

EQUIPMENT ABBREVIATIONS			
ACC	AIR COOLED CONDENSER	FUR	FURNACE
ACCU	AIR COOLING CONDENSING UNIT	GEN	GENERATOR
ACP	AIR COMPRESSOR	HUM	HUMIDIFIER
AF	AIR FILTER	HC	HEATING COIL
AFMS	AIR FLOW MEASURING STATION	HRT	HEAT RECOVERY UNIT
AHU	AIR HANDLING UNIT	HTR	HEATER
AS	AIR SEPARATOR	HX	HEAT EXCHANGE
B	BOILER	HPU	HEAT PUMP UNIT
CC	COOLING COIL	MAU	MAKE-UP AIR UNIT
CF	CABINET FAN	OB	OPPOSED BLADE DAMPER
CFE	CHEMICAL FEEDER	P	PUMP
CFP	CHEMICAL FEED PUMP	PW	POWER ROOF VENTILATOR
CH	CHILLER	RF	RETURN FAN
CP	CONDENSATE PUMP	RHC	REHEAT COIL
CRAC	COMPUTER ROOM AIR CONDITIONER	RMS	RADIANT MIXING BLOCK
CRU	CONDENSATE RETURN UNIT	RTU	ROOF TOP UNIT
CSG	CLEAN STEAM GENERATOR	SAT	SOUND ATTENUATOR
CT	COOLING TOWER	SEP	SEWAGE EJECTOR PUMP
CUH	CABINET UNIT HEATER	SF	SUPPLY FAN
CWP	CONDENSER WATER PUMP	SP	SUMP PUMP
DBP	DOMESTIC WATER BOOSTER PUMP	UH	UNIT HEATER
EAV	EXHAUST AIR VALVE	US	UTILITY SET
EF	EXHAUST FAN	UV	UNIT VENTILATOR
ERU	ENERGY RECOVERY UNIT	VAV	VARIABLE AIR VOLUME BOX
ET	EXPANSION TANK	WF	WATER FILTER
FCU	FAN COIL UNIT	WFMS	WATER FLOW MEASURING STATION
FP	FIRE PUMP	WH	WATER HEATER

GENERAL SYMBOLS	
	REVISION NUMBER, SHOWN ON PLAN
	TIE IN POINT
	KEYED NOTE
	NUMBER OF DETAIL NUMBER OF SHEET WHERE DETAIL APPEARS

CONTROL SYMBOLS	
	THERMOSTAT
	THERMOSTAT, REVERSE ACTING
	THERMOSTAT WITH LOCKING SECURITY COVER
	HUMIDISTAT
	TEMPERATURE SENSOR
	HUMIDITY SENSOR
	SENSOR (OTHER)
	(REFER TO GEN. ABBREVIATION FOR SENSOR TYPE)

PIPING SYMBOLS			
----- A -----	AIR		CHECK VALVE
----- AV -----	ACID VENT		SHUT-OFF VALVE
----- AW -----	ACID WASTE		THROTTLING VALVE
----- AWBS -----	ACID WASTE, BELOW SLAB		CIRCUIT BALANCING VALVE
----- BBD -----	BOILER BLOW DOWN		TWO-WAY CONTROL VALVE
----- BBW -----	BOILER FEED WATER		THREE-WAY CONTROL VALVE
----- CHW -----	CHILLED WATER RETURN		PRESSURE REDUCING VALVE
----- CHWR -----	CHILLED WATER SUPPLY		STRAINER
----- CLPS -----	CLEAN LOW PRESSURE STEAM		TRIPLE DUTY VALVE
----- CMPS -----	CLEAN MEDIUM PRESSURE STEAM		UNION
----- CO -----	CARBON DIOXIDE		PRESSURE GAUGE
----- COND -----	CONDENSATE RETURN		STEAM TRAP
----- CW -----	DOMESTIC COLD WATER		THERMOMETER
----- CWR -----	CONDENSER WATER RETURN		FLOW DIRECTION ARROW
----- CWS -----	CONDENSER WATER SUPPLY		FLOW CONTROL VALVE
----- D -----	INDIRECT DRAIN		WATER FLOW MEASURING STATION
----- DI -----	DEIONIZED WATER		METER
----- DW -----	DISTILLED WATER		PUMP
----- FOR -----	FUEL OIL RETURN		DROP IN PIPE
----- FOS -----	FUEL OIL SUPPLY		RISE IN PIPE
----- FOV -----	FUEL OIL VENT		PIPE CAP
----- FP -----	FIRE PROTECTION MAIN		PIPE CLEANOUT
----- FPD -----	FIRE PROTECTION DRY SYSTEM		PIPE CONNECTION
----- FPPA -----	FIRE PROTECTION PRE-ACTION SYSTEM		EXPANSION JOINT
----- FPW -----	FIRE PROTECTION WET SYSTEM		RP2 BACK FLOW PREVENTER
----- GAS -----	GAS		AUTO AIR VENT
----- GR -----	GLYCOL RETURN		MANUAL AIR VENT
----- GS -----	GLYCOL SUPPLY		RELIEF VALVE
----- GW -----	GREASE WASTE		FIN-TUBE RADIATION ELEMENT
----- HPC -----	HIGH PRESSURE STEAM CONDENSATE		FLOOR DRAIN (SIZE AS INDICATED)
----- HPS -----	HIGH PRESSURE STEAM		HOSE BIB OR WALL HYDRANT
----- HPWR -----	HEAT PUMP WATER RETURN		PIPING, HEAT TRACED
----- HPWS -----	HEAT PUMP WATER SUPPLY		PIPING PITCH, DOWN
----- HRR -----	HEAT RECOVERY WATER RETURN		PIPE ANCHOR
----- HRS -----	HEAT RECOVERY WATER SUPPLY		PIPE GUIDE
----- HW -----	DOMESTIC HOT WATER		
----- HWR -----	HEATING WATER RETURN		
----- HWS -----	HEATING WATER SUPPLY		
----- LPC -----	LOW PRESSURE STEAM CONDENSATE		
----- LPG -----	LIQUID PETROLEUM GAS		
----- LPS -----	LOW PRESSURE STEAM		
----- MED AIR -----	MEDICAL AIR		
----- MED VAC -----	MEDICAL VACUUM		
----- MPC -----	MEDIUM PRESSURE STEAM CONDENSATE		
----- MPS -----	MEDIUM PRESSURE STEAM		
----- N2 -----	NITROGEN		
----- N2O -----	NITROUS OXIDE		
----- NG -----	NATURAL GAS		
----- NP -----	NON-POTABLE WATER		
----- O2 -----	OXYGEN		
----- OVFL -----	OVERFLOW STORM DRAIN		
----- P -----	PUMPED CONDENSATE		
----- RD -----	REFRIGERANT DISCHARGE (HOT GAS)		
----- RL -----	REFRIGERANT LIQUID		
----- RS -----	REFRIGERANT SUCTION		
----- SD -----	STORM DRAIN		
----- SDBS -----	STORM DRAIN, BELOW SLAB		
----- SW -----	SOFTENED WATER		
----- TWR -----	TEMPERED WATER RETURN		
----- TWS -----	TEMPERED WATER SUPPLY		
----- V -----	VENT		
----- V -----	WASTE/SANITARY		
----- WAGD -----	WASTE/ANESTHETIC GAS DISPOSAL		
----- WBS -----	WASTE/SANITARY, BELOW SLAB		
----- WC -----	WASTE CONDENSATE (COLD COND.)		

GENERAL ABBREVIATIONS			
Ø	DIAMETER	FA	FRESH AIR
A	AIR	FD	FLOOR DRAIN
AC	AIR CONDITIONING	FLEX	FLEXIBLE
AD	ACCESS DOOR	FLG	FLANGE
AFF	ABOVE FINISHED FLOOR	FOB	FLAT ON BOTTOM
AG	ABOVE GROUND	FOP	FUEL OIL FILL
ALT	ALTERNATE	FOV	FUEL OIL VENT
ALUM	ALUMINUM	FOR	FUEL OIL RETURN
AP	ACCESS PANEL	FOS	FUEL OIL SUPPLY
APD	AIR PRESSURE DROP	FOT	FLAT ON TOP
APPROX	APPROXIMATE	FRP	FIBERGLASS REINFORCED PIPE
ARCH	ARCHITECT/ARCHITECTURAL	FT	FOOT (FEET)
AV	ACID VENT	FTG	FOOTING
AW	ACID WASTE	FTR	FIN TUBE RADIATION
AUTO	AUTOMATIC	GA	GAUGE
BLDG	BUILDING	GALL	GALLON
BOT	BOTTOM OF DUCT	GALV	GALVANIZED
BTD	BOTTOM	GC	GENERAL CONTRACTOR
BMT	BASEMENT	GPH	GALLONS PER HOUR
BTU	BRITISH THERMAL UNITS	GR	GRADE
BTUH	BRITISH THERMAL UNITS PER HOUR	HD	HEAD
CAP	CAPACITY	HGW	HEATING HOT WATER
CAV	CONSTANT AIR VOLUME	HURZ	HORIZONTAL
CB	CATCH BASIN	HP	HORSE POWER
CFM	CUBIC FEET PER MINUTE	HPS	HIGH PRESSURE STEAM
CFV	CONSTANT FLOW CONTROL VALVE	HPC	HIGH PRESSURE CONDENSATE
CH	CHEMICAL	HTG	HEATING
CLG	CEILING	HVAC	HEATING, VENTILATION, AIR CONDITIONING
CLG	COOLING	HW	DOMESTIC HOT WATER
CO	CARBON MONOXIDE	IN	INCHES
CO	CLEAN OUT	IN	INLET
CO2	CARBON DIOXIDE	INSUL	INSULATION
COL	COLUMN	INT	INTERIOR
COMB	COMBINATION	INV	INVERT
CONC	CONCRETE	INWG	INCHES WATER GAUGE
COND	CONDENSATE	IPLV	INTEGRATED PART LOAD VALVE
CONN	CONNECT	KBTU	ONE THOUSAND BTU PER HOUR
CONST	CONSTRUCT	LAB	LABORATORY
CONT	CONTINUE, CONTINUATION	LB	POUND
CONTR	CONTRACTOR	LBHR	POUNDS PER HOUR
COORD	COORDINATE	LF	LINEAL FEET
CTR	CENTER	LOC	LOCATION
CUFT	CUBIC FEET	LP	LOW PRESSURE
CV	CHECK VALVE	LPG	LIQUIFIED PETROLEUM GAS
CW	DOMESTIC COLD WATER	LVR	LOUVER
°	DEGREE	LWT	LEAVING WATER TEMPERATURE
DAT	DISCHARGE AIR	M/A	MIXED AIR
DB	DRY BULB	MAD	MIXED AIR DAMPER
DI	DEIONIZED WATER	MAN	MANUAL
DIA	DIAMETER	MAT	MIXED AIR TEMPERATURE
DIAG	DIAGONAL	MATL	MATERIAL
DISCH	DISCHARGE	MAV	MANUAL AIR VENT
DIR	DEIONIZED WATER RETURN	MAX	MAXIMUM
DS	DEIONIZED WATER SUPPLY	MBD	MOTORIZED BYPASS DAMPER
DV	DIVISION	MBH	ONE THOUSAND BTU PER HOUR
DN	DOWN	MFC	ONE THOUSAND CUBIC FEET
DW	DISTILLED WATER	MD	MOTORIZED DAMPER
DWG	DRAWING	MECH	MECHANICAL
EA	EACH	MFR	MANUFACTURER
EAT	ENTERING AIR TEMPERATURE	MH	MANHOLE
EG	ETHYLENE GLYCOL	MN	MANHOLE
EL	ELBOW	MISC	MISCELLANEOUS
ELEC	ELECTRICAL	MMBH	ONE MILLION BTU PER HOUR
ELEV	ELEVATION	MTR	MOTOR
EQ	EQUAL	MUA	MAKE-UP AIR
EQUIP	EQUIPMENT	NC	NORMALLY CLOSED
ESP	EXTERNAL STATIC PRESSURE	NIC	NOT IN CONTRACT
EWT	ENTERING WATER TEMPERATURE	NO	NORMALLY OPEN
EX	EXISTING	NOM	NOMINAL
EXP	EXPANSION	NPLV	NOMINAL PART LOAD VALVE
EXT	EXTERIOR	NTS	NOT TO SCALE
F or °F	DEGREES FAHRENHEIT		

Ø	DIAMETER	FA	FRESH AIR	OXY	OXYGEN
A	AIR	FD	FLOOR DRAIN	OA	OUTSIDE AIR
AC	AIR CONDITIONING	FLEX	FLEXIBLE	OAD	OUTSIDE AIR DAMPER
AD	ACCESS DOOR	FLG	FLANGE	OAT	OUTSIDE AIR TEMPERATURE
AFF	ABOVE FINISHED FLOOR	FOB	FLAT ON BOTTOM	OC	ON CENTER
AG	ABOVE GROUND	FOP	FUEL OIL FILL	OF	OVERFLOW
ALT	ALTERNATE	FOV	FUEL OIL VENT	ORD	OVERFLOW ROOF DRAIN
ALUM	ALUMINUM	FOR	FUEL OIL RETURN	PD	PRESSURE DROP
AP	ACCESS PANEL	FOS	FUEL OIL SUPPLY	PG	PROPYLENE GLYCOL
APD	AIR PRESSURE DROP	FOT	FLAT ON TOP	PIV	POST INDICATOR VALVE
APPROX	APPROXIMATE	FRP	FIBERGLASS REINFORCED PIPE	PLBG	PLUMBING
ARCH	ARCHITECT/ARCHITECTURAL	FT	FOOT (FEET)	PAIR	PAIR
AV	ACID VENT	FTG	FOOTING	PREL	PRELIMINARY
AW	ACID WASTE	FTR	FIN TUBE RADIATION	PRESS	PRESSURE
AUTO	AUTOMATIC	GA	GAUGE	PRV	PRESSURE REDUCING STATION
BLDG	BUILDING	GALL	GALLON	PSI	PRESSURE REDUCING VALVE
BOT	BOTTOM OF DUCT	GALV	GALVANIZED	PSIG	POUNDS PER SQUARE INCH GAUGE
BTD	BOTTOM	GC	GENERAL CONTRACTOR	PW	POTABLE WATER
BMT	BASEMENT	GPH	GALLONS PER HOUR	PWR	POWER
BTU	BRITISH THERMAL UNITS	GR	GRADE	RA	RETURN AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	HD	HEAD	RAD	RETURN AIR DAMPER
CAP	CAPACITY	HGW	HEATING HOT WATER	RAT	RETURN AIR TEMPERATURE
CAV	CONSTANT AIR VOLUME	HURZ	HORIZONTAL	RCP	RADIANT CEILING PANEL
CB	CATCH BASIN	HP	HORSE POWER	RD	ROOF DRAIN
CFM	CUBIC FEET PER MINUTE	HPS	HIGH PRESSURE STEAM	REC	RECESSED
CFV	CONSTANT FLOW CONTROL VALVE	HPC	HIGH PRESSURE CONDENSATE	RECT	RECTANGULAR
CH	CHEMICAL	HTG	HEATING	RED	REDUCER
CLG	CEILING	HVAC	HEATING, VENTILATION, AIR CONDITIONING	REFR	REFRIGERATION
CLG	COOLING	HW	DOMESTIC HOT WATER	RH	RELATIVE HUMIDITY
CO	CARBON MONOXIDE	IN	INCHES	REQD	REQUIRED
CO	CLEAN OUT	IN	INLET	RLA	RELIEF AIR
CO2	CARBON DIOXIDE	INSUL	INSULATION	RLD	RELIEF AIR DAMPER
COL	COLUMN	INT	INTERIOR	RM	ROOM
COMB	COMBINATION	INV	INVERT	RND	ROUND
CONC	CONCRETE	INWG	INCHES WATER GAUGE	RPM	REVOLUTIONS PER MINUTE
COND	CONDENSATE	IPLV	INTEGRATED PART LOAD VALVE	RPZ	REDUCED PRESSURE ZONE
CONN	CONNECT	KBTU	ONE THOUSAND BTU PER HOUR	SA	SANITARY
CONST	CONSTRUCT	LAB	LABORATORY	SAN	SCHEDULE
CONT	CONTINUE, CONTINUATION	LB	POUND	SCHED	SCHEDULE
CONTR	CONTRACTOR	LBHR	POUNDS PER HOUR	SECT	SECTION
COORD	COORDINATE	LF	LINEAL FEET	SF	SQUARE FEET
CTR	CENTER	LOC	LOCATION	SD	SMOKE DAMPER
CUFT	CUBIC FEET	LP	LOW PRESSURE	SHT	SHEET
CV	CHECK VALVE	LPG	LIQUIFIED PETROLEUM GAS	SIM	SIMILAR
CW	DOMESTIC COLD WATER	LVR	LOUVER	SLV	SLEEVE
°	DEGREE	LWT	LEAVING WATER TEMPERATURE	SP	STATIC PRESSURE
DAT	DISCHARGE AIR	M/A	MIXED AIR	SPEC	SPECIFICATION
DB	DRY BULB	MAD	MIXED AIR DAMPER	SPS	STATIC PRESSURE STATION
DI	DEIONIZED WATER	MAN	MANUAL	SQ	SQUARE
DIA	DIAMETER	MAT	MIXED AIR TEMPERATURE	SRV	SAFETY RELIEF VALVE
DIAG	DIAGONAL	MATL	MATERIAL	SS	STAINLESS STEEL
DISCH	DISCHARGE	MAV	MANUAL AIR VENT	STD	STANDARD
DIR	DEIONIZED WATER RETURN	MAX	MAXIMUM	STM	STEAM
DS	DEIONIZED WATER SUPPLY	MBD	MOTORIZED BYPASS DAMPER	STRUCT	STRUCTURAL
DV	DIVISION	MBH	ONE THOUSAND BTU PER HOUR	SUCT	SUCTION
DN	DOWN	MFC	ONE THOUSAND CUBIC FEET	SUSP	SUSPENDED
DW	DISTILLED WATER	MD	MOTORIZED DAMPER	TCP	TEMPERATURE CONTROL PANEL
DWG	DRAWING	MECH	MECHANICAL	TCEC	TOTALLY ENCLOSED FAN COOLED
EA	EACH	MFR	MANUFACTURER	TEFC	TEMPERATURE CONTROL PANEL
EAT	ENTERING AIR TEMPERATURE	MH	MANHOLE	TEMP	TEMPERATURE
EG	ETHYLENE GLYCOL	MN	MANHOLE	TSP	TOTAL STATIC PRESSURE
EL	ELBOW	MISC	MISCELLANEOUS	TYP	TYPICAL
ELEC	ELECTRICAL	MMBH	ONE MILLION BTU PER HOUR	UG	UNDERGROUND
ELEV	ELEVATION	MTR	MOTOR	VAC	VACUUM
EQ	EQUAL	MUA	MAKE-UP AIR	V	VENT
EQUIP	EQUIPMENT	NC	NORMALLY CLOSED	VEL	VELOCITY
ESP	EXTERNAL STATIC PRESSURE	NIC	NOT IN CONTRACT	VENT	VENTILATION
EWT	ENTERING WATER TEMPERATURE	NO	NORMALLY OPEN	VERT	VERTICAL
EX	EXISTING	NOM	NOMINAL	VFD	VARIABLE FREQUENCY DRIVE
EXP	EXPANSION	NPLV	NOMINAL PART LOAD VALVE	VOL	VOLUME
EXT	EXTERIOR	NTS	NOT TO SCALE	VTR	VENT THROUGH ROOF
F or °F	DEGREES FAHRENHEIT			WB	WET BULB
				WC	WATER COLUMN
				WCO	WALL CLEAN OUT
				WPD	WATER PRESSURE DROP

