



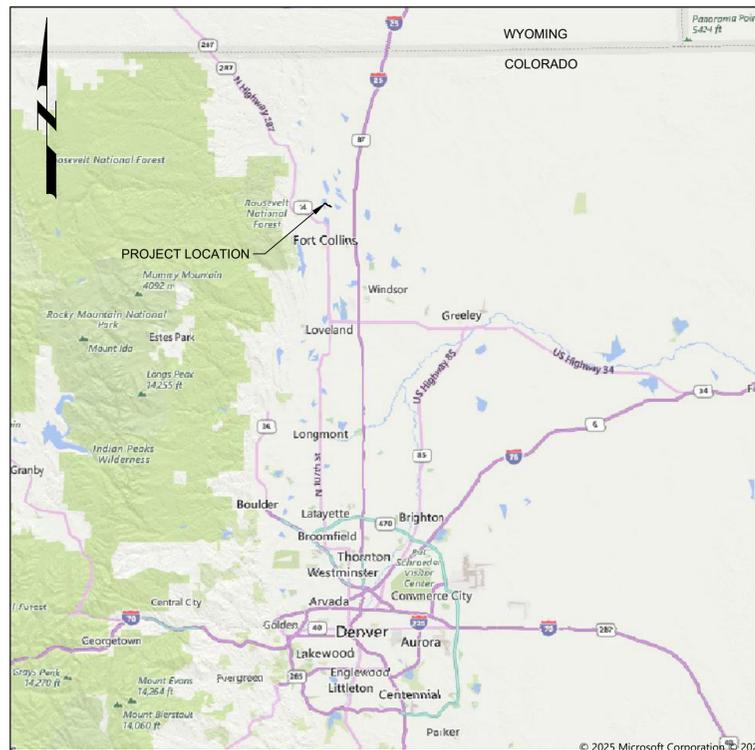
THORNTON WATER PROJECT

SOURCE WATER PUMP STATION

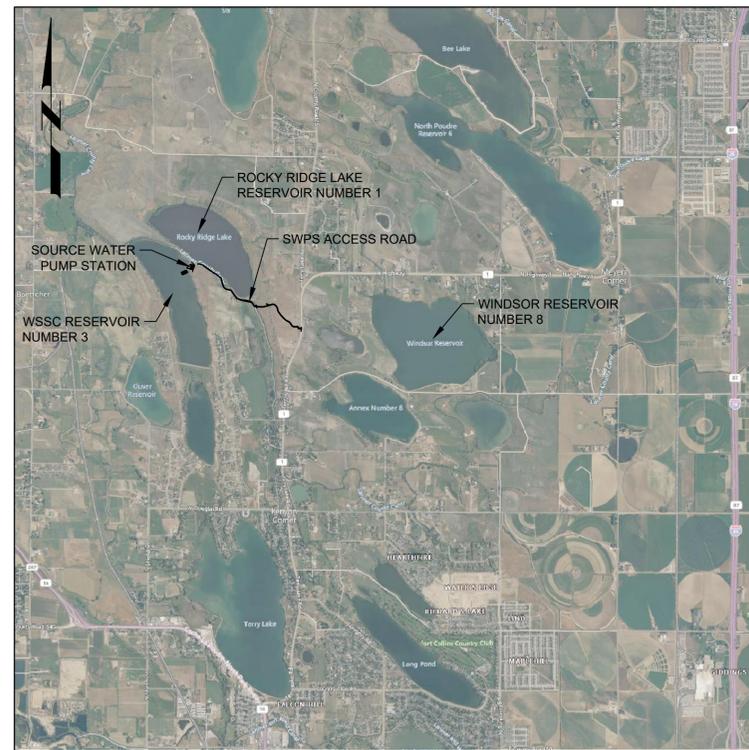
AGENCY REVIEW

OCTOBER 2025

PROJECT #12-777XP



VICINITY MAP



LOCATION MAP

JASON PIERCE, P.E. - PROJECT DIRECTOR _____ DATE _____

JOHN HIMYAK, P.E. - PROJECT ENGINEER _____ DATE _____

MICHAEL WELKER, P.E. - PROJECT MANAGER _____ DATE _____

TONY STOUT, P.E. - OWNER'S ADVISOR _____ DATE _____



JOB NO.	203505
DRAWING NO.	30G01
SHEET NO.	1 OF 160

LAST SAVED BY: AVALENZUELA

DETAIL REFERENCES

GENERAL SYMBOLS

STRUCTURAL HATCH PATTERNS

GENERAL NOTES

VIEW
DESCRIPTION
VIEW TITLE

PLAN
 SCALE: SCALE
 FILE: FILE
 PLAN NOT REFERENCED

SECTION CUT
 VIEW
 ##X##
 - = SHOWN ON SAME DRAWING
 ##X## = SEE INDICATED DRAWING

SECTION OR DETAIL
ELEVATION
 SCALE: SCALE
 FILE: FILE
 DRAWING CUT ORIGATION

DETAIL CALL-OUT (ENLARGED)
 VIEW
 ##X##
 SEE INDICATED DRAWING

DRAWING REFERENCE
 AREA DESIGNATOR (WHEN APPLICABLE)
 DISCIPLINE DESIGNATOR
 ##X##
 CONSECUTIVE SHEET NUMBER

TYPICAL DETAIL REFERENCE
 TYPICAL DETAIL #
 2
 TYP

EXTERIOR ELEVATION VIEWS
 A
 ##X##

PHOTO LOCATION
 #
 ARROW INDICATES POINT OF VIEW

GRID BUBBLE
 < >

TYPICAL DETAIL #
LINE 3
LINE 1
LINE 2
 ?
 TYP

MODIFICATION NOTE
 S = STANDARD
 J = JOB SPECIFIC
 R = REVISED
 N = NOTE TO TYPICAL DETAIL USER

SHT X OF X
 SHEETS IN DETAIL

XX/XX/20XX
 DATE CREATED (REVISED)

NORTH ARROW/PLANT NORTH

SCALE
 0 10' 20' 40'
 SCALE: 1" = 20'

BRACKET

BREAK LINE

PIPE BREAK PLAN VIEW

PIPE BREAK CROSS SECTION

PIPE CONTINUATION (SINGLE LINE)

KEY NOTE
 34

REVISION DELTA
 2

EXISTING ELEVATION
 EX TOW XXXX.X±

ELEVATION
 TOC XXXX.XX

EQUIPMENT/DEVICE KEY TAG
 1

EQUIPMENT/DEVICE TAG AND NUMBER
 XXX-XX-XXXX
 EQUIPMENT
 EX-EQUIP = EXISTING EQUIPMENT
 EF-EQUIP = FUTURE EQUIPMENT

PIPE TAG
 PIPE SIZE
 FLOW STREAM
 X" XXX
 SIZE FLOW STREAM
 EX-SIZE FLOW STREAM = EXISTING
 EF-SIZE FLOW STREAM = FUTURE

ALUMINUM

BRICK OR BLOCK

BRONZE, BRASS, OR COPPER

CAST IRON OR FIBERGLASS

CONCRETE (ALL CLASSES)

GRATING

RUBBER

SAND OR GROUT

STEEL

TREAD PLATE

WOOD

- FOLLOWING NOTES ARE GENERAL AND APPLY TO ALL SHEETS OF THESE CONTRACT DOCUMENTS AS IF THEY WERE WRITTEN IN THEIR ENTIRETY ON EACH SHEET.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND SHALL IMMEDIATELY NOTIFY THE CONSTRUCTION MANAGER OF ANY DISCREPANCIES. CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS INCLUDING LOCATION AND DIMENSIONS OF ALL EXISTING CONSTRUCTION AND UTILITIES. CONTRACTOR SHALL NOTIFY CONSTRUCTION MANAGER IF THERE IS A CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND EXISTING CONSTRUCTION BEFORE PROCEEDING WITH WORK.
- UNLESS DETAILED, SPECIFIED, OR OTHERWISE INDICATED ON THE DRAWINGS, CONSTRUCTION SHALL BE AS INDICATED IN THE APPLICABLE TYPICAL DETAILS AND GENERAL NOTES. TYPICAL DETAILS SHALL APPLY EVEN THOUGH NOT REFERENCED AT SPECIFIC LOCATIONS ON DRAWINGS.
- WHERE NO CONSTRUCTION DETAILS ARE SHOWN OR NOTED FOR ANY PART OF WORK, DETAILS SHALL BE IN THE SAME AS FOR OTHER SIMILAR WORK.
- THE CONTRACTOR SHALL TAKE ALL PRECAUTIONARY MEASURES NECESSARY TO PROTECT FROM DAMAGE EXISTING FACILITIES AND UTILITIES SHOWN OR NOT SHOWN THAT ARE TO REMAIN IN PLACE. ALL FACILITIES DAMAGED BY THE CONTRACTOR'S OPERATIONS SHALL BE EXPEDITIOUSLY REPAIRED OR RECONSTRUCTED TO THE ORIGINAL OR BETTER CONDITION AT THE CONTRACTOR'S EXPENSE WITHOUT ADDITIONAL COMPENSATION.
- THE CONTRACTOR IS RESPONSIBLE FOR ARRANGING ALL REQUIRED INSPECTIONS. THE PRESENCE OR ABSENCE OF THE INSPECTOR WILL NOT RELIEVE THE CONTRACTOR OF FULL RESPONSIBILITY FOR THE PROPER PERFORMANCE OF THE WORK.



LAST SAVED BY: JENNIFER JACOBSEN

AGENCY REVIEW

DESIGNED
 CE
 DRAWN
 CE
 CHECKED
 CE
 DATE
 OCTOBER 2025



CITY OF THORNTON
 THORNTON WATER PROJECT
 SOURCE WATER PUMP STATION
 GENERAL
 NOTES AND SYMBOLS

VERIFY SCALES	JOB NO. 203505
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 30G03
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET NO. 3 OF 160

