

ABBREVIATIONS		
A/E	ARCHITECT / ENGINEER	CD-2 CONSTRUCTION DOCUMENTS (SUBMISSION2)
AAHX	AIR TO AIR HEAT EXCHANGER	
AB	AIR BLENDER	CENT CENTRIFUGAL
AC	AIR COMATIC AIR VENT	CFH CUBIC FEET PER HOUR
ACC	AIR COOLED CONDENSER	CFM CUBIC FEET PER MINUTE
ACCH	AIR COOLED CHILLER	CFT CUBIC FEET
ACCU	AIR-COOLED CONDENSING UNIT	CFP CHEMICAL FEED PUMP
ACD	AIR CONDITIONING UNIT	CEILING CEILING
ACD-TP	AUTOMATIC CONTROL	CH CHILLER
AD	DAMPER,MODULATING	CHP CHILLED WATER PUMP
AF	AUTOMATIC CONTROL	CHP CHILLED WATER PUMP
AFV	ACCESS DOOR	CHW CHILLED WATER RETURN
AFV	AFTER FILTER	CHS CHILLED WATER SUPPLY
AFV	AIR FLOW CONTROL VALVE	CHS CAST IRON
AFV	AFTER FINISHED FLOOR	CM CARBON MONOXIDE
AFV	AIR FLOW MEASURING DEVICE	CM CUBIC METER
AFW	AIR FOL WHEEL (FAN)	CM/S CUBIC METER PER SECOND
AHU	AIR-HANDLING UNIT	CO CARBON DIOXIDE
AMP	AMPERAGE	COMP COMPRESSOR UNIT
AP	ACCESS PANEL	COPE COEFFICIENT OF PERFORMANCE
APD	AIR PRESSURE DROP	CP CONDENSATE PUMP
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE	CR CEILING REGISTER
AS	AIR SEPARATOR	CS CONDENSATE STORAGE TANK
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	CSG CLEAN STEAM GENERATOR
AW	AIR WASHER	CT COILING TOWER
AWF	AXIAL FLOW	CD CONDENSING UNIT
		CUH CABINET UNIT HEATER
		CV CONSTANT VOLUME
B	BOILER	CW COLD WATER (POTABLE)
BD	BUTTERFLY DAMPER	CWC CHILLED WATER COOLING COIL
BDD	BACKDRAFT DAMPER	CWP CONDENSER WATER PUMP
BDR	BASE BOARD RADIATOR	CWR CONDENSER WATER RETURN (TO COILING TOWER)
BFP	BACKFLOW PREVENTER	CWS CONDENSER WATER SUPPLY (FROM COILING TOWER)
BFT	BOILER PLANT FIRE TUBE	
BH	BOTTLE GRILLE	
BHP	BRAKE HORSEPOWER	D DAMPER - AUTOMATIC
BHW	HOT WATER HEATING BOILER	D-1 OUTDOOR AIR DAMPER
BKH	BOILER BLOWDOWN HEAT EXCHANGER	D-2 RETURN AIR DAMPER
BK	BACKWARD INCLINED WHEEL (FAN)	D-3 RELIEF AIR DAMPER
BMT	BONE MARROW TRANSPLANT	DB DECEIBELS
BOT	BOTTLE REGISTER	DB-BULB TEMPERATURE
BS	BIOLOGICAL SAFETY CABINETS	DD-1 DESIGN DEVELOPMENT (SUBMISSION1)
BT	BLOWOFF TANK	DD-2 DESIGN DEVELOPMENT (SUBMISSION2)
BTB	BLOWOFF TANK CONTROL VALVE	DDG DIRECT DIGITAL CONTROLS
BTU	BRITISH THERMAL UNIT	DEC DEGREE
BTU	BRITISH THERMAL UNIT PER HOUR	DF DIFFUSER
BWT	BOILER PLANT WATER TUBE	DIA DIAMETER
		DW DEIONIZED WATER
C	CENTIGRADE (CELSIUS)	DP DEW POINT TEMPERATURE
CC	COOLING COIL	DFR DEFURER PLATE
CCD	COOLING COIL CONDENSATE DRAIN	DPA DIFFERENTIAL PRESSURE ASSEMBLY
CD	CEILING DIFFUSER	DPS DIFFERENTIAL PRESSURE SENSOR
CD-1	CONSTRUCTION DOCUMENTS (SUBMISSION1)	DREX DIRECT EXPANSION
		DXXC DIRECT EXPANSION COOLING COIL

ABBREVIATIONS			
EA	EXHAUST AIR	FT	FEET
EAT	ENTERING AIR TEMPERATURE	FT-LB	FOOT-POUND
EC	EVAPORATIVE COOLER	FTR	FIN TUBE RADIATION
ECC	ENGINEERING CONTROL CENTER	FV	FACE VELOCITY
ECG	EVAPORATIVE CONDENSER UNIT	GA	GAUGE
EDH	ELECTRIC DUCT HEATER	GAL	GALLONS
EEH	ELECTRIC EFFICIENCY RATIO	GH	GRAVITY HOOD
EF	EXHAUST FAN	GPL	GALLONS PER DAY
EG	EXHAUST GRILLE	GPL	GALLONS PER HOUR
ECS	EMERGENCY GAS SHUTOFF	CPM	GALLONS PER MINUTE
ECT	ENTERING GLYCOL TEMPERATURE	GPR	GAS PRESSURE REGULATOR
EJ	EXHAUST HOOD	GS	GALVANIZED STEEL
EH	EXPANSION JOINT	H	HUMIDIFIER
END	END OF MARK DRIP (STEAM)	H&CW	HOT & COLD WATER
ENT	ENTERING	H	HOSE/KEEPING AID CLOSET
ER	ELECTRIC REGISTER	HB	HOSE BIB
ERIC	ELECTRIC RADIANT COIL	HC	HEATING COIL
ERP	ELECTRIC RADIANT PANEL	HD	HEAD
ESP	EXTERNAL STATIC PRESSURE	HD	HOOD
ET	EXPANSION TANK	HWA	HAND-OFF/AUTOMATIC
ETO	ETHYLENE OXIDE	HP	HEAT PUMP
EUH	ELECTRIC UNIT HEATER	HP	HORSEPOWER
EVA	EVAPORATED WATER COOLER	HPS	HIGH PRESSURE DRIP TRAP
EWT	ENTERING WATER TEMPERATURE	HPR	HIGH PRESSURE RETURN
EX	EXISTING	HP	(STEAM CONDENSATE)
F	FAHRENHEIT	HPS	HIGH PRESSURE SUPPLY
F&T	FLOAT AND THERMOSTATIC	HR	HEAT RECOVERY COIL
F/SDPR	COMBURNER FAN FIRE SMOKE DAMPER	HRD	HEAT RECOVERY DEVICE
FA	FREE AREA	HRP	HYDRONIC RADIANT (CEILING) PANEL
FC	FLEXIBLE CONNECTION	HRW	HEAT RECOVERY WHEEL
FCU	FAN COIL (IN PIPE)	HUM	HUMIDISTAT
FCU	FAN COIL UNIT CONNECTION ONLY	HTM	HUMIDIFIER TERMINAL
FCU	FAN COIL UNIT HEATING ONLY	HUM	HUMIDIFIER UNIT MOUNTED
FD	FORWARD CURVED WHEEL (FAN)	HT	HEATING AND VENTILATING UNIT
FD	FLOOR DRAIN	HW	HOT WATER
FD	FIRE DAMPER	HCW	HOT WATER COIL
FD	FINAL FLOOR	HWHC	HOT WATER HEATING COIL
FDH	FLUE GAS/FEEDWATER HEAT EXCHANGER	HWP	HEATING HOT WATER PUMP
F	FLOW METER	HWR	HEATING HOT WATER RETURN
F	FUEL OIL PUMP	HWS	HEATING HOT WATER SUPPLY
F	FUEL OIL TANK	HWHT	HOT WATER UNIT HEATER
FOT	FUEL OIL TANK HEAT EXCHANGER	HVD	HOISTWAY VENT DAMPER
FT	FEET PER MINUTE	HX	HEAT EXCHANGER
FT	FEET PER SECOND	HZ	HERTZ
FPTU	FAN FAN FAN TERMINAL UNIT		
FR	FLOOR REGISTER		
FRP	FIBER REINFORCED POLYESTER		
FR	FLOW SWITCH		
FSTAT	FREEZE/STAT		