AIRSIDE SYMBOLS			
	FIRE DAMPER		RECTANGULAR DUCT (WIDTHxHEIGHT IN INCHES)
	FIRE/SMOKE DAMPER		ROUND SPIRAL DUCT (DIAMETER IN INCHES)
	SMOKE DAMPER		OVAL DUCT (WIDTHxHEIGHT IN INCHES)
	MANUAL/VOLUME DAMPER		SUPPLY DUCT TOWARD VIEWER
	AIRFLOW MEASURING STATION		SUPPLY DUCT AWAY FROM VIEWER
	MOTORIZED DAMPER		RETURN DUCT TOWARD VIEWER
	BACK DRAFT DAMPER		RETURN DUCT AWAY FROM VIEWER
	VARIABLE AIR VOLUME VALVE		EXHAUST DUCT TOWARD VIEWER
	VARIABLE AIR VOLUME VALVE WITH REHEAT COIL		EXHAUST DUCT AWAY FROM VIEWER
	SOUND ATTENUATOR		CHANGE IN DUCT ELEVATION - RISE INDICATED BY "UP"
	SUPPLY AIR OUTLET (ARROWS INDICATE DIRECTION OF THROW; IF NO ARROWS, 4-WAY THROW)		CHANGE IN DUCT ELEVATION - DROP INDICATED BY "DN"
	RETURN AIR INLET		SIDE ACCESS DOOR (VERTICAL)
	EXHAUST AIR INLET		TOP ACCESS DOOR (HORIZONTAL)
	RECTANGLE TO ROUND TRANSITION		BOTTOM ACCESS DOOR (HORIZONTAL)
	STRAIGHT TAP		FLEXIBLE CONNECTION
	45° ENTRY TAP		DUCT LINING
	HIGH EFFICIENCY TAP		SIDEWALL DIFFUSER
	RECTANGLE TO ROUND		SIDEWALL GRILLE
			TRANSFER GRILLES
			UNDERCUT DOOR (R=CLEARANCE)

GENERAL MECHANICAL NOTES	
1.	REFER TO "DIVISION 1 - GENERAL REQUIREMENTS" IN THE PROJECT MANUAL FOR WORK THAT IS THE RESPONSIBILITY OF ALL CONTRACTORS.
2.	IT IS THE RESPONSIBILITY OF THE MECHANICAL CONTRACTORS TO COORDINATE THE WORK OF THEIR TRADE WITH ALL OTHER TRADES PRIOR TO PROCEEDING WITH THEIR WORK. ANY WORK REQUIRING REMOVAL AND REINSTALLATION DUE TO LACK OF COORDINATION SHALL BE THE RESPONSIBILITY OF THE CONTRACTORS.
3.	PRIOR TO PERFORMING WORK REQUIRED, INSPECT ALL EXISTING CONDITIONS AND INSTALLED WORK OF OTHER TRADES AND VERIFY THAT ALL CONDITIONS AND ALL SUCH WORK IS COMPLETE TO THE POINT WHERE MECHANICAL WORK CAN PROPERLY COMMENCE.
4.	PERFORM CUTTING, FITTING, AND PATCHING OF MECHANICAL EQUIPMENT AND MATERIALS REQUIRED TO REMOVE EXISTING WORK AND TO INSTALL EQUIPMENT AND MATERIALS IN EXISTING STRUCTURES.
5.	PROTECT NEW WORK AND EXISTING WORK TO REMAIN.
6.	THE CONTRACTOR IS REQUIRED TO FIELD VERIFY LOCATIONS OF EXISTING WORK TO REMAIN.
7.	ALL EQUIPMENT SHALL BE INSTALLED TRUE, LEVEL, AND IN THE LOCATION SHOWN ON THE DRAWINGS.
8.	ALL EQUIPMENT SHALL BE INSTALLED IN A MANNER THAT PROVIDES ADEQUATE MAINTENANCE ACCESS.
9.	PROTECT EQUIPMENT AND MATERIALS FROM THE WEATHER AND CONSTRUCTION DUST DURING CONSTRUCTION AND LEAVE ALL EQUIPMENT AND DUCT INTERIORS CLEAN.
10.	INSTALL ALL MANUALLY ADJUSTABLE CONTROL DEVICES AT A MAXIMUM OF 48" A.F.F. IN ACCORDANCE WITH ADA REQUIREMENTS. INSTALL CONTROL SENSORS AT AN ELEVATION OF 60" A.F.F. COORDINATE WITH ELECTRICAL DEVICES.

MECHANICAL SHEET INDEX	
M001	MECHANICAL SYMBOLS AND ABBREVIATIONS
MD101	MECHANICAL DEMOLITION & HVAC PLANS - 700 BLDG
M141a	HYDRONIC PLAN - TC AREA A
M141b	HYDRONIC PLAN - TC AREA B
M151a	VENTILATION PLAN - TC AREA A
M151b	VENTILATION PLAN - TC AREA B
M201a	ROOF MECHANICAL PLAN - TC AREA A
M201b	ROOF MECHANICAL PLAN - TC AREA B
M301	AIR HANDLING UNIT SECTIONS
M401	ENLARGED MECHANICAL ROOM VENTILATION PL

E

D

C

B

A

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C1 HYDRONIC PLAN - TC AREA A LEVEL 2

M141a 1/8" = 1'-0"

0'-0" 4'-0" 8'-0" 16'-0"

A3 HYDRONIC PLAN - TC AREA A

M141a 1/8" = 1'-0"

0'-0" 4'-0" 8'-0" 16'-0"

GENERAL SHEET NOTES

A. MOUNT ALL UNIT HEATERS WITH BOTTOM LEVEL AT 8'-6" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE.

KEYED SHEET NOTES

1. PROVIDE THERMOSTAT/TEMPERATURE SENSOR WITH INSULATED BASE
2. EQUIPMENT CONTROLLERS AND CONTROL SENSORS LOCATED WITHIN SPACE ARE REQUIRED TO BE NEMA 4 RATED TO WITHSTAND HOSE-DIRECTED WATER.

HYDRONIC SNOWMELT MANIFOLD SCHEDULE

MANIFOLD & ZONE TAG	RESPECTIVE ROOMS	ZONE AREA (SQUARE FEET)	BTU/H·SF	NUMBER OF LOOPS	SLAB SURFACE TEMP (°F)	APPROX. LOOP LENGTHS (FEET)	MANIFOLD & TUBING SIZE (INCHES)	AVERAGE SPACING (INCHES)	FLOW PER LOOP (GPM)	HEAD LOSS (FT. H2O)	RADIANT HEAT LOAD (MBH)	MAX. EWT (°F)	MAX. LWT (°F)
WORKING FLUID - 50% GLYCOL													
MANIFOLD-1	812 - FIRE RISER	280	198	3	>35 °F	240	0.625	6	1.33	8.6	55.3	125	97



701 Washington Ave. N, Ste 200 | Minneapolis, MN 55401 | (612) 338-2029

CLIENT:
**ALEXANDRIA TECH
AND COMM. COLLEGE**
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

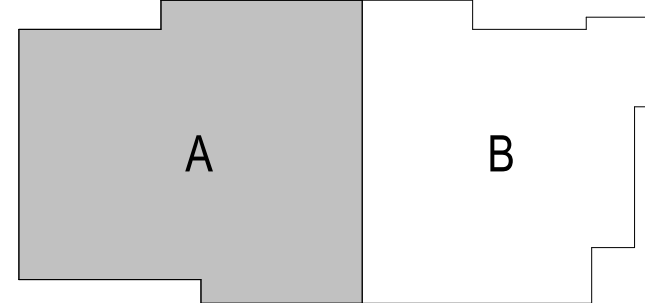
ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

ROOF CONSULTANT:
INSPER
1000 Parkers Lake Road, Suite 100
Wayzata, MN 55391

TECHNOLOGY CONSULTANT:
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118

TRANSPORTATION CENTER



KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2"
ON FULL SIZE SHEETS

02/27/2026	BID PACK #2
12/22/2025	BID PACK #1
NO	DATE
ISSUED FOR	

2	07/09/2026	PR-06
1	06/15/2026	PR-04
NO	DATE	REVISION

I HEREBY CERTIFY that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: *Ryan K. Thorson*

Typed or Printed Name: RYAN K. THORSON

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**HYDRONIC PLAN - TC
AREA A**

DRAWN BY: MJG

CHECKED BY: AJA

PROJ. NO: 230736

DRAWING NO:

M141a

E

D

C

B

A

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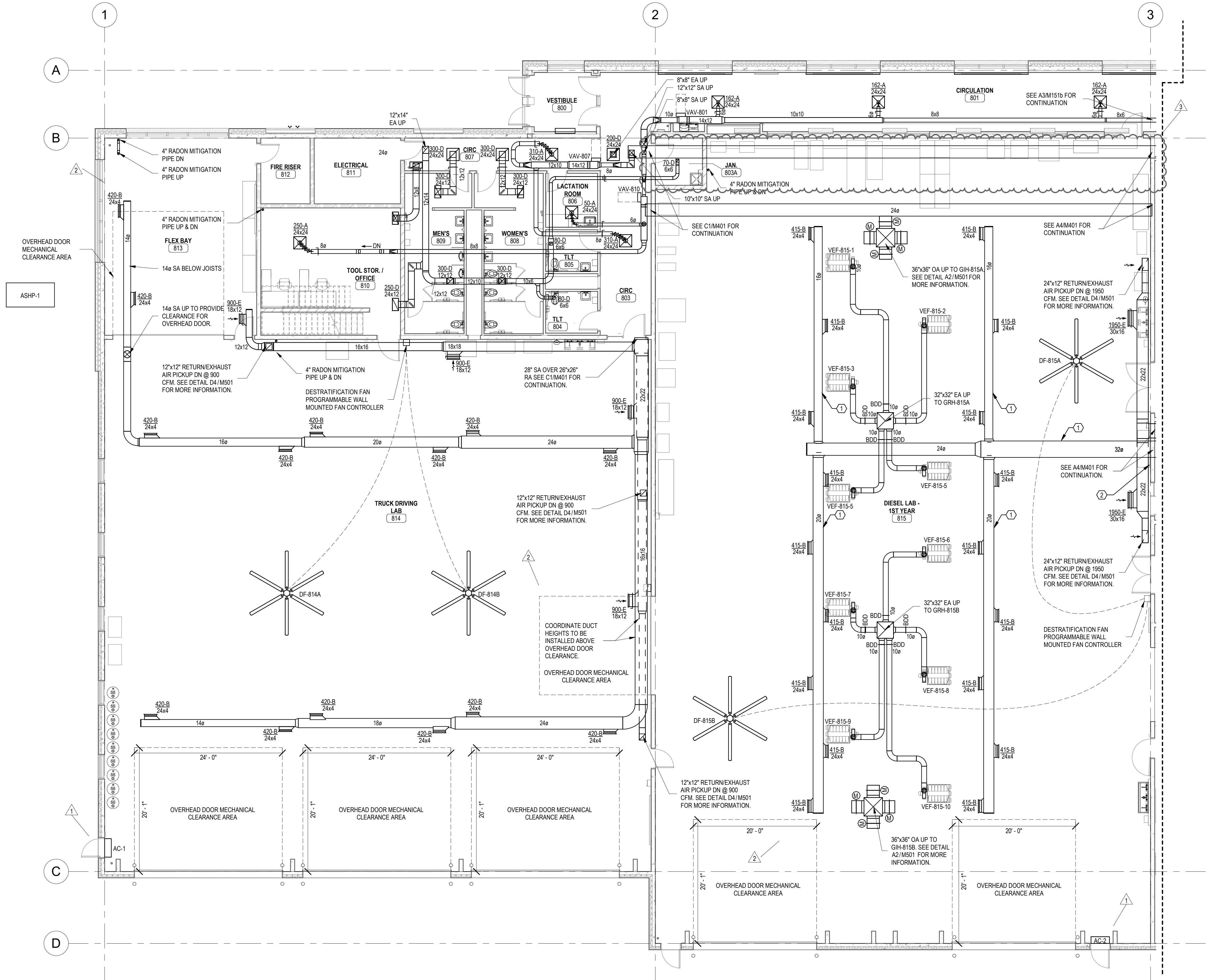
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5

6

GENERAL SHEET NOTES	
A.	MOUNT ALL TYPE B SUPPLY DIFFUSERS FROM ROUND DUCT AT A 22.5° DOWNWARD ANGLE.
KEYED SHEET NOTES	
1.	ROUTE DUCTWORK THROUGH JOIST WEBBING.
2.	INSTALL WALL MOUNTED SWITCHES FOR EACH VEHICLE EXHAUST FAN SERVING ROOM WITH ON/OFF AND UP/DOWN CONTROL.



A2 VENTILATION PLAN - TC AREA A
M151a 1/8" = 1'-0"

0'-0" 4'-0" 8'-0" 16'-0"



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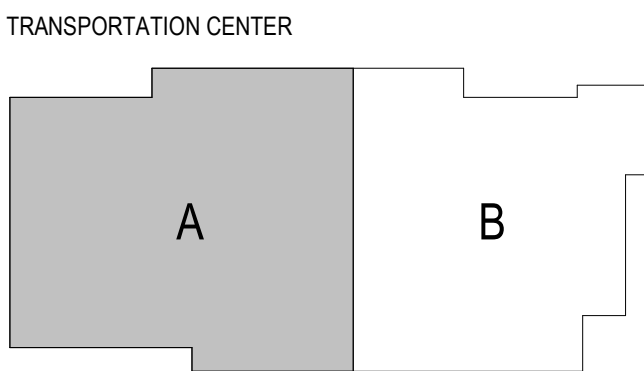
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TRUE NORTH
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KRA
1917 Coventry Court
Mendota Heights, MN 55118



KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2"
ON FULL SIZE SHEETS

02/27/2026	BID PACK #2
12/22/2025	BID PACK #1
NO	DATE
ISSUED FOR	

3	07/09/2025	PR-06
2	05/06/2025	PR-02
1	03/18/2026	BP2 - ADDENDUM 01
NO	DATE	REVISION

I HEREBY CERTIFY that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: *Ryan K. Thorson*

Typed or Printed Name: RYAN K. THORSON

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**VENTILATION PLAN - TC
AREA A**

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:
M151a

Autodesk Docs/230736/ATCC Student Services & Transportation Center/230736/ATCC Student Services & Transportation Center MEP/4.rvt
2/26/2026 10:43:38 AM

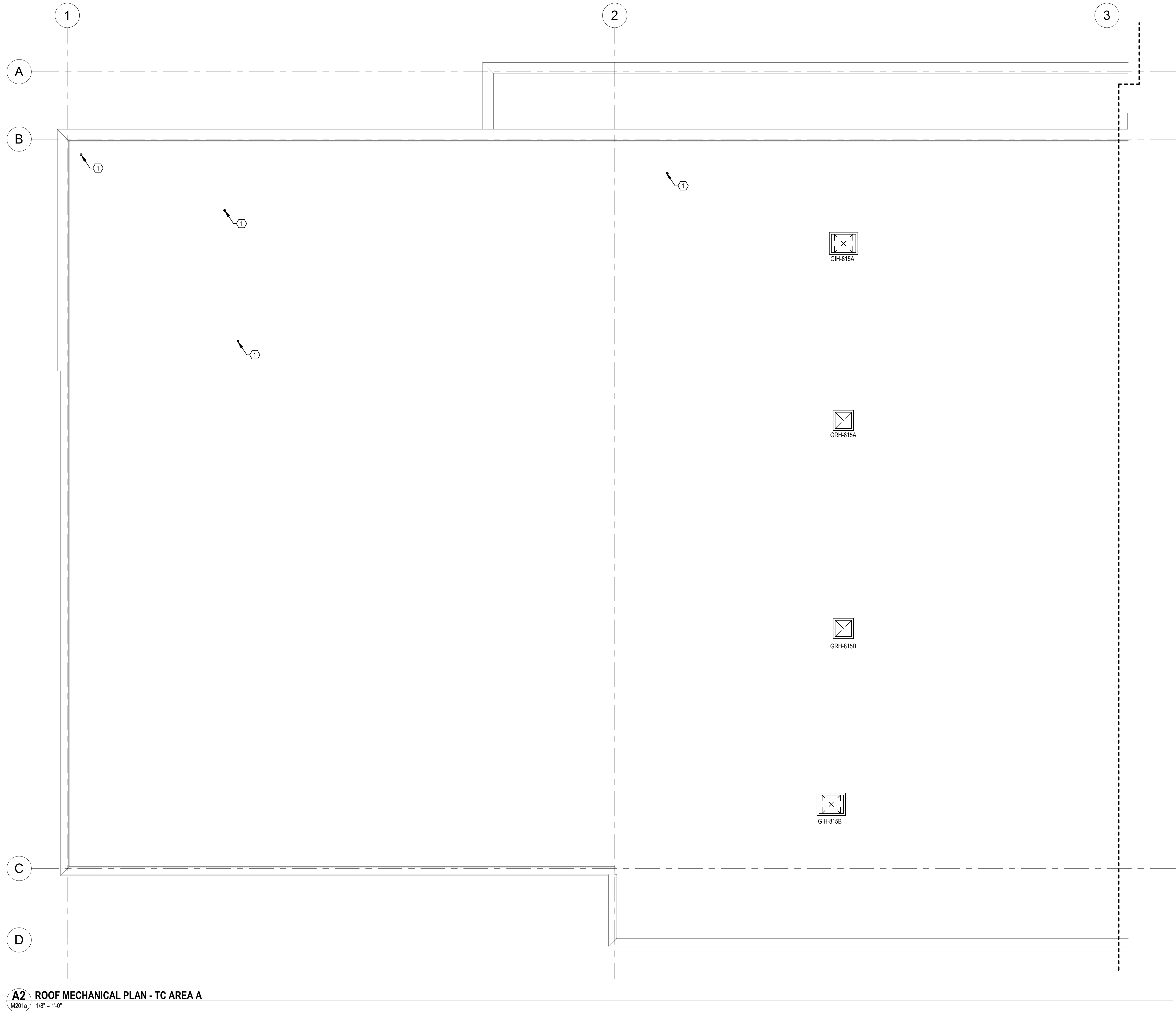
E

D

C

B

A



0'-0" 4'-0" 8'-0" 16'-0"



GENERAL SHEET NOTES	
A.	ENSURE LOCATION OF MECHANICAL ROOF PENETRATIONS HAS MINIMUM CLEARANCE OF 2'-0" FROM ROOF DRAINAGE VALLEYS.
KEYED SHEET NOTES	
1.	RADON MITIGATION SYSTEM VENT TERMINAL. PROVIDE TOP OF VENT AT LEAST 2'-0" ABOVE FINISHED ROOF LEVEL.