	1	2	3	4	5	6	7	8	9	10	11	12	13																											
	@ △ #	AT (MEASUREMENT) DEFLECTION ANGLE, CENTRAL ANGLE NUMBER (REBAR Ø)	CTJ CTL CTR CTSK CU CUP CV CW CWW CY	CONTROL JOINT CONTROL CENTER, CENTERED COUNTERSUNK CUBIC COPPER PIPE CHECK VALVE COLD WATER COMBINATION WASTE AND VENT CUBIC YARD	FPM FPP FRP FRPP FRS FS FSTN FT or FTG FUP FV FW FX FXC FXE	FEET PER MINUTE FLEXIBLE PLASTIC PIPE FIBERGLASS REINFORCED PLASTIC FIBERGLASS REINFORCED PLASTIC PIPE FROTH SPRAY FAR SIDE FASTEN(ED) FOOT, FEET FOOTING FUEL DISPENSER FLAP VALVE FLUSHING WATER, FINISHED WATER FIRE EXTINGUISHER FIRE EXTINGUISHER CABINET FIRE EXTINGUISHER - ELECTRICAL	MC MCJ MD MECH MET MFR MGL MGD MH MIN MISC MIX MJ MK ML MOD MOIST MON MOS MPM MS MTD	MECHANICAL COUPLING MASONRY CONTROL JOINT MOTORIZED DAMPER MECHANICAL METAL MANUFACTURER MILLIGRAMS PER LITER MILD WATER MILLION GALLONS PER DAY MANHOLE MINIMUM MISCELLANEOUS MIXER MECHANICAL JOINT MARK MIXED LIQUOR MASONRY OPENING MODIFIED MOISTURE MONUMENT MOISTURE SEPARATOR METERING PUMP MOP SINK MOUNTED	RER RES REV RF RG RH RHR RHRA RHBB RLS RM RO ROT RP RPM RPMF RR RT RTU RUD RW RWR RWW	REACTOR RESERVOIR REVISION, REVERSE RETURN FAN RETURN GRILLE RUBBER GASKET RIGHT HAND RIGHT HAND REVERSE RIGHT HAND REVERSE ACTIVE RIGHT HAND REVERSE BEVEL REGISTERED LAND SURVEYOR ROOM ROUGH OPENING ROTAMETER RADIUS POINT REVOLUTIONS PER MINUTE REINFORCED PLASTIC MORTAR PIPE RETURN REGISTER RIGHT RTF RTU RUD RW RWR RWW	T.O.W. TR TS TSD TSPL TSTAT TTB TUR TV TWV TYP	TOP OF WALL TRIAD (THREE CONDUCTOR SHIELDED CABLE), TIMING RELAY THICKENER SUPERNATANT OR SUBNATANT THICKENED SLUDGE DECANT TURBIDIMETER SAMPLE THERMOSTAT TELEPHONE TERMINAL BOARD TURNING VANES TURNING VANES THREE-WAY VALVE TYPICAL																												
A	AB ABC ABS AC ACB ACI ACP ACU AD ADDL ADJ ADMIN ADR AED AER AFC AFB AFM AHU AIC AIL ALT AL ANCH ANV APPROX ARCH ARV ASSY ASTM AV AVG AVV AW	ANCHOR BOLT AGGREGATE BASE COURSE ACRYLONITRILE BUTADIENE STYRENE ASPHALTIC CONCRETE AIR CIRCUIT BREAKER AMERICAN CONCRETE INSTITUTE ASBESTOS CEMENT PIPE AIR CONDITIONING UNIT AREA DRAIN ADDITIONAL ADJACENT, ADJUST, ADJUSTABLE ADMINISTRATION ACCESS DOOR AREA EQUIPMENT DRAIN AERAT(ION)(OR) AFTERCOOLER ABOVE FINISHED FLOOR AIR FLOW MONITOR AIR HANDLING UNIT AIR COMPRESSOR AIR INTAKE LOUVER ALTERNATE ALUMINUM ANCHOR ANGLE VALVE APPROXIMATE, APPROXIMATELY ARCHITECTURAL AIR RELEASE VALVE ASSEMBLY AMERICAN SOCIETY FOR TESTING AND MATERIALS ACID VENT AVERAGE AIR AND VACUUM VALVE ACID WASTE	D D/W DBL DDR DEG or ° DEMO DET DFL DIA DIA or Ø DIAG DIF DIG DIM DIP DISCH DIW DL DLV DMP DMS DN do DO DP DPV DR DRIP DRV DS DSW DUC DUH DW DWD DWG(S) DWL(S)	DEPTH, DIGITAL OR DISCRETE, DRAIN DRIVEWAY DOUBLE DESICCANT DRYER DEGREE DEMOLISH, DEMOLITION DETAIL DECANT/FILTRATE DOOR GRILLE DIAMETER DIAGONAL DIFFUSER DIGESTER DIMENSION DUCTILE IRON PIPE DISCHARGE DEIONIZED WATER DEAD LOAD, DRAIN LINE DOWN LOUVER DAMPER DIAPHRAGM SEAL DOWN DITTO DOOR OPENING DEEP (OR DEPTH) DIAPHRAGM VALVE DOOR, DRAIN DRAIN VALVE DIGESTED SLUDGE, DOWN SPOUT DISTILLED WATER, DOOR SWITCH DUST COLLECTOR DUCT HEATER UNIT DISTILLED WATER DEWATERING DRAIN DRAWING(S) DOWEL(S)	G GA GAL GALV GAV GB GBT GC GEL GEN GL GLV GM GND GPD GPM GR GRTG GRV GSP GV GYP	GAS, GROUND, GUTTER GAUGE or GAGE GALLONS GALVANIZE(D) GRAVITY VENTILATOR GRADE BREAK GRAVITY BELT THICKENER GROOVED COUPLING GRAVITY EXHAUST LOUVER GENERAL, GENERATOR GLASS GLOBE VALVE GAS METER GROUND GALLONS PER DAY GALLONS PER MINUTE GRADE GRATING GRAVITY VENTILATOR GALVANIZED STEEL PIPE GATE VALVE GYPSUM	H H1E H2E HAS HB HDPE HDW HDWL HGT HORIZ HP HPA HPT HPU HR HSF HSS HTX HF HW HWL HWR HWS HxW HYD	EXPLOSION-PROOF, HIGH, HORIZONTAL HOOK ONE END HOOK TWO ENDS HOSE ANCHOR STUD HOSE BIB HIGH DENSITY POLYETHYLENE HARDWARE HEADWALL HOOD EXHAUST FAN HEIGHT HORIZONTAL HEAT PUMP, HORSEPOWER, HIGH PRESSURE HIGH PRESSURE AIR HIGH POINT HEAT PUMP UNIT AIR HANDRAIL, HOSE REEL, HOUR HOOD SUPPLY FAN HOLLOW STRUCTURAL SECTION (STEEL) HEAT EXCHANGER HOSE VALVE HOT WATER HIGH WATER LEVEL HOT WATER RETURN HOT WATER SUPPLY HEIGHT BY WIDTH HYDRANT	I IA ID ID I.F. IN or ° INCL INF INJ INSTR INSUL INT INV IP ISR	INSTRUMENT AIR INSIDE DIAMETER, INSIDE DIMENSION, IDENTIFICATION INSIDE FACE INCHES INCLUDE, INCLUDING INFILTRANT INJECTOR INSTRUMENTATION INSULATE(E)(D)(NG)(ON) INTERIOR INVERT IRON PIPE INTRINSICALLY SAFE RELAY	J JST JT	JOIST JOINT	K KGV	KNIFE GATE VALVE	L LAB LAV LB(S) LDF LDFR LF LG LH LHR LHRA LHRB LL LLH LLV LP LPA LPG LPT LR LS LT LWL	ANGLE (STRUCTURAL), LENGTH, LOUVER LABORATORY LAVATORY POUND(S) LIQUID DIESEL FUEL LIQUID DIESEL FUEL RETURN LINEAL FEET LONG LEFT HAND LEFT HAND REVERSE LEFT HAND REVERSE ACTIVE LEFT HAND REVERSE BEVEL LIVE LOAD LONG LEG HORIZONTAL LONG LEG VERTICAL LOW PRESSURE LOW PRESSURE AIR LIQUIFIED PROPANE GAS LOW POINT LONG RADIUS LAB SINK LEFT LOW WATER LEVEL	M MAINT MAN MASY MATL MAU MAX MB	MOTOR MAINTENANCE MANUAL MASONRY MATERIAL MAKE-UP AIR UNIT MAXIMUM MACHINE BOLT	N NA NC NEV NG NPT NPW NS NTS	NORTH, NEUTRAL NOT APPLICABLE NORMALLY CLOSED VALVE, NEEDLE NATURAL GRADE, NATURAL OR LP GAS NOT IN CONTACT NUMBER NOMINAL NATIONAL PIPE THREAD NON-POTABLE WATER NEAR SIDE NOT TO SCALE	O OBD OC OD OED OF OFL OPNG OPP OPP HND OZ	OPEN OPPOSED BLADE DAMPER ON CENTER OUTSIDE DIAMETER, OUTSIDE DIMENSION OPEN EQUIPMENT DRAIN OUTSIDE FACE OVERFLOW OPENING OPPOSITE OPPOSITE HAND OUNCE	P PBL PC PCC PCCP PCP PD PD, PLD PDP PE PERP PG PH PIV PL PLAS PLCS PLS PLWD PMP PNL(S) POL POLY POS POW PP PPMV PRC PREFAB PRG PROJ PRR PRV PS PSF PSG PSI PSIG PT PV PVC PVDF PVI PVMT PVT PLW	POLE POLYMER BLENDER POINT OF CURVATURE PLANT CONTROL CENTER PRESTRESSED CONCRETE CYLINDER PIPE PROGRESSIVE CAVITY PUMP POSITIVE DISPLACEMENT, PLANT DRAIN PULSATION DAMPENER POSITIVE DISPLACEMENT PUMP PLAIN END PERPENDICULAR PRESSURE GAUGE PHASE, PHYSICALLY HANDICAPPED POINT OF INTERSECTION POST INDICATOR VALVE PLATE, PROPERTY LINE PLASTIC PLACES POLYMER SOLUTION PLYWOOD PUMP PANEL(S) POLYMER POLYETHYLENE POSITION POTABLE WATER POWER POLE PARTS PER MILLION (VOLUME) POINT OF REVERSE CURVATURE PREFABRICATED PRESSURE REGULATOR PRIMARY PROJECTION PRESSURE OR VACUUM RELIEF VALVE PRESSURE REDUCING VALVE, PRESSURE REGULATION VALVE, PRESSURE RELIEF VALVE PUMP STATION, PIPE SUPPORT POUNDS PER SQUARE FOOT PRESSURE GAUGE POUNDS PER SQUARE INCH POUNDS PER SQUARE INCH GAUGE POINT, POINT OF TANGENCY PLUG VALVE POINT OF VERTICAL CURVATURE, POLYVINYL CHLORIDE POLYVINYLIDENE FLUORIDE POINT OF VERTICAL INTERSECTION PAVEMENT POINT OF VERTICAL TANGENCY PLANT WATER	Q QTY	QUANTITY	R R/W or R.O.W. RAD RAS RCP RCCP RD RDL RDOF RECIRC RED REF REG REINF REJ REQD	RISER RIGHT OF WAY RADIUS, RADIAL RETURN ACTIVATED SLUDGE REINFORCED CONCRETE PIPE REINFORCED CONCRETE CYLINDER PIPE ROOF DRAIN ROOF DRAIN LINE ROOF DRAIN OVERFLOW RECIRCULATING REDUCER, ROOF EQUIPMENT DRAIN REFERENCE REGULATOR, REGULATING REINFORCE(D)(ING)(MENT) RUBBER EXPANSION JOINT REQUIRED	S S/W S SA SC SCB SCD SCFM SCH SCO SCR SCR SD	SIDEWALK SOUTH, SWITCH, SLOPE SAMPLE SECONDARY CLARIFIER SCRUBBER SMOKE CONTROL DAMPER STANDARD CUBIC FEET PER MINUTE SCHEDULE SURFACE CLEANOUT BAR SCREEN SILICON CONTROL RECTIFIER SMOKE DETECTOR, SPLITTER DAMPER, STORM DRAIN SUMP DISCHARGE DRAIN LINE SLUDGE DRAWWOFF SECONDARY EFFLUENT SECONDARY, SECOND SECTION SEDIMENTATION SEPTAGE SUPPLY FAN SOFTENED WATER SUPPLY GRILLE STORE FRONT GLAZING SYSTEM SHOWER DRAIN SOLIDS HANDLING-RECYCLE SHOWER SHEET SIMILAR SKIMMINGS SLOPE, SLUDGE SLUDGE COLLECTOR DRIVE SLIDE GATE SLEEVE VALVE SAMPLER, SUMP PUMP SUPERNATANT OR SUBNATANT SOLUTION STATIC PRESSURE, SET POINT SUMP PUMP DRAIN SINGLE POLE DOUBLE THROW SPECIFICATION(S) SPLITTER BOX SPARE SAMPLE SINK SAMPLE WATER SQUARE SQUARE FEET SQUARE INCHES SHORT RADIUS, SUPPLY REGISTER SCRUBBER RECIRCULATION LIQUID (CAUSTIC) SANITARY SEWER, SELECTOR SWITCH SERVICE SINK SECONDARY SLUDGE STAINLESS STEEL SLUDGE TRANSFER STATION STABILIZER STANDARD(S) STIFF STIRRUPS STEEL STEAM STEEL PIPE STRAINER STRUCTURAL SLUDGE GATE PIPE SUPPORT, SUPPORT SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE SANITARY WASTE SEAL WATER SYMMETRICAL SYNTHETIC	T T&B TAS TBM TBM TCV TDH TDR TEL TH THK TKS TLV TMH TMP TNK T.O. TOC TOG TOM TOS	TANGENT LENGTH, THERMOSTAT, TIMER, TREAD TOP AND BOTTOM THREADED ANCHOR STUD TEMPORARY BENCHMARK TOP OF CURB TEMPERATURE CONTROL VALVE TOTAL DYNAMIC HEAD TIME DELAY RELAY, TOWEL DISPENSER/RECEPTACLE TELEPHONE TEST HOLE THICKENER, THICKNESS, THICK THICKENED SLUDGE TELESCOPING VALVE TELEPHONE MANHOLE TEMPERATURE TANK TOP OF TOP OF CONCRETE TOP OF GRATING TOP OF MASONRY TOP OF STEEL	U UC UG UHMWPE UHMW UNO US	UNDERCUT UNDERGROUND ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE ULTRA HIGH MOLECULAR WEIGHT UNLESS NOTED OTHERWISE UTILITY SINK	V VAR VB VCP VEC VERT VFR VG VOL VRV VTR	VALVE VARIES VALVE BOX VITRIFIED CLAY PIPE VINYL ESTER COATING VERTICAL VOLUMETRIC FEEDER VACUUM GAUGE, VALLEY GUTTER VOLUME VACUUM REGULATING VALVE VENT THROUGH ROOF	W W W/O WAS WCO WEF WF WH WI WL WM WOD WP WPT WRG WRS WSTP WT WTF WTP WTR WW WWW WWF WWTF WWTP	WEST, WIDTH WITHOUT WASTE ACTIVATED SLUDGE WALL CLEANOUT WALL EXHAUST FAN WALL FITTING, WASH FOUNTAIN WATER HEATER WEIGHT INDICATOR WALL LOUVER, WATER LEVEL WATER METER WASTE OIL DRAIN WEATHERPROOF, WATERPROOF WORKING POINT WEIR GATE WATER SOFTENER WATER SURFACE WATERSTOP WALK THROUGH, WEIGHT WATER TREATMENT FACILITY WATER TREATMENT PLANT WATER WATER CONTROL VALVE WASTEWATER WELDED WIRE FABRIC WASTEWATER TREATMENT FACILITY WASTEWATER TREATMENT PLANT	Y YCO YH	WYE YARD CLEANOUT YARD HYDRANT

LAST SAVED BY: JENNIFER JACOBSEN

AGENCY REVIEW

DESIGNED	CE
DRAWN	CE
CHECKED	CE
DATE	OCTOBER 2025



CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
GENERAL
ABBREVIATIONS

VERIFY SCALES	JOB NO. 203505
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 30G04
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	SHEET NO. 4 OF 160

ELECTRICAL PLAN SYMBOLS

ELECTRICAL ONE-LINE SYMBOLS

IDENTIFICATION SYMBOLS

	EQUIPMENT / INSTRUMENT IDENTIFICATION
	EQUIPMENT / INSTRUMENT LOCATOR
	LUMINAIRE IDENTIFICATION a = CIRCUIT DESIGNATION b = DEVICE SWITCH FROM c = MOUNTING HEIGHT FROM FINISHED FLOOR TO BOTTOM OF FIXTURE X = LUMINAIRE TYPE, REFER TO THE LUMINAIRE SCHEDULE
	CONDUIT IDENTIFICATION XXX = CONDUIT NUMBER REFER TO CONDUIT SCHEDULE UNLESS OTHERWISE NOTED. GROUPED CONDUITS ARE LABELED LEFT TO RIGHT OR TOP TO BOTTOM
	INDICATES KEYNOTE # (PERTAINS ONLY TO SHEET WHERE NOTE IS FOUND)
	DISCONNECT SWITCH
	CAMERA

SWITCHES / RECEPTACLES

	SINGLE POLE SWITCH a = CIRCUIT DESIGNATION b = DEVICE SWITCHED DESIGNATION c = TYPE 2 = DOUBLE POLE SWITCH 3 = THREE-WAY SWITCH 3P = THREE POSITION SWITCH 4 = FOUR-WAY SWITCH K = KEY OPERATED SWITCH F = SWITCH AND FUSE/STAT HOLDER P = SWITCH AND PILOT LIGHT T = THERMOSTAT D = DIMMER SWITCH L = LOW VOLTAGE LIGHT SWITCH M = MANUAL MOTOR STARTER N = NETWORK SINGLE OR MULTIPLE SWITCH LOCATIONS WP = WEATHER PROOF REFER TO ABBREVIATIONS LEGEND FOR ALL OTHER DESIGNATIONS
	OCCUPANCY SENSOR a = CIRCUIT DESIGNATION b = DEVICE SWITCH FROM c = MOUNTING HEIGHT FROM FINISHED FLOOR TO BOTTOM OF FIXTURE X = SENSOR TYPE, REFER TO THE LUMINAIRE CONTROL COMPONENT SCHEDULE
	PHOTOCELL
	SWITCH AND SINGLE RECEPTACLE a = CIRCUIT DESIGNATION b = DEVICE TYPE DESIGNATION
	DUPLEX RECEPTACLE
	QUADRUPLEX RECEPTACLE
	IN FLOOR DUPLEX RECEPTACLE
	IN FLOOR QUADRUPLEX RECEPTACLE
	DUPLEX RECEPTACLE w/SPLIT WIRE
	DEDICATED RECEPTACLE
	SPECIAL PURPOSE RECEPTACLE
	WELDING RECEPTACLE a = CIRCUIT DESIGNATION b = DISCONNECT TYPE
	TWIST LOCK RECEPTACLE a = AMP RATING
	TELEPHONE OUTLET
	DATA COMMUNICATIONS OUTLET a = NETWORK SWITCH

RACEWAY

	EXPOSED CONDUIT
	EXPOSED CONDUIT HIDDEN BEHIND WALLS, FLOORS OR OTHER STRUCTURES
	CONDUIT IN DUCT BANK
	DIRECT BURIED CONDUIT
	CONDUIT IN SLAB
	CONDUIT VERTICAL CHANGE IN DIRECTION
	BREAK AND CONTINUATION IN CONDUIT RUN
	CONDUIT CAP
	CONDUIT SEAL
	CONDUIT TEE
	JUNCTION BOX
	DUCT BANK APPROXIMATE DIMENSIONS SHOWN ON DUCT BANK SECTIONS

LUMINAIRES

*SIZE OF BLOCK MAY APPEAR SMALLER OR LARGER DEPENDING ON SCALE OF DRAWINGS

	LINEAR FIXTURE
	2' X 2' LAY-IN TROFFER
	2' X 4' LAY-IN TROFFER
	LUMINAIRE POLE MOUNTED
	LUMINAIRE, EMERGENCY BATTERY-POWERED
	LUMINAIRE, EMERGENCY/EXIT BATTERY-POWERED
	LUMINAIRE, EMERGENCY BATTERY-POWERED REMOTE
	LUMINAIRE, SURFACE OR PENDANT MOUNTED
	LUMINAIRE, WALL MOUNTED
	LUMINAIRE, FLOOD / SPOT
	LUMINAIRE, EXIT ONE OR TWO FACES AS INDICATED. ARROW POINTS IN DIRECTION OF EGRESS.

