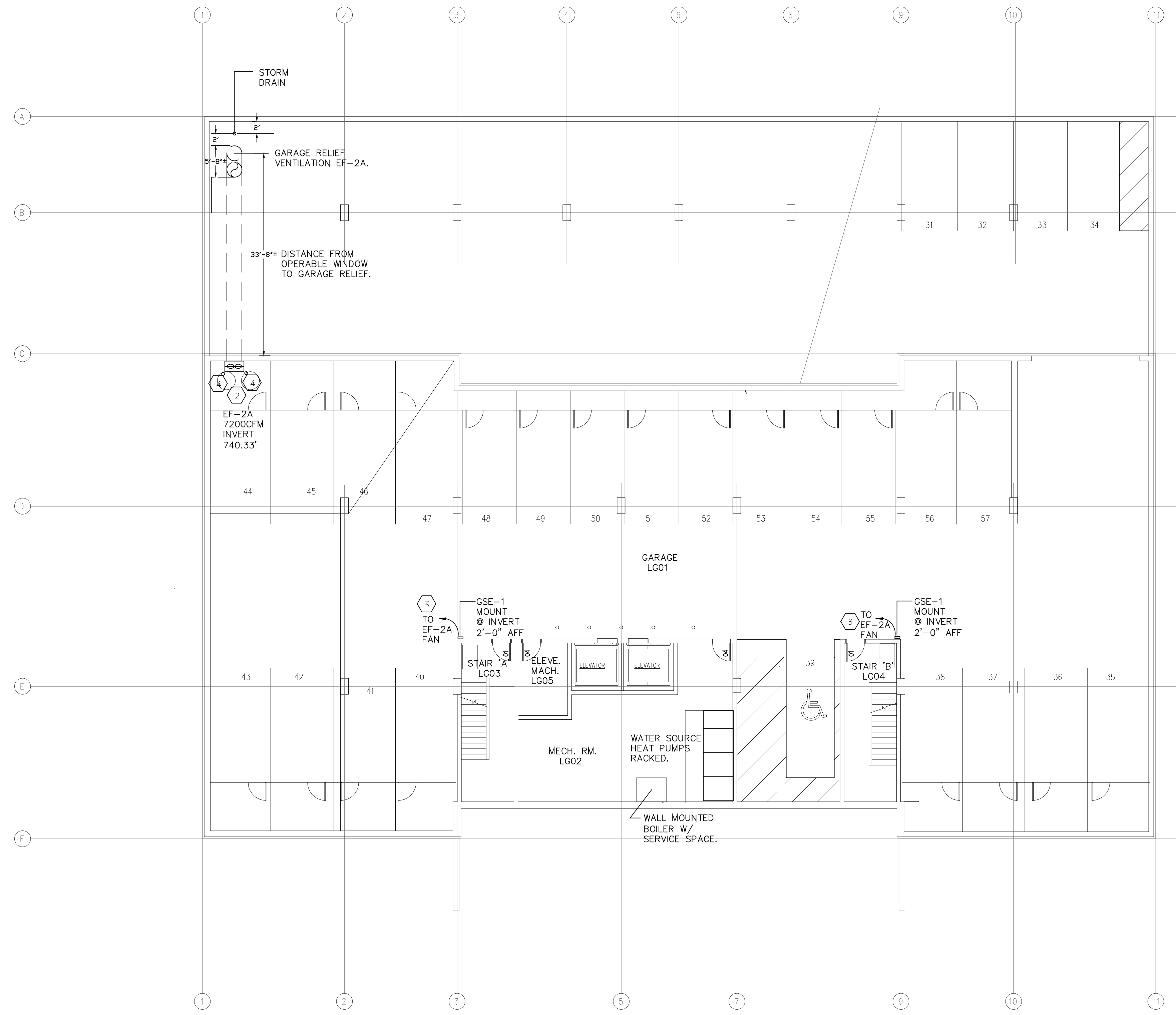


GROUND LEVEL PARKING DISCHARGE HOOD - VENTILATION

SCALE: 1/4" = 1'-0"
SEE SHEETS M1.3A AND M1.3B FOR INFORMATION

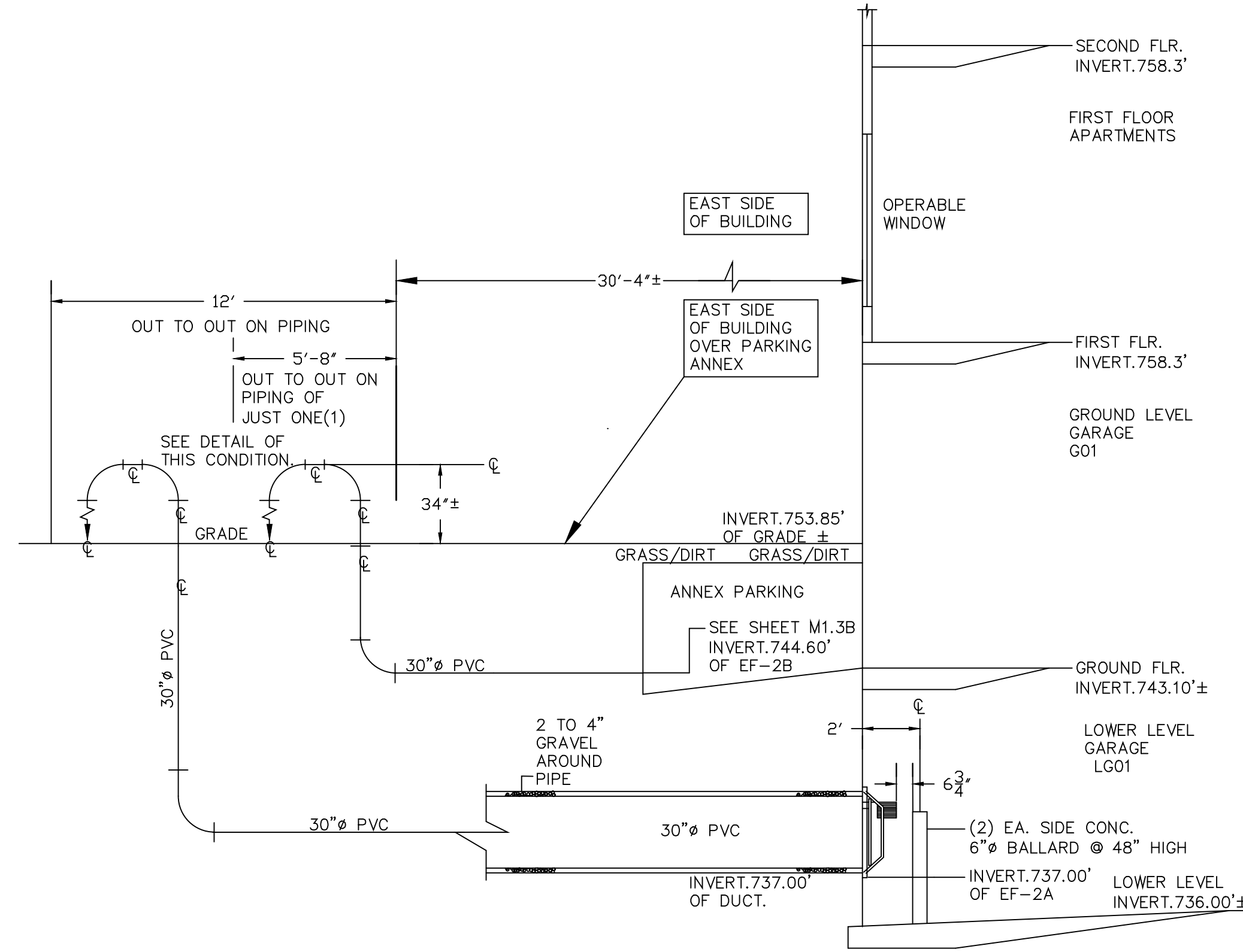
LOWER LEVEL PARKING DISCHARGE HOOD - VENTILATION

SCALE: 1/4" = 1'-0"
SEE SHEETS M1.3A AND M1.3B FOR INFORMATION



LOWER LEVEL PARKING PLAN - VENTILATION

SCALE: 3/32" = 1'-0"



GROUND LEVEL PARKING ELEVATION - VENTILATION

SCALE: 1/4" = 1'-0"
SEE SHEETS M1.3A AND M1.3B FOR INFORMATION

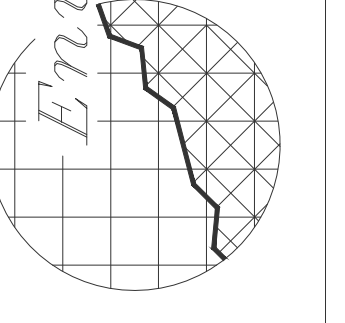
LOWER LEVEL PARKING ELEVATION - VENTILATION

SCALE: 1/4" = 1'-0"
SEE SHEETS M1.3A AND M1.3B FOR INFORMATION



Richard D. Herndon, P.E.

(618) 344-8609
 Environ Architects-Planners
 6201 W. Main Suite 150
 Maryville, IL 62062



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:
 FEBRUARY 20, 2014
 SEPTEMBER 8, 2014

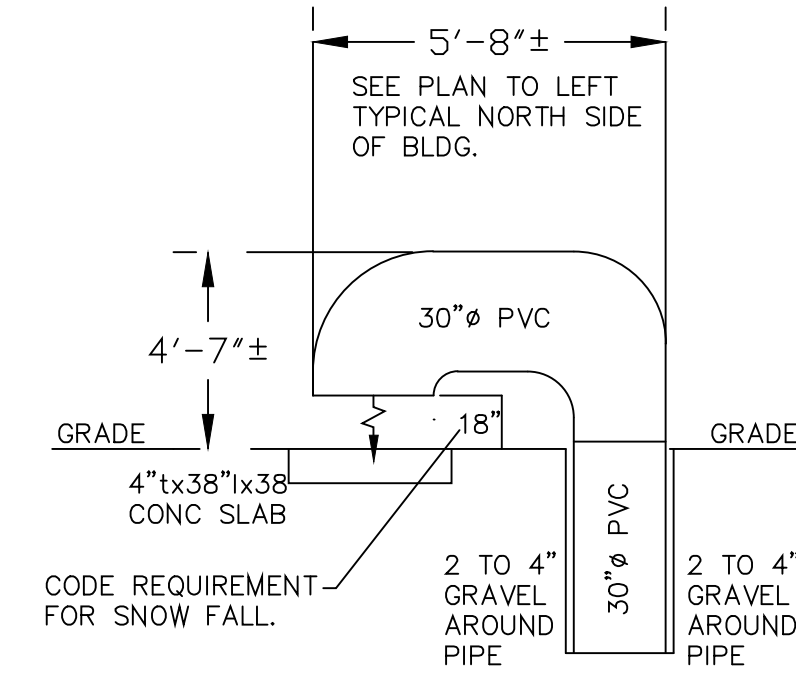


A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
 MCKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

SHEET
M1.3B
 OF

KEY NOTES: FOR PARKING LEVELS VENTILATION

- 1 PROVIDE SUPPLY VENTILATION FAN-1. GREENHECK-SBS-1H48-10 QUANTITY OF 2 FANS @ 15,500 EACH @ ESP. 0.2.
- 2 PROVIDE EXHAUST VENTILATION FAN-2. REENHECK-SBE-3L30-10. QUANTITY OF 2 @ 7,200 CFM EACH @ ESP 0.3.
- 3 PROVIDE GAS DETECTOR (GSE-1) MODEL GSE-CN-1 BRASCH.
- 4 PROVIDE CONC BALLARD 6"Ø AS SHOWN TO PROTECT FANS.



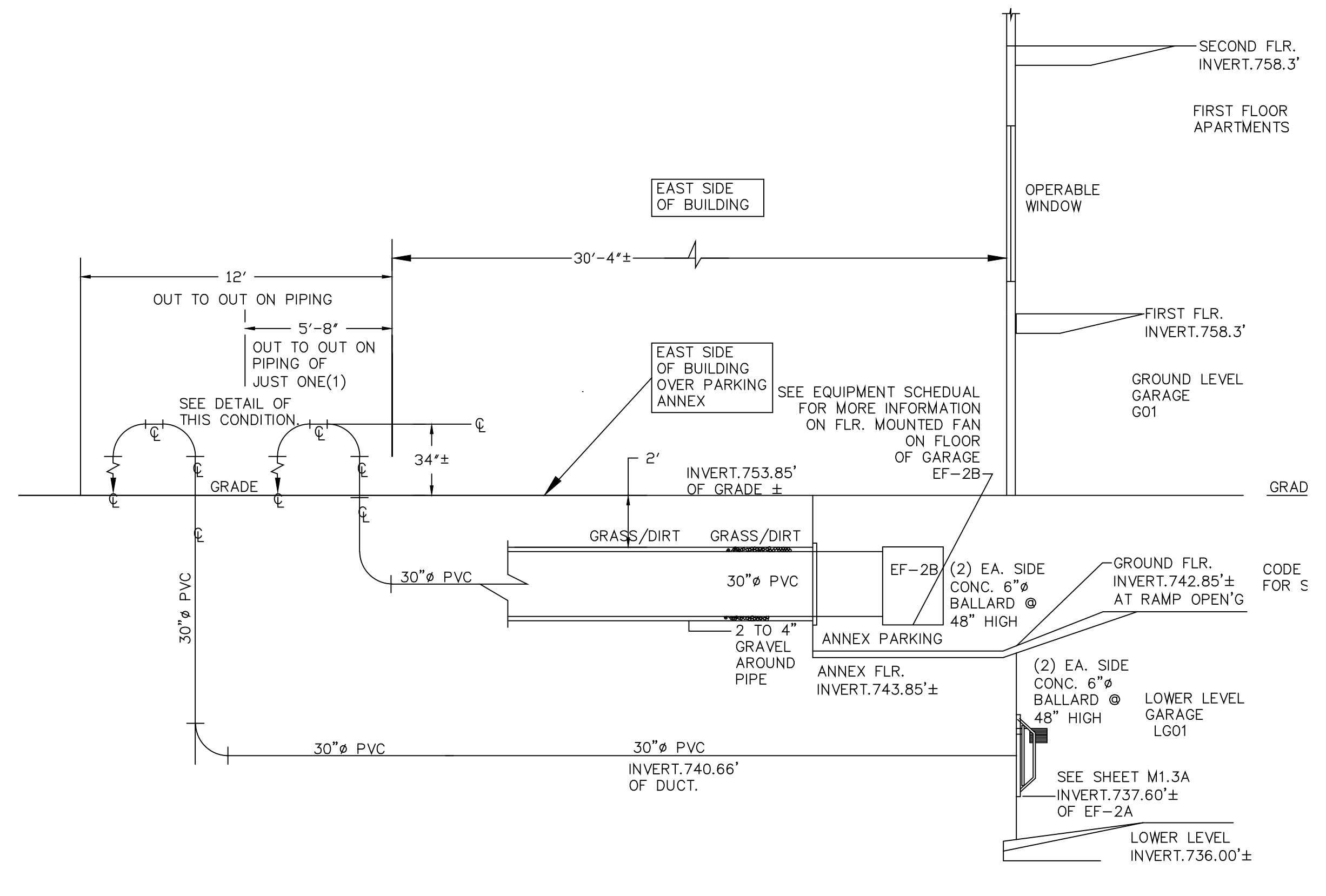
TYP. EAST SIDES OF BUILDING
 SEE PLAN NORTH SIDE OF BUILDING
 OPTION #2

GROUND LEVEL PARKING ELEVATION - VENTILATION

SCALE: NTS

LOWER LEVEL PARKING ELEVATION - VENTILATION

SCALE: NTS



GROUND LEVEL PARKING ELEVATION - VENTILATION

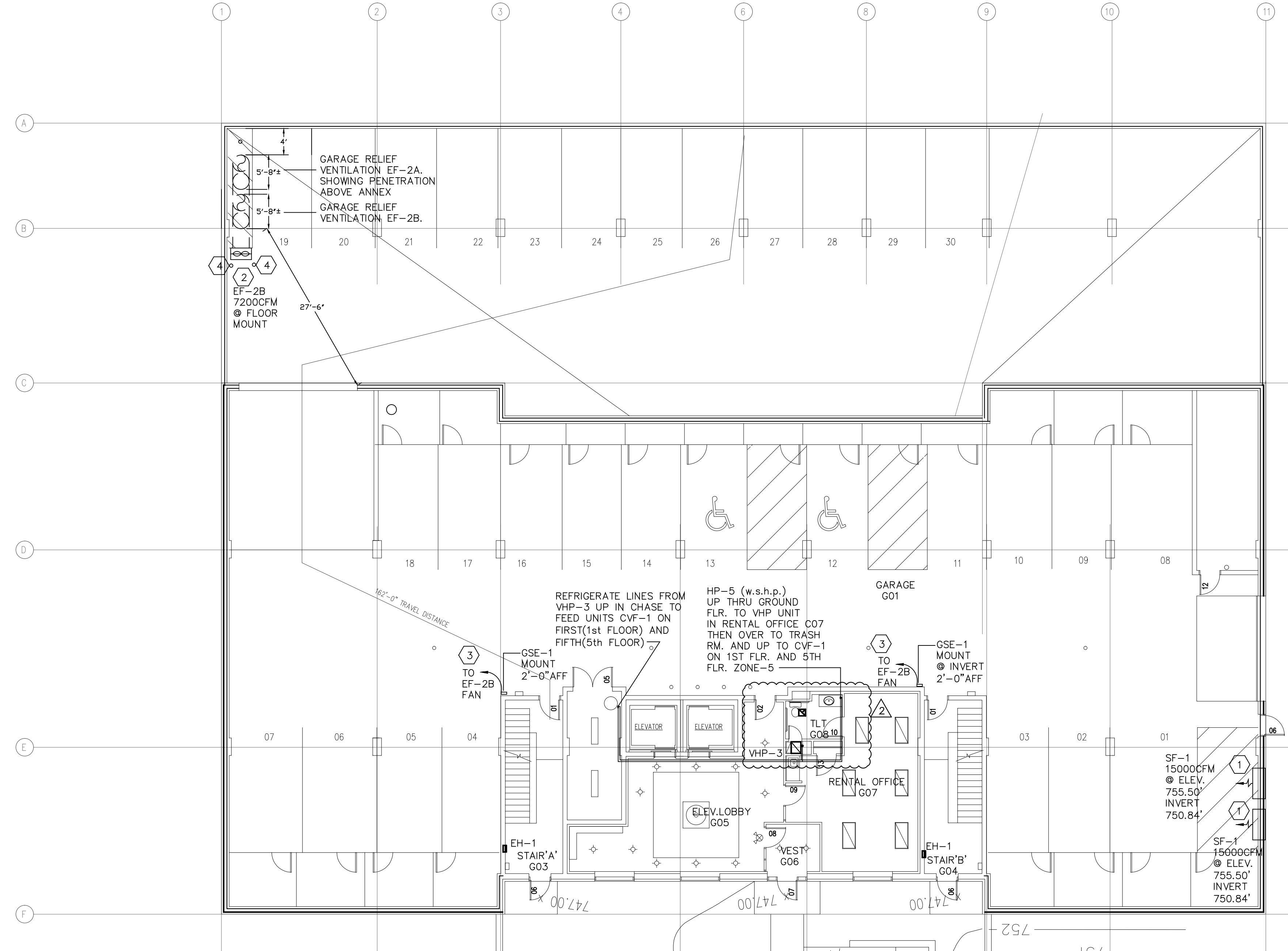
SCALE: NTS

SEE SHEETS M1.3A AND M1.3B FOR INFORMATION

LOWER LEVEL PARKING ELEVATION - VENTILATION

SCALE: NTS

SEE SHEETS M1.3A AND M1.3B FOR INFORMATION



GROUND LEVEL PARKING PLAN - VENTILATION

SCALE: 3/32" = 1'-0"

F:\HES\Projects\3058 Cardinal Square Apartments - Any Electric\Drawings\MFP\2058.dwg, M1.3B, 9/8/2014 2:34:40 PM, Jgraves, DWG to PDF.pc3, ARCH expand D (36,00 x 24,00 Inches), 1:1

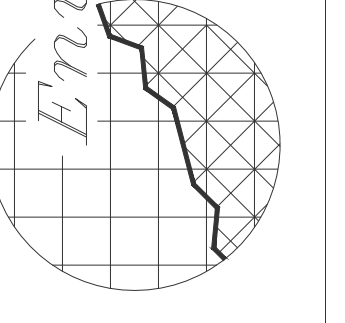
KEY NOTES: FOR VHP UNITS

- 1 INSTALL REFRIGERANT LINE SETS IN EQUIPMENT ENCLOSURE VERTICALLY OF 1 THRU 5 FLOOR. FOR (VHP) AIR HANDLER FOR EACH APARTMENT. TO RISE UP AT THIS POINT.
- 2 REFRIGERANT LINES TO RISE UP IN EQUIPMENT ENCLOSURE.
- 3 PROVIDE AT LEAST R-6 INSULATION ON REFRIGERANT LINES IN UNCONDITIONED SPACE AND EQUIPMENT ENCLOSURE SPACES.
- 4 ELECTRICAL TO PROVIDE EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS.
- 5 COORDINATE WITH GRID OF CEILING.
- 6 SEE EQUIPMENT SCHEDULE FOR INFORMATION.
- 7 TYP. ENCLOSURE FOR VHP IS AT CEILING 42"Dx25"W



Richard D. Herndon

(618) 344-8609
 Environ Architects-Planners
 6201 W. Main Suite 150
 Maryville, IL 62062