ABBREVIATIONS	
I/O	INPUT/OUTPUT
IAQ	INDOOR AIR QUALITY
IBT	INVERTED BUCKET TRAP
ICU	IN-LINE CENTRIFUGAL FAN
ICU	INTENSIVE CARE UNIT
ID	INSIDE DIAMETER
IFB	INTEGRAL FACE AND BYPASS
IN	INCHES
IN HG	INCHES OF MERCURY
IN WC	INCH WATER COLUMN
IN WC	INCH WATER GAUGE
IN-LB	INCH-POUND
IPVL	INTEGRATED PART LOAD VALVE
IR	INFRARED HEATER
IS	INSERT SCREEN
IU	INDUCTION UNIT
IV	INLET VANES
J	INTENTIONALLY LEFT BLANK
kg	KILOGRAM
kg/HR	KILOGRAM PER HOUR
KPa	KILOPASCAL
KWt	KILOWATT
KWH	KILOWATT HOUR
L	LITER
L/h	LITERS PER HOUR (OR LITERS/HOUR)
L/m	LITERS PER MINUTE (OR LITERS/MINUTE)
LPM	LITERS PER SECOND (OR LITERS/SECOND)
LAT	LEAVING AIR TEMPERATURE
LBS/HR	POUNDS PER HOUR
LF	LINEAR FOOT (FEET)
LEAT	LEAVING GYCOL TEMPERATURE
LH	LATENT HEAT
LPG	LIQUID PROPANE GAS
LPR	LOW PRESSURE RETURN
LPRC	LOW PRESSURE STEAM (STEAM CONDENS.)
LPC	LOW PRESSURE STEAM (TRAP CLEAN)
LLHX	LIQUID TO LIQUID HEAT EXCHANGER
LLH	LOW PRESSURE STEAM
LPH	LOW PRESSURE STEAM (CLEAN)
LS	LINEAR SLOT DIFFUSER
LTPC	LOCAL TEMPERATURE CONTROL PANEL
LW	LEAVING
LVR	LOUVER
LWT	LEAVING WATER TEMPERATURE

P PUMP
 PA PASCAL
 PC PUMPED CONDENSATE
 PCF POUNDS PER CUBIC FOOT (FEET)
 PD PRESSURE DROP
 PEF PROPELLER (TYPE) EXHAUST FAN
 PF PER-FILTER
 PG PRESSURE GAGE
 PGW PROPYLENE GLYCOL-WATER (SOLUTION)
 PH PREHEAT COIL
 PHM PARTS PER MILLION
 PRS PRESSURE REGULATING (VALVE) STATION
 PRV PRESSURE REGULATING VALVE
 PSI POUNDS PER SQUARE INCH
 PSQ POUNDS PER SQUARE INCH - ABSOLUTE
 PSIG POUNDS PER SQUARE INCH - GAGE
 PSS PRIMARY SECONDARY SYSTEM
 PSV SAFETY SAFETY VALVE
 PTAC PACKAGED TERMINAL AIR CONDITIONER

 R/E RETURN OR EXHAUST
 RA RETURN AIR
 RAD REFRIGERANT AIR DRYER
 RAF RADIO FREQUENCY
 RAHX ROTARY AIR HEAT EXCHANGER
 RAT RETURN AIR TEMPERATURE
 RCH REMOTE CONDENSER CHILLER
 RCU RECIPROCATING CHILLER UNIT
 RD REFRIGERANT DISCHARGE
 RDS ROOM DATA SHEETS
 REA RELIEF AIR
 RF RETURN FAN
 RG RETURN GRILLE
 RH RELATIVE HUMIDITY
 RHC REHEAT COIL
 RHG REFRIGERANT HOT GAS
 RL REFRIGERANT LIQUID LINE
 RLA RUN LOAD AMPERE
 RO REVERSE OSMOSIS
 RPM REVOLUTIONS PER MINUTE
 RR RETURN REGISTER
 RS REFRIGERANT SUCTION
 RTU ROOM THERMIST
 RV RELIEF VALVE