CONDUIT SIZE AND CONDUCTORS

INDIVIDUAL CONDUCTORS

W"C-(3-X (Ø), 1-Y (N) & 1-Z (G))

W"C (WHERE INDICATED): W = CONDUIT TRADE SIZE

3-X (Ø):
3 = QUANTITY
X = SIZE OF CONDUCTORS
(Ø) = DESIGNATES PHASE CONDUCTORS

1-Y (N) (WHERE INDICATED):
1 = QUANTITY
Y = SIZE OF CONDUCTORS
(N) = DESIGNATES NEUTRAL CONDUCTOR

1-Z (G) (WHERE INDICATED):
1 = QUANTITY
Z = SIZE OF CONDUCTORS
(G) = DESIGNATES GROUND CONDUCTORS

U{3-X (Ø) & 1-X (G)}
U = NUMBER OF PARALLEL RUNS

VFD CONDUCTORS

U{[N/C-X (Ø) & INTEGRAL (G)];VFD}
U = NUMBER OF PARALLEL RUNS
N/C = NUMBER OF PHASE CONDUCTORS IN CABLE
X = SIZE OF CONDUCTORS
VFD = VFD CABLE

MULTI CONDUCTOR CABLES

K/2/C#16S
K (WHERE INDICATED) = NUMBER OF PAIRS
2/C#16S = TWO CONDUCTOR, 16 GAUGE TWISTED SHIELDED PAIR

K/3/C#16S
K (WHERE INDICATED) = NUMBER OF TRIPLETS
3/C#16S = THREE CONDUCTOR, 16 GAUGE TWISTED SHIELDED TRIPLETS

U{[N/C-X (Ø) & INTEGRAL (G)];MC}
U = NUMBER OF PARALLEL RUNS
MC = MULTICONDUCTOR CABLE
N/C = NUMBER OF PHASE CONDUCTORS IN THE CABLE
X = SIZE OF CONDUCTORS

GROUNDING

----- UNDERGROUND GROUND CABLE #4/0 SDBC UNLESS OTHERWISE NOTED

GROUND ROD

GROUND ROD AND GROUND WELL

CONDUIT SIZE AND CONDUCTORS

INDIVIDUAL CONDUCTORS

W"C-(3-X (Ø), 1-Y (N) & 1-Z (G))

W"C (WHERE INDICATED): W = CONDUIT TRADE SIZE

3-X (Ø):
3 = QUANTITY
X = SIZE OF CONDUCTORS
(Ø) = DESIGNATES PHASE CONDUCTORS

1-Y (N) (WHERE INDICATED):
1 = QUANTITY
Y = SIZE OF CONDUCTORS
(N) = DESIGNATES NEUTRAL CONDUCTOR

1-Z (G) (WHERE INDICATED):
1 = QUANTITY
Z = SIZE OF CONDUCTORS
(G) = DESIGNATES GROUND CONDUCTORS

U{3-X (Ø) & 1-X (G)}
U = NUMBER OF PARALLEL RUNS

VFD CONDUCTORS

U{[N/C-X (Ø) & INTEGRAL (G)];VFD}
U = NUMBER OF PARALLEL RUNS
N/C = NUMBER OF PHASE CONDUCTORS IN CABLE
X = SIZE OF CONDUCTORS
VFD = VFD CABLE

MULTI CONDUCTOR CABLES

K/2/C#16S
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K/3/C#16S
K (WHERE INDICATED) = NUMBER OF TRIPLETS
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U{[N/C-X (Ø) & INTEGRAL (G)];MC}
U = NUMBER OF PARALLEL RUNS
MC = MULTICONDUCTOR CABLE
N/C = NUMBER OF PHASE CONDUCTORS IN THE CABLE
X = SIZE OF CONDUCTORS

FIRE ALARM

FIRE ALARM CONTROL PANEL

MISCELLANEOUS

	MOTOR HP = HORSE POWER a = RPM FULL LOAD AMPS AS NOTED
	PACKAGED EQUIPMENT LOAD RATING AS INDICATED a = RATED LOAD b = UNIT (HP, KW, KVA) AS INDICATED
	TRANSFORMER a = DEVICE I.D. b = KVA RATING c = NUMBER OF PHASES d = PRIMARY VOLTAGE e = SECONDARY VOLTAGE f,g = CONNECTION TYPE SYMBOL h = IMPEDANCE
	CURRENT TRANSFORMER WITH SHORTING TERMINAL BLOCK a = QUANTITY b = RATIO
	POTENTIAL TRANSFORMER a = QUANTITY b = RATIO c,d = CONNECTION SYMBOL
	SOLID STATE MULTI-FUNCTION METER a = DESIGNATION b = NETWORK PROTOCOL
	SURGE PROTECTIVE DEVICE a = DESIGNATION
	AMPERE TEST POINT
	VOLTAGE TEST POINT
	UTILITY METER a = DESIGNATION b = METER TYPE
	LIGHTNING ARRESTOR
	DRAWOUT CONNECTION
	GROUND
	CAPACITOR
	BATTERY
	KIRK KEY INTERLOCK
	LOAD BANK a = DESIGNATION b = VOLTAGE c = WATTAGE
	RESISTOR a = DESIGNATION b = AMPERAGE c = TIME(S)

LOW VOLTAGE

	LOW VOLTAGE CIRCUIT BREAKER a = TYPE MCP = MOTOR CIRCUIT PROTECTOR TM = THERMAL MAGNETIC SS = SOLID STATE b = FRAME SIZE (MANUFACTURER TO DETERMINE FRAME SIZE UNLESS INDICATED) c = NUMBER OF POLES d = TRIP SETTING AT = AMP TRIP AC = MCP CONTINUOUS RATING e = DESIGNATION f = INTERRUPTING RATING g = NETWORK PROTOCOL
	LOW VOLTAGE CIRCUIT BREAKER AUXILIARY OPERATOR * = S = SHUNT TRIP = G = GROUND FAULT INTERRUPTER = V = SOLENOID KEY RELEASE
	DISCONNECT SWITCH
	FUSE
	MOTOR STARTER/DRIVE a = STARTER TYPE VFD-6 = 6-PULSE VFD VFD-18 = 18-PULSE VFD VFD-RH = REDUCED HARMONIC VFD (18-PULSE OR ACTIVE FRONT END AS DEFINED IN THE SPECIFICATIONS) RVSS = REDUCED VOLTAGE SOLID STATE STARTER RVAT = REDUCED VOLTAGE AUTO TRANSFORMER a/B = DEVICE WITH BYPASS STARTER REFER TO THE SPECIFICATIONS FVNR = FULL VOLTAGE NON-REVERSING FVR = FULL VOLTAGE REVERSING REFER TO ABBREVIATIONS LEGEND FOR ALL OTHER DESIGNATIONS
	b = VFD INPUT OPTIONS LL = LINE REACTOR PHF = PASSIVE HARMONIC FILTER
	c = VFD LR = LOAD REACTOR DV/DT = XX SINWAVE = XX
	c = FVNR SIZE # = NEMA STARTER SIZE

ONE-LINE LINETYPES

	ELECTRICAL ONE-LINES
	ONE-LINE CONTROL CABLES
	EQUIPMENT ENCLOSURE

MEDIUM VOLTAGE

	AUTOMATIC TRANSFER SWITCH a = DESIGNATION b = AMP c = VOLT d = PHASE e = POLES f = KASC RATING
	CIRCUIT BREAKER, MEDIUM VOLTAGE a = CIRCUIT BREAKER NUMBER b = FRAME SIZE
	ANSI RELAY DEVICE a = ANSI DEVICE FUNCTION b = QUANTITY
	MEDIUM VOLTAGE DISCONNECT SWITCH NON-FUSED CUT OUT
	MEDIUM VOLTAGE DISCONNECTING FUSE SINGLE FUSE CUT OUT
	MEDIUM VOLTAGE DISCONNECTING FUSE DOUBLE FUSE CUT OUT
	MEDIUM VOLTAGE SINGLE FUSE
	MEDIUM VOLTAGE DOUBLE FUSE
	MEDIUM VOLTAGE LINE FRONT TERMINATOR
	MEDIUM VOLTAGE ELBOW
	MEDIUM VOLTAGE TEE
	MOV-ELBOW ARRESTOR
	MEDIUM VOLTAGE CONTACTOR
	MEDIUM VOLTAGE STARTER

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CITY OF THORNTON
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SOURCE WATER PUMP STATION
ELECTRICAL
LEGEND

VERIFY SCALES	JOB NO. 203505
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 30GE01
0 1"	SHEET NO. 13 OF 160

ABBREVIATIONS

POWER DEVICE FUNCTION NUMBERS

A	AMP	G	GROUND / EQUIPMENT GROUND / GROUND FAULT	O	OPEN OR OPENED	V	VOLT
ABS	ABSOLUTE	GEN	GENERATOR	OH	OVERHEAD	VA	VOLT AMPERE
AC	ALTERNATING CURRENT	GRC	GALVANIZED STEEL RIGID CONDUIT	OL	OVERLOAD RELAY	VAR	VARMETER
ACK	ACKNOWLEDGE	GFCI	GROUND FAULT CIRCUIT INTERRUPTER (RECEPTACLE)	P	POLE	VCP	VENDOR CONTROL PANEL
ACTR	ACTUATOR	GFI	GROUND FAULT INTERRUPTER (BREAKER)	PA	PUBLIC ADDRESS	VFD	VARIABLE FREQUENCY DRIVE
AF	AMP FRAME	GFR	GROUND FAULT RELAY	PB	PUSHBUTTON / PULL BOX	VHF	VERY HIGH FREQUENCY
AFC	AUTOMATIC FREQUENCY CONTROL	H	HOT-LEG	PCS	PVC COATED GALVANIZED STEEL CONDUIT	VM	VOLTMETER
AIC	AMP INTERRUPTING CAPACITY	HF	HIGH FREQUENCY	PCM	PROCESS CONTROL MODULE	VP	VAPORPROOF
AM	AMMETER	HP	HORSEPOWER	PE	PHOTOCELL	VR	VOLTAGE REGULATOR
ANN	ANNUNCIATOR	HPS	HIGH PRESSURE SODIUM	PF	POWER FACTOR	VS	VOLTAGE SWITCH
ANT	ANTENNA	HR	HOUR	PFCC	POWER FACTOR CORRECTION CAPACITOR	VT	VOLTAGE TRANSFORMER
APU	AUXILIARY POWER UNIT	HSTAT	HUMIDISTAT	PFR	PHASE FAILURE RELAY	VTP	VOLTAGE TEST POINT
ARM	ARMORED CABLE	HV	HIGH VOLTAGE	PH	PHASE	W	WATT / WEST
AS	AMMETER SWITCH	HVAC	HEATING/VENTILATION/AIR CONDITIONING	PNL	PANEL	WT	WATER TIGHT
ASYM	ASYMMETRICAL	HZ	HERTZ	PPX	POWER PANEL NO. X	WP	WEATHER PROOF
AT	AMP TRIP	I	INSTANTANEOUS / INTERMITTENT LOAD	PRI	PRIMARY	XFMR	TRANSFORMER
ATO	AUTOMATIC THROW OVER	IC	INTERRUPTING CAPACITY	PT	POTENTIAL TRANSFORMER		
ATP	AMMETER TEST POINT	IJB	INSTRUMENT JUNCTION BOX	PVC	POLYVINYL CHLORIDE RIGID PLASTIC CONDUIT		
ATS	AUTOMATIC TRANSFER SWITCH	IMC	INTERMEDIATE METAL CONDUIT	PWR	POWER		
AUTO XFMR	AUTOMATIC TRANSFORMER	INST	INSTANTANEOUS	RAC	RIGID ALUMINUM CONDUIT		
AUX	AUXILIARY	INT	INTERLOCK	RECPT	RECEPTACLE		
AWG	AMERICAN WIRE GAUGE	INTERCOM	INTERCOMMUNICATION	REV	REVERSE		
B	BELL	J	JUNCTION BOX	RF	RADIO FREQUENCY		
BAT	BATTERY	K	KEY INTERLOCK	RMS	ROOT MEAN SQUARED		
BFG	BELOW FINISHED GRADE	KA	KILOAMP	RVAT	REDUCED VOLTAGE AUTO TRANSFORMER		
BHP	BRAKE HORSEPOWER	KV	KILOVOLT	RVNR	REDUCED VOLTAGE NON-REVERSING		
BKR	BREAKER	KVA	KILOVOLT AMPERE	RVSS	REDUCED VOLTAGE SOLID STATE		
BRF	BELOW RAISED FLOOR	KVAR	KILOVAR (REACTANCE)	S	SHIELD / SHORT-TIME		
C	CONDUIT / CONTINUOUS LOAD	KW	KILOWATT	SA	SURGE ARRESTER		
CB	CIRCUIT BREAKER	KWD	KILOWATT DEMAND	SC	SHORT CIRCUIT		
CCTV	CLOSED CIRCUIT TELEVISION	KWH	KILOWATT HOUR	SDBC	SOFT DRAWN BARE COPPER		
CCW	COUNTER CLOCKWISE	L	LONG-TIME	SFL	SUB FEED LUGS		
CKT	CIRCUIT	L-B	LINE-BUS	SLT	SEALTIGHT LIQUIDTIGHT FLEXIBLE CONDUIT		
COAX	COAXIAL CABLE	L-G	LINE-GROUND	SM	SURFACE MOUNTED		
COM	COMMON	LA	LIGHTNING ARRESTOR	SP	SINGLE POLE		
COMM	COMMUNICATION	LBL	LABEL	SPD	SURGE PROTECTIVE DEVICE		
CPT	CONTROL POWER TRANSFORMER	LC	LIGHTING CONTACTOR	SPDT	SINGLE POLE DOUBLE THROW		
CR	CONTROLLED RECEPTACLE	LCP- X	LOCAL CONTROL PANEL NO. X	SPST	SINGLE POLE SINGLE THROW		
CS	CONTROL SWITCH	LL	LEAD-LAG LOAD REACTOR	SPKR	SPEAKER		
CT	CURRENT TRANSFORMER	LP	LIGHT POLE	SS	SOLID STATE		
CV	CONTROL VALVE	LP- X	LIGHTING PANEL NO. X	STB	SHORTING TERMINAL BLOCK		
CW	CLOCKWISE / COOL WHITE	LTG	LIGHTING	SW	SWITCH		
DC	DIRECT CURRENT	LV	LOW VOLTAGE	SWBD	SWITCHBOARD		
DCS	DISTRIBUTED CONTROL SYSTEM	LVL	LEVEL	SWGR	SWITCHGEAR		
DCU - X	DISTRIBUTED CONTROL UNIT NO. X	M-X	MOTOR CONTROLLER NO. X	SYM	SYMMETRICAL		
DEMO	DEMOLITION	MA	MILLIAMPERE	TACH	TACHOMETER		
DISC	DISCONNECT SWITCH	MCA	MOTOR CIRCUIT AMPS	TB - X	TERMINAL BLOCK - UNIT X		
DM	DEMAND METER	MCC - X	MOTOR CONTROL CENTER NO. X	TC	THERMOCOUPLE / TIME CLOCK / TRAY CABLE		
DPDT	DOUBLE POLE DOUBLE THROW	MCP	MOTOR CIRCUIT PROTECTOR	TD	TEMPERATURE DETECTOR RELAY		
DPST	DOUBLE POLE SINGLE THROW	MH	MANHOLE / MOUNTING HEIGHT	TE	TOTALLY ENCLOSED		
DS	DOOR SWITCH	MLO	MAIN LUGS ONLY	TEFC	TOTALLY ENCLOSED FAN COOLED		
E/G	EMERGENCY GENERATOR	MOD	MOTOR OPERATED DAMPER	TENV	TOTALLY ENCLOSED NON-VENTILATED		
EM	EMERGENCY	MOV	METAL OXIDE VARISTOR	TERM	TERMINAL		
EMT	ELECTRICAL METALLIC TUBING	MPR	MOTOR PROTECTION RELAY	TJB	TERMINAL JUNCTION BOX		
ENCL	ENCLOSURE	MS-X	MOTOR STARTER NO. X	TM	THERMAL MAGNETIC		
ENG	ENGINE	MSP	MOTOR STARTING PANEL	TP	TWISTED PAIR		
ENT	ELECTRICAL NON-METALLIC TUBING	MTO	MANUAL THROW OVER	TS	TEMPERATURE SWITCH		
EP	EXPLOSION PROOF	MTR-X	MOTOR NO. X	TS1W	TWO SPEED CONSEQUENT POLE, ONE WINDING		
ETM	ELAPSED TIME METER	MVS	MEDIUM VOLTAGE SWITCH	TS2W	TWO SPEED SEPARATE WINDING		
F	SUB-FED	MW	MEGAWATT	TSTAT	THERMOSTAT		
FA	FIRE ALARM	N	NEUTRAL	UHF	ULTRA HIGH FREQUENCY		
FACP	FIRE ALARM CONTROL PANEL	NC	NORMALLY CLOSED	UNG	UNGROUNDING		
FDR	FEEDER	NEC	NATIONAL ELECTRICAL CODE	UPS	UNINTERRUPTIBLE POWER SUPPLY		
FLA	FULL LOAD AMPS	NFC	NONMETALLIC FLEXIBLE CONDUIT	UVR	UNDER VOLTAGE RELAY		
FLX	FLEXIBLE CONDUIT	NL	NIGHT LIGHT				
FO	FIBER OPTIC	NO	NORMALLY OPEN				
FRC	FIBERGLASS RIGID CONDUIT	NP	NAMEPLATE				
FREQ	FREQUENCY						
FU	FUSE						
FU SW	FUSED SWITCH						
FVNR	FULL VOLTAGE NON-REVERSING						
FVR	FULL VOLTAGE REVERSING						
FWD	FORWARD						