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

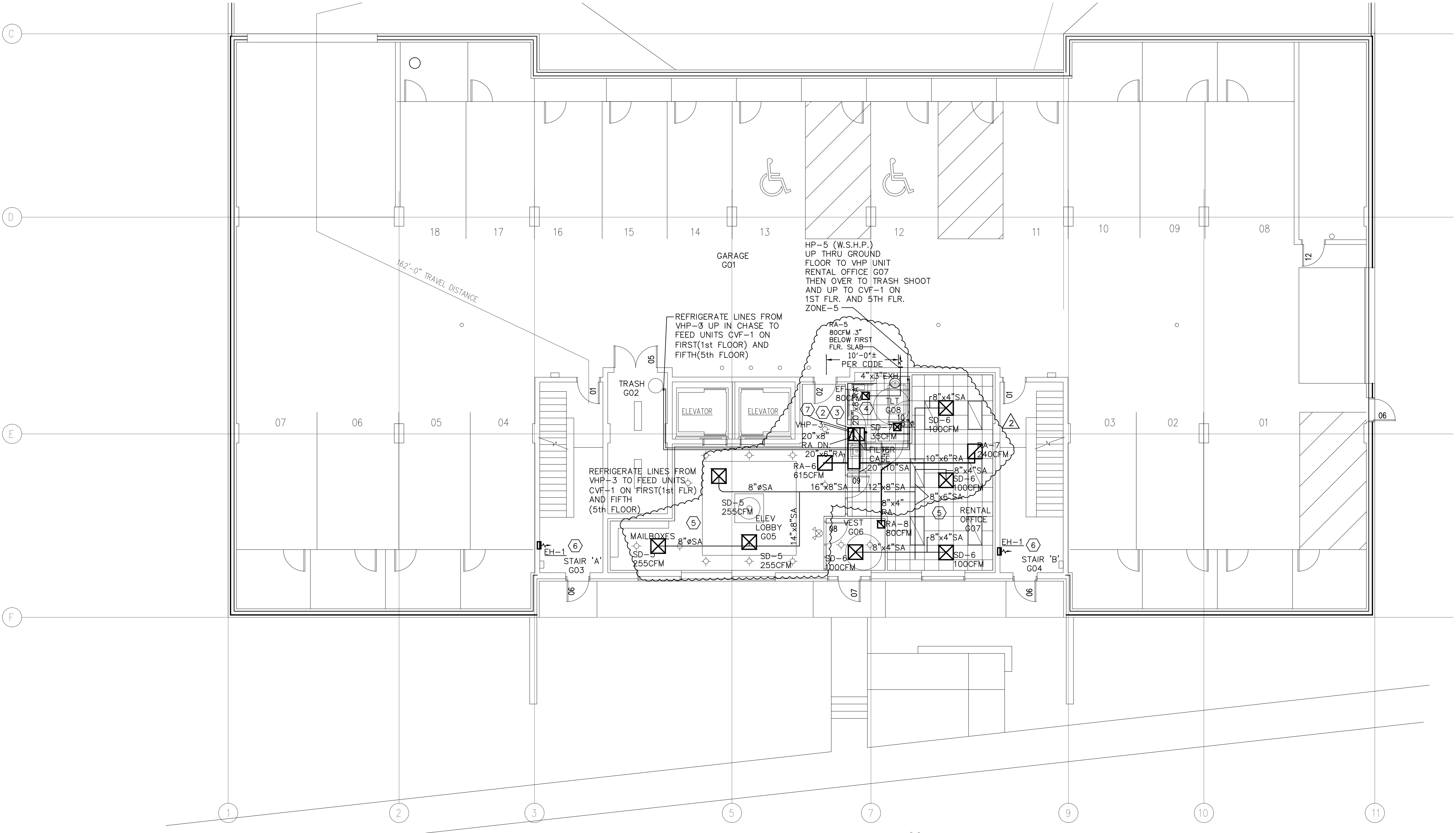
REVISED:
2 SEPTEMBER 8, 2014



SHRINAY CORPORATION
 WWW.SHRINAY.COM
 TEL - 847-754-1064

A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
 MCKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

SHEET
M1.4
 OF



GROUND LEVEL PARKING PLAN - HVAC
 SCALE: 1/8" = 1'-0"

F:\HES\Projects\3058 Cardinal Square Apartments - Amy Electric.Dwg\MFP3058.dwg, M1.4, 9/8/2014 2:34:14 PM, Jgraves, DWG to PDF.pc3, ARCH expand D (36,00 x 24,00 Inches), 1:1

GENERAL NOTES

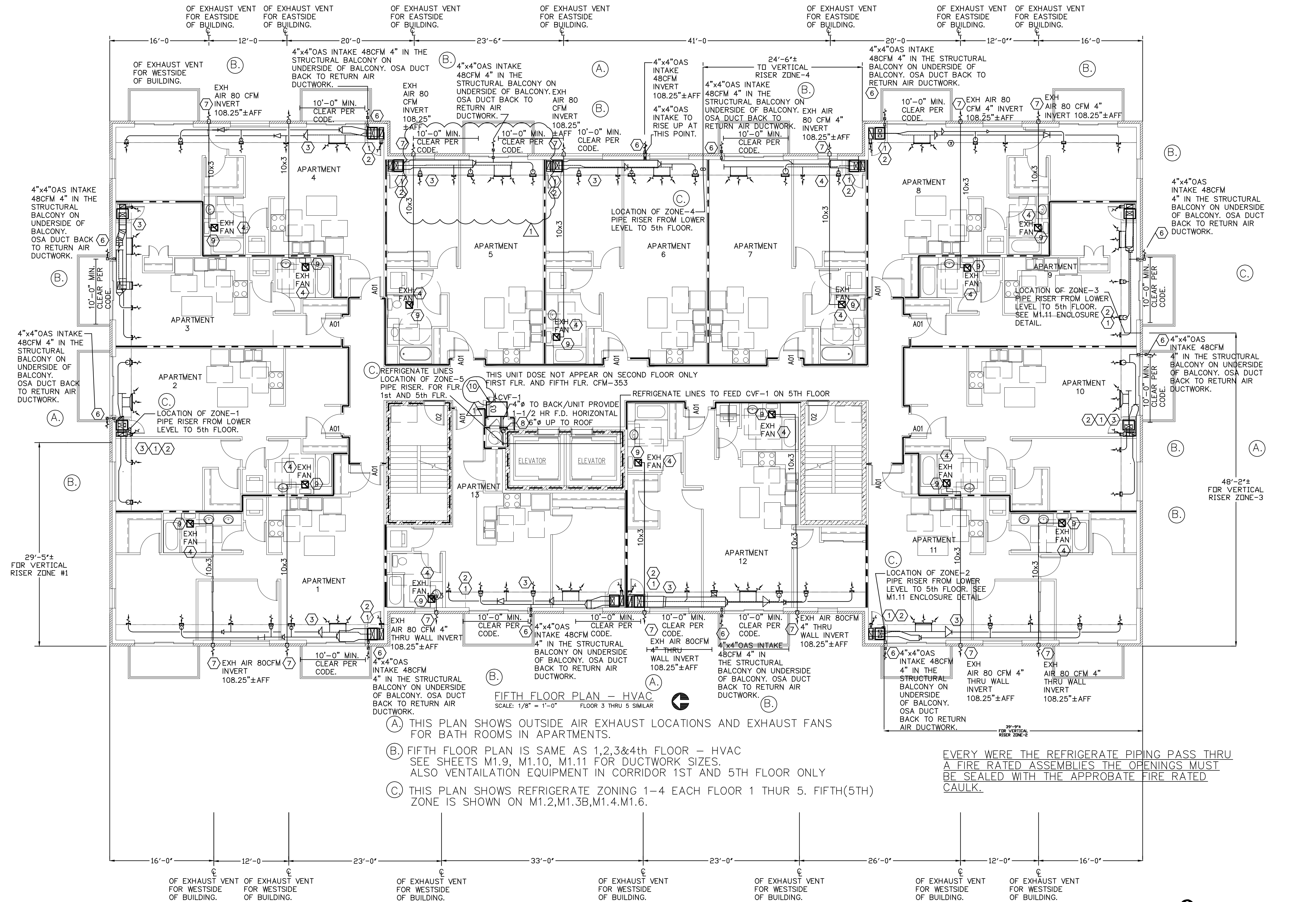
- A. THE HVAC CONTRACTOR SHALL VISIT THE PROJECT SITE BEFORE BIDDING AND VERIFY ANY ADDITIONAL MECHANICAL DEMOLITION TO BE DONE AT THIS LOCATION THAT WOULD INTERFERE WITH NEW CONSTRUCTION. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK. VERIFY ALL DIMENSIONS. DRAWINGS ARE ILLUSTRATIVE AND MAY NOT REFLECT EXACT CONDITIONS OR DIMENSIONS.
- B. HVAC CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY.
- C. THE CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
- D. THE LOCATION OF NEW DUCTWORK, AIR DEVICES, ETC. SHOWN ON THESE DRAWINGS SHOULD BE CONSIDERED IN ITS APPROXIMATE LOCATION. HVAC CONTRACTOR SHALL FIELD VERIFY ALL SIZES AND CLEARANCES PRIOR TO FABRICATION.
- E. DO NOT SCALE THE DRAWINGS. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF EQUIPMENT AND SYSTEMS. THEY ARE NOT INTENDED TO SHOW EVERY OFFSET, FITTING AND COMPONENT. DO NOT USE THE PLANS FOR EXACT LOCATION OF EQUIPMENT, FIXTURES OR ARCHITECTURAL ITEMS SUCH AS WALLS, WINDOWS, SOFFITS, AND PLASTER. SPECIFIC LOCATIONS, MOUNTING HEIGHTS AND OVERALL DIMENSIONS OF DEVICES AND FIXTURES ARE TO BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS AND DETAILS WHEN AVAILABLE.
- F. THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.

- G. MAIN SUPPLY AIR DUCT SHALL BE WRAPPED WITH INSULATION SEE SPECIFICATIONS.
- H. ALL MAIN DUCT SUPPLY AND RETURN SIZE ARE WITHOUT INTERIOR INSULATION. ACTUAL OUTSIDE DIMENSION SHOULD AS ON DRAWINGS.

KEY NOTES: FOR VHP UNITS

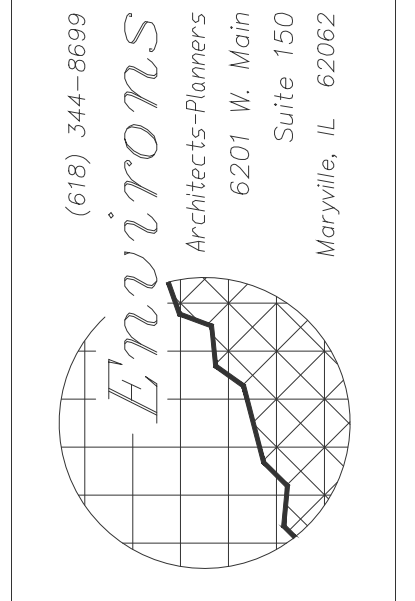
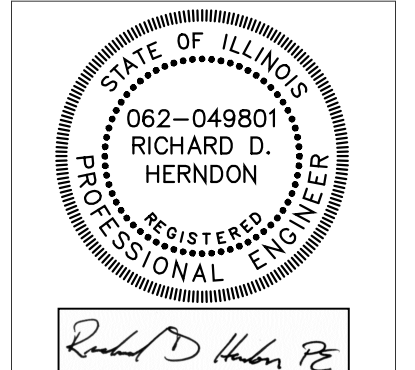
1. INSTALL REFRIGERANT LINE SETS IN EQUIPMENT ENCLOSURE VERTICALLY OF 1 THRU 5 FLOOR. FOR (VHP) AIR HANDLER FOR EACH APARTMENT.
2. REFRIGERANT LINES UP IN EQUIPMENT ENCLOSURE.
3. PROVIDE AT LEAST R-6 INSULATION ON DUCTS IN UNCONDITIONED EQUIPMENT ENCLOSURE SPACES.
4. PROVIDED BY ELECTRICAL EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS.
5. NOT USED
6. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT VENT SIZE 4" FOR 48CFM.
7. PROVIDE 4"x4" EXHAUST AIR DUCT TO OUT SIDE BUILDING EXTERIOR VENT SIZE 4" FOR 80CFM. VENTS PROVIDED BY MECHANICAL CONTRACTOR. DEFLECTO WHITE ITEM NUMBER H54W/4B. MECHANICAL CONTRACTOR TO PAINT VENT TO MATCH BRICK COLOR.

8. RUN OUTSIDE AIR DUCT FROM ROOF W/ WEATHER CAP DOWN TO 1ST FLOOR CVF UNIT. TAKE 4" OSA DUCT TO CVF UNIT FOR OUTSIDE AIR. AND DO THE SAME FOR 5TH FLOOR OSA.
9. EXHAUST DUCTWORK TO TURN UP INTO CEILING AND RUN TIN STRUCTURE JOIST TO OUTSIDE OF BUILDING.
10. MOUNT CVF-1 FLUSH WITH THE CEILING. IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.



- A. THIS PLAN SHOWS OUTSIDE AIR EXHAUST LOCATIONS AND EXHAUST FANS FOR BATH ROOMS IN APARTMENTS.
- B. FIFTH FLOOR PLAN IS SAME AS 1,2,3&4th FLOOR - HVAC SEE SHEETS M1.9, M1.10, M1.11 FOR DUCTWORK SIZES. ALSO VENTILATION EQUIPMENT IN CORRIDOR 1ST AND 5TH FLOOR ONLY
- C. THIS PLAN SHOWS REFRIGERATE ZONING 1-4 EACH FLOOR 1 THUR 5. FIFTH(5TH) ZONE IS SHOWN ON M1.2,M1.3B,M1.4.M1.6.

EVERY WERE THE REFRIGERATE PIPING PASS THRU A FIRE RATED ASSEMBLIES THE OPENINGS MUST BE SEALED WITH THE APPROPRIATE FIRE RATED CAULK.



JOB NO. 13027

DATE: NOVEMBER 15, 2013
REVISED: FEBRUARY 20, 2014



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

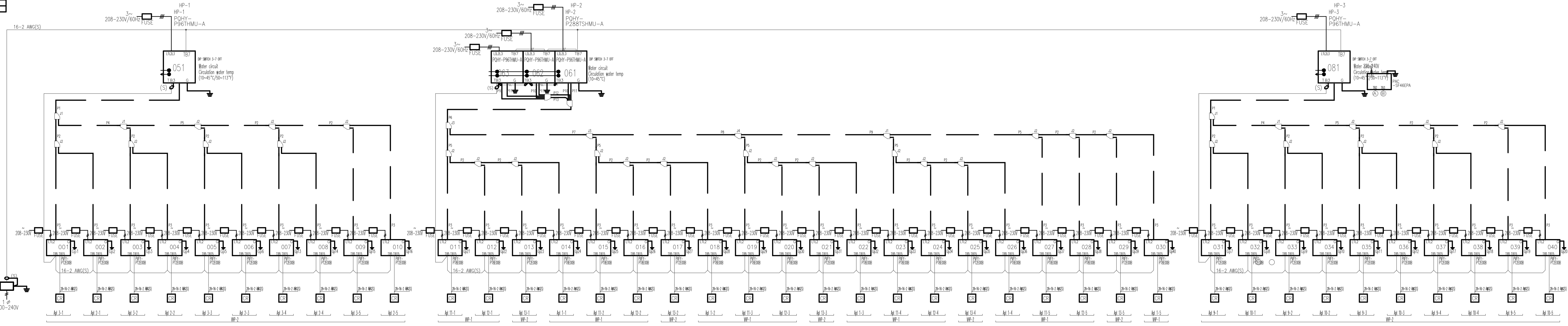
SHEET
M1.5
OF

Cardinal Square Apts	
PROJECT NO.	16000000000000000000
DATE	11/15/13
DESIGNED BY	HERNDON ENGINEERING
CHECKED BY	HERNDON ENGINEERING
DATE	11/15/13

city MULT
SYSTEM SCHEMATIC DWG.

Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.
1.25oz(1/8 AMG) ; 1.25oz(1/8 AMG) or more ; 0.75oz(3/16 AMG) ; between 0.5oz(1/4 AMG) and 0.75oz(3/16 AMG)

PIPING LIST	SIZE	TYPE	NOTE
P1	3/8"	1/2"	
P2	3/8"	1/2"	
P3	3/8"	1/2"	
P4	3/8"	1/2"	
P5	3/8"	1/2"	
P6	3/8"	1/2"	
P7	3/8"	1/2"	
P8	3/8"	1/2"	
P9	3/8"	1/2"	
P10	3/8"	1/2"	
P11	3/4"	1/2"	
P12	3/4"	1/2"	



REMARKS:
Originator: Ray Weyman
Comments: Herndon Engineering
Jim Miller

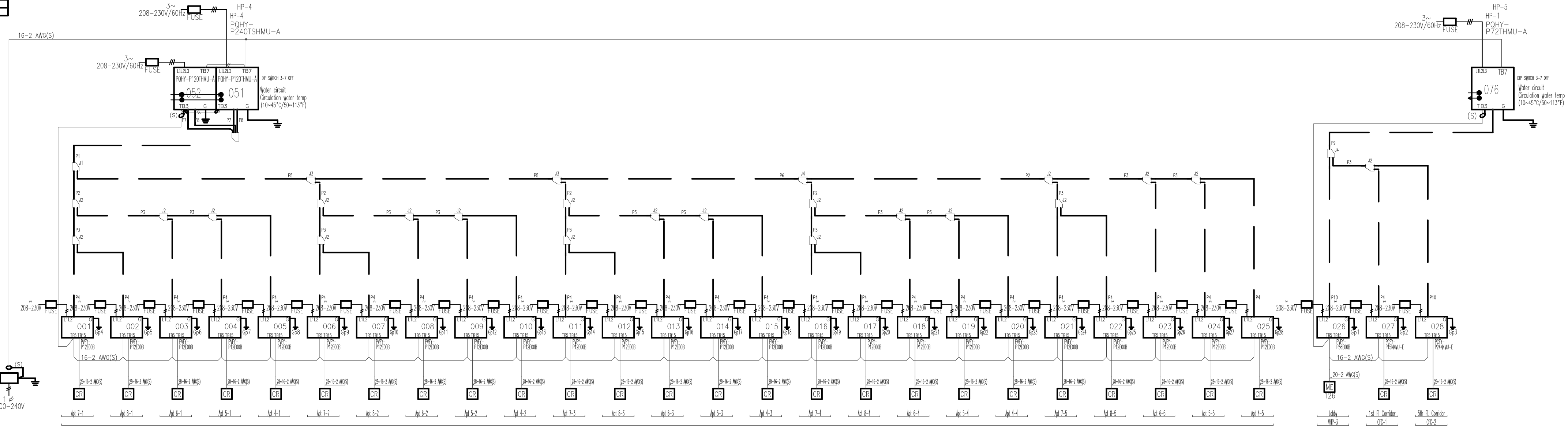
CC-1 PIPING AND WIRING DIAGRAM.

Cardinal Square Apts	
PROJECT NO.	16000000000000000000
DATE	11/15/13
DESIGNED BY	HERNDON ENGINEERING
CHECKED BY	HERNDON ENGINEERING
DATE	11/15/13

city MULT
SYSTEM SCHEMATIC DWG.

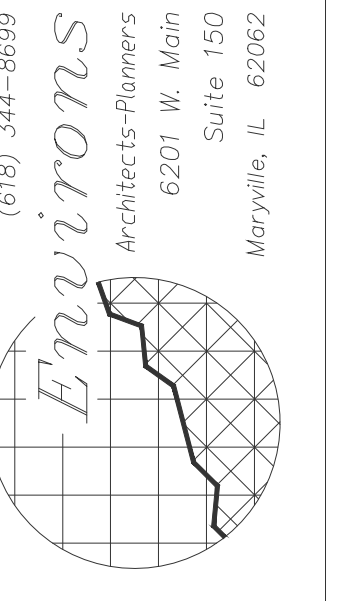
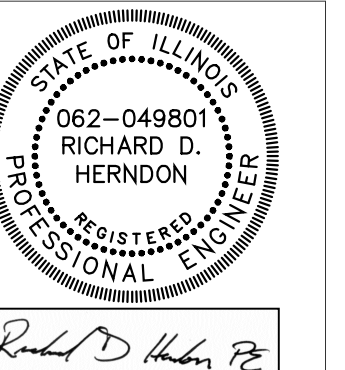
Additional refrigerant charge is needed depending on the size and length of extended piping. Please refer the amount of pre-charge and the formula of calculation which is mentioned on the data book.
1.25oz(1/8 AMG) ; 1.25oz(1/8 AMG) or more ; 0.75oz(3/16 AMG) ; between 0.5oz(1/4 AMG) and 0.75oz(3/16 AMG)

PIPING LIST	SIZE	TYPE	NOTE
P1	3/8"	1/2"	
P2	3/8"	1/2"	
P3	3/8"	1/2"	
P4	3/8"	1/2"	
P5	3/8"	1/2"	
P6	3/8"	1/2"	
P7	3/8"	1/2"	
P8	3/8"	1/2"	
P9	3/8"	1/2"	
P10	3/8"	1/2"	



REMARKS:
Originator: Ray Weyman
Comments: Herndon Engineering
Jim Miller

CC-2 PIPING AND WIRING DIAGRAM.