701 Washington Ave. N, Ste 200 | Minneapolis, MN 55401 | 612.338.2029

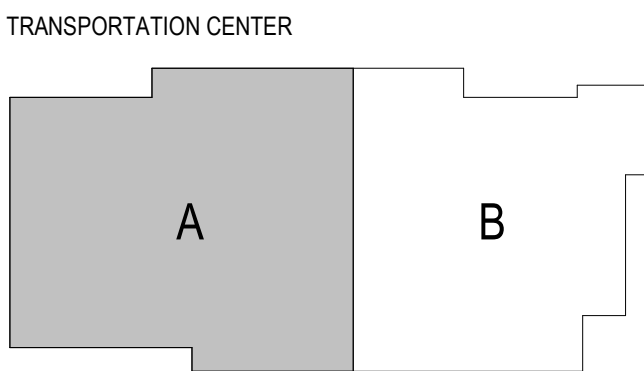
CLIENT:
**ALEXANDRIA TECH
AND COMM. COLLEGE**
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

ROOF CONSULTANT:
INSPER
1000 Parkers Lake Road, Suite 100
Wayzata, MN 55391

TECHNOLOGY CONSULTANT:
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118



KEYPLAN

THIS SQUARE APPEARS 1/2"x1/2"
ON FULL SIZE SHEETS

02/27/2026	BID PACK #2	
12/22/2025	BID PACK #1	
NO	DATE	ISSUED FOR

NO	DATE	REVISION

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Signature: *Ryan K. Thorson*

Typed or Printed Name: RYAN K. THORSON

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**ROOF MECHANICAL
PLAN - TC AREA A**

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

M201a

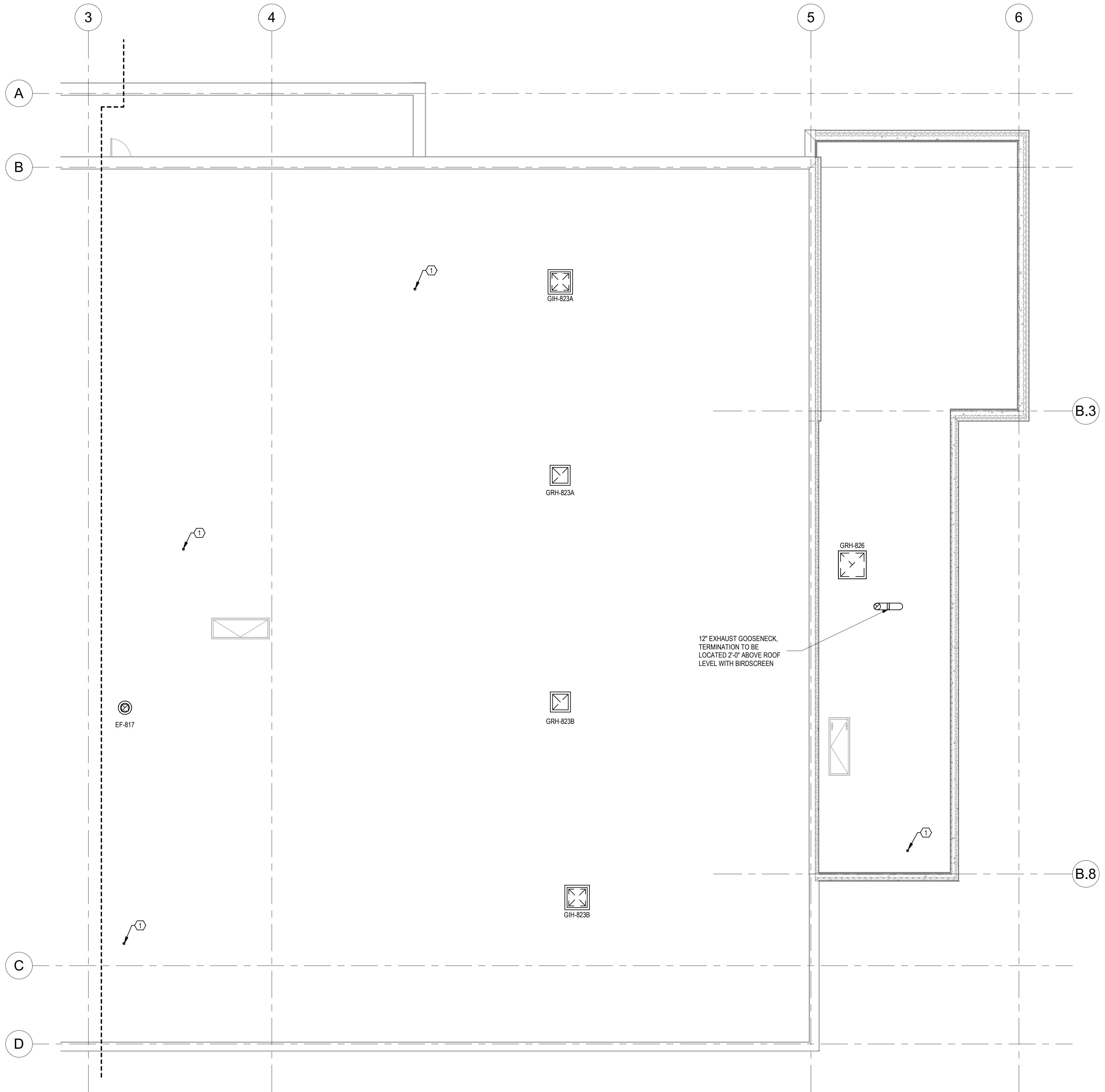
E

D

C

B

A



A3 ROOF MECHANICAL PLAN - TC AREA B
M201b / 1/8" = 1'-0"

0'-0" 4'-0" 8'-0" 16'-0"



GENERAL SHEET NOTES

- A. ENSURE LOCATION OF MECHANICAL ROOF PENETRATIONS HAS MINIMUM CLEARANCE OF 2'-0" FROM ROOF DRAINAGE VALLEYS.

KEYED SHEET NOTES

1. RADON MITIGATION SYSTEM VENT TERMINAL. PROVIDE TOP OF VENT AT LEAST 2'-0" ABOVE FINISHED ROOF LEVEL.



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CLIENT:
**ALEXANDRIA TECH
AND COMM. COLLEGE**
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

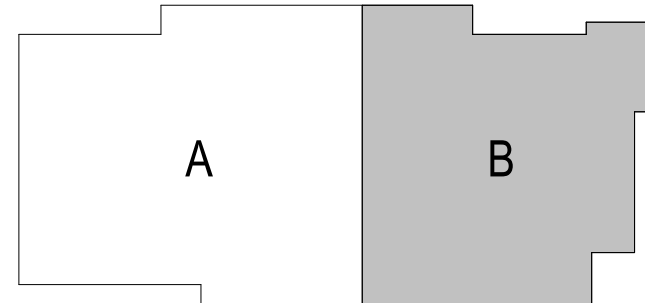
ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

ROOF CONSULTANT:
INSPER
1000 Parkers Lake Road, Suite 100
Wayzata, MN 55391

TECHNOLOGY CONSULTANT:
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118

TRANSPORTATION CENTER



KEYPLAN

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12/22/2025	BID PACK #1	
NO	DATE	ISSUED FOR

NO	DATE	REVISION
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Signature: *Ryan K. Thorson*

Typed or Printed Name: RYAN K. THORSON

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**ROOF MECHANICAL
PLAN - TC AREA B**

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

M201b

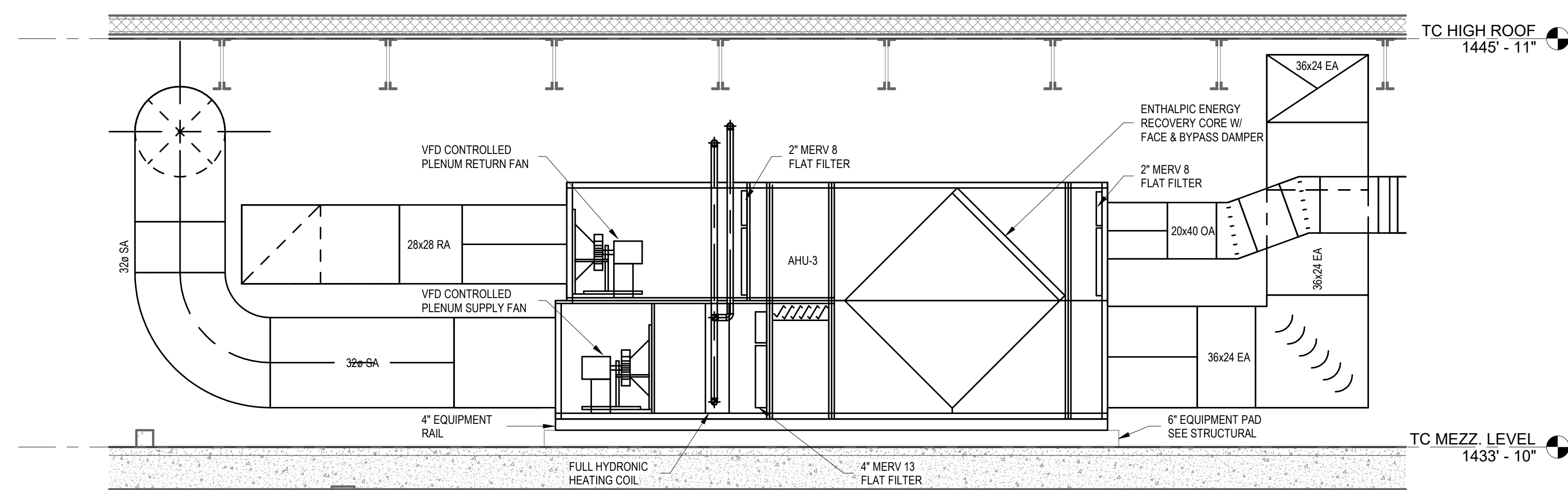
CLIENT:
ALEXANDRIA TECH
AND COMM. COLLEGE
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

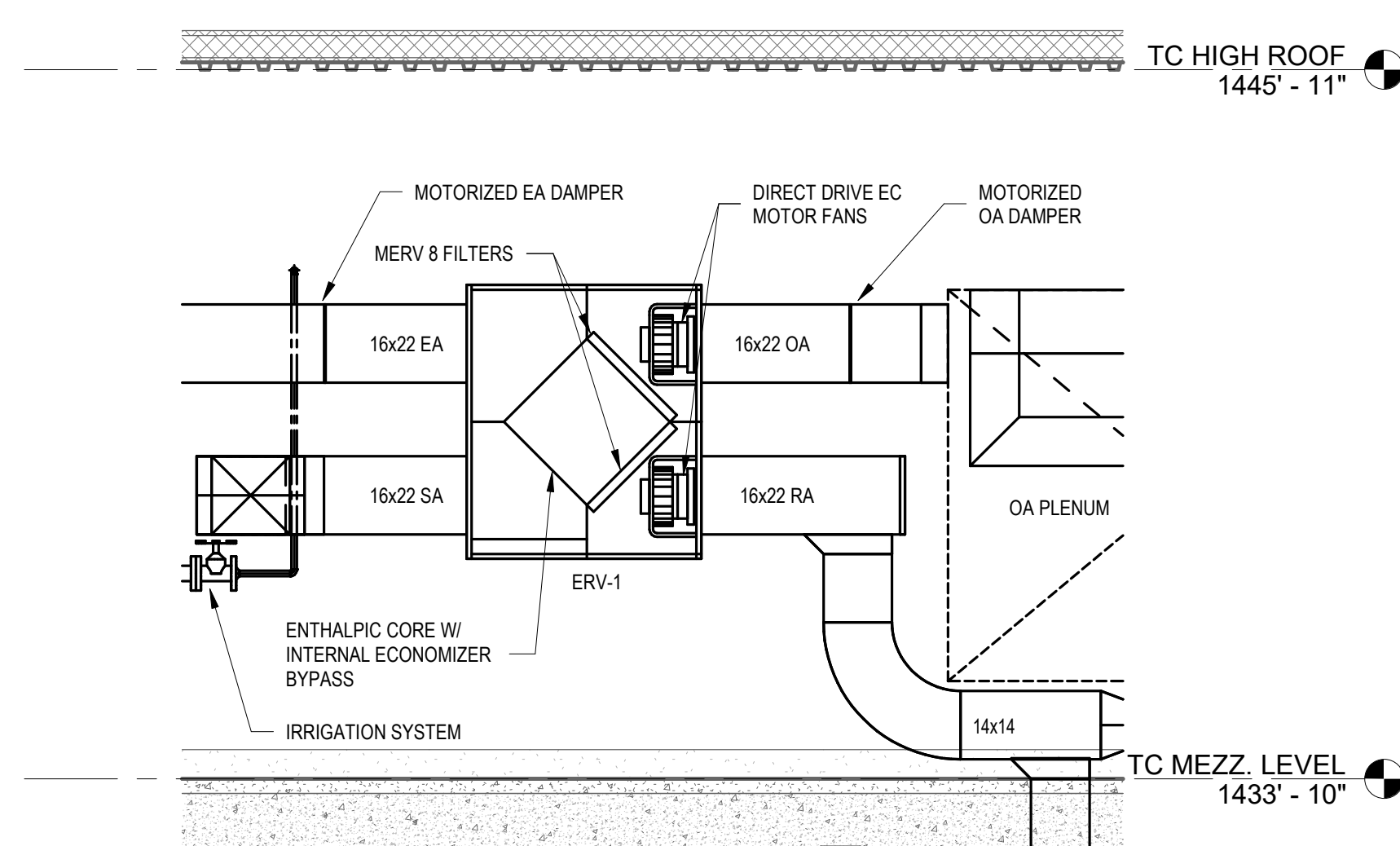
ROOF CONSULTANT:
INSPEC
1000 Parkers Lake Road, Suite 101
Wayzata, MN 55391

TECHNOLOGY CONSULTANT
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

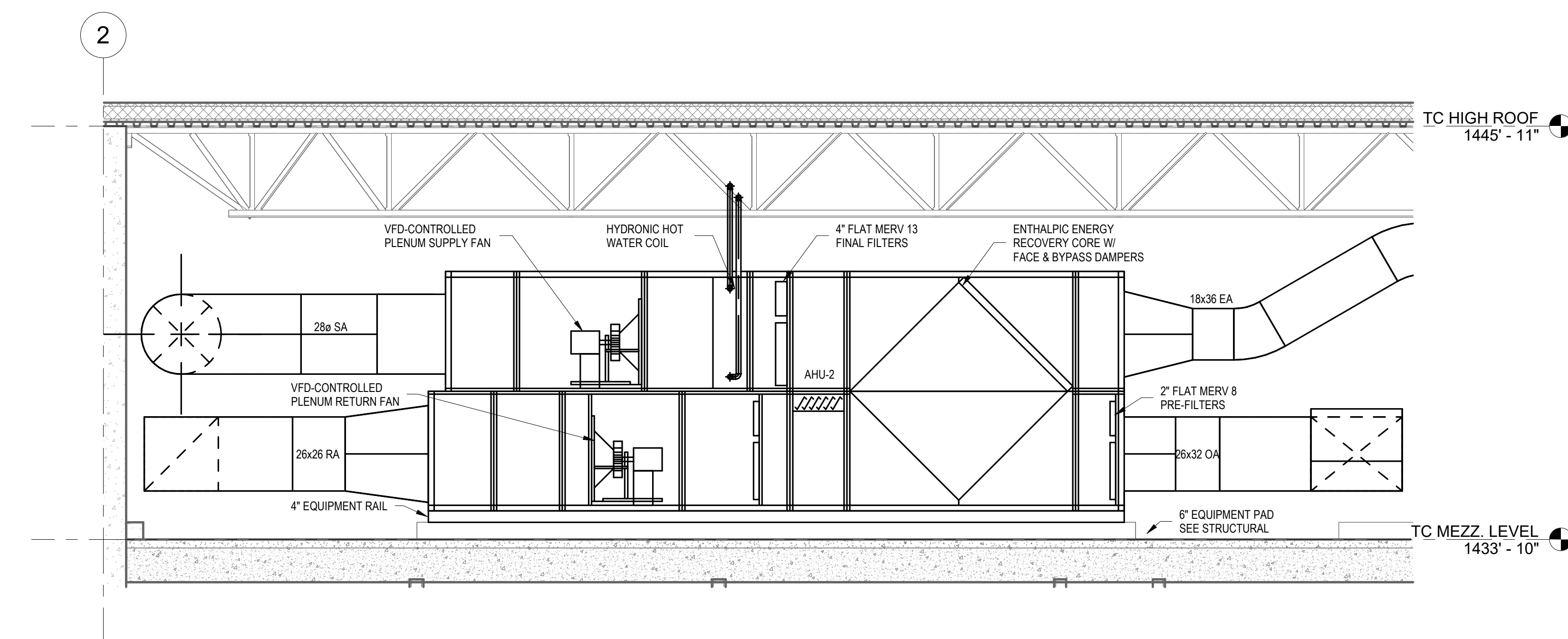
ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118



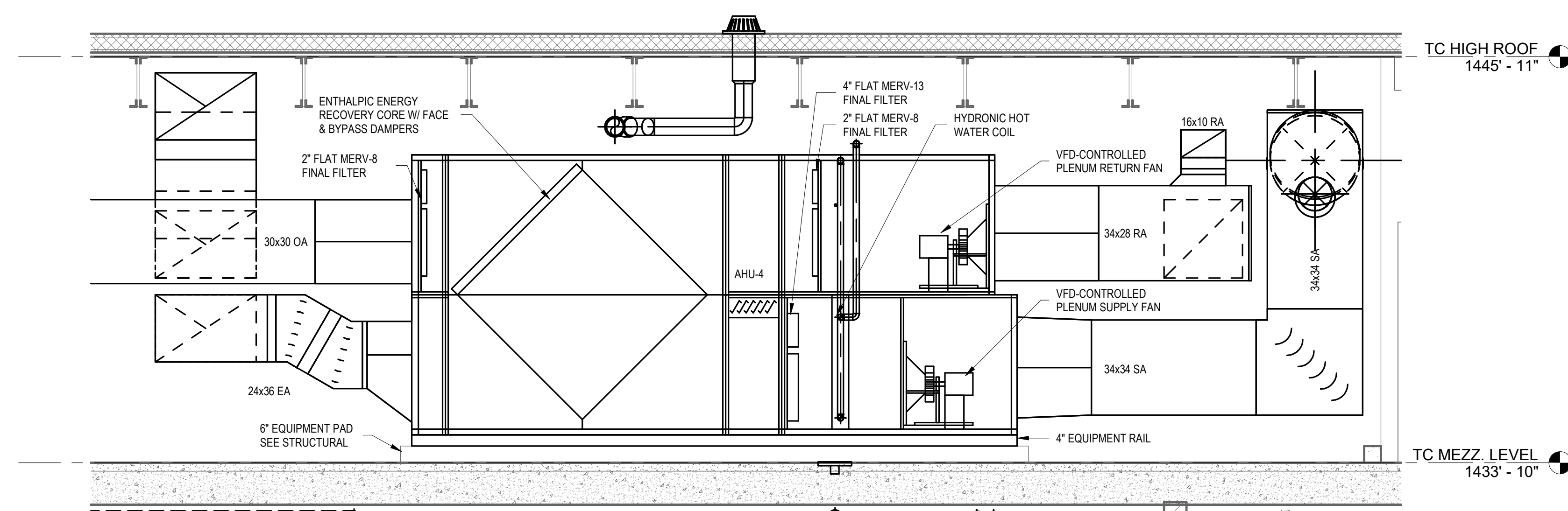
D4 AHU-3 SECTION
M301 3/8" = 1'-0"



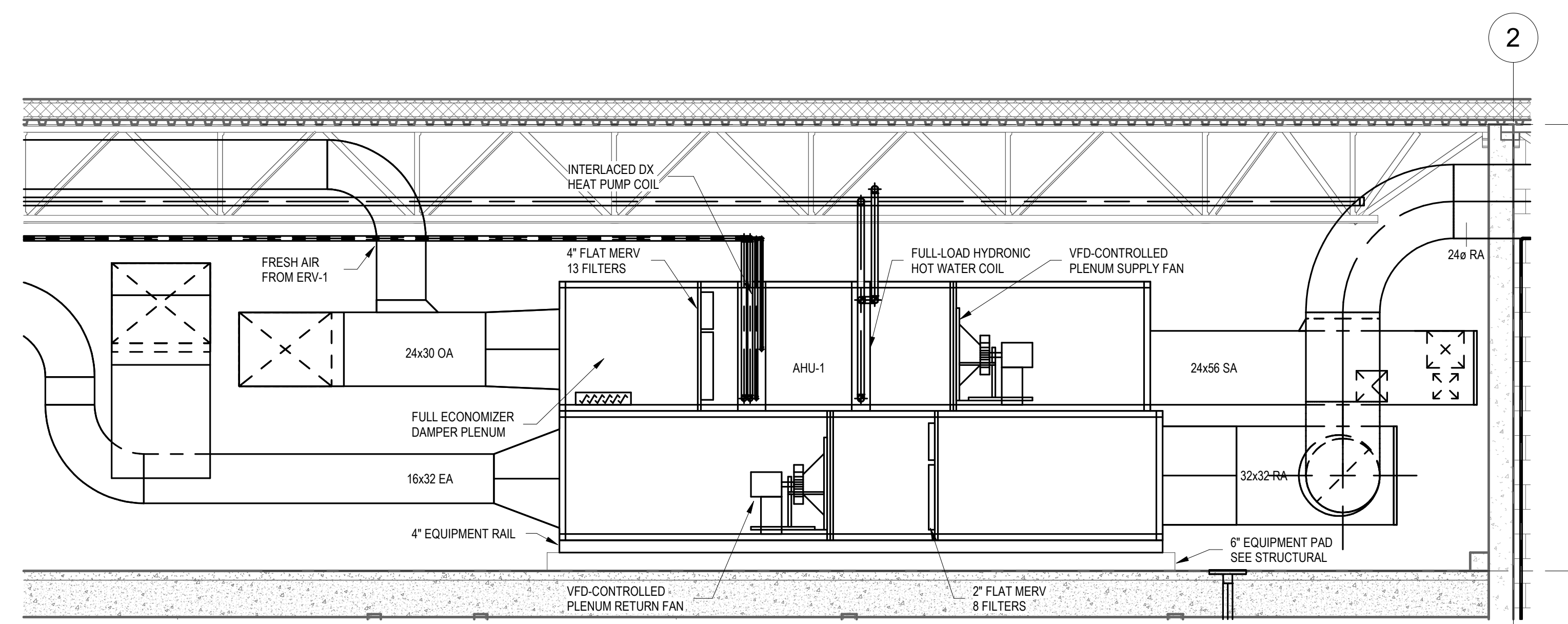
B2 ERV-1 SECTION VIEW
M301 3/8" = 1'-0"