1	MASTER ELEMENT	81	FREQUENCY RELAY
2	TIME-DELAY STARTING OR CLOSING RELAY	82	DC LOAD MEASURING RECLOSING RELAY
3	CHECKING OR INTERLOCKING RELAY	83	AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
4	MASTER CONTACTOR	84	OPERATING MECHANISM
5	STOPPING DEVICE	85	PILOT COMMUNICATIONS, CARRIER OR PILOT-WIRE RELAY
6	STARTING CIRCUIT BREAKER	86	LOCKOUT RELAY
7	ANODE CIRCUIT BREAKER	87	DIFFERENTIAL PROTECTIVE RELAY
8	CONTROL POWER DISCONNECTING DEVICE	88	AUXILIARY MOTOR OR MOTOR GENERATOR
9	REVERSING DEVICE	89	LINE SWITCH
10	UNIT SEQUENCE SWITCH	90	REGULATING DEVICE
11	MULTIFUNCTION DEVICE	91	VOLTAGE DIRECTIONAL RELAY
12	OVER-SPEED DEVICE	92	VOLTAGE AND POWER DIRECTIONAL RELAY
13	SYNCHRONOUS-SPEED DEVICE	93	FIELD-CHANGING CONTACTOR
14	UNDER-SPEED DEVICE	94	TRIPPING OR TRIP-FREE RELAY
15	SPEED OR FREQUENCY MATCHING DEVICE		
16	DATA COMMUNICATIONS DEVICE		
17	SHUNTING OR DISCHARGE SWITCH		
18	ACCELERATING OR DECELERATING DEVICE		
19	STARTING-TO-RUNNING TRANSITION CONTACTOR		
20	ELECTRICALLY OPERATED VALVE		
21	DISTANCE RELAY		
22	EQUALIZER CIRCUIT BREAKER		
23	TEMPERATURE CONTROL DEVICE		
24	VOLTS PER HERTZ RELAY		
25	SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE		
26	APPARATUS THERMAL DEVICE		
27	UNDERVOLTAGE RELAY		
27N	GROUND FAULT UNDERVOLTAGE RELAY		
28	FLAME DETECTOR		
29	ISOLATING CONTACTOR		
30	ANNUNCIATOR RELAY		
31	SEPARATE EXCITATION DEVICE		
32	DIRECTIONAL POWER RELAY		
33	POSITION SWITCH		
34	MASTER SEQUENCE DEVICE		
35	BRUSH-OPERATING OR SLIP-RING SHORT-CIRCUITING DEVICE		
36	POLARITY DEVICE		
37	UNDERCURRENT OR UNDERPOWER RELAY		
38	BEARING PROTECTIVE DEVICE		
39	MECHANICAL CONDITION MONITOR		
40	FIELD RELAY		
41	FIELD CIRCUIT BREAKER		
42	RUNNING CIRCUIT BREAKER		
43	MANUAL TRANSFER OR SELECTOR DEVICE		
44	UNIT SEQUENCE STARTING RELAY		
45	ABNORMAL ATMOSPHERIC CONDITION MONITOR		
46	REVERSE-PHASE OR BALANCE CURRENT RELAY		
47	PHASE-BALANCE OR PHASE-SEQUENCE VOLTAGE RELAY		
48	INCOMPLETE SEQUENCE RELAY		
49	MACHINE OR TRANSFORMER THERMAL RELAY		
50	INSTANTANEOUS OVERCURRENT RELAY		
51	AC TIME OVERCURRENT RELAY		
52	AC CIRCUIT BREAKER		
53	FIELD EXCITATION RELAY		
54	TURNING GEAR ENGAGING DEVICE		
55	POWER FACTOR RELAY		
56	FIELD APPLICATION RELAY		
57	SHORT-CIRCUITING OR GROUNDING DEVICE		
58	RECTIFICATION FAILURE RELAY		
59	OVERVOLTAGE RELAY		
60	VOLTAGE OR CURRENT BALANCE RELAY		
61	DENSITY SWITCH OR SENSOR		
62	TIME-DELAY STOPPING OR OPENING RELAY		
63	PRESSURE SWITCH		
64	GROUND DETECTOR RELAY		
65	GOVERNOR		
66	NOTCHING OR JOGGING DEVICE		
67	AC DIRECTIONAL OVERCURRENT RELAY		
68	BLOCKING OR OUT OF STEP RELAY		
69	PERMISSIVE CONTROL DEVICE		
70	RHEOSTAT		
71	LIQUID LEVEL SWITCH		
72	DC CIRCUIT BREAKER		
73	LOAD-RESISTOR CONTACTOR		
74	ALARM RELAY		
75	POSITION CHANGING MECHANISM		
76	DC OVERCURRENT RELAY		
77	TELEMETERING DEVICE		
78	PHASE-ANGLE MEASURING RELAY		
79	AC RECLOSING RELAY		
80	FLOW SWITCH		

COMMONLY USED SUFFIX LETTER APPLIED TO POWER DEVICE FUNCTION NUMBERS

A	ALARM ONLY
B	BUS PROTECTION
G	GROUND FAULT PROTECTION (RELAY CT IN A SYSTEM NEUTRAL CIRCUIT OR GENERATOR PROTECTION)
GS	GROUND FAULT PROTECTION (RELAY CT IN TOROIDAL OR GROUND SENSOR TYPE)
L	LINE PROTECTION
M	MOTOR PROTECTION
N	NEGATIVE SEQUENCE (RELAY COIL CONNECTED IN RESIDUAL CT CIRCUIT)
T	TRANSFORMER PROTECTION
V	VOLTAGE
P	PHASE PROTECTION

ABBREVIATIONS

AFD	ARC FLASH DETECTOR
CLK	CLOCK OR RIMING SOURCE
DDR	DYNAMIC DISTURBANCE RECORDER
DFR	DIGITAL FAULT RECORDER
ENV	ENVIRONMENTAL DATA
HIZ	HIGH IMPEDANCE FAULT DETECTOR
HMI	HUMAN MACHINE INTERFACE
HST	HISTORIAN
LGC	SCHEME LOGIC
MET	SUBSTATION METERING
PDC	PHASOR DATA CONCENTRATOR
PMU	PHASOR MEASUREMENT UNIT
PQM	POWER QUALITY MONITOR
RIO	REMOTE I/O DEVICE
RTU	REMOTE TELEMETRY UNIT/REMOTE TERMINAL UNIT
SER	SEQUENCE OF EVENTS RECORDER
TCM	TRIP CIRCUIT MONITOR

NOTES:
1. REFER TO SPECIFICATIONS AND OTHER DRAWINGS FOR ADDITIONAL ABBREVIATIONS.

AGENCY REVIEW

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CHECKED	CE
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CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
ABBREVIATIONS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203505
DRAWING NO. 30GE02
SHEET NO. 14 OF 160

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SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6	FIELD - 7	FIELD - 8
HARDWIRED I/O POINT		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE 7 - IO TABLE	REFER	REFER	AI - ANALOG INPUT AO - ANALOG OUTPUT DI - DISCRETE INPUT DO - DISCRETE OUTPUT RTD - RTD INPUT	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE		
NETWORK / SOFT I/O		1 - TAG 2 - LOOP NUMBER 3 - PROTOCOL 4 - PANEL 5 - PLC 6 - EXISTING/FUTURE 7 - IO TABLE 8 - SWITCH/SEGMENT	REFER	REFER	COMMUNICATION PROTOCOL CNET - CONTROLNET DNET - DEVICENET EIP - ETHERNET/IP FF - FOUNDATION FIELDBUS HART-IP - HART OVER ETHERNET MANF - MFR. PROPRIETARY MBRTU - MODBUS RTU MB+ - MODBUS PLUS MBTCP - MODBUS TCP DP - PROFIBUS DP PA - PROFIBUS PA PNET - PROFINET SNMP - SNMPv3 HTTP - WEB SERVER (TCP/IP)	PAC - PROGRAMMABLE AUTOMATION CONTROLLER NO. PLC - PROGRAMMABLE LOGIC CONTROLLER NO. RIO - REMOTE I/O VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE		
PILOT DEVICE OPERATOR INTERFACE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - DESCRIPTION 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	AM - AUTO/MANUAL BYPASS ESD - EQUIPMENT SHUTDOWN HOA - HAND/OFF/AUTO LOR - LOCAL/OFF/REMOTE LOS - LOCK OUT STOP LS - LEAD/STANDBY LSR - LOCAL/STOP/REMOTE OC - OPEN/CLOSE OO - OFF/ON OSC - OPEN/STOP/CLOSE RST - RESET SEL - SELECT SPD - SPEED SS - START/STOP ST - STOP	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. RVSS - REDUCED VOLTAGE SOLID STARTER NO. VCP - VENDOR CONTROL PANEL NO. VFD - VARIABLE FREQUENCY DRIVE NO.	E - EXISTING F - FUTURE		
POWER DEVICE PRIMARY FUNCTION OPERATOR ACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER DISC - DISCONNECT FU - FUSE	REFER	TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 24VDC - 2P 24VAC - 1P 48VDC - 2P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE	
POWER DEVICE AUXILIARY FUNCTION OPERATOR ACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - DESCRIPTION 4 - DESCRIPTION 5 - DESCRIPTION 6 - EXISTING/FUTURE	DISC - DISCONNECT	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	E - EXISTING F - FUTURE	
POWER DEVICE PRIMARY FUNCTION OPERATOR INACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - VOLTAGE-POLE 5 - LOCATION 6 - EXISTING/FUTURE	CB - CIRCUIT BREAKER FU - FUSE	REFER	MCP - MOTOR CIRCUIT PROTECTOR SS - SOLID STATE CIRCUIT BREAKER TM - THERMAL MAGNETIC CIRCUIT BREAKER	24VDC - 1P 24VDC - 2P 24VAC - 1P 48VDC - 2P 120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	DP - DISTRIBUTION PANEL NO. LCP - LOCAL CONTROL PANEL NO. LP - LIGHTING PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. PP - POWER PANEL NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE	
FIELD EQUIPMENT STARTER / DRIVE CUBICLE / CABINET		1 - TAG 2 - LOOP NUMBER 3 - TYPE 4 - VOLTAGE-POLE 5 - POWER SOURCE 6 - EXISTING/FUTURE	MS - MOTOR STARTER RVAT - REDUCED VOLTAGE AUTO TRANSFORMER STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER VFD - VARIABLE FREQUENCY DRIVE	REFER	FVNR - FULL VOLTAGE NON-REVERSING STARTER FVR - FULL VOLTAGE REVERSING STARTER PWS - PART-WINDING STARTER RVAT - REDUCED VOLTAGE AUTO STARTER RVSS - REDUCED VOLTAGE SOLID STATE STARTER TS1W - TWO SPEED SINGLE WINDING TS2W - TWO SPEED TWO WINDINGS VFD - VARIABLE FREQUENCY DRIVE	120VAC - 1P 208VAC - 2P 208VAC - 3P 240VAC - 2P 240VAC - 3P 480VAC - 3P 2400VAC - 3P 4160VAC - 3P	LCP - LOCAL CONTROL PANEL NO. MCC - MOTOR CONTROL CENTER NO. PCM - PROCESS CONTROL MODULE NO. VCP - VENDOR CONTROL PANEL NO.	E - EXISTING F - FUTURE	

SYMBOL	DRAWING VISIBLE FIELDS	FIELD - 1	FIELD - 2	FIELD - 3	FIELD - 4	FIELD - 5	FIELD - 6	FIELD - 7	FIELD - 8
INSTRUMENT PRIMARY ELEMENT		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR ACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - DESCRIPTION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR ACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
INSTRUMENT/CONTROL ELEMENT PRIMARY FUNCTION OPERATOR INACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
INSTRUMENT/CONTROL ELEMENT AUXILIARY FUNCTION OPERATOR INACCESSIBLE		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
FIELD EQUIPMENT NON-POWERED		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION/SIZE 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
FIELD EQUIPMENT PRIMARY FUNCTION OPERATOR POWERED		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	REFER	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION
FIELD EQUIPMENT AUXILIARY FUNCTION OPERATOR POWERED		1 - TAG 2 - LOOP NUMBER 3 - FUNCTION 4 - FURNISHED BY 5 - LOCATION 6 - EXISTING/FUTURE	MWH - MOTOR WINDING HEATER SWITCH TSH - TEMPERATURE SWITCH XSH - TORQUE SWITCH	REFER	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION	DESCRIPTION

INSTRUMENT BUBBLE LOCATIONS	NOTES
I/O	
POWER SOURCE	
FIELD	

1 INSTRUMENT TAG IDENTIFICATION LETTERS TABLE
 2 OPERATOR PILOT DEVICE LEGEND
 3 EQUIPMENT TAGGING TABLE
 4 I/O TYPE DESIGNATIONS
 5 INSTRUMENT TYPE DESIGNATIONS TABLE
 6 FURNISHED BY:
 FBO FURNISHED BY OWNER
 FBV FURNISHED BY VENDOR
 7 PROVIDED BY:
 PBO PROVIDED BY OWNER
 PBV PROVIDED BY VENDOR

AGENCY REVIEW DESIGNED CE DRAWN CE CHECKED DJC DATE OCTOBER 2025						CITY OF THORNTON THORNTON WATER PROJECT SOURCE WATER PUMP STATION INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 1	VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 203505 DRAWING NO. 30GN01 SHEET NO. 15 OF 160
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INSTRUMENT TAG IDENTIFICATION LETTERS

Table with columns for Measured Variable and Instrumentation Function, listing various codes like AE, AT, AIT, AY, AI, AR, AC, etc.

