



MEP ENGINEERING • TECHNOLOGY
ENERGY MODELING • COMMISSIONING

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05/21/2018	100% DD
06/29/2018	50% CD
27 JUL 2018	Construction Documentation
04 JAN 2018	Addendum 002

MECHANICAL SHEET NOTES:

- COORDINATE WORK ON THIS SHEET WITH ALL TRADES. WORK SHOWN ON THIS SHEET IS INTENDED TO PROVIDE THE OVERALL ENGINEERING CONCEPT AND DOES NOT PROVIDE FOR RELOCATIONS, OFFSETS, ETC. THAT ARE REQUIRED BY FIELD CONDITIONS. THE COORDINATION OF TRADES SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT.
- COORDINATE THE EXACT LOCATIONS OF NEW MECHANICAL AND PLUMBING EQUIPMENT WITH THE LOCATIONS OF LIGHT FIXTURES, PIPING, AND OTHER CONSTRUCTION TO ALLOW FOR PROPER ACCESS TO SERVICE EQUIPMENT. INSTALL ALL EQUIPMENT ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.
- REFER TO 1-M3.00 AND 1-M3.01 FOR DETAILS, 1-M4.00 FOR GENERAL MECHANICAL NOTES, 1-M4.00 FOR EQUIPMENT SCHEDULES AND 1-M6.00 THROUGH 1-M6.04 FOR CONTROLS.

AIR DEVICE TAG LEGEND

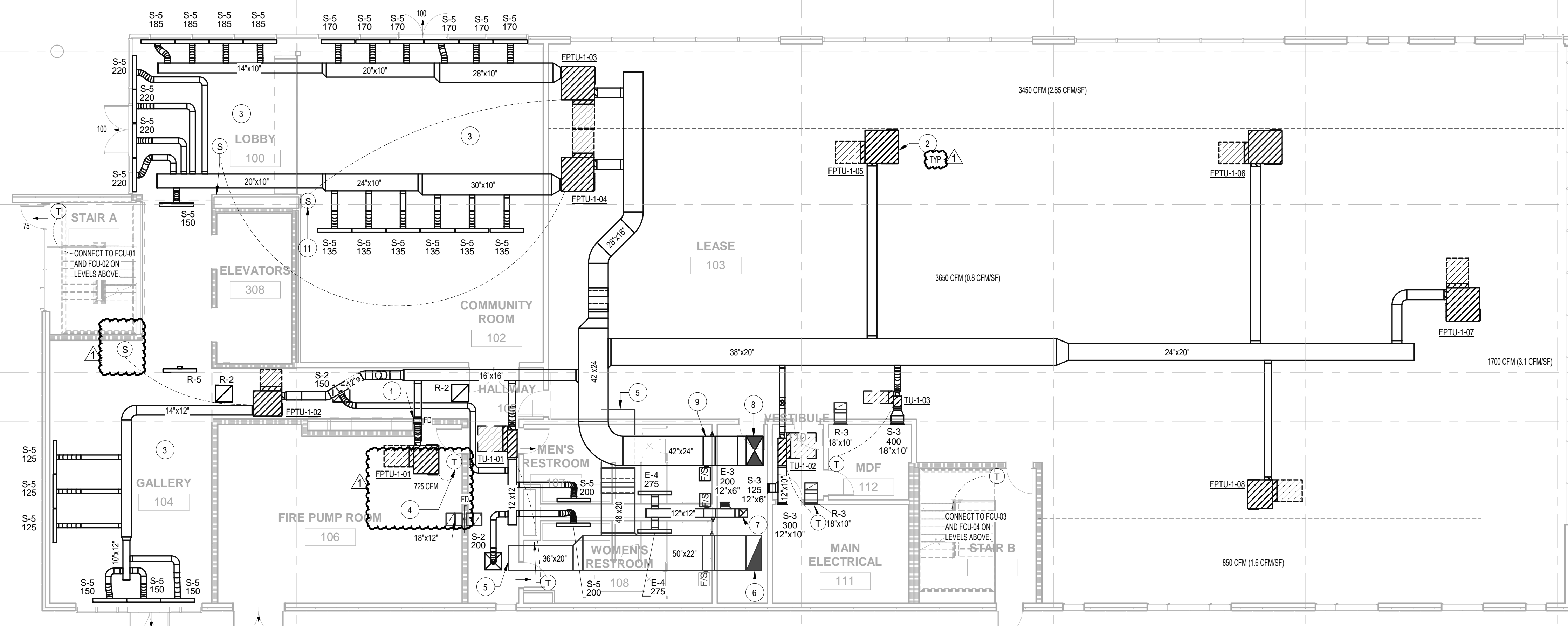
CFM	S-2	AIR DEVICE TAG/MARK
18'x10'	300	DEVICE DIMENSIONS (WIDTH x HEIGHT) IF APPLICABLE

NECK SIZE SCHEDULE

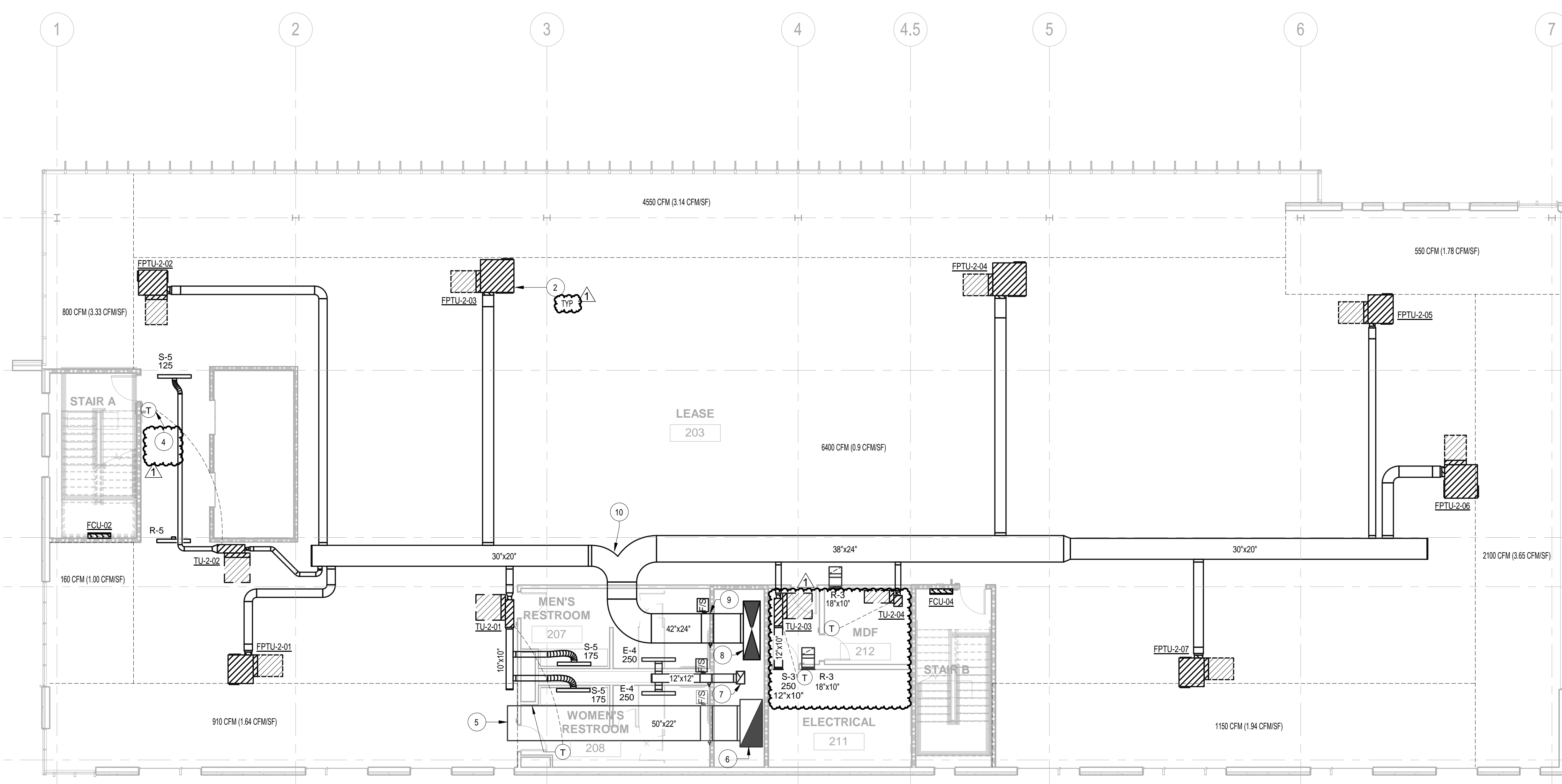
CFM RANGE	SQUARE NECK SIZE	ROUND NECK SIZE
0 - 125	6" x 6"	6" DIA
130 - 220	8" x 8"	8" DIA
225 - 350	10" x 10"	10" DIA
355 - 500	12" x 12"	12" DIA
505 - 750	15" x 15"	14" DIA
755 - 850	16" x 16"	16" DIA

NOTES BY SYMBOL

- PROVIDE AND INSTALL FIRE DAMPER WITH ACCESS PANEL. TYPICAL FOR ALL DAMPERS LABELED "FD". PROVIDE PERMANENTLY AFFIXED CEILING TAGS. REFER TO M-301 FOR DETAIL.
- PROVIDE AND INSTALL FAN POWERED TERMINAL UNIT FOR FUTURE SPACE BUILD OUT. UNIT TO BE USED FOR TEMPORARY CONDITIONING OF SPACE. SUSPEND UNIT AS HIGH AS POSSIBLE. PROVIDE OPEN END OF TRUNK DUCT. PROVIDE THERMOSTAT WITH 75 FT OF CONTROL WIRE COILED & BUNDLED TO SIDE OF UNIT. THERMOSTAT TO BE EQUAL TO TRANE MODEL WCS-S0. REFER TO COM-SCHEDULE FOR MORE INFORMATION.
- ALL DUCTWORK IN THIS ROOM IS TO BE ROUTED TIGHT TO STRUCTURE, INTERNALLY INSULATED, DUCTWORK AND PAINTED BLACK.
- PROVIDE AND INSTALL DDC THERMOSTAT. SENSOR TO BE EQUAL TO TRANE MODEL WCS-S0. THERMOSTAT SHALL BE CONNECTED TO NEW BUILDING AUTOMATION SYSTEM. PROVIDE INSULATED BASE FOR ALL THERMOSTATS AND LOCKABLE COVER FOR PUBLIC SPACES. COORDINATE EXACT LOCATION OF THERMOSTATS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION. TYPICAL FOR ALL THERMOSTAT SENSORS LABEL "T".
- PROVIDE AND INSTALL INTERNALLY LINED RETURN DUCT WITH ACOUSTICAL INSULATION. CUT END OF RETURN DUCT AT A 45DEG ANGLE UP TO PROVIDE MORE FREE AREA. NO EQUIPMENT OR OBSTRUCTION SHALL BE WITHIN 12 INCHES OF RETURN OPENING.
- RETURN AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
- EXHAUST AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR. UP TO EF-01 AT THIS LOCATION.
- SUPPLY AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
- PROVIDE AND INSTALL FIRE SMOKE DAMPER. TYPICAL FOR ALL DAMPERS LABELED "FS". DAMPER SHALL BE UL555S RATED FOR A DYNAMIC SYSTEM. PROVIDE PERMANENTLY AFFIXED CEILING TAGS. REFER TO M-301 FOR DETAIL.
- REFER TO DUCT SPLITTER DETAIL. TYPICAL FOR ALL TEE FITTINGS INDICATED IN THIS MANNER.
- PROVIDE AND INSTALL DDC COMBINATION THERMOSTAT AND CO2 SENSOR. SENSOR TO BE EQUAL TO TRANE MODEL WCS-S02. THERMOSTAT/SENSOR SHALL BE CONNECTED TO NEW BUILDING AUTOMATION SYSTEM. PROVIDE INSULATED BASE FOR ALL THERMOSTATS AND LOCKABLE COVER FOR PUBLIC SPACES. COORDINATE EXACT LOCATION OF THERMOSTATS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION. TYPICAL FOR ALL THERMOSTAT SENSORS LABEL "S".



1 LEVEL 1 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"



2 LEVEL 2 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"

PROJECT NAME
AFFORDABLE HOUSING CAMPUS

PROJECT ADDRESS

KIRKSEY PROJECT NO.

KEY PLAN

SHEET TITLE
LEVEL 1 & 2 MECHANICAL PLAN

SHEET NUMBER
1-M2.30-01



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AIR DEVICE TAG LEGEND

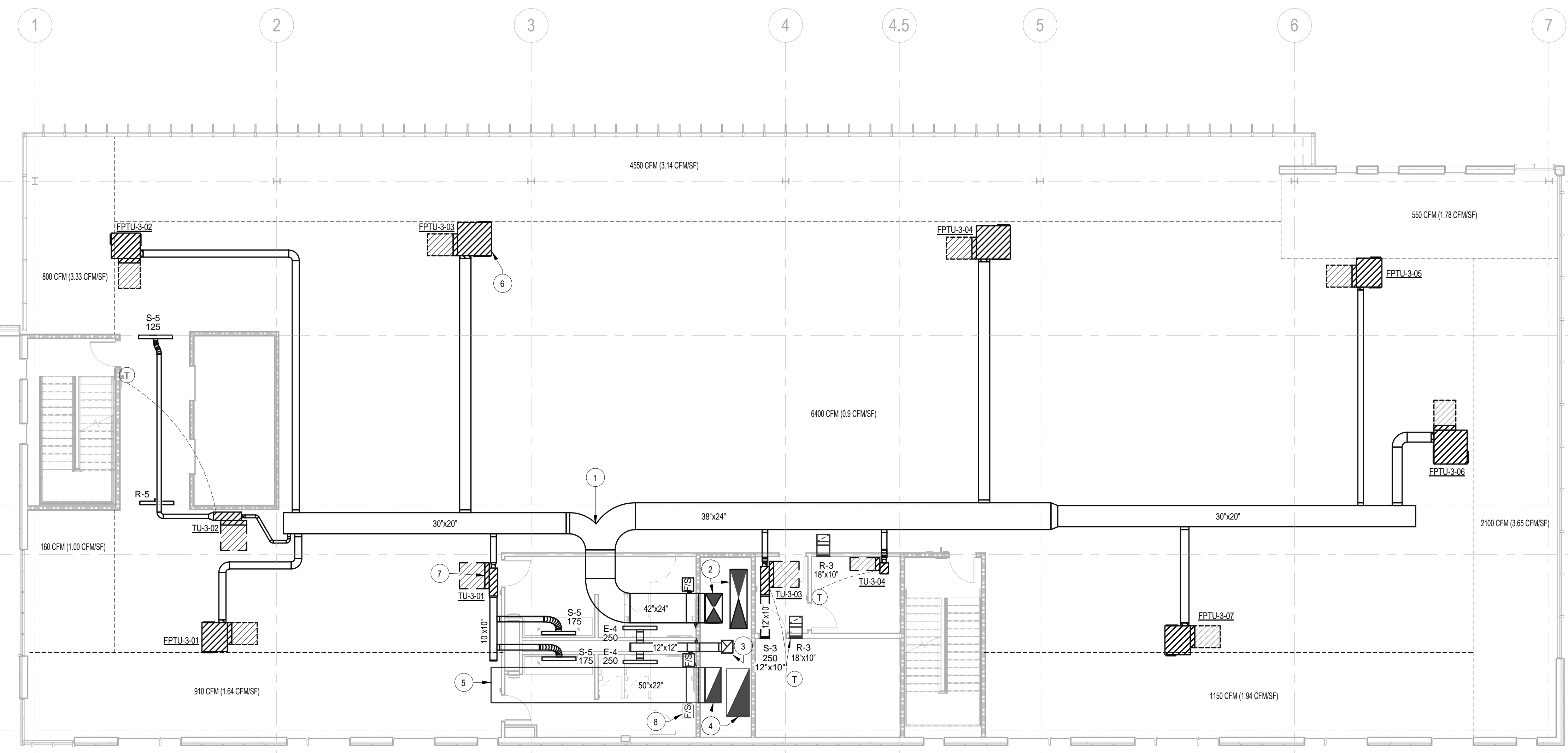
CFM	S-2	AIR DEVICE TAGMARK
18"x10"	300	DEVICE DIMENSIONS (WIDTHxHEIGHT) IF APPLICABLE

