



COLORADO DEPARTMENT OF TRANSPORTATION

G ROAD HVAC

GRAND JUNCTION, CO

STATE OF COLORADO PROJECT #26988

APRIL 30TH, 2026

100% CD SET

CODE INFORMATION:

1. THE FOLLOWING APPLICABLE CODES HAVE BEEN ADOPTED BY THE STATE BUILDINGS PROGRAM (SBP) AND INCLUDE THE 2024 VERSIONS OF THE IBC, IEBC, IMC, IECC, IPC, IFGC, THE COLORADO MODEL ELECTRIC READY AND SOLAR READY CODE, AND THE 2023 VERSION OF THE NEC.

CODE ANALYSIS:

1. THE BUILDING IS CLASSIFIED AS A "B" OCCUPANCY ACCORDING TO THE ORIGINAL CONSTRUCTION DRAWINGS FROM 2011.
2. THE BUILDING IS SINGLE STORY.
3. TOTAL BUILDING AREA IS 13,714 FT² FROM THE ORIGINAL CONSTRUCTION DRAWINGS OF 2011.
4. THE BUILDING IS CONSTRUCTION TYPE II-B (FROM THE ORIGINAL CONSTRUCTION DOCUMENTS).
5. THE BUILDING IS FULLY SPRINKLED THROUGHOUT AND HAS A FIRE ALARM SYSTEM.
6. THE BUILDING HAS SECURE ACCESS.
7. CLIMATE ZONE 5B, COUNTY: MESA.

DESIGN TEAM:

BIGHORN CONSULTING ENGINEERS
386 INDIAN ROAD
GRAND JUNCTION, CO 81501
CONTACT: SHAWN BRILL
PHONE: 970-312-8636

GENERAL CONSTRUCTION NOTES:

1. THE SCOPE OF WORK FOR THIS PROJECT WILL INVOLVE THE REPLACEMENT OF FOUR PACKAGED AIR HANDLING UNITS LOCATED ON THE GROUND, HVAC CONTROLS, NEW VAV BOXES, AND ASSOCIATED ELECTRICAL.
2. DEMOLITION INCLUDES THE REMOVAL OF THE EXISTING PACKAGED UNITS, THREE ZONE DAMPER BOXES, ONE BYPASS BOX, AND CONTROLS. THERE WILL BE SELECTIVE CUTTING AND PATCHING REQUIRED AS PART OF THIS PROJECT.
3. COORDINATE STAGING AREA FOR CONSTRUCTION WITH THE OWNER.
4. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL WASTE DISPOSAL FOR THIS PROJECT. COORDINATE THE LOCATION OF WASTE DUMPSTERS WITH THE OWNER.
5. THE CONTRACTOR IS TO VERIFY ALL DIMENSIONS AND ACCESS REQUIREMENTS FOR ALL NEW EQUIPMENT PRIOR TO ORDERING MATERIAL.
6. MAINTAIN ACCESS/EGRESS FOR THE BUILDING DURING CONSTRUCTION.

SCOPE OF NEW WORK:

1. THE WORK WILL INVOLVE THE FOLLOWING:
- 1.1. REMOVAL OF FOUR GROUND-MOUNTED PACKAGED UNITS AND REPLACEMENT WITH THREE NEW GAS-FIRED, VAV PACKAGED ROOFTOP UNITS AND ONE NEW SINGLE ZONE VAV UNIT FOR THE LAB. EXISTING ELECTRICAL TO BE RECONNECTED.
- 1.2. INSTALLATION OF NINE, NEW VAV BOXES WITH ELECTRIC REHEAT.
- 1.3. RECONNECTING OF GAS PIPING FROM THE EXISTING GAS PIPING TO THE NEW GAS FIRED PACKAGED RTUS.
- 1.4. REMOVAL OF THE EXISTING BUILDING AUTOMATION SYSTEM (BAS) AND REPLACEMENT WITH A NEW TRANE TRACER SC+ BAS INCLUDING NEW DISTRIBUTED CONTROLLERS. THIS WILL INCLUDE REMOVAL OF ALL UNITARY CONTROLS ON THE EXISTING ZONE BOXES, REMOVAL OF ALL EXISTING SENSORS AND CONTROLLED DEVICES ASSOCIATED WITH THE EXISTING PACKAGE UNITS AND ZONE BOXES AND REPLACEMENT WITH NEW. THE NEW SYSTEM WILL PROVIDE CONTROL LOOPS, SEQUENCES, AND POINTS LIST DATA AS LISTED IN THE CONSTRUCTION DOCUMENTS. THE PROJECT WILL ALSO RECEIVE A COMMISSIONING EFFORT AS REQUIRED BY THE IECC-408.2 INCLUDING A SYSTEM PLAN, PRE-FUNCTIONAL TESTING, AND ON SITE COMMISSIONING WITH A FINAL REPORT.
- 1.5.

PROJECT ACCESS:

1. THE CONTRACTOR IS TO COORDINATE ALL BUILDING ACCESS WITH THE OWNER.
2. THIS IS A SECURE FACILITY WITH CONTROLLED ACCESS THAT WILL REQUIRE SCHEDULING AND COORDINATING WORK ACCESS WITH THE OWNER FOR ALL PERSONNEL ACCESS DURING THE PROJECT.

DRAWING INDEX

- T1-1 TITLE SHEET
- M0-1 MECHANICAL - COVER SHEET
- M1-1 MECHANICAL - WEST FLOOR PLAN
- M1-2 MECHANICAL - EAST FLOOR PLAN
- M3-1 MECHANICAL - SCHEDULES AND DETAILS
- M3-2 MECHANICAL - CONTROL SCHEMATICS AND DETAILS
- M3-3 MECHANICAL - CONTROL SEQUENCE OF OPERATION
- M3-4 MECHANICAL - CONTROL SEQUENCE OF OPERATION
- E0-1 ELECTRICAL - COVER SHEET
- E2-1 ELECTRICAL - WEST FLOOR PLAN
- E2-2 ELECTRICAL - EAST FLOOR PLAN
- E3-1 ELECTRICAL - SCHEDULES AND DETAILS



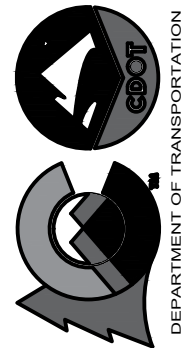
PROJECT VICINITY MAP

NTS

DATE	No.	DESCRIPTION
02/19/2026	1	99% CONSTRUCTION DOCS
03/10/2026	2	100% CONSTRUCTION DOCS
04/30/2026	3	100% CONSTRUCTION DOCS

Colorado Department of Transportation

PROPERTY MANAGEMENT
2829 W. HOWARD PL.
DENVER, CO 80204
Phone: 303-757-9011



CDOT GRAND JUNCTION

G ROAD HVAC
GRAND JUNCTION, COLORADO



DRAWN BY: BCE

CDOT PROJECT NO.
26988
BCE PROJECT NO.
25481

DRAWING NUMBER

T1-1



Compliance Certificate

Project Information

Energy Code: 2024 IECC
Project Title: 25481 CDDT GJ HVAC Upgrade
Location: Grand Junction, Colorado
Climate Zone: 5b
Project Type: Alteration
Project No: 104042
Project Sub Type: Other Alteration
All Electric: false
Is Renewable: false
Has Battery: false
Has Charger: false
Has Heat Pump: false

Construction Site:
2328 G Road
Grand Junction , Colorado 81505

Owner/Agent:
CDDT
2829 W. Howard Place
Denver, Colorado 80204

Designer/Contractor:
Shawn Brill
386 Indian Road
Bighorn Consulting Engineers
Grand Junction, Colorado 81501
9702701694
shawn@bighorneng.com

Notes:

Renewable energy

Number of Floors: 1
Area of Three Largest Floors: 0
Proposed Capacity: 0
Required Capacity: 0
Proposed Off-site Energy: 0
Required Off-site Energy: 0
Exception: None

Renewables Pass

Building Area

Description	Floor Area
1-Office (Office) : Nonresidential	13714



Mechanical Compliance Certificate

Project Information

Energy Code: 2024 IECC
Project Title: 25481 CDDT GJ HVAC Upgrade
Location: Grand Junction, Colorado
Climate Zone: 5b
Project Type: Alteration

Construction Site:
2328 G Road
Grand Junction , Colorado 81505

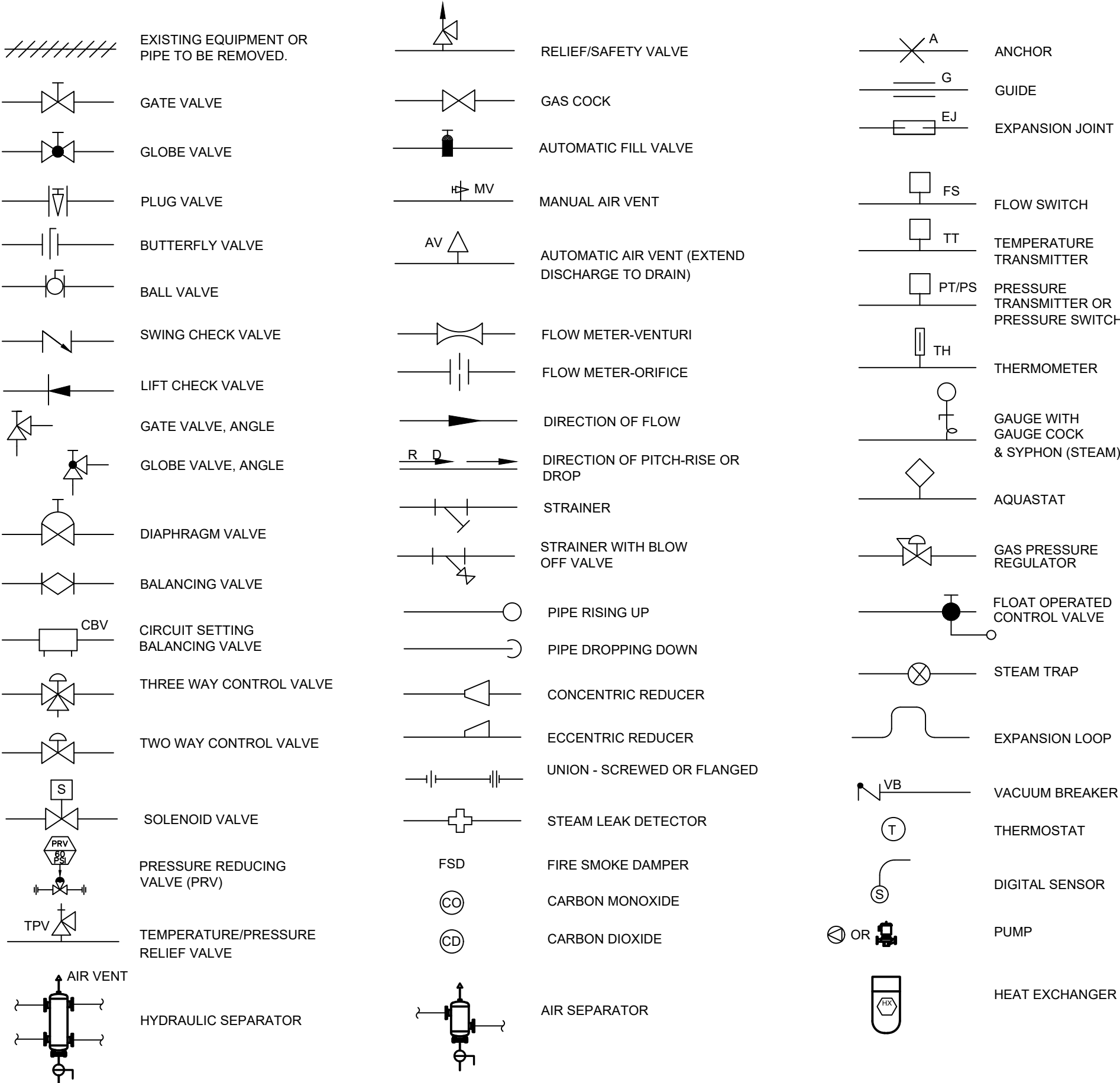
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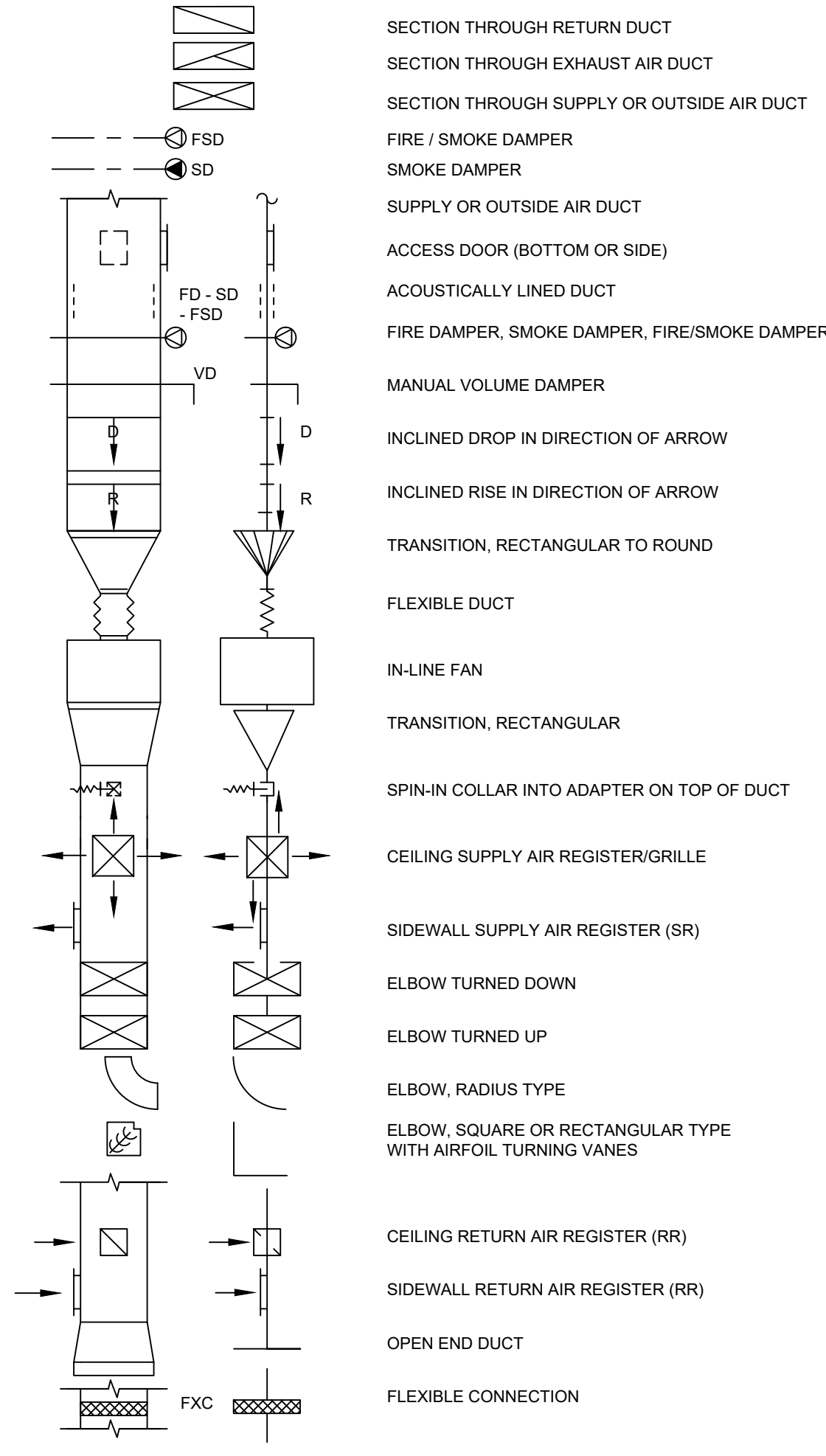
Mechanical Systems List