OPERATOR PILOT DEVICE LEGEND

Table with columns for Pilot Device Function and Device Type, listing codes like HSA, HSB, HSC, HSD, HSE, HSF, HSG, etc.

I/O TYPE DESIGNATIONS

Table listing I/O type designations such as RNG (RUNNING), FAIL (FAILED/FAULT), FWD (RUNNING FORWARD), etc.

INSTRUMENT TYPE DESIGNATIONS

Table listing instrument type designations such as CGD (COMBUSTIBLE GAS DETECTOR), COND (CONDUCTIVITY), DO (DISSOLVED OXYGEN), etc.

SPECIFIC ABBREVIATIONS

Table listing specific abbreviations such as HTR (HEATER), HTU (HEAT TRACE UNIT), MWH (MOTOR WINDING HEATER), etc.

P&ID LINE SYMBOLS

Table showing P&ID line symbols for Instrument or Connection to Process, Pneumatic Signal, Electric Signal, etc.

PROCESS LINE SYMBOLS

Table showing process line symbols for Primary Process Flow in Pipe, Secondary Process Flow in Pipe, etc.

DESIGNATIONS

Table showing designations for Equipment Enclosure, Existing, Future.

MISCELLANEOUS P&ID SYMBOLS

Table showing miscellaneous P&ID symbols for Process Continuation, Signal Continuation, Pipe Callout, Schematic Detail, Typical Detail.

AGENCY REVIEW

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CITY OF THORNTON, THORNTON WATER PROJECT, SOURCE WATER PUMP STATION, INSTRUMENTATION, SYMBOLS AND ABBREVIATIONS 2

VERIFY SCALES, BAR IS ONE INCH ON ORIGINAL DRAWING, 0 1", SHEET NO. 16 OF 160

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1	2	3	4	5	6	7	8	9	10	11	12	13		
<p>ACTUATORS</p> <p>DIAPHRAGM ELECTRIC HYDRAULIC ELECTRIC HAND HYDRAULIC MOTOR PNEUMATIC SOLENOID</p> <p>HYDRAULIC MODULATING</p> <p>PNEUMATIC SINGLE SOLENOID OPEN/CLOSE</p> <p>PNEUMATIC SINGLE SOLENOID w/ SPEED CONTROL</p> <p>PNEUMATIC DUAL SOLENOID OPEN/CLOSE</p> <p>PNEUMATIC DUAL SOLENOID OPEN/HOLD/CLOSE</p> <p>PNEUMATIC DUAL SOLENOID OPEN/CLOSE w/ SPEED CONTROL</p> <p>PNEUMATIC MODULATING</p> <p>PNEUMATIC MODULATING OPEN/CLOSE w/ SPEED CONTROL</p>						<p>PIPING</p> <p>AIR GAP BLIND FLANGE CAPPED OR PLUGGED CONCENTRIC INCREASER CONCENTRIC REDUCER DRAIN ECCENTRIC INCREASER FLANGED CONNECTION</p> <p>TEE UNION ECCENTRIC REDUCER EXPANSION COUPLING EXPANSION JOINT VIBRATION CENTER FLEXIBLE CONNECTION QUICK DISCONNECT</p>			<p>PUMPS</p> <p>AIR DRIVEN CENTRIFUGAL CHEMICAL FEED DIAPHRAGM DIAPHRAGM GEAR LOBE PERISTALTIC OR HOSE PISTON PROGRESSIVE CAVITY</p> <p>SUBMERSIBLE VERTICAL TURBINE VERTICAL CHOPPER WATER CHAMP</p>			<p>BLOWERS/COMPRESSORS/FANS</p> <p>CENTRIFUGAL SINGLE STAGE BLOWER/FAN CENTRIFUGAL MULTI STAGE BLOWER RECIPROCATING COMPRESSOR SCREW COMPRESSOR FAN LIQUID RING COMPRESSOR ROTARY LOBE BLOWER</p>		

CHECK VALVES		PRESSURE VALVES		VALVES		MISC																																																																																				
BACK FLOW PREVENTER	BALL	DIAPHRAGM CHECK	DOUBLE FLAP	FLAPPER	SLANTING CHECK VALVE	SPRING LOADED GENERAL	SPRING LOADED SWING	SWING	BACKPRESSURE REGULATING SELF CONTAINED	BACKPRESSURE REGULATING EXTERNAL TAP	PRESSURE REDUCING SELF CONTAINED	PRESSURE REDUCING EXTERNAL TAP	REGULATING	PRESSURE RELIEF	VACUUM RELIEF	3-WAY	3-WAY PLUG	4-WAY	AIR-RELIEF	ANGLE	BALL	BALL V-NOTCH	BUTTERFLY	BUTTERFLY-BURIED VALVE BOX	CONE	DUCKBILL	DIAPHRAGM	FLOAT	GATE	GATE-BURIED VALVE BOX	GLOBE	HOSE	MISCELLANEOUS	MUD	NEEDLE	PINCH	PLUG ECCENTRIC	PLUG ECCENTRIC w-VALVE BOX	PLUG ECCENTRIC LUBRICATED	PLUG ECCENTRIC BURIED VALVE BOX	PLUG CONCENTRIC	PLUG CONCENTRIC -BURIED VALVE BOX	PLUG CONCENTRIC LUBRICATED	PLUG CONCENTRIC LUBRICATED BURIED VALVE BOX	PUMP DISCHARGE	TELESCOPING	AIR / CHEMICAL DIFFUSER	BASKET STRAINER	BLOW-OFF SILENCER	CALIBRATION COLUMN	COALESCER	DESICCANT DRYER	EDUCTOR/EJECTOR	EQUIPMENT/ INSTRUMENT LOCATOR	EYEWASH	FILTER	FILTER SEPARATOR	FINE FILTER	FIRE ALARM/SENSOR	FLAME ARRESTER	FLAME ARRESTER w/THERMALLY OPERATED VALVE	FLOW CONDITIONER	GAS CANNON	GRINDER	HEAT EXCHANGER	HOIST	HORIZONTAL MIXER	HOSE CONNECTION	INLET STRAINER	INLINE STATIC MIXER	INLINE DUCT BALANCING DAMPER	LOUVER OR BACKDRAFT DAMPER	MATERIAL CHANGE	MIXER	NOZZLE	ORIFICE RESTRICTION	PERISTALTIC COMPOSITE SAMPLER	PULSATION DAMPENER	REFRIGERATED DRYER	RUPTURE DISK	SAMPLE PORT	SIGHT TUBE	SMOKE DETECTOR	STRAINER - MECHANICALLY CLEANED	STRAINER WITH BLOW OFF	STRAINER WYE TYPE	VAPOR HEATER	VAPORIZER	VENT	VENT TO ATMOSPHERE

VALVE DESIGNATIONS

NO	NORMALLY OPEN
NC	NORMALLY CLOSED
FO	FAIL OPEN
FC	FAIL CLOSE
FLP	FAIL LAST POSITION

<p>AGENCY REVIEW</p>		<p>DESIGNED CE</p> <p>DRAWN CE</p> <p>CHECKED DJC</p> <p>DATE OCTOBER 2025</p>				<p>CITY OF THORNTON THORNTON WATER PROJECT SOURCE WATER PUMP STATION INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 3</p>			<p>VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"</p> <p>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</p>	<p>JOB NO. 203505</p> <p>DRAWING NO. 30GN03</p> <p>SHEET NO. 17 OF 160</p>
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	FLOW		FLUMES		GATES		LEVELS		NETWORKS							
	CORIOLIS MAGNETIC ORIFICE PADDLE WHEEL PISTON ANNUBAR PITOT TUBE POSITIVE-DISPLACEMENT PROPELLER-TURBINE		ROTAMETER SHUTTLE THERMAL ULTRASONIC ULTRASONIC BIOGAS V-CONE VENTURI TUBE OR FLOW NOZZLE VORTEX		LEOPOLD-LAGCO PALMER-BOWLUS PARSHALL REGULAR CUTTHROAT TRAPEZOIDAL		SIDE VIEW PLAN VIEW FLAP KNIFE SLIDE SLUICE STOP STOP WEIR BUTTERFLY		BUBBLER CAPACITANCE TANK DIFFERENTIAL PRESSURE DISPLACEMENT ELECTRODE BALL FLOAT INVERTED COLUMN PROBE		RADAR PTOF RADAR (FREQUENCY MODULATED CONTINUOUS WAVE) RADAR TDR SUSPENDED/SUBMERSIBLE TUNING FORK ULTRASONIC		CABLE CALLOUTS AND ABBREVIATIONS FIBER ABBREVIATIONS FIBER LINE REPRESENTS ONE 24-STRAND FIBER OPTIC CABLE FIBER LINE REPRESENTS TWO 24-STRAND FIBER OPTIC CABLES EACH FIBER LINE REPRESENTS ONE 24-STRAND FIBER OPTIC CABLE COPPER LINE REPRESENTS FOUR COPPER ETHERNET CABLES EACH COPPER LINE REPRESENTS TWO COPPER ETHERNET CABLES NETWORK ABBREVIATIONS BMS = BUILDING MANAGEMENT SYSTEM BSN = BUSINESS NETWORK FCN = FIELD CONTROL NETWORK MIN = MAINTENANCE INFORMATION NETWORK PCN = PROCESS CONTROL NETWORK PLCN = PLC NETWORK SCN = SECURITY CONTROL NETWORK PCN-W = WIRELESS PROCESS CONTROL NETWORK NR = NETWORK RACK NP = NETWORK PANEL ES = ETHERNET SWITCH FPP = FIBER PATCH PANEL VLAN SYMBOLS [Symbol] = BUSINESS NETWORK [Symbol] = SECURITY CONTROL NETWORK [Symbol] = BUILDING MANAGEMENT SYSTEM [Symbol] = PROCESS CONTROL NETWORK [Symbol] = WIRELESS PROCESS CONTROL NETWORK [Symbol] = MAINTENANCE INFORMATION NETWORK [Symbol] = PLC NETWORK [Symbol] = FIELD CONTROL NETWORK			

PRESSURE/VACUUM			TEMPERATURE		WEIRS		NETWORK LINE SYMBOLS					
PRESSURE		DIFFERENTIAL PRESSURE	PRESSURE SEALS		TEMPERATURE w/THERMOWELL TEMPERATURE GAUGE THERMOMETER		SIDE VIEW		PLAN VIEW		COPPER ETHERNET DUPLIX FIBER PATCH FIBER OPTIC ETHERNET WIRELESS PROFIBUS DP PROFIBUS PA SERIAL DATA	
GAUGE PRESSURE SWITCH PRESSURE TRANSMITTER MANOMETER		GAUGE DIFFERENTIAL INDICATOR DIFFERENTIAL PRESSURE SWITCH DIFFERENTIAL PRESSURE TRANSMITTER	SEAL ANNULAR SEAL DIAPHRAGM SEAL SANITARY EXAMPLE PRESSURE SWITCH		WEIGHT PLATFORM SCALE		RECTANGULAR w/o END CONTRACTIONS RECTANGULAR w/ END CONTRACTIONS V-NOTCH (TRIANGULAR) TRAPEZOIDAL (CIPOLLETTI)		RECTANGULAR w/o END CONTRACTIONS RECTANGULAR w/ END CONTRACTIONS V-NOTCH (TRIANGULAR) TRAPEZOIDAL (CIPOLLETTI)		MISCELLANEOUS NETWORK SYMBOLS NETWORK CABLE CONTINUATIONS FIELD NETWORK DEVICE NETWORK EQUIPMENT CALLOUT	

AGENCY REVIEW			DESIGNED CE				CITY OF THORNTON THORNTON WATER PROJECT SOURCE WATER PUMP STATION INSTRUMENTATION SYMBOLS AND ABBREVIATIONS 4				VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 203505
			DRAWN CE				DRAWING NO. 30GN04					
			CHECKED DJC				SHEET NO. 18 OF 160					
REV	DATE	BY	DESCRIPTION	DATE OCTOBER 2025								