NECK SIZE SCHEDULE

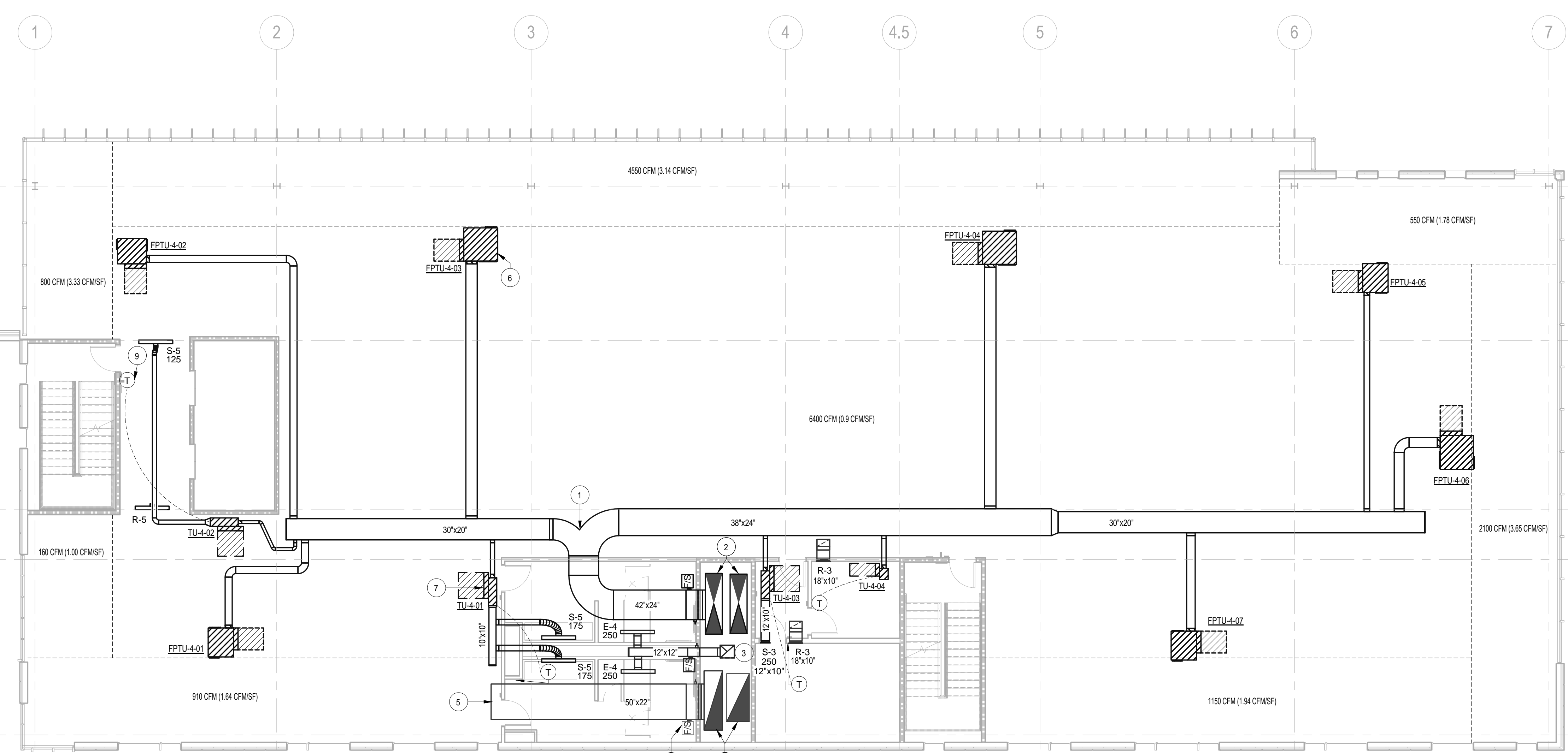
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NOTES BY SYMBOL

- REFER TO DUCT SPLITTER DETAIL, TYPICAL FOR ALL TEE FITTINGS INDICATED IN THIS MANOR.
- SUPPLY AIR DUCT RISER, REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
- EXHAUST AIR DUCT RISER, REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR, UP TO EF-01 AT THIS LOCATION.
- RETURN AIR DUCT RISER, REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
- PROVIDE AND INSTALL INTERNALLY LINED RETURN DUCT WITH ACOUSTICAL INSULATION. CUT END OF RETURN DUCT AT A 45DEG ANGLE UP TO PROVIDE MORE FREE AREA. NO EQUIPMENT OR OBSTRUCTION SHALL BE WITHIN 12 INCHES OF RETURN OPENING.
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- PROVIDE AND INSTALL NEW TERMINAL UNIT. TYPICAL. REFER TO 1-M3.00 FOR DETAIL AND 1-M4.00 FOR TERMINAL UNIT SCHEDULE. CONNECT TO NEW BUILDING AUTOMATION SYSTEM. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- PROVIDE AND INSTALL FIRE SMOKE DAMPER. TYPICAL FOR ALL DAMPERS LABELED "FS". DAMPER SHALL BE UL555 RATED FOR A DYNAMIC SYSTEM. PROVIDE PERMANENTLY AFFIXED CEILING TAGS. REFER TO M-301 FOR DETAIL.
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1 LEVEL 3 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"



2 LEVEL 4 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"

PROJECT NAME
AFFORDABLE HOUSING CAMPUS

PROJECT ADDRESS

KIRKSEY PROJECT NO.
KEY PLAN

SHEET TITLE
LEVEL 3 & 4 MECHANICAL PLAN

SHEET NUMBER
1-M2.30-03



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AIR DEVICE TAG LEGEND

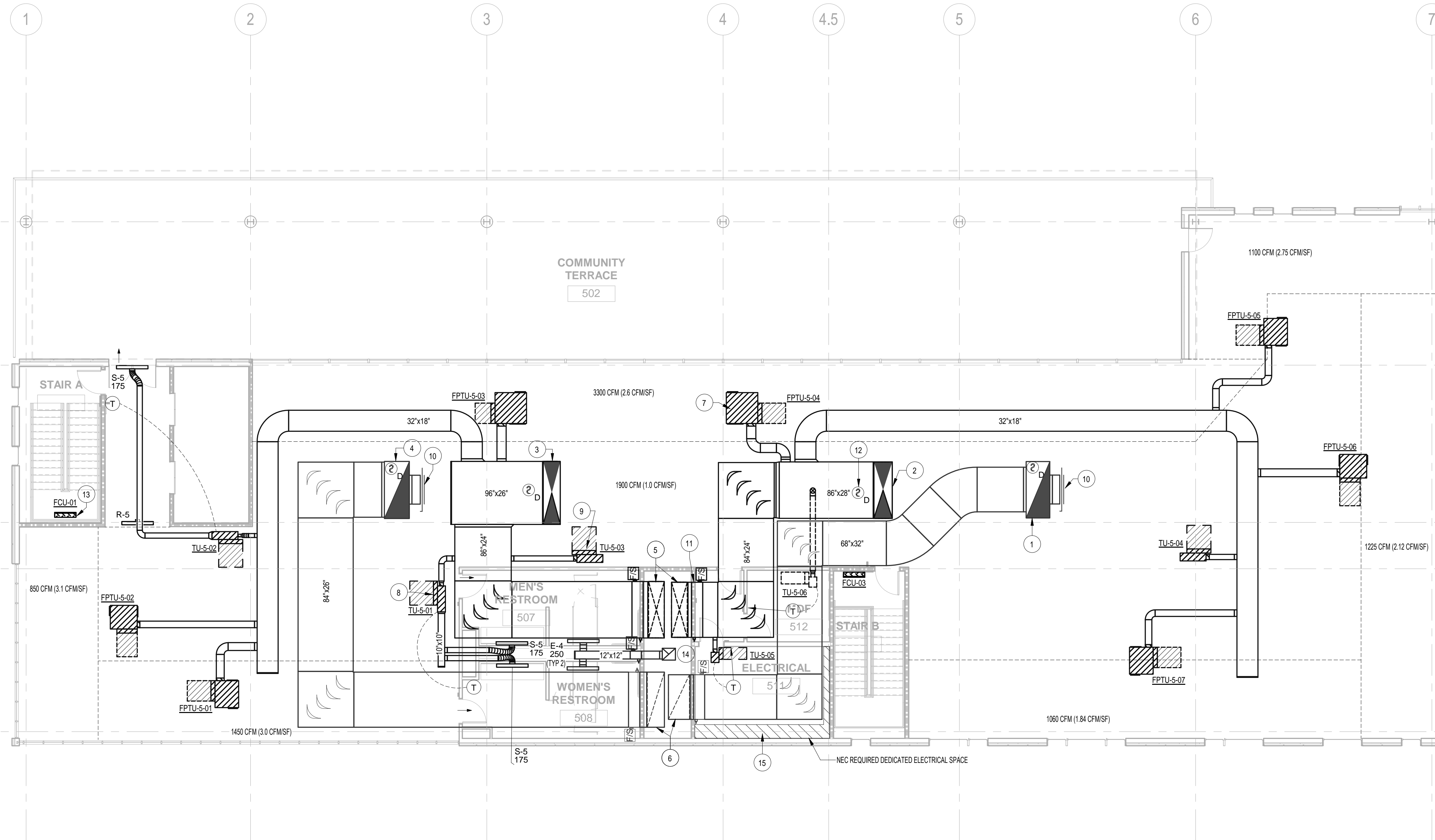
S-2	AIR DEVICE TAGMARK
CFM	DEVICE DIMENSIONS (WIDTH x HEIGHT) IF APPLICABLE

NECK SIZE SCHEDULE

CFM RANGE	SQUARE NECK SIZE	ROUND NECK SIZE
0 - 125	6" x 6"	6" DIA
130 - 220	8" x 8"	8" DIA
225 - 350	10" x 10"	10" DIA
355 - 500	12" x 12"	12" DIA
505 - 750	15" x 15"	14" DIA
755 - 850	16" x 16"	16" DIA

NOTES BY SYMBOL

- 86x36 RETURN AIR DUCTWORK UP TO RTU-01.
- 86x28 SUPPLY AIR DUCTWORK UP TO RTU-01.
- 96x26 SUPPLY AIR DUCTWORK UP TO RTU-02.
- 86x36 RETURN AIR DUCTWORK UP TO RTU-02.
- SUPPLY AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
- RETURN AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR.
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- PROVIDE AND INSTALL NEW TERMINAL UNIT. TYPICAL. REFER TO 1-M5.00 FOR DETAIL AND 1-M4.00 FOR TERMINAL UNIT SCHEDULE. CONNECT TO NEW BUILDING AUTOMATION SYSTEM. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- PROVIDE AND INSTALL TERMINAL UNIT FOR FUTURE SPACE BUILD OUT. UNIT TO BE USED FOR TEMPORARY CONDITIONING OF SPACE. SUSPEND UNIT AS HIGH AS POSSIBLE PROVIDE OPEN END OF TRUNK DUCT. PROVIDE THERMOSTAT WITH 75 FT OF CONTROL WIRE COILED & BUNDLED TO SIDE OF UNIT. THERMOSTAT TO BE EQUAL TO TRANE MODEL WCS-SD. BALANCE TO CFM ON SCHEDULE. REFER TO 1-M4.00 FOR MORE INFORMATION.
- 44x22 RETURN AIR DUCT TAP. PROVIDE A MANUAL BALANCING DAMPER AT END OF DUCT AND BALANCE TO CFM SHOWN ON PLANS.
- PROVIDE AND INSTALL FIRE SMOKE DAMPER. TYPICAL FOR ALL DAMPERS LABELED 'F/S'. DAMPER SHALL BE UL555S RATED FOR A DYNAMIC SYSTEM. PROVIDE PERMANENTLY AFFIXED CEILING TAGS. REFER TO M-301 FOR DETAIL.
- DUCT MOUNTED SMOKE DETECTOR BY FIRE ALARM CONTRACTOR. SMOKE DETECTOR SHALL BE MOUNTED IN THE SUPPLY AIR AND RETURN AIR DUCTS FOR ALL UNITS.
- PROVIDE AND INSTALL NEW WALL-MOUNTED FAN COIL UNIT AND CONDENSING UNIT. REFER TO 1-M4.00 FOR SCHEDULE. ROUTE 3/4" INSULATED CONDENSATE PIPING TO NEAREST FLOOR SINK/DRAIN. REFER TO PLANS FOR ROUTING. INSTALL ACCORDING TO MANUFACTURER RECOMMENDATION.
- EXHAUST AIR DUCT RISER. REFER TO 1-M5.01 FOR SUPPLY DUCT SIZES, TRANSITIONS, AND DUCT TAPS PER FLOOR. UP TO EF-01 AT THIS LOCATION.
- MECHANICAL AND ELECTRICAL CONTRACTORS ARE TO COORDINATE CONSTRUCTION WORK IN THIS SPACE TO MAINTAIN ALL NEC REQUIRED CLEARANCES.