B4 AHU-2 SECTION
M301 3/8" = 1'-0"



A1 AHU-4 SECTION
M301 3/8" = 1'-0"



A4 AHU-1 SECTION
M301 3/8" = 1'-0"

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ON FULL SIZE SHEETS

	02/27/2026	BID PACK #2
	12/22/2025	BID PACK #1
NO	DATE	ISSUED FOR

NO	DATE	REVISION
----	------	----------

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Signature: Ryan K. Thore

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
ATCC-23
TRANSPORTATION
CENTER

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**AIR HANDLING UNIT
SECTIONS**

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

M301

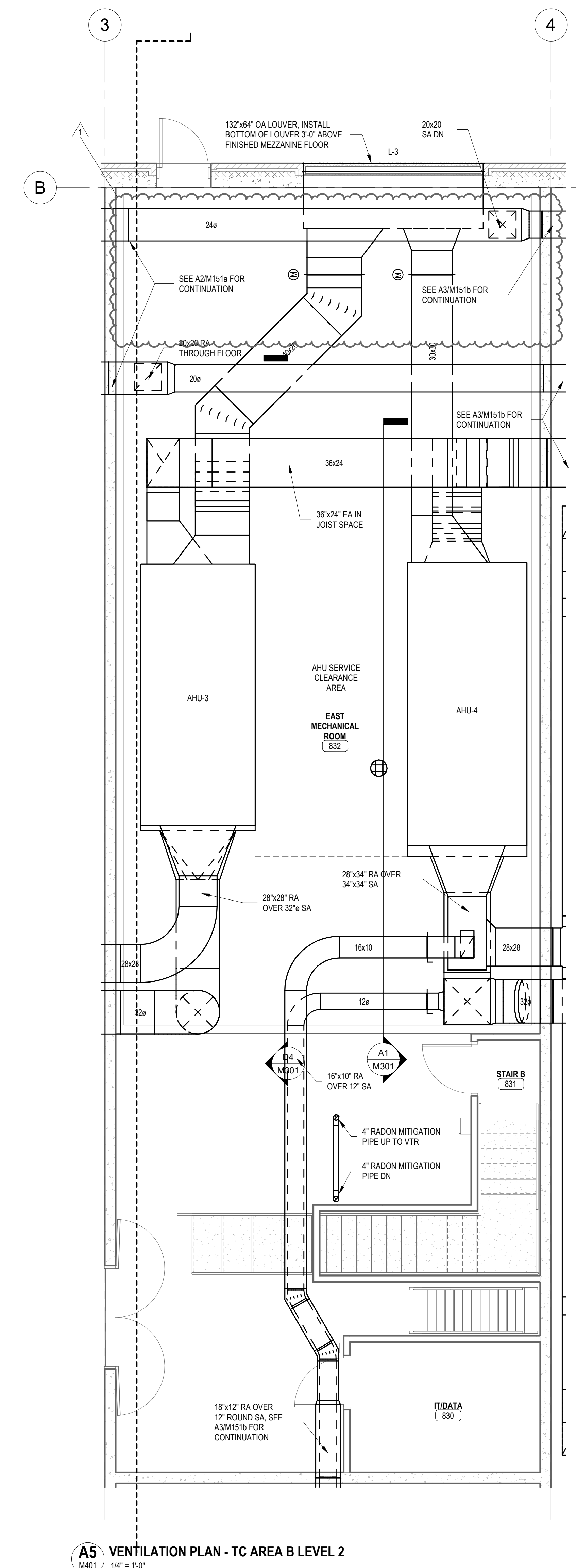
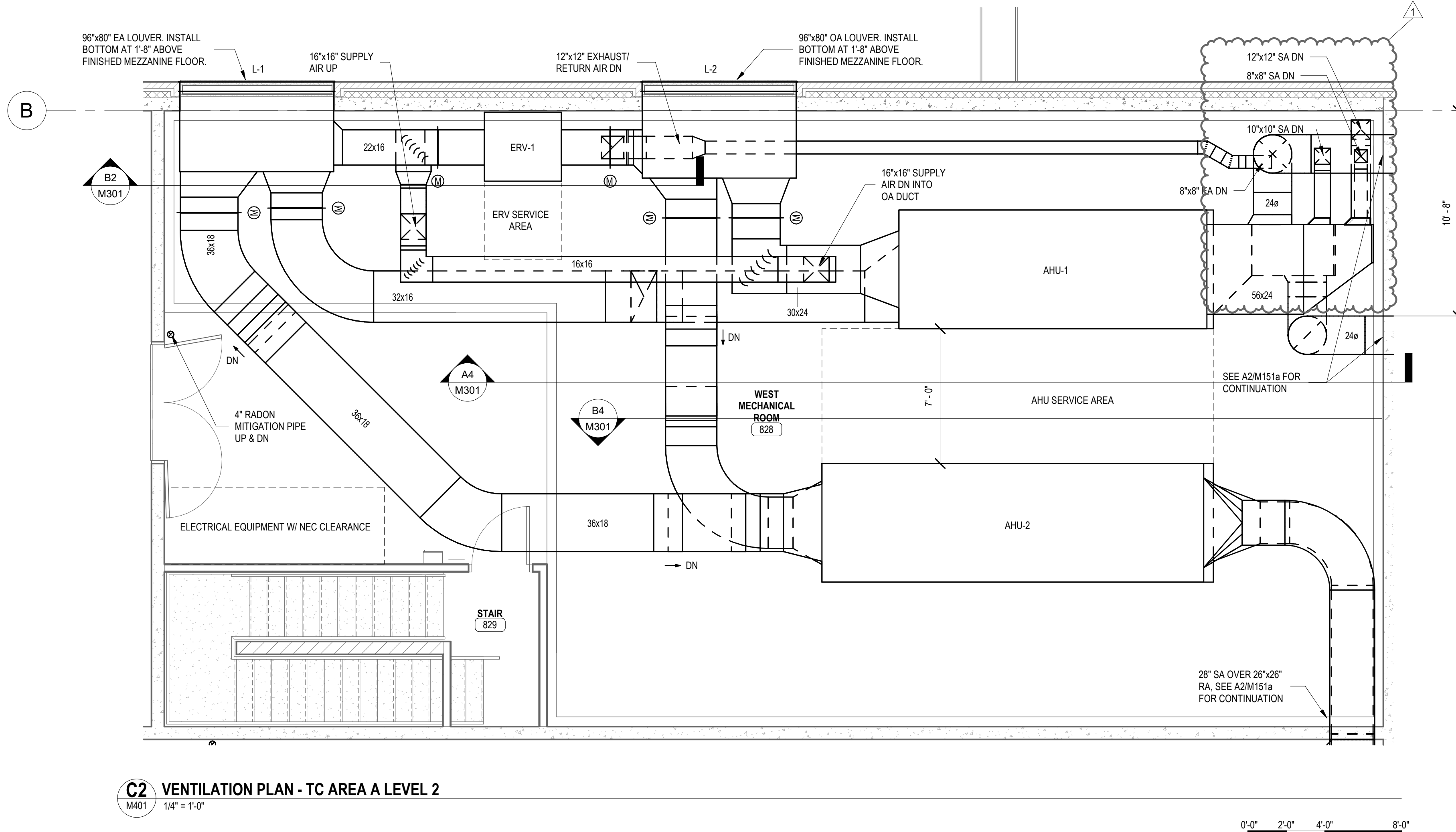
CLIENT:
**ALEXANDRIA TECH
AND COMM. COLLEGE**
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

ROOF CONSULTANT:
INSPER
1000 Parkers Lake Road, Suite 100
Wayzata, MN 55391

TECHNOLOGY CONSULTANT:
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118



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NO	DATE
ISSUED FOR	
1	07/09/2026
NO	DATE
PR-06	REVISION

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Signature: *Ryan K. Thorson*
Typed or Printed Name: RYAN K. THORSON
Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**ENLARGED
MECHANICAL ROOM
VENTILATION PLANS**

DRAWN BY: M/G
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

M401

As noted, Drawn by: JTH, ATCC Student Services & Transportation Center MEP/444
8/10/2026 3:56:55 PM

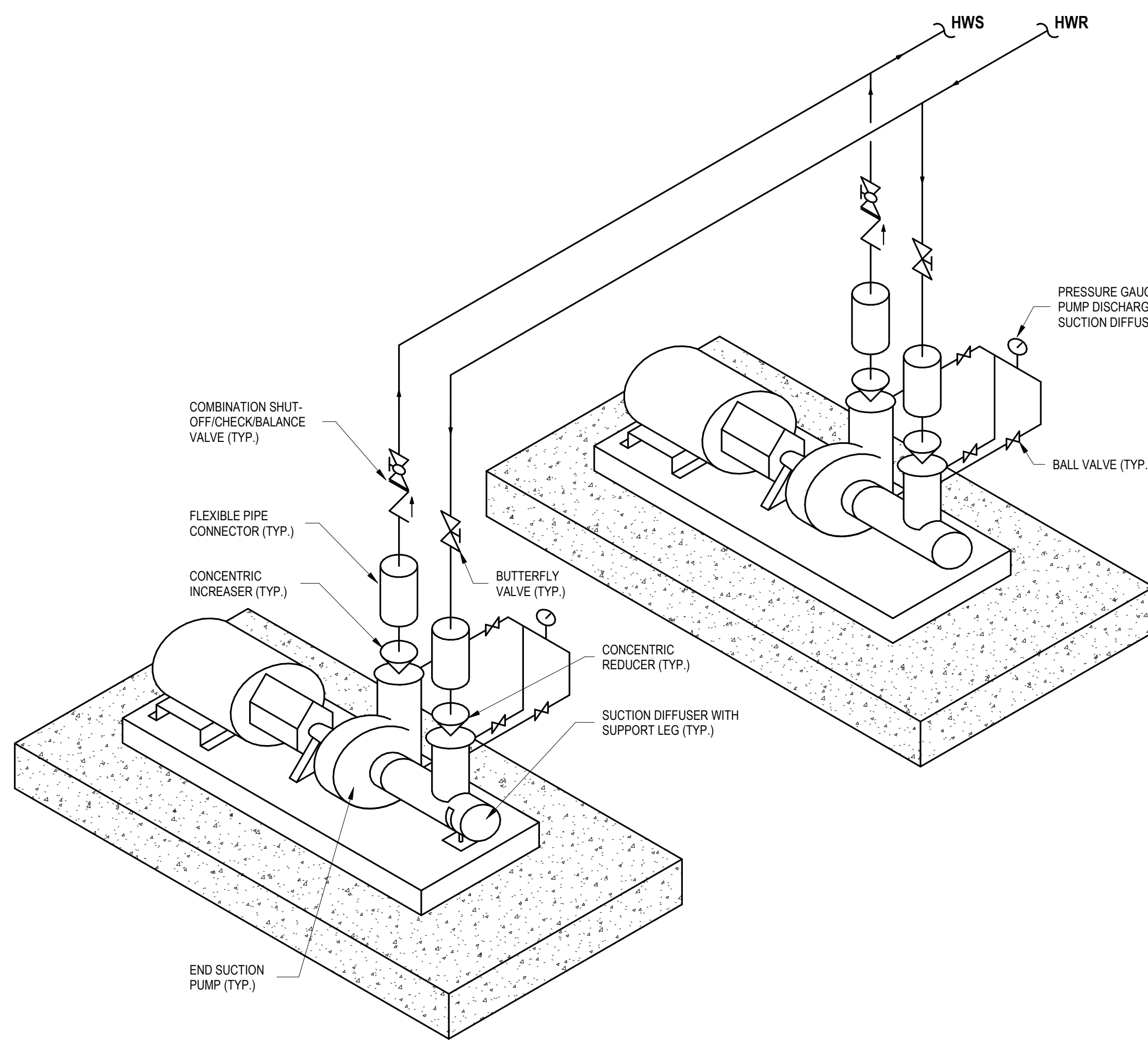
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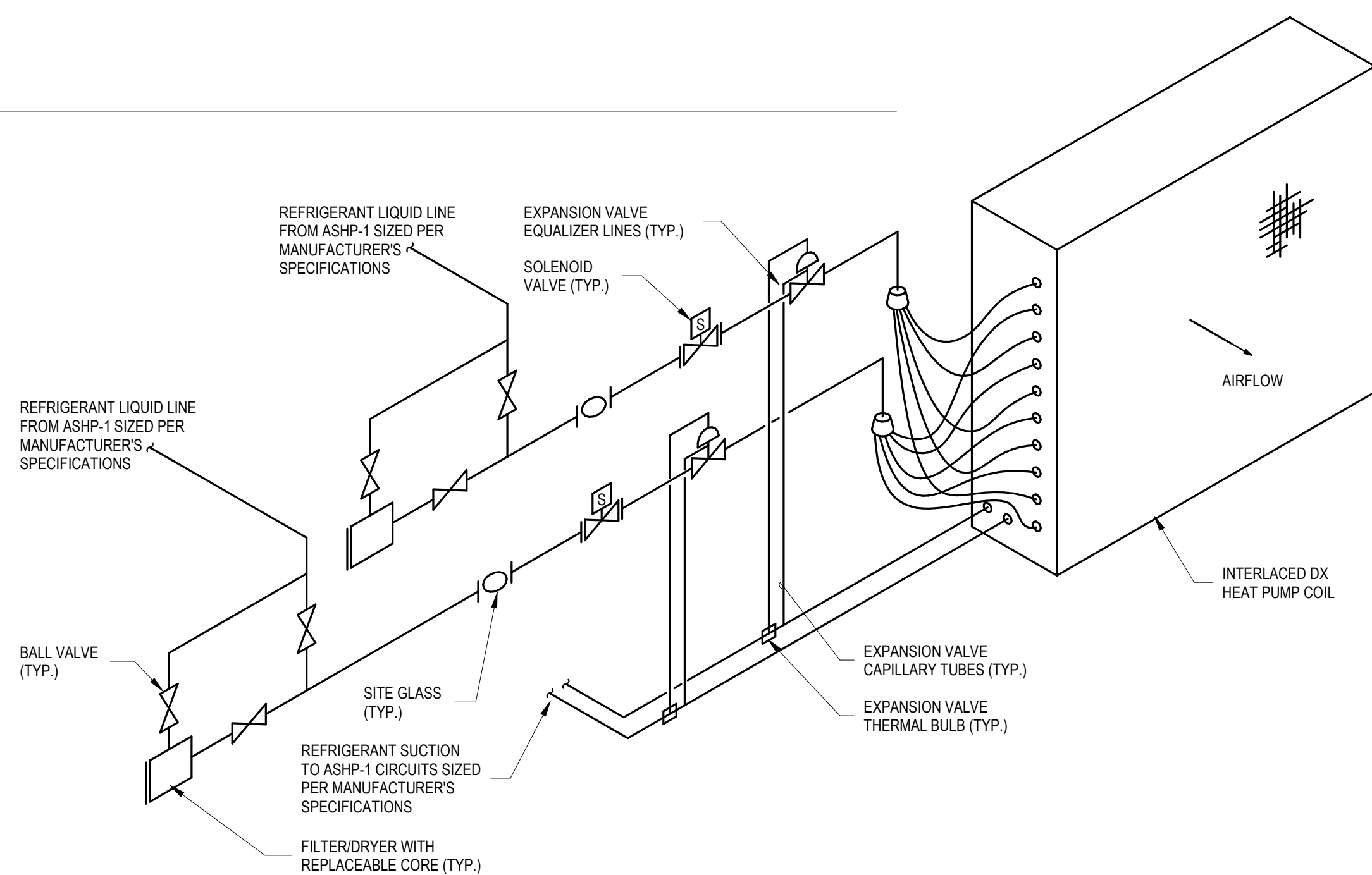
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B