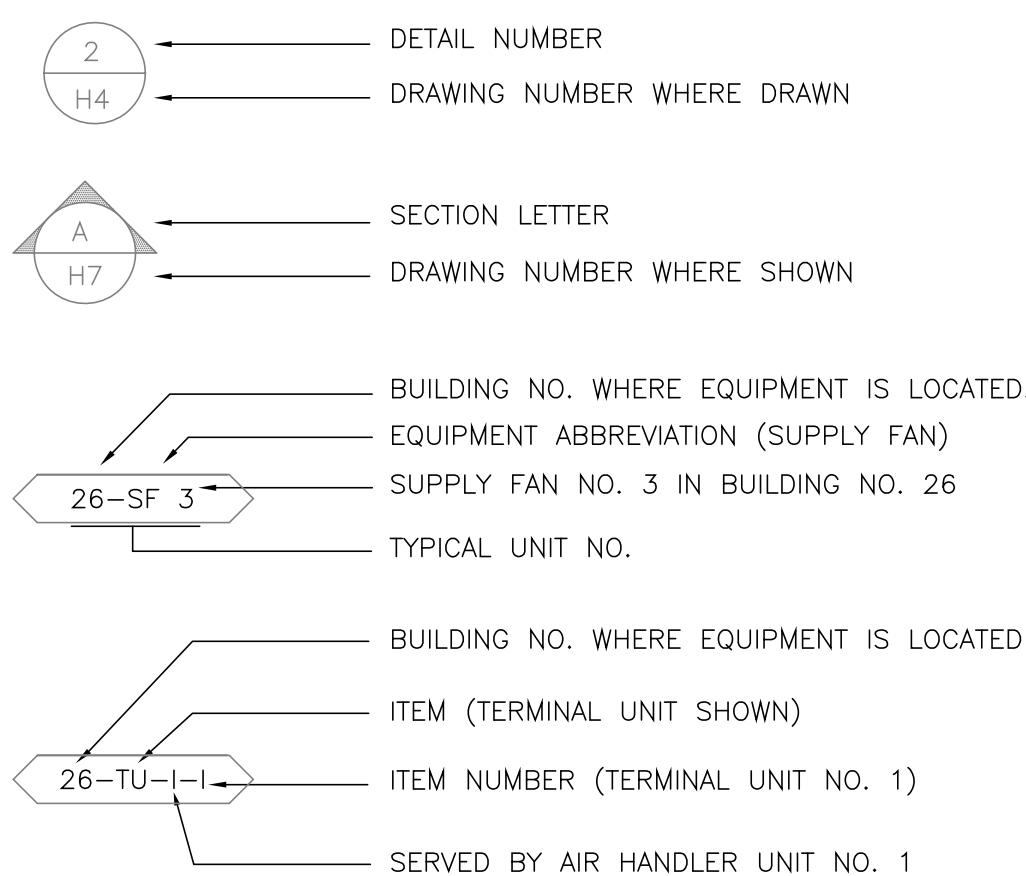
ONS

M METER, SI UNIT
M/S METERS PER SECOND
(OR METERS/SECOND)
MA MIXED AIR
MAT MECHANICAL EQUIPMENT ROOM
MAU MAKE-UP AIR TEMPERATURE
MAU MAKE-UP AIR UNIT
MAX MANUAL AIR VENT
MAX MAXIMUM
MB MIXING BOX
MBH 1000 BTUH
MCA MINIMUM BRANCH CIRCUIT AMPACITY
MER MECHANICAL EQUIPMENT ROOM
MERY MINIMUM EFFICIENCY RATING
VALUE
MH MANHOLE
MHP MOTOR HORSEPOWER
MIN MINIMUM
ML MILLIMETER
MCM MOTOR OPERATED VALVE
MPR MEDIUM PRESSURE RETURN
(STEAM CONDENSATE)
MPS MEDIUM PRESSURE STEAM
MRS MAGNETIC RESONANCE IMAGING
MVD MEAN TEMPERATURE DIFFERENCE
MVO MANUAL VOLUME DAMPER
MZ MULTI-ZONE

NA NOT APPLICABLE
NC NOISE CRITERIA
NC NORMALLY CLOSED
NG NATURAL GAS
NGFM NATURAL GAS FLOWMETER
NG NORMALLY OPEN
NOAA NATIONAL OCEANIC & ATMOSPHERIC
ADMINISTRATION
NOM NOMINAL
NPM NON-STANDARD PART LOAD VALUE
NPSH NET POSITIVE SUCTION HEAD
OAS OUTSIDE AIR
OAG OUTSIDE AIR GRILLE
OAI OUTSIDE AIR INTAKE
OD OUTSIDE DIAMETER
OFM OIL FLOWMETER
OR OPERATING ROOM

SA	SUPPLY AIR
SAD	SOUND ATTENUATING DEVICE
SAT	SUPPLY AIR TEMPERATURE
SC	SHOCK COEFFICIENT
SCFM	STANDARD CUBIC FEET PER MINUTE
SCIN	SIGNAL CODE INJURY
SD	SMOKE CONTROL RECTIFIER
SD	SMOKE DETECTOR
SD	SUPPLY AIR DIFFUSER
SD-1	SCHEMATIC DESIGN (SUBMISSION)
SD-2	SCHEMATIC DESIGN (SUBMISSIONS)
SDD	SMOKE DAMPER
SDD	SMOKE DAMPER (RETURN)
SDR	SMOKE DAMPER (SUPPLY)
SEN	SENSIBLE HEAT
SG	SUPPLY FAN
SG	SUPPLY AIR GRILLE
SH	STEAM HUMIDIFIER
SHC	STEAM HEATING COIL
SH	SQUARE INCHES
SP	STATIC PRESSURE
SP GR	SPECIFIC GRAVITY
SPD	SUPPLY PROCESS AND DISTRIBUTION
SPD	STEAM PRESSURE REDUCING VALVE
SPPS	STATIC PRESSURE SENSOR
SO FT	SQUARE FOOT (FEET)
SR	SUPPLY AIR REGISTER
SS	STAINLESS STEEL
SSHX	STEAM TO STEAM HEAT EXCHANGER
SU	SEAL SEPARATOR
ST	STEAM TRAP
SUR	STEAM UNIT HEATER
SV	STEAM PRESSURE REDUCING VALVE
SWH	TOTAL DISSOLVED SOLIDS
SWHX	STEAM TO WATER HEAT EXCHANGER
T & PCV	TEMPERATURE AND PRESSURE CONTROL VALVE
TAB	TEMPERATURE ADJUSTING, BALANCE
TD	TEMPERATURE DIFFERENCE
TG	TOTAL DYNAMIC HEAD
TDR	TOTAL DISSOLVED SOLIDS
TDH	TRANSFER GRILLE
TR	TRAP
TR	TOP REGISTER
TSP	TOTAL STATIC PRESSURE
TSAT	THERMOSTAT
TU	TERMINAL UNIT
WU	THRU--WALL UNIT


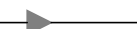

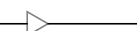




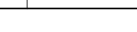
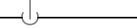


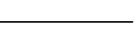
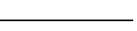






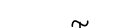


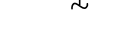
DRAWING SYMBOLS



PIPING SYMBOLS

HPS	HIGH PRESSURE STEAM (60 PSIG AND ABOVE)
HPR	HIGH PRESSURE STEAM CONDENSATE RETURN
MPS	MEDIUM PRESSURE STEAM (16 PSIG THRU 59 PSIG)
MPR	MEDIUM PRESSURE STEAM CONDENSATE RETURN
LPS	LOW PRESSURE STEAM (15 PSIG AND BELOW)
LPR	LOW PRESSURE STEAM CONDENSATE RETURN
PC	CONDENSATE PUMP DISCHARGE
HWS	HOT WATER HEATING SUPPLY
HWR	HOT WATER HEATING RETURN
GHS	GLYCOL-WATER HEATING SUPPLY
GHR	GLYCOL-WATER HEATING RETURN
SWS	SOLAR WATER SUPPLY
SWR	SOLAR WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RHG	REFRIGERANT HOT GAS
CWS	CONDENSER WATER SUPPLY (FROM TOWER)
CWR	CONDENSER WATER RETURN (TO TOWER)
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
GCS	CHILLED GLYCOL-WATER SUPPLY
CCR	CHILLED GLYCOL-WATER RETURN
MW	MAKE-UP WATER
D	DRAIN LINE
V	VENT LINE
GRS	GLYCOL-WATER RUN AROUND SUPPLY
GRR	GLYCOL-WATER RUN AROUND RETURN
X	EXISTING PIPE TO BE REMOVED

GENERAL PIPING SYMBOLS


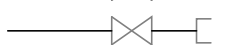
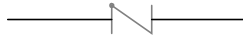
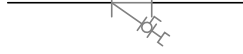
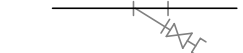
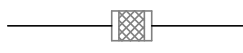





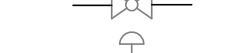
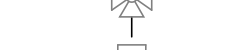




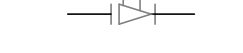








	DIRECTION OF PIPE PITCH (DOWN)
	DIRECTION OF FLOW
	ANCHOR
	REDUCER OR INCREASER
	ECCENTRIC REDUCER
	TOP CONNECTION, 45° OR 90°
	BOTTOM CONNECTION, 45° OR 90°
	SIDE CONNECTION
	CAPPED OUTLET
	RISE OR DROP IN PIPE
	UNION
	PIPE UP
	PIPE DOWN
	INVERTED BUCKET TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	FLOAT & THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	THERMOSTATIC TRAP SET INCLUDING PIPING ACCESSORIES SEE DETAIL
	THERMOMETER
	PRESSURE GAGE
	FLOW ELEMENT
	REFRIGERANT SIGHT GLASS
	TEST PLUG (PRESSURE/TEMPERATURE)
	AUTOMATIC AIR VENT
	MANUAL AIR VENT
	QUICK-COUPLE HOSE CONNECTOR