Quantity	Component	Description
HVAC Systems		
1	AHU-2 (Multiple-Zone):	Heating: 1 each - Duct Furnace (AHU-2), Gas, Capacity = 250 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et Cooling: 1 each - Single Package DX Unit (AHU-2), Capacity = 120 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 0.00, Required Efficiency = 0.00 Proposed Part Load Efficiency = 18.00 IEER, Required Part Load Efficiency = 14.60 IEER Fan System: FAN SYSTEM 2 OFFICES - Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: AHU-2 Supply, Multi-Zone VAV, 4000 CFM, 4.6 motor nameplate hp, 0.95 fan energy index AHU-2 1 Relief, Multi-Zone VAV, 4000 CFM, 0.9 motor nameplate hp, 0.95 fan energy index
1	AHU-4 (Single Zone):	Heating: 1 each - Duct Furnace (AHU-4), Gas, Capacity = 400 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et Cooling: 1 each - Single Package DX Unit (AHU-4), Capacity = 270 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 0.00, Required Efficiency = 0.00 Proposed Part Load Efficiency = 15.70 IEER, Required Part Load Efficiency = 13.00 IEER Fan System: FAN SYSTEM 3 OFFICES - Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: AHU-4 Supply, Single-Zone VAV, 3000 CFM, 4.6 motor nameplate hp, 0.95 fan energy index AHU-4 1 Relief, Multi-Zone VAV, 9000 CFM, 0.9 motor nameplate hp, 0.95 fan energy index
1	AHU-1 (Multiple-Zone):	Heating: 1 each - Central Furnace (AHU-1), Gas, Capacity = 150 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 80% AFUE Cooling: 1 each - Single Package DX Unit (AHU-1), Capacity = 72 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 0.00, Required Efficiency = 0.00 Proposed Part Load Efficiency = 17.70 IEER, Required Part Load Efficiency = 14.60 IEER Fan System: FAN SYSTEM 1 OFFICES - Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: AHU-1 SUPPLY Supply, Multi-Zone VAV, 2400 CFM, 3.0 motor nameplate hp, 0.95 fan energy index AHU-1 RELIEF Relief, Multi-Zone VAV, 2400 CFM, 0.9 motor nameplate hp, 0.95 fan energy index

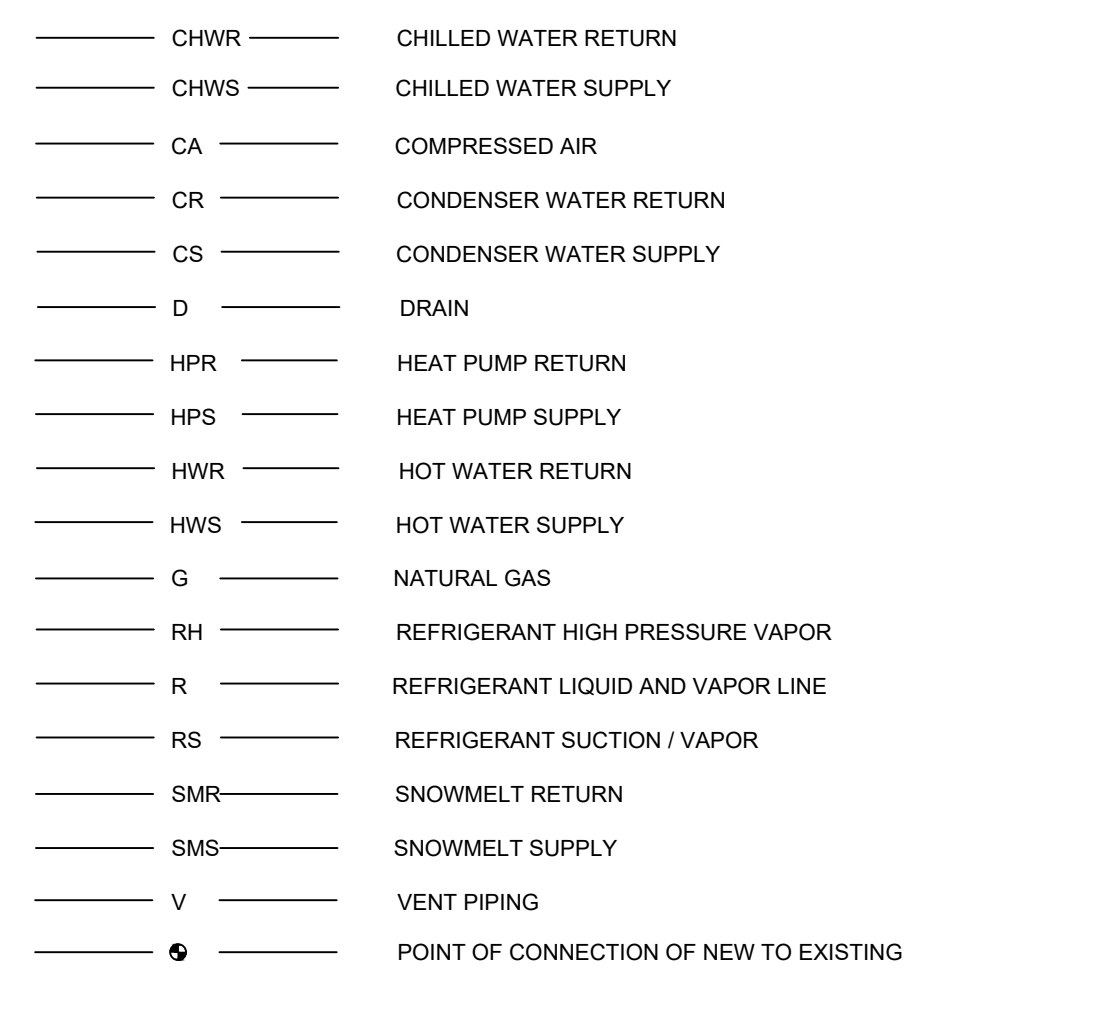
MECHANICAL ELEMENTS / VALVING



HVAC & DUCTWORK SYMBOLS



LINE DESIGNATION SYMBOLS



Quantity	Component	Description
1	AHU-3 (Multiple-Zone):	Heating: 1 each - Central Furnace (AHU-3), Gas, Capacity = 150 kBtu/h Proposed Efficiency = 80.00% Et, Required Efficiency: 80.00 % Et or 80% AFUE Cooling: 1 each - Single Package DX Unit (AHU-3), Capacity = 72 kBtu/h, Air-Cooled Condenser, Air Economizer Proposed Efficiency = 0.00, Required Efficiency = 0.00 Proposed Part Load Efficiency = 17.70 IEER, Required Part Load Efficiency = 14.60 IEER Fan System: FAN SYSTEM 1 OFFICES - Compliance (Motor nameplate HP and fan efficiency method) : Passes Fans: AHU-1 SUPPLY Supply, Multi-Zone VAV, 2400 CFM, 3.0 motor nameplate hp, 0.95 fan energy index AHU-1 RELIEF Relief, Multi-Zone VAV, 2400 CFM, 0.9 motor nameplate hp, 0.95 fan energy index

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2024 IECC requirements in COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Shawn Brill - engineer	Shawn Brill	4-21-2026
Name - Title	Signature	Date

RESPONSIBLE DIVISION:

UNLESS OTHERWISE INDICATED ALL HEATING, VENTILATING, AIR CONDITIONING, PLUMBING, AND OTHER MECHANICAL EQUIPMENT, MOTORS, AND CONTROLS SHALL BE FURNISHED, SET IN PLACE AND WIRED AS FOLLOWS:

ITEM	FURNISHED	SET	POWER WIRED	CONTROL WIRED
EQUIPMENT	23	23	26	--
COMBINATION MAGNETIC MOTOR STARTERS, MAGNETIC MOTOR STARTERS, VFD'S AND CONTACTORS	23(1)	26	26(2)	23
FUSED AND UNFUSED DISCONNECT SWITCHES, THERMAL OVERLOAD SWITCHES AND HEATERS, MANUAL MOTOR STARTERS	26	26	26	--
MANUAL-OPERATING AND MULTI-SPEED SWITCHES	23	26	26	26
CONTROLS, RELAYS, TRANSFORMERS	23	23	26	23
THERMOSTATS (LOW VOLTAGE) AND TIME SWITCHES	23	23	26	23
THERMOSTATS (LINE VOLTAGE)	23	23	26	26
TEMPERATURE CONTROL PANELS	23	23	26	23
MOTOR AND SOLENOID VALVES, DAMPER MOTORS, PE & EP SWITCHES	23	23(2)	--	23(2)
PUSH-BUTTON STATIONS AND PILOT LIGHTS	23	23(2)	--	23(2)
HEATING, COOLING, VENTILATION AND AIR CONDITIONING CONTROLS	23	23	26	23
EXHAUST FAN SWITCHES	23	26	26	23(2)

SUBSCRIPT FOOTNOTES:

- MOTOR STARTER TO INCLUDE CONTROL TRANSFORMER, HOA SWITCH, (1) NO AND (1) NC AUXILIARY CONTACT, AND "ON" AND "OFF" PILOT LIGHTS.
- IF ITEM IS FOR LINE VOLTAGE, SET IN PLACE AND CONNECT UNDER DIVISION 26, WHERE FACTORY MOUNTED ON EQUIPMENT OR ATTACHED TO PIPING OR DUCTS AND USING LINE VOLTAGE FURNISH AND SET UNDER DIVISION 23, CONNECT UNDER DIVISION 26.

ABBREVIATIONS:

44" MOUNTING HEIGHT ABOVE FINISHED FLOOR TO CENTER OF DEVICE	DIA DIAMETER	HP HORSEPOWER	PTAC PACKAGED TERMINAL AIR CONDITIONER
A AMPS	DIFF DIAGRAM	HR HOUR	PV PLUG VALVE
A.D. ACCESS DOOR	DIAG DIFFERENTIAL	HT HEIGHT	PVC POLYVINYL CHLORIDE
AAV AIR ADMITTANCE VALVE	DISCH DISCHARGE	HTR HEATER	QTY QUANTITY
ABV ABOVE	DIV DIVISION	HWIR HEATING WATER RETURN	RA RETURN AIR GRILLE / REGISTER
AC AIR CONDITIONING UNIT	DN DOWN	HWS HEATING WATER SUPPLY	RC REFLECTED CEILING PLAN
AC ABOVE COUNTER	DS DUCT SILENCER	HX HEAT EXCHANGER	RD ROOF DRAIN
AD AREA DRAIN (SEE SYMBOLS)	DWG DRAWING	HZ HERTZ	REL RELIEF
A.F.C. ABOVE FINISHED CEILING	DX DIRECT EXPANSION	ID INSIDE DIAMETER	REQD REQUIRED
A.F.G. ABOVE FINISHED GRADE	(E) EXISTING	IG ISOLATED GROUND	RF RETURN FAN
AIC AMPERE INTERRUPTING CAPACITY	EA EXHAUST AIR GRILLE/REGISTER	IN INCHES	RH RELATIVE HUMIDITY
AFCI ARC FAULT CIRCUIT INTERRUPTERS	EAT ENTERING AIR TEMPERATURE	INV INVERT	RHC REHEAT COIL
A.F.F. ABOVE FINISHED FLOOR	EC ELECTRICAL CONTRACTOR	JBX JUNCTION BOX	RLA RATED LOAD AMPS
AHU AIR HANDLING UNIT	ECC ECCENTRIC	K KELVIN	RM ROOM
ALUM ALUMINUM	EF EXHAUST FAN	KW KILOWATT	RPM REVOLUTIONS PER MINUTE
AP ACCESS PANEL OR DOOR	EL ELEVATION	KVA KILO VOLT - AMPS	SA SUPPLY AIR GRILLE / REGISTER
ATS AUTOMATIC TRANSFER SWITCH	ELEC ELECTRIC	LAT LEAVING AIR TEMPERATURE	SC SHORT CIRCUIT
AV AUDIO / VIDEO	ELEV ELEVATOR	LV LAVATORY	SCA SHORT CIRCUIT AVAILABLE
AVG AVERAGE	EM EMERGENCY FUNCTION	LB POUND	SCSR SHORT CIRCUIT CURRENT RATING
AWG AMERICAN WIRE GAGE	ENT ENTERING	LD LINEAR DIFFUSER	SCH SCHEDULE
BAS BUILDING AUTOMATION SYSTEM	EMT ELECTRIC METALLIC TUBE	LF LINEAR FEET	SD SMOKE DAMPER
BB BASEBOARD	EQ EQUAL	LIN LINEAR	SEF SMOKE EXHAUST FAN
BD BACK DRAFT DAMPER	EQUI EQUIPMENT	LIQ LIQUID	SF SUPPLY FAN
BFP BACK FLOW PREVENTOR	ES END SWITCH	LIM LUMEN	SH SENSIBLE HEAT
BL BOILER	ESP EXTERNAL STATIC PRESSURE	LRA LOCKED ROTOR AMPS	SH SHOWER
BLDG BUILDING	EXP EXPANSION TANK	LV LOUVER	SP STATIC PRESSURE
BLW BELOW	EWC ELECTRIC WATER COOLER	LVT LEAVING WATER TEMPERATURE	SPD SURGE PROTECTION DEVICE
BOB BOTTOM OF BEAM	EWIT ENTERING WATER TEMPERATURE	MBH THOUSANDS OF BTU PER HOUR	SPEC SPECIFICATION
BOD BOTTOM OF DUCT	EX EXHAUST	MC MECHANICAL CONTRACTOR	SQ SQUARE
BOP BOTTOM OF PIPE	EXPAN EXPANSION	MCA MINIMUM CIRCUIT AMPACITY	SS STAINLESS STEEL
BSMT BASEMENT	EXT EXTERNAL	MCB MAIN CIRCUIT BREAKER	SS SAFETY SHOWER
BTU BRITISH THERMAL UNIT	F DEGREES FAHRENHEIT	MDT MOTORIZED DAMPER	STD STANDARD
C CHILLER	F FREE AREA	MDP MAIN DISTRIBUTION PANEL	STL STEEL
CAFCI COMBINATION ARC FAULT CIRCUIT INTERRUPTERS	FC FAN COIL UNIT	MED MEDIUM	SYS SYSTEM
CAP CAPACITY	FC FOOTCANDLE	MFR MANUFACTURER	TEMP TEMPERATURE
CB CIRCUIT BREAKER	FCV FLOW CONTROL VALVE	MIN MINIMUM	TR TRANSFER GRILLE / REGISTER
CBV CIRCUIT BALANCING VALVE	FD FIRE DAMPER	MISC MISCELLANEOUS	TR TAMPER RESISTANT
CCT CORRELATED COLOR TEMPERATURE	FIN FINISHED	MLO MAIN LUG ONLY	TT TEMPERATURE TRANSMITTER
CKT CIRCUIT	FLA FULL LOAD AMPS	MOCPP MAXIMUM OVERCURRENT PROTECTION	TTB TELECOMMUNICATIONS TERMINAL BACKBOARD
CFH CUBIC FEET PER HOUR	FLEX FLEXIBLE	MTD MOUNTED	TYP TYPICAL
CFM CUBIC FEET PER MINUTE	FLR FLOOR	MUA MAKE-UP AIR UNIT	TX TRANSFORMER
CHWR CHILLED WATER RETURN	FLO FLOOR	N NEUTRAL	UC UNDERCUT DOOR
CHWS CHILLED WATER SUPPLY	FOB FLAT ON BOTTOM	NC NORMALLY CLOSED	UH UNIT HEATER
CI CAST IRON	FOT FLAT ON TOP	NEG NEGATIVE	UNOC UNOCCUPIED
CL CENTER LINE	FP FIRE PROTECTION	NIC NOT IN CONTRACT	UR URINAL
CLG CEILING	FP FIRE PUMP	NL NIGHT / SECURITY LIGHT - DO NOT SWITCH	V VOLTS
CMU CONCRETE MASONRY UNIT	FFM FEET PER MINUTE	NO NORMALLY OPEN	V VOLT AMPERE
CO CLEAN OUT	FFS FEET PER SECOND	NOM NOMINAL	V VALVE
COL COLUMN	FS FLOW SWITCH	NTS NOT TO SCALE	VAV VARIABLE AIR VOLUME UNIT
COMP COMPRESSOR	FSD FIRE/SMOKE DAMPER	OA OPPOSED AIR	VFD VARIABLE FREQUENCY DRIVE
CONC CONCRETE	FT FEET	OBDO OPPOSED BLADE DAMPER	VRF VARIABLE REFRIGERANT FLOW
COND CONDENSATE	FXC FEET CONNECTION	OC ON CENTER	VOLT VOLTAGE
CONN CONNECTION	GA GAUGE	OCC OCCUPIED	VTR VENT THROUGH ROOF
CONT CONTINUATION	GAL GALLON	OCP OVER CURRENT PROTECTION	W WIDTH
CONTR CONTRACTOR	GALV GALVANIZED	OD OPPOSED DIAMETER	W WATTS
CR COLOR RENDERING INDEX	GEC GROUND ELECTRODE CONDUCTOR	OL OVERLOAD	W/ WITH
CT COOLING TOWER	GFCI / GFI GROUND FAULT CIRCUIT INTERRUPTER	ORD OVERFLOW ROOF DRAIN	W/O WITHOUT
CU CURRENT TRANSFORMER	GC GENERAL CONTRACTOR	OZ OUNCE	WB WET BULB
CU CONDENSING UNIT	GPH GALLONS PER HOUR	PARALLEL BLADE DAMPER	WC WATER COLUMN
CU COPPER	GP GALLONS PER MINUTE	PD PRESSURE DROP	WC WATER CLOSET
CUH CABINET UNIT HEATER	GRSILB GRAINS PER POUND	PH PHASE	WG WATER GAUGE
CVB CONSTANT VOLUME BOX	H2O WATER	POS POSITIVE PRESSURE	WP WEATHERPROOF
CWR CONDENSER WATER RETURN	HB HOSE BIBB	POS POINT OF SALES	WPU WEATHERPROOF IN-USE
CWS CONDENSER WATER SUPPLY	HD HEAD (SEE SCHEDULES)	PRV PRESSURE REDUCING VALVE	WSR WITHSTAND RATING
DB DRY BULB	HP HEAT PUMP	PS PRESSURE SWITCH	XFMR TRANSFORMER
DEPT DEPARTMENT		PSI POUNDS PER SQUARE INCH	
DF DRINKING FOUNTAIN		PT PRESSURE TRANSMITTER	