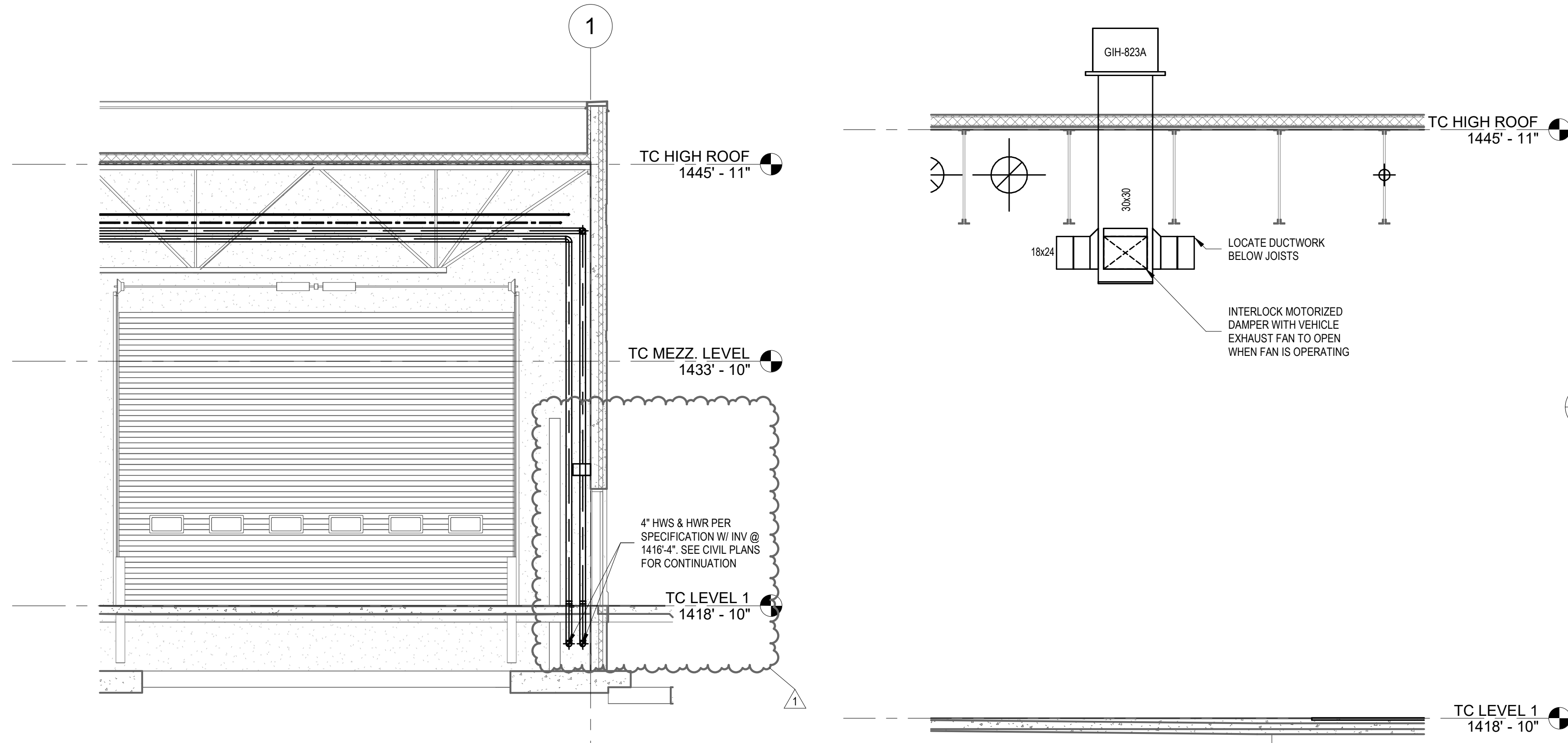
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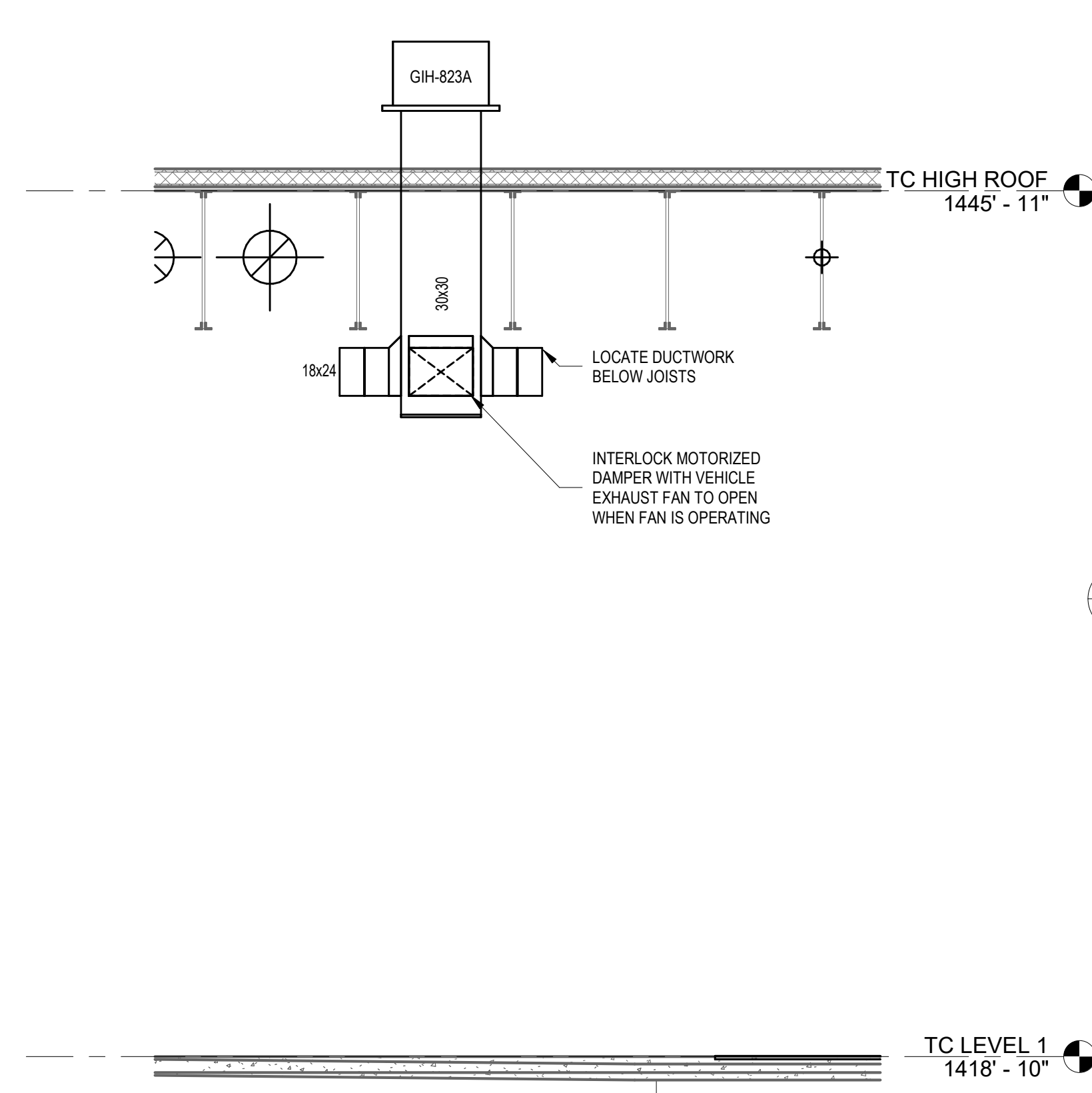
C1 PARALLEL END SUCTION PUMP DETAIL
M501 / NO SCALE



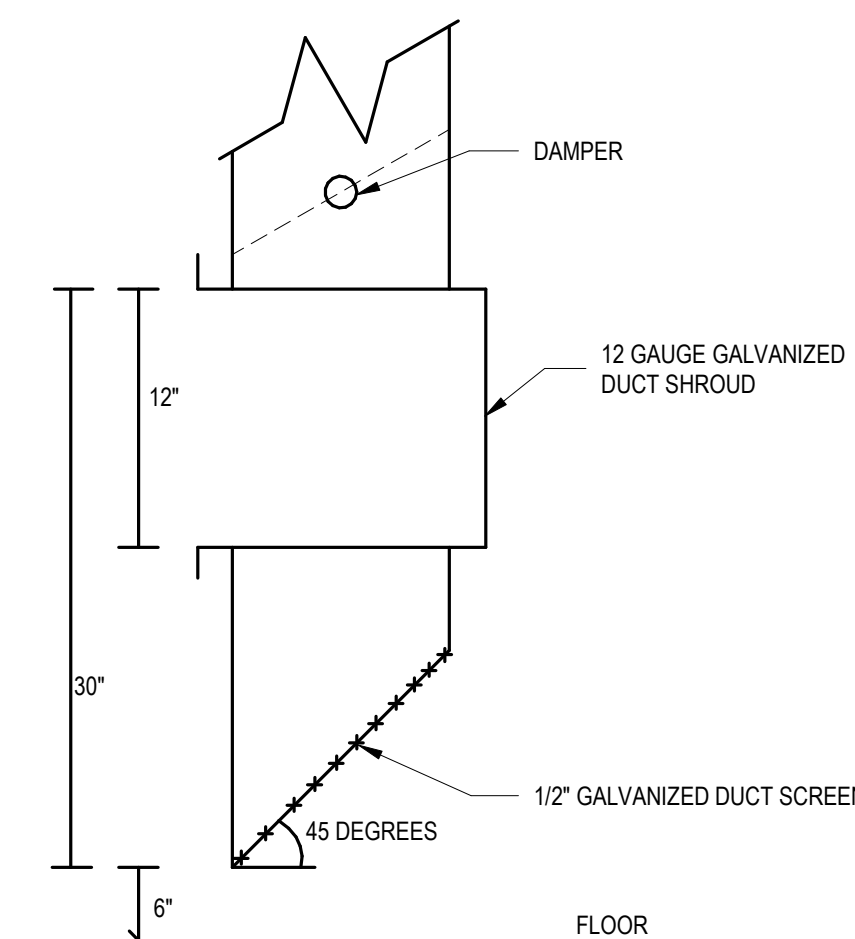
B2 INTERLACED HEAT PUMP DX COIL
M501 / NO SCALE



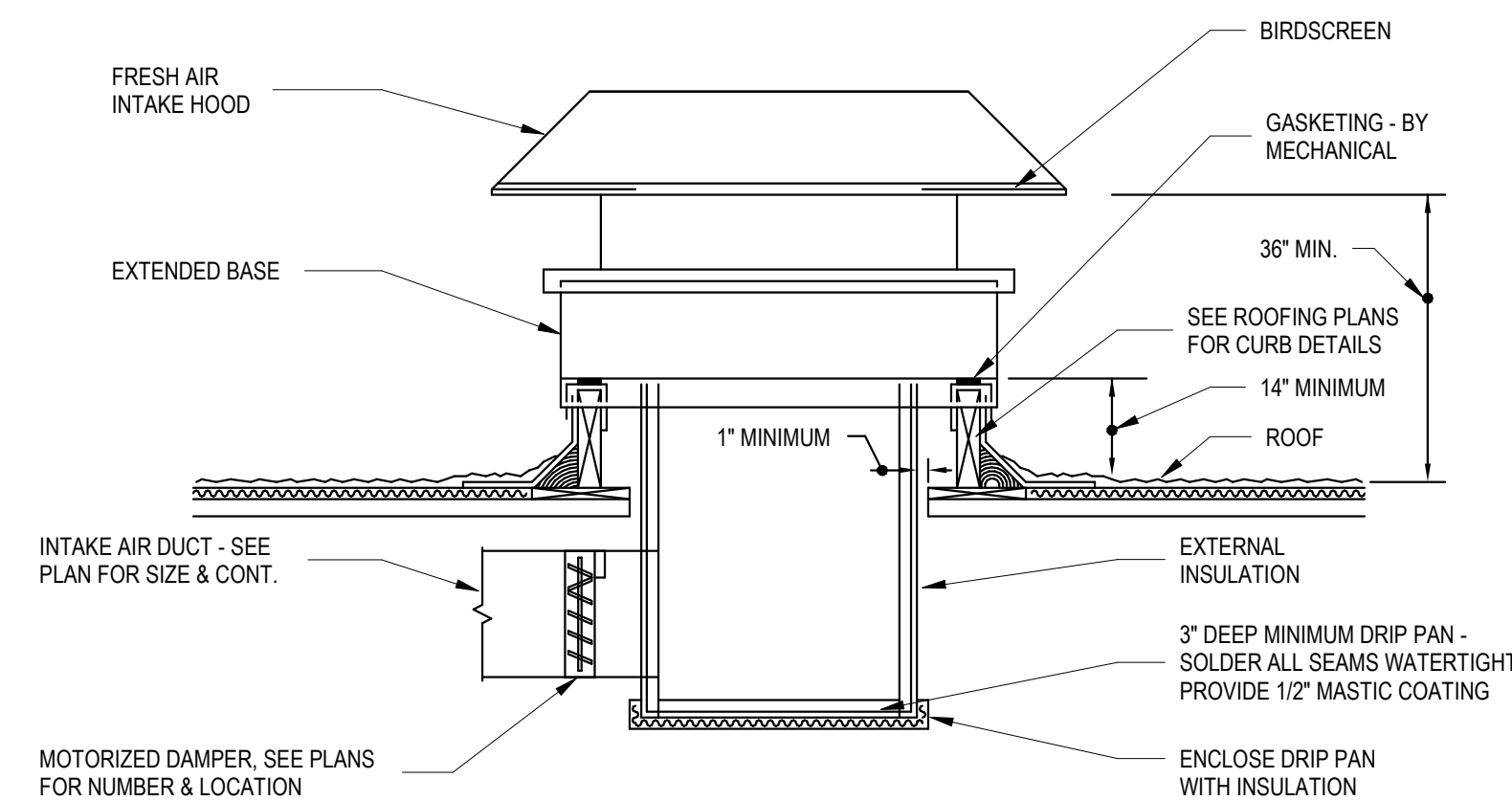
A1 HYDRONIC HWS & HWR INTO BUILDING
M501 / 3/16" = 1'-0"



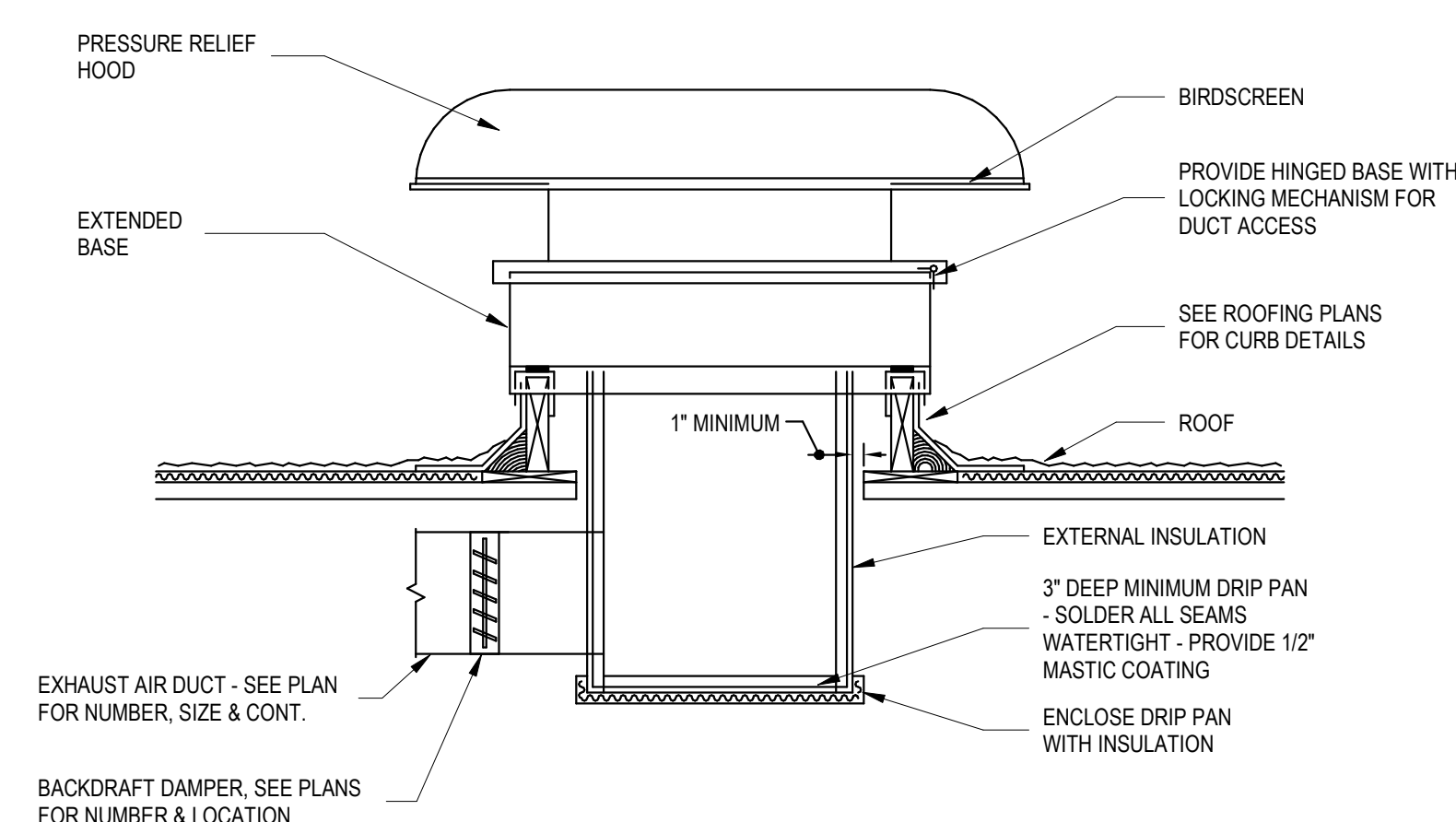
A2 VEHICLE EXHAUST MAKE UP AIR DETAIL
M501 / 1/4" = 1'-0"



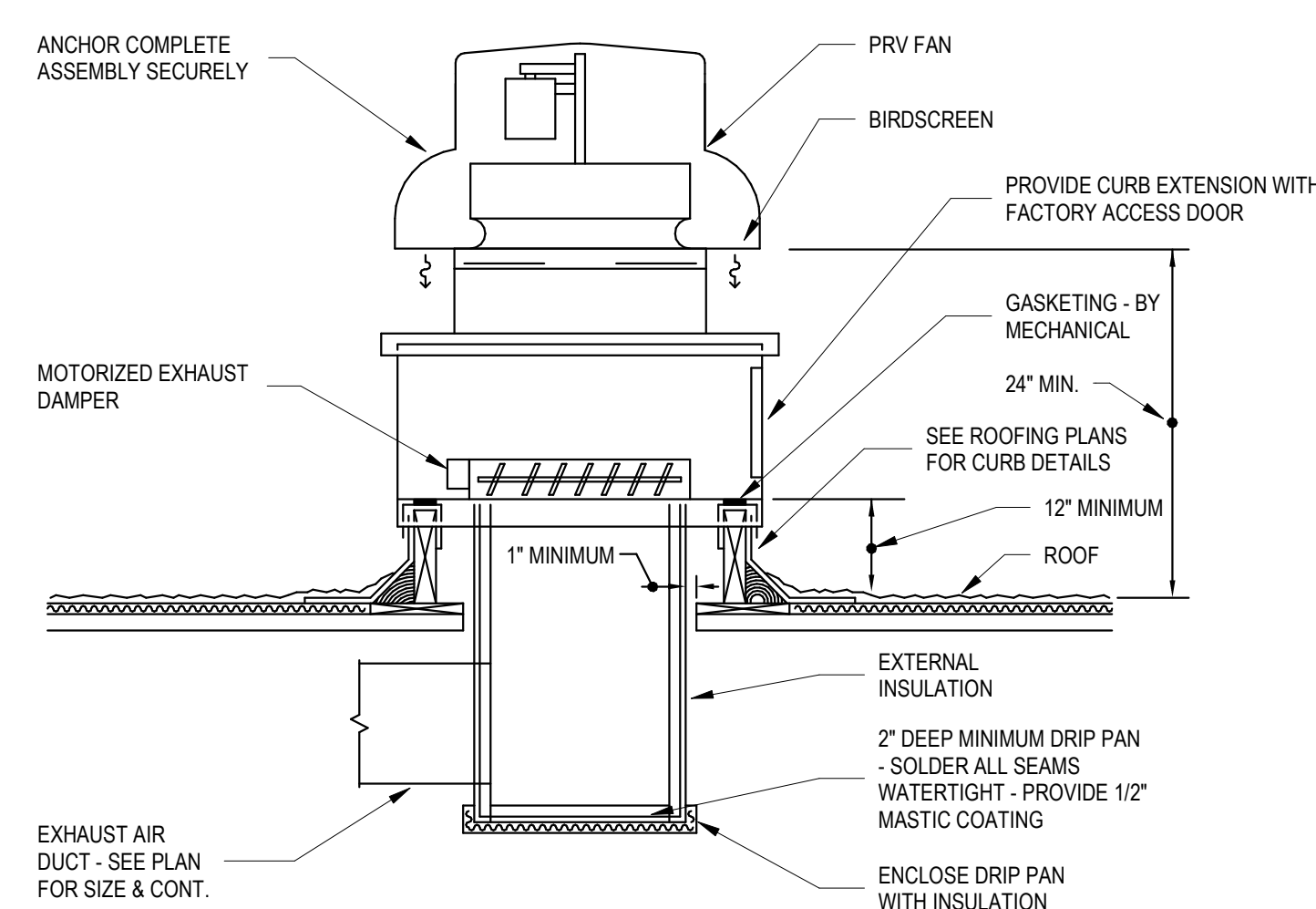
D4 FLOOR EXHAUST PICKUP DETAIL
M501 / NO SCALE