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.6
OF

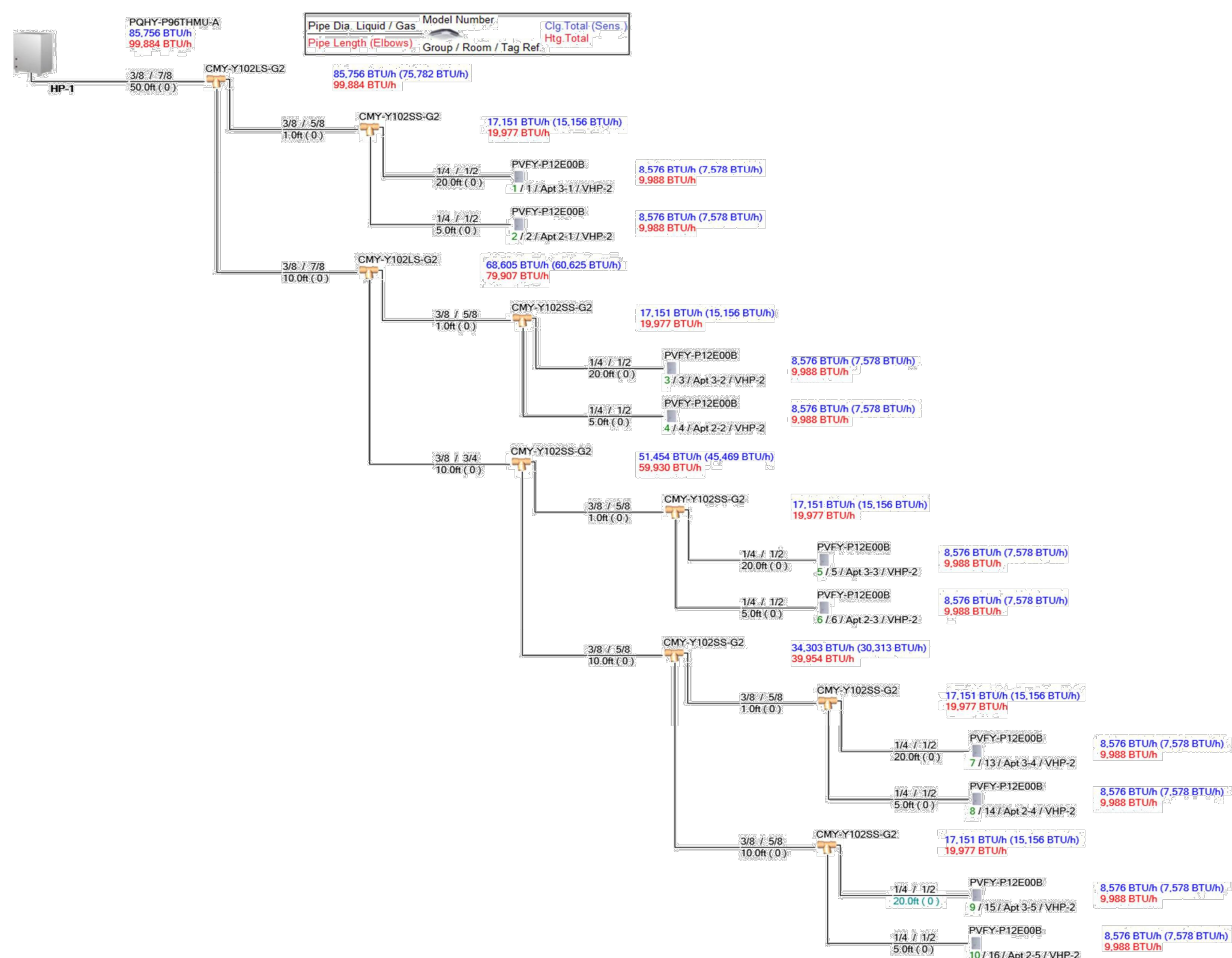
HERNDON ENGINEERING SERVICES, Inc.
5870 COOK ROAD, SUITE B, MILFORD OH 45150
Voice: (513) 248-1313 Fax: (513) 248-2869
Email: herndon@herndoneng.com Website: www.herndoneng.com

F:\HES\Projects\3058 Cardinal Square Apartments - Any Electric\DWG\MFP3058.dwg, M1.6, 12/16/2013 12:25:01 PM, bduim, DWG To PDF.pc3, ARCH expand D (36000 x 24100 inches), 1:1

© 2013 ENVIRON ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.

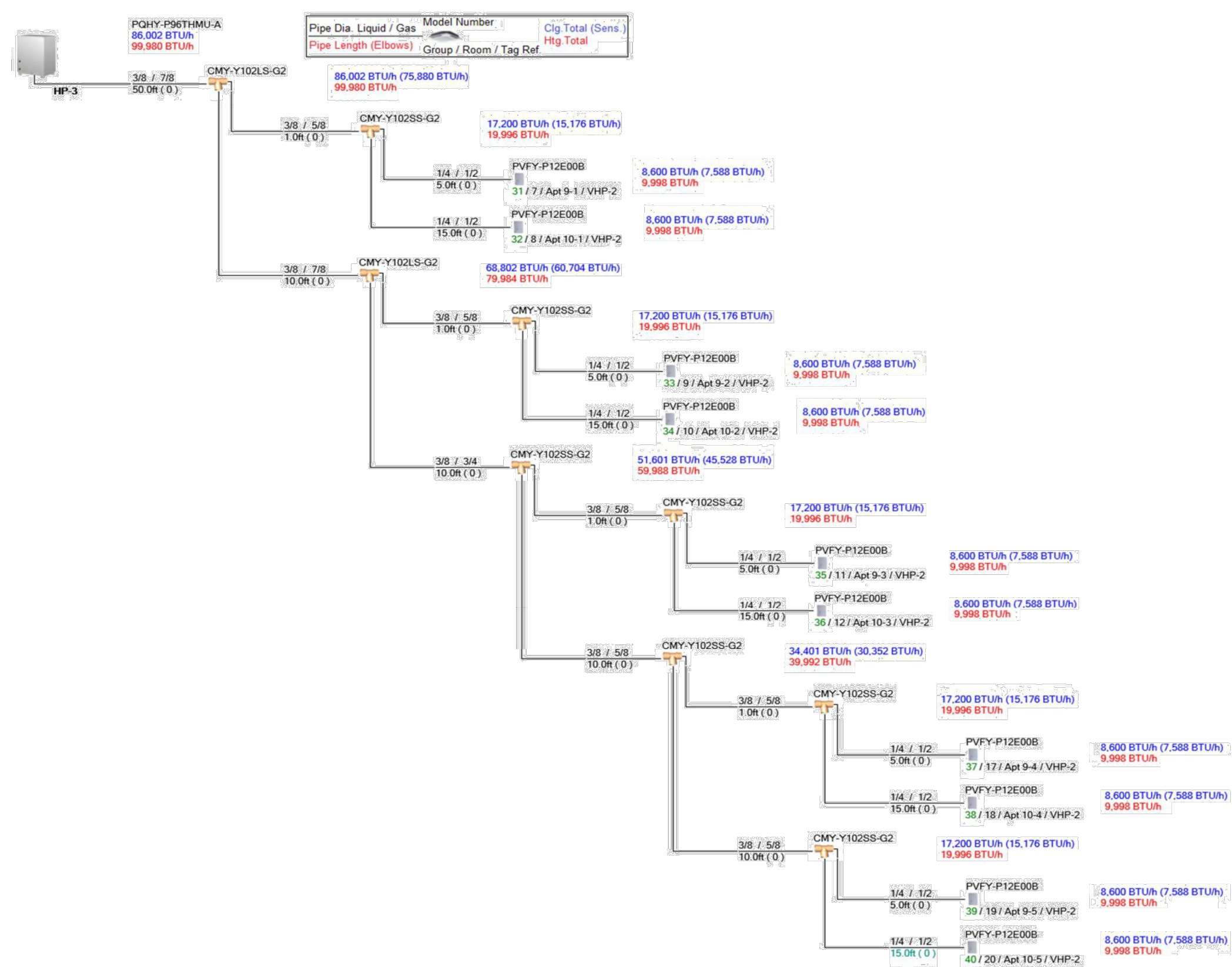
1-1

Piping Diagram Image (Design View)



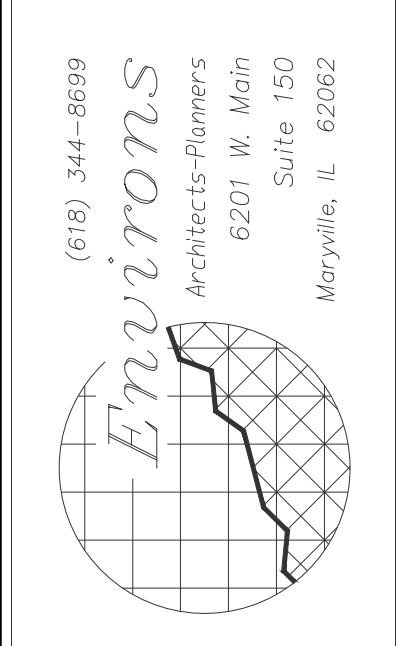
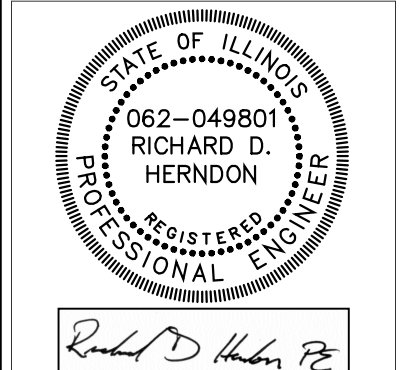
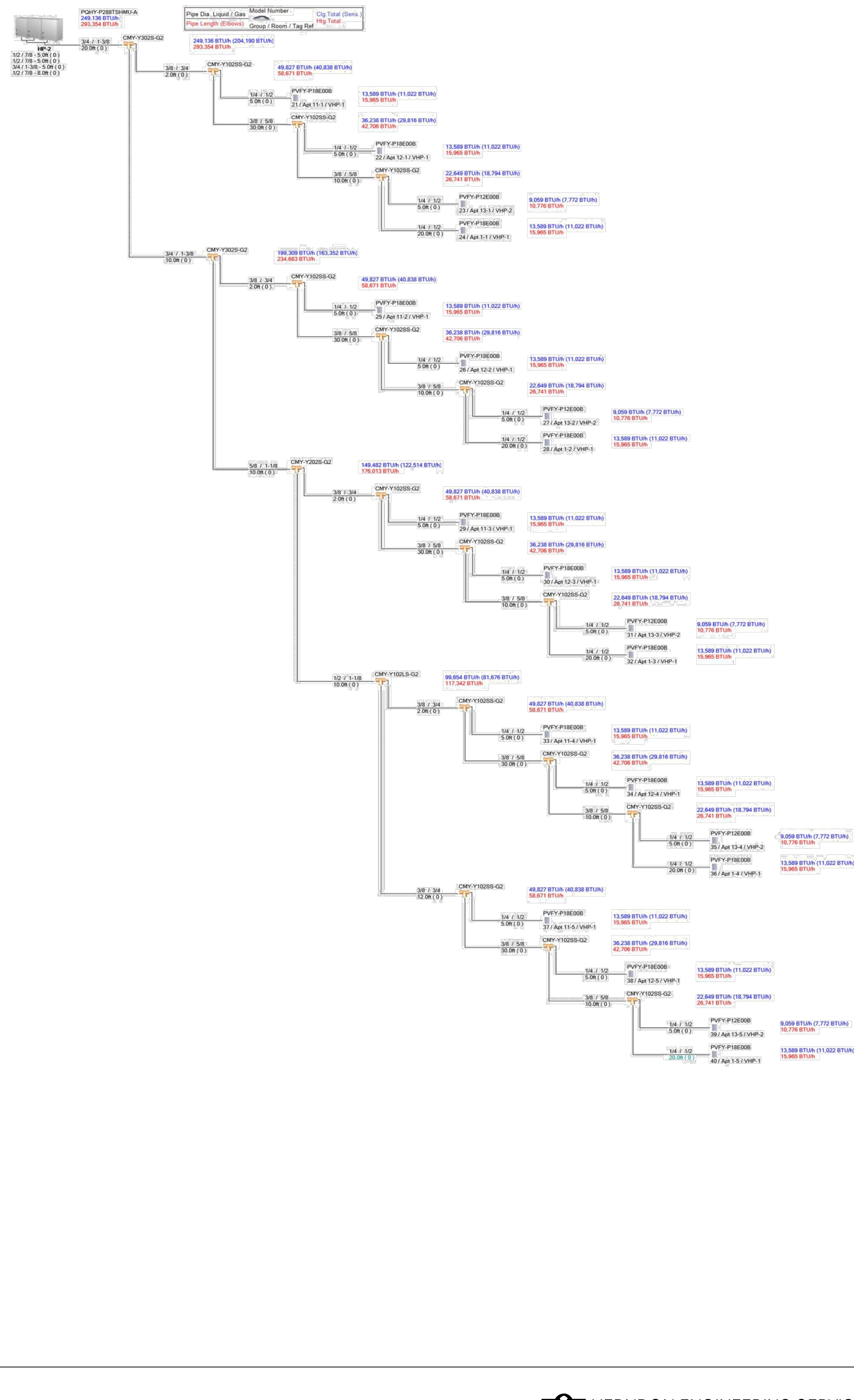
1-3

Piping Diagram Image (Design View)



1-2

Piping Diagram Image (Design View)



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:

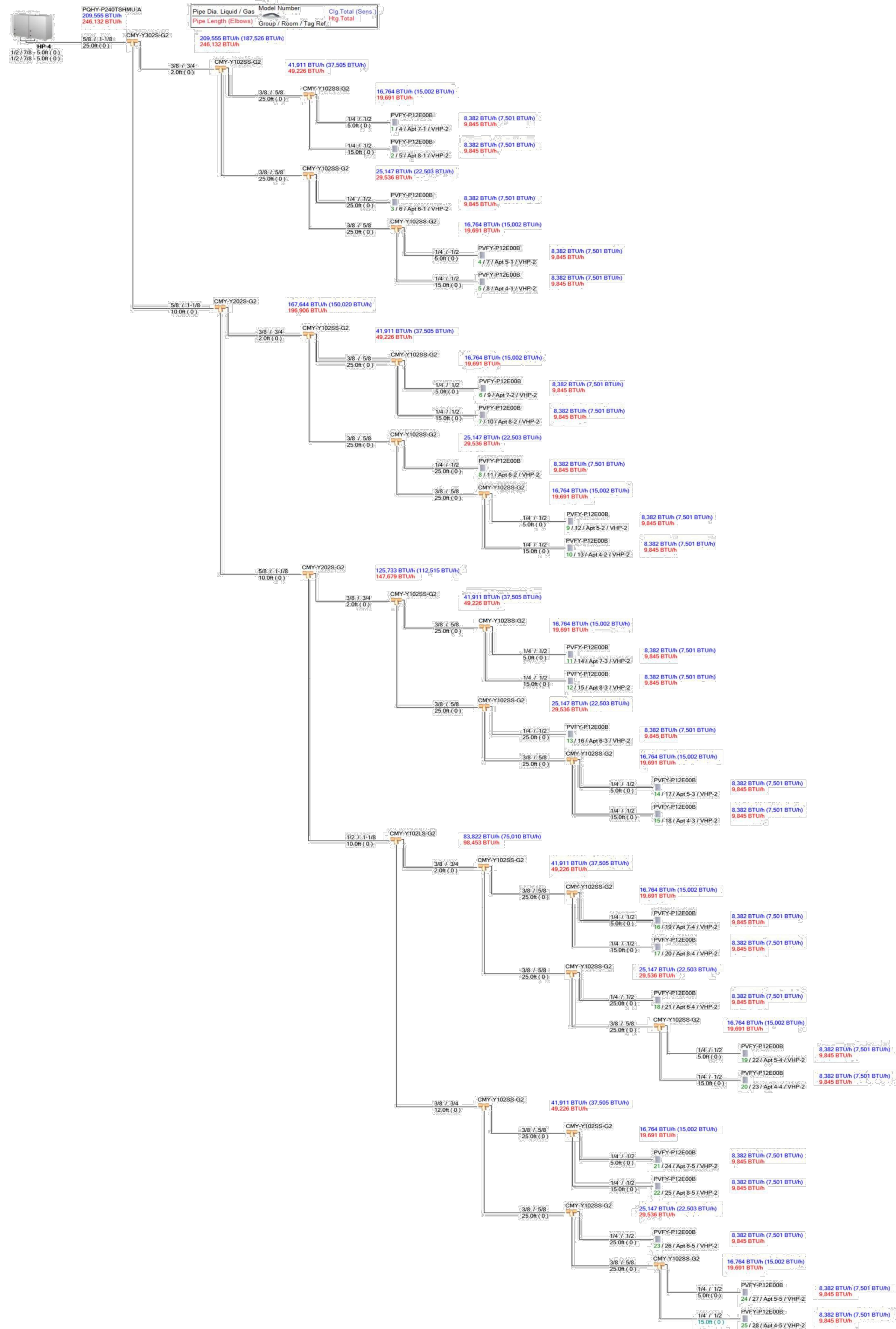


SHRINAY CORPORATION
WWW.SHRINAY.COM
TEL - 847-754-1064

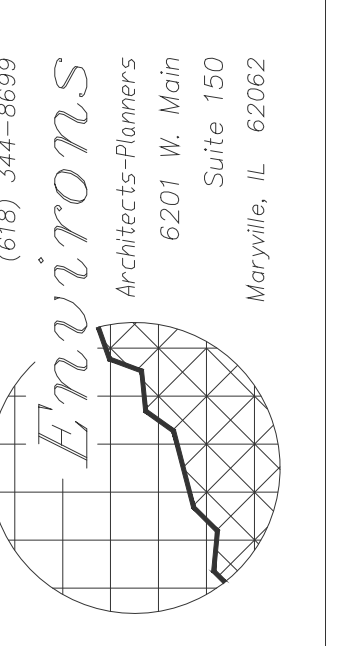
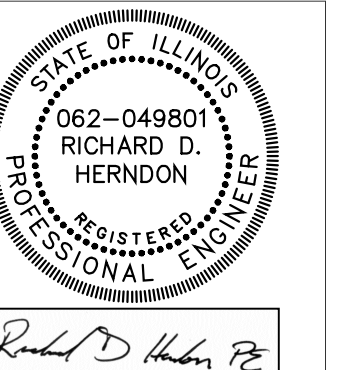
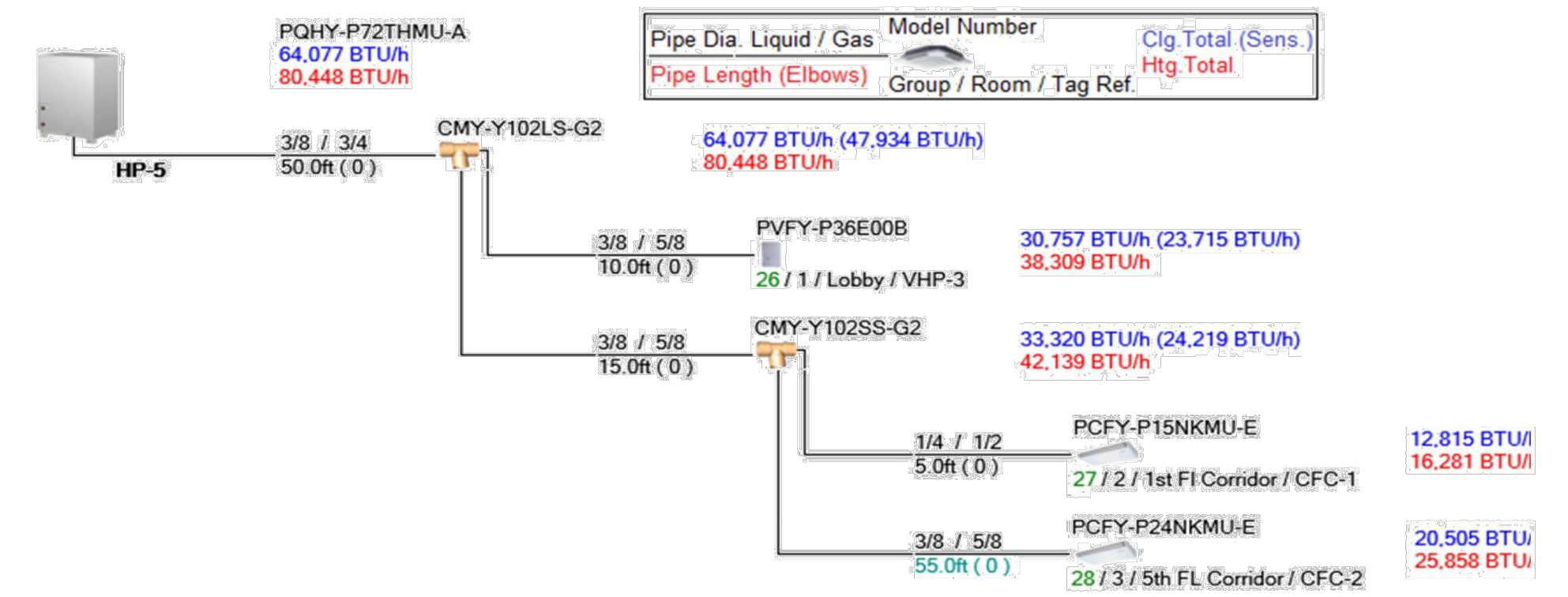
A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.7
OF

Piping Diagram Image (Design View)



Piping Diagram Image (Design View)



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:



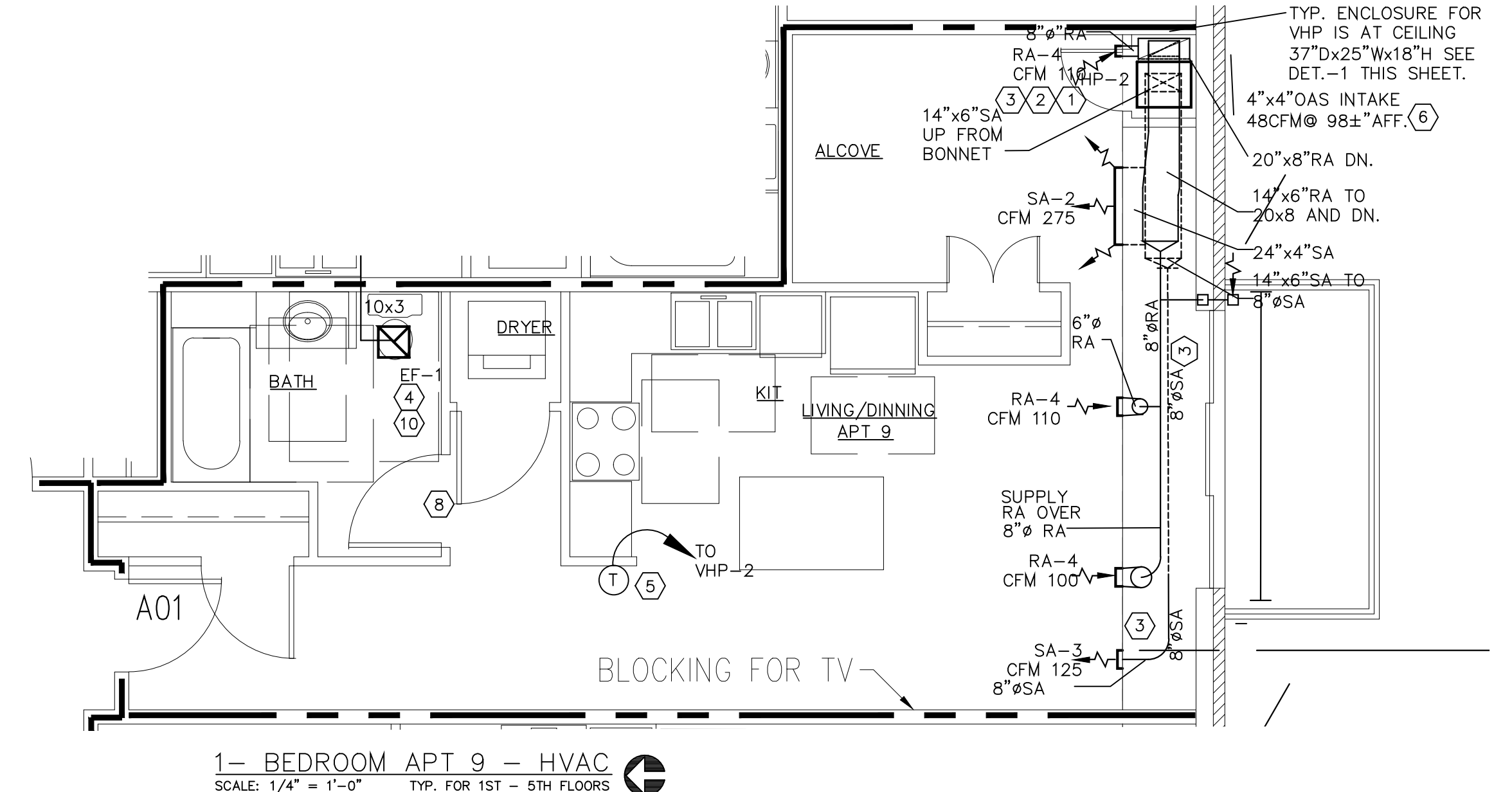
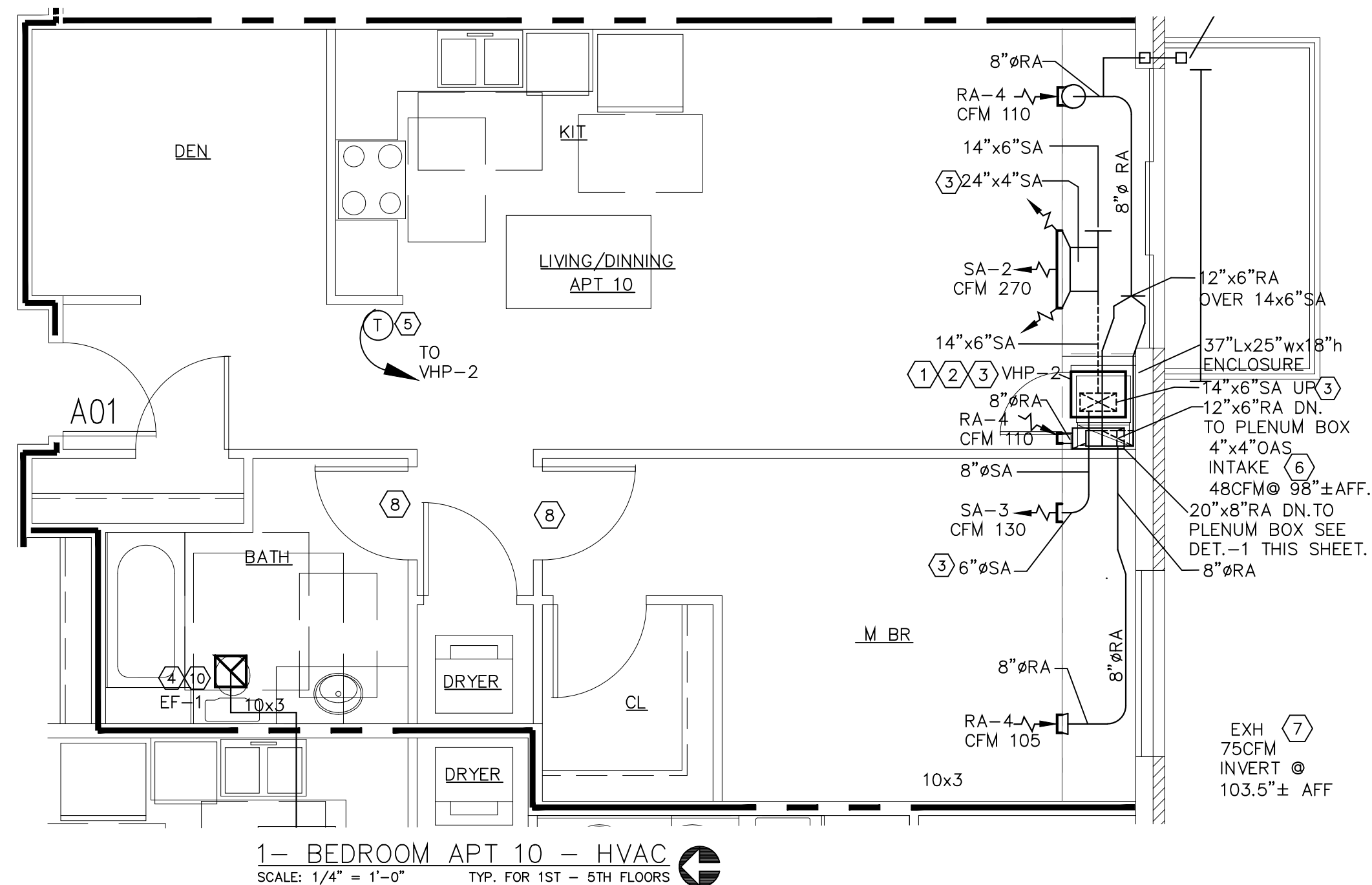
A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.8
OF

F:\IES\Projects\3058 Cardinal Square Apartments - Amy Electric\DWG\MFP3058.dwg, M1.8, 12/16/2013 12:25:39 PM, bduim, DWG To PDF.pc3, ARCH expand D (36.00 x 24.00 inches), 1, 1

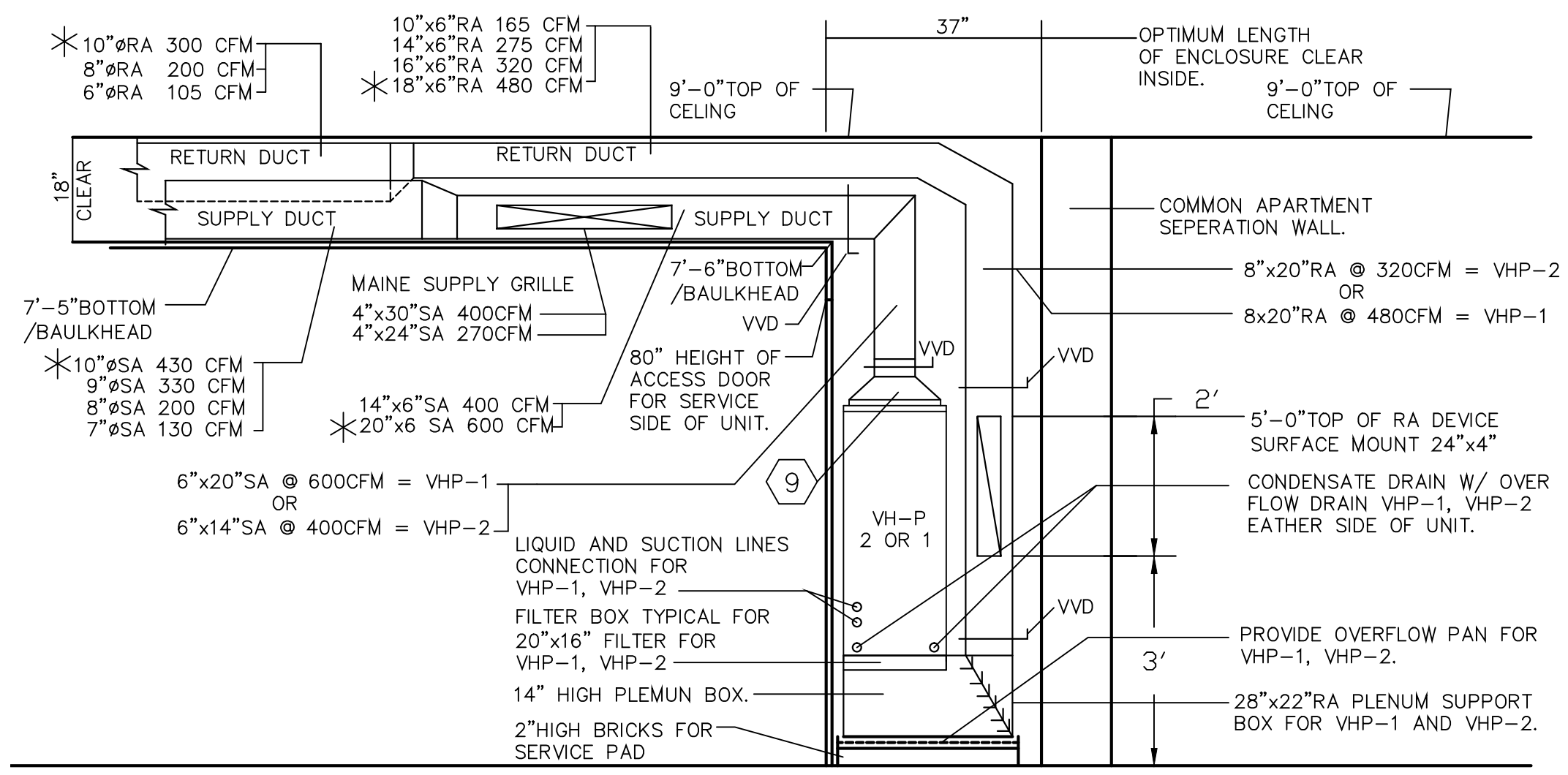
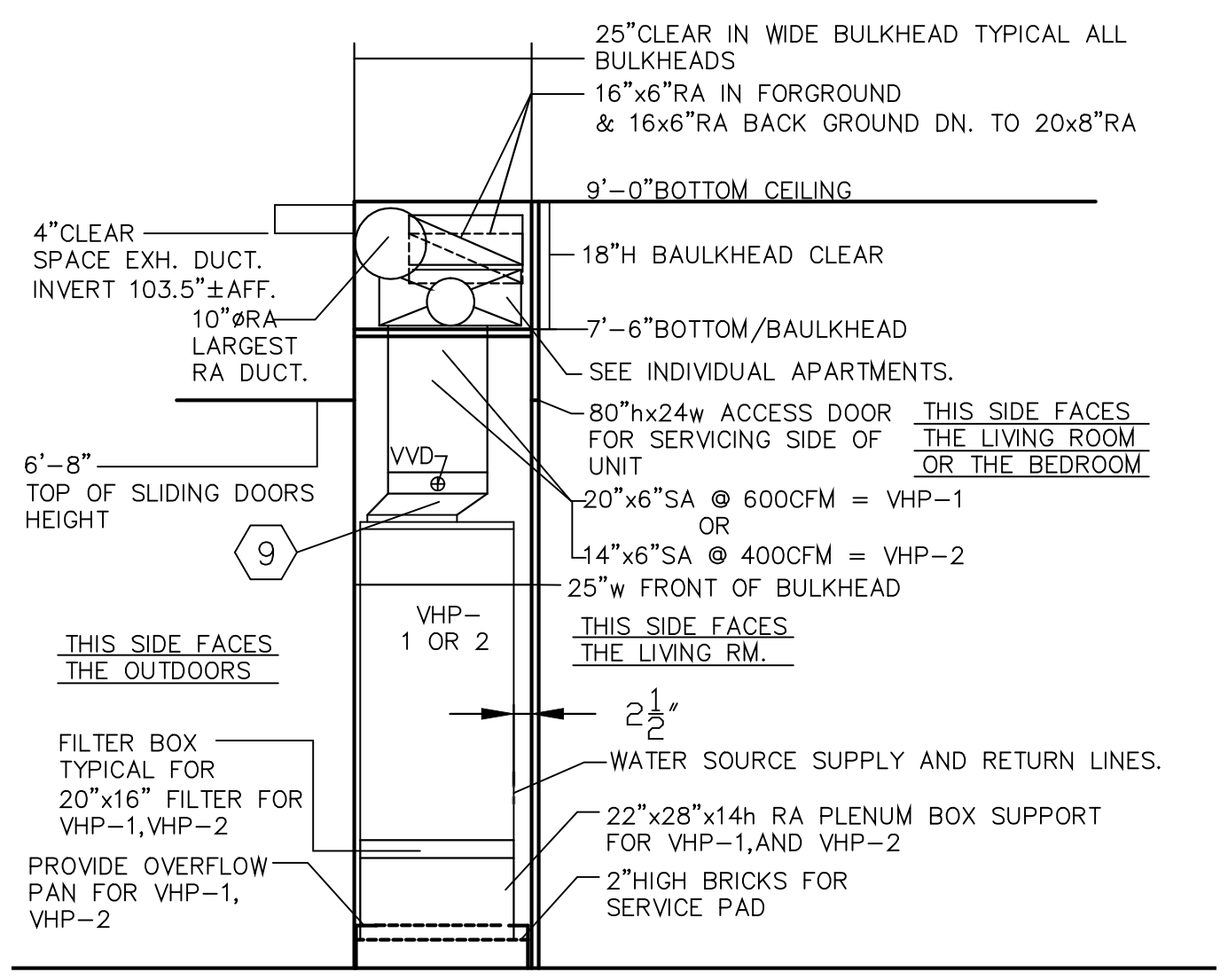
© 2013 ENVIRON ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.

HVAC LEGEND	
	RECTANGULAR DUCTWORK AND SIZE
	ROUND DUCTWORK AND SIZE
	FLEXIBLE DUCTWORK AND SIZE
	BALANCING/CONTROL/VOLUME DAMPER
	TURNING VANES
	HVAC UNIT
	SUPPLY DIFFUSER AND CFM
	SUPPLY REGISTER AND CFM
	RETURN AIR GRILLE & SIZE
	EXHAUST FAN AND CFM
	THERMOSTAT HONEYWELL T7350
	DUCT SMOKE DETECTOR SYSTEM SENSOR DH400-ACDCIHT
	ANNUNCIATOR - SYSTEM SENSOR APA451 WITH PIEZO ALERT
	DRAWING NOTE SYMBOL AND NUMBER
	CONNECT TO EXISTING
	AIR FLOW DIRECTION
	CONDENSATE DRAIN PIPING
	REFRIGERANT PIPING
	COMBUSTION AIR & FLUE PIPING



KEY NOTES: FOR VHP UNITS

1. INSTALL REFRIGERANT LINE SETS IN EQUIPMENT ENCLOSURE VERTICALLY OF 1 THRU 5 FLOOR. FOR (VHP) AIR HANDLER FOR EACH APARTMENT.
2. REFRIGERANT LINES UP IN EQUIPMENT ENCLOSURE.
3. PROVIDE AT LEAST R-6 INSULATION ON DUCTS IN UNCONDITIONED EQUIPMENT ENCLOSURE SPACES.
4. ELECTRICAL CONTRACTOR PROVIDE EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS.
5. PROVIDE AND INSTALL MITSUBISHI THERMOSTATS.
6. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 5" FOR 48CFM.
7. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 4" FOR 32CFM.
8. UNDERCUT DOOR BY 1/8" @ 42CFM PER LINEAL FOOT=129CFM.
9. PROVIDE AND INSTALL TRANSITION DUCT FROM BONNET OF VERTICAL HEAT PUMP(VHP) @ 15.6875"x12.5625" TO SUPPLY AIR DUCT REQUIRED FOR EACH UNIT. VHP-1 IS A 1-1/2 TON UNIT AND VHP-2 IS 1 TON UNIT.
10. EXHAUST DUCTWORK TO RISE UP IN TO STRUCTURAL CEILING THEN RUN IN CEILING TO OUTSIDE OF BUILDING.

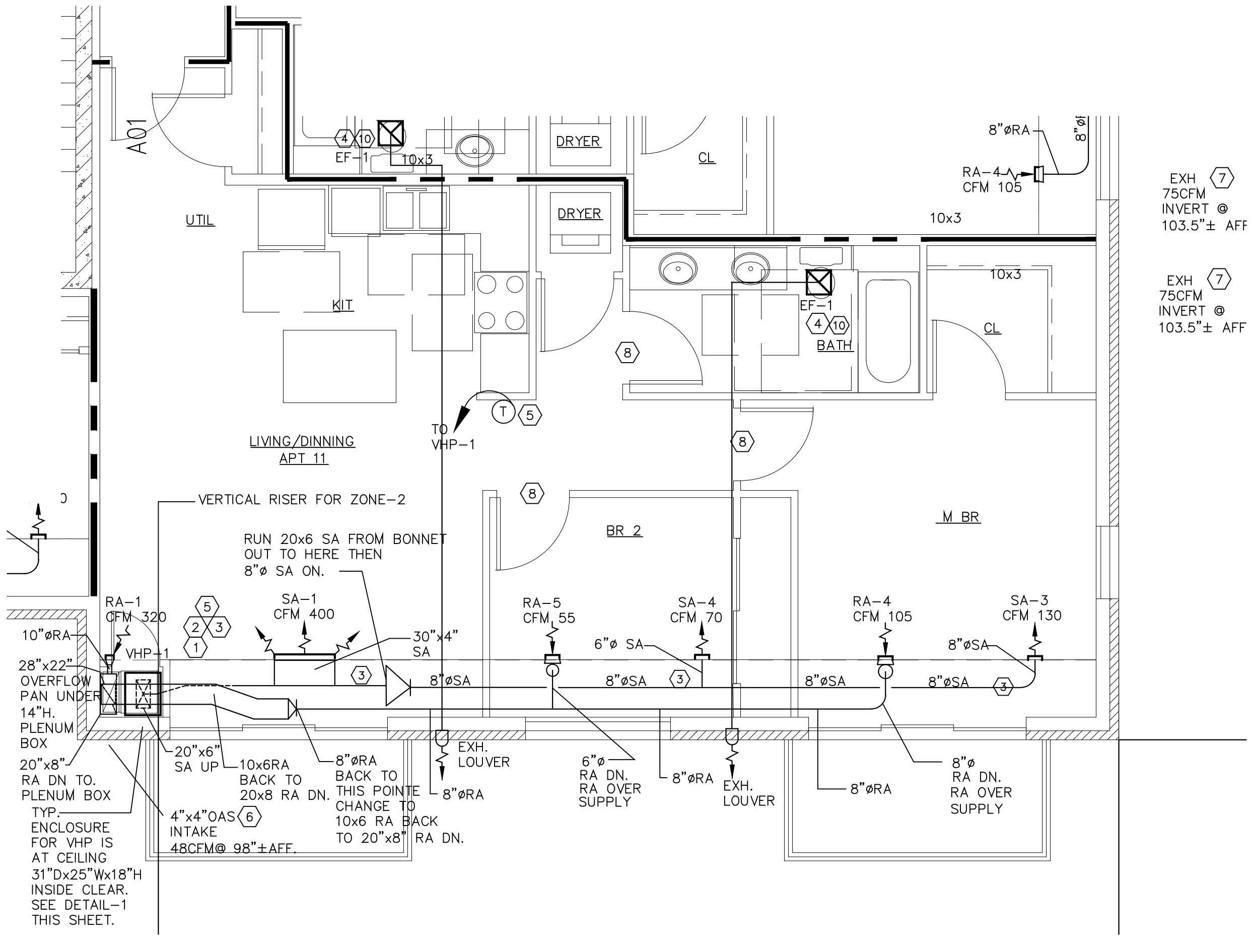
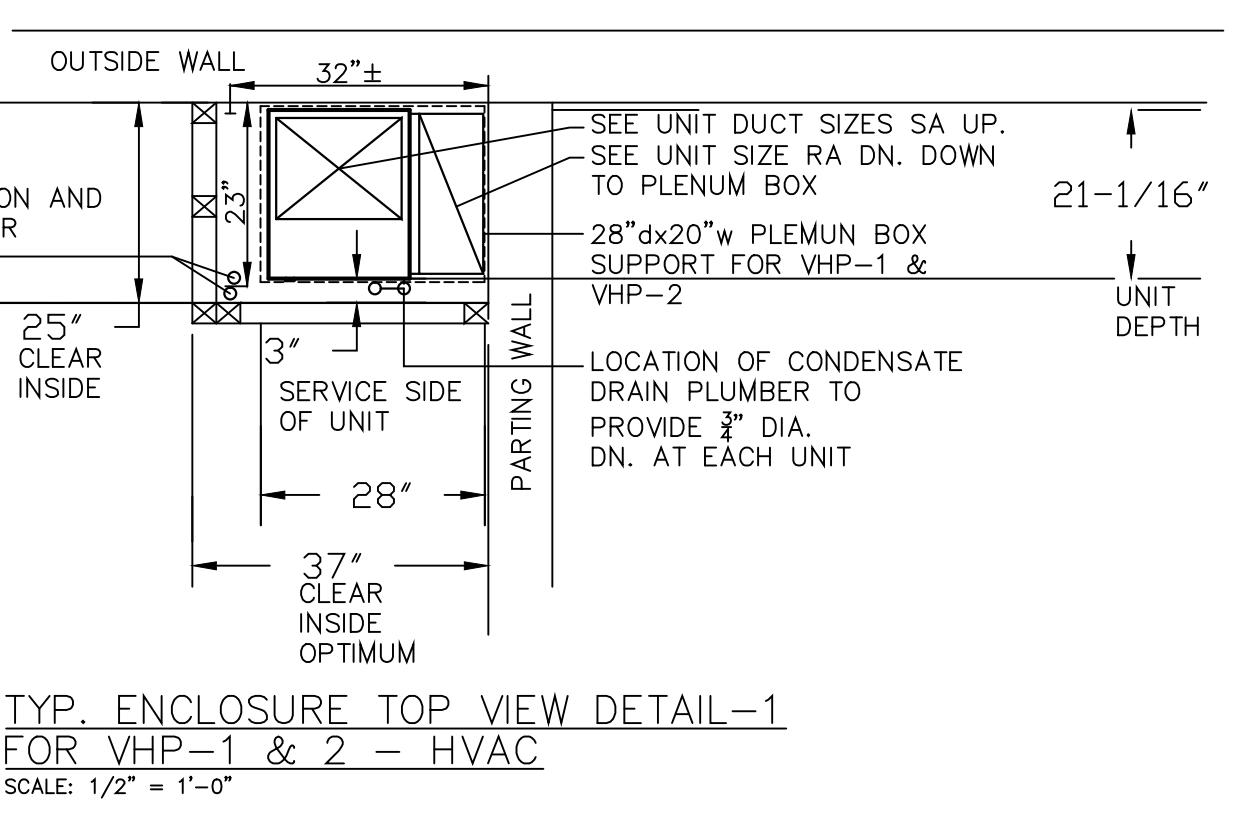