SUBSTITUTIONS:

A. SUBSTITUTIONS: SUBSTITUTION OF SPECIFIED EQUIPMENT WILL BE ALLOWED THROUGH A PRIOR APPROVAL PROCESS INITIATED BY THE CONTRACTOR. CONTRACTOR SHALL SUBMIT INTENDED SUBSTITUTION AT LEAST FIVE DAYS PRIOR TO BID FOR APPROVAL FROM ENGINEER. SUBMITTAL SHALL INCLUDE CAPACITIES, DIMENSIONS AND OPERATING INSTRUCTIONS FOR EACH PIECE OF EQUIPMENT. SUBSTITUTION SHALL OCCUR AT NO COST TO THE OWNER. CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF APPROVED SUBSTITUTION AND SHALL INCUR ALL COSTS ASSOCIATED WITH THE SUBSTITUTION INCLUDING STRUCTURAL MODIFICATIONS, SPACE LAYOUT AND REDESIGN COSTS. SEE ALSO DIVISION I GENERAL REQUIREMENTS.

EXAMINATION OF SITE, DRAWINGS, SPECIFICATIONS:

A. EXAMINE CAREFULLY THE SITE AND CONDITIONS OF THE SITE. PROVIDE ALL NECESSARY EQUIPMENT AND LABOR TO INSTALL A COMPLETE WORKING SYSTEM WITHIN THE SITE CONDITIONS.

B. EXAMINE THE DRAWINGS AND SPECIFICATIONS AND 5 DAYS PRIOR TO BIDDING REPORT ANY ERRORS, OMISSIONS, INCONSISTENCIES, AND CONFLICTS TO THE ENGINEER TO BE REMEDIED IN AN ADDENDUM TO THE PROJECT PRIOR TO BID TIME.

C. DRAWINGS ARE DIAGRAMMATIC AND CATALOG NUMBERS GIVEN ARE FOR REFERENCE ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE CAPACITY OF THE EQUIPMENT MEETS THE DRAWING REQUIREMENTS AND SHALL NOT DIMENSION FROM THE MECHANICAL, PLUMBING, OR PIPING DRAWINGS.

D. THE LATEST ADOPTED VERSIONS OF THE INTERNATIONAL BUILDING CODES SHALL BE USED AS REQUIRED. THIS WILL ALSO INCLUDE THE LATEST ADOPTED VERSIONS OF THE MECHANICAL, PLUMBING, AND ENERGY CONSERVATION CODES. ALL METHODS AND MATERIALS REQUIRED BY THESE CODES SHALL BE REQUIRED BY THESE SPECIFICATIONS UNLESS INDICATED OTHERWISE. OTHER APPLICABLE LOCAL CODES AND ORDINANCES SHALL BE AS REQUIRED AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO BE KNOWLEDGEABLE OF THESE REQUIREMENTS.

E. WHERE INSTALLATION PROCEDURES OR ANY PART THEREOF ARE REQUIRED TO BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER OF THE MATERIAL BEING INSTALLED, PRINTED COPIES OF THESE RECOMMENDATIONS SHALL BE FURNISHED TO THE ENGINEER PRIOR TO INSTALLATION. INSTALLATION OF THE ITEM WILL NOT BE ALLOWED TO PROCEED UNTIL THE RECOMMENDATIONS ARE RECEIVED. FAILURE TO FURNISH THESE RECOMMENDATIONS CAN BE CAUSE FOR REJECTION OF THE MATERIAL.

DESCRIPTION	DATE	NO.
1 99% CONSTRUCTION DOCS	02/19/2026	1
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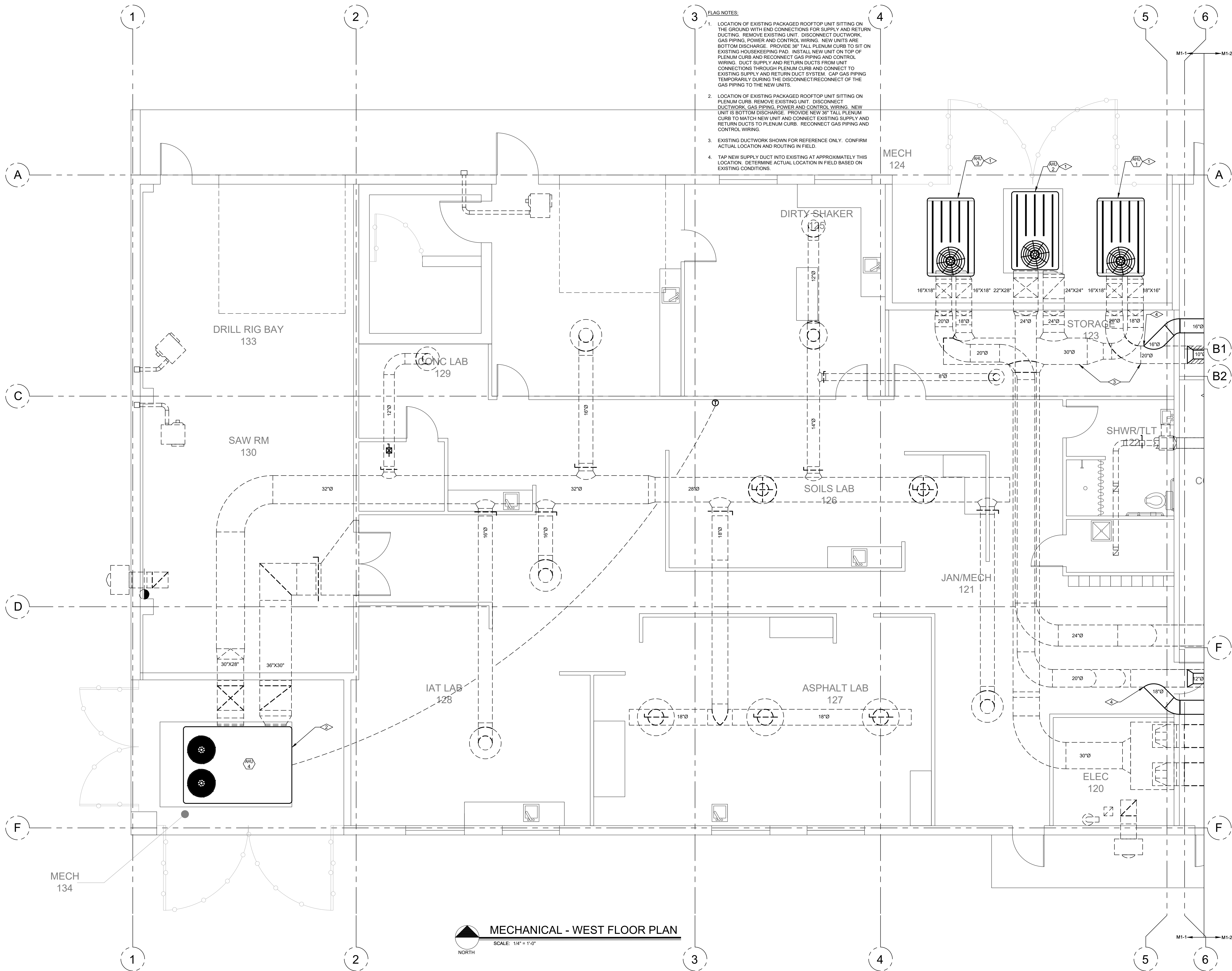


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M0-1



FLAG NOTES:

1. LOCATION OF EXISTING PACKAGED ROOFTOP UNIT SITTING ON THE GROUND WITH END CONNECTIONS FOR SUPPLY AND RETURN DUCTING. REMOVE EXISTING UNIT. DISCONNECT DUCTWORK, GAS PIPING, POWER AND CONTROL WIRING. NEW UNITS ARE BOTTOM DISCHARGE. PROVIDE 36" TALL PLENUM CURB TO SIT ON EXISTING HOUSEKEEPING PAD. INSTALL NEW UNIT ON TOP OF PLENUM CURB AND RECONNECT GAS PIPING AND CONTROL WIRING. DUCT SUPPLY AND RETURN DUCTS FROM UNIT CONNECTIONS THROUGH PLENUM CURB AND CONNECT TO EXISTING SUPPLY AND RETURN DUCT SYSTEM. CAP GAS PIPING TEMPORARILY DURING THE DISCONNECT/RECONNECT OF THE GAS PIPING TO THE NEW UNITS.
2. LOCATION OF EXISTING PACKAGED ROOFTOP UNIT SITTING ON PLENUM CURB. REMOVE EXISTING UNIT. DISCONNECT DUCTWORK, GAS PIPING, POWER AND CONTROL WIRING. NEW UNIT IS BOTTOM DISCHARGE. PROVIDE NEW 36" TALL PLENUM CURB TO MATCH NEW UNIT AND CONNECT EXISTING SUPPLY AND RETURN DUCTS TO PLENUM CURB. RECONNECT GAS PIPING AND CONTROL WIRING.
3. EXISTING DUCTWORK SHOWN FOR REFERENCE ONLY. CONFIRM ACTUAL LOCATION AND ROUTING IN FIELD.
4. TAP NEW SUPPLY DUCT INTO EXISTING AT APPROXIMATELY THIS LOCATION. DETERMINE ACTUAL LOCATION IN FIELD BASED ON EXISTING CONDITIONS.



MECHANICAL - WEST FLOOR PLAN

SCALE: 1/4" = 1'-0"

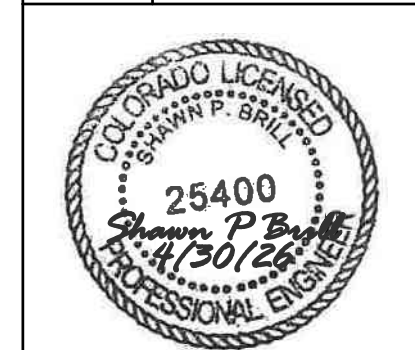
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MECHANICAL PROVISIONS:

1. SCOPE OF WORK

- A. THE CONTRACTOR IS RESPONSIBLE FOR ALL WORK, MATERIALS, AND LABOR TO SATISFY A COMPLETE WORKING SYSTEM WHETHER SPECIFIED OR IMPLIED.
- B. ALL WORK IS TO BE PERFORMED IN STRICT COMPLIANCE WITH ALL LOCAL CODES AND ALL OTHER REGULATION GOVERNING WORK OF THIS NATURE.
- C. THE CONTRACTOR SHALL, BEFORE SUBMITTING ANY PROPOSAL, EXAMINE THE PROPOSED SITE AND SHALL DETERMINE FOR HIMSELF THE CONDITIONS THAT MAY EFFECT THE WORK. NO ALLOWANCE SHALL BE MADE IF THE CONTRACTOR FAILS TO MAKE SUCH EXAMINATIONS.
- D. ALL EQUIPMENT AND MATERIALS SHALL BE AS SPECIFIED OR "APPROVED EQUAL" BY THE ENGINEER OR ARCHITECT.

2. PERMITS

- A. THE CONTRACTOR SHALL SECURE ALL PERMITS OR APPLICATIONS AND PAY ANY AND ALL FEES.

3. SHOP DRAWINGS

- A. SUBMIT MATERIAL LIST AND SHOP DRAWINGS FOR MAJOR EQUIPMENT TO THE ARCHITECT/ENGINEER FOR APPROVAL. THE CONTRACTOR SHALL SUBMIT FIVE SETS OF SHOP DRAWINGS AND THEY SHALL BE CLEARLY LABELED.

4. FLEXIBLE DUCT WORK

- A. FLEXIBLE TYPE DUCT SHALL BE OF TWO ELEMENT SPIRAL CONSTRUCTION COMPOSED OF A CORROSION RESISTANT METAL SUPPORTING SPIRAL AND COATED FABRIC WITH A MINERAL BASE. FLEXIBLE DUCT CONNECTORS SHALL BE LISTED BY U.L. CLASS 1 DUCTS, AND SHALL HAVE A FLAME SPREAD RATING NOT EXCEEDING 25 AND A SMOKE DEVELOPED RATING NOT EXCEEDING 50.
- B. USE OF FLEXIBLE DUCTWORK SHALL BE LIMITED TO NO MORE THAN 6 LINEAR FEET PER RUN.
- C. CONTRACTOR SHALL BE CAREFUL SO AS NOT TO KINK OR COLLAPSE FLEXIBLE DUCT.