1 LEVEL 5 MECHANICAL PLAN
SCALE: 1/8" = 1'-0"

PROJECT NAME
AFFORDABLE HOUSING CAMPUS

PROJECT ADDRESS

KIRKSEY PROJECT NO.

KEY PLAN

SHEET TITLE
LEVEL 5 MECHANICAL PLAN

SHEET NUMBER
1-M2.30-05

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KIRKSEY PROJECT NO.
KEY PLAN

SHEET TITLE
MECHANICAL DETAILS

SHEET NUMBER

1-M3.00

09 RETURN AIR BOOT DETAIL

SECTION

1'-0" MINIMUM

DEPTH = LENGTH (L)

DUCT TO BE LINED WITH 2" 2# DENSITY INSULATION.

STRUCTURE - REFER TO ARCH. AND STRUCTURAL DRAWINGS FOR DETAILS

CEILING TYPE AS SPECIFIED BY ARCHITECT

PLAN

3(W)+6"

VARIES - REFER TO PLANS (W)

3"

3"

3"

RETURN AIR OPENING

DUCT TO BE LINED WITH 2" 2# DENSITY INSULATION.

CEILING TYPE AS SPECIFIED BY ARCHITECT

SECTION

1'-0" MINIMUM

DEPTH = LENGTH (L)

STRUCTURE - REFER TO ARCH. AND STRUCTURAL DRAWINGS FOR DETAILS

CEILING TYPE AS SPECIFIED BY ARCHITECT

PLAN

3(W)+6"

VARIES - REFER TO PLANS (W)

3"

3"

3"

RETURN AIR OPENING BELOW

GENERAL NOTES:

- INTERNALLY LINED RETURN AIR DUCT SECTION (LINED W/ 2" 2# DENSITY INSULATION. REFER TO SPECIFICATIONS FOR OTHER REQUIREMENTS.) THROUGH PARTITION ABOVE CEILING. PLENUM AND OPENING SHALL BE OF THE INDICATED SIZE. OPENINGS ON EACH SIDE OF PARTITION SHALL BE PROVIDED IN TOP OR BOTTOM OF PLENUM AS SHOWN. END SHALL BE CAPPED, LINED AND SEALED. (REFER TO PLANS FOR LOCATION AND SIZES.)
- WHERE HALF BOOT IS INDICATED ON DRAWINGS, THE LENGTH SHALL STILL BE 3(W)+6" MINIMUM.

08 FIRE AND FIRE/SMOKE DAMPER DETAIL

DUCTWORK INSULATION WHERE SPECIFIED

NOTES:

- ABOVE FLOOR STRUCTURE.
- SHEET METAL DUCT AS SPECIFIED.
- RATED PARTITION (NOTE A).
- DAMPER SLEEVE (NOTE B).
- RETAINING ANGLES (NOTES C & D).
- EXPANSION CLEARANCE (NOTE E).
- DUCT CONNECTION AND SEALANT (NOTES F & G).
- ACCESS DOOR (NOTE H).
- DAMPER FRAME (NOTE I).
- OPPOSED BLADE FIRE/SMOKE DAMPER EQUAL TO RUSKIN MODEL.
- CURTAIN TYPE STYLE 'B' FIRE DAMPER EQUAL TO RUSKIN MODEL IBD2.

A. WALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS. ALL STEEL OR WOOD STUD OPENINGS SHALL BE FRAMED ON ALL SIDES SO AS TO NOT REST ON COMBUSTIBLE MATERIAL. WOOD FRAME OR STEEL STUD CONSTRUCTION REQUIRES THAT THE WALL SURFACE MATERIAL BE USED TO LINE THE OPENING SURROUNDING THE FIRE DAMPER SLEEVE.

B. SLEEVES SHALL NOT BE LIGHTER THAN 18 GAUGE.

C. RETAINING ANGLES SHALL BE INSTALLED ON FOUR SIDES OF THE SLEEVE AND ON EACH SIDE OF THE WALL. ANGLES ARE TO BE FASTENED TO THE SLEEVE ONLY WITH 1/4" BOLTS OR 1/2" LONG WELDS. MINIMUM 2 FASTENERS PER SIDE BEGINNING AT 2" FROM EACH CORNER OF THE SLEEVE AND 6" O.C. MAXIMUM.

D. RETAINING ANGLES SHALL OVERLAP WALL A MINIMUM OF 1" AROUND THE ENTIRE OPENING.

E. PROVIDE MINIMUM CLEARANCE BETWEEN SLEEVE AND WALL OPENING OF 1/8" PER LINEAR FOOT OF SLEEVE DIMENSION. VERTICAL CLEARANCE IS ALL AT TOP. HORIZONTAL CLEARANCE IS EQUALLY DIVIDED AT SIDES. SEAL EXPANSION SPACE WITH AN APPROVED SMOKE SEAL MATERIAL FOR FIRE/SMOKE DAMPER.

F. "S" AND DRIVE CONNECTIONS SHALL BE MADE WITH BREAKAWAY CONNECTION SUCH AS "S" SLIP TYPE CONNECTION ON THE TOP AND THE BOTTOM AND A DRIVE SLIP ON EACH SIDE OF THE SLEEVE.

G. DUCT SEALANT AND TAPE SHALL BE APPLIED TO THE JOINT FOR AIR TIGHTNESS AND SHALL BE NON-HARDENING.

H. DUCT ACCESS DOORS SHALL BE INSTALLED AT EACH FIRE DAMPER AND BE LOCATED SO THAT THE FIRE DAMPER CATCH MAY BE RELEASED WITH THE DAMPER IN A CLOSED POSITION AND THE FUSIBLE LINK REPLACED AND TO ALLOW ACCESS TO CONCEALED DAMPER ACTUATORS. EACH DOOR SHALL BE STENCILED "FIRE DAMPER ACCESS" OR "FIRE/SMOKE DAMPER ACCESS" AS APPLICABLE AND CONSTRUCTED IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS.

I. FIRE DAMPER FRAMES ARE TO BE BOLTED OR WELDED TO THE FIRE DAMPER SLEEVE. FASTENING TO THE SLEEVE SHALL BE IN ACCORDANCE WITH THE FIRE DAMPER MANUFACTURER'S INSTRUCTIONS. MINIMUM FASTENING SHALL BE 1/4" BOLTS OR 1/2" LONG WELDS WITH MAXIMUM SPACING OF 12" O.C. AND A MINIMUM OF 2 FASTENINGS PER SIDE BEGINNING 2" FROM THE CORNERS OF THE SLEEVE.

J. DAMPER SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS IN ORDER TO MAINTAIN UL FIRE RATED ASSEMBLY.

DUCT DIMENSIONS

0'-48"	1-1/2" x 1-1/2" x 12 GAUGE
49'-72"	2" x 2" x 12 GAUGE
OVER 72"	2" x 2" x 1/8"

ANGLES

0'-48"	1-1/2" x 1-1/2" x 12 GAUGE
49'-72"	2" x 2" x 12 GAUGE
OVER 72"	2" x 2" x 1/8"

07 TYPICAL SLOT DIFFUSER INSTALLATION

ACTIVE LENGTH

PLENUM BOX WITH INTERNALLY LINED INSULATION.

INACTIVE LENGTH, TYPICAL.

HANGER WIRE TAB. PROVIDE SUPPORT TO STRUCTURE AS REQUIRED.

INSULATED FLEX DUCT. MAXIMUM LENGTH AS SPECIFIED. NECK SIZES SHOWN ON DRAWINGS.

SPECIFIED DUCT. SEE FLOOR PLAN FOR SIZE AND SPECIFICATIONS FOR CONSTRUCTION REQUIREMENTS.

INSULATED FLEX DUCT. MAXIMUM LENGTH AS SPECIFIED.

ROUND OR OVAL INLET COLLAR. MINIMUM 2" EXTENSION.

SUPPLY AIR DUCT

AIR FLOW

VOLUME DAMPER

PROVIDE TITUS OR FIELD FABRICATED INTERNALLY LINED PLENUM BOX AS REQUIRED.

DUCT COLLAR STRAP ON LINER. DUCT TAPE ON OUTER JACKET. (TYPICAL)

CEILING AS SPECIFIED BY ARCHITECT.

VERTICAL INLET CONNECTION. NECK SIZES ARE SHOWN ON PLAN.

GENERAL NOTES:

- COORDINATE SLOT DIFFUSER FRAME/BORDER TYPE AND END BORDER CONFIGURATION WITH CEILING TYPE AND ARCHITECT.
- SUPPORT FLEX DUCT FROM STRUCTURE AS SPECIFIED. DUCT SHALL NOT KINK, SAG OR REST ON LIGHT FIXTURES, CEILING SUPPORT TEES OR TILE.

06 SUPPLY AIR SLOT DIFFUSER

HANGER WIRE TAB PROVIDE SUPPORT TO STRUCTURE AS REQUIRED.

INSULATED FLEX DUCT. MAXIMUM LENGTH AS SPECIFIED.

SPECIFIED DUCT WITH LINER OF DUCTWRAP AS SPECIFIED.

SPIN-IN TAP WITH VOLUME DAMPER. REFER TO ROUND TAP DETAIL.

DUCT COLLAR STRAP ON LINER. DUCT TAPE ON OUTER JACKET. (TYPICAL)

CEILING TYPE AS SPECIFIED BY ARCHITECT

SCHEDULED AIR DEVICE. ACTUAL AIR DEVICE SCHEDULED MAY VARY FROM AIR DEVICE SHOWN.

NOTE: SUPPORT FLEX DUCT FROM STRUCTURE AS SPECIFIED. DUCT SHALL NOT KINK, SAG OR REST ON LIGHT FIXTURES, CEILING SUPPORT TEES OR TILE.

04 FAN POWERED BOX INSTALLATION DETAIL

SERVICE CLEARANCE

UNIT CONTROL POWER JUNCTION BOX

42" X 30"

UNIT AND ELECTRIC HEATER POWER JUNCTION BOX

42" X 30"

FAN POWERED TERMINAL WITH ELECTRIC HEATER.

CONCENTRIC INLET REDUCER BY FFT MANUFACTURER.

INSULATED FLEXIBLE DUCT WORK. (SEE SPECIFICATIONS)

12" MINIMUM

AIR FLOW

PRIMARY AIR DUCT

20" MAXIMUM

NOTES BY SYMBOL:

- MAINTAIN MINIMUM STRAIGHT DISTANCE AS RECOMMENDED BY MANUFACTURER OF FAN POWERED TERMINAL DEVICE. (3'-0" MINIMUM)
- SERVICE CLEARANCE TO BE 42" X 30" IF UNIT POWER TO THIS SIDE OF UNIT IS 150 VOLTS OR GREATER OR GREATER.
- VERIFY UNIT CONTROL POWER AND ELECTRIC HEATER POWER JUNCTION BOX LOCATIONS WITH UNIT MANUFACTURER.

SECTIONS

ROOM THERMOSTAT. SEE PLAN FOR LOCATION.

CLAMP (SEE SPECIFICATIONS)

REHEAT COIL WHERE REQUIRED. RE: TERMINAL UNIT SCHEDULE.

VARIABLE AIR VOLUME TERMINAL UNIT. RE: SCHEDULE

45° TAP WITH VOLUME DAMPER

BRANCH DUCT

REFER TO PLANS FOR DUCT SIZES

NOTES:

- VARIABLE VOLUME TERMINAL UNIT SHALL BE PRESSURE INDEPENDENT SINGLE INLET OUTLET ELECTRONIC DDC DEVICES FOR COOLING ONLY APPLICATION. MAXIMUM STATIC PRESSURE LOSS THROUGH TERMINALS SHALL NOT EXCEED 0.05" W.G. AT SCHEDULED MAXIMUM AIRFLOW. FLOW SENSOR AND VELOCITY CONTROLLERS SHALL BE SELECTED AND FACTOR SET FOR OPERATION AT THE SPECIFIED MINIMUM AND MAXIMUM AIRFLOW.

02 DUCT SPLITTER DETAIL

MANUAL VOLUME DAMPER M.V.D. TYPICAL

W3 X D3

W

W2 X D2

STANDARD RADIUS ELBOW. CENTERLINE RADIUS R = 1 1/2 W.

AIR FLOW

A = [(W3)/D3] W1

B = [(W2)/(D2)+(W3)/D3] W1

LOW PRESSURE INTERNALLY LINED GALV. SHEETMETAL TRUNK DUCT FABRICATED PER SMACNA STANDARDS (TYPICAL)

DRAIN PAN

OPEN (DRAWTHRU ONLY)

PITCH DOWN TOWARD DRAIN. MIN. 1/8" PER FT.

PROVIDE THREADED CLEANOUT WITH PLUG. (BLOW THRU ONLY)

ROOF (OR FLOOR) DRAIN

ROOF (OR FLOOR)

NOTES:

- COORDINATE MOUNTING
- PAD OR BASE RAIL HEIGHT

UNIT TYPE

UNIT TYPE	A	B
DRAW THRU	1"± NEG STATIC PRESSURE	2" MINIMUM
BLOW THRU	2" MINIMUM	1"± POS STATIC PRESSURE

03 VAV TERMINAL DETAIL

MANUAL VOLUME DAMPER M.V.D. TYPICAL

W3 X D3

W

W2 X D2

STANDARD RADIUS ELBOW. CENTERLINE RADIUS R = 1 1/2 W.

AIR FLOW

A = [(W3)/D3] W1

B = [(W2)/(D2)+(W3)/D3] W1

LOW PRESSURE INTERNALLY LINED GALV. SHEETMETAL TRUNK DUCT FABRICATED PER SMACNA STANDARDS (TYPICAL)

DRAIN PAN

OPEN (DRAWTHRU ONLY)

PITCH DOWN TOWARD DRAIN. MIN. 1/8" PER FT.

PROVIDE THREADED CLEANOUT WITH PLUG. (BLOW THRU ONLY)

ROOF (OR FLOOR) DRAIN

ROOF (OR FLOOR)

NOTES:

- COORDINATE MOUNTING
- PAD OR BASE RAIL HEIGHT

UNIT TYPE

UNIT TYPE	A	B
DRAW THRU	1"± NEG STATIC PRESSURE	2" MINIMUM
BLOW THRU	2" MINIMUM	1"± POS STATIC PRESSURE

01 AIR HANDLING UNIT DRAIN TRAP DETAIL

DRAIN PAN

OPEN (DRAWTHRU ONLY)

PITCH DOWN TOWARD DRAIN. MIN. 1/8" PER FT.