10/29/2025 2:12 PM

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1			2			3			4			5			6			7			8			9			10			11			12			13		
DETAIL, REFERENCE & LOCATION DESIGNATIONS			HAND SWITCHES			PROCESS SWITCHES			MISCELLANEOUS																													
<p>SCHMATIC NUMBER → # → SCHMATIC DESCRIPTION</p> <p>DESCRIPTION</p> <p>CONTROL SCHEMATIC</p> <p>TAG NUMBER → TAG → LOOP → XXX → XXX- → PRIMARY EQUIPMENT LOOP</p> <p>REFERENCE DWG. DWG1 → P&ID REFERENCE</p> <p>ADDITIONAL REFERENCES</p> <p>LOCATION LEGEND → XXX → IN/AT XXX → ABBREVIATION → LOCATION DESCRIPTION</p>			<p>NORMALLY OPEN MOMENTARY PUSHBUTTON</p> <p>NORMALLY CLOSED MOMENTARY PUSHBUTTON</p> <p>MUSHROOM HEAD PUSHBUTTON NORMALLY OPEN</p> <p>MUSHROOM HEAD PUSHBUTTON NORMALLY CLOSED</p> <p>PUSH-PULL PUSHBUTTON MAINTAINED CONTACT</p> <p>PUSH-PULL PUSHBUTTON NORMALLY CLOSED</p> <p>PADLOCK SWITCH</p> <p>PULL CORD SWITCH</p> <p>STOP-LOCKOUT PUSHBUTTON</p> <p>THREE POSITION SELECTOR SWITCH a = POSITION 1 b = POSITION 2 c = POSITION 3 x = DENOTES POSITION CONTACTS CLOSED IN</p> <p>TWO POSITION SELECTOR SWITCH NORMALLY OPEN</p> <p>TWO POSITION SELECTOR SWITCH NORMALLY CLOSED</p> <p>SPRING-RETURN</p>			<p>LEVEL SWITCH CLOSE ON RISING LEVEL</p> <p>LEVEL SWITCH OPEN ON RISING LEVEL</p> <p>PRESSURE SWITCH CLOSE ON RISING PRESSURE</p> <p>PRESSURE SWITCH OPEN ON RISING PRESSURE</p> <p>TEMPERATURE SWITCH CLOSE ON RISING TEMPERATURE</p> <p>TEMPERATURE SWITCH OPEN ON RISING TEMPERATURE</p> <p>FLOW SWITCH CLOSE ON INCREASE IN FLOW</p> <p>FLOW SWITCH OPEN ON INCREASE IN FLOW</p> <p>VIBRATION SWITCH OPEN ON RISING VIBRATION</p> <p>VIBRATION SWITCH CLOSE ON RISING VIBRATION</p> <p>TORQUE SWITCH OPEN ON HIGH TORQUE</p> <p>TORQUE SWITCH CLOSE ON HIGH TORQUE</p> <p>NORMALLY CLOSED LIMIT SWITCH</p> <p>NORMALLY CLOSED HELD OPEN LIMIT SWITCH</p> <p>NORMALLY OPEN LIMIT SWITCH</p> <p>NORMALLY OPEN HELD CLOSED LIMIT SWITCH</p>			<p>VARISTOR</p> <p>CAPACITOR</p> <p>RESISTOR</p> <p>BATTERY</p> <p>DIODE</p> <p>MOTOR OVERLOAD HEATERS</p> <p>OVERLOAD CONTACT</p> <p>DRAWOUT CONNECTION</p> <p>GROUND</p> <p>LIGHTNING ARRESTOR</p> <p>SOLENOID</p> <p>CIRCUIT BREAKER</p> <p>DISCONNECT</p> <p>FUSE</p> <p>TRANSIENT SURGE PROTECTION</p> <p>MOTOR WINDING HEATER</p>			<p>ETM → ELAPSED TIME METER</p> <p>RTD</p> <p>MISC PORT a = TYPE</p> <p>ETHERNET PORT</p> <p>SPD → SURGE PROTECTION DEVICE</p> <p>TRANSFORMER LINE/LOAD REACTOR</p> <p>SPEED SWITCH</p> <p>SPEED POTENTIOMETER</p> <p>CONNECTION</p> <p>NO CONNECTION</p> <p>SHIELDED WIRE</p> <p>CONTROL POWER TRANSFORMER</p>																										
<p>TYPICAL TAGGING IDENTIFICATION</p> <p>TAGGING IDENTIFICATION</p> <p>1 = TAG: REFER TO THE EQUIPMENT AND INSTRUMENT TAGGING TABLES</p> <p>2 = DESCRIPTION</p> <p>3 = LOCATION: REFER TO THE LOCATION LEGEND</p> <p>ADDITIONAL FIELDS, IF ANY, ARE INDICATED NEXT TO THE RESPECTIVE SYMBOLS</p>			<p>RELAYS</p> <p>RELAY COIL a = TYPE CR = CONTROL RELAY TD = TIME DELAY RELAY M = MOTOR STARTER COIL L = MOTOR STARTER COIL - LOW SPEED H = MOTOR STARTER COIL - HIGH SPEED F = MOTOR STARTER COIL - FORWARD R = MOTOR STARTER COIL - REVERSE</p> <p>b = TIME DELAY STATE TDON = TIME DELAY ON ENERGIZATION TDOFF = TIME DELAY ON DEENERGIZATION</p> <p>c = TIMING RANGE/SETTING</p> <p>NORMALLY OPEN CONTROL CONTACT</p> <p>NORMALLY CLOSED CONTROL CONTACT</p> <p>TIME DELAY CONTACT NCTC = NORMALLY CLOSED TIMED CLOSING</p> <p>TIME DELAY CONTACT NCTO = NORMALLY CLOSED TIMED OPENING</p> <p>TIME DELAY CONTACT NOTO = NORMALLY OPEN TIMED OPENING</p> <p>TIME DELAY CONTACT NOTC = NORMALLY OPEN TIMED CLOSING</p>			<p>INDICATORS</p> <p>PILOT LIGHT a = LENS COLOR R = RED G = GREEN W = WHITE A = AMBER B = BLUE Y = YELLOW C = CLEAR</p> <p>PUSH-TO-TEST LIGHT</p> <p>BEACON</p> <p>HORN</p>			<p>MOTORS</p> <p>MOTOR - 1 PHASE a = HORSEPOWER</p> <p>MOTOR - 3 PHASE</p>			<p>I/O</p> <p>PLC DISCRETE a = INPUT/OUTPUT b = I/O VOLTAGE</p> <p>PLC ANALOG</p> <p>DIGITAL BUS a = PROTOCOL</p>																										

<p>AGENCY REVIEW</p>			<p>DESIGNED CE</p> <p>DRAWN CE</p> <p>CHECKED DJC</p> <p>DATE OCTOBER 2025</p>								<p>CITY OF THORNTON</p> <p>THORNTON WATER PROJECT</p> <p>SOURCE WATER PUMP STATION</p> <p>INSTRUMENTATION</p> <p>SCHEMATIC SYMBOLS</p>			<p>VERIFY SCALES</p> <p>BAR IS ONE INCH ON ORIGINAL DRAWING</p> <p>0 1"</p> <p>IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY</p>		<p>JOB NO. 203505</p> <p>DRAWING NO. 30GN05</p> <p>SHEET NO. 19 OF 160</p>	
1	2	3	4	5	6	7	8	9	10	11	12	13					

EQUIPMENT TAGGING SYSTEM

XXX-AABC

EQUIPMENT DESCRIPTOR			
XXX		XXX	
AB	AERATION BASIN	GRC	GRIT CHAMBER
AER	AERATOR	GRI	GRINDER
AHU	AIR HANDLING UNIT	GRD	GRIT DEWATERING UNIT (CYCLONE)
ARC	AIR COMPRESSOR	GRW	GRIT WASHER
ATS	AUTOMATIC TRANSFER SWITCH	GTW	GATEWAY
AUG	AUGER	HPU	HYDRAULIC POWER UNIT
AVR	AIR VACUUM RELIEF	IC	ISOLATION CONTACTOR
BAR	BAR SCREEN	INM	INDUCTION MIXER
BAS	BASIN	MAU	MAKE-UP AIR UNIT
BC	BYPASS CONTACTOR	MIX	MIXER
BFP	BELT FILTER PRESS	MS	MOTOR STARTER
BIT	BIO TOWER	MPR	MOTOR PROTECTION RELAY
BLO	BLOWER	NP	NETWORK PANEL
BOI	BOILER	NR	NETWORK RACK
BUR	BURNER	OZG	OZONE GENERATOR
CB	CIRCUIT BREAKER	PBU	POLYMER BLENDING UNIT
CC	COMMUNICATIONS CABINET	PCM	PROCESS CONTROL MODULE
CEN	CENTRIFUGE	PDC	POWER DISTRIBUTION CENTER
CHI	CHILLER	PMP	PUMP
CHL	CHLORINATOR	PPR	PUMP PROTECTION RELAY
CLA	CLASSIFIER	PQM	POWER QUALITY METER
CLR	CLARIFIER	REC	RECEIVER
COL	COLLECTOR	RVSS	REDUCED VOLTAGE STARTER
CON	CONVEYOR	RIO	REMOTE IO PANEL
COO	COOLER	RES	RESERVOIR
COS	COMPOSITE SAMPLER	RUD	ROLL UP DOOR
CF	CARTRIDGE FILTER	SCB	SCRUBBER
CR	CONTROL RELAY	SCR	SCREEN
CRN	BRIDGE CRANE/HOIST/MONORAIL	SCW	SCREW
CYC	CYCLONE CLASSIFIER	SF	SUPPLY FAN
DAM	DAMPER	SHA	SHAKER
DCD	DC DRIVE	SLA	SLAKER
DEC	DECARBONATOR	SLC	SLUDGE COLLECTOR
DGC	DIGESTER GAS CONDITIONING	SPD	SURGE PROTECTION DEVICE
DIF	DIFFUSER	SRR	STIRRER
DIG	ANAEROBIC DIGESTER	STR	STRAINER
DISC	DISCONNECT	SV	SOLENOID VALVE
DRY	DRYER	SWC	SCREENING WASHER COMPACTOR
DSC	DUST COLLECTOR	THI	THICKENER
EDU	EDUCTOR	TIP	TIPPING TROUGH
EF	EXHAUST FAN	TNK	TANK
ES	ETHERNET SWITCH	UVB	UV BANK
ERD	ENERGY RECOVERY DEVICE	UVR	ULTRAVIOLET REACTOR
EUH	ELECTRIC UNIT HEATER	VAL	VALVE
EVP	EVAPORATOR	LCP	LOCAL CONTROL PANEL
EXC	EXCHANGER	VCP	VENDOR CONTROL PANEL
FACP	FIRE ALARM CONTROL PANEL	VFD	VARIABLE FREQUENCY DRIVE
FDR	FEEDER	WEL	WELL
FLA	FLARE	*CV	* CONTROL VALVE
FLC	FLOCCULATOR	*V	* VALVE
FLT	FILTER	*CG	* CONTROL GATE
FU	FUSE	*G	* GATE
GAT	GATE		* = A (ANALYTICAL), F (FLOW), L (LEVEL)
GEN	ENGINE GENERATOR		P (PRESSURE), T (TEMPERATURE)

PROCESS EQUIPMENT		
A	B	DESCRIPTION
PUMP STATION		
30	1	PUMP 1 (FUTURE)
	1	PUMP 1 DISCH VALVE (FUTURE)
	2	PUMP 2
	2	PUMP 2 DISCH VALVE
	3	PUMP 3
	3	PUMP 3 DISCH VALVE
	4	PUMP 4 (FUTURE)
	5	PUMP 5
	6	PUMP 6
31	0	PS DISCH VALVE 1
	0	WASHWATER SUMP PUMP
	1	PS DISCH VALVE 2
34	0	RESERVOIR MIDDLE INTAKE HYDRAULIC GATE
	1	RESERVOIR LOWER INTAKE HYDRAULIC GATE

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AGENCY REVIEW			
DESIGNED	CE		
DRAWN	CE		
CHECKED	DJC		
DATE	OCTOBER 2025		
REV	DATE	BY	DESCRIPTION
1			



CITY OF THORNTON
 THORNTON WATER PROJECT
 SOURCE WATER PUMP STATION
 INSTRUMENTATION
 EQUIPMENT TAGGING

VERIFY SCALES	JOB NO. 203505
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 30GN07
0 1"	SHEET NO. 21 OF 160
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	

10/29/2025 2:13 PM

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GENERAL NOTES:

- 1. DIGITAL NETWORK TABLE IS TYPICAL FOR ONE PIECE OF EQUIPMENT, REFER TO P&IDS FOR EQUIPMENT COUNT AND TOTAL NUMBER OF TABLES NEEDED.

KEY NOTES:

- 1. THE VARIABLE FREQUENCY DRIVES WILL BE CONNECTED VIA HARD WIRED SIGNALS ONLY. THE DRIVES WILL HAVE ETHERNET RJ45 CONNECTIONS FOR POTENTIAL FUTURE USE.

ATS_1						
AUTOMATIC TRANSFER SWITCH						
PROTOCOL: SNMPv3						
DESCRIPTION	CONTROL	HISTORIZE	INDICATE	ALARM	TREND	INTERLOCK
START	✓		✓			
STOP	✓	✓	✓			

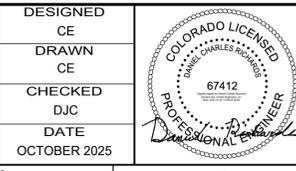
SWBD_1						
SWITCHBOARD						
PROTOCOL: MODBUS TCP						
DESCRIPTION	CONTROL	HISTORIZE	INDICATE	ALARM	TREND	INTERLOCK
A PH V		✓	✓		✓	
B PH V		✓	✓		✓	
C PH V		✓	✓		✓	
A PH CURRENT		✓	✓		✓	
B PH CURRENT		✓	✓		✓	
C PH CURRENT		✓	✓		✓	
A PH DEMAND CURRENT		✓	✓			
B PH DEMAND CURRENT		✓	✓			
C PH DEMAND CURRENT		✓	✓			
3 PH AVG DEMAND CURRENT		✓	✓		✓	
WATTS		✓	✓		✓	
VARs		✓	✓		✓	
VA		✓	✓		✓	
VA DEMAND		✓	✓		✓	
W DEMAND		✓	✓		✓	
ENERGY		✓	✓		✓	
FREQUENCY		✓	✓		✓	
POWER FACTOR		✓	✓		✓	
BREAKER OPEN		✓	✓			
BREAKER TRIPPED		✓	✓	✓		
POWER FAIL ON BUS		✓	✓	✓		
ON UTIL POWER		✓	✓			

SWGR_1						
SWITCHGEAR						
PROTOCOL: SNMPv3						
DESCRIPTION	CONTROL	HISTORIZE	INDICATE	ALARM	TREND	INTERLOCK
A PH V		✓	✓		✓	
B PH V		✓	✓		✓	
C PH V		✓	✓		✓	
A PH CURRENT		✓	✓		✓	
B PH CURRENT		✓	✓		✓	
C PH CURRENT		✓	✓		✓	
A PH DEMAND CURRENT		✓	✓			
B PH DEMAND CURRENT		✓	✓			
C PH DEMAND CURRENT		✓	✓			
3 PH AVG DEMAND CURRENT		✓	✓		✓	
WATTS		✓	✓		✓	
VARs		✓	✓		✓	
VA		✓	✓		✓	
VA DEMAND		✓	✓		✓	
W DEMAND		✓	✓		✓	
ENERGY		✓	✓		✓	
FREQUENCY		✓	✓		✓	
POWER FACTOR		✓	✓		✓	
BREAKER OPEN		✓	✓			
BREAKER TRIPPED		✓	✓	✓		
POWER FAIL ON BUS		✓	✓	✓		
ON UTIL POWER		✓	✓			

UPS_1						
CABINET UPS						
PROTOCOL: SNMPv3						
DESCRIPTION	CONTROL	HISTORIZE	INDICATE	ALARM	TREND	INTERLOCK
UPS SWITCHED TO BATTERY POWER		✓	✓	✓	✓	
AC POWER RESTORED		✓	✓	✓	✓	
UPS INTERNALLY BYPASSED		✓	✓	✓	✓	
UPS BYPASS UNAVAILABLE		✓	✓	✓	✓	
UPS OUTPUT OFF		✓	✓	✓	✓	
UPS RETURNED TO UTILITY POWER		✓	✓	✓	✓	
REPLACE BATTERY WARNING		✓	✓	✓	✓	
UPS BATTERY TEST IN PROGRESS		✓	✓	✓	✓	
LOW BATTERY ALARM		✓	✓	✓	✓	
UPS OUTPUT OVERLOADED		✓	✓	✓	✓	
UPS HARDWARE FAILED		✓	✓	✓	✓	
UPS BATTERY DISCHARGED		✓	✓	✓	✓	
UPS INVERTER FAILED		✓	✓	✓	✓	
UTILITY POWER FAULTED		✓	✓	✓	✓	
UPS SHUTDOWN IMMINENT		✓	✓	✓	✓	
UPS CIRCUIT BREAKER ALARM		✓	✓	✓	✓	
COMMUNICATION WITH UPS LOST		✓	✓	✓	✓	
UPS TEMPERATURE ALARM		✓	✓	✓	✓	
UPS SWITCHED TO BATTERY POWER		✓	✓	✓	✓	
LOW BATTERY ALARM		✓	✓	✓	✓	
UPS FAULTED		✓	✓	✓	✓	