5. REFRIGERANT

- A. PIPING CONTRACTOR SHALL PROVIDE AND INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS AND IN SUCH A WAY AS TO BE INCONSPICUOUS AND FREE FROM ANY POSSIBLE CONDENSATION.
- B. INSULATE REFRIGERANT LINES WITH ARMOUR-FLEX TYPE INSULATION. SHALL BE TYPE "K" COPPER TUBING, WITH WROUGHT COPPER SOLDER TYPE FITTINGS SUITABLE FOR CONNECTION WITH SILVER SOLDER.

6. DUCTWORK

- A. THE DUCTWORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE "SMACNA" APPLICABLE MANUALS.
- B. ALL DUCTWORK SHALL BE THE LOW VELOCITY TYPE, UNLESS SPECIFIED OTHERWISE.
- C. CONTRACTOR SHALL PROVIDE AND INSTALL APPROVED FIRE DAMPERS AND ACCESS PANELS IN ANY AND ALL DUCTWORK WHICH PENETRATES A HORIZONTAL OR VERTICAL FIRE PARTITION, OR AS OTHERWISE SHOWN ON DRAWINGS.
- D. ALL BRANCH DUCTS TO HAVE VOLUME DAMPERS. SMOOTH TURN RADIUS DUCTWORK OR TURNING VANES SHALL BE USED THROUGHOUT WHERE FLOW EXCEEDS 150 CFM.
- E. ALL DUCT JOINTS TO BE SEALED IN ACCORDANCE WITH "SMACNA" STANDARDS AND ACCEPTED GOOD PRACTICE.
- F. ALL DUCT DIMENSIONS SHOWN ARE NET INSIDE. VALUES DIMENSIONS MAY BE CHANGED SO LONG AS THE NET FREE FACE AREA IS MAINTAINED.
- G. ALL CONCEALED DUCTWORK SHALL BE INSULATED WITH 1-1/2" FIBERGLASS INSULATING BLANKET WITH ALUMINUM FOL. FACING.
- H. ALL SUPPLY AND RETURN DUCTWORK 15 FEET DOWNSTREAM OF THE HVAC UNIT SHALL BE INTERNALLY LINED WITH A 1/2" ACOUSTICAL DUCT LINER UNLESS OTHERWISE NOTED ON THE DRAWINGS.

7. DRAINAGE PIPING

- A. (CONDENSATE) SHALL BE SCHEDULE 40 PVC PIPE WITH SOLVENT JOINTS, UNLESS NOTED OTHERWISE ON FLOOR PLAN. MATERIALS USED IN RETURN AIR PLENUMS MUST COMPLY WITH ASTM E84 FLAME/SMOKE 25/50 SPREAD INDEX REQUIREMENTS. PITCH HORIZONTAL LINES 1" IN 10'-0". CONDENSATE DRAINS SHALL BE ROUTED TO FLOOR DRAIN, ROOF DRAIN OR INDIRECT WASTE DRAIN.

8. HVAC CONTROLS

- A. CONTRACTOR TO SUPPLY AND INSTALL ALL CONTROL WIRING AND THERMOSTATS AS REQUIRED.

9. ELECTRICAL

- A. CONTRACTOR TO COORDINATE WITH ELECTRICAL CONTRACTOR FOR LOCATION OF WIRING FOR EACH HVAC UNIT.

10. PIPE SUPPORTS

- A. ALL PIPE SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE IN A NEAT AND WORKMANLIKE MANNER. THE USE OF WIRE OR METAL STRAP TO SUPPORT PIPES WILL NOT BE PERMITTED. SPACING OF PIPE SUPPORTS SHALL NOT EXCEED 4 FEET FOR ALL PIPING. PLASTIC PIPING TO BE SUPPORTED EVERY 4 FEET.

11. GAS PIPING

- A. PIPING SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH MALLEABLE IRON FITTINGS. WHERE GAS PIPE CONNECTS TO EQUIPMENT, IT SHALL BE PROVIDED WITH A DRIP LEG THE FULL SIZE OF THE RUNOUT. A 100% SHUT-OFF VALVE AND A UNION. GAS PIPING CONTAINING PRESSURE GREATER THAN 0" W.G. SHALL BE SCHEDULE 40 BLACK STEEL PIPE WITH WELDED JOINTS.

12. MISCELLANEOUS

- A. ALL EXTERIOR OPENINGS TO BE PROPERLY CAULKED AND SEALED WITH A SEALANT OF HIGH QUALITY AND LONG LIFE, TO PREVENT INFILTRATION OF OUTSIDE AIR INTO CONDITIONED SPACE. COORDINATE INSTALLATION OF ALL ROOF FLASHING AT ROOF PENETRATION.
- B. DO NOT SCALE THIS DRAWING FOR EXACT DIMENSIONS.
- C. VERIFY ALL FIGURES, CONDITIONS, AND DIMENSIONS AT THE JOB SITE.
- D. THE MECHANICAL PLANS ARE INTENDED TO BE DIAGRAMMATIC AND ARE BASED ON ONE MANUFACTURER'S EQUIPMENT. THEY ARE NOT INTENDED TO SHOW EVERY ITEM IN ITS EXACT LOCATION, THE EXACT DIMENSIONS, OR ALL THE DETAILS OF THE EQUIPMENT.
- E. THE CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSIONS OF THE EQUIPMENT PROPOSED TO ENSURE THAT THE EQUIPMENT WILL FIT IN THE AVAILABLE SPACE.
- F. PEX TUBING, IF PEX TUBING IS USED AS AN APPROVED ALTERNATE FOR APPLICATIONS WHERE METALLIC PIPING IS THE BASIS OF DESIGN, THE PEX MANUFACTURER SHALL SUBMIT SHOP DRAWINGS CLEARLY INDICATING THAT THE DESIGN HAS BEEN ANALYZED AND MODIFIED, AS REQUIRED TO MAINTAIN SCHEDULED HYDRONIC SYSTEM PARAMETERS. ANY DESIGN RESULTING IN INCREASED SYSTEM PRESSURE DROP AS A RESULT OF IMPROPER PEX SIZING OR DESIGN SHALL NOT BE PERMITTED.

13. TESTING AND BALANCING

- A. THE HVAC SYSTEM SHALL BE TESTED AND AND BALANCED BY AN INDEPENDENT AGENCY, UNDER THE SUPERVISION OF A LICENSED PROFESSIONAL ENGINEER. A SEALED TYPE WRITTEN REPORT SHALL BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND APPROVAL.

14. GUARANTEE

- A. MATERIALS, EQUIPMENT AND INSTALLATION SHALL BE GUARANTEED FOR A PERIOD OF ONE(1) YEAR FROM DATE OF ACCEPTANCE. DEFECTS WHICH APPEAR DURING THAT PERIOD SHALL BE CORRECTED AT THIS CONTRACTOR'S EXPENSE.
- B. FOR THE SAME PERIOD, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO PREMISES CAUSED BY DEFECTS IN WORKMANSHIP OR IN THE WORK OR EQUIPMENT FURNISHED AND/OR INSTALLED BY HIM.

ROOFTOP AIR HANDLING UNIT SCHEDULE

EQUIPMENT NO.	SERVICE	SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	E.S.P. (IN. W.G.)	COOLING NOM. (TONS)	HEATING			FILTERS	EVAP FAN (HP)	POWER EXHAUST	POWER EXHAUST ELECTRICAL			ELECTRICAL			UNIT WEIGHT (LBS.)	MANUFACTURER & MODEL	OPTIONS /ACCESSORIES
						GAS (CFH)	INPUT (MBH)	OUTPUT (MBH)				V./PH./HZ.	AMPS	HP	V./PH./HZ.	MCA (A)	MOCP (A)			
AHU-1	NORTH OFFICES	2,400	220	1.5	6	170	150	120	MERV 13	3	YES	460/1/60	3.3	0.87	460/3/60	23	25	1223	TRANE, YHK072	NOTE 1, 2, 4
AHU-2	CENTER SPACES	4,050	800	1.5	10	282	250	200	MERV 13	4.6	YES	460/1/60	3.3	0.87	460/3/60	35	45	1297	TRANE, YHK120	NOTE 1, 2, 4
AHU-3	SOUTH OFFICES	2,925	180	1.5	6	170	150	120	MERV 13	3	YES	460/1/60	3.3	0.87	460/3/60	23	25	1223	TRANE, YHK072	NOTE 1, 2, 4
AHU-4	LAB	9,000	700	1.5	22.5	452	400	320	MERV 13	4.6	YES	460/1/60	3.3	0.87	460/3/60	64	80	2453	TRANE, YHK300	NOTE 1, 3, 4

NOTE:

1. PROVIDE WITH COIL GUARDS, HORIZONTAL DUCT CONNECTIONS, REFRIGERANT LEAK DETECTION CONTROLS. UNIT MOUNTED CIRCUIT BREAKER, 65K SCRR, 100% MODULATING ECONOMIZER, POWERED EXHAUST FAN, MODULATING GAS HEAT, HINGED ACCESS PANELS, FACTORY UNITARY CONTROLS, BACNET INTERFACE.
2. THIS UNIT IS PART OF A MULTIZONE VAV SYSTEM. SUPPLY FAN SPEED CONTROL.
3. THIS IS A SINGLE ZONE VAV AIR HANDLER.
4. SEE COMCHECK COMPLIANCE REPORT FOR REQUIRED EFFICIENCIES OF EQUIPMENT FOR COOLING AND HEATING OPERATION.

ELECTRIC VARIABLE AIR VOLUME UNIT SCHEDULE

EQUIPMENT NO.	SERVICE	MAXIMUM AIRFLOW SETPOINT (CFM)	MINIMUM AIRFLOW SETPOINT (CFM)	ELECTRIC HEATING COIL			MANUFACTURER & MODEL	OPTIONS/ACCESSORIES
				CAPACITY (MBH)	ΔP AIR W.C.	COIL KW		
VA-1-1	NORTHWEST OFFICES	925	315	15.3	0.020	4.5	TRANE, VCEF10	NOTE-1
VA-1-2	NORTH CENTER OFFICES	925	315	15.3	0.020	4.5	TRANE, VCEF10	NOTE-1
VA-1-3	NORTHEAST OFFICES	550	180	8.5	0.040	2.5	TRANE, VCEF08	NOTE-1
VA-2-1	BREAK ROOM	1450	480	22.2	0.040	6.5	TRANE, VCEF12	NOTE-1
VA-2-2	CONFERENCE ROOM	1400	465	22.2	0.040	6.5	TRANE, VCEF12	NOTE-1
VA-2-3	LOBBY, ADMIN.	1200	400	18.8	0.040	5.5	TRANE, VCEF12	NOTE-1
VA-3-1	SOUTHWEST OFFICES	1200	400	18.8	0.040	5.5	TRANE, VCEF12	NOTE-1
VA-3-2	SOUTH CENTER OFFICES	1200	400	18.8	0.040	5.5	TRANE, VCEF12	NOTE-1
VA-3-3	SOUTHEAST OFFICES	425	140	6.8	0.020	2.0	TRANE, VCEF08	NOTE-1

NOTES:

1. PROVIDE WITH UC400 DDC CONTROLLER, DIGITAL DISPLAY ZONE SENSOR WITH EXTERNALLY ADJUSTABLE SETPOINT, 1/2" MATT FACED INSULATION, 480-24 VOLT CONTROL TRANSFORMER, DISCONNECT SWITCH, PWM HEAT CONTROL, ELECTRIC HEAT CONTACTORS, OCCUPIED/UNOCCUPIED OVERRIDE BUTTON.

DUCT CONSTRUCTION MINIMUM SHEET METAL THICKNESSES

RECTANGULAR DUCTS				
MAXIMUM SIZE (INCHES)	STEEL (MINIMUM THICKNESS, NOMINAL)		ALUMINUM (MINIMUM THICKNESS, NOMINAL)	
	THROUGH 12		0.020 INCH (NO. 24 B&S GAGE)	
	13 THROUGH 30		0.025 INCH (NO. 22 B&S GAGE)	
	31 THROUGH 54		0.032 INCH (NO. 20 B&S GAGE)	
	55 THROUGH 84		0.040 INCH (NO. 18 B&S GAGE)	
OVER 84		0.051 INCH (NO. 16 B&S GAGE)		
ROUND DUCTS				
MAXIMUM SIZE (INCHES)	SPIRAL SEAM DUCT		LONGITUDINAL SEAM DUCT	FITTINGS
	STEEL (MINIMUM THICKNESS, NOMINAL)		STEEL (MINIMUM THICKNESS, NOMINAL)	STEEL (MINIMUM THICKNESS, NOMINAL)
	THROUGH 12		0.022 INCH (26 GAGE, GALV.)	0.022 INCH (26 GAGE, GALV.)
	13 THROUGH 18		0.028 INCH (24 GAGE, GALV.)	0.028 INCH (24 GAGE, GALV.)
	19 THROUGH 28		0.034 INCH (22 GAGE, GALV.)	0.034 INCH (22 GAGE, GALV.)
29 THROUGH 36		0.040 INCH (20 GAGE, GALV.)	0.040 INCH (20 GAGE, GALV.)	
37 THROUGH 52		0.052 INCH (18 GAGE, GALV.)		

RTU MULTI-ZONE VAV - A2L SEQUENCE NOTES:

A2L REFRIGERANT SYSTEM MITIGATION FACTORY SEQUENCES:

AS SOON AS THE REFRIGERANT LEAK IS DETECTED IN THE PACKAGED ROOF TOP UNIT (RTU), THE CONTROLLER IN THE RTU INITIATES NOTIFICATION, EITHER WITH A BACNET POINT, HARDWIRED OUTPUT POINT, OR BOTH. WITHIN 15 SECONDS OF LEAK DETECTION, THE CONTROLLER INITIATES SUPPLY FAN OPERATION TO BEGIN AIR CIRCULATION ACCORDING TO ASHRAE STANDARD 15. IF THE SUPPLY FAN IS NOT ALREADY OPERATING, BAS OVERRIDES ALL VAV MEMBERS FULLY OPEN FOR THE DURATION OF MITIGATION. ADDITIONALLY, BAS PREVENTS ELECTRIC HEAT FROM OPERATING IN THE VAV TERMINALS, WHEN ELECTRIC HEAT IS PRESENT IN THOSE DEVICES.

DURING THE UNOCCUPIED MODE, THE RTU IS NORMALLY OFF AND THE ASSOCIATED VAV TERMINALS ARE NORMALLY CLOSED. THE MITIGATION SEQUENCE REQUIRES SUPPLY FAN OPERATION WITHIN 15 SECONDS, BUT THE ASSOCIATED VAV TERMINALS ARE NORMALLY CLOSED IN UNOCCUPIED. INSTEAD OF RELYING ONLY ON THE RACE CONDITIONS BETWEEN SUPPLY FAN INITIATION AND THE VAV DAMPERS OPENING, BAS WILL OVERRIDE THE IDENTIFIED VAV MEMBERS TO FULLY OPEN DURING UNOCCUPIED. THIS ALLOWS AN AIR PATH FOR SUPPLY FAN OPERATION. THE REMAINING BOXES WILL BE OVERRIDDEN TO FULLY OPEN UPON MITIGATION ALARM. ELECTRICAL OPERATION IS DISABLED IN ALL VAV MEMBERS DURING MITIGATION.