KEY NOTES: FOR APARTMENTS PLANS

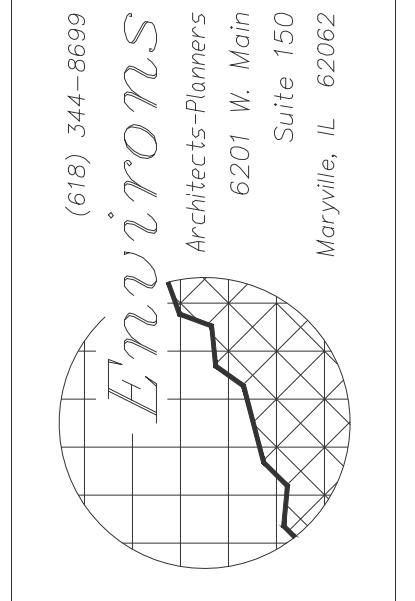
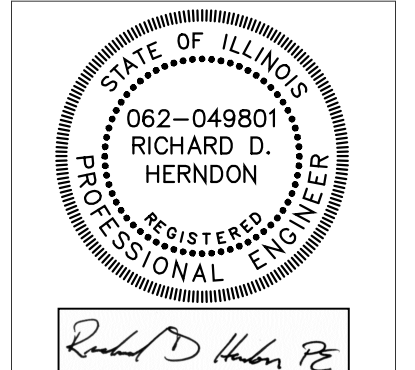
GENERAL NOTES

- THE HVAC CONTRACTOR SHALL VISIT THE PROJECT SITE BEFORE BIDDING AND VERIFY ANY ADDITIONAL MECHANICAL DEMOLITION TO BE DONE AT THIS LOCATION THAT WOULD INTERFERE WITH NEW CONSTRUCTION. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK. VERIFY ALL DIMENSIONS. DRAWINGS ARE ILLUSTRATIVE AND MAY NOT REFLECT EXACT CONDITIONS OR DIMENSIONS.
- HVAC CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY.
- THE CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
- THE LOCATION OF NEW DUCTWORK, AIR DEVICES, ETC. SHOWN ON THESE DRAWINGS SHOULD BE CONSIDERED IN ITS APPROXIMATE LOCATION. HVAC CONTRACTOR SHALL FIELD VERIFY ALL SIZES AND CLEARANCES PRIOR TO FABRICATION.
- DO NOT SCALE THE DRAWINGS. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF EQUIPMENT AND SYSTEMS. THEY ARE NOT INTENDED TO SHOW EVERY OFFSET, FITTING AND COMPONENT. DO NOT USE THE PLANS FOR EXACT LOCATION OF EQUIPMENT, FIXTURES OR ARCHITECTURAL ITEMS SUCH AS WALLS, WINDOWS, SOFFITS, AND PILASTERS. SPECIFIC LOCATIONS, MOUNTING HEIGHTS AND OVERALL DIMENSIONS OF DEVICES AND FIXTURES ARE TO BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS AND DETAILS WHEN AVAILABLE.
- THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
- MAIN SUPPLY AIR DUCT SHALL BE LINED TO MINIMIZE NOISE.
- ALL MAIN DUCT SUPPLY AND RETURN SIZE ARE WITHOUT INTERIOR INSULATION. ACTUAL OUTSIDE DIMENSION SHOULD BE 2" LARGER.

F:\HES\Projects\3058 Cardinal Square Apartments - Any Electric\DWG\MFP\3058.dwg, M1.9, 12/16/2013 12:24:04 PM, bddm, DWG To PDF.pc3, ARCH expand D (36,000 x 24,000 Inches), 11



EVERY WERE THE REFRIGERATE PIPING PASS THRU A FIRE RATED ASSEMBLIES THE OPENINGS MUST BE SEALED WITH THE APPROPBATE FIRE RATED.



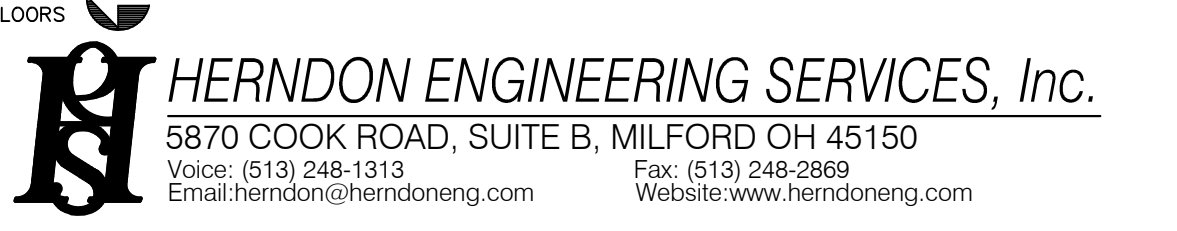
JOB NO. 13027

DATE: NOVEMBER 15, 2013
REVISED:

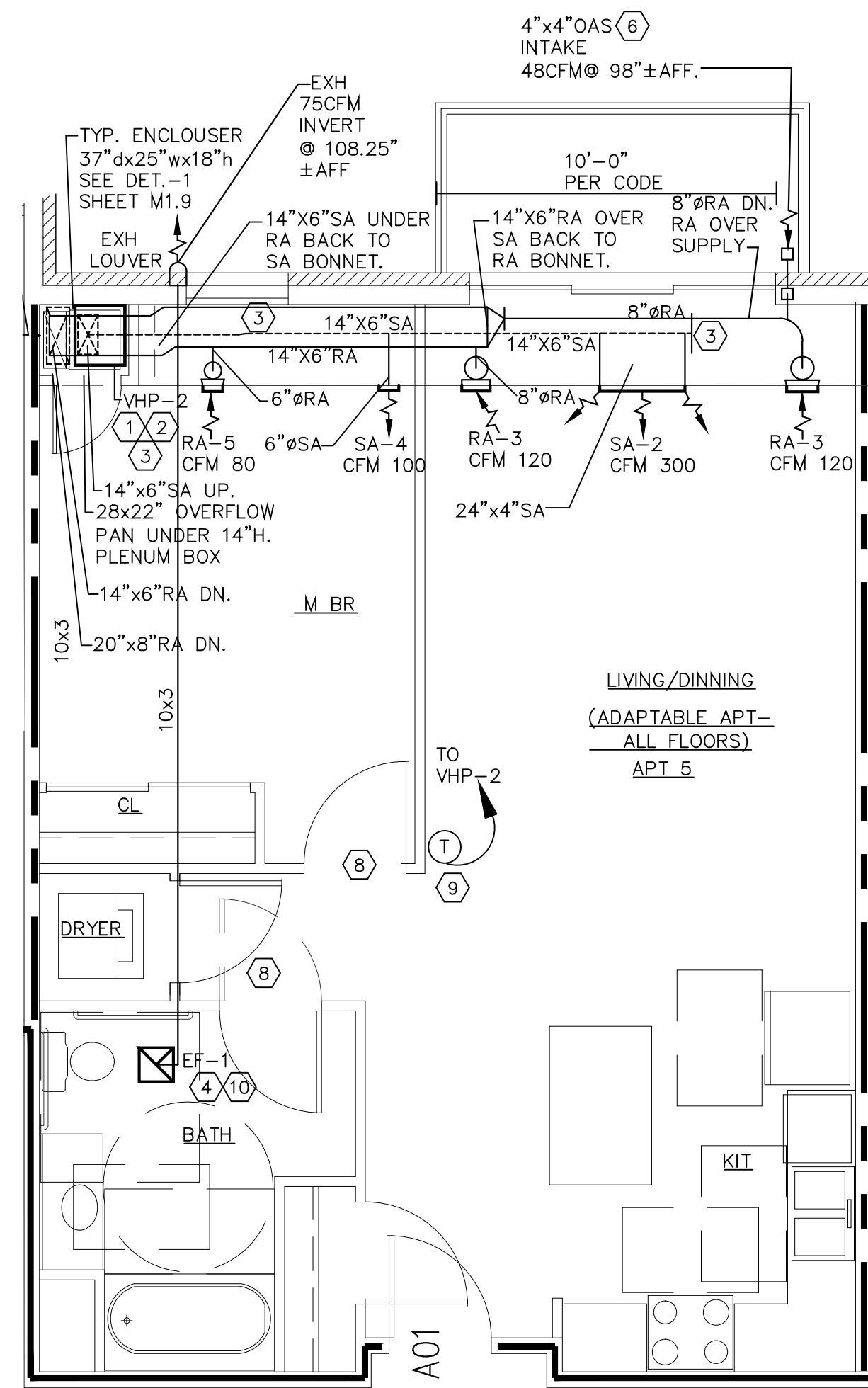


A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
MUNDELEIN, ILLINOIS
McKINLEY + ANTHONY AVE.

SHEET
M1.9
OF



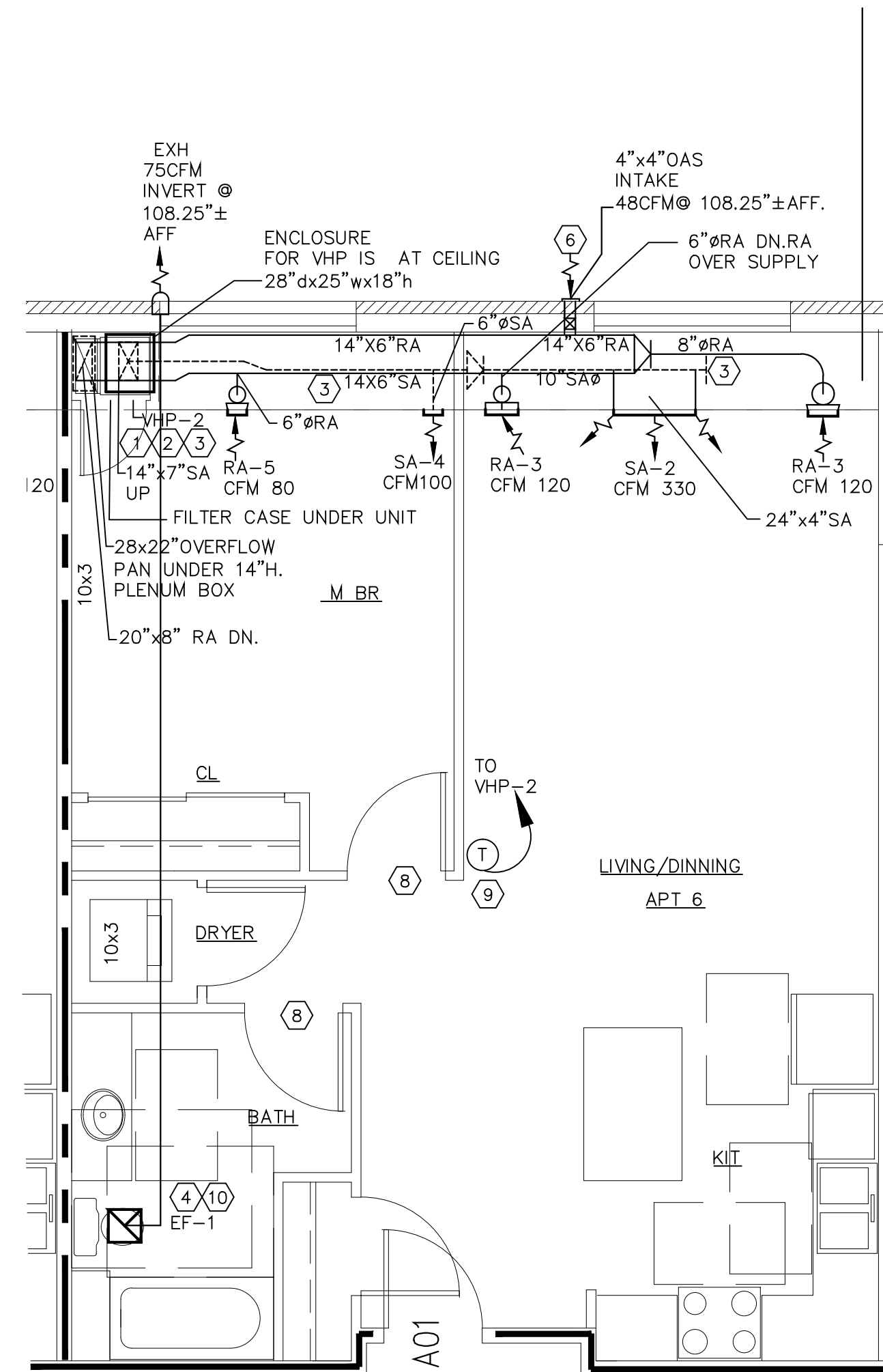
© 2013 ENVIRON ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.



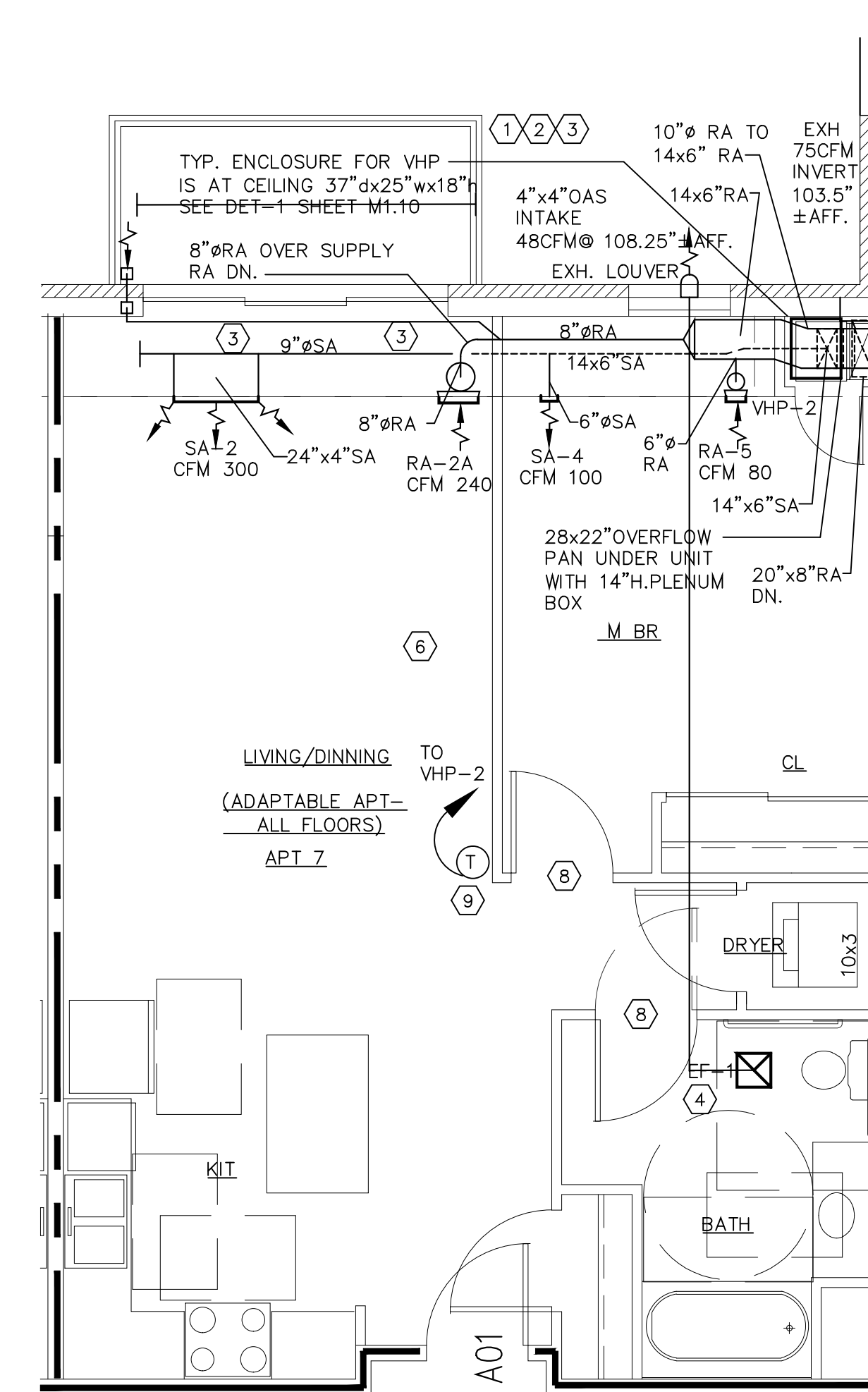
1- BEDROOM APT 5 - HVAC
SCALE: 1/4" = 1'-0" TYP. FOR 1ST - 5TH FLOORS

KEY NOTES: FOR VHP UNITS

1. INSTALL REFRIGERANT LINE SETS IN EQUIPMENT ENCLOSURE VERTICALLY OF 1 THRU 5 FLOOR. FOR (VHP) AIR HANDLER FOR EACH APARTMENT.
2. REFRIGERANT LINES UP IN EQUIPMENT ENCLOSURE.
3. PROVIDE AT LEAST R-6 INSULATION ON DUCTS IN UNCONDITIONED EQUIPMENT ENCLOSURE SPACES.
4. ELECTRICAL CONTRACTOR PROVIDE EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS. BY ELECTRICAL CONTRACTOR.
5. ENCLOSURE IS 34" LONG AT THIS APARTMENT ONLY.
6. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 5" FOR 48CFM.
7. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 4" FOR 32CFM.
8. UNDERCUT DOOR @ 1/8" @ 42CFM PER LINEAL FOOT = 123CFM.
9. HVAC CONTRACTOR TO PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT. PER MANUFACTURER REQUIREMENTS (MITSUBISHI).
10. EXHAUST DUCTWORK TO RISE INTO STRUCTURAL CEILING AND THEN GO TO OUT SIDE OF BUILDING.



1- BEDROOM APT 6 - HVAC
SCALE: 1/4" = 1'-0" TYP. FOR 1ST - 5TH FLOORS



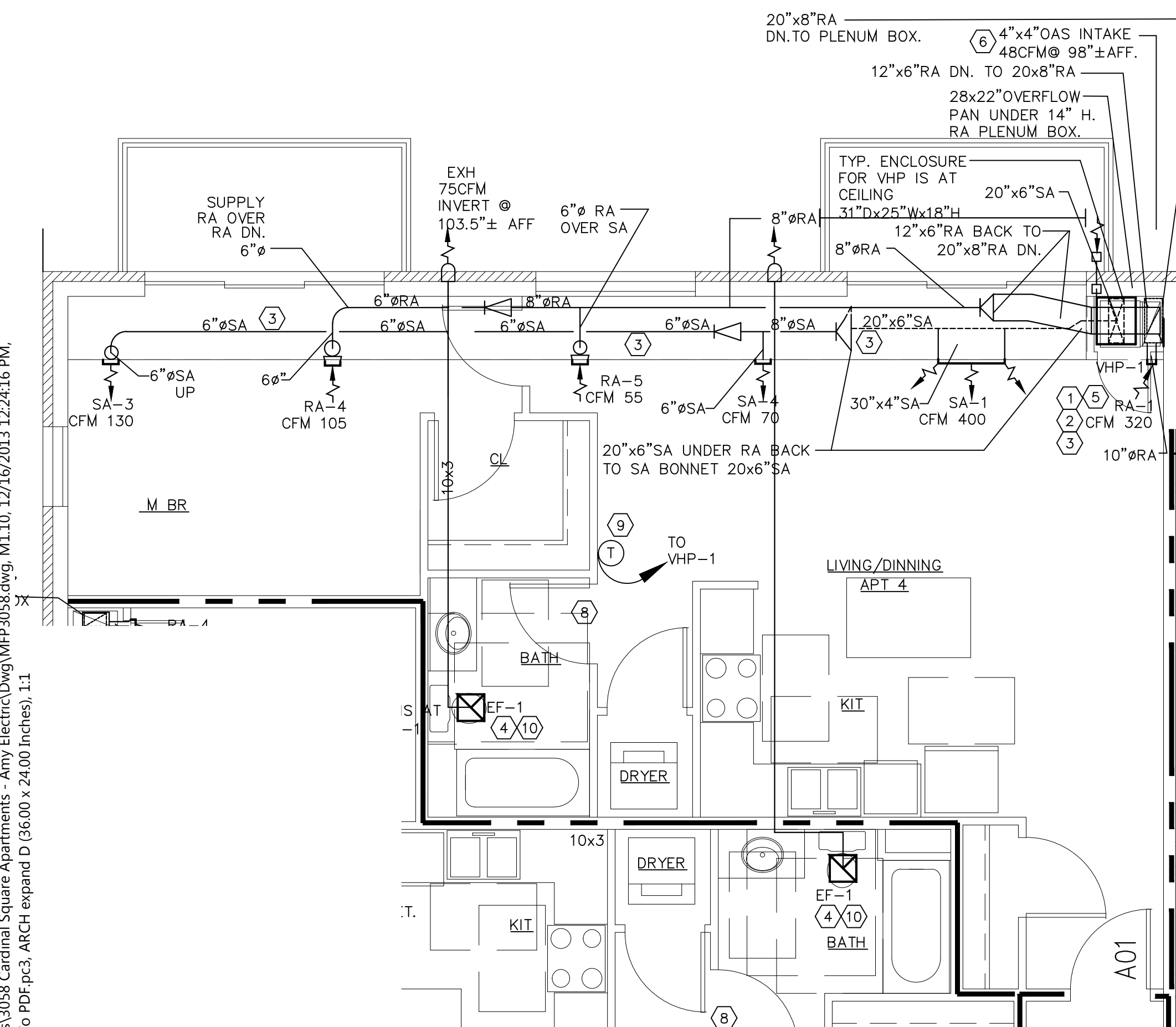
1- BEDROOM APT 7 - HVAC
SCALE: 1/4" = 1'-0" TYP. FOR 1ST - 5TH FLOORS

EVERY WERE THE REFRIGERATE PIPING PASS THRU A FIRE RATED ASSEMBLIES THE OPENINGS MUST BE SEALED WITH THE APPROPRIATE FIRE RATED CAULK.