PROVIDE THREADED CLEANOUT WITH PLUG. (BLOW THRU ONLY)

ROOF (OR FLOOR) DRAIN

ROOF (OR FLOOR)

NOTES:

- COORDINATE MOUNTING
- PAD OR BASE RAIL HEIGHT

UNIT TYPE

UNIT TYPE	A	B
DRAW THRU	1"± NEG STATIC PRESSURE	2" MINIMUM
BLOW THRU	2" MINIMUM	1"± POS STATIC PRESSURE

233113-001

233300-002

233713-002

233713-003

233600-001

233113-002

233113-004

SCALE: NONE

FAN SCHEDULE												
MARK	LOCATION	AREA	CFM	TYPE	ESP	HP	VOLTAGE - PHASE - HERTZ	MCA	MOCPP	WEIGHT	MANUFACTURER / MODEL	NOTES
EF-01	ROOF	GENERAL	2850	DOWNBLAST	.75"	1	460-3-60	4	20	92	GREENECK / GB-180	

- NOTES:**
- MECHANICAL CONTRACTOR SHALL PROVIDE COMBINATION STARTER/DISCONNECTS AND ELECTRICAL CONTRACTOR TO INSTALL PROVIDE INTEGRAL DISCONNECT SWITCH FOR ALL BOXES. COORDINATE WITH ELECTRICAL CONTRACTOR.
 - TRANSITION AT BOX FROM DUCT RUNOUT SIZE SHOWN TO BOX INLET SIZE.
 - PROVIDE CONTROL VOLTAGE TRANSFORMER. COORDINATE DOC CONTROLS WITH CONTROLS CONTRACTOR PRIOR TO PURCHASE.
 - PROVIDE AUTOMATIC RESET AND DISCHARGE TEMPERATURE SENSOR FOR ALL BOXES WITH ELECTRIC HEAT.
 - CONTROLS ARE TO BE FACTORY MOUNTED.
 - REFER TO SPECIFICATIONS FOR MORE INFORMATION.

Air Device Schedule										
MARK	DEVICE TYPE	DESCRIPTION	MANUFACTURER / MODEL							
E-3	SIDEWALL RETURN AIR GRILLE	ALUMINUM RETURN GRILLE; REF. DWG FOR FLOW, AND SIZE OF GRILLE. 34" BLADE SPACINGS, DOUBLE DEFLECTION. PROVIDE WITH BAKED WHITE ENAMEL FINISH. PROVIDE CONCEALED MOUNTING. COORDINATE FRAME TYPE WITH ARCHITECT.	TITUS / 350RL							
E-4	SLOT EXHAUST	4 FOOT LONG LINEAR EXHAUST SLOT. TO BE 1" SLOT WITH 2" SLOT WIDTH. PROVIDE WITH HIDDEN FLANGE OR TAPE AND SPACKLE FLANGE FINISH.	TITUS / TBR-30							
R-2	CEILING RETURN AIR GRILLE	24"x24" ALUMINUM EGGRATE FACE RETURN GRILLE WITH ROUND NECK. REFER TO NECK SIZE SCHEDULE AND FLOOR PLANS FOR NECK SIZE. PROVIDE WITH BAKED WHITE ENAMEL FINISH. PROVIDE CONCEALED MOUNTING. COORDINATE FRAME TYPE WITH CEILING TYPE.	TITUS / PAR							
R-3	SIDEWALL RETURN AIR GRILLE	ALUMINUM RETURN GRILLE; REF. DWG FOR FLOW, AND SIZE OF GRILLE. 34" BLADE SPACINGS, DOUBLE DEFLECTION. PROVIDE WITH BAKED WHITE ENAMEL FINISH. PROVIDE CONCEALED MOUNTING. COORDINATE FRAME TYPE WITH ARCHITECT.	TITUS / 350RL							
R-5	SLOT RETURN	4 FOOT LONG LINEAR RETURN SLOT. TO BE 1" SLOT WITH 2" SLOT WIDTH. PROVIDE WITH HIDDEN FLANGE OR TAPE AND SPACKLE FLANGE FINISH.	TITUS / TBR-30							
S-2	CEILING SUPPLY DIFFUSER	24"x24" ALUMINUM LOUVERED FACED DIFFUSER WITH ROUND NECK. REFER TO DRAWING FOR DIRECTION OF FLOW. REFER TO NECK SIZE SCHEDULE AND FLOOR PLANS FOR NECK SIZE. PROVIDE WITH BAKED WHITE ENAMEL FINISH. COORDINATE FRAME TYPE WITH CEILING TYPE.	TITUS / OMNI							
S-3	SIDEWALL SUPPLY GRILLE	ALUMINUM SUPPLY GRILLE; REF. DWG FOR FLOW, AND SIZE OF GRILLE. 34" BLADE SPACINGS, DOUBLE DEFLECTION. PROVIDE WITH BAKED WHITE ENAMEL FINISH. PROVIDE CONCEALED MOUNTING. COORDINATE FRAME TYPE WITH ARCHITECT.	TITUS / 300FL							
S-5	SLOT SUPPLY DIFFUSER	4 FOOT LONG LINEAR SUPPLY SLOT DIFFUSER. TO BE 1" SLOT WITH 2" SLOT WIDTH. PROVIDE WITH INSULATED TITUS PLENUM BOX WITH 8" DIAMETER INLET. PROVIDE WITH HIDDEN FLANGE OR TAPE AND SPACKLE FLANGE FINISH.	TITUS / FL-20							

ROOF TOP UNIT SCHEDULE			
DESIGNATION	RTU-01	RTU-02	
LOCATION	ROOF	ROOF	
SERVES	BUILDING	BUILDING	
CONFIGURATION	HRNTL DWNFLW	HRNTL DWNFLW	
OUTSIDE AIR CFM	6000	6000	
SUPPLY FAN			
SUPPLY CFM	36000	36000	
ESP(in. water ga.)	3.4	3.4	
MOTOR HP	50	50	
RELIEF FAN			
RELIEF CFM	30000	30000	
ESP(in. water ga.)	0.75	0.75	
MOTOR HP	30	30	
COOLING COIL			
REFRIGERANT TYPE	410A	410A	
SENSIBLE MBH	911.1	911.1	
TOTAL MBH	1147.5	1147.5	
EAT Deg (DBWB)	7765	7765	
LAT Deg (DBWB)	57,955.6	57,955.6	
AMBIENT TEMP (°F)	105	105	
ENERGY RECOVERY WHEEL			
MAX DESIGN OA VOLUME	1080006000	1080006000	
DESIGN EXHAUST VOLUME	4800	4800	
WHEEL MOTOR HP	1	1	
SUMMER CAPACITY (TOTAL MBH) @ MAX	334.2	334.2	
WINTER CAPACITY (TOTAL MBH) @ MAX	226.1	226.1	
COOLING MIXED AIR LAT Deg F DBWB	7765	7765	
HEATING MIXED AIR LAT Deg F DBWB	62,646.5	62,646.5	
ELECTRIC			
VOLTAGE-PHASE-HERTZ	460-3-60	460-3-60	
MCA	288.3	288.3	
MOCPP	300	300	
SHORT CIRCUIT CURRENT RATING			
MINIMUM ICR	10K	10K	
OPERATING WEIGHT LBS.	19074	19074	
MANUFACTURER/MODEL	DAIKIN / RPS110D	DAIKIN / RPS110D	
NOTES	1-18	1-18	

- NOTES:**
- Provide with 30% prefilter.
 - ESP includes 0.5" for dirty pre-filter.
 - Provide single point connection and factory installed disconnect.
 - Provide and install float switch and connect to building automation system. If enabled, float switch shall disable fan and send alarm to BAS.
 - Unit shall have variable frequency drive. Coordinate with electrical contractor on installation and start-up.
 - Provide unit with 1" minimum duct insulation.
 - Provide motorized outside air damper with airflow measurement station.
 - Provide fan vibration isolation. Rubber in shear not allowed.
 - Provide unit with MERV 13 filters. ESP includes 0.5" for dirty filter.
 - Provide factory recommended roof curb.
 - Unit shall have with downflow openings.
 - Unit shall be 2" double wall construction, designed for outdoor application.
 - Provide with factory installed GFCI outlet and 120V transformer. Outlet shall remain energized if unit disconnect is in "off" position.
 - Provide low ambient kit for operation to 20 degrees F.
 - Provide refrigerant service valves and replaceable coil filter drier.
 - Provide economizer with power exhaust. Economizer shall be controlled by dry bulb. Provide airflow measurement station on OA damper and relief air damper. Supply fan airflow measurement to match specifications/best practice.
 - All motors driven by VFDs shall be inverter duty and shall have shaft grounding rings equal to AEGIS SGR.
 - Mechanical contractor shall provide and install smoke detector in unit return and/or supply per code (SARA). Mechanical Contractor shall coordinate connection to fire alarm system with Fire Alarm Contractor.

MECHANICAL GENERAL NOTES:

- MECHANICAL INSTALLATIONS SHALL BE IN STRICT COMPLIANCE WITH THE APPLICABLE LOCAL, STATE, AND FEDERAL CODES, STANDARDS, AND GOVERNING AUTHORITIES HAVING JURISDICTION.
- FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND ACCESSORIES REQUIRED FOR A COMPLETE WORKING AND COORDINATED SYSTEM. ALL NEW MATERIALS, EQUIPMENT, AND ACCESSORIES SHALL MATCH EXISTING BUILDING STANDARDS IN QUALITY, TYPE, AND FINISH, UNLESS OTHERWISE NOTED.
- WORK SHOWN ON THESE SHEETS IS INTENDED TO PROVIDE THE OVERALL ENGINEERING CONCEPT. EXACT LOCATION OF DUCT/PIPING AND EQUIPMENT SHALL BE COORDINATED WITH BUILDING STRUCTURE, EQUIPMENT FURNISHING, ARCHITECTURAL DRAWINGS AND ALL OTHER TRADES PRIOR TO INSTALLATION. ANY CONTRACTOR INSTALLING WORK WITHOUT PRIOR COORDINATION SHALL RELOCATE HIS WORK AT HIS EXPENSE TO ALLOW PROPER INSTALLATION OF ANY AND ALL TRADES WORK.
- SUBMIT SHOP DRAWINGS TO THE ENGINEER AND OBTAIN APPROVAL. PRIOR TO PROCURING ANY NEW EQUIPMENT, SUBMIT OPERATING AND MAINTENANCE MANUALS FOR ALL NEW EQUIPMENT TO THE ENGINEER AND BUILDING ENGINEER.
- THE MECHANICAL CONTRACTOR SHALL FURNISH MOTOR DISCONNECTS, RELAYS AND STARTERS. THE ELECTRICAL CONTRACTOR SHALL INSTALL THESE DEVICES.
- ALL DUCTWORK DIMENSIONS ARE CLEAR, INSIDE DIMENSIONS. DUCTWORK SHALL BE GALVANIZED STEEL AND SHALL MEET MINIMUM S.M.A.C.A. CONSTRUCTION STANDARDS.
- MAINTAIN ALL DUCTWORK CLEARANCES REQUIRED BY THE NATIONAL ELECTRIC CODE FOR ALL ELECTRICAL PANELS. DUCT/PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL GEAR OR IN THE SERVICE SPACE REQUIRED BY THE NATIONAL ELECTRIC CODE. COORDINATE WITH THE ELECTRICAL CONTRACTOR.
- CONDUIT, PIPING, AND DUCTWORK SHALL BE INDEPENDENTLY SUPPORTED, AND THIS SUPPORT SHALL BE INDEPENDENT OF PARTITION AND CEILING SYSTEM SUPPORTS.
- ALL THERMOSTATS, CONTROLS, AND CONTROL WIRING (50 VOLTS OR LESS) OR PNEUMATIC TUBING SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR. CONTROL WIRING SHALL BE PROVIDED IN CONDUIT IF REQUIRED BY LOCAL CODES. FIELD VERIFY PRIOR TO BID. POWER WIRING SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
- PROVIDE EXTERNAL INSULATION FOR SUPPLY DUCT WITH AN EQUIVALENT THERMAL RESISTANCE AT LEAST R-8.
- MECHANICAL FASTENERS AND SEALANTS SHALL BE USED TO CONNECT DUCTS AND AIR DEVICES.
- REFER TO ARCHITECTURAL INTERIOR ELEVATION PLANS, WHERE THE ARCHITECT HAS DRAWN SUCH ELEVATIONS, FOR THE LOCATIONS OF ALL WALL MOUNTED DEVICES. OBTAIN THE ARCHITECT'S APPROVAL OF PROPOSED LOCATIONS FOR ALL VISIBLE THERMOSTATS AND OTHER CONTROL DEVICES.
- REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF WALLS WHICH EXTEND TO STRUCTURE, WHERE FLEXIBLE DUCT PENETRATES A WALL WHICH EXTENDS TO STRUCTURE. PROVIDE INSULATED RIDG DUCT EXTENDING 12 INCHES ON EITHER SIDE OF THE PARTITION.
- AT TIME OF FINAL INSTALLATION OBSERVATIONS, THE OPERATION OF ALL SYSTEMS OF EQUIPMENT SHALL HAVE BEEN DEMONSTRATED TO PERFORM PROPERLY.
- MANUAL BALANCE DAMPERS SHALL BE PROVIDED AT ALL BRANCH TAPS AND AT OTHER LOCATIONS AS SHOWN ON THE DRAWINGS AND AS REQUIRED FOR PROPER AIR BALANCE. BALANCING DEVICES SHALL BE IN ACCORDANCE WITH IMC03.15.
- PROVIDE ENGRAVED PHENOLIC LABEL FOR ALL EQUIPMENT AND SIGNAGE.
- SMOKE DETECTORS SHALL BE INSTALLED IN THE SUPPLY AND RETURN DUCTS OF ALL UNITS EXCEEDING 2,000 CFM. DETECTORS SHALL BE WIRED SUCH THAT UPON SENSING ALARM CONDITIONS, THE UNIT SHALL BE COMPLETELY SHUT DOWN AND A SIGNAL SHALL NOTIFY THE FIRE ALARM PANEL. THE MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL FACTORY PROVIDED CONTROLS AND APPURTENANCES AS REQUIRED TO PERFORM THE DESIRED SEQUENCE OF OPERATIONS. THE CONTRACTOR SHALL BE FURNISHED BY THE FIRE ALARM CONTRACTOR AND INSTALLED BY THE FIRE ALARM CONTRACTOR.
- CONDENSATE DRAIN PIPING SHALL BE SLOPED AT 1/8" PER FOOT.