A2L UNOCCUPIED OVERRIDE

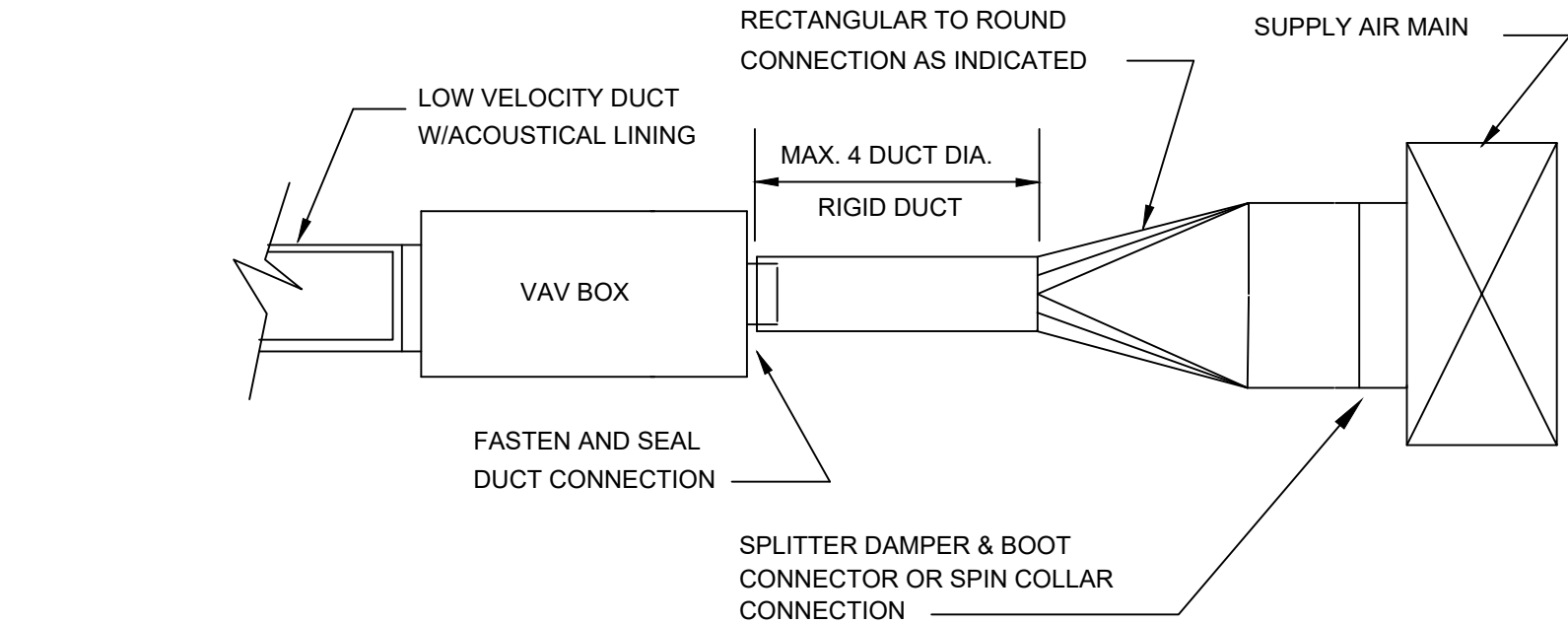
BEST PRACTICE IS TO DESIGNATE ONE OR MORE VAV BOXES FOR A2L UNOCCUPIED OVERRIDE, WHICH ALLOWS BAS TO OVERRIDE THOSE BOXES FULLY OPEN DURING UNOCCUPIED IN CASE FAST-ACTING A2L MITIGATION RESPONSE IS NECESSARY. SINCE EQUIPMENT MITIGATION REQUIRES THE INITIATION OF SUPPLY FAN OPERATION WITHIN 15 SECONDS, PRE-POSITIONING SOME VAV BOXES OPEN DURING UNOCCUPIED REDUCES THE RISK OF A DUCT PRESSURE EVENT DURING MITIGATION. BY DEFAULT, VAV BOXES DESIGNATED AS COMMON SPACES WILL ALSO BE DESIGNATED FOR A2L UNOCCUPIED OVERRIDE, THOUGH THOSE SELECTIONS CAN BE EDITED AFTER INITIAL SETUP.

A2L REFRIGERANT DETECTION & DILUTION SEQUENCE - SINGLE ZONE VAV RTU:

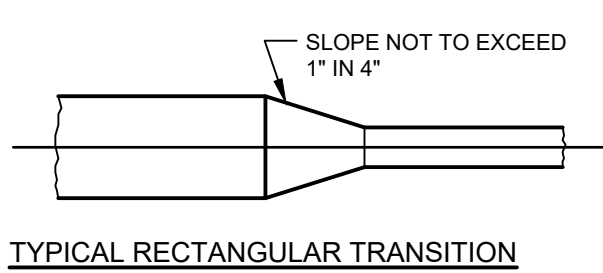
FACTORY CONTROLS AND REFRIGERANT DETECTOR SHALL BE PROVIDED FOR A2L REFRIGERANT DILUTION SEQUENCE. UPON DETECTION OF REFRIGERANT IN AIRSTREAM, REFRIGERANT COMPRESSORS TO BE DISABLED AND DE-ENERGIZED, SUPPLY/RELIEF FAN AND OUTSIDE AIR TO BE MODULATED TO PURGE AND DILUTE ANY REFRIGERANT IN AIRSTREAM. NOTIFY AND ALARM BAS THAT REFRIGERANT HAS BEEN DETECTED IN AIR STREAM.

TERMINAL BOX CONNECTION

NOT TO SCALE



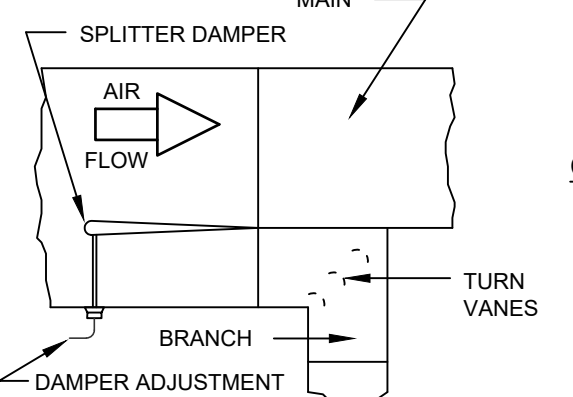
CONSTRUCTION OF 90° ELBOWS



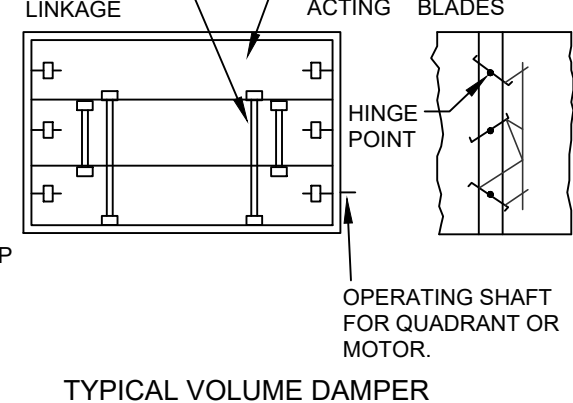
TYPICAL RECTANGULAR TRANSITION

TYPICAL RECTANGULAR TO ROUND TRANSITION

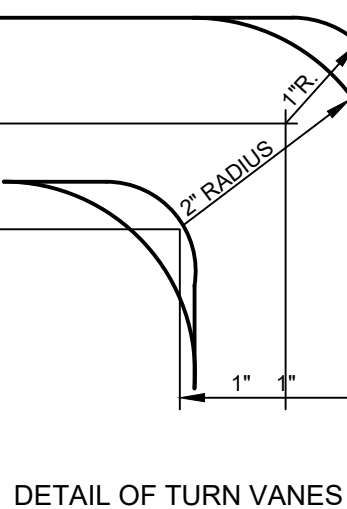
CONSTRUCTION OF 45° ELBOWS



TYPICAL SPLITTER DAMPER



TYPICAL VOLUME DAMPER



DETAIL OF TURN VANES

HORIZONTAL

VERTICAL

DETAILS OF THE LOW VELOCITY DUCT LAYOUT

NO SCALE



The diagram illustrates a mechanical system layout with the following components and connections:

- Top Section:** SP P (AI) is connected to a control unit (C) and a pump (P).
- Left Section:** RLF (AO) and RLF (BO) are connected to a control unit (C) and a pump (P).
- Right Section:** RA CO2 (AI) and RA SD (HDW) are connected to a control unit (C) and a pump (P).
- Bottom Section:** OAT (AI) and OAH (AI) are connected to a control unit (C) and a pump (P). SAF (BO), SAF (AO), and UT (AO) are connected to a control unit (C) and a pump (P).
- Central Section:** A complex network of pipes connects the various components, including a central control unit (C) and a pump (P).

[illegible]

SA

DA FLW (AI)

AIR VLV (AO)

SPT (AI)

SPT SP (AI)

SP OCC (BI)

DAT (AI)

PH 1 (BO)

PH 2 (BO)

DA

Point Name	POINTS								ALARMS						
	GRAPHIC	ANALOG HARDWARE INPUT (AI)	BINARY HARDWARE INPUT (BI)	ANALOG HARDWARE OUTPUT (AO)	BINARY HARDWARE OUTPUT (BO)	SOFTWARE POINT (SPT)	HARDWARE INTERLOCK (HWI)	WIRELESS (WLS)	NETWORK (NET)	HIGH ANALOG LIMIT	LOW ANALOG LIMIT	BINARY	LATCH DIAGNOSTIC	SENSOR FAIL	COMMUNICATION FAIL
BUILDING STATIC PRESSURE LOCAL SP P	X	X								X	X			X	
COMPRESSOR 1 MODULATION COMMAND CMP1	X			X											
COMPRESSOR 2 COMMAND CMP2	X			X											
COOLING OUTPUT COMMAND CLG	X			X											
DISCHARGE AIR TEMPERATURE DAT	X	X												X	
DX COIL FROST STAT FROSTAT	X	X									X				
GAS HEAT OUTPUT COMMAND GHTG	X			X											
HEATING OUTPUT COMMAND HTG	X	X		X											
MIXED AIR DAMPER MAD	X	X		X											
OUTSIDE AIR DAMPER COMMAND OAD	X			X											
OUTSIDE AIR HUMIDITY LOCAL OAH	X	X												X	
OUTSIDE AIR TEMPERATURE LOCAL OAT	X	X												X	
PRIMARY FILTER STATUS LOCAL FIL	X	X								X					
REFRIGERANT LFL CONCENTRATION ALARM THRESHOLD SENSOR A RALM A		X													
REFRIGERANT LFL CONCENTRATION ALARM THRESHOLD SENSOR B RALM B		X													
REFRIGERANT LFL CONCENTRATION ALARM THRESHOLD SENSOR C RALM C		X													
REFRIGERANT LFL CONCENTRATION ALARM THRESHOLD SENSOR D RALM D		X													
REFRIGERANT CONCENTRATION BAS RPPM				X											
REFRIGERANT HIGH SIDE PRESSURE (63HS) RH		X													
REFRIGERANT LOW SIDE PRESSURE (63LS) RLO		X													
DUCT REFRIGERANT MONITOR RPPM		X													
REFRIGERANT LEAK DETECTION SYSTEM INPUT RIN			X												
REFRIGERANT LEAK SENSOR COMMUNICATION STATUS SENSOR A RSTS A					X										
REFRIGERANT LFL CONCENTRATION SENSOR A RPPM A		X													
REFRIGERANT LFL CONCENTRATION SENSOR B RPPM B		X													
REFRIGERANT LFL CONCENTRATION SENSOR C RPPM C		X													
REFRIGERANT LFL CONCENTRATION SENSOR D RPPM D		X													
REFRIGERANT MITIGATION ACTIVE RMGT			X												
REFRIGERANT TYPE RTYPE					X										
RELIEF AIR DAMPER COMMAND RLFDNR	X			X											
RELIEF AIR FAN START/STOP RLRF	X	X		X											
RETURN AIR CO2 LOCAL RA CO2			X							X				X	
RETURN AIR HUMIDITY LOCAL RAH	X	X												X	
RETURN AIR SMOKE DETECTION LOCAL RA SD					X										
RETURN AIR TEMPERATURE LOCAL RAT	X	X												X	
SPACE TEMPERATURE LOCAL (WIRED) SPT	X	X								X	X				
SPACE SETPOINT LOCAL (WIRED) SP STPT	X	X													
SUPPLY FAN SPEED SAF					X										
SUPPLY FAN START/STOP SAF	X			X											
SUPPLY FAN STATUS LOCAL SAF	X	X													
APPLICATION MODE APP MODE					X										
BAS COMMUNICATION STATE BAS COM					X										X
COMPRESSOR ENABLE CMP ENA	X			X											
COMPRESSOR LOCKOUT STATUS CMP LCK				X											
COOL OUTPUT CLG					X										
DISCHARGE AIR STATIC PRESSURE SETPOINT DA SP SPT	X	X													
ECONOMIZER ENABLE ECON ENA					X										
ECONOMIZER MINIMUM POSITION SETPOINT ECON MIN POS SP	X														

[illegible][illegible]

Colorado Department of Transportation  PROPERTY MANAGEMENT 2829 W. HOWARD PL. DENVER, CO 80204 Phone: 303-757-9011  DEPARTMENT OF TRANSPORTATION	CDOT GRAND JUNCTION G ROAD HVAC GRAND JUNCTION, COLORADO		DRAWN BY: BCE	CDOT PROJECT NO. 26988 BCE PROJECT NO. 25481	DRAWING NUMBER M3-2																								
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Guide Specification: SYSTEM CONTROLLER

1.0 BUILDING AUTOMATION SYSTEM - GENERAL DESCRIPTION

- A. Provide a new Building Automation System (BAS) to integrate and control all mechanical equipment associated with this project.
- 1.The Building Automation System shall be as indicated on the drawings and described in these specifications. The system must be fully integrated and coordinated with mechanical equipment DDC controllers furnished and installed in the equipment manufacturer's factory as specified in those sections. The intent of the BAS is to integrate all mechanical equipment into one system for global monitoring, control, and alarming associated with the building. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system to ensure occupant comfort while maintaining energy efficiency.
2. The BAS shall meet open standard protocol communication standards (As defined in System Communications Section) to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects.
3. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and terminal devices on this project.
4. Approved vendors, products and web services shall comply with SOC2 Type II as defined by the AICPA. SOC2 Type II compliance is a certification that confirms that a service provider has established and implemented effective controls to secure their clients' data in accordance with the Trust Services Criteria (TSC).
- a. SOC2 Type II compliance provides assurance to customers that the service provider has established and implemented effective security controls and is committed to protecting their data.
- b. To achieve SOC2 Type II compliance, the manufacturer shall have completed an independent audit to assess design and implementation of their controls, policies, and procedures.
5. The BAS shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by the security permissions of the operator role. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate data.