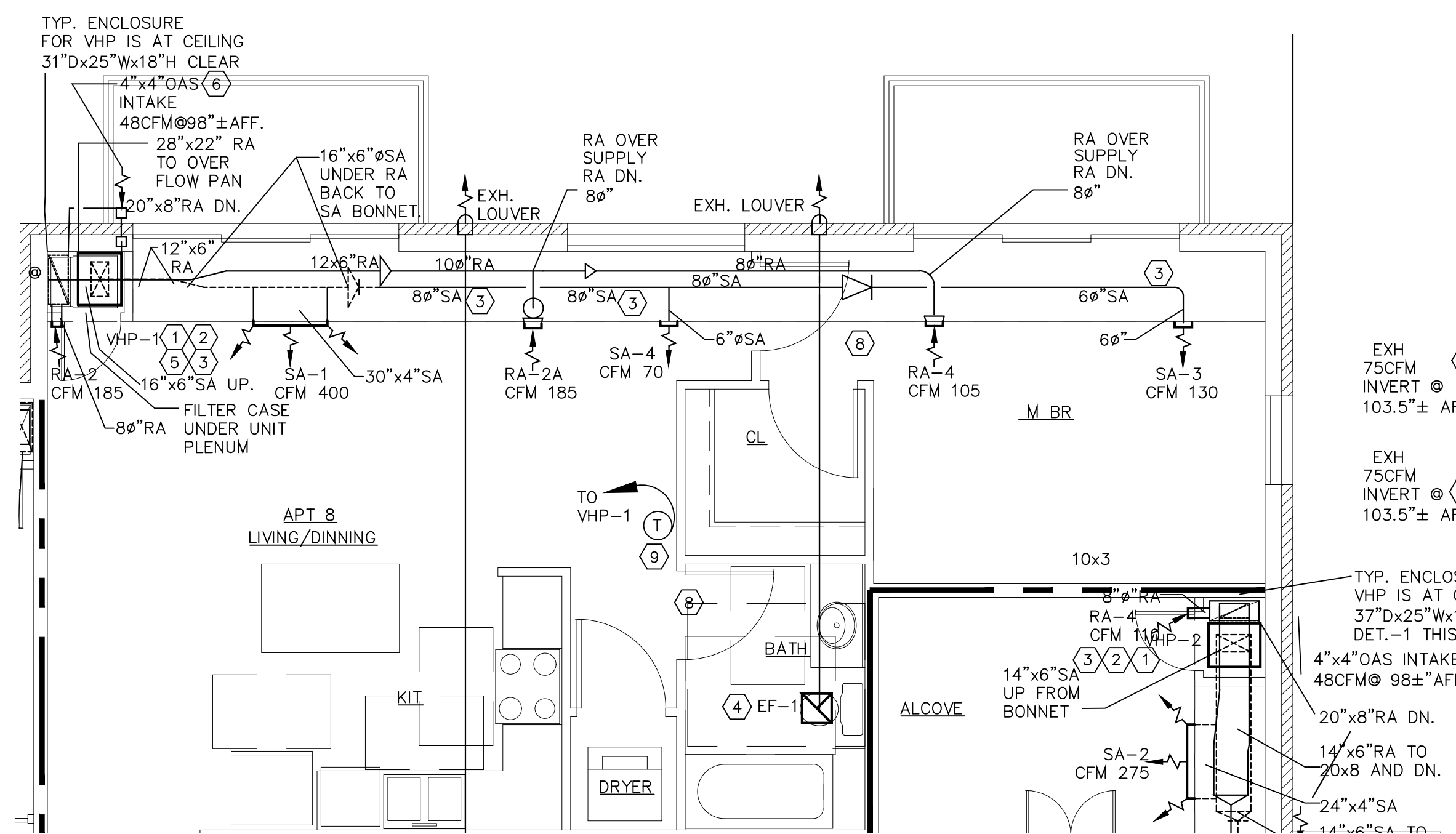
GENERAL NOTES

- A. THE HVAC CONTRACTOR SHALL VISIT THE PROJECT SITE BEFORE BIDDING AND VERIFY ANY ADDITIONAL MECHANICAL DEMOLITION TO BE DONE AT THIS LOCATION THAT WOULD INTERFERE WITH NEW CONSTRUCTION. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK. VERIFY ALL DIMENSIONS. DRAWINGS ARE ILLUSTRATIVE AND MAY NOT REFLECT EXACT CONDITIONS OR DIMENSIONS.
- B. HVAC CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY.
- C. THE CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
- D. THE LOCATION OF NEW DUCTWORK, AIR DEVICES, ETC. SHOWN ON THESE DRAWINGS SHOULD BE CONSIDERED IN ITS APPROXIMATE LOCATION. HVAC CONTRACTOR SHALL FIELD VERIFY ALL SIZES AND CLEARANCES PRIOR TO FABRICATION.
- E. DO NOT SCALE THE DRAWINGS. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF EQUIPMENT AND SYSTEMS. THEY ARE NOT INTENDED TO SHOW EVERY OFFSET, FITTING AND COMPONENT. DO NOT USE THE PLANS FOR EXACT LOCATION OF EQUIPMENT, FIXTURES OR ARCHITECTURAL ITEMS SUCH AS WALLS, WINDOWS, SOFFITS, AND PILASTERS. SPECIFIC LOCATIONS, MOUNTING HEIGHTS AND OVERALL DIMENSIONS OF DEVICES AND FIXTURES ARE TO BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS AND DETAILS WHEN AVAILABLE.
- F. THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEERS APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
- G. MAIN SUPPLY AIR DUCT SHALL BE LINED TO MINIMIZE NOISE.
- H. ALL MAIN DUCT SUPPLY AND RETURN SIZE ARE WITHOUT INTERIOR INSULATION. ACTUAL OUTSIDE DIMENSION SHOULD BE 2" LARGER.

F:\IES\Projects\3058 Cardinal Square Apartments - Any Electric.Dwg\MFP3058.dwg, M1.10, 12/16/2013 12:24:16 PM, bddm, DWG To PDF.pc3, ARCH expand D (3600 x 2400 Inches), 11

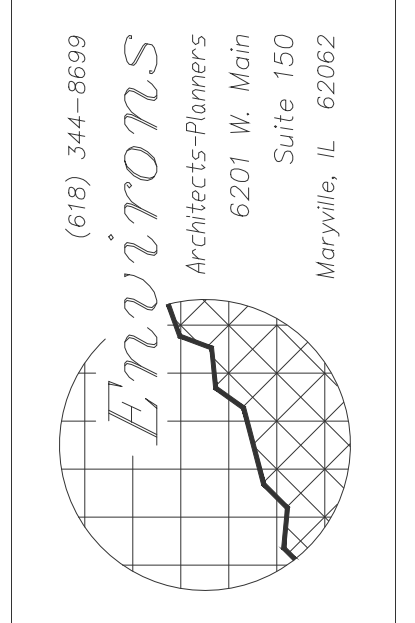
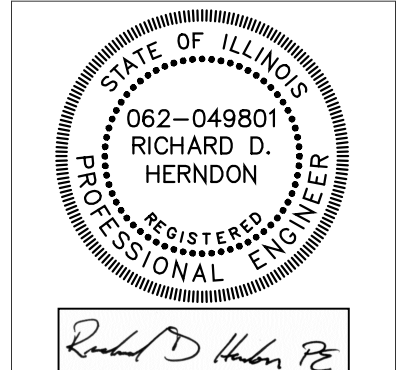


2- BEDROOM APT 4 - HVAC
SCALE: 1/4" = 1'-0" TYP. FOR 1ST - 5TH FLOORS



2- BEDROOM APT 8 - HVAC
SCALE: 1/4" = 1'-0" TYP. FOR 1ST - 5TH FLOORS

HERNDON ENGINEERING SERVICES, Inc.
5870 COOK ROAD, SUITE B, MILFORD OH 45150
Voice: (513) 248-1313 Fax: (513) 248-2869
Email: herndon@herndoneng.com Website: www.herndoneng.com



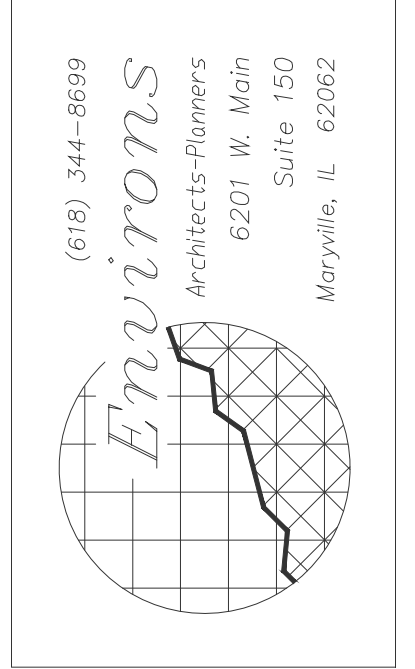
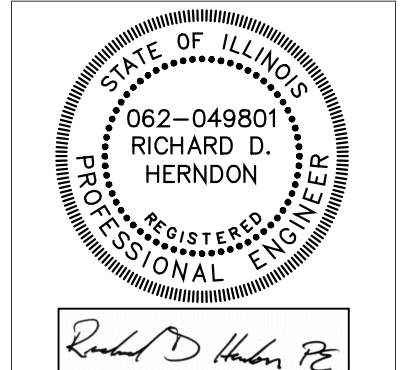
JOB NO. 13027
DATE: NOVEMBER 15, 2013
REVISED:



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE. MUNDELEIN, ILLINOIS

SHEET
M1.10
OF

© 2013 ENVIRON ARCHITECTS-PLANNERS ALL RIGHTS RESERVED.



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
MUNDELEIN, ILLINOIS
McKINLEY + ANTHONY AVE.

SHEET
M1.11
OF

GENERAL NOTES

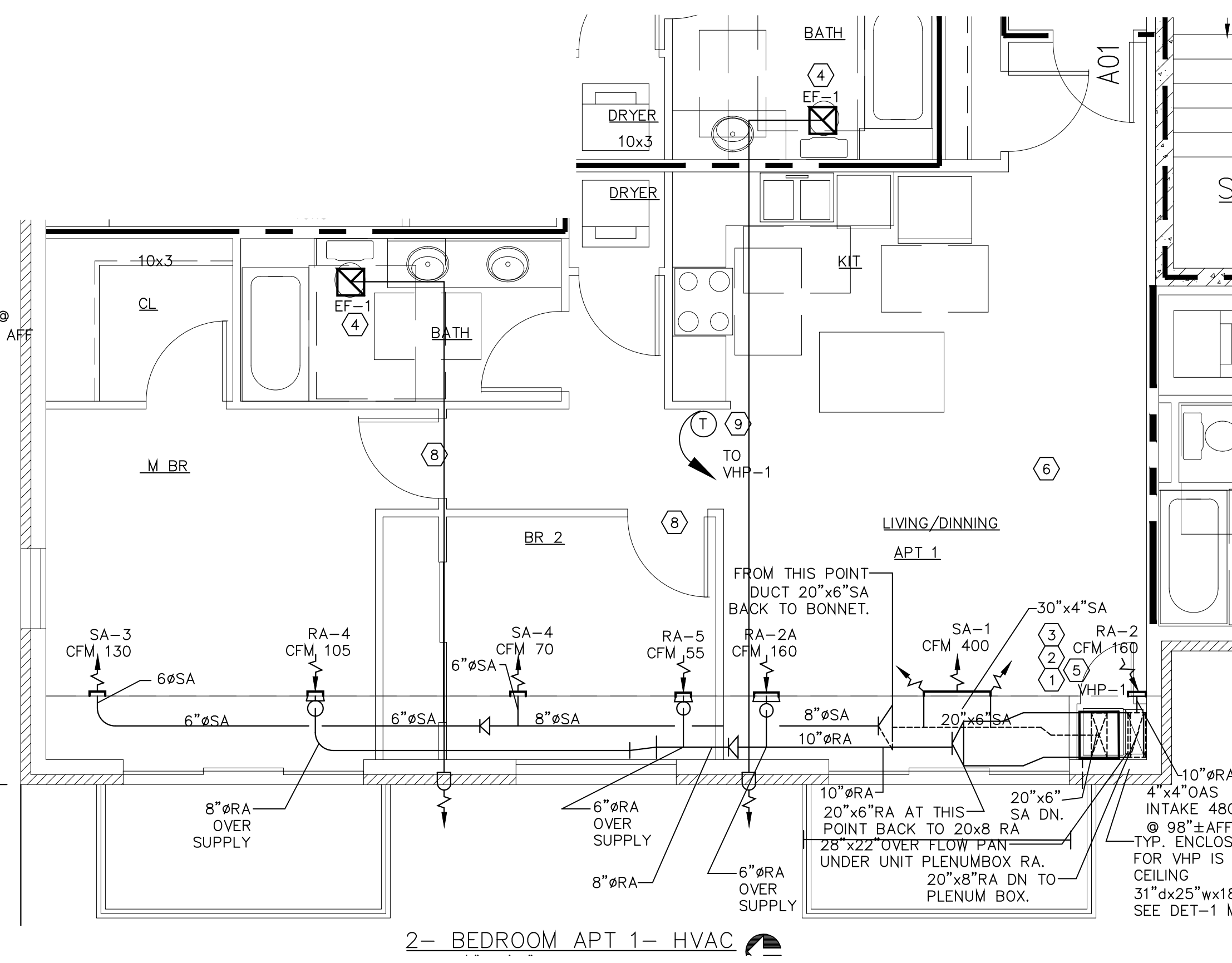
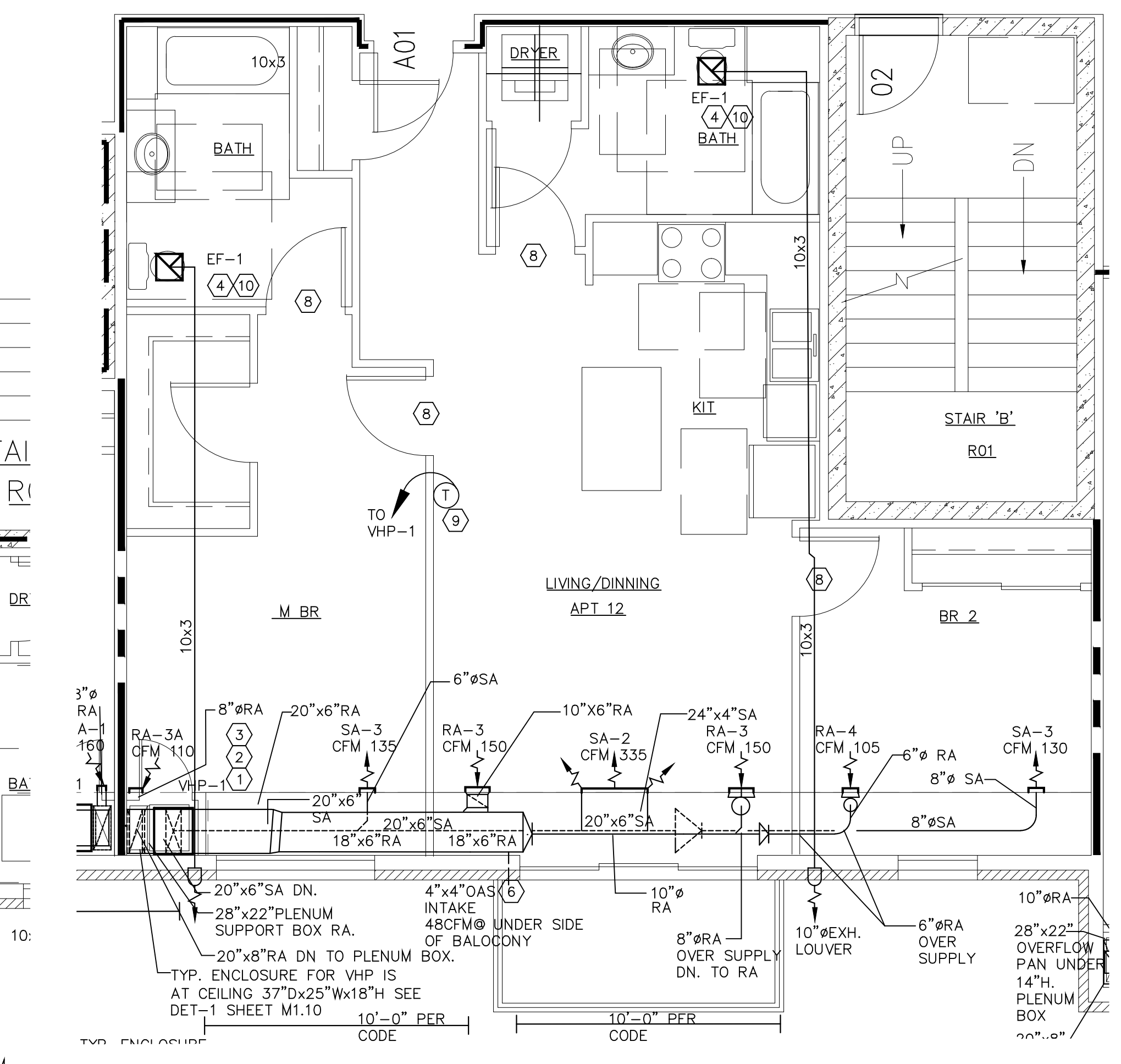
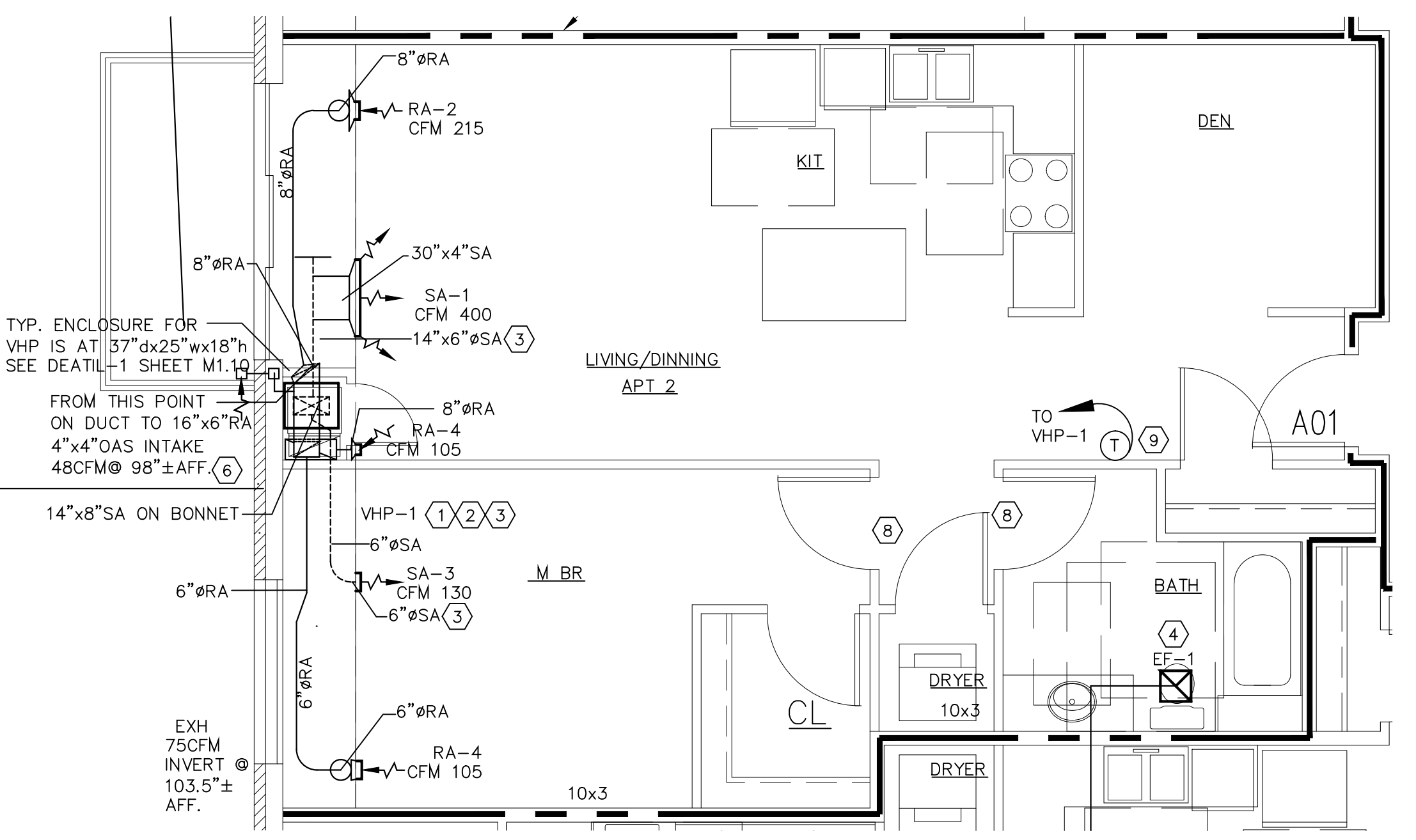
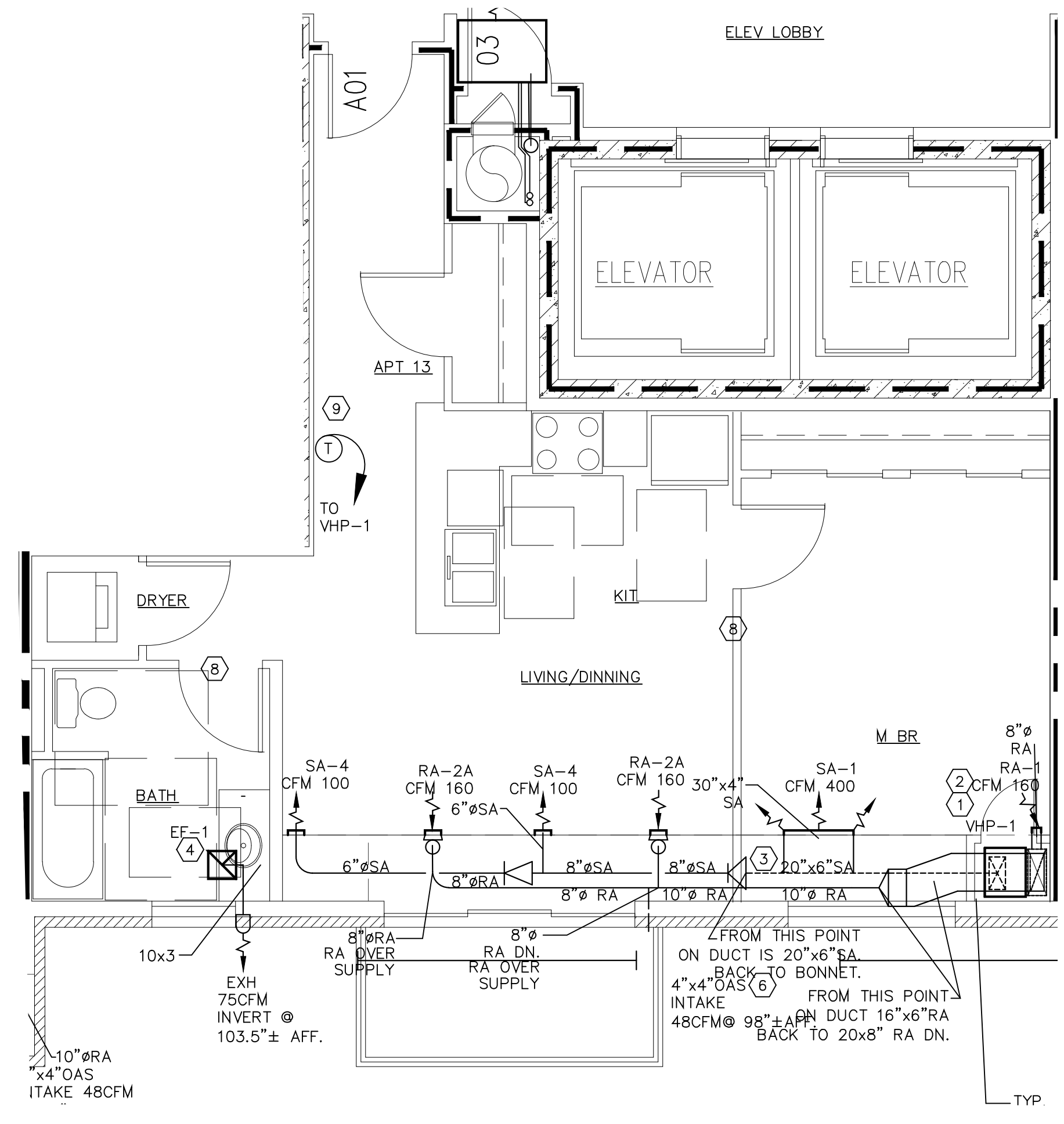
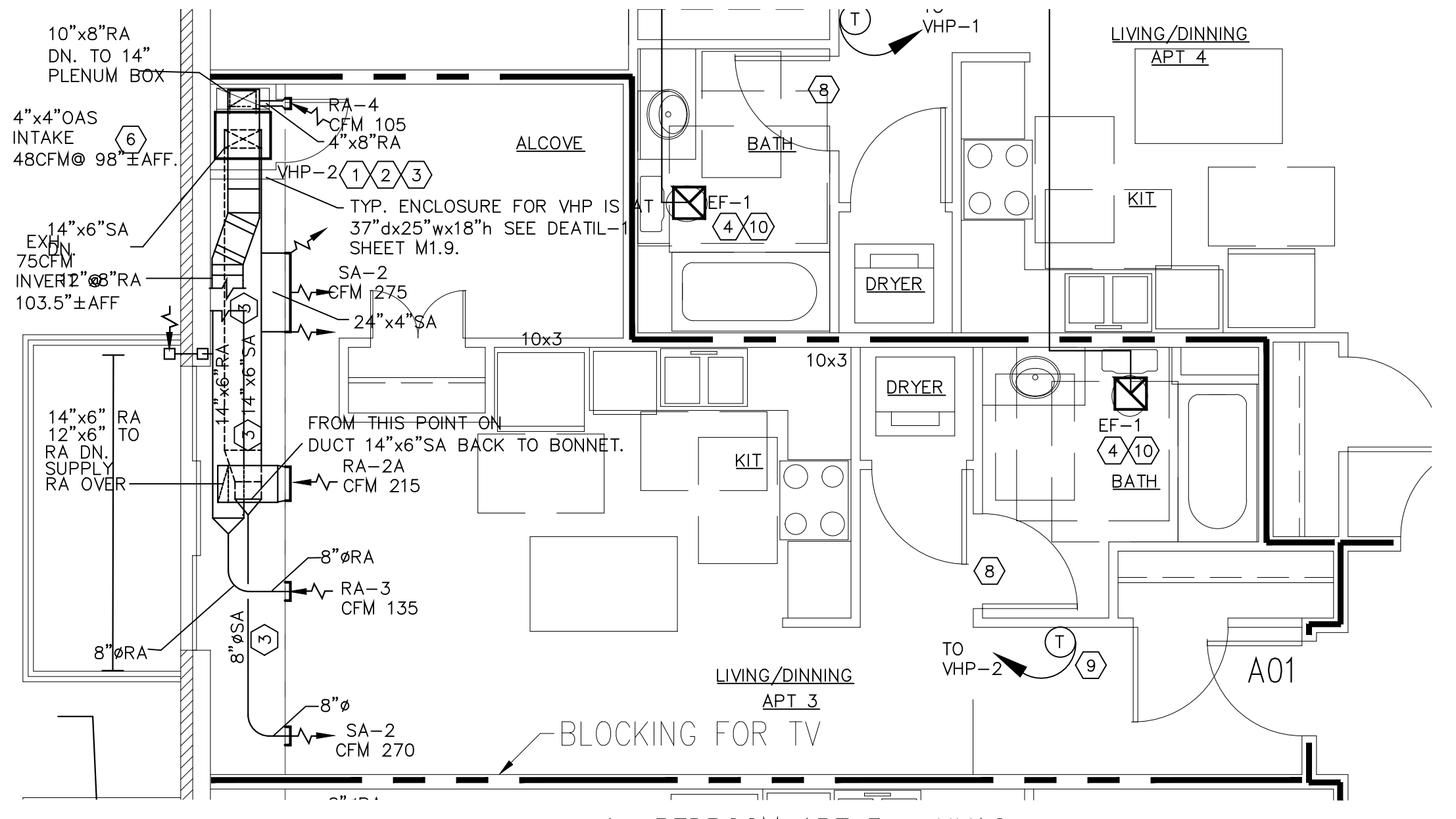
- A. THE HVAC CONTRACTOR SHALL VISIT THE PROJECT SITE BEFORE BIDDING AND VERIFY ANY ADDITIONAL MECHANICAL DEMOLITION TO BE DONE AT THIS LOCATION THAT WOULD INTERFERE WITH NEW CONSTRUCTION. FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF WORK. VERIFY ALL DIMENSIONS. DRAWINGS ARE ILLUSTRATIVE AND MAY NOT REFLECT EXACT CONDITIONS OR DIMENSIONS.
- B. HVAC CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPES, DUCTWORK, UNITS, ETC. WITH ALL OTHER TRADES AND SHIFT LOCATION OR OFFSET WHERE NECESSARY.
- C. THE CONTRACTOR SHALL COORDINATE ALL AIR DEVICES WITH ELECTRICAL AND ARCHITECTURAL REFLECTED CEILING PLANS.
- D. THE LOCATION OF NEW DUCTWORK, AIR DEVICES, ETC. SHOWN ON THESE DRAWINGS SHOULD BE CONSIDERED IN ITS APPROXIMATE LOCATION. HVAC CONTRACTOR SHALL FIELD VERIFY ALL SIZES AND CLEARANCES PRIOR TO FABRICATION.
- E. DO NOT SCALE THE DRAWINGS. DRAWINGS ARE DIAGRAMMATIC AND SHOW THE GENERAL ARRANGEMENT OF EQUIPMENT AND SYSTEMS. THEY ARE NOT INTENDED TO SHOW EVERY OFFSET, FITTING AND COMPONENT. DO NOT USE THE PLANS FOR EXACT LOCATION OF EQUIPMENT, FIXTURES OR ARCHITECTURAL ITEMS SUCH AS WALLS, WINDOWS, SOFFITS, AND PILASTERS. SPECIFIC LOCATIONS, MOUNTING HEIGHTS AND OVERALL DIMENSIONS OF DEVICES AND FIXTURES ARE TO BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS AND DETAILS WHEN AVAILABLE.
- F. THE DRAWINGS ARE DIAGRAMMATIC IN NATURE. EXACT LOCATIONS OF DEVICES AND ROUTING OF DUCTWORK SHALL BE DETERMINED BY CONTRACTOR AFTER COORDINATION WITH ALL OTHER TRADES AND FIELD DETERMINATION OF FINAL CONSTRUCTION DETAILS. MINOR ADJUSTMENTS TO DUCT ROUTING AND CONFIGURATION TO AVOID CONFLICT WITH BUILDING STRUCTURE OR OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S PRICE. CONTRACTOR SHALL OBTAIN ENGINEER'S APPROVAL IN WRITING FOR ANY MODIFICATIONS TO SYSTEM DESIGN PRIOR TO INSTALLATION.
- G. MAIN SUPPLY AIR DUCT SHALL BE LINED TO MINIMIZE NOISE.
- H. ALL MAIN DUCT SUPPLY AND RETURN SIZE ARE WITHOUT INTERIOR INSULATION. ACTUAL OUTSIDE DIMENSION SHOULD BE 2" LARGER.