PIPING SYMBOLS

FWD	FEEDWATER PUMP DISCHARGE
FWS	FEEDWATER PUMP SUCTION
CTD	CONDENSATE TRANSFER PUMP DISCHARGE
CTPS	CONDENSATE TRANSFER PUMP SUCTION
VR	VACUUM CONDENSATE RETURN
TC	TUBE CLEANER WATER SUPPLY
BO	BOILER BLOWOFF
CBD	CONTINUOUS BLOWDOWN
BWS	BOILER WATER SAMPLE
FWS	FEEDWATER SAMPLE (FROM DEAERATOR)
CF	CHEMICAL FEED
OFL	OVERFLOW
A	COMPRESSED AIR
G	NATURAL GAS MAIN FUEL
GO	NATURAL GAS IGNITER FUEL
LPQO	LIQUEFIED PETROLEUM GAS IGNITER FUEL
FOS	FUEL OIL SUPPLY
FOR	FUEL OIL RETURN
CW	COLD WATER (CITY WATER)
SW	SOFTENED WATER
HW	HOT WATER
RH	ROLLER-TYPE HANGER
SH	VARIABLE SPRING-TYPE HANGER (TYPE 51)*
SCH	SPRING CUSHION-TYPE HANGER (TYPE 4B OR 49)*
■	CLEVIS-TYPE HANGER
TH	TRAPEZE HANGER (PROVIDE U-BOLT PIPE ATTACHMENT TO TRAPEZE EXCEPT WHERE RH ARE INDICATED)
PS	FLOOR-SUPPORTED PIPE STAND
RC	RISER CLAMP (TYPE 42)*
■	WALL BRACKET (TYPE 31, 32, 33)*
CSH	CONSTANT SUPPORT HANGER (TYPE 54, 55, 56)*
SS	SLIDING SUPPORTS (TYPE 35)*

* TYPE NUMBERS REFER TO MANUFACTURER'S STANDARDIZATION SOCIETY STANDARD PRACTICE SP-58

VALVE SYMBOLS

	GATE VALVE – THREADED/FLANGED
	GLOBE VALVE – THREADED/FLANGED
	GATE VALVE WITH 3/4" HOSE ADAPTER
	CHECK VALVE
	WYE STRAINER (WITH BALL VALVE & HOSE CONNECTION)
	WYE STRAINER WITH VALVED DRAIN AND QUICK-COUPLE HOSE CONNECTOR
	FLEXIBLE CONNECTION
	ANGLE GLOBE VALVE
	BUTTERFLY VALVE
	BALL VALVE
	MODULATING CONTROL VALVE
	MODULATING CONTROL BUTTERFLY VALVE
	TWO POSITION CONTROL VALVE
	THREE-WAY MODULATING CONTROL VALVE
	THREE-WAY TWO POSITION CONTROL VALVE
	PRESSURE REGULATING VALVE
	PRESSURE SAFETY VALVE
	AUTOMATIC BALANCING CONTROL VALVE
	WATER BALANCE DEVICE
	CIRCUIT SETTER VALVE
	GATE VALVE WITH GLOBE-VALVED BYPASS
	PLUG VALVE
	CONTROL VALVE (CV) – FLOAT-OPERATED
	PRESSURE REDUCING VALVE (PRV)
	WATER LEVEL CONTROLLER
	FLOW METER

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Revisions:	Date

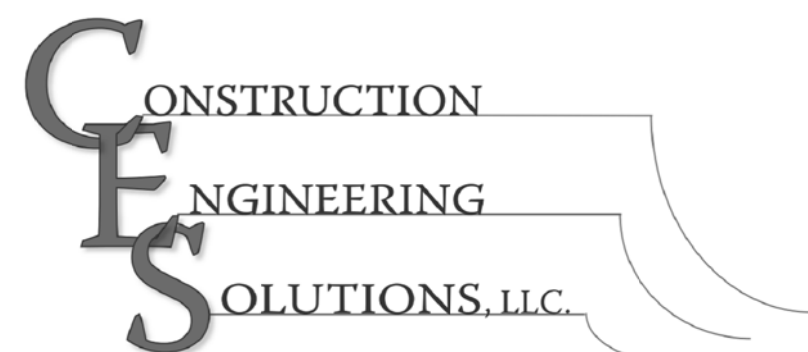
CONSULTANTS:

ACM ENGINEERING

ELECTRICAL/MECHANICAL DESIGN, CONSULTING ENGINEERS
3880 S. 8.4 RD., GLADE PARK CO 81523
PH: (970) 245-7292 CELL: (970) 261-7471
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ARCHITECT/ENGINEERS:



715 Roundup Drive
Grand Junction, Colorado 81507
970.549.4504

Drawing Title
MECHANICAL COVER SHEET

Approved: Project Director
BILL FRAZIER, P.E.
PHONE: 970-242-0731

Project Title	Replace Chilled Water Lines and Sanitary Pipelines
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Location	2121 North Avenue Grand Junction, CO 81501
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Checked

Drawn

Project Number
#575-14-107

Building Number

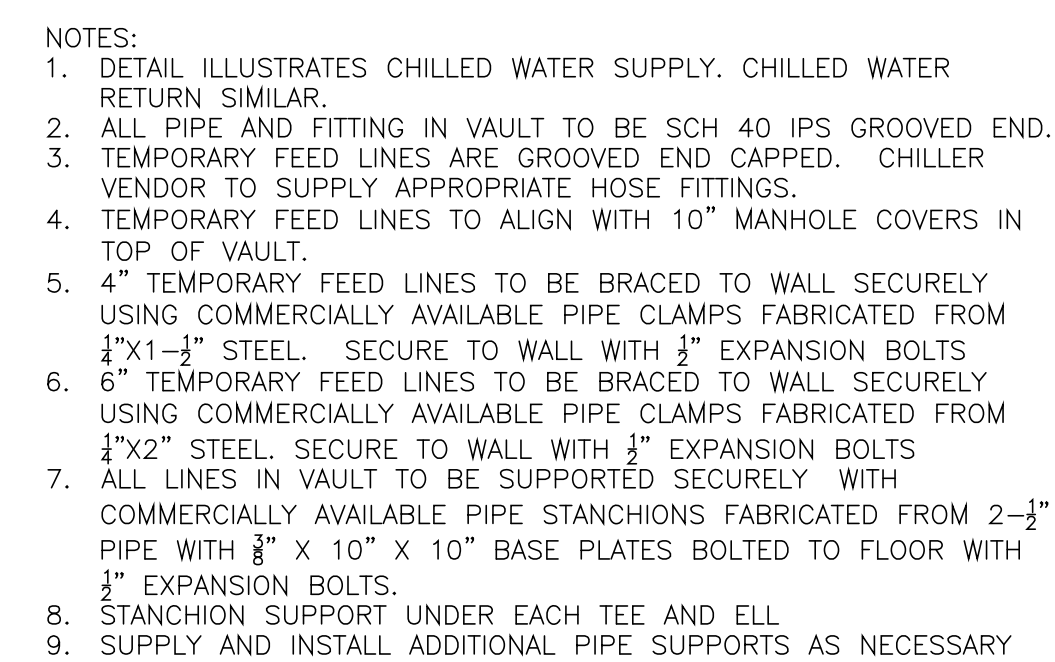
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Office of
Construction
and Facilities
Management



Scale: AS SHOWN



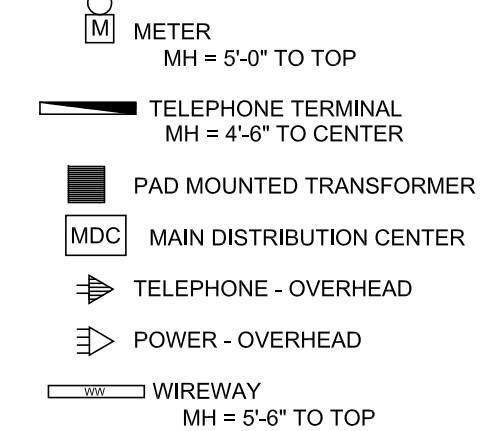
P+ID OF BUILDINGS 1 AND 20, VAULT 2

NTS

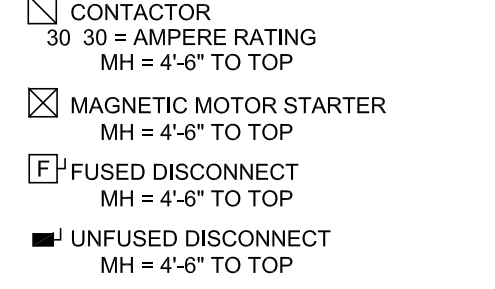
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ELECTRICAL LEGEND

SERVICE ENTRANCE



EQUIPMENT



OUTLETS



GENERAL NOTES

SEE THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.