1.1 APPROVED CONTROL SYSTEM MANUFACTURERS

A. Approved BAS Manufacturers:

- Trane Tracer®
- Alerton Compass
- Automated Logic

1.2 SYSTEM COMMUNICATION

A. System Communications

- 1.Each workstation, building controller, and equipment/plant controller communication interface shall utilize the BACnet™ protocol with an Ethernet (IEEE 802.3) or RS485 (EIA-485) physical interface and an appropriate data link technology as defined in ANSI/ASHRAE® Standard 135-2012. (e.g. BACnet over IP, BACnet over IPv6, BACnet SC, BACnet over MS/TP).
2. All system controllers shall be BTL listed as a BACnet Building Controller (B-BC) as defined in ANSI/ASHRAE® Standard 135-2012.
3. The system shall support both BACnet over IP and BACnet over MS/TP, allowing for a hybrid approach to meet various performance and cost requirements. Supporting both twisted-pair and Ethernet topologies to offer flexibility and cost-effectiveness.
4. All documented status and control points, schedule, alarm, and data-log services or objects shall be available as standard object types as defined in ANSI/ASHRAE® Standard 135-2012.
5. The control system shall be capable of obtaining and using data from a RESTful API data server (e.g. current weather, forecast weather, etc.) to enhance energy efficiency, cost savings, and/or user comfort. The control system shall account for a communication loss to the API server such that the system will continue to operate.
6. All Operator Workstations (B-OVS, B-AWS) and Building Controllers (B-BC) shall support BACnet Secure Connect (BACnet SC), a secure and encrypted data link layer specifically designed for those networks.
7. Each System Controller shall communicate with a network of Custom Application and Application Specific Controllers utilizing one or more of the interfaces documented within Field Bus Communications below.

B. Field Bus Communications

1.BACnet™

- a. All equipment and plant controllers shall be BTL listed as a BACnet Application Specific Controller (B-ASC) or a BACnet Advanced Application Controller (B-AAC) as defined in ANSI/ASHRAE® Standard 135-2012.
- b. All communication shall conform to ANSI/ASHRAE® Standard 135-2012.
- c. System Controller shall function as a BACnet router to each unit controller providing a globally unique BACnet Device ID for all BACnet controllers within the system.
- d. BACnet MS/TP
- 1) Communication between System Controller and equipment/plant controllers shall utilize BACnet MS/TP as defined in ANSI/ASHRAE® Standard 135-2012.
2. LonTalk
- a. Communication between System Controller and equipment/plant controllers shall utilize LonTalk (FTT-10 transceiver) as defined in the LonTalk standard.
- b. Points within LonTalk equipment/plant controllers shall be exposed as standard BACnet points within the System Controller without need for manual intervention by an operator.

C. Variable Refrigerant Flow (VRF) Communications

1.The VRF system shall communicate with the BAS using one of the following communications methods.

- a. The VRF system and the BAS shall utilize ANSI/ASHRAE® Standard 135 (BACnet) protocol revision 12 or greater.
- b. Recognizing that VRF manufacturers utilize proprietary protocols to pass information between VRF equipment components, A gateway device is an accepted method to convert proprietary data to BACnet data. BACnet data shall conform to BACnet protocol revision 12 or greater.
- c. When a device is capable of data exchange with the BACnet protocol across non-IP network segments, the BACnet protocol shall be used to exchange data. If a device does not support the BACnet protocol an alternative protocol may be used. Data exchanged using the alternative protocol shall be converted to the BACnet protocol to allow integration to the BAS.
2. To promote BAS interoperability, each instance of the following VRF system components shall be visible to the BAS network as a virtual BACnet device.
- a. Indoor equipment
- b. Outdoor equipment
- c. Refrigerant manifold devices
- d. Outdoor air ventilation systems
3. Virtual BACnet device functionality shall conform to BACnet protocol revision 12 or greater and meet the minimum functionality defined by BACnet device profile B-ASC.

1.3 OPERATOR INTERFACE

A. Provide Building Operator Web Interface

- 1.Manufacturer shall provide a user interface with time-of-day schedules, data collection, dashboards, reports and building summary, system applications, and self-expiring timed overrides. Manufacturer shall provide a published user and applications guide(s) that detail the system application operation, configuration, setup and troubleshooting.
2. The building operator web interface shall be accessible via a web browser without requiring any "plug-ins" (i.e. JAVA Runtime Environment (JRE), Adobe Flash).
3. User Roles
- a. The system shall include pre-defined "roles" that allow a system administrator to quickly assign permissions to a user.
- b. User login/logout attempts shall be recorded.
- c. The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user definable.
4. On-Line Help and Training
- a. Provide a context sensitive, on line help system to assist the operator in operation and configuration of the system.
- b. On-line help shall be available for all system functions and shall provide the relevant data for each particular screen.
5. Equipment and Application Pages
- a. The building operator web interface shall include standard pages for all equipment and applications. These pages shall allow an operator to obtain information relevant to the operation of the equipment and/or application, including:
- 1) Animated Equipment Graphics for each major piece of equipment and floor plan in the System. This includes:
- a) Each Chiller, Air Handler, VAV Terminal, Fan Coil, Boiler, and Cooling Tower. These graphics shall show all points dynamically as specified in the points list.
- b) Animation capabilities shall include the ability to show a sequence of images reflecting the position of analog outputs, such as valve or damper positions. Graphics shall be capable of launching other web pages.
- 2) Alarms relevant to the equipment or application without requiring a user to navigate to an alarm page and perform a filter.
- 3) Historical Data (As defined in Trend Logs section of CONTROLLER SOFTWARE) for the equipment or application without requiring a user to navigate to a Data Log page and perform a filter.
- b. VAV Air System. An operator shall be able to view and control (where applicable) the following parameters via the building operator web interface:
- 1) System Mode
- 2) System Occupancy
- 3) Ventilation (Outdoor air flow) setpoint
- 4) Ventilation (Outdoor air flow) status
- 5) Air Handler Static pressure setpoint
- 6) Air Handler Static pressure status
- 7) Air Handler occupancy status
- 8) Air Handler Supply air cooling and heating set points
- 9) Air Handler minimum, maximum and nominal static pressure setpoints
- 10) VAV box minimum and maximum flow
- 11) VAV box drive open and close overrides
- 12) VAV box occupancy status
- 13) VAV box Airflow to space
- 14) Average space temperature
- 15) Minimum space temperature
- 16) Maximum space temperature
- 6.

7. System Graphics. Building operator web interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building area included in this contract. Indicate thermal comfort on floor plan summary graphics using colors to represent zone temperature relative to zone set point.

- a. Graphic imagery - graphics shall use 3D images for all standard and custom graphics. The only allowable exceptions will be photo images, maps, schematic drawings, and selected floor plans.
- b. Animation. Graphics shall be able to animate by displaying different image lies for changed object status.
- c. Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.

7. Graphics Library. Furnish a library of standard HVAC equipment such as chillers, air handlers, terminals, fan coils, unit ventilators, rooftop units, and VAV boxes, in 3-dimensional graphic depictions. The library shall be furnished in a file format compatible with the graphics generation package program.

8. Manual Control and Override

- a. Point Control. Provide a method for a user to view, override, and edit if applicable, the status of any object and property in the system. The point status shall be available by menu, on graphics or through custom programs.
- b. Temporary Overrides. The user shall be able to perform a temporary override wherever an override is allowed, automatically removing the override after a specified period of time.
- c. Override Owners. The system shall convey to the user the owner of each override for all priorities that an override exists.
- d. Provide a specific icon to show timed override or operator override, when a point, unit controller or application has been overridden manually.
9. Scheduling. - The scheduling application shall provide graphical representation of the day, week, month and exception events.
10. Alarm/Event Notification
- a. Alarm/Event Log. The operator shall be able to view all logged system alarms/events from any building operator web interface.

- 1) The operator shall be able to sort and filter alarms from events. Alarms shall be sorted in a minimum of 4 categories based on severity.
- 2) The operator shall be able to acknowledge and add comments to alarms
- 3) Alarm/event messages shall use full language, easily recognized descriptors.
- b. Alarm Suppression. Alarms shall be able to be suppressed based on load/source relationships to present the likely root cause to the building operator as described in ASHRAE Guideline 36. Load/Source relationships shall be configurable by the user through a web interface.

11. Reports and Logs

- a. The building operator web interface shall provide a reporting package that allows the operator to select reports.
- b. The building operator web interface shall provide the ability to schedule reports to run at specified intervals of time.
- c. The following standard reports shall be available without requiring a user to manually configure the report:
- 1) All Points in Alarm Report: Provide an on demand report showing all current alarms.
- 2) All Points in Override Report: Provide an on demand report showing all overrides in effect.
- 3) Commissioning Report: Provide a one-time report that lists all equipment with the unit configuration and present operation.
- 4) Points report: Provide a report that lists the current value of all points
- d. The controls vendor shall provide a hardening report that summarizes the port configuration details to ensure sites have not been exposed to the Internet in alignment with Cyber Security best practices.

B. Provide Mobile App Interface

- 1.Provide mobile (smart phone or tablet) interfaces to the building automation system, compatible with iOS and Android™ operating systems.
2. Controls manufacturer shall provide a phone/tablet interface with the ability to view/override status and setpoints, view/change schedules, view/acknowledge/comment on alarms, and view graphics for all spaces and equipment.
3. This phone/tablet interface shall resize itself appropriately for the size of the interface (i.e. no "pinching and zooming" required).
4. This phone/tablet interface shall function remotely from the facility while following IT security best practices (e.g. no ports exposed to the internet).
5. The operator interface shall support system access on a mobile device via a mobile app to:
- a. Alarm log
- b. System Status
- c. Equipment status
- d. Space Status
- e. Standard Equipment graphics
- f. Override set points
- g. Override occupancy
- h. Acknowledge Alarms
- i. Add Comment(s) to Alarms

C. Provide Local Operator Interface - Touch sensitive display

- 1.Provide a color touch sensitive display that allows the building occupants to accomplish the following tasks:
- a. Control the set points for multiple pieces of equipment with a single touch. Set point adjustment by the occupant shall be bound by editable limits.
- b. Occupant override of the system/equipment operating mode shall be possible with a single touch on the local operator display. With the ability to set up point overrides to expire at designated times.
- c. The local operator display shall provide occupant access to system time of day scheduling. Occupants shall have the ability to schedule events more than one year in advance. Exception schedules and holidays shall be shown clearly on the calendar, visible to the occupant on the touchscreen display.
- d. The local operator display shall offer PIN control, which shall limit system control access to only those with proper login credentials.
- e. The local operator display shall display the alerts that require service of the connected equipment.
2. To ensure interoperability with the Building Automation System (BAS), the local operator display shall be provided by the BAS solution provider associated with this project.
3. Local operator display shall be a minimum of 10 inches in size and be provided with mounting hardware to allow it to be installed on an office wall or control panel door.

1.4 BUILDING / SYSTEM CONTROLLERS

- A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in CONTROLLER SOFTWARE section.
- 1.The controller shall provide a USB communications port for connection to a PC.
2. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.
3. All System Controllers shall have a real time clock and shall be able to accept a BACnet time synchronization command for automatic time synchronization.
4. Data shall be shared between networked System Controllers.
5. Serviceability - The System Controller shall have a display on the main board that indicates the current operating mode of the controller.
- B. Controls manufacturer shall provide secure remote access to the Building Automation System (BAS). Secure remote access shall not require IP ports to be "exposed" (i.e. port-forwarded or external public IP addresses) to the Internet. Controls manufacturer shall update secure remote access software as necessary to follow cyber security best practices and respond to cyber security events.

1.5 BUILDING CONTROLLER SOFTWARE

- A. Manufacturer shall provide standard applications to deliver HVAC system control. Standard applications include Time of Day Scheduling with Optimal Start/Stop, VAV Air Systems Control, Chiller Plant Control, Historical Trend Logs and Trim and Respond. Manufacturer shall provide system optimization strategies for functions such as fan pressure optimization and ventilation optimization.
- B. Furnish the following applications software for building and energy management. All software applications shall reside and run in the system controllers. Editing of applications shall occur at the building operator interface.
- 1.VAV Air Systems Applications
- a. The BAS shall provide air system applications that coordinate air handlers (AHU)/rooftop units (RTU) and Variable Air Volume Terminal equipment.
- b. The air system applications shall perform the following functions:
- 1) Startup and shutdown the air handler safely. Ensure the VAV boxes are open sufficiently when the air handler is running, to prevent damage to the ductwork and VAV boxes due to high air pressure.
- 2) Fan Pressure Optimization (ASHRAE 90.1, Guideline 36) - Minimize energy usage by controlling system static pressure to the lowest level while maintaining zone airflow requirements. Trim and respond reset logic shall reset setpoint within the range of min and max values based on zone requests.
- 3) During commissioning, and with the engineer/owner, the controls contractor shall confirm the performance of Fan Pressure Optimization by conducting a field functional test that demonstrates critical zone reset.
- 4) Ventilation Optimization (ASHRAE 62) - properly ventilate all spaces while minimizing operating energy costs, using measured outdoor air flow. Dynamically calculate the system outdoor air requirement based on "real time" conditions in the spaces (i.e., number of occupants, CO2 levels, etc.) minimizing the amount of unconditioned outdoor air that must be brought into the building.
- 5) Demand Controlled Ventilation - the active ventilation setpoint shall modulate between the occupied ventilation and occupied standby ventilation setpoint; Resetting the setpoint based on CO2 levels in the space.
- 6) Discharge Air Temperature Reset (ASHRAE 90.1, Guideline 36) - Minimize energy usage by controlling discharge air temperature in response to building loads and outdoor air temperature. Trim and respond reset logic shall reset setpoint within the range of min and max values based on zone requests.
- 7) If applicable mitigation sequences for A2L mildly flammable refrigerants, including BACnet COV (change of value) functionality and A2L Unoccupied Override to ensure rapid response and compliance with safety standards.
- c.

- d. The Air Systems application shall provide a user interface that includes status of current system operation with real time data of key operating parameters. Key operating parameters for Guideline 36 include:

- Duct Static Pressure
- Duct Static Optimization Setpoint
- Outdoor Airflow
- Ventilation Optimization Setpoint
- Duct Static Optimization Maximum VAV Damper/Source VAV box
- Ventilation Optimization Maximum VAV Vent Ratio/Source VAV box
- Discharge Air Temperature
- Discharge Air Temperature Optimization Setpoint
- Duct Static Optimization System Requests
- Discharge Air Temperature Optimization System Requests

- d. The air system application status screens shall explain what optimization calculations are occurring, critical parameters, and source equipment members. The optimization status, inputs, and results shall be displayed for VAV Ventilation Optimization (calculating proper outside air intake), VAV Discharge Air Temperature Optimization (calculating proper discharge air temperature) and VAV Duct Static Pressure Optimization (calculating proper fan static pressure).
- e. The air systems applications shall provide a user interface that enables configuration changes made by swipe and type fields, selection list, and check box entry for feature definition:

- VAV Auxiliary Night Heat
- VAV Source Temperature Distribution
- Changeover System control
- Start/Stop Delay operation
- Enable/Disable Optimization Strategies (Duct Static Optimization, Discharge Air Temperature Optimization and Ventilation Optimization)

- f. The operation of VAV Terminal equipment members of the VAV Air System shall be selected by check box to optionally participate in the following functions when for Guideline 36 applications:

- System calculations (min, max, average)
- Duct Pressure Optimization
- Ventilation Optimization
- Drive to Maximum Override
- Common Source Temperature
- Common Space
- Discharge Air Temperature Optimization
- Hot Water Temperature Optimization
- Chilled Water Temperature Optimization
- The air system application vendor shall provide a published applications guide that details the air system application operation, configuration, setup, and troubleshooting. The applications guide documentation shall be maintained under version control, and updated by the manufacture to reflect most recent feature updates as made available. Contents of the guide shall include:

- Description of System Operation
- Required Components
- Sequences of Operation
- Installation
- Controller Setup
- Required Programming
- Commissioning
- Optimization Strategies
- Special Applications
- Troubleshooting
- The air system application shall present in plain user language the current operation with source zone information and reset events.