PARALLEL FAN POWERED TERMINAL UNIT SCHEDULE																					
MARK	SYSTEM	UNIT SIZE	INLET SIZE	RUN OUT SIZE	AIRFLOW		STATIC PRESSURE			FAN				ELECTRIC COIL				MANUFACTURER / MODEL			
					MAX CFM	MIN CFM	INLET	DOWN	MIN	CFM	ESP	HP	EAT	LAT	KW	CONTROL STEPS	MCA		MOCPP	VOLTAGE	PHASE
FPTU-1-01	RTU-01	2	8"	10"	725	220	1.0	25	X	510	.25	1.6	65	85	5.0	LYNERGY	23	30	277	1	TRANE / VPEF
FPTU-1-02	RTU-01	3	10"	12"	825	250	1.0	25	X	560	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-1-03	RTU-01	5	14"	16"	1760	530	1.0	25	X	1230	.25	1.3	65	85	11.5	LYNERGY	21	30	480	3	TRANE / VPEF
FPTU-1-04	RTU-01	5	14"	16"	1840	550	1.0	25	X	1290	.25	1.3	65	85	12.0	LYNERGY	22	30	480	3	TRANE / VPEF
FPTU-1-05	RTU-01	5	14"	16"	1725	520	1.0	25	X	1210	.25	1.3	65	85	11.5	LYNERGY	21	30	480	3	TRANE / VPEF
FPTU-1-06	RTU-01	5	14"	16"	1725	520	1.0	25	X	1210	.25	1.3	65	85	11.5	LYNERGY	21	30	480	3	TRANE / VPEF
FPTU-1-07	RTU-01	5	14"	16"	1700	510	1.0	25	X	1190	.25	1.3	65	85	11.0	LYNERGY	20	30	480	3	TRANE / VPEF
FPTU-1-08	RTU-01	3	10"	12"	850	255	1.0	25	X	595	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-2-01	RTU-01	3	10"	12"	1080	325	1.0	25	X	755	.25	1.4	65	85	7.0	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-2-02	RTU-01	3	10"	12"	800	240	1.0	25	X	560	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-2-03	RTU-01	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-2-04	RTU-01	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-2-05	RTU-01	2	8"	10"	550	165	1.0	25	X	385	.25	1.6	65	85	4.0	LYNERGY	18	20	277	1	TRANE / VPEF
FPTU-2-06	RTU-01	6	14"	16"	2100	630	1.0	25	X	1470	.25	3.4	65	85	14.0	LYNERGY	28	30	480	3	TRANE / VPEF
FPTU-2-07	RTU-01	3	12"	14"	1150	345	1.0	25	X	805	.25	1.4	65	85	7.5	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-3-01	RTU-02	3	10"	12"	1080	325	1.0	25	X	755	.25	1.4	65	85	7.0	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-3-02	RTU-02	3	10"	12"	800	240	1.0	25	X	560	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-3-03	RTU-02	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-3-04	RTU-02	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-3-05	RTU-02	2	8"	10"	550	165	1.0	25	X	385	.25	1.6	65	85	4.0	LYNERGY	18	20	277	1	TRANE / VPEF
FPTU-3-06	RTU-02	6	14"	16"	2100	630	1.0	25	X	1470	.25	3.4	65	85	14.0	LYNERGY	28	30	480	3	TRANE / VPEF
FPTU-3-07	RTU-02	3	12"	14"	1150	345	1.0	25	X	805	.25	1.4	65	85	7.5	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-4-01	RTU-02	3	10"	12"	1080	325	1.0	25	X	755	.25	1.4	65	85	7.0	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-4-02	RTU-02	3	10"	12"	800	240	1.0	25	X	560	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-4-03	RTU-02	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-4-04	RTU-02	6	16"	18"	2275	685	1.0	25	X	1595	.25	3.4	65	85	15.0	LYNERGY	29	30	480	3	TRANE / VPEF
FPTU-4-05	RTU-02	2	8"	10"	550	165	1.0	25	X	385	.25	1.6	65	85	4.0	LYNERGY	18	20	277	1	TRANE / VPEF
FPTU-4-06	RTU-02	6	14"	16"	2100	630	1.0	25	X	1470	.25	3.4	65	85	14.0	LYNERGY	28	30	480	3	TRANE / VPEF
FPTU-4-07	RTU-02	3	12"	14"	1150	345	1.0	25	X	805	.25	1.4	65	85	7.5	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-5-01	RTU-01	3	12"	14"	1450	435	1.0	25	X	1015	.25	1.4	65	85	9.5	LYNERGY	17	20	480	3	TRANE / VPEF
FPTU-5-02	RTU-01	3	10"	12"	850	255	1.0	25	X	595	.25	1.4	65	85	5.5	LYNERGY	25	30	277	1	TRANE / VPEF
FPTU-5-03	RTU-01	5	14"	16"	1650	495	1.0	25	X	1155	.25	1.3	65	85	11.0	LYNERGY	20	30	480	3	TRANE / VPEF
FPTU-5-04	RTU-02	5	14"	16"	1650	495	1.0	25	X	1155	.25	1.3	65	85	11.0	LYNERGY	20	30	480	3	TRANE / VPEF
FPTU-5-05	RTU-02	3	10"	12"	1100	330	1.0	25	X	770	.25	1.4	65	85	7.5	LYNERGY	14	20	480	3	TRANE / VPEF
FPTU-5-06	RTU-02	3	12"	14"	1250	375	1.0	25	X	875	.25	1.4	65	85	8.5	LYNERGY	16	20	480	3	TRANE / VPEF
FPTU-5-07	RTU-02	3	10"	12"	1060	320	1.0	25	X	740	.25	1.4	65	85	7.0	LYNERGY	14	20	480	3	TRANE / VPEF

- NOTES:**
- PROVIDE INTEGRAL DISCONNECT SWITCH FOR ALL BOXES. COORDINATE WITH ELECTRICAL CONTRACTOR.
 - TRANSITION AT BOX FROM DUCT RUNOUT SIZE SHOWN TO BOX INLET SIZE.
 - PROVIDE CONTROL VOLTAGE TRANSFORMER. COORDINATE DOC CONTROLS WITH CONTROLS CONTRACTOR PRIOR TO PURCHASE.
 - PROVIDE AUTOMATIC RESET AND DISCHARGE TEMPERATURE SENSOR FOR ALL BOXES WITH ELECTRIC HEAT.
 - CONTROLS ARE TO BE FACTORY MOUNTED.
 - REFER TO SPECIFICATIONS FOR MORE INFORMATION.

TERMINAL UNIT - ELECTRIC HEAT SCHEDULE																
MARK	SYSTEM	INLET SIZE	RUN OUT SIZE	TYPE	AIRFLOW		ESP	ELECTRIC COIL				VOLTAGE	PHASE	MANUFACTURER / MODEL	NOTES	
					MAX CFM	MIN CFM		EAT	LAT	KW	CONTROL					
TU-1-01	RTU-01	10	12	VAV	750	300	0.4	55	90	3.5	SCR	277	1	TRANE / VCEF		
TU-1-02	RTU-01	6	10	VAV	425	150	0.4	55	90	2.0	SCR	277	1	TRANE / VCEF		
TU-1-03	RTU-01	6	10	VAV	400	140	0.4	55	90	0.0	SCR	120	1	TRANE / VCEF		
TU-2-01	RTU-01	6	10	VAV	350	125	0.4	55	90	1.5	SCR	277	1	TRANE / VCEF		
TU-2-02																

DATE	ISSUE
06/29/2018	50% CD
27 JUL 2018	Construction Documentation
04 JAN 2018	Addendum 002

PROJECT NAME
AFFORDABLE HOUSING CAMPUS

PROJECT ADDRESS

KIRKSEY PROJECT NO.

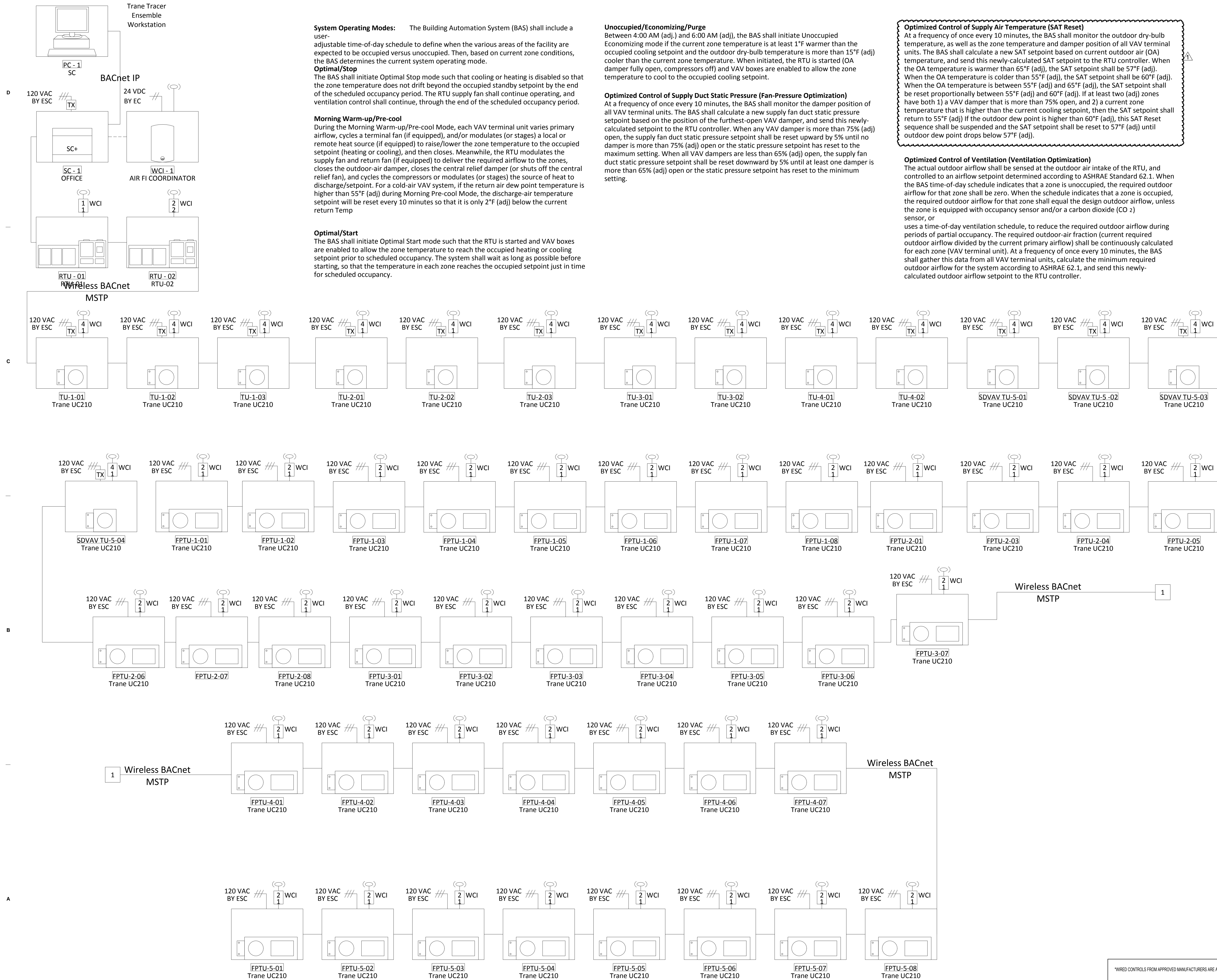
KEY PLAN

SHEET TITLE
MECHANICAL CONTROLS RISER

SHEET NUMBER

1-M6.01

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System Operating Modes: The Building Automation System (BAS) shall include a user-adjustable time-of-day schedule to define when the various areas of the facility are expected to be occupied versus unoccupied. Then, based on current zone conditions, the BAS determines the current system operating mode.

Optimal/Stop
The BAS shall initiate Optimal Stop mode such that cooling or heating is disabled so that the zone temperature does not drift beyond the occupied standby setpoint by the end of the scheduled occupancy period. The RTU supply fan shall continue operating, and ventilation control shall continue, through the end of the scheduled occupancy period.

Morning Warm-up/Pre-cool
During the Morning Warm-up/Pre-cool mode, each VAV terminal unit varies primary airflow, cycles a terminal fan (if equipped), and/or modulates (or stages) a local or remote heat source (if equipped) to raise/lower the zone temperature to the occupied setpoint (heating or cooling), and then closes. Meanwhile, the RTU modulates the supply fan and return fan (if equipped) to deliver the required airflow to the zones, closes the outdoor-air damper, closes the central relief damper (or shuts off the central relief fan), and cycles the compressors or modulates (or stages) the source of heat to discharge/setpoint. For a cold-air VAV system, if the return air dew point temperature is higher than 55°F (adj) during Morning Pre-cool Mode, the discharge-air temperature setpoint will be reset every 10 minutes so that it is only 2°F (adj) below the current return Temp.

Optimal/Start
The BAS shall initiate Optimal Start mode such that the RTU is started and VAV boxes are enabled to allow the zone temperature to reach the occupied heating or cooling setpoint prior to scheduled occupancy. The system shall wait as long as possible before starting, so that the temperature in each zone reaches the occupied setpoint just in time for scheduled occupancy.

Unoccupied/Economizing/Purge
Between 4:00 AM (adj.) and 6:00 AM (adj.), the BAS shall initiate Unoccupied Economizing mode if the current zone temperature is at least 1°F warmer than the occupied cooling setpoint and the outdoor dry-bulb temperature is more than 15°F (adj) cooler than the current zone temperature. When initiated, the RTU is started (OA damper fully open, compressors off) and VAV boxes are enabled to allow the zone temperature to cool to the occupied cooling setpoint.

Optimized Control of Supply Duct Static Pressure (Fan-Pressure Optimization)
At a frequency of once every 10 minutes, the BAS shall monitor the damper position of all VAV terminal units. The BAS shall calculate a new supply fan duct static pressure setpoint based on the position of the furthest-open VAV damper, and send this newly-calculated setpoint to the RTU controller. When any VAV damper is more than 75% (adj) open, the supply fan duct static pressure setpoint shall be reset upward by 5% until no damper is more than 75% (adj) open or the static pressure setpoint has reset to the maximum setting. When all VAV dampers are less than 65% (adj) open, the supply fan duct static pressure setpoint shall be reset downward by 5% until at least one damper is more than 65% (adj) open or the static pressure setpoint has reset to the minimum setting.

Optimized Control of Supply Air Temperature (SAT Reset)
At a frequency of once every 10 minutes, the BAS shall monitor the outdoor dry-bulb temperature, as well as the zone temperature and damper position of all VAV terminal units. The BAS shall calculate a new SAT setpoint based on current outdoor air (OA) temperature, and send this newly-calculated SAT setpoint to the RTU controller. When the OA temperature is warmer than 65°F (adj), the SAT setpoint shall be 57°F (adj). When the OA temperature is colder than 55°F (adj), the SAT setpoint shall be 60°F (adj). When the OA temperature is between 55°F (adj) and 60°F (adj), the SAT setpoint shall be reset proportionally between 55°F (adj) and 60°F (adj). If at least two (adj) zones have both 1) a VAV damper that is more than 75% open, and 2) a current zone temperature that is higher than the current cooling setpoint, then the SAT setpoint shall return to 55°F (adj). If the outdoor dew point is higher than 60°F (adj), this SAT Reset sequence shall be suspended and the SAT setpoint shall be reset to 57°F (adj) until outdoor dew point drops below 57°F (adj).