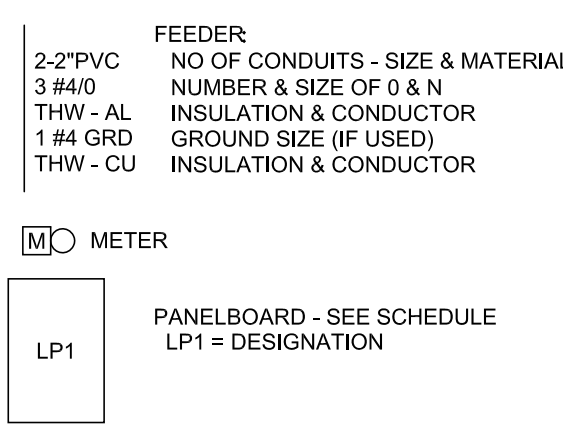
SEE THE ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF CEILING MOUNTED DEVICES.

ALL OUTLETS ARE TO BE INSTALLED FLUSH UNLESS OTHERWISE INDICATED.

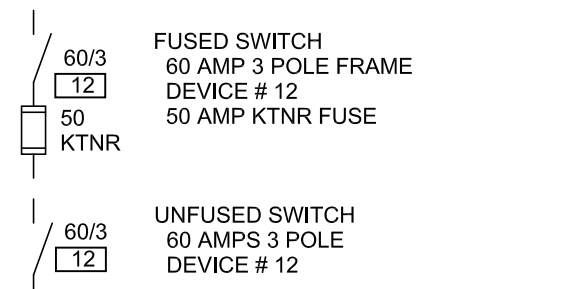
MOUNTING HEIGHTS SHOWN ON THE PLANS TAKE PRECEDENCE OVER THIS LEGEND.

CHECK ALL DOOR SWINGS AND CABINETRY ELEVATIONS BEFORE INSTALLING SWITCH AND OUTLET BOXES.