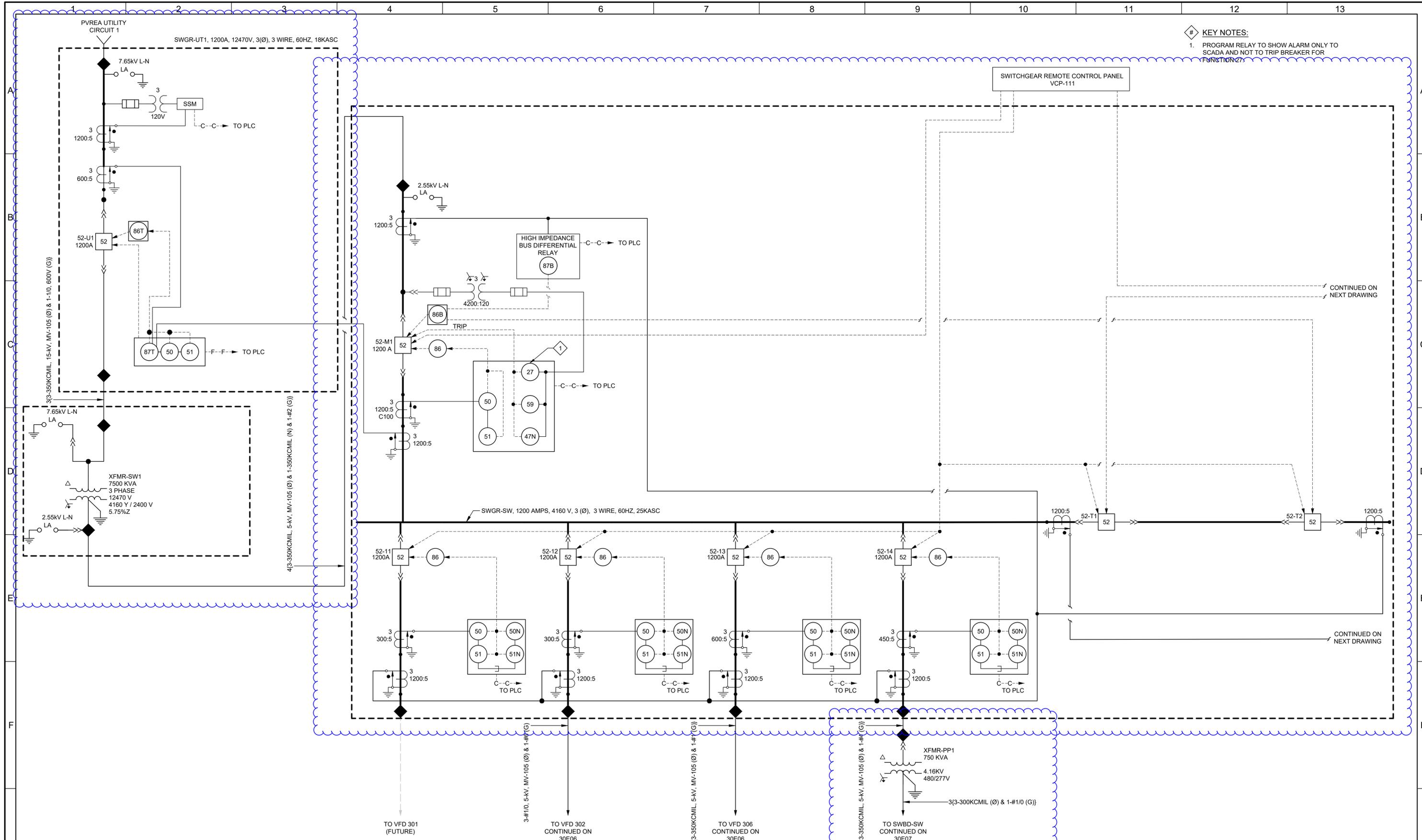
VFD_1						
SOURCE WATER PUMP						
PROTOCOL: HARDWIRED						
DESCRIPTION	CONTROL	HISTORIZE	INDICATE	ALARM	TREND	INTERLOCK
LOCAL			✓			
OFF	✓		✓			
REMOTE			✓			
STOP	✓		✓			
START	✓		✓			
SPEED	✓		✓			
SPEED FEEDBACK		✓	✓		✓	
RESET ELAPSED TIME	✓		✓			
RUNNING		✓	✓		✓	
TOTAL STARTS		✓	✓			
DAILY STARTS		✓	✓			
ELAPSED TIME		✓	✓			
DAILY RUN TIME		✓	✓			
PH V		✓	✓		✓	
PH CURRENT		✓	✓		✓	
POWER KVA		✓	✓		✓	
CURRENT ALARM HIGH			✓	✓		✓
OVERLOAD			✓	✓		✓
FAULT		✓	✓	✓		✓
FAIL TO RESPOND			✓	✓		✓
EQUIPMENT SHUTDOWN			✓	✓		✓
LOW FLOW			✓	✓		✓
LOW LOW LEVEL			✓	✓		✓
ESD OK	✓	✓	✓	✓		✓

AGENCY REVIEW		
DESIGNED	CE	
DRAWN	CE	
CHECKED	DJC	
DATE	OCTOBER 2025	
REV	DATE	BY
1		



CITY OF THORNTON
 THORNTON WATER PROJECT
 SOURCE WATER PUMP STATION
 INSTRUMENTATION
 DIGITAL NETWORK TABLES

VERIFY SCALES	JOB NO. 203505
BAR IS ONE INCH ON ORIGINAL DRAWING	DRAWING NO. 30GN08
0 1"	SHEET NO. 22 OF 160
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	



KEY NOTES:
 1. PROGRAM RELAY TO SHOW ALARM ONLY TO SCADA AND NOT TO TRIP BREAKER FOR FUNCTION 27.

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CONTINUED ON NEXT DRAWING

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2			

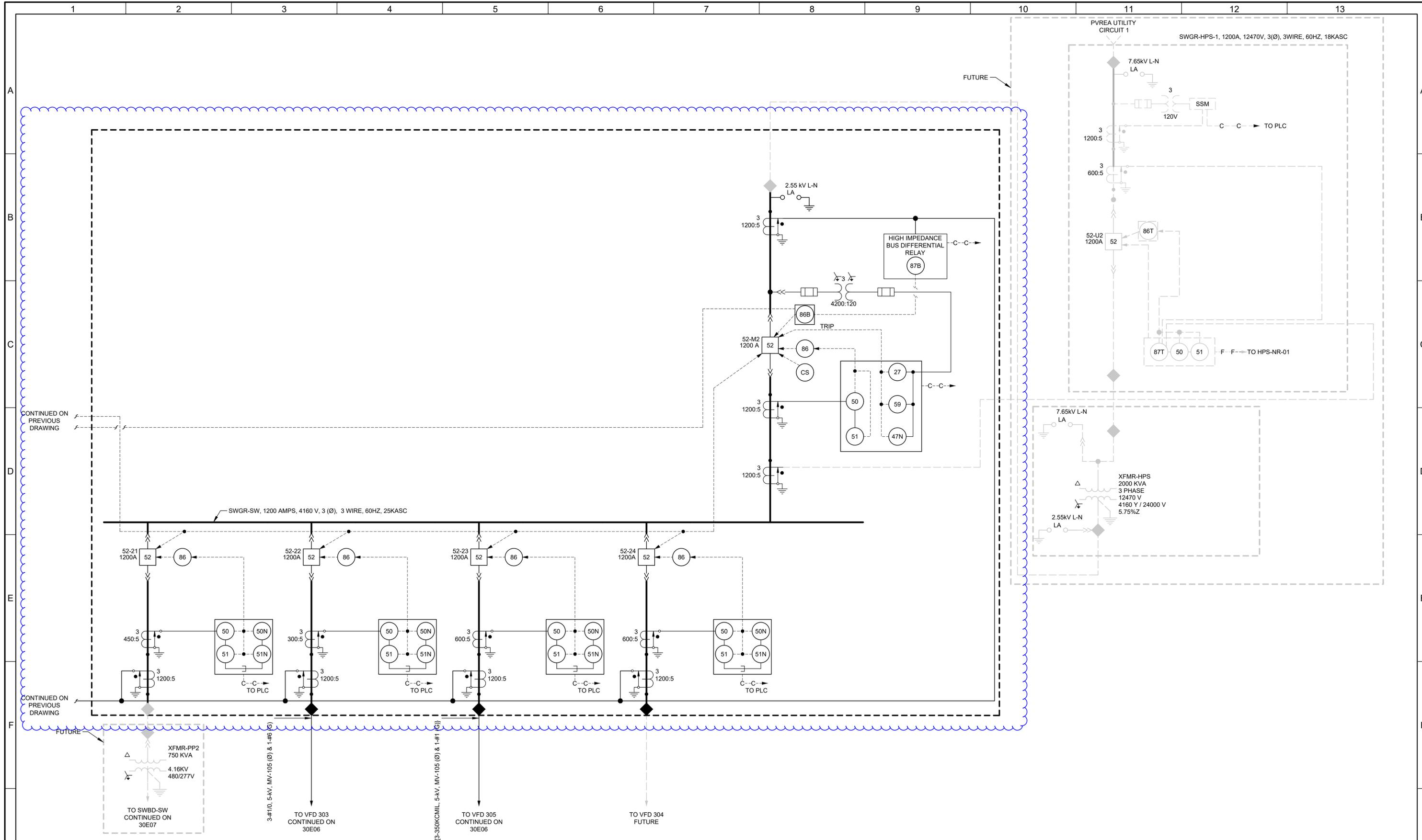
DESIGNED	JD
DRAWN	CWG
CHECKED	TDH
DATE	OCTOBER 2025



CITY OF THORNTON
 THORNTON WATER PROJECT
 SOURCE WATER PUMP STATION
 ELECTRICAL
 SWGR-SW ONE-LINE DIAGRAM 1

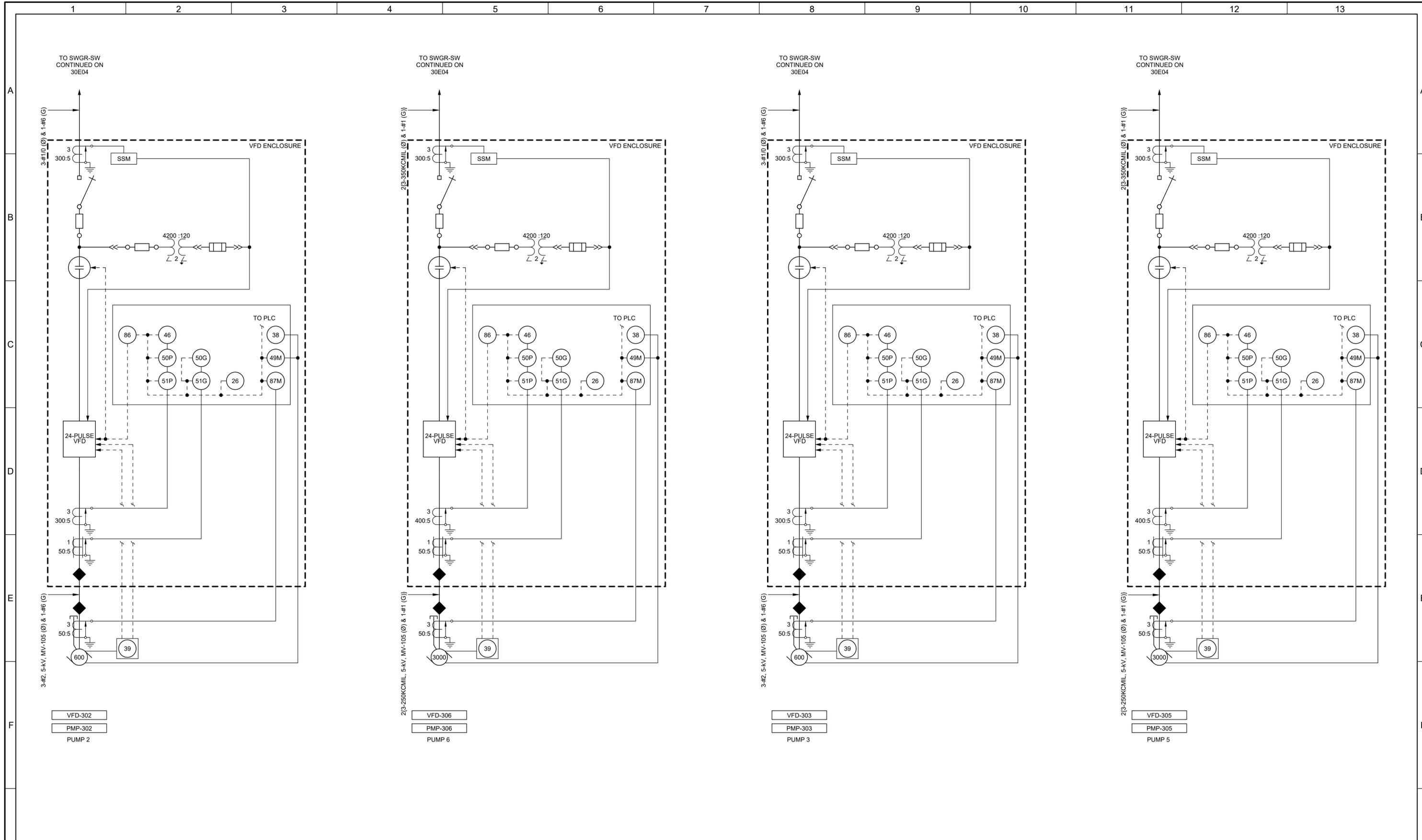
VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203505
 DRAWING NO. 30E04
 SHEET NO. 88 OF 160



AGENCY REVIEW	DESIGNED JD				CITY OF THORNTON	JOB NO. 203505
	DRAWN CWG				THORNTON WATER PROJECT	DRAWING NO. 30E05
	CHECKED TDH				ELECTRICAL	SHEET NO. 89 OF 160
	DATE OCTOBER 2025				SWGR-SW ONE-LINE DIAGRAM 2	
REV	DATE	BY	DESCRIPTION		VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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JD
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DATE
OCTOBER 2025