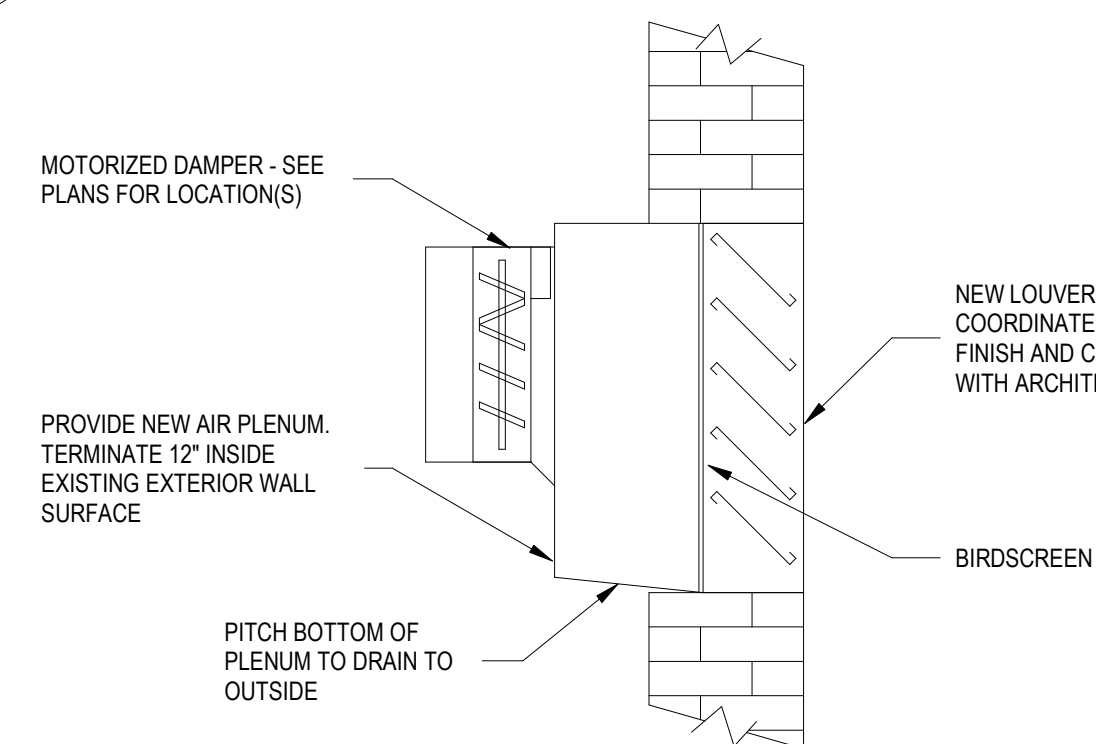
C4 GRAVITY INTAKE VENTILATOR DETAIL
M501 / 1/8" = 1'-0"



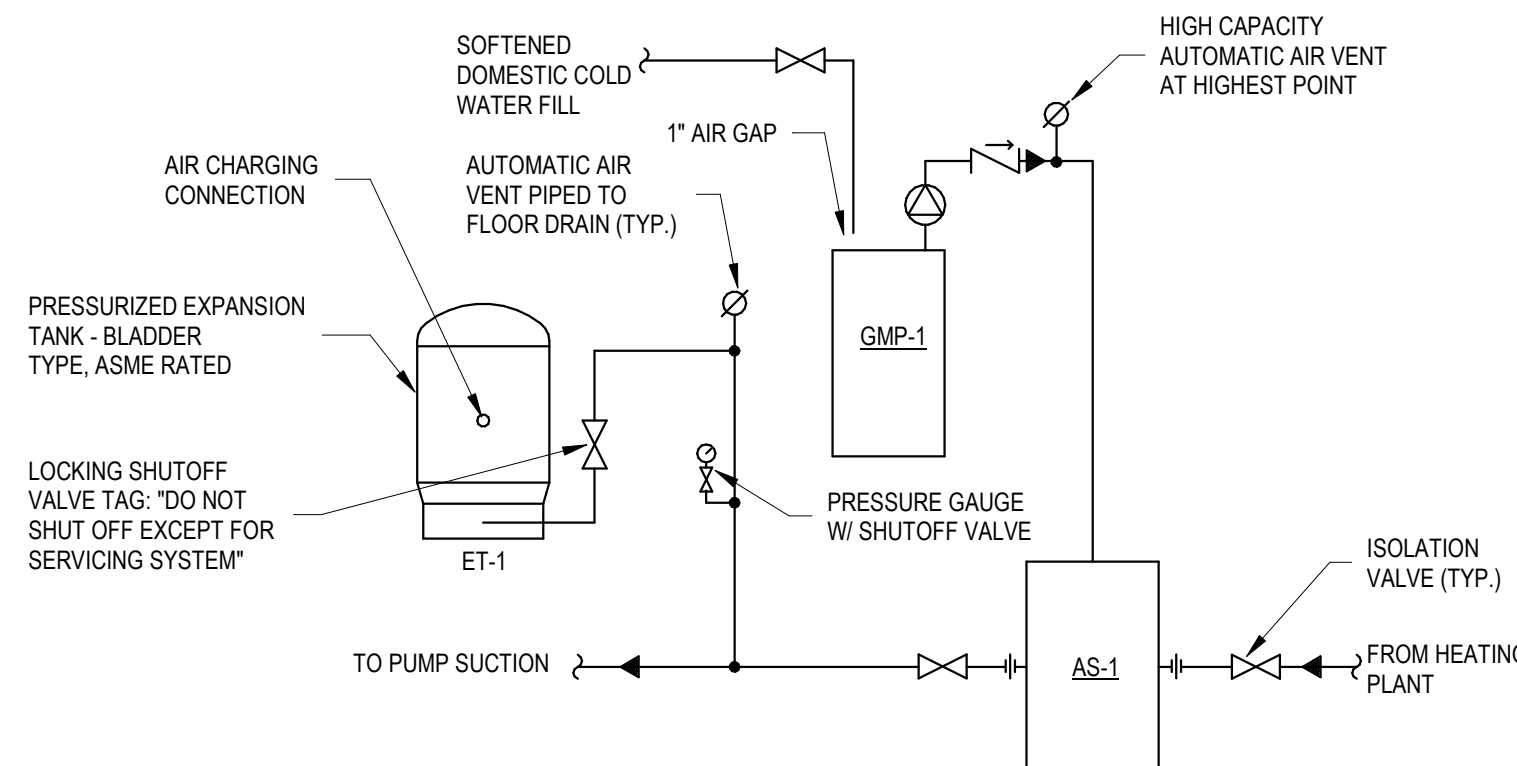
B4 GRAVITY RELIEF VENTILATOR DETAIL
M501 / NO SCALE



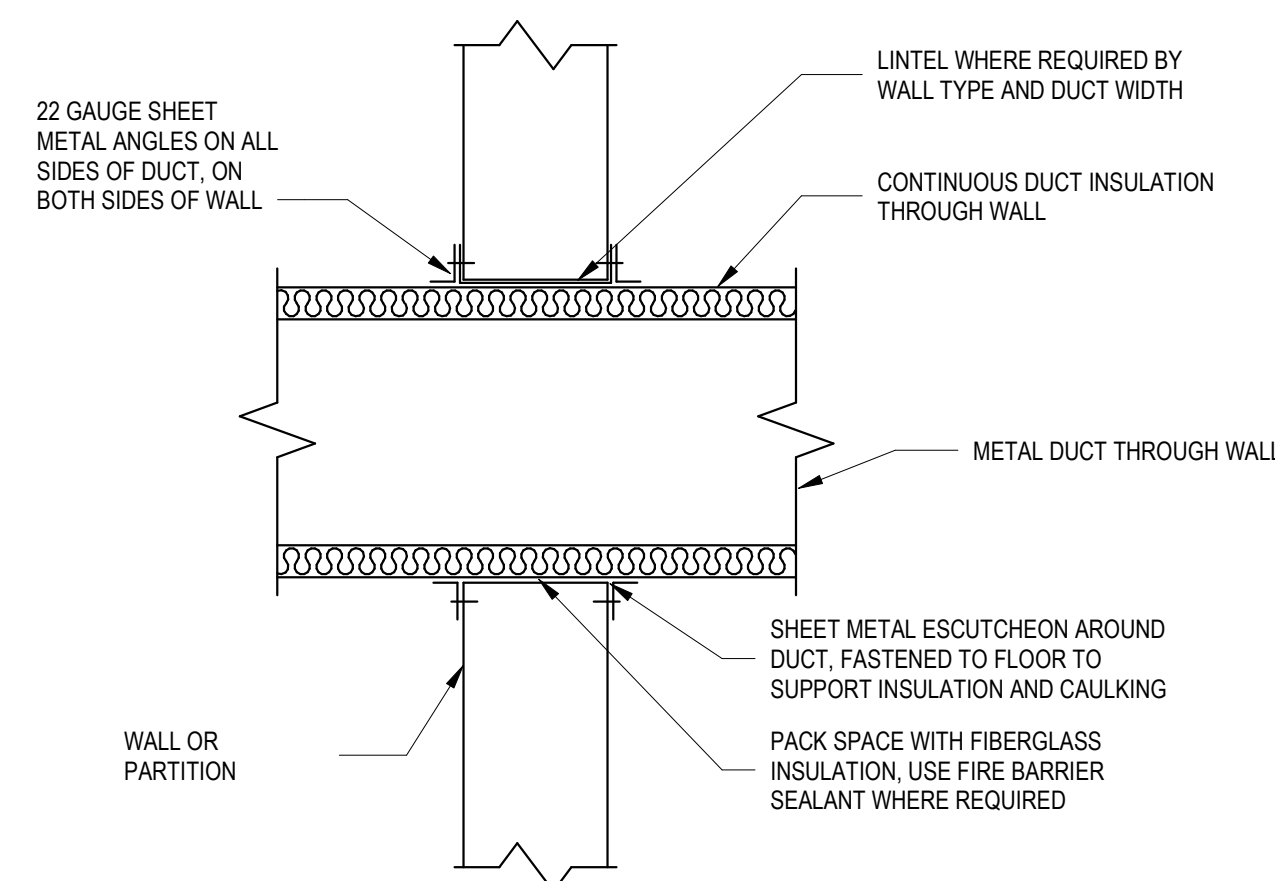
A4a POWER ROOF VENTILATOR DETAIL
M501 / NO SCALE



A4 LOUVER DETAIL
M501 / NO SCALE

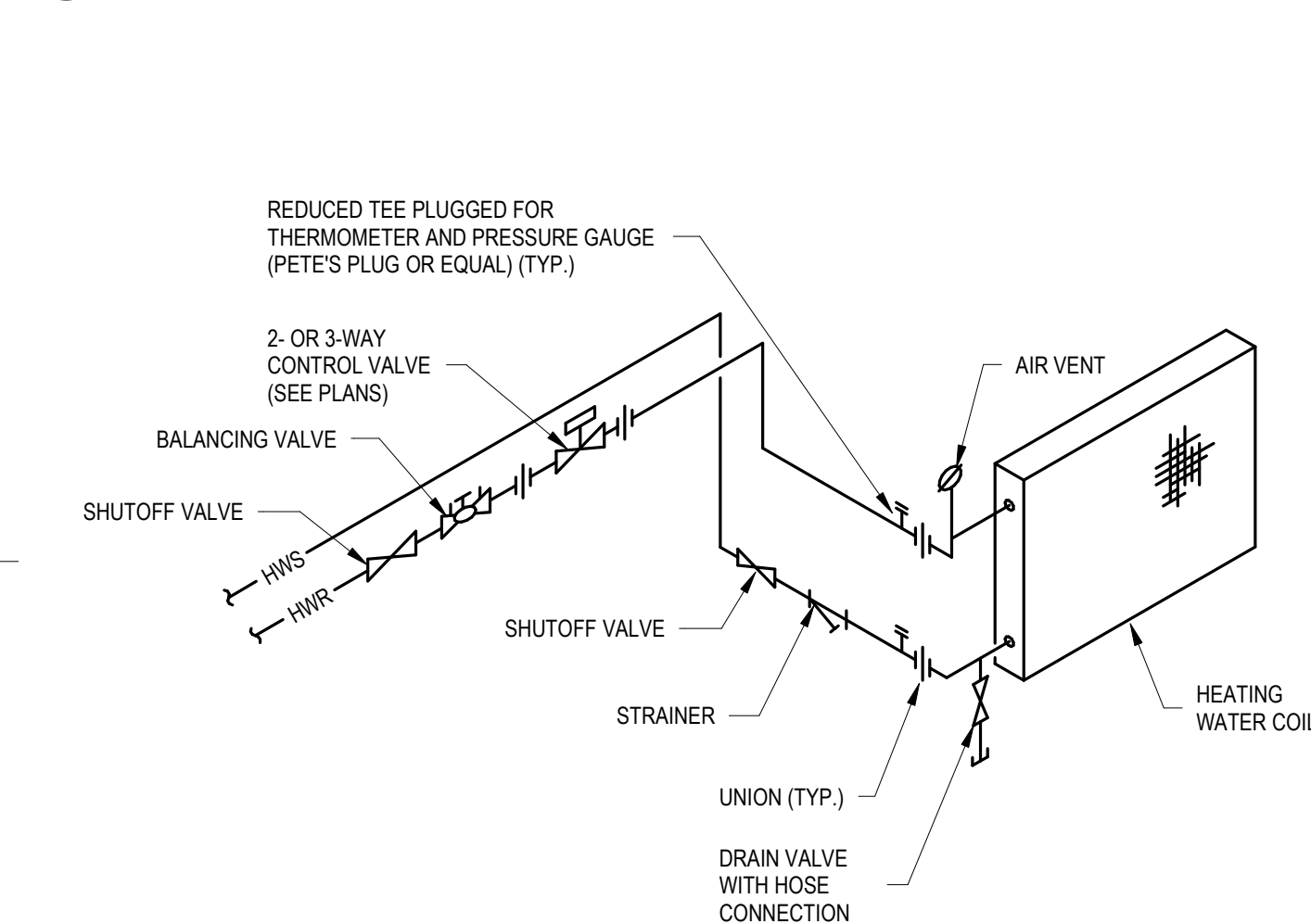


D5 AIR SEPARATOR, EXP. TANK, AND GLYCOL MAKE-UP PIPING DETAIL
M501 / NO SCALE

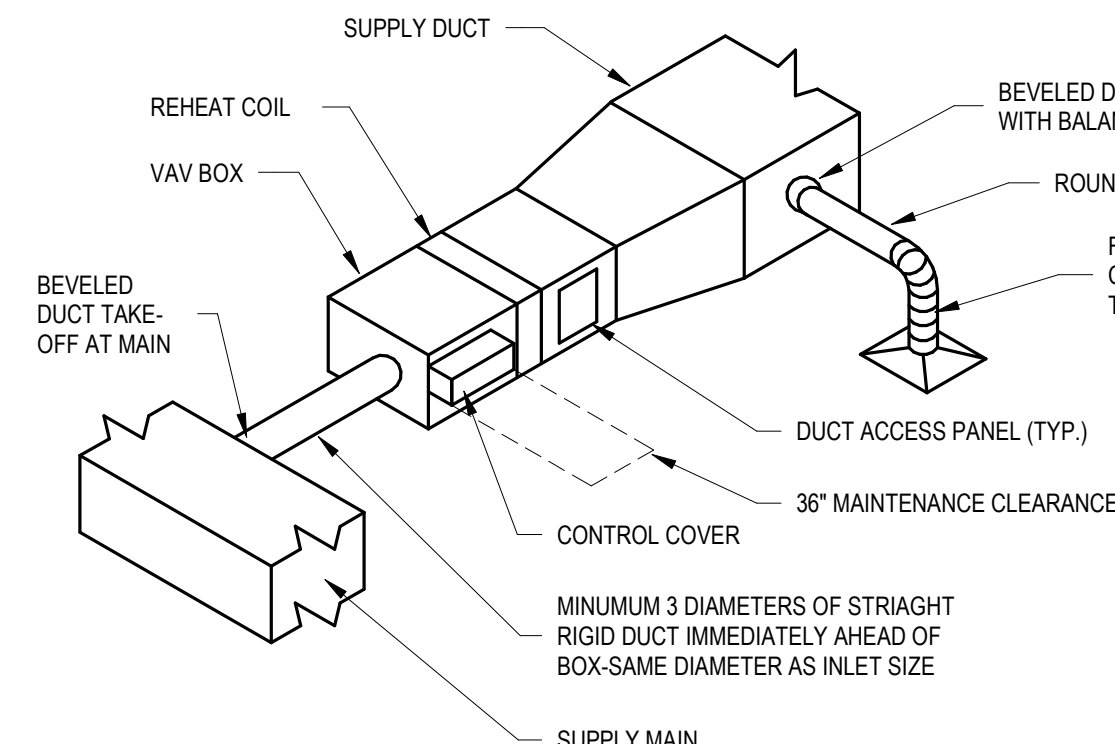


C5 DUCT PENETRATION THROUGH INT. WALL DETAIL
M501 / NO SCALE

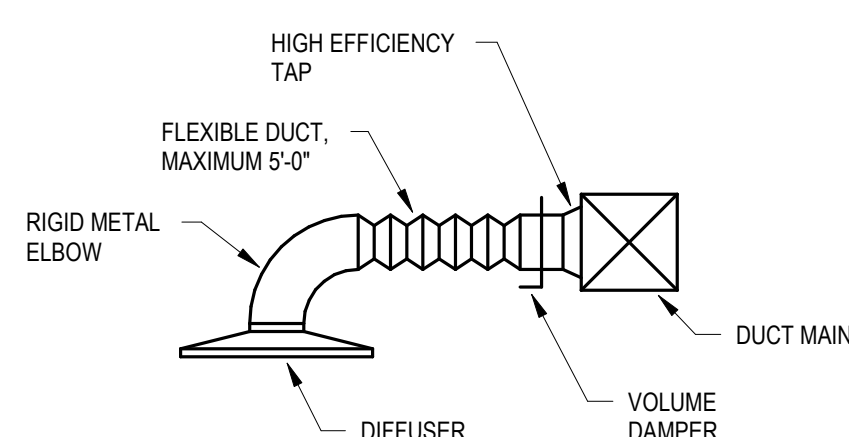
C5 DUCT PENETRATION THROUGH INT. WALL DETAIL
M501 / NO SCALE



B5 HEATING COIL PIPING DETAIL
M501 / NO SCALE



A5a VARIABLE AIR VOLUME BOX DETAIL
M501 / NO SCALE



A5 TYPICAL DIFFUSER INSTALLATION DETAIL
M501 / NO SCALE



701 Washington Ave. N, Ste 200 | Minneapolis, MN 55401 | 612.338.2029

CLIENT:
**ALEXANDRIA TECH
AND COMM. COLLEGE**
1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

ELECTRICAL CONSULTANT:
HALLBERG ENGINEERING
5051 Miller Trunk Highway
Hermantown, MN 55811

ROOF CONSULTANT:
INSPER
1000 Parkers Lake Road, Suite 100
Wayzata, MN 55391

TECHNOLOGY CONSULTANT:
TRUE NORTH
140 3rd Street South
Stillwater, MN 55082

ACOUSTICS CONSULTANT:
KRA
1917 Coventry Court
Mendota Heights, MN 55118

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	02/27/2026	BID PACK #2	
	12/22/2025	BID PACK #1	
NO	DATE	ISSUED FOR	
1	06/15/2026	PR-04	
NO	DATE	REVISION	

I HEREBY CERTIFY that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: *Ryan K. Thorson*
Typed or Printed Name: RYAN K. THORSON
Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
MECHANICAL DETAILS

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

M501



Mendota Heights, MN 55118

NOTE 1: PROVIDE WITH DOOR LIMIT SWITCH.