Optimized Control of Ventilation (Ventilation Optimization)
The actual outdoor airflow shall be sensed at the outdoor air intake of the RTU, and controlled to an airflow setpoint determined according to ASHRAE Standard 62.1. When the BAS time-of-day schedule indicates that a zone is unoccupied, the required outdoor airflow for that zone shall be zero. When the schedule indicates that a zone is occupied, the required outdoor airflow for that zone shall equal the design outdoor airflow, unless the zone is equipped with occupancy sensor and/or a carbon dioxide (CO₂) sensor, or uses a time-of-day ventilation schedule, to reduce the required outdoor airflow during periods of partial occupancy. The required outdoor-air fraction (current required outdoor airflow divided by the current primary airflow) shall be continuously calculated for each zone (VAV terminal unit). At a frequency of once every 10 minutes, the BAS shall gather this data from all VAV terminal units, calculate the minimum required outdoor airflow for the system according to ASHRAE 62.1, and send this newly-calculated outdoor airflow setpoint to the RTU controller.

*WIRED CONTROLS FROM APPROVED MANUFACTURERS ARE APPROVED AND ACCEPTABLE.



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DATE	ISSUE
06/29/2018	50% CD
27 JUL 2018	Construction Documentation
04 JAN 2018	Addendum 002

PROJECT NAME
AFFORDABLE HOUSING CAMPUS

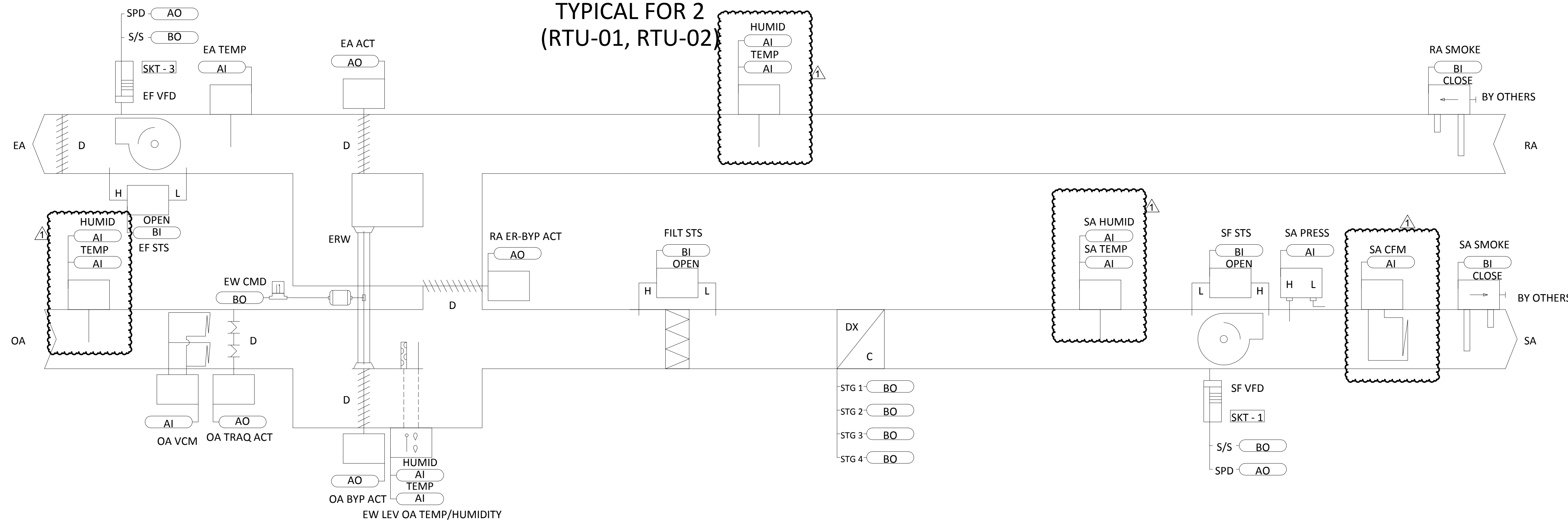
PROJECT ADDRESS

KIRKSEY PROJECT NO.
KEY PLAN

SHEET TITLE
MECHANICAL RTU FLOW DIAGRAM AND SEQUENCE OF OPERATIONS

SHEET NUMBER
1-M6.02

TYPICAL FOR 2 (RTU-01, RTU-02)



Building Automation System Interface:
The Building Automation System (BAS) shall send the controller Occupied Bypass, Pre-Cool, Occupied / Unoccupied and Heat / Cool modes. If a BAS is not present, or communication is lost with the BAS the controller shall operate using default modes and setpoints. The BAS shall also send the controller a duct static pressure setpoint, discharge air temperature setpoint, and ventilation airflow setpoint, each calculated by optimization routines in the BAS.

Occupied Modes:
During occupied periods, the supply fan shall run continuously and the outside air damper shall open to maintain current airflow setpoint. The unit controller shall control the supply fan speed to maintain the current duct static pressure setpoint (adj.). The compressors, energy recovery wheel (if enabled), and OA damper (if airside economizing is enabled) shall cycle/modulate to maintain discharge air temperature at setpoint (adj.).

Unoccupied Mode:
When the space temperature is above the unoccupied cooling setpoint of 85.0 deg. F (adj.) the supply fan shall start, the outside air damper shall open if economizing is enabled and remain closed if economizing is disabled and the DX cooling shall be enabled. The energy recovery wheel shall remain off. When the space temperature falls below the unoccupied cooling setpoint of 85.0 deg. F minus the unoccupied differential of 4.0 deg. F (adj.) the supply fan shall stop, the DX cooling shall be disabled and the outside air damper shall close.

Optimal Start:
The BAS shall monitor the scheduled occupied time, occupied space setpoints and space temperature to calculate when the optimal start occurs.

Pre-Cool Mode:
During optimal start, if the average space temperature is above the occupied cooling setpoint, pre-cool mode shall be activated. When pre-cool is initiated the unit shall enable the fan and cooling or economizer. The outside air damper shall remain closed, unless economizing. When the average space temperature reaches occupied cooling setpoint (adj.), the unit shall transition to the occupied mode.

Optimal Stop:
The BAS shall monitor the scheduled unoccupied time, occupied setpoints and space temperature to calculate when the optimal stop occurs. When the optimal stop mode is active the unit controller shall maintain the space temperature to the space temperature offset setpoint.

Occupied Bypass:
The BAS shall monitor the status of the "on" and "cancel" buttons of the space temperature sensors. When an occupied bypass request is received from a space sensor, the unit shall transition from its current occupancy mode to occupied bypass mode and the unit shall maintain the space temperature to the occupied setpoints (adj.).

Cooling Mode:
The unit controller shall use the discharge air temperature sensor and discharge air temperature cooling setpoint to determine when to initiate requests for cooling. Discharge air setpoint shall be maintained by modulating the economizer or staging the DX cooling as required to maintain the discharge air setpoint.

Building Pressure Control:
A differential pressure transducer shall actively monitor the difference in pressure between the building (indoors) and outdoors. If the building pressure increases above the differential pressure setpoint, the unit controller shall turn on the exhaust fan and modulate the exhaust fan VFD to control building pressure to the differential pressure setpoint. If the building pressure decreases below the differential pressure setpoint, the controller shall deactivate the exhaust fan VFD.

The outside pressure, inside building pressure, and adjustable differential pressure to be viewable through the BAS. Both RTUs shall communicate to prevent fighting to control building pressure.

Supply Air Temperature Reset Control:
The supply air temperature setpoint shall be reset to the optimal setpoint communicated by the BAS. The BAS shall reset the supply air temperature setpoint based on the current outside air temperature. The BAS shall override this reset function and return the supply air temperature setpoint to 57.2 deg. F (adj.) if more than two (adj.) zones begin to overheat. Also, the BAS shall override this reset function whenever outdoor dew point is higher than 60.0 deg. F (adj.) or indoor humidity is higher than 60% RH (adj.). If the supply air temperature drops below the minimum limit, a low temperature alarm shall be annunciated and the unit shall shut down. If the supply air temperature rises above the maximum limit, a high temperature alarm shall be annunciated.

Filter Status:
A differential pressure switch shall monitor the differential pressure across the filter when the fan is running. If the switch closes for 2 minutes after a request for fan operation a dirty filter alarm shall be annunciated at the BAS.

Economizer :
The supply air sensor shall measure the dry bulb temperature of the air leaving the evaporator coil while economizing. When economizing is enabled and the unit is operating in the cooling mode, the economizer damper shall be modulated between its minimum position and 100% to maintain the discharge air temperature setpoint. The economizer damper shall modulate toward minimum position in the event the discharge air temperature falls below the discharge low limit temperature setpoint. Compressors shall be delayed from operating until the economizer has opened to 100%.

Dry Bulb Control:
Outside air (OA) dry bulb shall be measured. The economizer shall enable when OA dry bulb is less than 65 degrees (adj.). The economizer shall disable when OA dry bulb is greater than 66 degrees (adj.).

Energy Recovery Wheel Operation:
When the OA enthalpy is higher than the RA enthalpy, the wheel shall be turned on and both OA and EA bypass dampers shall be closed. When the OA enthalpy is less than the RA enthalpy and the RTU is cooling (or airside economizing), the wheel shall be turned off and both OA and EA bypass dampers shall be open. When the RTU is heating, the wheel shall be turned on as the first stage of heat, the OA bypass damper shall be closed, and the EA bypass damper shall modulate (as necessary) to maintain discharge air temperature at setpoint (adj.). If the OA temperature drops below the frost threshold setpoint (adj.), the OA bypass damper shall modulate to maintain the exhaust side leaving temperature at setpoint.

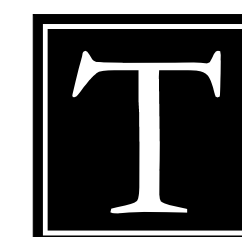
Ventilation Control:
When in the occupied mode, the flow-measuring outdoor-air damper shall modulate to maintain the current ventilation airflow setpoint. The ventilation airflow setpoint shall be reset to the optimal ventilation setpoint communicated by the BAS. The BAS shall reset the ventilation setpoint based on the current ventilation needs of the VAV terminals as determined by space CO2 sensors.

Supply Fan:
The supply fan shall be enabled while in the occupied mode and cycled on during the unoccupied mode. A differential pressure switch shall monitor the differential pressure across the fan. If the switch does not open within 40 seconds after a request for fan operation a fan failure alarm shall be annunciated at the BAS, the unit shall stop, requiring a manual reset.

Supply Duct Static Pressure Control:
The duct static pressure setpoint shall be reset to the optimal setpoint communicated by the BAS. The BAS shall reset the duct static pressure setpoint based on the position of the furthest open VAV damper. Upon a call for heating or cooling in the unoccupied mode the unit controller shall modulate the speed of the VFD to 100%. If for any reason the supply air pressure exceeds the supply air pressure high limit, the supply fan shall shut down. The unit shall be allowed to restart three times after a 15 minute off period. If the overpressurization condition occurs on the fourth restart, the unit shall shut down and a manual reset diagnostic is displayed at the remote panel and/or the BAS system.

Exhaust Fan Status:
A differential pressure switch shall monitor the differential pressure across the fan. If the switch is detected to be open for 40 consecutive seconds after a request for exhaust fan operation a fan failure alarm shall be annunciated at the BAS and the exhaust fan shall stop. A manual reset shall be required.

Smoke Detector Shutdown: The unit shall shut down in response to a signal from either smoke detector indicating the presence of smoke. The smoke detectors shall be interlocked to the unit through the dry contacts of the smoke detectors. A manual reset of the smoke detectors shall be required to restart the unit.



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27 JUL 2018	Construction Documentation
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2 04 JAN 2019	Addendum 002