EVERY WHERE THE REFRIGERATE PIPING PASS THRU A FIRE RATED ASSEMBLIES THE OPENINGS MUST BE SEALED WITH THE APPROPRIATE FIRE RATED CAULK.

KEY NOTES: FOR VHP UNITS

1. INSTALL REFRIGERANT LINE SETS IN EQUIPMENT ENCLOSURE VERTICALLY OF 1 THRU 5 FLOOR. FOR (VHP) AIR HANDLER FOR EACH APARTMENT.
2. REFRIGERANT LINES UP IN EQUIPMENT ENCLOSURE.
3. PROVIDE AT LEAST R-6 INSULATION ON DUCTS IN UNCONDITIONED EQUIPMENT ENCLOSURE SPACES.
4. ELECTRICAL CONTRACTOR TO PROVIDE EXHAUST FAN (EF-1) TYPICAL FOR BATH ROOMS.
5. ENCLOSURE IS 34" LONG AT THIS APARTMENT ONLY.
6. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 5" FOR 48CFM.
7. PROVIDE 4"x4" OSA DUCT TO RETURN AIR DUCT AND SEIHO VENT LOUVER SIZE 4" FOR 32CFM.
8. UNDER CUT DOOR @ 1/8" @ 42CFM PER LINTEL FOOT = 129CFM
9. HVAC CONTRACTOR PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT.
10. PER MANUFACTURER REQUIREMENTS (MITSUBISHI).
11. EXH. DUCTWORK TO RISE UP INTO STRUCTURAL CEILING THEN RUN TO OUTSIDE BUILDING.

HERNDON ENGINEERING SERVICES, Inc.
5870 COOK ROAD, SUITE B, MILFORD OH 45150
Voice: (513) 248-1313 Fax: (513) 248-2869
Email: herndon@herndoneng.com Website: www.herndoneng.com



F:\IES\Projects\3058 Cardinal Square Apartments - Amy Electric.Dwg\MFP3058.dwg, M1.11, 12/16/2013 12:25:27 PM.
 bddm, DWG To PDF.pc3, ARCH expand D (36000 x 24100 inches), 1:1

VENTILATION AIR SCHEDULE ASHRAE STANDARD 62.1-2004														
Job# and Name: 3058 cardinal apts.														
Table 6-1														
typical floor	Room Name	Az sqft	Occupancy Category	Rp cfm/P	Ra cfm/sqft	Default People /1000sf	People Pz	People Rp x Pz	Area Azz Ra cfm	OA cfm	Vbz Ez	SA Vpz cfm	10% OA cfm	
1	APARTMENT	938	living quarters	5	0.06	5	2	10	56	66	0.9	74	600	57
2	APARTMENT	805	living quarters	5	0.06	5	1	5	48	53	0.9	59	400	38
3	APARTMENT	573	living quarters	5	0.06	5	1	5	34	39	0.9	44	400	38
4	APARTMENT	751	living quarters	5	0.06	5	1	5	45	50	0.9	56	400	38
5	APARTMENT	747	living quarters	5	0.06	5	1	5	45	50	0.9	55	400	38
6	APARTMENT	767	living quarters	5	0.06	5	1	5	46	51	0.9	57	400	38
7	APARTMENT	749	living quarters	5	0.06	5	1	5	45	50	0.9	55	400	38
8	APARTMENT	748	living quarters	5	0.06	5	1	5	45	50	0.9	55	400	38
9	APARTMENT	577	living quarters	5	0.06	5	1	5	35	40	0.9	44	400	38
10	APARTMENT	829	living quarters	5	0.06	5	1	5	50	55	0.9	61	400	38
11	APARTMENT	899	living quarters	5	0.06	5	2	10	54	64	0.9	71	600	57
12	APARTMENT	630	living quarters	5	0.06	5	1	5	38	43	0.9	48	400	38
13	APARTMENT	952	living quarters	5	0.06	5	2	10	57	67	0.9	75	600	57
14	APTS. CORRIDOR	626	comidor	0	0.06	0	0	0	37.56	38	0.8	47	352	33
TOTAL 5th FLOOR														
typical floor-5	10591	living quarters	5	0.06	5	16	80	365	410	0.9	455	6152	584	
typical floor-4	10591	living quarters	5	0.06	5	16	80	365	410	0.9	512	6152	550	
typical floor-3	10591	living quarters	5	0.06	5	16	80	365	410	0.9	512	6152	550	
typical floor-2	10591	living quarters	5	0.06	5	16	80	365	410	0.9	512	6152	550	
typical floor-1	10591	living quarters	5	0.06	5	16	80	365	410	0.9	512	6152	550	
15	ground floor	345	lobby	0	0.06	0	0	0	21	21	0.9	23	680	65
16	office space	588	office space	5	0.06	5	1	5	35	40	0.9	45	400	38
17	lower level	578	mechanical room	0	0.12	0	0	0	69	69	0.9	77	900	86
total bldg. 54466														
total garage 20,561														
15	parking garage	9596	ground level parking	0	0.12	0	0	0	1152	1152	0.9	1279	15000	1425
17	parking garage	10965	lower level parking	0	0.12	0	0	0	1316	1316	0.9	1462	15000	1425
total garage 20,561														

(6-1) Vz = RpPz + RaAz
 Az = zone floor area
 Pz = zone population
 Rp = outdoor airflow rate required per person
 Ra = outdoor airflow rate required per unit area
 Ez = Zone air Distribution Effectiveness

(6-2) Voz = Vz / Ez
 (6-3) Vot = Voz

Breathing Zone Outdoor Airflow
 Net occupied floor of the zone (ft2)
 The largest number of people expected to occupy the zone during typical usage

Zone Outdoor Airflow
 Outdoor Air Intake flow for Single Zone System

EXHAUST FAN SCHEDULE FOR REFERANCE ONLY												
DESIGN BASIS: NUTONE												
TAG	MODEL#	LOCATION	CFM	ESP	FRPM	POWER	VOLTAGE	dBa	SONES			
EF-1	-	BATHROOMS	80	0.1	-	23.3W	115/60/1	-	0.3	A,B,C,D,E,F,G		

ELECTRICAL TO PROVIDE EXHAUST FAN w/ LIGHT

REMARKS:
 A. MANUAL SWITCH NEXT TO LIGHT SWITCH. SWITCH-NEMA-1. THERMAL OVERLOADS.
 B. SPRING LOADED ALUMINUM BACKDRAFT DAMPER, DISCONNECT, MOUNTING BRACKET.
 C. PROVIDE HANGING VIBRATION ISOLATORS.
 D. STANDARD DESIGNER GRILLE, ALUMINUM GRILLE WITH WHITE ENAMEL FINISH.
 E. VENT. MODEL DEFLECTO PLASTIC WHIT MODEL HS4W/48, INSECT SCREEN ON WALL. DUCT TO BE 10x3 COMBINED SIZE. OR VENT LOUVER SIZE 4"x4" PAINT TO MATCH THE WALL COLOR.
 F. ELECTRICAL CONTRACTOR TO PROVIDE CONTROL SWITCH SEE ELECTRICAL.
 G. EXHAUST FAN TO HAVE LIGHT WITH IT.

EXHAUST AND SUPPLY FAN SCHEDULE FOR GARAGE VENTILATION												
DESIGN BASIS: GREENHECK												
TAG	MODEL#	LOCATION	CFM	ESP	RPM	POWER	VOLTAGE	dBa	SONES	WEIGHT		
EF-2A	SBE-3L30-10	LOWER LEVEL PARKING	7200	0.3	1343	1-HP	208/60/3	68	16.9	255	A,B,C,E,F,G,H	
EF-2B	QEI-20-L-20	GROUND LEVEL PARKING	7200	0.625	1725	2-HP	208/60/3	74	16.9	380	A,C,F,H,K	
SF-3A	SBS-1H48-10	GROUND LEVEL PARKING	15,000	0.2	1725	1-HP	208/60/3	68	16.4	611	A,B,C,D,F,G,H,J	
SF-3B	SBS-1H48-10	GROUND LEVEL PARKING	15,000	0.2	1725	1-HP	208/60/3	68	16.4	611	A,B,C,D,F,G,H,J	

REMARKS:
 A. MANUAL SWITCH NEXT TO DOOR. SWITCH-NEMA-1. THERMAL OVERLOADS. FOR EXHAUST & SUPPLY FANS.
 B. VERTICAL MOUNT EXHAUST GRAVITY DAMPER, DISCONNECT, MOUNTING BRACKET.
 C. PROVIDE BEARING WITH GREASE FITTINGS FOR EXHAUST FAN.
 D. STANDARD DESIGNER GRILLE, ALUMINUM GRILLE WITH WHITE ENAMEL FINISH.
 E. LOUVER SIZE 32"x32" FOR EXHAUST FAN.
 F. HVAC CONTRACTOR TO WIRE UP PARKING LOT SENSOR CONTROLS.
 G. POWER VENTILATION DAMPER WD-220-PB-50x50 MOUNTED NOT COATED DAMPER ACTUATOR 115 VAC ACTUATED. FOR SUPPLY FAN.
 H. PROVIDE BRASCH(GSE-CN-1) GAS DETECTOR. PROVIDE TWO (2) PER PARKING LEVEL.
 J. LOUVER SIZE 50"x50" FOR SUPPLY FAN.
 K. PROVIDE THREADED RODS TO STABILIZE SIDE TO SIDE MOTIONS,MOTOR WITH CLASS B INSULATION, MOUNTING SUPPORT- UNIVERSAL, BEARING- L(10) LIFE OF 80K MOUNTING, COATED WITH PERMATECTOR-GRAY,FAN AND ATTACHED ACCESSORIES, DIRECT MOUNT ISOLATORS, MOTOR COVER, UL/CUL-750-"POWER VENTILATORS", AND HOUSING IS SEAL HOUSING FOR OUTDOOR USE.

AIR DEVICE SCHEDULE												
BASIS OF DESIGN: PRICE												
TAG	MODEL#	PANEL	NECK SIZE	CFM	MISCL.	REMARKS						
SA-1	510	30x4" SIDEWALL DOUBLE DEFL.	30x4"	400		ABCDE						
SA-2	510	24x4" SIDEWALL DOUBLE DEFL.	24"x4"	275		ABCDE						
SA-3	510	10"x4"	8"ø	135		ABCDE						
SA-4	510	7"x4"	6"ø	55		ABC						
SA-5	SPD	24"x24"	12"ø	255		ABCDE						
SA-6	SPD	24"x24"	6"ø	100		ABCDE						
SA-7	SPD	24"x24" TB	4"ø	35		ABCDEF						
RA-1	80 SURFACE	24"x4" VERTICAL SEE DET.-3 M1.10	BOOT W/10"ø	320		ABCF						
RA-2	80 SURFACE	20"x4" VERTICAL SEE DET.-3 M1.10	BOOT W/10"ø	185		ABCF						
RA-2A	80 SURFACE	20"x4" HORIZONTAL	BOOT W/8"ø	185		ABCF						
RA-3	80 SURFACE	16"x4" HORIZONTAL	8"ø	135		ABCF						
RA-3A	80 SURFACE	16"x4" VERTICAL	8"ø	135		ABCF						
RA-4	80 SURFACE	7"x4" HORIZONTAL	8"ø	105		ABCF						
RA-5	80 SURFACE	7"x4" HORIZONTAL	6"ø	55		ABCF						
RA-6	80 LAYIN	24"x24" TB	16"x14"	960		ABCF						
RA-7	80 LAYIN	24"x24" TB	10"x10"	240		ABCF						

REMARKS:
 A. COLOR SHALL BE WHITE POWDER COAT.
 B. PROVIDE VOLUME DAMPERS IN TAKEOFFS WHERE ACCESSIBLE. WHERE DAMPERS ARE NOT ACCESSIBLE, PROVIDE OPPOSED BLADE DAMPER AT DIFFUSER.
 C. COORDINATE FRAME TYPE WITH ARCHITECTURAL REFLECTED CEILING PLAN.
 D. PROVIDE DAMPER /W SUPPLY DIFFUSER.
 E. SURFACE MOUNT.
 F. PROVIDE 24"x24" PAN IN TB FRAME FOR LAY-IN CEILING.