2. Trend Logs

- a. The system shall harvest trend logs for defined key measurements for each controlled HVAC device and HVAC application. Trend logs shall be captured for a minimum of 5 key operating points for each piece of HVAC equipment and HVAC application and stored for no less than 1 year at 15-minute intervals. Data Logs shall be capable of being configured on an interval or change of value basis.

1) Fan Coil

- Discharge Air Temperature
- Space Temperature Active
- Space Temperature Setpoint Active
- Air Flow Setpoint Active
- Discharge Air Flow

2) Water Source Heat Pump

- Discharge Air Temperature
- Space Temperature Active
- Space Temperature Setpoint Active
- Air Flow Setpoint Active
- Discharge Air Flow

3) Air Handling Unit/Rooftop (VAV)

- Discharge Air Temperature
- Discharge Air Temperature Setpoint Active
- Space Temperature Active
- Cooling Capacity Status
- Discharge Air Flow

4) Air Handling Unit/Rooftop (CV)

- Discharge Air Temperature
- Space Temperature Active
- Space Temperature Setpoint Active
- Cooling Capacity Status
- Heating Capacity Primary Status
- Outdoor Air Damper Position

5) VAV Box

- Discharge Air Temperature
- Space Temperature Active
- Space Temperature Setpoint Active
- Air Flow Setpoint Active
- Discharge Air Flow

3. Trim and Respond

- a. The BAS shall provide a setpoint reset application program based on 'trim and respond' functionality as outlined in ASHRAE Guideline 36.
- 1.6 SOFTWARE SERVICE TOOLS
- A. Provide one copy of software service tool to enable controller back-up/restore, configuration, firmware update, diagnostics, and equipment status that is specifically compatible with the BACnet unit level controllers being installed as part of this project. This software shall be registered to the Owner at project completion. Manufacturer shall provide subscription to service tool for 5 years that entitles free software updates.

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100% CONSTRUCTION DOCS	2	03/10/2026
100% CONSTRUCTION DOCS	3	04/30/2026

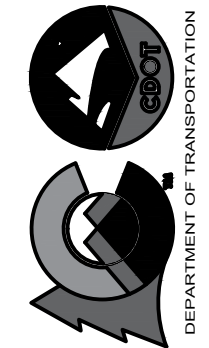
Colorado Department of Transportation

PROPERTY MANAGEMENT

2829 W. HOWARD PL.

DENVER, CO 80204

Phone: 303-757-9011



CDOT GRAND JUNCTION

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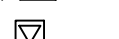
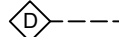
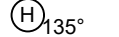
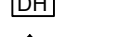
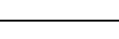
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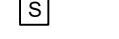
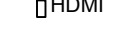
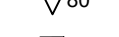
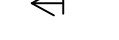


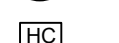
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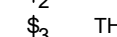
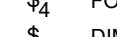
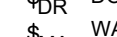
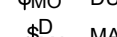
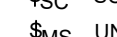
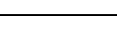
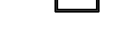
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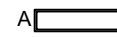
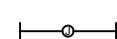
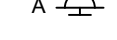
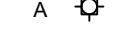
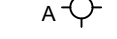
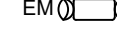
FIRE ALARM EQUIPMENT LEGEND	
	FIRE ALARM CONTROL PANEL
	FIRE ALARM PULL STATION
	FIRE ALARM HORN
	FIRE ALARM STROBE
	FIRE ALARM HORN/STROBE
	CEILING MOUNTED SPEAKER
	DUCT DETECTOR
	REMOTE LAMP
	SMOKE DETECTOR - PHOTOELECTRIC
	135° STANDARD HEAT DETECTOR
	PIR DETECTOR
	DOOR HOLD - MAGNETIC HOLD
	FLOW SWITCH
	TAMPER SWITCH

COMMUNICATION LEGEND	
	CLOCK ONLY
	CLOCK / PA SPEAKER WALL MOUNTED
	ROUND CEILING MOUNTED SPEAKER
	SQUARE SPEAKER
	INTERCOM PUSH TO CALL SWITCH
	WIRELESS ACCESS POINT ABOVE THE CEILING
	ABOVE THE CEILING PROJECTOR CONNECTION
	WALL MOUNTED HDMI
	PLAIN DATA OUTLET
	PLAIN DATA OUTLET WITH MOUNTING HEIGHT
	COMBINATION DATA/TELEPHONE
	CEILING MOUNTED COMBINATION DATA/TELEPHONE
	TELEVISION OUTLET

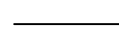
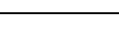
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	ELECTRIC DOOR STRIKE
	CARD READER FOR DOOR OPERATOR

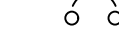
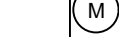
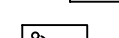
LIGHTING LEGEND	
<u>NOTES:</u>	
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VARIATION AND/OR COMBINATION MAY BE USED ON THE PLANS.	
A NUMBER NEXT TO A RECEPTACLE OR DEVICE INDICATES A CIRCUIT NUMBER.	
AN UPPER CASE LETTER NEXT TO A SWITCH INDICATES THE FUNCTION OF THE SWITCH. A LOWER CASE LETTER INDICATES THE SWITCH CIRCUIT.	
AN UPPER CASE LETTER NEXT TO A LIGHT FIXTURE INDICATES THE TYPE OF FIXTURE. REFER TO THE LUMINAIRE SCHEDULE FOR FIXTURE SPECIFICATIONS. A LOWER CASE LETTER NEXT TO A LIGHT CORRESPONDS TO THE SWITCH DESIGNATION.	

SWITCHES	
	SINGLE POLE SWITCH
	TWO POLE SWITCH
	THREE-WAY SWITCH
	FOUR-WAY SWITCH
	DIMMER SWITCH
	3 WAY DIMMER SWITCH - (4D INDICATES A 4WAY DIMMER)
	DOOR ACTIVATED SWITCH
	WALL MOUNTED DUAL TECHNOLOGY MANUAL ON / AUTO OFF VACANCY SENSOR SWITCH
	LOW VOLTAGE LIGHT SWITCH
	MANUAL MOTOR STARTER
	PILOT LIGHT SWITCH
	AUTO ON / AUTO OFF LIGHT SWITCH
	DUAL TECHNOLOGY MOTION / OCCUPANCY SENSOR LIGHT SWITCH
	MANUAL ON / AUTO OFF DIMMING LIGHT SWITCH
	KEY OPERATED LIGHT SWITCH
	MANUAL ON - TIMED OFF LIGHT SWITCH
	CEILING MOUNTED DUAL TECHNOLOGY OCCUPANCY SENSOR SWITCH
	CEILING MOUNTED DUAL TECHNOLOGY MANUAL ON / AUTO OFF VACANCY SENSOR
	CEILING MOUNTED DAYLIGHT HARVESTING SENSOR
	SCENE CONTROL STATION
	UNIT LIGHTING MANAGEMENT CONTROL STATION.

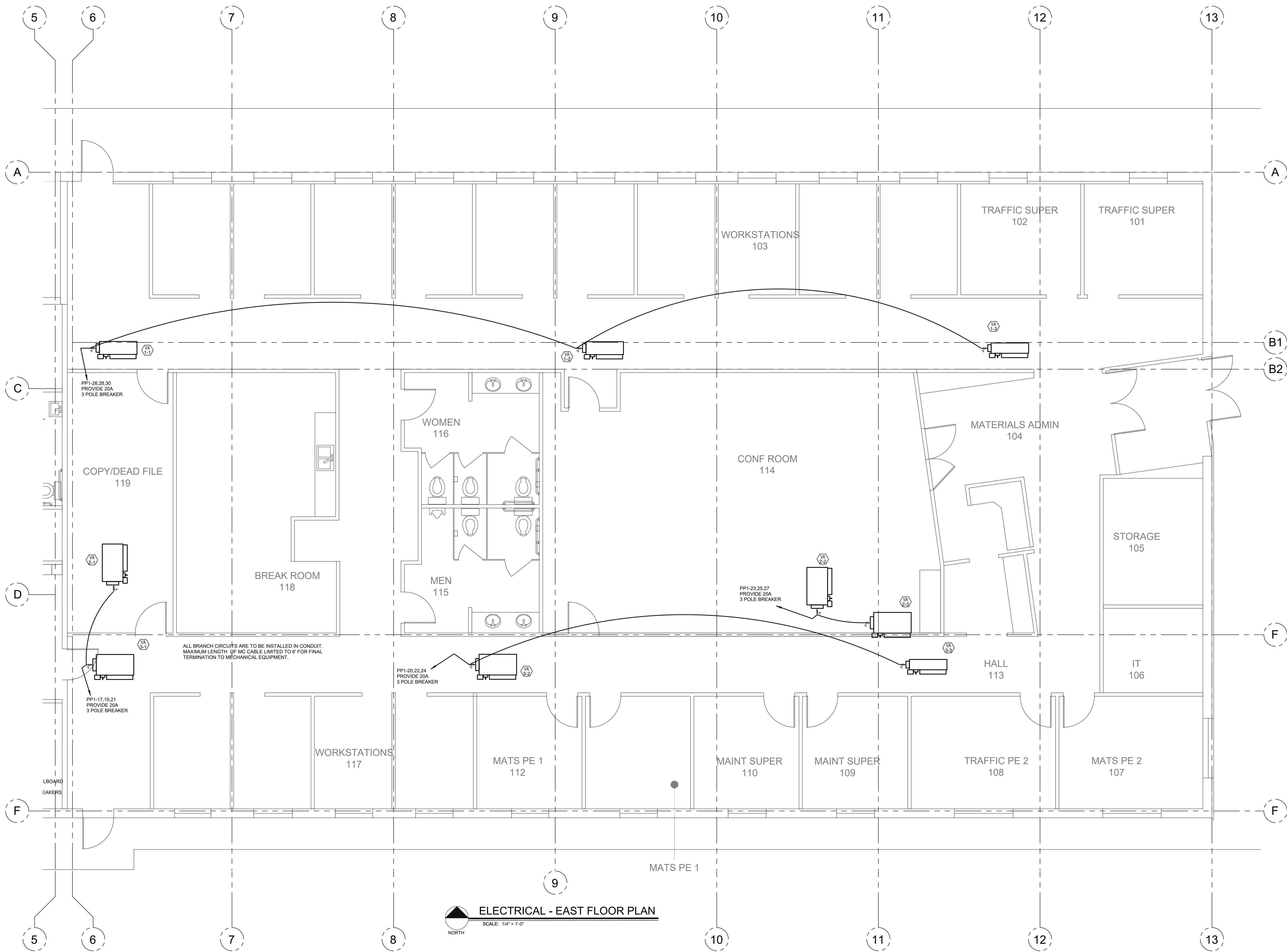
LIGHT FIXTURES	
	1'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
	2'x4' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
	2'x2' LED TROFFER OR DIRECT/INDIRECT TYPE FIXTURE GRID, FLANGE OR SURFACE MOUNTED
	OPEN STRIP FIXTURE
	WALL BRACKET LINEAR FIXTURE
	WALL MOUNTED SCONCE LIGHT FIXTURE
	RECESSED DOWNLIGHT CAN FIXTURE
	SURFACE CEILING OR PENDANT MOUNTED FIXTURE
	DOUBLE FACE EXIT SIGN, WALL AND CEILING MOUNTED
	SINGLE FACE EXIT SIGN, WALL AND CEILING MOUNTED
	WALL MOUNTED EMERGENCY LIGHT
	EMERGENCY EXTERIOR EGRESS FIXTURE

GENERAL ELECTRICAL NOTES:	
1. ALL ELECTRICAL WORK TO COMPLY WITH LATEST EDITION OF NEC, IECG AND ALL APPLICABLE GOVERNING CODES.	
2. FIELD COORDINATION DURING CONSTRUCTION IS IMPERATIVE. CONTRACTORS BIDDING THIS WORK MUST MAKE REASONABLE ALLOWANCES FOR UNFORESEEN CONTINGENCIES.	
3. ELECTRIC UTILITY TO ADVISE OWNER AND/OR THE ELECTRICAL ENGINEER PRIOR TO SERVICE MODIFICATION REQUIRING COST TO THE OWNER.	
WIRING:	
1. ALL WIRING IS SHOWN DIAGRAMMATICALLY ON DRAWING. FIELD VERIFY ALL CONDITIONS PRIOR TO ROUGH-IN.	
2. ALL CONDUITS AND CONVEYANCES SHALL BE CONCEALED. IN THE EVENT THAT A NEW DEVICE IS BEING INSTALLED IN AN EXISTING DRYWALL PARTITION, PROVIDE A CUT IN TYPE BOX AND FISH FLEXIBLE CONDUIT DOWN INSIDE THE WALL FROM ABOVE THE CEILING AND REPAIR THE DRYWALL AROUND THE CONDUIT. TRANSITION TO EMT ONCE ABOVE THE CEILING.	
3. SIZES OF WIRE AND CABLES ARE BASED UPON COPPER CONDUCTORS, UNLESS OTHERWISE INDICATED. ALL CIRCUITS SHALL CONTAIN (2) #12 AWG WITH (1) #12 GND IN 1/2" CONDUIT UNLESS NOTED OTHERWISE.	
4. ALL BRANCH CIRCUITS WITH HOME RUNS OVER 50 FEET, WILL BE SIZED ONE SIZE LARGER.	
5. ALL PENETRATIONS IN OR THROUGH FIRE RATED PARTITIONS SHALL BE FIRE STOPPED IN SUCH A WAY THAT THE PENETRATION MATCHES THE FIRE RATING OF THE WALL.	
6. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL COORDINATION BETWEEN THE APPROPRIATE DISCIPLINES AND CONTRACTORS.	
7. COORDINATE ALL DEVICE, FIXTURE AND HARDWARE COLOR SELECTIONS WITH THE ARCHITECT PRIOR TO MAKING SHOP DRAWING SUBMITTALS.	
8. COORDINATE THE MOUNTING HEIGHTS OF ALL RECEPTACLES MOUNTED ABOVE COUNTERS, CASEWORK AND APPLIANCE RECEPTACLES WITH ARCHITECTURAL ELEVATIONS.	
9. BRANCH CIRCUIT AND SPECIAL SYSTEMS WIRING FOR DEVICES ON WALLS IN FINISHED AREAS WHICH CANNOT BE CONCEALED SHALL BE INSTALLED IN SURFACE MOUNTED RACEWAY.	
10. ALL EXPOSED CONDUITS, BOXES, ETC. IN ROOMS TO BE PAINTED SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE. EXPOSED CONDUITS, BOXES, ETC. IN ROOMS WHICH ARE NOT PAINTED MAY BE LEFT UN-PAINTED. EXPOSED CONDUIT, BOXES, ETC. ON THE EXTERIOR OF BUILDINGS SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACE AS CLOSELY AS POSSIBLE.	
11. THE CONTRACTOR IS RESPONSIBLE FOR PATCHING, PAINTING, REPAIRING OR REPLACEMENT OF ALL WALLS, CEILING OR OTHER BUILDING ELEMENTS WHICH ARE DISTURBED AS PART OF THE DEMOLITION AND/OR INSTALLATION OF ELECTRICAL WORK.	
12. PROVIDE ELECTRICAL CONNECTION TO ALL FIRE, SMOKE, AND FIRE / SMOKE DAMPERS INCLUDING POWER AND FIRE ALARM. VERIFY EXACT SIZE AND FINAL LOCATION OF ALL DAMPERS WITH THE MECHANICAL CONTRACTOR. ALL ROOFTOP UNITS RATED AT MORE THAN 2000 CFM WILL BE OUTFITTED WITH A DUCT DETECTOR IN THE RETURN DUCT. ALL ROOFTOP UNITS RATED AT MORE THAN 15000 CFM WILL BE OUTFITTED WITH A DUCT DETECTOR IN BOTH THE SUPPLY AND RETURN DUCT AT ROOFTOP LEVEL AND IN THE RETURN DUCT AT EVERY LEVEL THAT IS SERVED. ELECTRICAL CONTRACTOR WILL PROVIDE A REMOTE TEST STATION AND ALL WIRING NECESSARY TO COMPLETE INSTALLATION.	
13. REFER TO THE MECHANICAL EQUIPMENT SCHEDULE FOR ADDITIONAL REQUIREMENTS ASSOCIATED WITH PLUMBING AND HVAC EQUIPMENT AND OWNER/GENERAL CONTRACTOR FURNISHED EQUIPMENT.	