Assembled: Drawn: 02/27/2026 ATCC Student Services & Transportation Center MEP/414
5/15/2026 3:35:29 PM

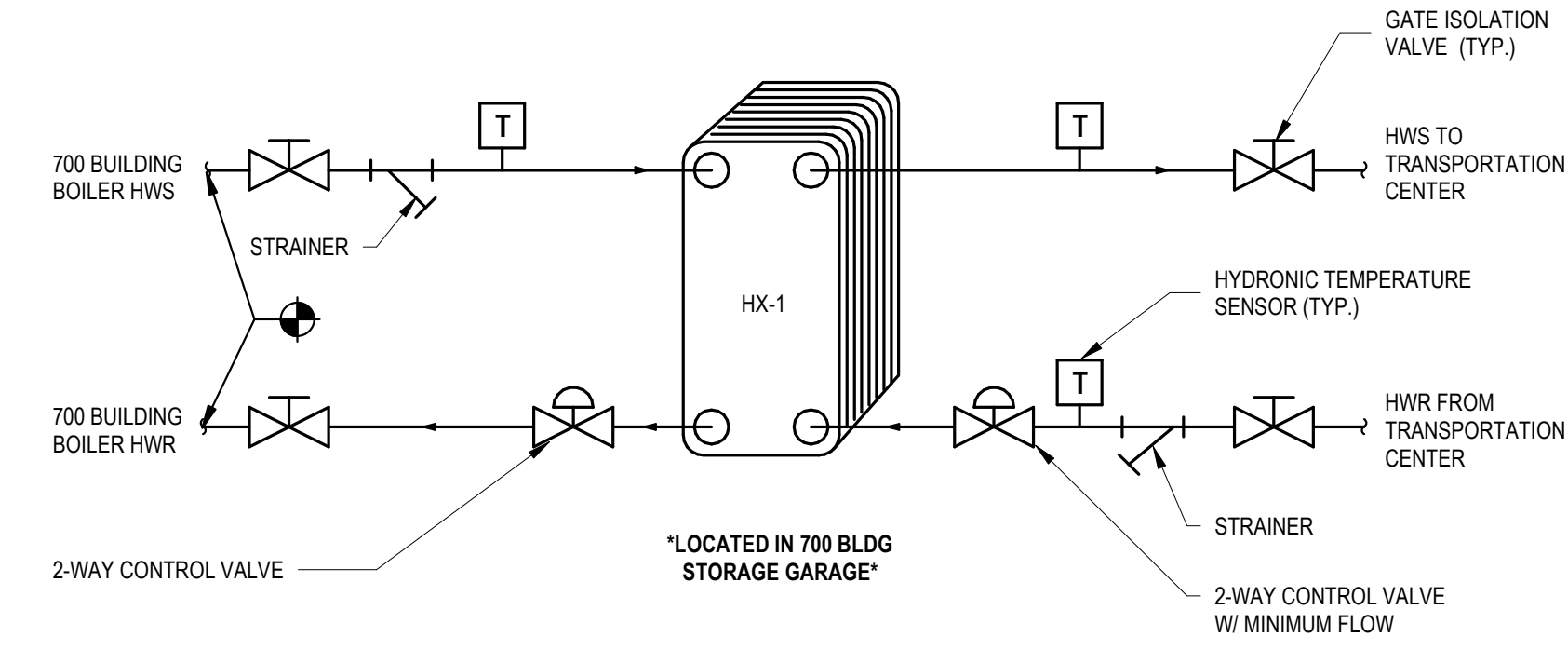
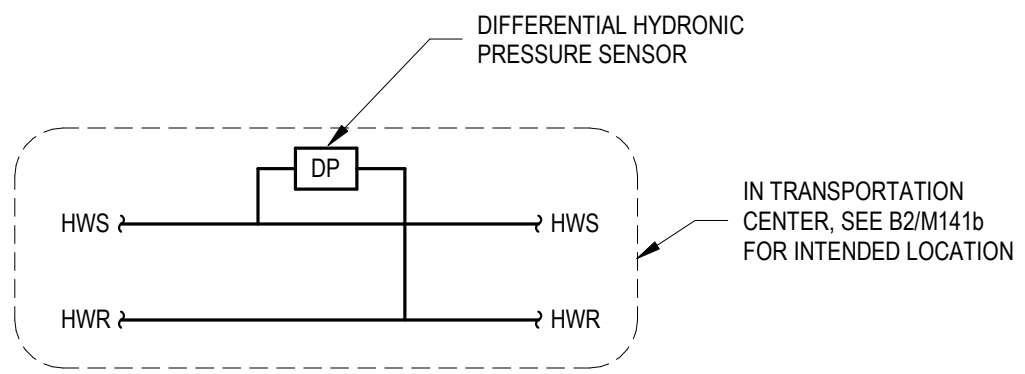
HEATING PLANT POINT LIST												
POINT NAME	HARDWARE POINTS				SOFTWARE POINTS					GRAPHIC DISPLAY		
	AI	AO	BI	BO	D	M	A	L	S			
DIFF PRESSURE	X									X		
HEATING LWT	X				X						X	
HEATING RWT	X				X							X
HEATING LWT SPT		X				X		X		X		
DIFF PRESSURE SPT		X				X		X		X		
PUMP COMMAND (EACH PUMP)						X		X		X		
PUMP VFD SPD (EACH PUMP)		X				X		X		X		
PUMP STATUS (EACH PUMP)			X		X			X		X		
LEAD PUMP				X		X					X	
HIGH DP ALARM							X					X
LOW DP ALARM							X					X
PUMP FAILURE (EACH PUMP)							X					X

HEATING PLANT SEQUENCE OF OPERATIONS

- A. System Description and Intent: The Transportation Center heating load is to be provided via a brazed-plate heat exchanger tapping from the 700 Building's existing boiler plant. Insulated hydronic piping buried between the buildings will connect the heat exchanger with the variable-primary hydronic heating water loop within the Transportation Center. VFD controlled pumps located in the Transportation Center's Western Mechanical Room will operate in a variable-primary lead-lag parallel configuration and modulate based upon differential pressure setpoint. Control of the 700 Building heating water system shall be maintained with its existing intent. The following sequence outlines recommended values. All set points shall be adjusted in the field during the commissioning period to meet the actual criteria of the installed system.
- B. Controlled Equipment: P-1, P-2
- C. Schedule: Always available
- D. HVAC Setpoints:
1. Recommended Hot Water Differential Pressure SPT: 12 psi (adj.)
 2. Heating LWT Setpoint = 700 Bldg EVT - 5°F (adj.)

- E. Sequences:
1. Heating:
 - a. Upon and heating demand from Transportation Center:
 - 1) Open both HCVs.
 - a) HCVs to modulate to maintain Transportation Center LWT (HWS) SPT.
 - 2) Command lead pump on via VFD. Minimum speed shall not be below 25% (adj.).
 - 3) The controller shall modulate the lead pump via VFD to maintain the hot water differential pressure setpoint.
 - a) If the lead pump VFD speed is greater than 90% (adj.), command lag pump on. Controller to modulate lead/lag pumps at equal speeds to maintain hot water differential pressure setpoint.
 - i. Upon rising hot water differential pressure:
 - j. Turn down lead/lag VFDs to maintain hot water differential pressure setpoint.
 - ii) If VFD speeds < 40% (adj.), the lag VFD shall stage off and the lead VFD shall continue to run and modulate to maintain setpoint.
 2. Leading/lag control:
 - a. The hot water pumps, P-1 & P-2, shall rotate lead designation every 24 hours (adj.).
 - b. Upon failure of the lead pump, the lag pump shall run and the lead pump shall turn off.
 3. Control valve serving Transportation Center hydronic return shall be set to 30% (adj.) to maintain minimum flow.

- F. Alarms:
1. Pump failures.
 2. High differential pressure, >25% of setpoint (adj.)
 3. Low differential pressure, <25% of setpoint (adj.)



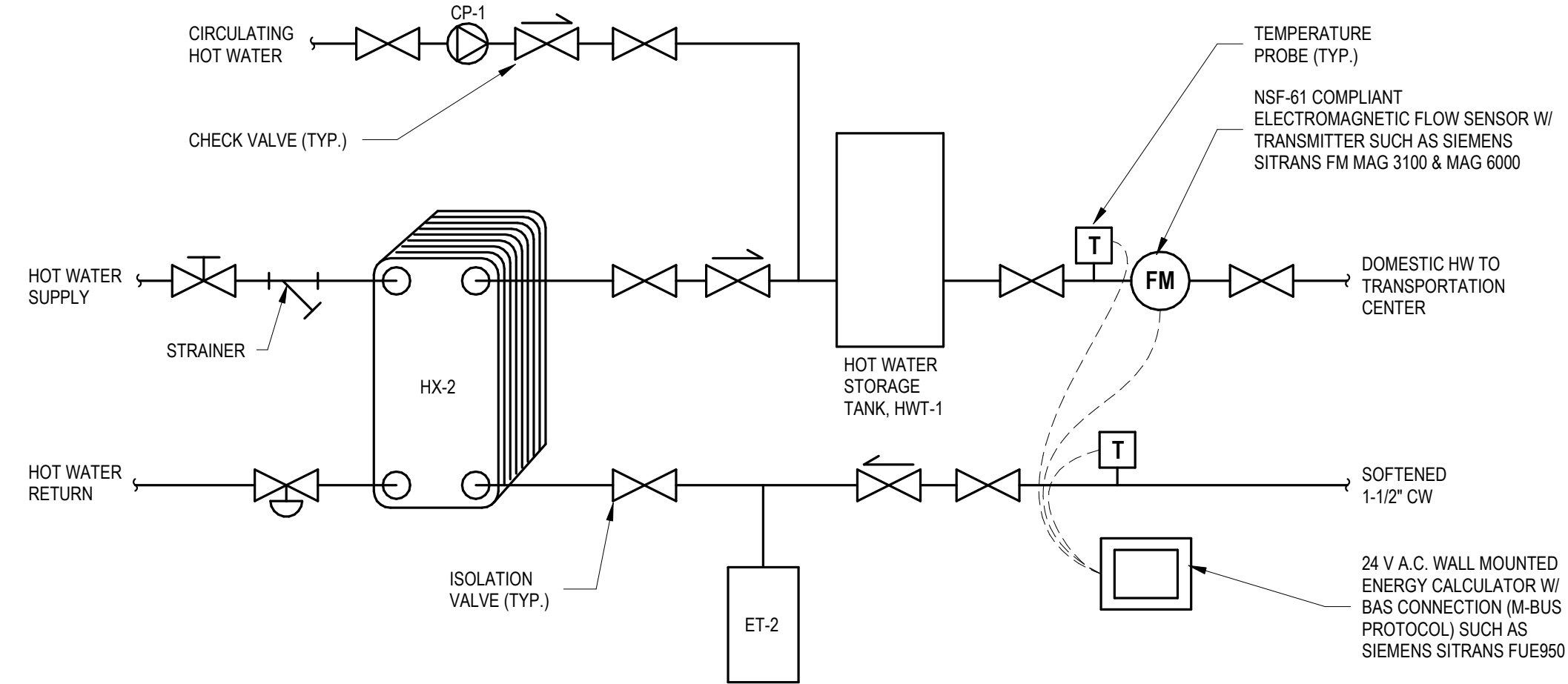
C1 BRAZED PLATE WATER TO WATER HEAT EXCHANGE
M702 NO SCALE

DOMESTIC HOT WATER SYSTEM POINT LIST												
POINT NAME	HARDWARE POINTS				SOFTWARE POINTS					GRAPHIC DISPLAY		
	AI	AO	BI	BO	D	M	A	L	S			
LWT SETPOINT		X			X		X			X		
LWT (HW)	X				X		X			X		
EWT (CW)	X				X		X			X		
CP-1 PUMP COMMAND			X		X		X			X		
CP-1 PUMP STATUS			X		X		X			X		
LWT ALARM SETPOINT	X				X							
LOW LWT ALARM						X					X	
PUMP FAILURE ALARM						X						X

DOMESTIC HOT WATER SEQUENCE OF OPERATIONS

- A. System Description and Intent: Transportation Center domestic hot water is supplied via an NSF-61 compliant double wall brazed-plate heat exchanger transferring heat from the building's internal hydronic loop. Domestic hot water load is to be metered and trended according using an in-line flow meter and temperature probes.
- B. Controlled Equipment: HCV
- C. Schedule: Building occupancy
- D. Setpoints: HW Temperature: 120°F (adj.)
- E. Sequences:
1. Occupied Mode:
 - a. Hydronic HWR HCV to modulate to maintain hot water temperature of 120°F.
 - b. Command CP-1 on.
 2. Unoccupied Mode:
 - a. Hydronic HWR HCV to modulate to maintain hot water temperature of 120°F.
 - b. Command CP-1 off.

- F. Alarms:
1. Low HW temperature, < 110 °F (adj.)
 2. Pump Failure

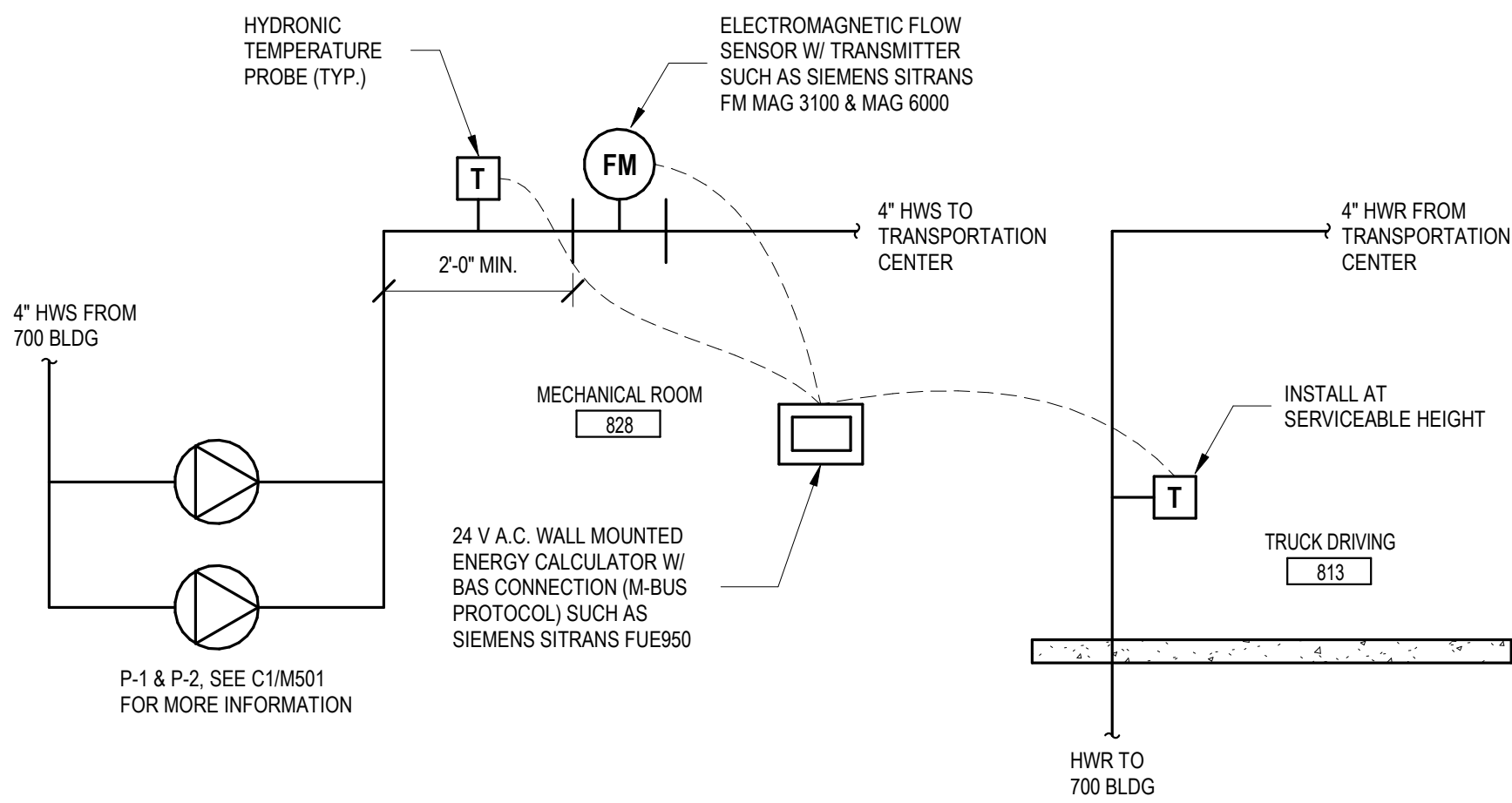


A1 DOMESTIC HOT WATER HEAT DETAIL
M702 NO SCALE

B3 METERING POINT LIST												
POINT NAME	HARDWARE POINTS				SOFTWARE POINTS					GRAPHIC DISPLAY		
	AI	AO	BI	BO	D	M	A	L	S			
HVAC SYSTEM ELECTRICAL ENERGY USE					X					X		
INTERIOR LIGHTING ENERGY USE					X					X		
EXTERIOR LIGHTING ENERGY USE					X					X		
PLUG LOADS ENERGY USE					X					X		
BUILDING WATER USE (VOLUME)					X			X		X		
BUILDING HEATING HOT WATER ENERGY USE					X			X		X		
BUILDING DOMESTIC HOT WATER ENERGY USE					X			X		X		
IRRIGATION WATER USE (VOLUME)					X			X		X		
DAILY PEAK KW	X				X			X		X		
CURRENT DAY KWH	X				X			X		X		

PROVIDE THESE POINTS FOR ELECTRIC METERS SERVING ALL BUILDING SYSTEMS. REFER TO DIVISION 26 DRAWINGS AND SPECIFICATIONS FOR LOCATIONS AND TECHNICAL INFORMATION.

RETAIN DAILY, WEEKLY, MONTHLY TOTALS FOR 12 MONTHS, AND ANNUAL TOTALS FOR 5 YEARS FOR EACH SUB-METERED CATEGORY.