GEOTHERMAL PUMP SCHEDULE									
BASIS OF DESIGN: WIL0									
TAG	MODEL	LOCATION	TYPE	CAPACITY G.P.M.	HD(FT)	HP	RPM	VOLTS/ø	WEIGHT
P-1	STRATOS 2x3-35	MECH LG02	VERTICAL INLINE	100	20	3/4	-	230/1	37.2
P-2	STRATOS 2x3-35	MECH LG02	VERTICAL INLINE	100	20	3/4	-	230/1	37.2

REMARKS:
 A. PUMPING LIQUID WATER GLYCOL MIX
 B. GEOTHERMAL GROUND LOOP INLINE PUMP (2) PARALLEL.
 D. 2 X 3 - 35 PUMP WITH A 3/4 HP MOTOR.
 E. COORDINATE WITH MECHANICAL CONTRACTOR FOR LOCATION.

RADIANT PUMP SCHEDULE									
BASIS OF DESIGN: GRUNDFOS									
TAG	MODEL	LOCATION	TYPE	CAPACITY G.P.M.	HD(FT)	HP	RPM	VOLTS/ø	WEIGHT
RH-1	UP-2699	MECH LG02	IN-LINE	0-37	0-32	1/6	-	120/1ø	-
RH-2	UP-2699	MECH LG02	IN-LINE	0-37	0-32	1/6	-	120/1ø	-

REMARKS:
 A. PUMPING LIQUID WATER
 B. RADIANT IN-LINE PUMP.
 C. GRUNDFOS UP-2699 SERIES VERTICAL IN-LINE PUMP.
 D. COORDINATE WITH MECHANICAL CONTRACTOR FOR LOCATION.

HVAC EQUIPMENT SCHEDULE																								
TAG	MFR.	MODEL#	APT. #	HEAT MBH TOTAL	COOLING MBH TOTAL SENSIBLE	GPM	CORRECTED COOLING TOTAL CAPACITY (BTU/H)	CORRECTED HEATING TOTAL CAPACITY (BTU/H)	NORM SYSTEM CORRECTED CAPACITY % OF NORM	REFRIG PIPE DIM HIGH/LOW PRESSURE(INCH) (SEE NOTE- G)	AIRFLOW - CFM SUPPLY RETURN O.A. EXHAUST				HP/W	RPM	MCA	MOCPP	GAS HEAT MBH INPUT / OUTPUT	VOLTS/PH	MOUNTING	WEIGHT IN lbs.	(db)	NOTES
HP-1	MITSUBISHI	PQHY-P96THMU-A	-	108.0	96.300	79,929.0	25.4	85,756.5	99,884.1	124.6%	3/8 , 7/8	-	-	-	-	-	22/22	30/30	- / -	208/230 3ø	PAD	433	49	A,D,F,G,H,M,N
CP-1	WIL0	1.25 x25	-	-	-	-	-	-	-	-	1/8 HP	3100	15	20	- / -	120 1ø	ON HEAT PUMP	-	-	120 1ø	ON HEAT PUMP	-	-	S
VHP-2	MITSUBISHI	PVFY-P18E00B	2	-	10.017	8.650	-	-	-	-	-	600	480	38	75	-	.78	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	3	-	10.008	8.625	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	98	32	A,B,D,E,I,F,G,M,N
HP-2	MITSUBISHI	PQHY-P288TSHMU-A	-	324.0	288.900	86,497	76.1	252,791.3	294,650.8	114.2%	3/4 , 1-3/8	-	-	-	-	-	22/22	30/30/30	- / -	208/230 3ø	PAD	433	54	
CP-2	WIL0	1.25 x25	-	-	-	-	-	-	-	-	1/8 HP	3100	15	20	- / -	120 1ø	ON HEAT PUMP	-	-	120 1ø	ON HEAT PUMP	-	-	S
VHP-1	MITSUBISHI	PVFY-P18E00B	1	-	14.841	12.975	-	-	-	-	-	600	480	57	75	-	.78	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	13	-	10.017	8.650	-	-	-	-	-	400	320	57	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	98	32	A,B,D,E
VHP-1	MITSUBISHI	PVFY-P18E00B	11	-	15.299	13.413	-	-	-	-	-	600	480	57	75	-	.78	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-1	MITSUBISHI	PVFY-P18E00B	12	-	15.299	13.413	-	-	-	-	-	600	480	38	75	-	.78	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
HP-3	MITSUBISHI	PQHY-P96THMU-A	-	108.0	96.300	108,000	25.4	86,002.4	99,980.3	124.6%	3/8 , 7/8	-	-	-	-	-	22/22	30/30	- / -	208/230 3ø	PAD	433	49	A,D,F,G,J,M,N
CP-3	WIL0	1.25 x25	-	-	-	-	-	-	-	-	1/8 HP	3100	15	20	- / -	120 1ø	ON HEAT PUMP	-	-	120 1ø	ON HEAT PUMP	-	-	S
VHP-2	MITSUBISHI	PVFY-P18E00B	9	-	12.941	10.554	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	10	-	12.941	10.554	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
HP-4	MITSUBISHI	PQHY-P240TSHMU-A	-	270.0	240.000	199,200	50.7	212,888.8	247,255.1	125.0%	5/8 , 1-1/8	-	-	-	-	-	29/26	40/40	- / -	208/230 3	PAD	433	54	A,D,F,G,K,M,N
CP-4	WIL0	1.25 x25	-	-	-	-	-	-	-	-	1/8 HP	3100	15	20	- / -	120 1ø	ON HEAT PUMP	-	-	120 1ø	ON HEAT PUMP	-	-	S
VHP-2	MITSUBISHI	PVFY-P12E00B	4	-	12.832	10.478	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	5	-	12.832	10.478	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	6	-	12.832	10.478	-	-	-	-	-	400	320	38	75	-	.25	15	- / -	208/230 1ø	FLR 1-5	88	31	A,B,D,E
VHP-2	MITSUBISHI	PVFY-P12E00B	7	-	10.037	8.6																		

MECHANICAL SPECIFICATION

1. GENERAL

- a. MECHANICAL INSTALLATION SHALL BE IN ACCORDANCE WITH ALL STATE, COUNTY, AND LOCAL CODES.
- b. ALL TESTS SHALL BE PERFORMED IN ACCORDANCE WITH STATE, COUNTY, AND ENGINEER'S REQUIREMENTS.
- c. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL MATERIALS, LABOR, PERMITS, INSPECTIONS, FEES, QUALITY OF MATERIALS AND WORKMANSHIP AND FINAL CLEAN-UP PERTAINING TO THE MECHANICAL WORK.
- d. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING A BID AND SHALL LAY OUT HIS OWN WORK. HE SHALL BE RESPONSIBLE FOR ACCURACY OF THE SAME WITH RESPECT TO THE INTENT OF THESE SPECIFICATIONS. THIS CONTRACTOR SHALL TAKE HIS OWN MEASUREMENTS AND BE RESPONSIBLE FOR THEM.
- e. THIS CONTRACTOR SHALL VERIFY AND SATISFY HIMSELF THAT ALL EQUIPMENT FURNISHED WILL PROPERLY FIT IN THE SPACE PROVIDED, THAT IT WILL FUNCTION PROPERLY, AND THAT ALL PARTS OF EQUIPMENT REQUIRING SERVICE ARE READILY ACCESSIBLE.
- f. WORK INSTALLED BY THIS CONTRACTOR WHICH INTERFERES WITH OR AFFECTS THE EXISTING STRUCTURES SHALL BE CHANGED AS DIRECTED AND ALL COSTS INCIDENT TO SUCH CHANGES SHALL BE PAID BY THIS CONTRACTOR.
- g. ALL WORK OF THIS CONTRACT SHALL BE DONE NEATLY AND PROFICIENTLY AND ONLY BY MECHANICS SKILLED IN THEIR PARTICULAR CRAFT.
- h. ALL PIPING SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING WALLS AND FRAMING SYSTEM. ALL VERTICAL RUNS SHALL BE HELD AGAINST WALLS, COLUMNS, ETC., AS POSSIBLE TO PERMIT MAKING OF PIPE JOINTS.
- i. ALL MATERIALS SHALL BE FREE OF DEFECTS OR ERRORS WHICH WOULD RESULT IN POOR APPLICATION OR CAUSE DEFECTS IN WORKMANSHIP.
- j. CONTRACTOR SHALL DO ALL CUTTING AND PATCHING REQUIRED FOR INSTALLATION OF THIS WORK. ALL OPENINGS IN WALLS, FLOORS OR CEILINGS SHALL BE PROPERLY SEALED AND RESTORED IN KIND. FLASH AND COUNTERFLASH AT ROOF OPENINGS.
- k. ALL EQUIPMENT SHALL BE LISTED AND LABELED, UNLESS OTHERWISE APPROVED.
- l. ALL WIRING SHALL MEET THE REQUIREMENTS LISTED IN THE ELECTRICAL SPECIFICATIONS. ALL CONTROL AND INTERLOCK WIRING AND CONDUIT (120V OR 24V) SHALL BE BY THE MECHANICAL CONTRACTOR.
- m. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE CONDITIONS OF LISTING AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AND THIS CODE.

2. SUBSTITUTIONS

- a. CERTAIN MAKES OF MATERIALS AND EQUIPMENT ARE SPECIFIED AND DRAWINGS ARE DETAILED ACCORDING TO THIS MATERIAL. CONTRACTOR SHALL BASE HIS BID ON FURNISHINGS AND INSTALLING THE SPECIFIED MAKE AND MODEL OR THE "EQUIVALENT" MODEL OF ANOTHER OF THE SPECIFIED MANUFACTURERS WHICH MEETS ALL THE QUALIFICATIONS OF THE SPECIFIED ITEMS.
- b. "EQUIVALENT" MATERIALS AND EQUIPMENT ARE THOSE OF MANUFACTURER WHICH MEET THE SAME STANDARDS OF PERFORMANCE, HAVE EQUAL OR BETTER MATERIALS OF CONSTRUCTION, AND EQUAL OR BETTER MAINTENANCE CHARACTERISTICS. ALL EQUIVALENTS MUST FIT THE SPACE PROVIDED IN THE BUILDING STRUCTURE. WHERE THE USE OF EQUIVALENTS RESULTS IN CHANGES, THIS CONTRACTOR SHALL BE RESPONSIBLE FOR SUCH CHANGES AND ANY COSTS RESULTING FROM THEM.
- c. IF THE CONTRACTOR INTENDS TO USE EQUIPMENT OR MATERIALS NOT SPECIFIED, HE MUST RECEIVE APPROVAL FROM THE ENGINEER/ARCHITECT PRIOR TO THE AWARD OF THE CONTRACT. THIS PRIOR APPROVAL ONLY PERMITS SUBMITTAL OF A PARTICULAR MANUFACTURER'S EQUIPMENT IN GENERAL. THE SPECIFIED ITEM TO BE USED MUST AGAIN BE SUBMITTED FOR FINAL REVIEW AS SPECIFIED UNDER "SHOP DRAWINGS".

3. SHOP DRAWINGS

- a. SUBMIT TO ENGINEER/ARCHITECT THREE (3) COPIES OF CERTIFIED SHOP DRAWINGS, DESCRIPTIVE DATA, DIAGRAMS & SPECIFICATIONS ON ALL SPECIFIED MATERIALS & EQUIPMENT FOR REVIEW IN AMPLE TIME BEFORE MANUFACTURERS ARE AUTHORIZED TO MAKE SHIPMENT. THE INFORMATION SUBMITTED SHALL BE PREPARED AND ARRANGED IN A FORMAT WHICH WILL PERMIT EASY IDENTIFICATION AND COMPARISON BY THE ENGINEER/ ARCHITECT OF SPECIFIED EQUIPMENT. ONE COPY SHALL BE RETURNED TO THE CONTRACTOR FOLLOWING THE ENGINEER/ ARCHITECTS REVIEW. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FURNISH ANY ADDITIONAL COPIES (SHOWING ARCHITECT ENGINEER STAMP AND COMMENT) AS NECESSARY FOR SUPPLIERS AND/OR BUILDING OFFICIALS.
- b. THE MAKE, TYPE, AND FINISH OF ALL MATERIALS, EQUIPMENT AND APPARATUS SHALL BE APPROVED BY THE ENGINEER/ ARCHITECT IN WRITING BEFORE THE CONTRACTOR INSTALLS IT. ANY SUBSTITUTION FOR ANY SPECIFIED EQUIPMENT OR MATERIAL SHALL FIRST BE APPROVED BY THE ENGINEER/ARCHITECT IN WRITING.
- c. SUBMIT TYPEWRITTEN SCHEDULE SHOWING ALL ELECTRICAL CHARACTERISTICS AND REQUIREMENTS FOR ALL ELECTRICALLY OPERATED EQUIPMENT. THE SCHEDULE SHALL BE USED BY THE ELECTRICAL CONTRACTOR FROM WHICH HE WILL PREPARE HIS WORK.
- d. SHOP DRAWINGS SHALL INCLUDE, BUT ARE NOT LIMITED TO THE FOLLOWING: MAKE, MODEL NUMBER, DIMENSIONS, ELECTRICAL CHARACTERISTICS (RATING), SHOP DRAWINGS SHALL BEAR NAME OF PROJECT AND LOCATION.
- e. CONTRACTOR SHALL KEEP AT LEAST ONE SET OF COLORED CORRECTED SHOP AND DESIGN DRAWINGS AT THE SITE. DRAWINGS SHALL BE CURRENT, DENOTING APPROVED MODIFICATIONS AND INSTALLED DEPARTURE. SUBMIT ONE SET OF "AS-BUILT" DRAWINGS TO OWNER BEFORE FINAL PAYMENT.

4. CLEANING

- a. THIS CONTRACTOR SHALL REMOVE FROM THE PREMISES ALL ACCUMULATION OF DIRT, DEBRIS, WASTE MATERIALS AND RUBBISH CAUSED BY HIS EMPLOYEES OR WORK, AT LEAST ONCE A WEEK, EXCEPT THAT COMBUSTIBLE MATERIALS SHALL BE REMOVED DAILY.

HVAC WORK

1. EQUIPMENT

- a. VERTICAL HEAT PUMP UNIT – MITSUBISHI HIGH EFFICIENCY UNIT. MEET ASHRAE 90.1 MINIMUM ENERGY EFFICIENCY REQUIREMENT. GAS HEATING WITH ELECTRIC COOLING. CAPACITIES SHALL BE AS LISTED. PROVIDE 2" PLEATED FILTER, ROOF CURB, PREWIRED CONTROL CENTER, ELECTRONIC PILOT, GAS VALVE, SAFETY LIMIT, MAX COOLING COIL PRESSURE DROP SHALL BE AS LISTED WHEN WET. SEE SCHEDULE ON DRAWING.
- a. UPFLOW VERTICAL HEAT PUMP AS SCHEDULE. CAPACITIES SHALL BE AS LISTED. PROVIDE EACH UNIT W/THROW AWAY FILTERS, BOTTOM PLENUM, PREWIRED CONTROL CENTER, FAN RELAY, BLOWER DOOR SAFETY SWITCH, FULLY INSULATED ENCASED. COOLING COIL W/TRANSITIONS AS REQUIRED. MAX COOLING COIL PRESSURE DROP SHALL BE AS LISTED WHEN WET.
- b. R-410A HIGH EFFICIENCY WATER COOLED CONDENSING UNIT AS SCHEDULE. COOLING CAPACITY SHALL BE AS LISTED. ACCESSORIES: LOW AND HIGH PRESSURE SWITCHES.
- c. DIFFUSERS AND GRILLES – AS SCHEDULED NC 30 OR LESS. FRAME TYPE TO MATCH CEILING LAYOUT. PROVIDE VOLUME DAMPERS IN TAKEOFFS WHERE ACCESSIBLE.
- d. ELECTRIC HEATERS AS SCHEDULE. QMARK OR BERKO OR EQUAL. SEE DRAWINGS FOR SIZE. BUILT IN THERMOSTAT, DISCONNECT SWITCH, END CAPS, OVERHEAT PROTECTION, MOUNTING KIT, COLOR AND FINISHED SELECTED BY ARCHITECT.
- e. ALL MECHANICAL EQUIPMENT MUST BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS WHICH SHALL BE AVAILABLE AT THE JOB SITE.
- f. ALL MECHANICAL EQUIPMENT SHALL BEAR THE LABEL OF AN APPROVED AGENCY. VERIFICATION THAT THE MECHANICAL EQUIPMENT HAS BEEN TESTED TO THE APPROPRIATE STANDARDS MUST BE SUBMITTED.

2. SHEET METAL DUCTWORK – LOW VELOCITY

- a. DUCTS SHALL BE GALVANIZED SHEET METAL OF STANDARD GAUGES. PROVIDE DUCT MATERIAL MEETING LATEST EDITION OF SMACNA "HVAC DUCT CONSTRUCTION STANDARD". NONMETALLIC DUCTS SHALL BE CONSTRUCTED WITH CLASS 0 OR CLASS 1 DUCT MATERIAL IN ACCORDANCE WITH UL181.
- b. CONSTRUCTION, INSTALLATION AND SUPPORT OF ALL DUCTWORK SHALL CONFORM TO THE LATEST EDITION OF SMACNA "HVAC DUCT CONSTRUCTION STANDARD –METAL AND FLEXIBLE". SUPPORT DUCT WITH APPROVED HANGERS AT INTERVALS NOT EXCEEDING 10 FEET.
- c. ALL DUCT ELBOWS SHALL BE EITHER FULL RADIUS OR WITH TURNING VANES. FULL RADIUS ELBOWS SHALL BE AS SHOWN IN SMACNA FIG. 2-2
- d. FLEXIBLE DUCT SHALL BE LISTED AND LABELED AS CLASS 0 OR CLASS 1. FIVE FEET MAXIMUM LENGTH TO DIFFUSER. INSTALL SHEET METAL ELBOW AT ALL DIFFUSERS AND USE FLEXIBLE DUCT TO CONNECT ELBOW TO SUPPLY DUCT.
- e. ALL JOINTS SHALL BE SECURELY FASTENED AND SEALED WITH WELDS, GASKETS, MASTICS (ADHESIVES) MASTIC –PLUS EMBEDDED –FABRIC SYSTEMS OR TAPES. TAPES AND MASTICS USED WITH RIGID FIBROUS GLASS DUCTS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 181.
- f. COVER DUCTWORK AND KEEP DUCTS CLEAN. PROTECT ALL DUCTWORK AND EQUIPMENT FROM MOISTURE ABSORPTION.

3. DAMPERS

- a. DAMPERS WITH LOCKING DEVICE, WHERE ACCESSIBLE, SHALL BE RUSKIN MD-35. OPPOSED BLADE FOR RECTANGULAR DUCTS 12 INCHES AND ABOVE, AND MODEL MD-25 PARALLEL BLADE FOR DUCTS 10 INCHES AND BELOW, AND MODEL MDRS-25 FOR ROUND DUCTS. INSTALL PER MANUFACTURER'S INSTRUCTIONS. SINGLE BLADE ROUND DAMPERS WITH LOCKING DEVICE SHALL BE IN SPIN-IN COLLARS.

4. DUCT INSULATION

- a. INSULATE ALL SUPPLY AIR DUCTWORK AND DIFFUSER PLENUMS WITH FIBERGLASS INSULATION TO COMPLY WITH THE BUILDING / ENERGY CODE.

5. CONDENSATE DRAIN PIPING

- a. INSTALL TRAP AT EVAPORATOR COIL DRAIN. EXTEND DRAIN LINE FROM COIL TRAP TO DRAIN. PIPING SHALL BE STANDARD WEIGHT, PVC PIPE AND FITTINGS AND WITH JOINTS OF PVC SOLVENT CEMENT. PROVIDE CLEANOUTS THROUGHOUT RUN AND AT TOPS OF TRAPS.

6. REFRIGERANT PIPING

- a. FURNISH AND INSTALL ALL REFRIGERANT PIPING TO CONNECT COILS TO CONDENSING UNIT. PIPING SHALL BE INSTALLED IN SUCH A MANNER AS TO MEET WITH THE APPROVAL OF ALL GOVERNING AUTHORITIES AND THE HEREIN MENTIONED CODES.

7. CONTROLS

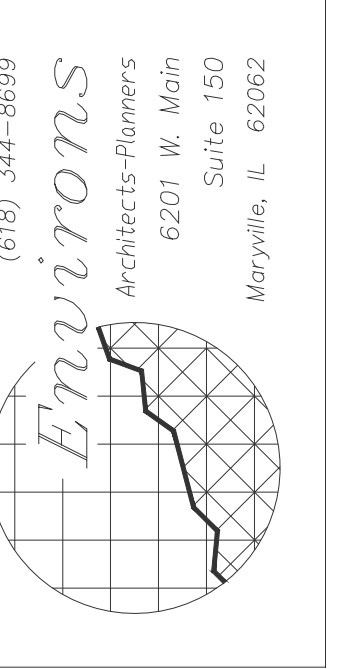
- a. ELECTRONIC 7-DAY PROGRAMMABLE THERMOSTAT SHALL BE MITSUBISHI OR EQUAL AS SPECIFIED UNDER EQUIPMENT.
- b. FURNISH AND INSTALL ALL CONTROL TRANSFORMERS, INTERLOCKS, AND CONTROL WIRING.

8. TEST AND ADJUSTMENTS

- a. ALL SYSTEMS AND EQUIPMENT SHALL BE CAREFULLY ADJUSTED TO PROVIDE COMFORTABLE AND UNIFORM CONDITIONS IN EACH AND EVERY SPACE TO THE OWNER'S SATISFACTION. PROVIDE ANY REQUIRED DRIVES TO SATISFY QUANTITIES INDICATED.



Richard D. Herndon PE



JOB NO.
13027

DATE:
NOVEMBER 15, 2013

REVISED:



A NEW APARTMENT BUILDING 'C':
CARDINAL SQUARE APARTMENTS
McKINLEY + ANTHONY AVE.
MUNDELEIN, ILLINOIS

SHEET
M1.13
OF