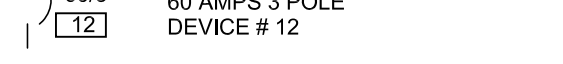
ONE LINE DIAGRAM



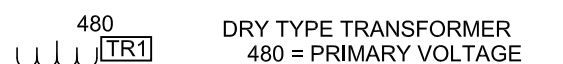
CONDUIT



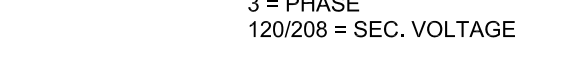
GENERAL SYMBOLS



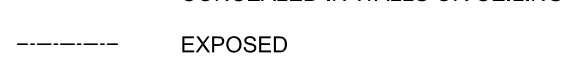
FIRE ALARM SYSTEM



DUCT SMOKE DETECTOR

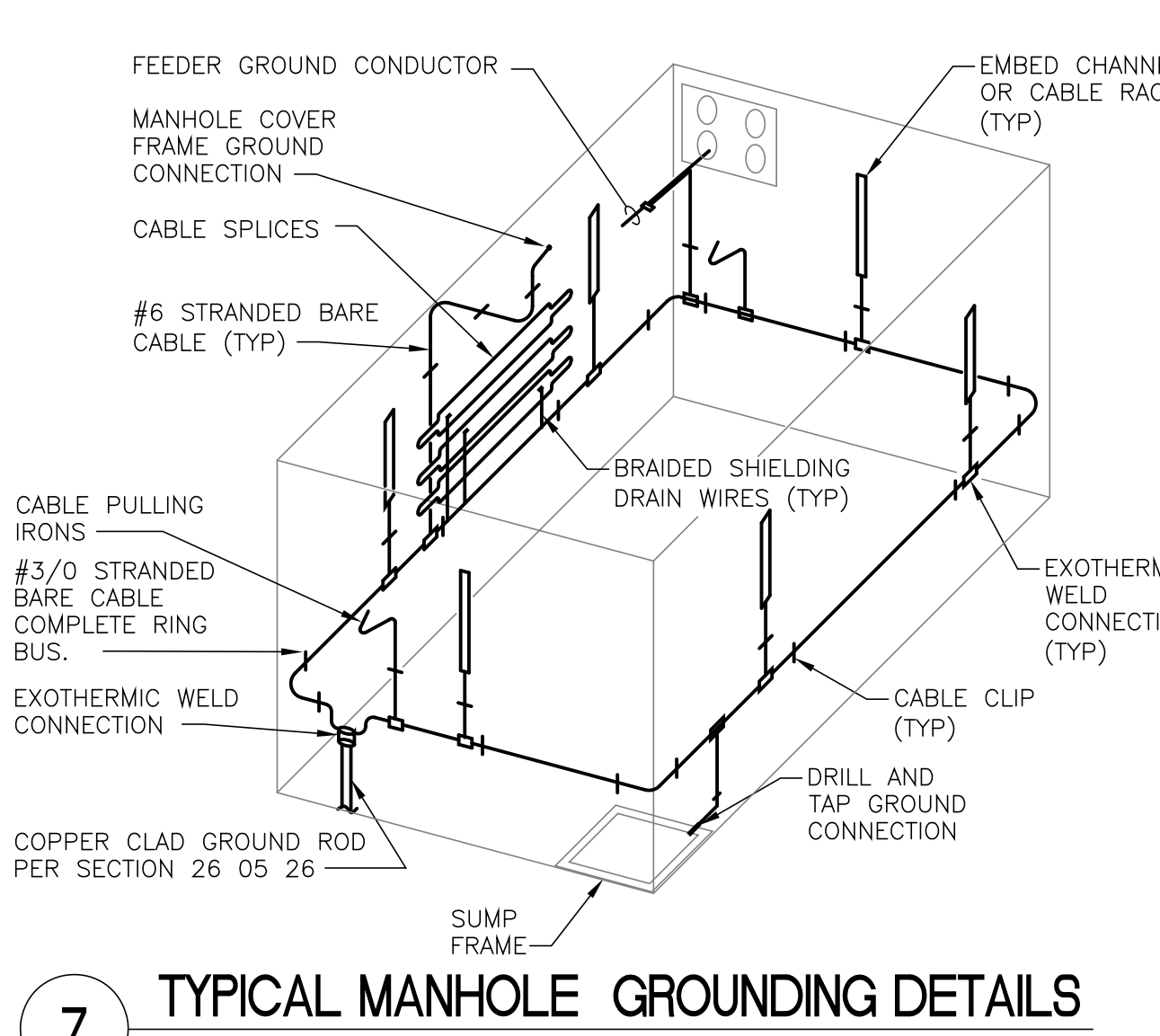


FIRE ALARM DIGITAL DIALER

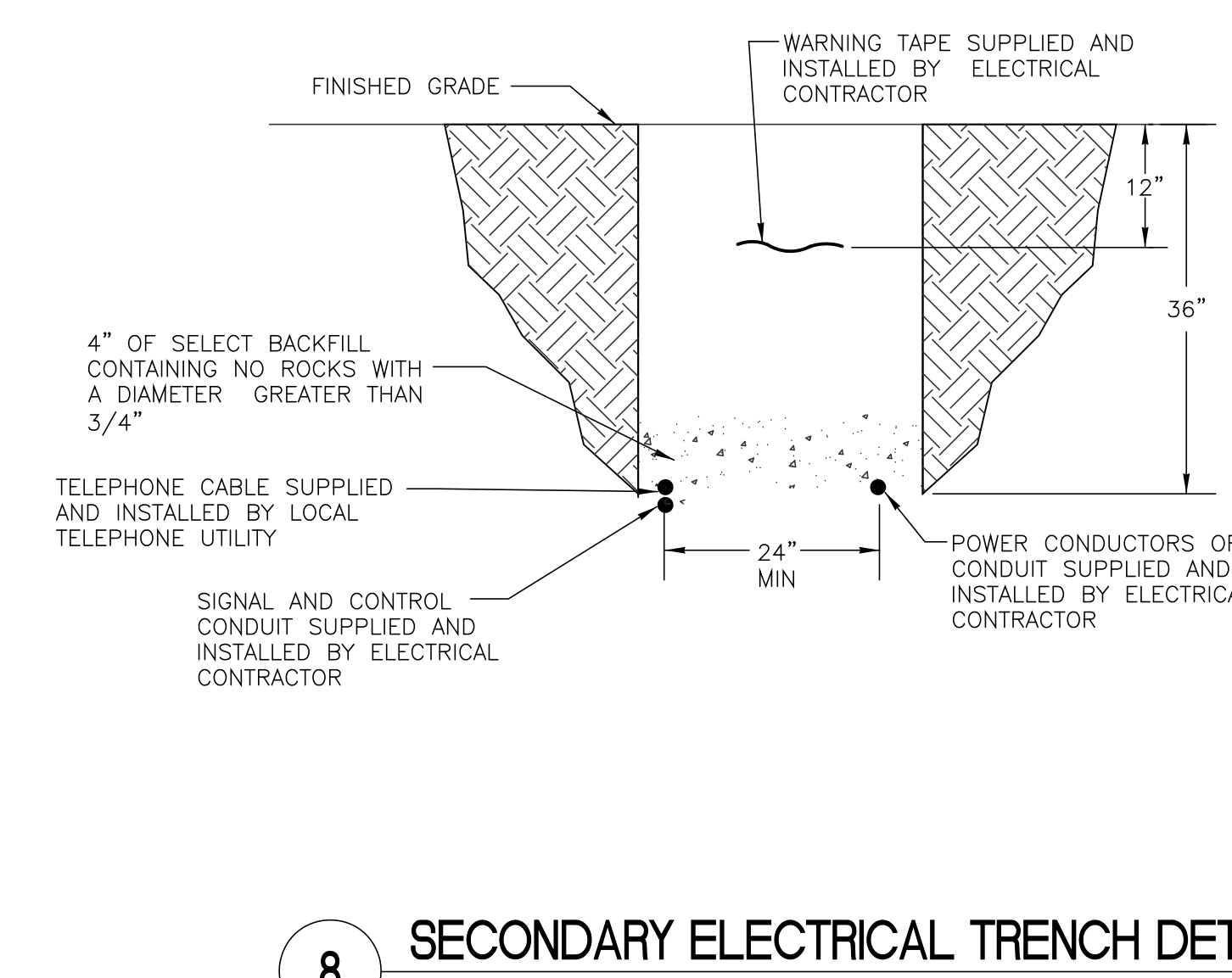


NOTE: ALL ABBREVIATIONS SHOWN ARE NOT NECESSARILY USED.

- AC - ABOVE COUNTER
- AF - ABOVE FINISHED FLOOR
- AFG - ABOVE FINISHED GRADE
- AIC - AMPS INTERRUPTING CURRENT
- BFG - BELOW FINISHED GRADE
- CB - CIRCUIT BREAKER
- CT - CURRENT TRANSFORMER
- CU - COPPER
- ELR - END OF LINE RESISTOR
- EM - EMERGENCY
- EWC - ELECTRIC WATER COOLER
- FLA - FULL LOAD AMPS
- FWE - FURNISHED WITH EQUIPMENT
- GFI - GROUND FAULT INTERRUPTER
- GRC - GALVANIZED RIGID CONDUIT
- HOA - HAND-OFF-AUTOMATIC
- HP - HORSEPOWER
- MCA - MINIMUM CIRCUIT AMPS
- MCB - MAIN CIRCUIT BREAKER
- MCP - MOTOR CIRCUIT PROTECTION
- MLO - MAIN LUGS ONLY
- NIC - NOT IN CONTRACT
- NL - NIGHT LIGHT FUNCTION
- NTS - NOT TO SCALE
- OC - OVER CURRENT
- SC - SHORT CIRCUIT
- TTB - TELEPHONE TERMINAL BOARD
- U.N.O. - UNLESS NOTED OTHERWISE
- UG - UNDERGROUND
- VFD - VARIABLE FREQUENCY DRIVE
- WG - WIREGUARD
- WP - WEATHERPROOF
- ITD CB - INVERSE TIME DELAY CIRCUIT BREAKER
- TD - TIME DELAY



7 TYPICAL MANHOLE GROUNDING DETAILS



8 SECONDARY ELECTRICAL TRENCH DETAIL

GENERAL NOTES (FOR ALL ELECTRICAL SHEETS)