ELECTRICAL EQUIPMENT LEGEND	
	BRANCH CIRCUIT PANELBOARD
	TELEPHONE TERMINAL BOARD
	ELECTRIC MOTOR
	FUSED SAFETY SWITCH / DISCONNECT COMBINATION
	MOTOR STARTER
	CONTRACTOR
	CIRCUITRY HOMERUN: PANEL LA - CIR. #7
	CONDUIT OR WIRE CONCEALED IN WALL/CLG. (SOLID LINE TYPE)
	CONDUIT OR WIRE UNDERFLOOR/UNDERGND. (CENTER LINE TYPE)

MAIN DISTRIBUTION GEAR	
	CIRCUIT BREAKER IN A PANEL BOARD
	PAD MOUNTED UTILITY TRANSFORMER
	FUSED DISCONNECT 100A = AMP RATING 2P = NUMBER OF POLES
	FUSED DISCONNECT
	ELECTRICAL METER SHOWN ON ONE-LINE DIAGRAMS
	ELECTRICAL POWER PANEL WITH MAIN LUG OR MAIN BREAKER PPI= PANEL NAME 225A MLO = MAIN LUG OR BREAKER SIZE 120/208V = PANEL VOLTAGE 3PH, 4 WIRE = PANEL PHASE, DISTRIBUTION TYPE
	PP1 225A MCB 120/208V 3PH, 4W
	PP1 225A MLO 120/208V 3PH, 4W

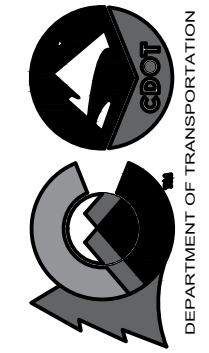
ELECTRICAL DEVICE LEGEND	
	CEILING JUNCTION BOX - SURFACE/FLUSH
	WALL JUNCTION BOX - SURFACE/FLUSH
	DUPLEX RECEPTACLE
	FLOOR MOUNTED RECEPTACLE
	SPLIT WIRED DUPLEX RECEPTACLE
	CEILING MOUNTED DUPLEX RECEPTACLE
	FLOOR MOUNTED FOURPLEX RECEPTACLE
	APPLIANCE RECEPTACLE - 3 WIRE
	DUPLEX RECEPTACLE
	FOURPLEX RECEPTACLE
	ABBREVIATIONS PERTAIN TO ALL DUPLEX AND FOURPLEX RECEPTACLES:
AC	ABOVE COUNTER
AC GF	ABOVE COUNTER - GROUND FAULT CIRCUIT INTERRUPTER
AC USB	ABOVE COUNTER WITH USB PORT
AF	ARC FAULT PROTECTED
AF USB	ARC FAULT PROTECTED WITH USB PORT
AF GF	ARC FAULT WITH GROUND FAULT CIRCUIT INTERRUPTER
D	DEDICATED RECEPTACLE
D USB	DEDICATED RECEPTACLE WITH USB PORT
EM	RECEPTACLE CIRCUITED TO THE EMERGENCY PANEL WITH RED COVER PLATE
GF	GROUND FAULT CIRCUIT INTERRUPTER
GF WP	WEATHER PROOF GROUND FAULT CIRCUIT INTERRUPTER
72"	PLUS LOAD
72"	GENERAL PURPOSE WITH MOUNTING HEIGHT.
	ELECTRIC HAND DRYER
	THERMOSTAT
	OPEN/CLOSE/STOP PUSH BUTTON
	DRAWING KEY NOTES
ROOM	ROOM DESIGNATION
100	



 **ELECTRICAL - EAST FLOOR PLAN**
SCALE: 1/4" = 1'-0"

DATE	No.	DESCRIPTION
02/19/2026	1	99% CONSTRUCTION DOCS
03/10/2026	2	100% CONSTRUCTION DOCS
04/30/2026	3	100% CONSTRUCTION DOCS

Colorado Department of Transportation

**PROPERTY MANAGEMENT**
2829 W. HOWARD PL.
DENVER, CO 80204
Phone: 303-757-9011

CDOT GRAND JUNCTION
G ROAD HVAC
GRAND JUNCTION, COLORADO



DRAWN BY: BCE

CDOT PROJECT NO. 26988
BCE PROJECT NO. 25481

DRAWING NUMBER
E2-2

MECHANICAL EQUIPMENT SCHEDULE												
COMB: COMBINATION MOTOR STARTER			NR: NONE REQUIRED			CONT: CONTRACTOR						
MAG: MAGNETIC MOTOR STARTER			PI: PLUG-IN UNIT			MAN: MANUAL MOTOR STARTER						
						W/U: SUPPLIED WITH UNIT:						
UNIT NO	FUNCTION (NOTES)	LOAD	VOLTS	Ø	FULL LOAD AMPS	BRANCH CIRCUIT CONDUIT SIZE	CIRCUIT NO.	WIRE SIZE	GRND WIRE SIZE	BRKR SIZE	START	DISC FUSE
	ELECTRIC VAV UNITS	4.5KW	460V	3	5.65A	1/2"	3	12	12	20	NR	
	UNIT VAV 1-2 IS SIMILAR	---	460V	3	3.14A	1/2"	3	12	12	20	NR	
	ELECTRIC VAV UNITS	2.5KW	460V	3	3.14A	1/2"	3	12	12	20	NR	
	UNIT VAV 2-2 IS SIMILAR	---	460V	3	8.16A	1/2"	3	12	12	20	NR	
	ELECTRIC VAV UNITS	6.5KW	460V	3	8.16A	1/2"	3	12	12	20	NR	
	UNITS VAV 3-1 & 3-2 ARE SIMILAR	---	460V	3	6.90A	1/2"	3	12	12	20	NR	
	ELECTRIC VAV UNITS	5.5KW	460V	3	6.90A	1/2"	3	12	12	20	NR	
	ELECTRIC VAV UNITS	2.0KW	460V	3	2.51A	1/2"	3	12	12	20	NR	

EXISTING SERVICE DESIGNED WITH 56.3 KW SPARE CAPACITY EXISTING PANEL PP1 CALCULATED EXISTING LOAD = 18.2KW											
PANEL SCHEDULE -		PP1	TYPE: VOLTAGE: ENCLOSURE:	PANELBOARD NEMA1	BUS SIZE: MAIN BRKR: MOUNTING:		100 100 FLUSH	PHASES: WIRES: SC RATING:	3 4 10000	NEUTRAL BUS: GROUND BUS:	YES YES
LOAD TYPE	LOAD DESCRIPTION			AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION	
LIGHTING	ELEC,TOILET STORAG RMS ---			20A 1P	1 1408	A	2 1535	20A 1P	LIGHTING	NORTH OPEN OFFICE	
LIGHTING	NORTH LAB ---			20A 1P	3 1664	B	4 1701	20A 1P	LIGHTING	SOUTH OPEN OFFICE ---	
LIGHTING	BAY LIGHTING ---			20A 1P	5 1664	C	6 1687	20A 1P	LIGHTING	CONF/COPY/BREAK ---	
LIGHTING	BATH/ELECRADIO RMS ---			20A 1P	7 564	A	8 1520	20A 1P	LIGHTING	EXTERIOR PARKING LOT ---	
LIGHTING	EMERGENCY LIGHTING ---			20A 1P	9 768	B	10 504	20A 1P	LIGHTING	EMERGENCY LIGHTING ---	
LIGHTING	RP1 8-9-10 ---			20A 1P	11 1000	C	12 200	20A 1P	LIGHTING	LIGHTING CONTROL PANEL ---	
LIGHTING	RP1 11-12-13-14 ---			20A 1P	13 1000	A	14 1000	20A 1P	LIGHTING	RP1 1-3 ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	15 0	B	16 1000	20A 1P	LIGHTING	RP1 2 ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	17 0	C	18 1000	20A 1P	LIGHTING	RP1 4 - 15 ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	19 0	A	20 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	21 0	B	22 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	23 0	C	24 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	25 0	A	26 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	27 0	B	28 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
SPARE	UNALLOCATED FUTURE ---			20A 1P	29 0	C	30 0	20A 1P	SPARE	UNALLOCATED FUTURE ---	
LOADS BY TYPE:					LOADS BY PHASE:						
LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)		PHASE	CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)			
LIGHTING	18215.00	1.25	22768.75		A	7027.00	25.37	A-B: 80.2			
KITCHEN	0.00	0.00	0.00		B	5637.00	20.35	B-C: 98.5			
PROCESS	0.00	1.00	0.00		C	5551.00	20.04	C-A: 79			
RECEPTACLES	0.00	1.00	0.00		TOTAL/AVERAGE		18215.00	21.92	85.9		
MECH HEATING	0.00	1.00	0.00		NOTES:						
MECH COOLING	0.00	1.00	0.00		1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.						
MECH YEAR ROUND	0.00	1.00	0.00								
APPLIANCE	0.00	1.00	0.00								
MISCELLANEOUS	0.00	1.00	0.00								
MOTOR	0.00	1.00	0.00								
SPARE	0.00	1.00	0.00								
LARGEST MOTOR ¹	ABOVE	0.25	0.00								
TOTAL	18215.00		22769.00								

REVISE PANEL PP1 CALCULATED EXISTING LOAD = 65.2KW
ADDED LOAD OF 47 KW, LEAVING 9.3KW SPARE

PANEL SCHEDULE -		PP1A	TYPE: VOLTAGE: ENCLOSURE:	PANELBOARD 277/480 NEMA1	BUS SIZE: MAIN BRKR: MOUNTING:			100 100 FLUSH	PHASES: WIRES: SC RATING:	3 4 10000	NEUTRAL BUS: GROUND BUS:	YES YES
LOAD TYPE	LOAD DESCRIPTION			AMPS POLES	CKT# LOAD	Ø	CKT# LOAD	AMPS POLES	LOAD TYPE	LOAD DESCRIPTION		
LIGHTING	ELEC,TOILET STORAG RMS ---			20A 1P	1 1408	A	2 1535	20A 1P	LIGHTING	NORTH OPEN OFFICE ---		
LIGHTING	NORTH LAB ---			20A 1P	3 1664	B	4 1701	20A 1P	LIGHTING	SOUTH OPEN OFFICE ---		
LIGHTING	BAY LIGHTING ---			20A 1P	5 1664	C	6 1687	20A 1P	LIGHTING	CONF/COPY/BREAK ---		
LIGHTING	BATHELEC/RADIO RMS ---			20A 1P	7 564	A	8 1520	20A 1P	LIGHTING	EXTERIOR PARKING LOT ---		
LIGHTING	EMERGENCY LIGHTING ---			20A 1P	9 768	B	10 504	20A 1P	LIGHTING	EMERGENCY LIGHTING ---		
LIGHTING	RP1 8-9-10 ---			20A 1P	11 1500	C	12 200	20A 1P	LIGHTING	LIGHTING CONTROL PANEL ---		
LIGHTING	RP1 11-12-13-14 ---			20A 1P	13 3000	A	14 1500	20A 1P	LIGHTING	RP1 1 - 3 ---		
SPARE	UNALLOCATED FUTURE ---			20A 1P	15 0	B	16 1500	20A 1P	LIGHTING	RP1 2 ---		
MECH HEATING	--- ---			---	17 4000	C	18 1500	20A 1P	LIGHTING	RP1 4 - 15 ---		
MECH HEATING	UNITS VAV2-1 & 3-1 ---			20A 3P	19 4000	A	20 2500	---	MECH HEATING	--- ---		
MECH HEATING	--- ---			---	21 4000	B	22 2500	20A 3P	MECH HEATING	UNITS VA 3-2 & VA 3-3 ---		
MECH HEATING	--- ---			---	23 4000	C	24 2500	---	MECH HEATING	--- ---		
MECH HEATING	UNITS VAV2-2 & 2-3 ---			20A 3P	25 4000	A	26 3833	---	MECH HEATING	--- ---		
MECH HEATING	--- ---			---	27 4000	B	28 3833	20A 3P	MECH HEATING	UNITS VA 1-2 & 1-3 ---		
SPARE	UNALLOCATED FUTURE ---			20A 1P	29 0	C	30 3833	---	MECH HEATING	--- ---		
LOADS BY TYPE:					LOADS BY PHASE:							
LOAD TYPE	CONNECTED LOAD (VA)	DEMAND FACTOR	DEMAND LOAD (VA)	PHASE		CONNECTED LOAD (VA)	CONNECTED LOAD (AMPS)	BALANCE (PERCENT)				
LIGHTING	22215.00	1.25	27768.75	A		23860.30	86.14	A-B: 85.8				
KITCHEN	0.00	0.00	0.00	B		20470.30	73.90	B-C: 98				
PROCESS	0.00	1.00	0.00	C		20884.30	75.39	C-A: 87.5				
RECEPTACLES	0.00	1.00	0.00									
MECH HEATING	43000.00	1.00	43000.00	TOTAL/AVERAGE 65215.00 78.48 90.4								
MECH COOLING	0.00	1.00	0.00									
MECH YEAR ROUND	0.00	1.00	0.00									
APPLIANCE	0.00	1.00	0.00	NOTES:								
MISCELLANEOUS	0.00	1.00	0.00	1. THE LARGEST CONNECTED MOTOR LOAD IS INCLUDED IN MECHANICAL, PROCESS, OR MOTOR LOADS.								
MOTOR	0.00	1.00	0.00									
SPARE	0.00	1.00	0.00									
LARGEST MOTOR ¹	ABOVE	0.25	0.00									
TOTAL	65215.00		70769.00									

DATE

No.

DESCRIPTION

02/19/2026

1

99% CONSTRUCTION DOCS

03/10/2026

2

100% CONSTRUCTION DOCS

04/30/2026

3

100% CONSTRUCTION DOCS

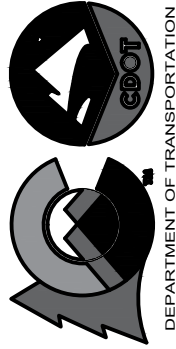
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DENVER, CO 80204

Phone: 303-757-9011



DEPARTMENT OF TRANSPORTATION

CDOT GRAND JUNCTION

G ROAD HVAC

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DRAWN BY: BCE

CDOT PROJECT NO. 26988
BCE PROJECT NO. 25481

DRAWING NUMBER

E3-1