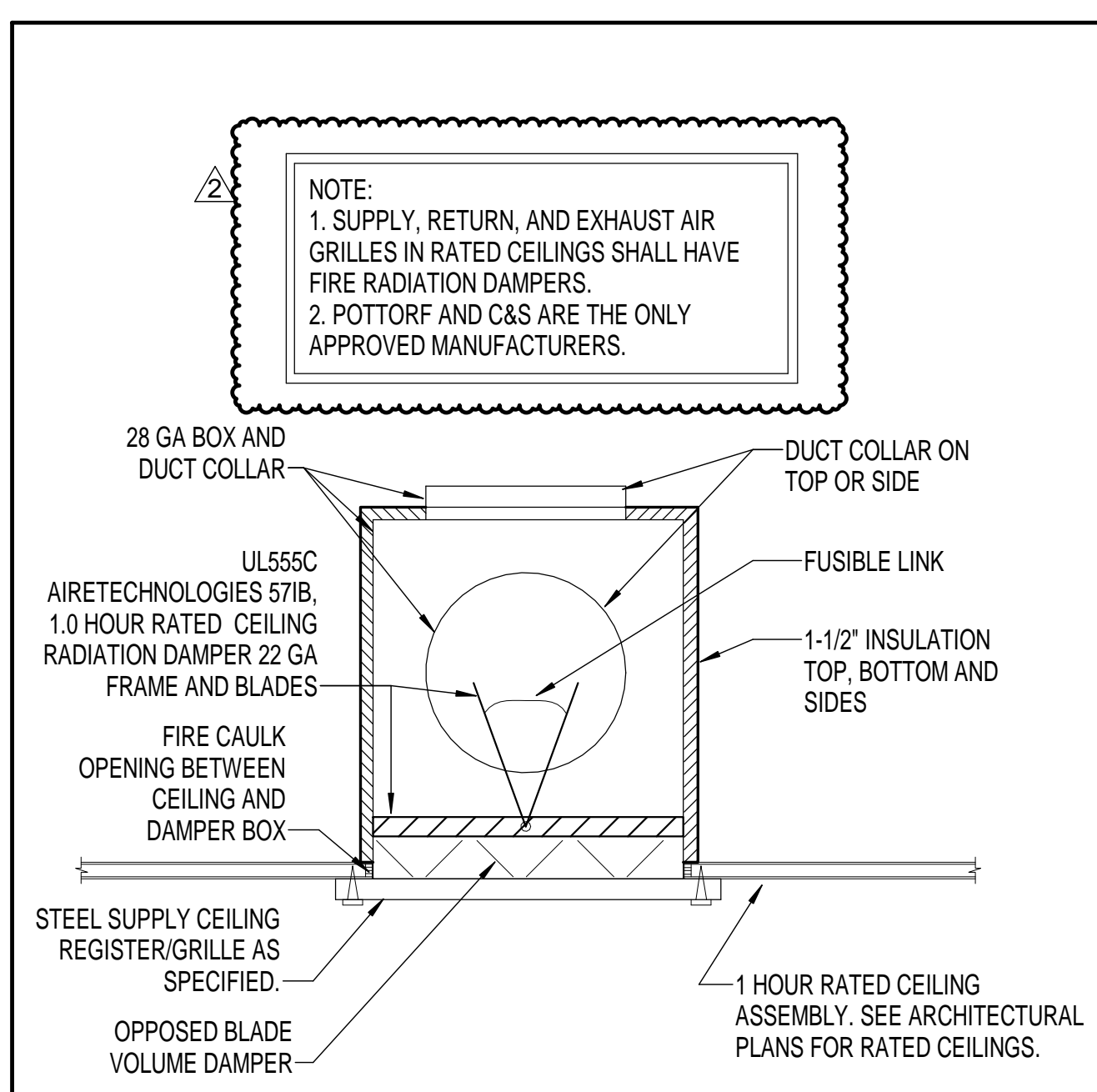
PROJECT NAME
**AFFORDABLE HOUSING
OPERATIONS CENTER**

PROJECT ADDRESS
**3119 EMANCIPATION AVE.
HOUSTON, TX 77004**

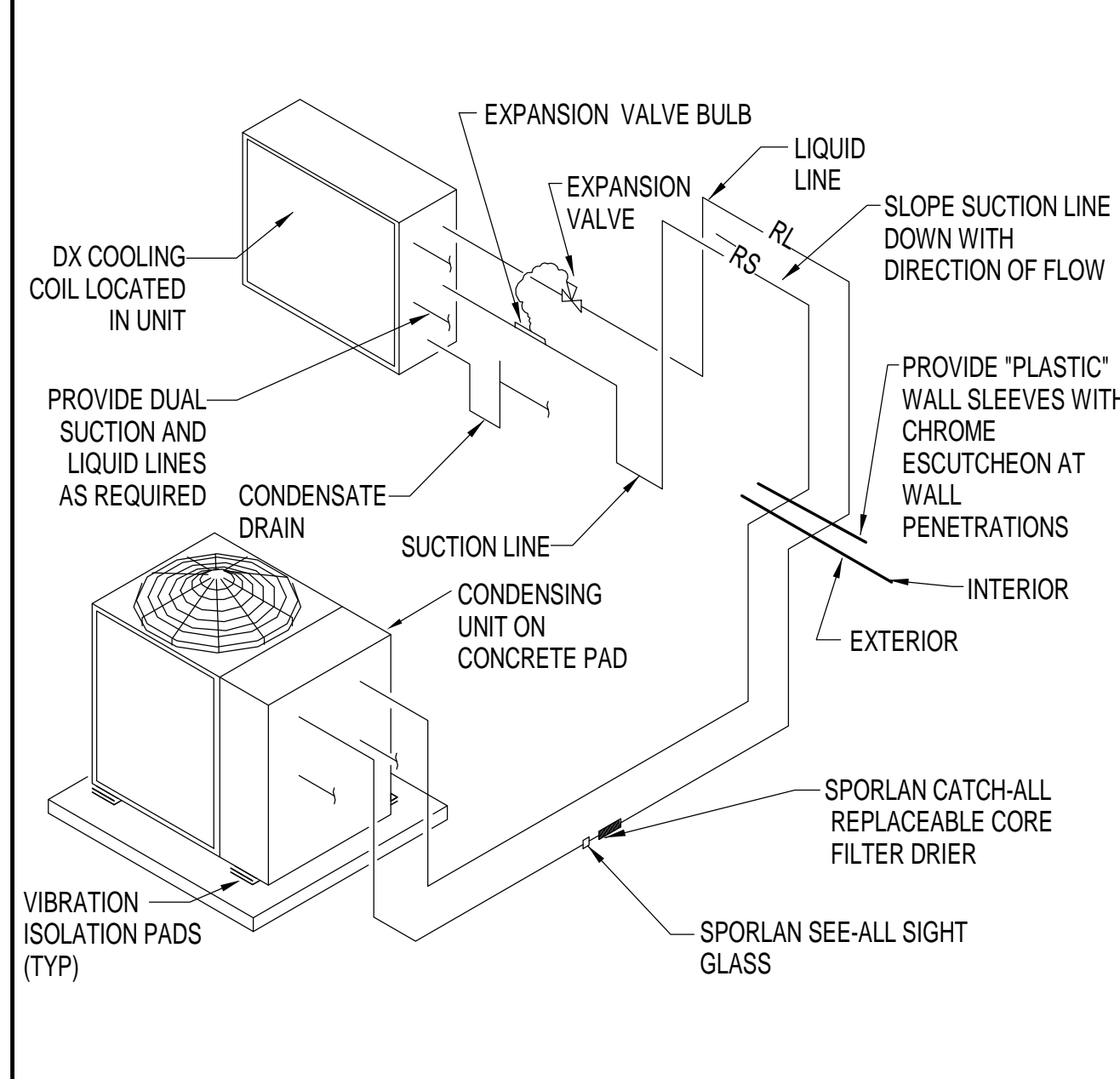
KIRKSEY PROJECT NO. **2017045**
KEY PLAN