1. INFORMATION ON THE DRAWINGS HAS BEEN ASCERTAINED FROM EXISTING DRAWINGS AND FIELD OBSERVATIONS. THIS INFORMATION IS AS ACCURATE AS CONDITIONS WOULD ALLOW. PRIOR TO SUBMITTING BIDS, THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE TO VERIFY EXISTING ELECTRICAL EQUIPMENT AND OBSERVE ANY CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. FIELD VERIFY QUANTITIES OF EXISTING LIGHT FIXTURES, ELECTRICAL DEVICES, COMMUNICATION DEVICES, FIRE ALARM DEVICES AND ELECTRICAL EQUIPMENT. NOTIFY THE ARCHITECT/ENGINEER OF ANY EXISTING CONDITIONS WHICH MODIFY THE SCOPE OF WORK AS SHOWN ON THE CONSTRUCTION DOCUMENTS. SUBMISSION OF A BID PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS FOR MOBILIZATION, LABOR, EQUIPMENT, AND/OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WILL NOT BE RECOGNIZED.
2. ELECTRICAL CONTRACTOR SHALL FULLY COORDINATE WITH OWNER REPRESENTATIVES. ALL ELECTRICAL WORK PERFORMED UNDER THIS CONTRACT SHALL CONFORM WITH LATEST EDITIONS OF THE NATIONAL ELECTRICAL CODE, UNIFORM BUILDING CODE OR INTERNATIONAL BUILDING CODE, LOCAL BUILDING AND FIRE DEPARTMENT REQUIREMENTS. PERFORM WORK IN ACCORDANCE WITH REQUIREMENTS OF OWNER REPRESENTATIVE.
3. ELECTRICAL CONTRACTOR SHALL MAINTAIN ON THE JOB AN UP TO DATE SET OF WORKING DRAWINGS, MARKED UP TO SHOW ELECTRICAL SYSTEMS AS INSTALLED. PROVIDE TENANT REPRESENTATIVES WITH ONE SET OF REPRODUCIBLE WITH "AS BUILT" PROJECT RECORD INFORMATION CLEARLY INDICATED. ELECTRICAL CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LOCAL FEES, PERMITS, AND SERVICES OF INSPECTION AUTHORITIES REQUIRED BY ELECTRICAL WORK FOR THIS ELECTRICAL CONSTRUCTION.
4. ELECTRICAL CONTRACTOR SHALL RE-USE EXISTING BRANCH CIRCUIT CONDUIT AND WIRING WHERE POSSIBLE. RE-ROUTE AND EXTEND AS NECESSARY. PROVIDE ADDITIONAL NEW CONDUIT, WIRING, COMPONENTS AND CONNECTIONS AS REQUIRED FOR COMPLETE AND OPERATIONAL SYSTEMS. TYPICAL.
5. THESE DRAWINGS ARE DIAGRAMMATIC. DO NOT SCALE DRAWINGS, REFER TO ARCHITECTURAL DRAWINGS FOR EXACT DIMENSIONS.
6. COORDINATE EXACT EQUIPMENT LOCATIONS WITH OWNER/ARCHITECT PRIOR TO ROUGH-IN. COORDINATE THE WIRING DEVICE LOCATIONS WITH THE ARCHITECTURAL ELEVATIONS, CASEWORK SHOP DRAWINGS, AND EQUIPMENT INSTALLATION DRAWINGS. COORDINATE THE LOCATION OF THE MECHANICAL EQUIPMENT WITH THE MECHANICAL PLANS AND THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. COORDINATE THE LOCATION OF THE LUMINAIRES WITH THE ARCHITECTURAL CEILING PLAN.
7. ANY ITEMS DAMAGED BY THE CONTRACTOR SHALL BE REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST TO THE OWNER.
8. FIELD VERIFY EXACT LOCATION OF MECHANICAL EQUIPMENT WITH MECHANICAL PLANS AND MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. FIELD VERIFY ALL LOCATIONS WITH OWNER/ARCHITECT PRIOR TO ROUGH-IN.
9. REFERENCE ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS. ALL WORK TO BE COORDINATED WITH OTHER TRADES AS REQUIRED.
10. BRANCH CIRCUITS AND FEEDERS SHALL HAVE AN EQUIPMENT GROUNDING CONDUCTOR AND ALL CONDUCTORS SHALL BE #12 AWG UNLESS NOTED OTHERWISE. BRANCH CIRCUITS SHOWN AS A SINGLE HOME RUN CAN BE COMBINED AS LONG AS DE-RATING AND SIZING IS OBSERVED PER THE NEC. ELECTRICAL CONTRACTOR SHALL USE #10 AWG CU WIRE WHEN LENGTH OF CONDUCTOR EXCEEDS 75 FEET FOR 120 VOLT, 20 AMP CIRCUITS. SIZE CONDUCTORS FOR MINIMUM VOLTAGE DROP ALLOWED PER THE NATIONAL ELECTRICAL CODE.
11. ALL JUNCTION BOX COVERS SHALL BE INDELIBLY LABELED WITH PANEL DESIGNATION AND BRANCH CIRCUIT NUMBER OF EACH WIRE WITHIN THE JUNCTION BOX. ALL HOME RUNS SHALL BE IN EMT CONDUIT, TYPICAL.
12. ELECTRICAL CONTRACTOR SHALL INCREASE SIZE OF SHARED NEUTRAL CONDUCTOR WITHIN FURNITURE SYSTEMS TO #10 AWG CU CONDUCTOR. ELECTRICAL CONTRACTOR TO CONSIDER THE NEUTRAL CONDUCTOR AS A CURRENT CARRYING CONDUCTOR WHEN FEEDING ELECTRONIC LOADS.
13. VERIFY ALL SPECIFIC COMPUTER AND COMMUNICATIONS EQUIPMENT REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. COORDINATION SHALL INCLUDE MOUNTING HEIGHTS, CONNECTION TYPE AND POWER REQUIREMENTS. ALL CONNECTIONS FOR COMPUTER AND COMMUNICATIONS EQUIPMENT SHALL BE IN ACCORDANCE WITH EQUIPMENT MANUFACTURERS AND SUPPLIERS RECOMMENDATIONS.
14. THE CONTRACTOR IS TO MAINTAIN FIRE RATINGS FOR ALL CONDUIT PENETRATIONS THROUGH FIRE RATED CONSTRUCTION.
15. COORDINATE THE INSTALLATION OF COMMUNICATIONS CABLING, ROUTING, MOUNTING BOXES, AND TERMINATIONS WITH THE OWNER OR IT MANAGER, PRIOR TO ROUGH-IN.
16. MAINTAIN CIRCUIT CONTINUITY FOR EXISTING ITEMS THAT ARE REMAINING OR BEING RELOCATED.
17. ELECTRICAL CONTRACTOR SHALL VERIFY BRANCH CIRCUIT WIRING LENGTHS AND PROVIDE CONDUCTOR SIZED TO PREVENT VOLTAGE DROP EXCEEDING 3% AT THE FARTHEST OUTLET, AND ENSURE THE MAXIMUM VOLTAGE DROP ON BOTH FEEDERS AND BRANCH CIRCUITS TO THE FARTHEST POINT DOES NOT EXCEED 5%.
18. ELECTRIC UTILITY TO ADVISE OWNER AND/OR ENGINEER, PRIOR TO SERVICE MODIFICATION REQUIRING COST TO THE OWNER.
19. PROVIDE TYPED UPDATED PANEL SCHEDULES FOR ALL PANELS AT THE COMPLETION OF WORK. TRACE AND VERIFY ALL EXISTING CIRCUITS FEEDS AND VERIFY THAT PANEL SCHEDULES REFLECTS FINAL CONNECTIONS. CLEAN EXPOSED PANEL BOARD SURFACES AND CHECK TIGHTNESS OF ELECTRICAL CONNECTIONS. REPLACE DAMAGED CIRCUIT BREAKERS AS REQUIRED AND PROVIDE FILLER PLATES FOR VACANT SPACES.
20. ALL CIRCUIT BREAKER LUGS SHALL BE RATED FOR A MINIMUM OF 75 DEGREE CELSIUS.
21. MINIMUM WORKING CLEARANCES PER THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE SHALL BE PROVIDED AROUND AND IN FRONT OF ALL ELECTRICAL EQUIPMENT.
22. ELECTRICAL CONTRACTOR TO PROVIDE TEMPORARY POWER AND WIRING FOR THE PERFORMANCE OF ALL TRADES FOR THE ENTIRE PERIOD OF CONSTRUCTION AND SHALL REMOVE ALL TEMPORARY WIRING AT THE COMPLETION OF CONSTRUCTION.
23. COORDINATE MOUNTING HEIGHTS AND LOCATIONS OF ALL ELECTRICAL DEVICES LOCATED WITHIN, ABOVE, OR NEAR MILLWORK WITH ARCHITECTURAL DRAWINGS, APPROVED "SHOP DRAWINGS", AND MILLWORK CONTRACTOR. MAINTAIN CONSISTENT MOUNTING PRACTICES FOR A UNIFORM APPEARANCE. VERIFY ALL OUTLET REQUIREMENTS PRIOR TO ROUGH IN.
24. ALL NEW AND MODIFIED ELECTRICAL EQUIPMENT, SUCH AS SWITCH BOARDS, PANEL BOARDS, INDUSTRIAL CONTROL PANELS, METER SOCKET ENCLOSURES, AND MOTOR CONTROL CENTERS THAT ARE IN OTHER THAN DWELLING OCCUPANCIES, AND ARE LIKELY TO REQUIRE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE WHILE ENERGIZED SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING OR MAINTENANCE OF THE EQUIPMENT PER NEC ARTICLE 110.6.
25. IT IS IMPERATIVE THAT TEMPORARY CHILLER BE USED IN WINTER MONTHS FOR LOAD CONSIDERATIONS. USE OF TEMPORARY CHILLERS IN THE SUMMER IS NOT RECOMMENDED. THE 200 TON TEMPORARY CHILLERS WILL BE LOAD LIMITED TO 320 AMPS FOR THE NEW 400 AMP CONNECTIONS. COORDINATE ELECTRICAL REQUIREMENTS WITH PROVIDER PRIOR TO STARTING WORK.
26. LOAD ANALYSIS OF ENTIRE VA CAMPUS WAS NOT INCLUDED IN SCOPE OF WORK OF THIS PROJECT. THE PANELS AND BREAKERS SIZES THAT WERE SELECTED WERE EXISTING AND LABELED IN EARLIER PROJECTS AS SPARES AND WOULD HAVE BEEN INCLUDED IN EARLIER LOAD CALCULATIONS. FOR THE TEMPORARY CHILLERS, TWO 400 AMP 480 VOLT 3 PHASE SPARES WERE USED DUE TO THE AVAILABILITY IN EXISTING PANELS. EXISTING METER DATA, PROVIDED BY THE VA, WAS ANALYZED AND IT WAS DETERMINED THAT THERE WAS ADEQUATE CAPACITY FOR THE NEW LOADS ON THE NEW PANELS. THE VA HAS BEEN MADE AWARE THAT THERE WAS NOT A COMPREHENSIVE LOAD ANALYSIS COMPLETED OF THE CAMPUS AND THAT WE RECOMMEND AT A LATER DATE THAT ONE BE COMPLETED.