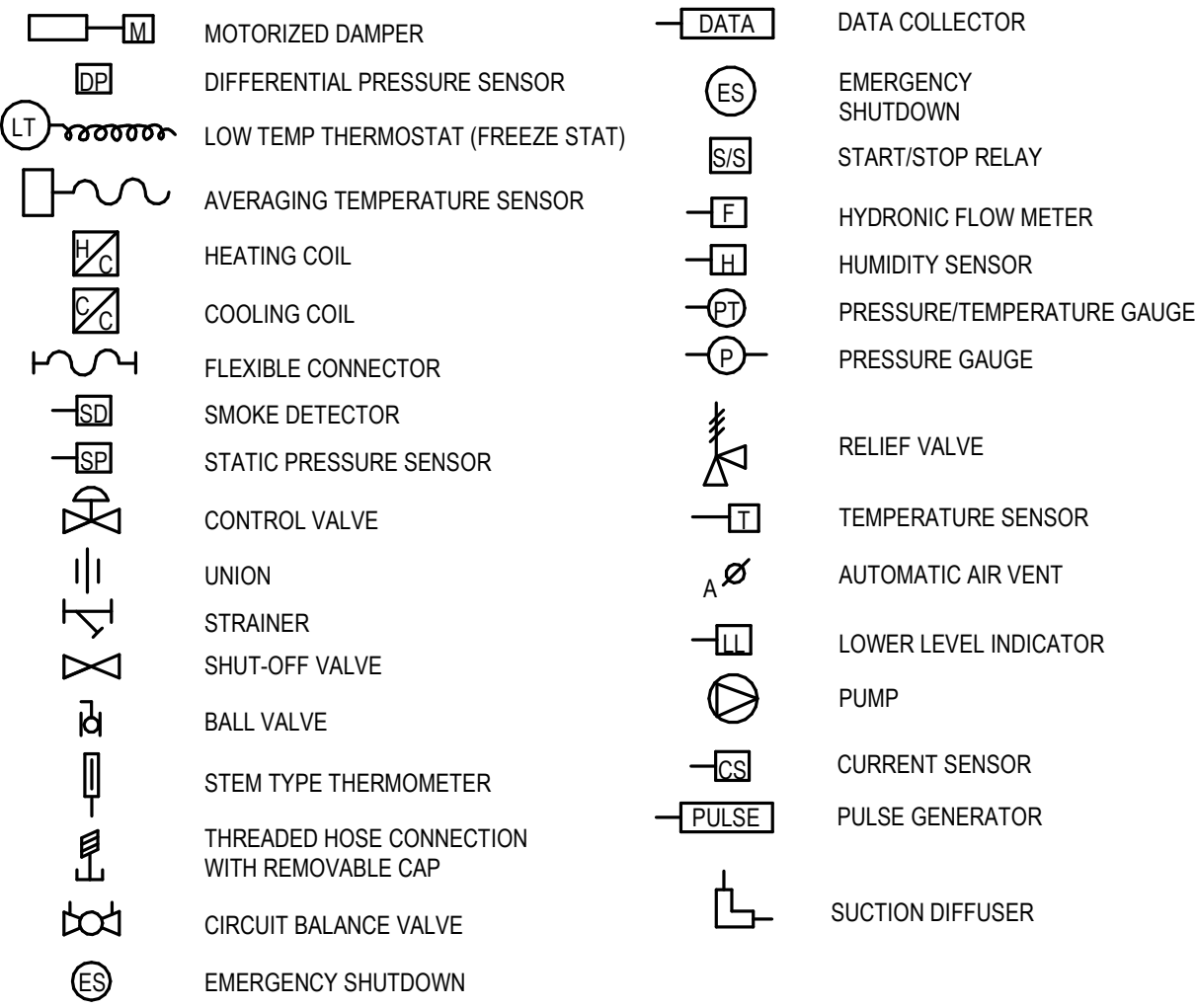


D3 HYDRONIC METERING DETAIL
M702 NO SCALE

AHU-1 POINT LIST												
POINT NAME	HARDWARE POINTS				SOFTWARE POINTS					GRAPHIC DISPLAY		
	AI	AO	BI	BO	D	M	A	L	S			
SCHEDULE		X				X			X		X	
ZnT SPT		X				X			X		X	
EAD Command		X			X				X		X	
EAD Failure								X			X	
Economizer Status				X	X				X		X	
OAD Command		X			X				X		X	
OA Flowrate	X				X				X		X	
OAD Failure							X				X	
OA Temperature	X					X			X		X	
OA Humidity	X				X				X		X	
OA FF DP	X					X			X		X	
RA FF DP	X					X			X		X	
HCV Command		X			X				X		X	
AHU SF Command			X		X				X		X	
AHU SF Status	X				X						X	
AHU SF Failure								X			X	
DAT DB SPT		X				X			X		X	
DAT DB	X					X			X		X	
DAT WB	X					X			X		X	
Low DAT							X				X	
AHU RF Command				X		X			X		X	
AHU RF Status	X				X				X		X	
AHU RF Failure								X			X	
RAD Command				X	X				X		X	
AHU RA Temp	X				X				X		X	
AHU RA Humidity	X				X				X		X	
AHU RA Smoke Detect			X						X		X	
ERV-1 SF Status	X				X				X		X	
ERV-1 SF Command				X		X			X		X	
ERV-1 SF Failure							X				X	
ERV-1 OA Filter/Core DP	X					X			X		X	
ERV-1 EA Filter/Core DP	X					X			X		X	
ERV-1 SA Duct SP	X					X			X		X	
ERV-1 DAT	X					X			X		X	
ERV-1 EF Status	X					X			X		X	
ERV-1 EF Command				X		X			X		X	
ERV-1 EF Failure								X			X	
ERV-1 OAD Command		X				X			X		X	
ERV-1 OAD Failure								X			X	
ERV-1 EAD Command		X				X			X		X	
ERV-1 EAD Failure								X			X	
ERV-1 EA Flow	X					X			X		X	
ASHP-1 Command (Stage 1)				X		X			X		X	
ASHP-1 Command (Stage 2)				X		X			X		X	
ASHP-1 Status (Stage 2)	X				X				X		X	
ASHP-1 Status (Stage 2)	X				X				X		X	
ASHP-1 Alarm							X				X	
Return Low SP Shutdown			X				X				X	
Supply High SP Shutdown			X				X				X	
Refrigerant Leak Detection			X				X				X	

A4 AHU-1 DIAGRAM
M702 NO SCALE

DIAGRAM SYMBOLS & ABBREVIATIONS



POINT LIST COLUMN ABBREVIATIONS

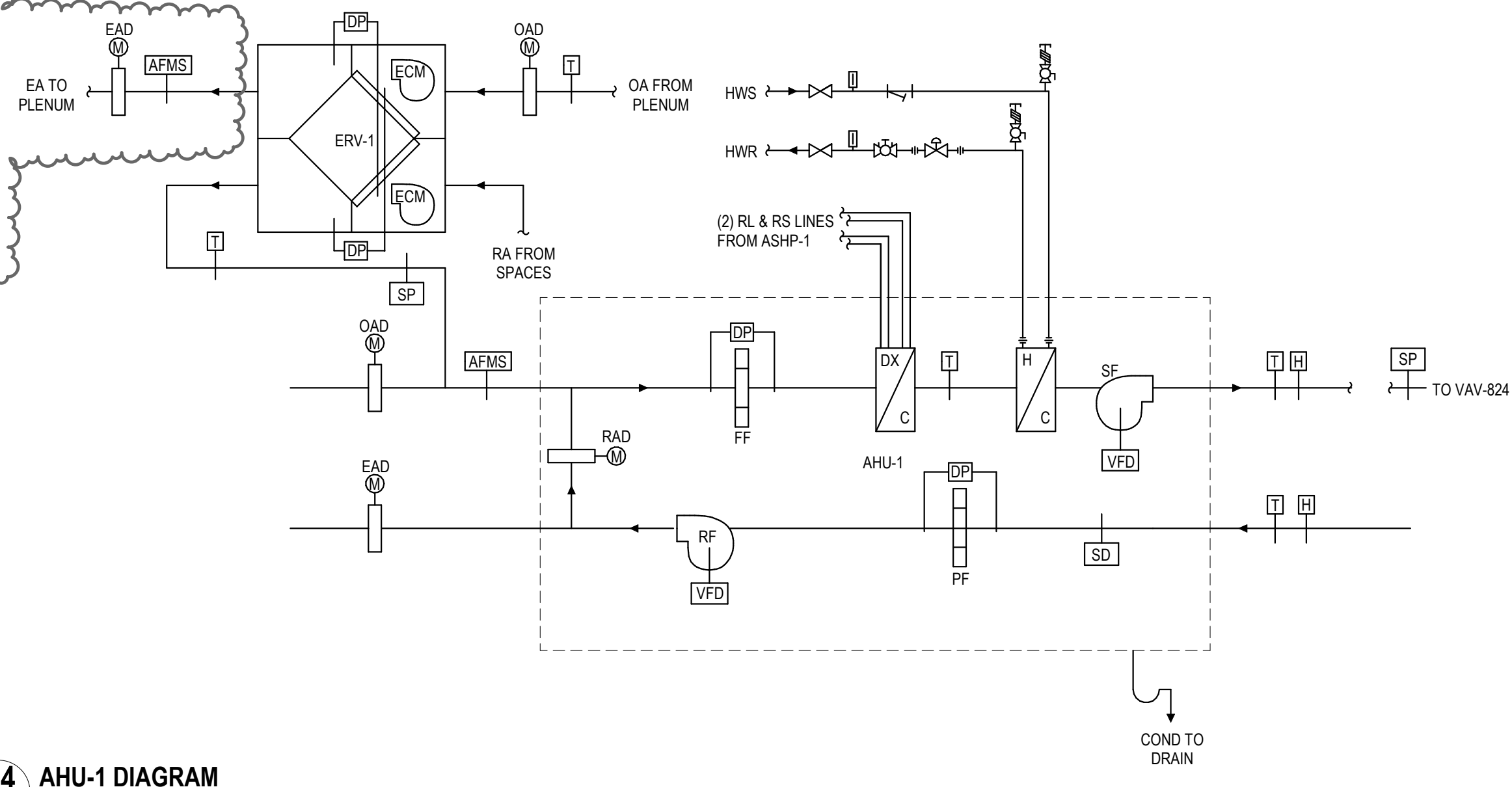
AI	ANALOG INPUT
AO	ANALOG OUTPUT
BI	BINARY INPUT
BO	BINARY OUTPUT
D	DISPLAY OUT (READ ONLY)
M	MODIFY VALUE (OPERATOR OVERRIDE ALLOWED)
A	ALARM
L	LOG (TREND)
S	SCHEDULE

AHU-1 SEQUENCE OF OPERATIONS

- A. System Description and Intent: This air handling unit serves the offices, tool storage rooms, corridors, both innovation labs, the dyro control room, and the restrooms. This is a mixed airflow system that provides heated or cooled air to VAV boxes with hydronic reheat. Airflow and discharge temperature will modulate based on requirements of the spaces served. An external energy recovery core with ECM fans will operate to recover energy from bathroom exhaust while supplying the required ventilation to the unit in non-economizing operation.
- B. Controlled Equipment: AHU-1, ERV-1, ASHP-1
- C. Schedule: Building BAS occupied/unoccupied schedule
- D. HVAC Setpoints:
1. DAT SPT: 55°F (cooling) & 65°F (heating, adj.) to satisfy zone with greatest cooling demand.
 2. OAF SPT: 1,800 CFM
 3. EAF SPT: 1,280 CFM
 4. Reset SP SPT to maintain one inch VAV at 100% open.
 - a. SP SPT = 1.0 inch wc for 10 minute (adj) start up period.

- E. Sequences:
1. Unoccupied Heating:
 - a. Available if a space ZnT < 60°F in order to prioritize perimeter hydronic heat.
 - b. AHU SF = modulate on SP SPT.
 - c. AHU RF = modulate when SF operating.
 - d. OADs, EADs, ERV-1 = closed/off. RAD = modulate.
 - e. If DAT < 55°F, command ASHP-1 on and modulate to maintain DAT of 60°F.
 2. Unoccupied Cooling:
 - a. Economize if 55°F (adj.) < OAT < 68 °F.
 - 1) AHU OAD, EAD = 100% open.
 - 2) RAD = closed.
 - 3) AHU SF & RF = Operate at 100%.
 - 4) HCV = closed.
 - 5) ASHP-1 = off.
 - b. If ZnT > ZnT SPT:
 - 1) AHU SF = modulate on SP SPT.
 - 2) AHU RF = modulate when SF operating.
 - 3) OADs, EADs, ERV-1 = closed/off. RAD = modulate.
 - 4) Command ASHP-1 on.
 - 5) Modulate ASHP-1 to maintain DAT SPT = 55°F (adj.).
 3. Pre-occupied Mode:
 - a. Provide optimal start sequence to bring spaces to occupied setpoints at scheduled start of occupied mode.
 - b. Heating:
 - 1) AHU SF = modulate on SP SPT.
 - 2) AHU RF = modulate when SF operating.
 - 3) OADs, EADs, ERV-1 = closed/off. RAD = open.
 - 4) Modulate ASHP-1 to maintain DAT SPT = 60°F (adj.).
 - a) If OAT < 5°F (adj.), ASHP-1 = off
 - i. Open HCV and modulate to maintain DAT SPT = 80 °F (adj.).
 - c. Cooling:
 - 1) Economize per E.2.a. if 55 °F (adj.) < OAT < 68 °F.
 - 2) If economizing not available:
 - a) AHU SF = modulate on SP SPT.
 - b) OADs, EADs, ERV-1 = closed/off. RAD = open.
 - c) ASHP-1 modulates to maintain DAT setpoints.
 4. Occupied Mode:
 - a. Fans:
 - 1) AHU-1 SF, RF run continuously.
 - a) AHU SF = modulate to maintain SP SPT.
 - 2) ERV-1 SF & EF run continuously.
 - 3) Economize per E.2.a. if Zone requires cooling and 55 °F (adj.) < OAT < 68 °F.
 - b. Dampers:
 - 1) VAV-821 & VAV-824 modulate between minimum and maximum airflow to satisfy space CO2 less than 1,000 ppm when AHU-1 is on and not in economizing.
 - 2) ERV OAD & EAD = open; AHU OAD & EAD = closed.
 - 3) RAD = modulate.
 - c. Coils:
 - 1) Modulate ASHP-1 or HCV to maintain DAT setpoint.
 - a) In heating mode, utilize ASHP coil in heating until OAT < 5°F (adj.) at which point command ASHP off and open HCV.
 - b) If DAT < 4°F (adj.) below DAT SPT, open and modulate HCV to maintain DAT SPT.

- F. Alarms:
1. AHU fan failures.
 2. ERV fan failures.
 3. AHU damper failures.
 4. ERV damper failures.
 5. ASHP-1 failure.
 6. Low DAT (< 52°F).
 7. High duct static pressure shutdown.
 - a. Manual reset.
 8. Return air smoke detected:
 - a. Shutdown fans and close OAD & EAD.
 9. Refrigerant detected:
 - a. Fully open OAD & EAD, fully open HCV, open all VAV dampers to 100%, & run fans full speed.



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TECHNOLOGY CONSULTANT:

TRUE NORTH

140 3rd Street South

Stillwater, MN 55082

ACOUSTICS CONSULTANT:

KRA

1917 Coventry Court

Menota Heights, MN 55118

THIS SQUARE APPEARS 1'2"x1'2"
ON FULL SIZE SHEETS

02/27/2026 BID PACK #2
NO DATE ISSUED FOR

1 06/17/2026 ASI-04
NO DATE REVISION

I HEREBY CERTIFY that this plan, specification, or
report was prepared by me or under my direct
supervision and that I am a duly Licensed Professional
Engineer under the laws of the State of Minnesota.

Signature: Ryan K. Thorsen

Typed or Printed Name: RYAN K. THORSON

Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
ATCC-23
TRANSPORTATION
CENTER

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:

SYSTEM DETAILS AND
CONTROLS

DRAWN BY: MJG

CHECKED BY: AJA

E

D

C

B

A

Autodesk Docs/230736-ATCC Student Services & Transportation Center/230736-ATCC Student Services & Transportation Center MEP/444
3/18/2026 9:02:25 AM

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GENERAL SHEET NOTES

A. N/A

KEYED SHEET NOTES

1. CORE DRILL PRE-CAST WALL FOR NEW HYDRONIC PIPE. VERIFY LOCATIONS OF STEEL REINFORCING WITHIN WALL PRIOR TO MODIFICATIONS BY MEANS OF IMPULSE RADAR IMAGING.

2. DEMOLISH STEAM TO HOT WATER HEAT EXCHANGER AND ASSOCIATED PIPING. LEAVE STAND FOR REUSE OF NEW HYDRONIC HEAT EXCHANGER.

3. DEMOLISH ALL STEAM PIPING, INSULATION, VALVING, TRAPS, AND ACCESSORIES WITHIN HATCHED DEMO REGION. HIGH-PRESSURE CONDENSATE AND STEAM PIPING TO REMAIN.

4. CAP PIPE AT INDICATED LOCATION. EXTEND PIPE TO NEW HX-1. SEE DETAIL C1/M702 FOR PIPING ACCESSORIES AND DETAILS.

5. INTENDED LOCATION FOR HX-1. INSTALL EITHER VIA WALL-MOUNTED BRACKETS OR 4" CONCRETE HOUSEKEEPING PAD.



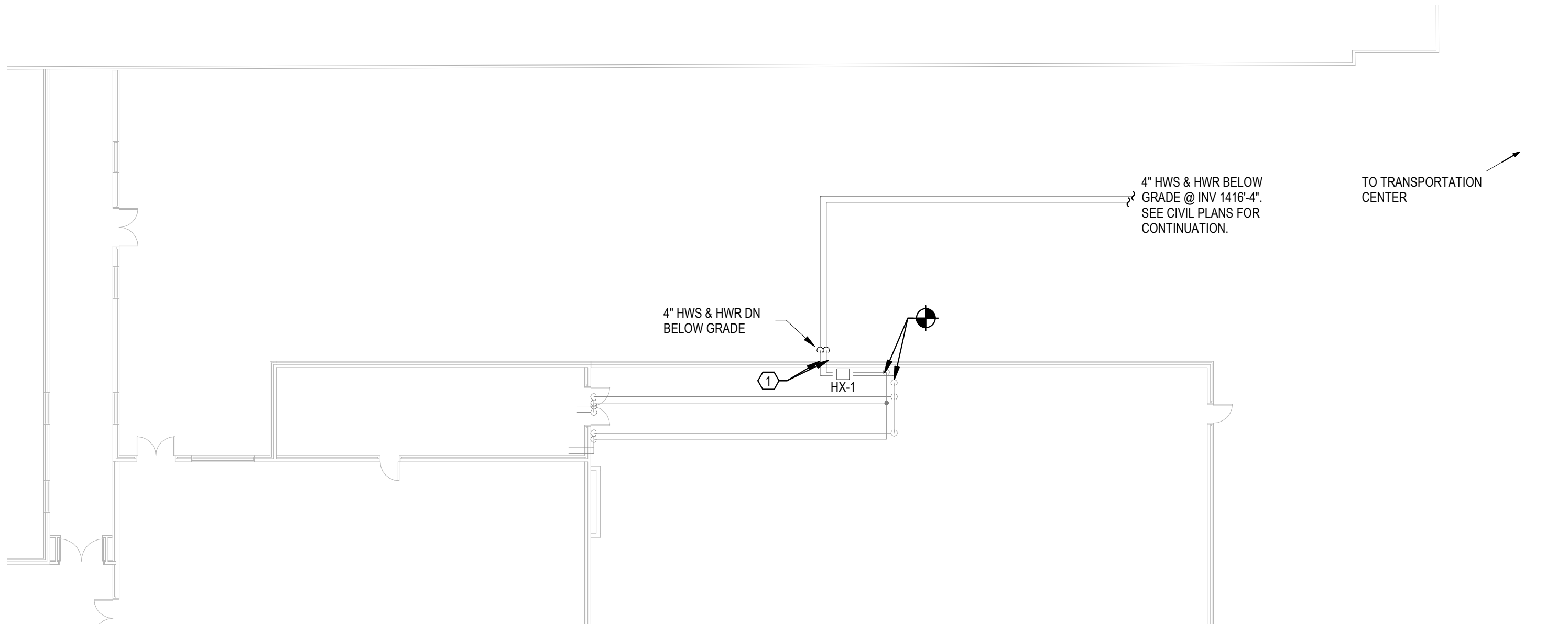
B2 STEAM SYSTEM DEMOLITION 3
MD101/ NO SCALE



B4 STEAM SYSTEM DEMOLITION 2
MD101/ NO SCALE



B5 STEAM SYSTEM DEMOLITION 1
MD101/ NO SCALE



A4 MECHANICAL PLANS - 700 BLDG
MD101/ 1/16" = 1'-0"

0'-0" 8'-0" 16'-0" 32'-0"



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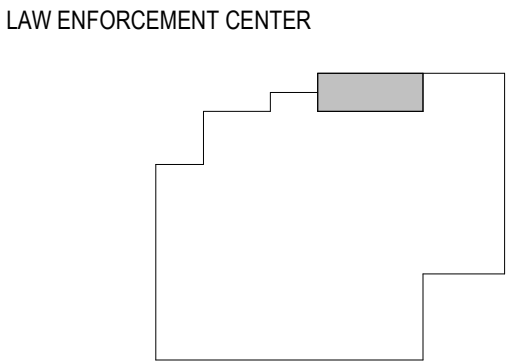
CLIENT:
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1917 Coventry Court
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THIS SQUARE APPEARS 1/2"x1/2"
ON FULL SIZE SHEETS

02/27/2026	BID PACK #2
NO	DATE
	ISSUED FOR

1	03/18/2026	BP2 - ADDENDUM 01
NO	DATE	REVISION

I HEREBY CERTIFY that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature: *Ryan K. Thorsen*
Typed or Printed Name: RYAN K. THORSON
Date: 02/27/2026 License Number: 41496

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PROJECT NAME:
**ATCC-23
TRANSPORTATION
CENTER**

1601 JEFFERSON STREET
ALEXANDRIA, MN 56308

DRAWING TITLE:
**MECHANICAL
DEMOLITION & HVAC
PLANS - 700 BLDG**

DRAWN BY: MJG
CHECKED BY: AJA
PROJ. NO: 230736
DRAWING NO:

MD101