SHEET TITLE
MECHANICAL DETAILS

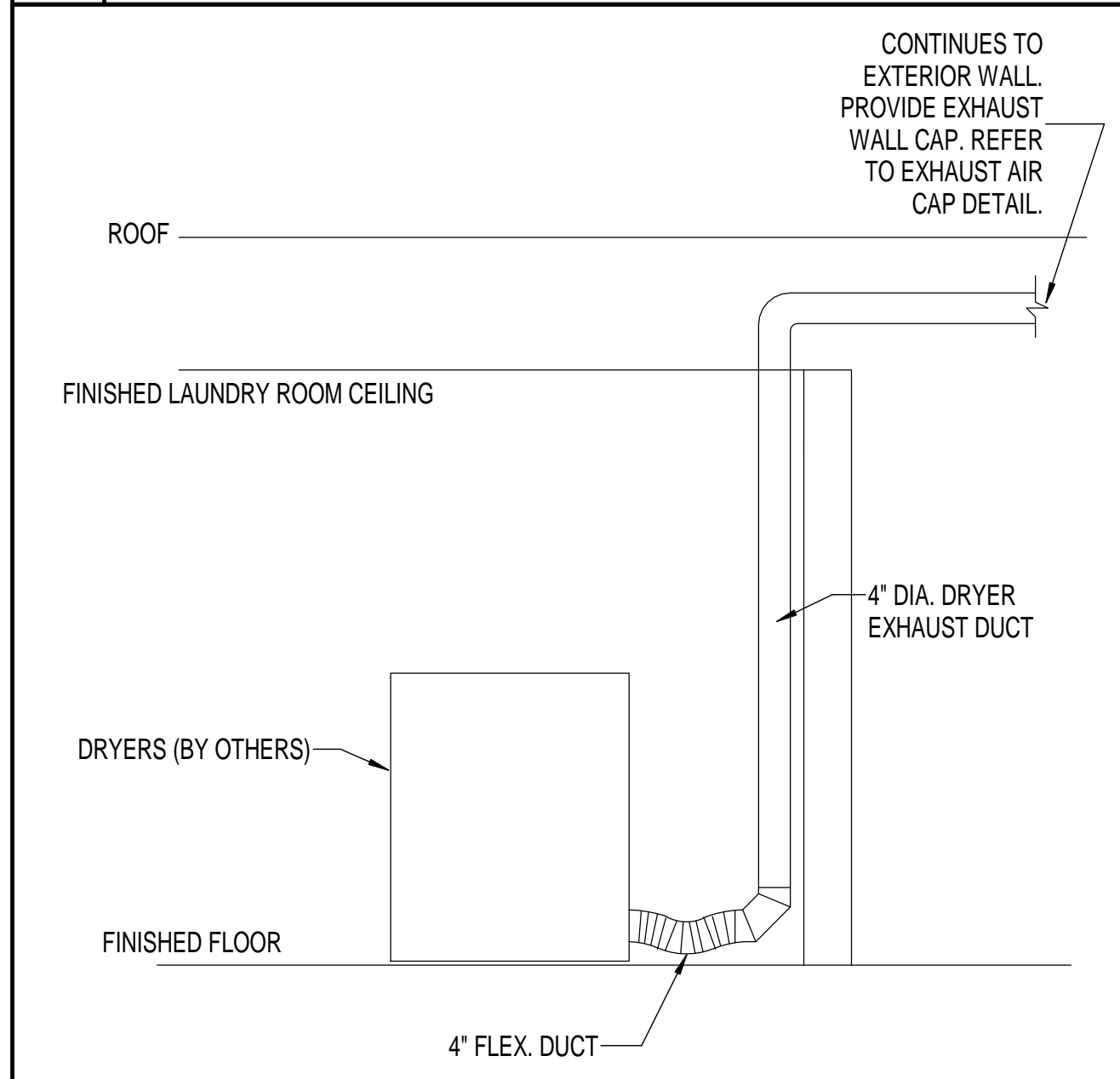
SHEET NUMBER
3-M3.00



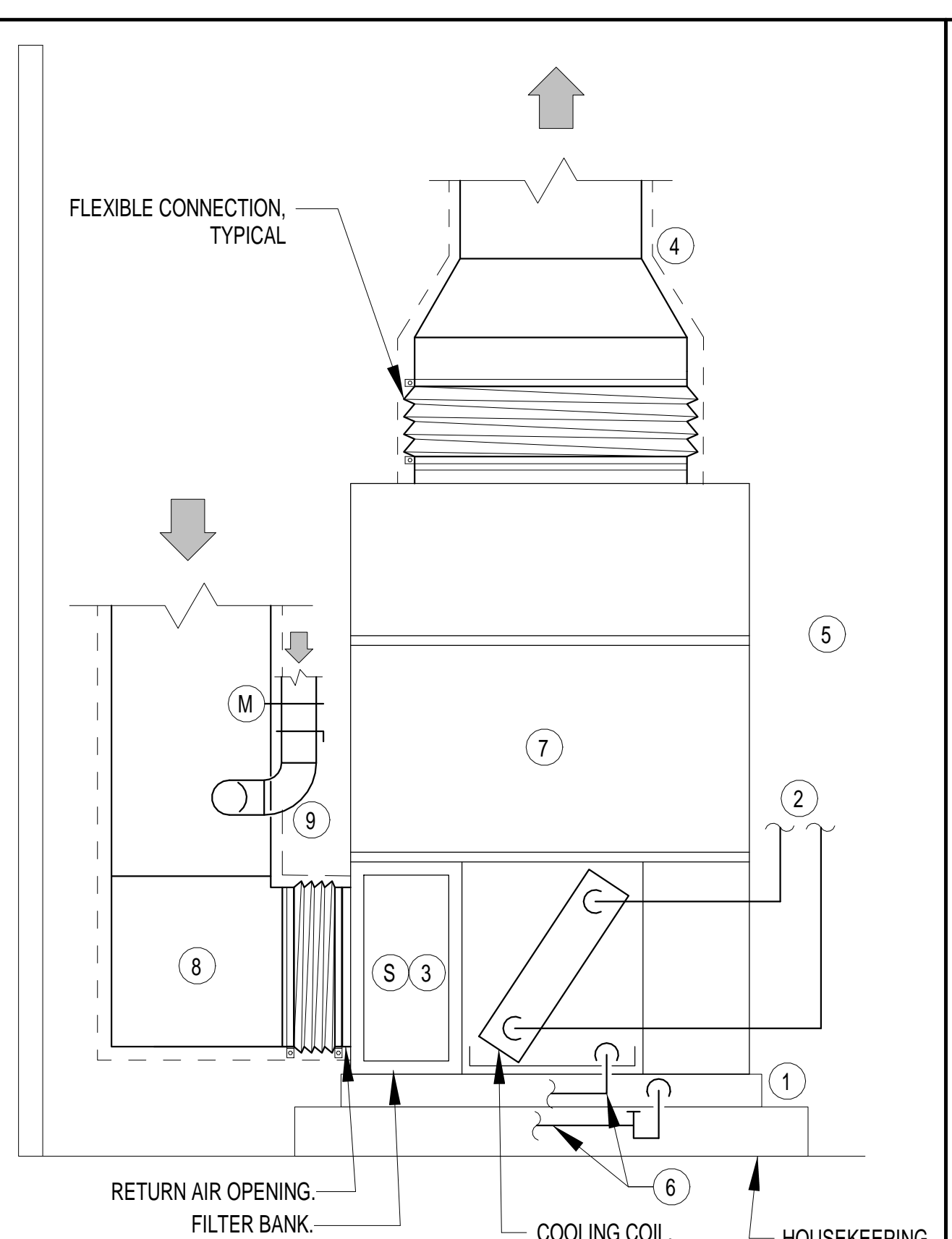
06 CEILING AIR DEVICE FIRE RADIATION DAMPER DETAIL



05 REFRIGERANT PIPING DETAIL



04 DRYER EXHAUST DUCTWORK DETAIL



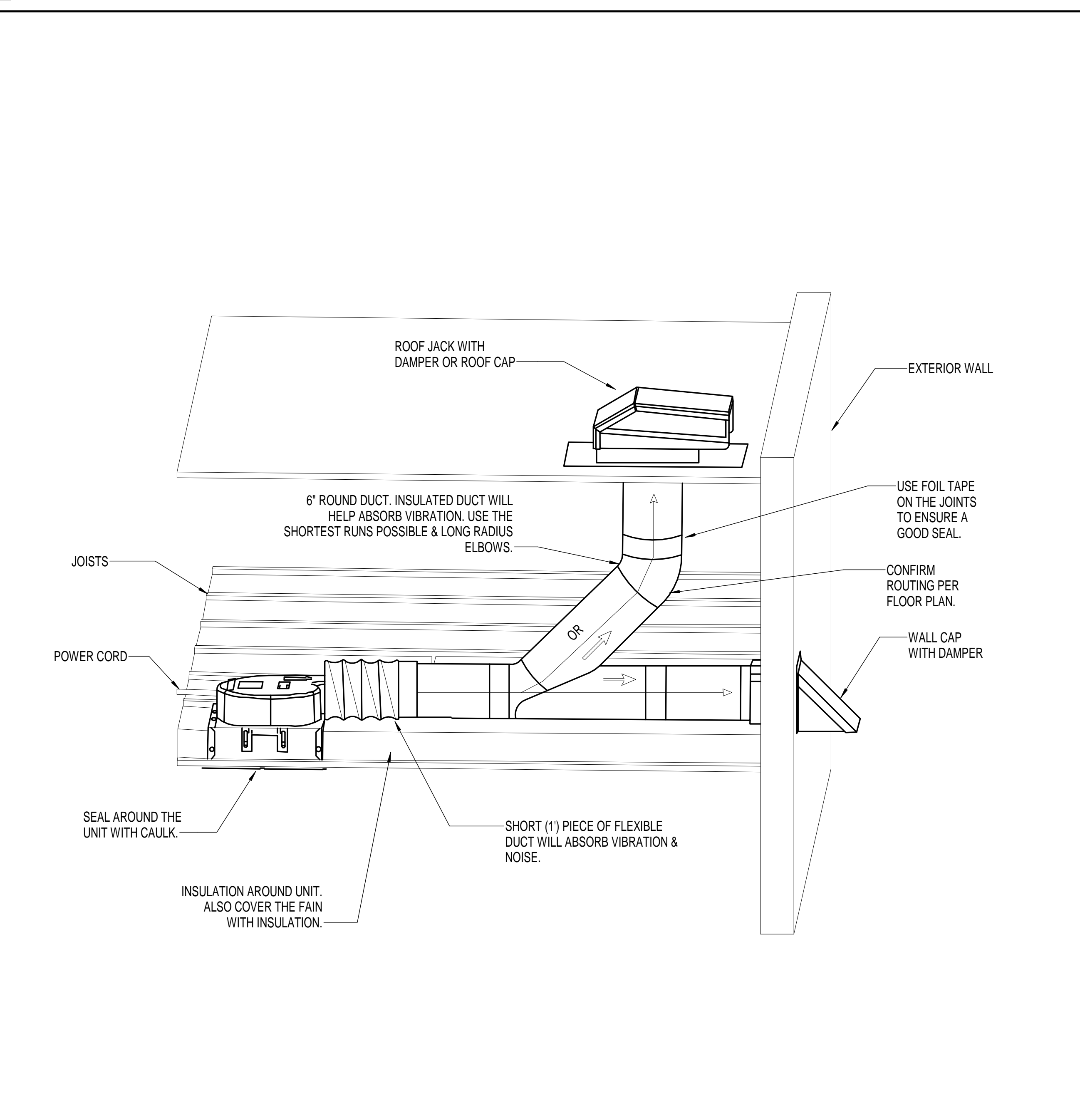
GENERAL NOTES:

- REFER TO PLANS FOR DUCTWORK CONFIGURATION FOR EACH INDIVIDUAL FAN COIL UNIT. REFER TO PLANS AND SPECIFICATION FOR SPECIFICATION FOR SPECIFIC FAN COIL, VIBRATION ISOLATOR, FLEXIBLE DUCT, DUCTWORK, PIPING, STOP VALVES, CONTROLS AND FAN COIL INSTALLATION REQUIREMENTS ETC.
- REFER TO PLANS FOR FAN COIL UNITS DESIGN AIR QUANTITY.
- PROVIDE FLEXIBLE CONNECTION AT FAN COIL UNIT DISCHARGE.
- PROVIDE VIBRATION ISOLATORS SPRING TYPE WITH FAN COIL UNIT.
- COORDINATE ROUTING OF REFRIGERANT LINES WITH CLEARANCE REQUIRED FOR SERVICE ACCESS AND FILTER REMOVAL.

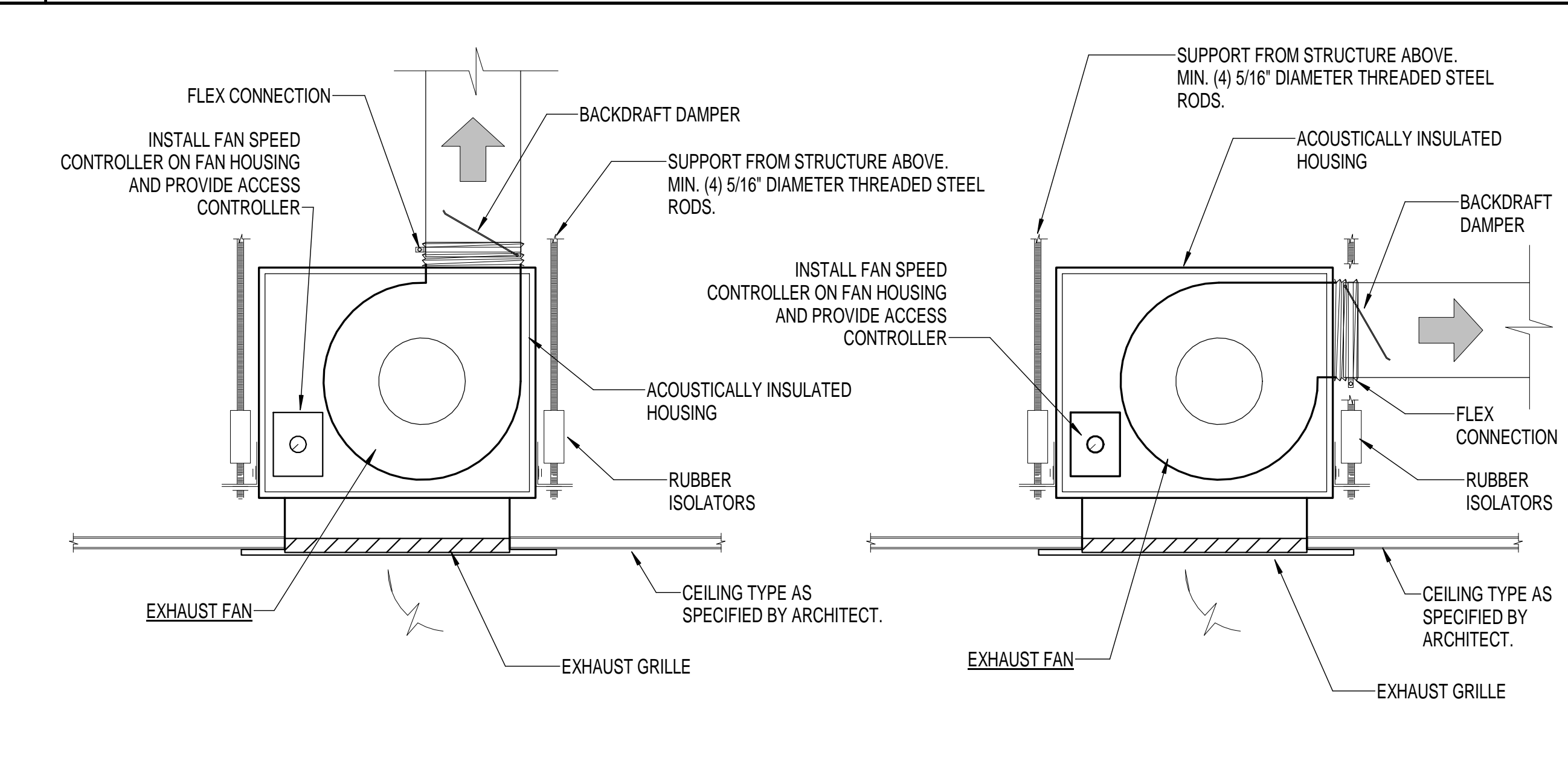
NOTES BY SYMBOL

- PROVIDE AUXILIARY DRAIN PAN WITH FAN COIL UNIT. DIMENSIONS OF DRAIN PAN SHALL EXTEND 2' BEYOND THE FAN COIL UNIT ON ALL SIDES. ROUTE INSULATED AUXILIARY DRAIN AND CONDENSATE DRAIN LINES TO LOCATION INDICATED ON PLANS. FLOAT SWITCH CONFORMING TO UL 508 MAY BE USED IN LIEU OF AUXILIARY DRAIN LINE. FLOAT SWITCH TO DE-ENERGIZE UNIT WHEN WATER IS DETECTED IN AUXILIARY DRAIN PAN. REFER TO PLANS FOR AUXILIARY DRAIN SYSTEM.
- REFRIGERANT PIPING, SIZE AND ROUTE ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
- DUCT MOUNTED SMOKE DETECTOR FOR UNITS GREATER THAN 2000 CFM. REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS AND CONFIRM LOCATION WITH LOCAL AUTHORITY HAVING JURISDICTION.
- EXTERNALLY WRAPPED DUCTWORK INSULATION. REFER TO BASE BUILDING SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- MAINTENANCE AND SERVICE ACCESS CLEARANCE. GENERAL CONTRACTOR IS RESPONSIBLE FOR KEEPING SIDES OF FAN COIL UNIT CLEAR OF OBSTRUCTION FOR AUXILIARY DRAIN PAN REMOVAL.
- INSULATED, TRAPPED CONDENSATE DRAIN LINE AND AUXILIARY PAN DRAIN LINE. AUXILIARY PAN NOT REQUIRED IF FLOAT SWITCH IS INSTALLED. REFER TO MECHANICAL SCHEDULES TO VERIFY IF CONDENSATE PUMP NECESSARY.
- FAN COIL/AIR HANDLER UNIT (FCU/AHU) TO BE INSTALLED ON HOUSEKEEPING PAD. COORDINATE FAN COIL/AIR HANDLER UNIT LOCATION WITH STRUCTURAL AND ARCHITECTURAL ELEMENTS TO MAINTAIN REQUIRED ACCESS TO MOTORS, FILTERS, VALVES, AND ACCESS TO PANEL ON UNIT. CONTRACTOR SHALL BE RESPONSIBLE FOR KEEPING WORKING CLEARANCES FREE OF PIPING, CONDUIT, DUCTS, AND OTHER OBSTRUCTIONS.
- UNLESS NOTED OTHERWISE, FIELD FABRICATED PLENUM BOX WITH EXTERNALLY WRAPPED DUCTWORK. PROVIDE MANUAL BALANCE DAMPER AT THE END OF PLENUM BOX TO BALANCE THE SYSTEM.
- OUTSIDE AIR DUCT WITH MANUAL BALANCING DAMPER AND MOTORIZED DAMPER. MOTORIZED AIR DAMPER SHALL OPEN WHEN CONDENSING UNIT IS ENERGIZED OR HEATING COIL IS ENABLED. BALANCE TO CFM INDICATED ON PLANS.

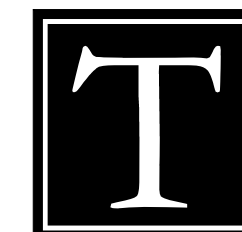
03 DUCTED VERTICAL FAN COIL UNIT INSTALLATION DETAIL



02 EXHAUST AIR CAP DETAIL



01 CEILING MOUNTED EXHAUST FAN



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KIRKSEY PROJECT NO. **2017045**

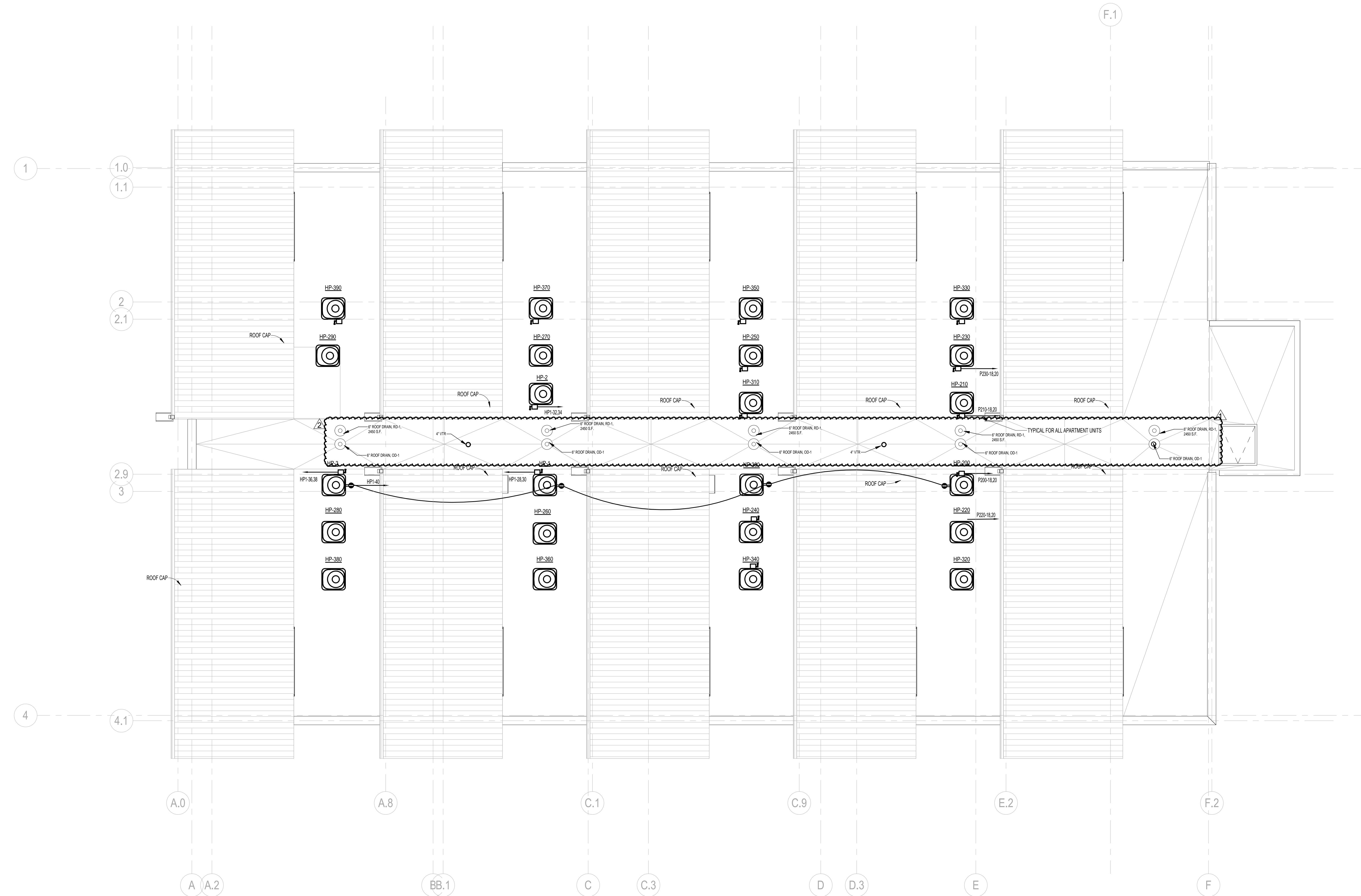
KEY PLAN

SHEET TITLE
HOUSING MEP ROOF PLAN

SHEET NUMBER

3-MEP1.00

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1 MEP HOUSING ROOF PLAN
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