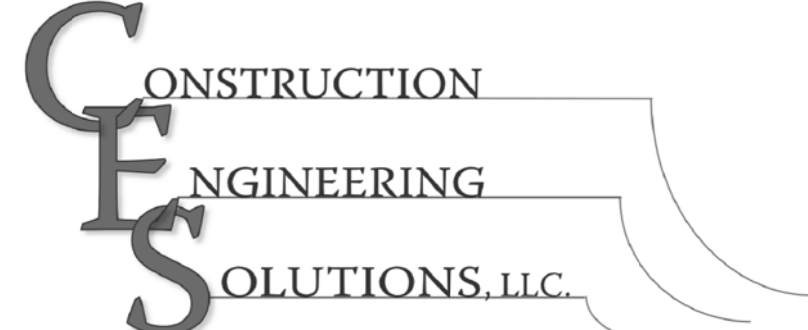
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Drawing Title
ELECTRICAL DETAILS, COVER SHEET

Approved Project Director
BILL FRAZIER, P.E.
PHONE: 970-242-0731

Project Title
Replace Chilled Water Lines
and Sanitary Pipelines

Location
2121 North Avenue
Grand Junction, CO 81501

Date
May 2014

Checked
AJM

Drawn
AJM

Project Number
575-14-107

Building Number
-

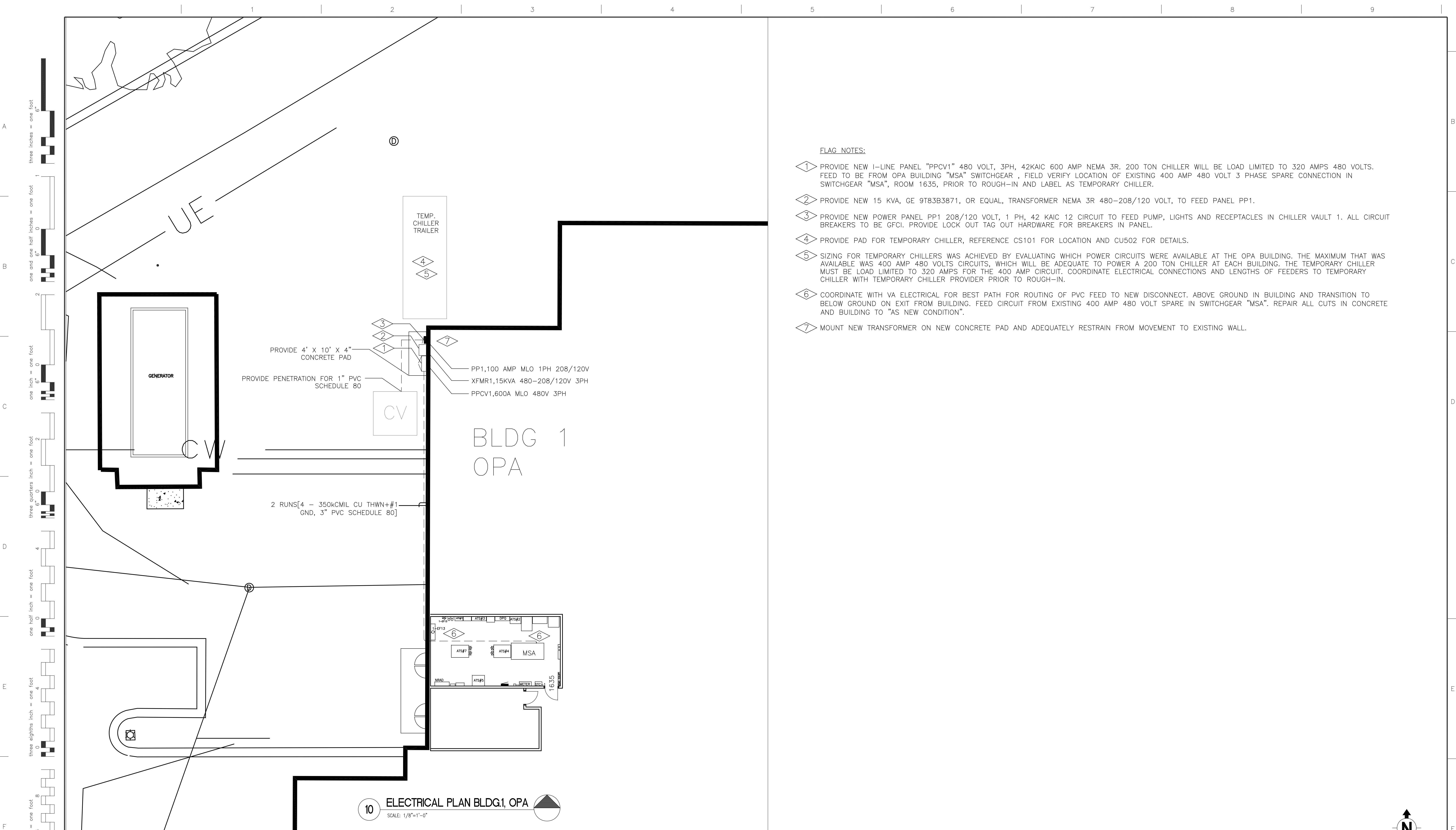
Drawing Number
ES101

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Office of
Construction
and Facilities
Management



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Revisions:

Date

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Drawing Title

TEMP. CHILLERS ELECTRICAL PLAN
BUILDING 1 OPA

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Bill Frazier, P.E.
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Project Title

Replace Chilled Water Lines
and
Sanitary Pipelines

Location 2121 North Avenue
Grand Junction, CO 81501

Date May 2014

Checked AJM

Drawn AJM

Project Number #575-14-107

Building Number -

Drawing Number ES102

Dwg 17 of 19

Office of Construction and Facilities Management

Department of Veterans Affairs

VA FORM 08-6231

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