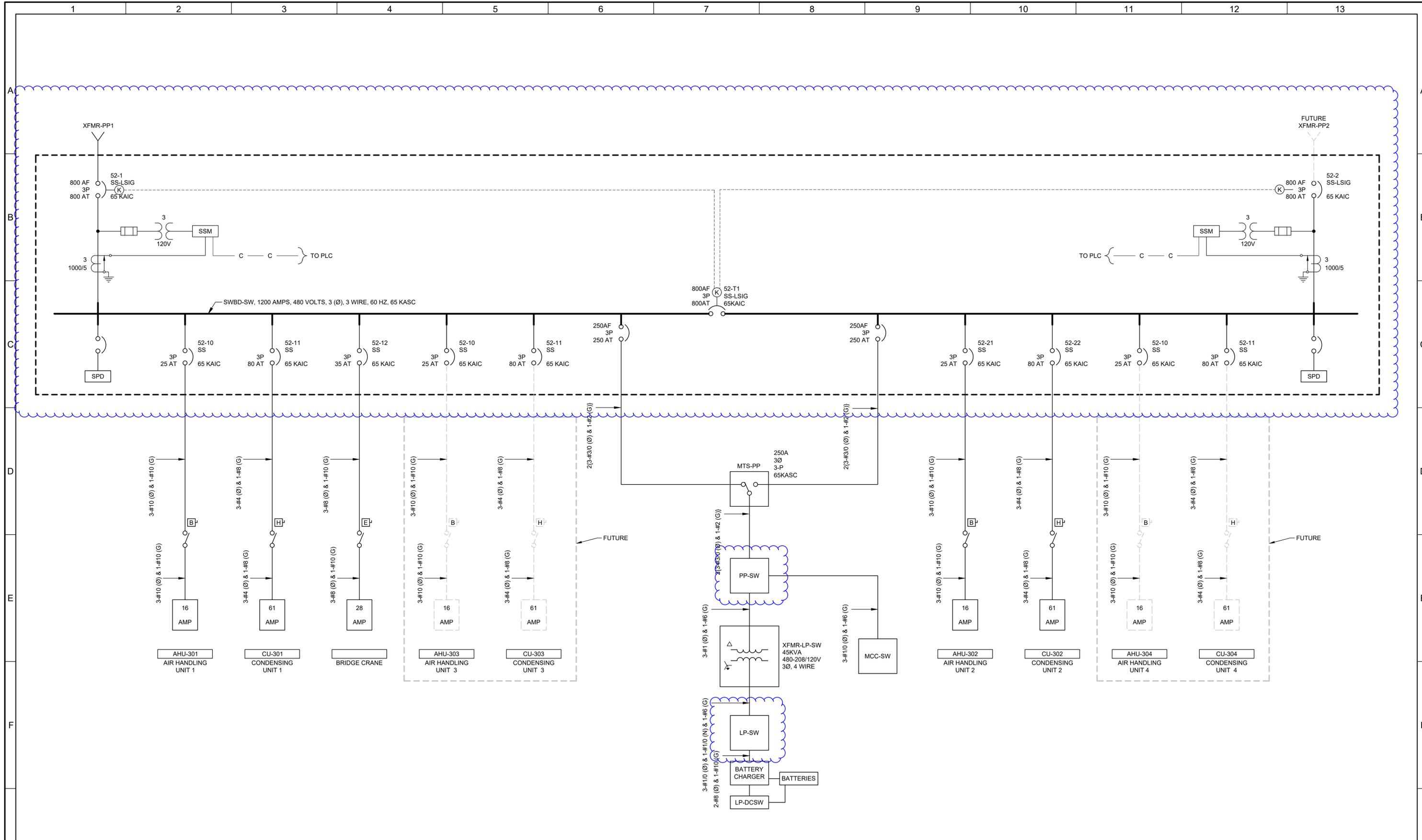


CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
PUMPS 1-5
ONE-LINE DIAGRAMS

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
203505
DRAWING NO.
30E06
SHEET NO.
90 OF 160

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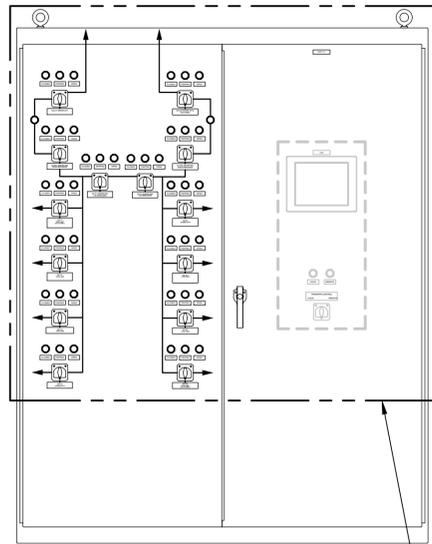
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DESIGNED
JD
DRAWN
CWG
CHECKED
TDH
DATE
OCTOBER 2025

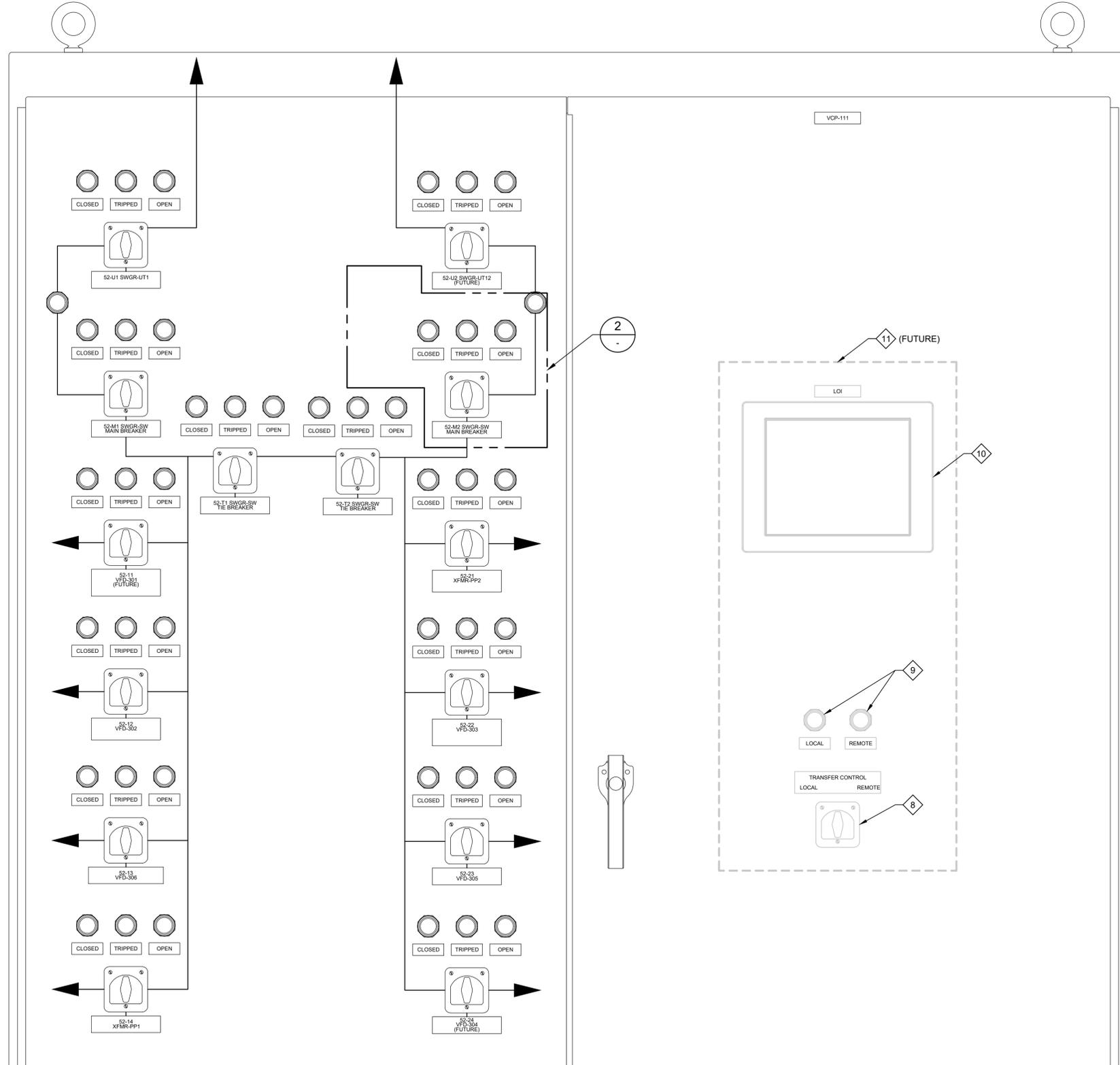


CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
SWBD-SW ONE-LINE DIAGRAM

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 203505
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. 30E07
	SHEET NO. 91 OF 160



A ELEVATION
SCALE: 3/4" = 1'-0"



1 DETAIL
SCALE: 3" = 1'-0"

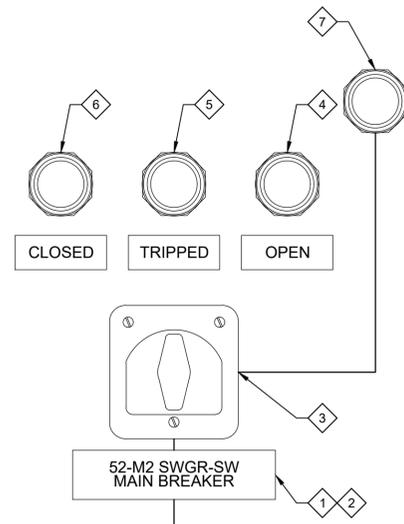
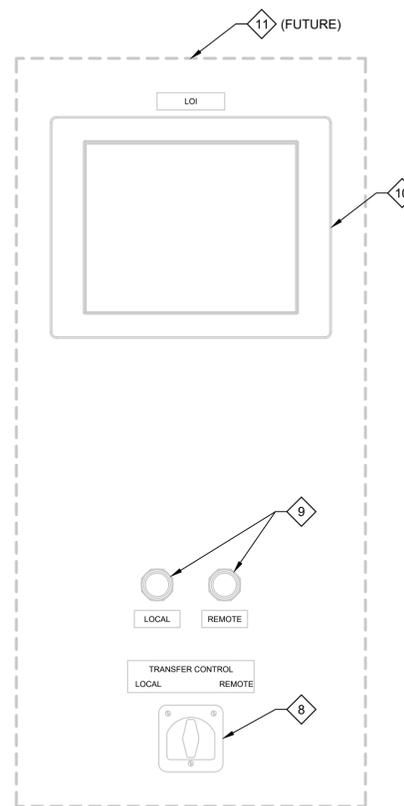
2 DETAIL
SCALE: 6" = 1'-0"

GENERAL NOTES:

1. EACH BREAKER CONTROL SWITCH AND INDICATING LIGHT SET ARE TYPICAL OF DEVICES SHOWN IN DETAIL 2.
2. ALL PILOT LIGHTS SHALL BE PUSH TO TEST, LED TYPE.
3. PROVIDE CONTROL SWITCHES, INDICATING LIGHTS, NAMEPLATES, AND WIRING TO FIELD TERMINAL BLOCKS FOR CUBICLES SHOWN.
4. USE EQUIPMENT DESIGNATIONS FROM 30E03 TO DEVELOP NAMEPLATE SCHEDULE. SUBMIT SCHEDULE TO ENGINEER FOR APPROVAL.

KEY NOTES:

1. EQUIPMENT SERVED.
2. BREAKER IDENTIFIER.
3. BREAKER OPEN/CLOSE CONTROL SWITCH.
4. BREAKER OPEN GREEN INDICATING LIGHT.
5. BREAKER TRIPPED AMBER INDICATING LIGHT. LIGHT TO ILLUMINATE UPON A PROTECTION INITIATED OPENING.
6. BREAKER CLOSED RED INDICATING LIGHT.
7. WHITE STATUS LIGHT TO BE ILLUMINATED WHEN SOURCE IS ENERGIZED.
8. REMOTE/LOCAL CONTROL SWITCH. REMOTE SELECTION WILL USE PLC. LOCAL WILL USE SWITCHES TO COMPLETE TRANSFER (FUTURE).
9. AMBER FOR REMOTE INDICATION, WHITE FOR LOCAL INDICATION. ENABLED MODE SHALL ILLUMINATE CORRESPONDING LIGHT (FUTURE).
10. 12" LOI SCREEN (FUTURE).
11. FUTURE SPACE ALLOCATION FOR TRANSFER CONTROL WHEN SECOND UTILITY SOURCE IS INSTALLED AND AVAILABLE.



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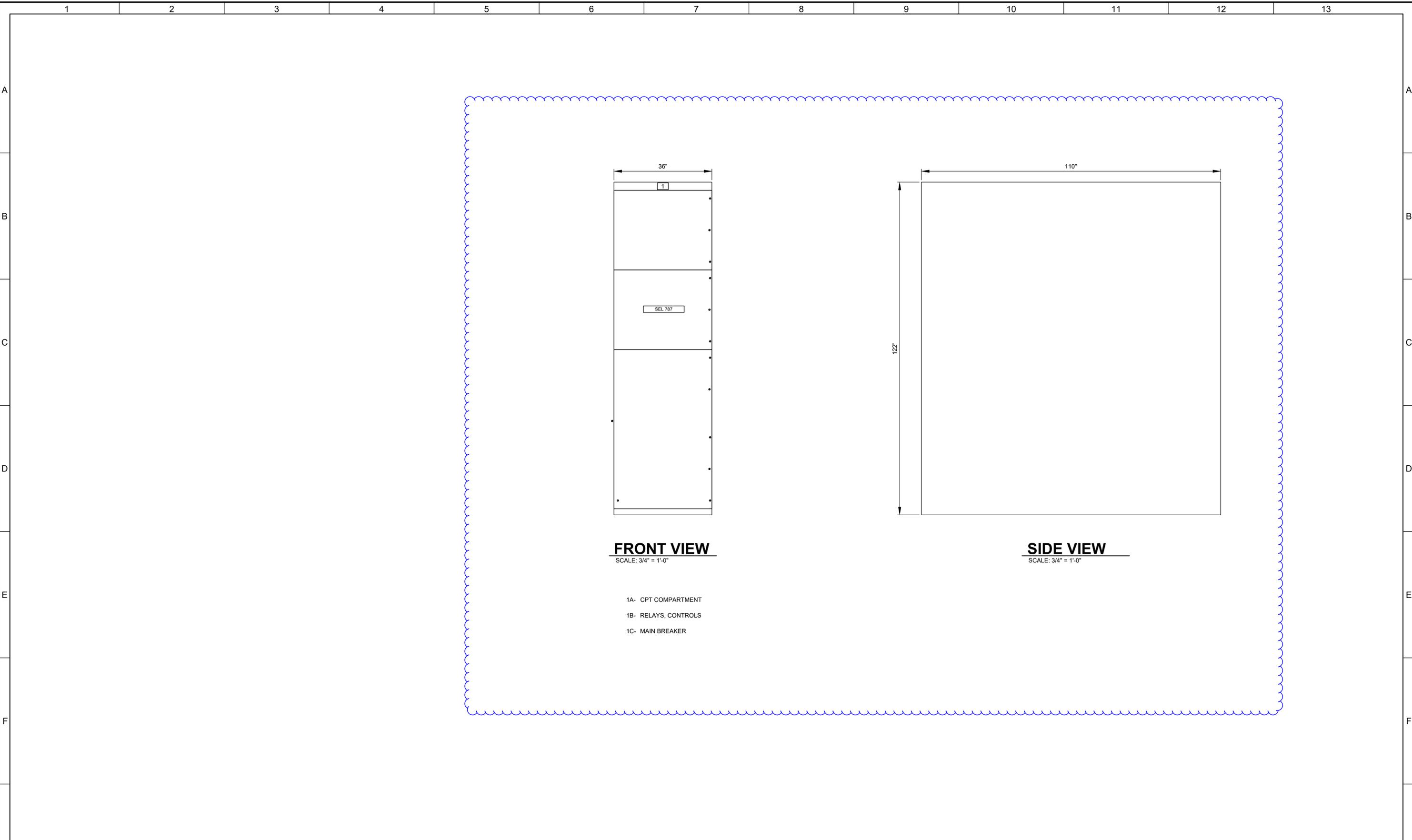
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DATE OCTOBER 2025



CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
SWITCHGEAR SWGR-SW CONTROL PANEL
VCP-111 ELEVATION

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	JOB NO. 203505 DRAWING NO. 30E09 SHEET NO. 93 OF 160
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FRONT VIEW
SCALE: 3/4" = 1'-0"

SIDE VIEW
SCALE: 3/4" = 1'-0"

- 1A- CPT COMPARTMENT
- 1B- RELAYS, CONTROLS
- 1C- MAIN BREAKER

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REV	DATE	BY	DESCRIPTION

AGENCY REVIEW

DESIGNED	JD
DRAWN	CWG
CHECKED	TDH
DATE	OCTOBER 2025

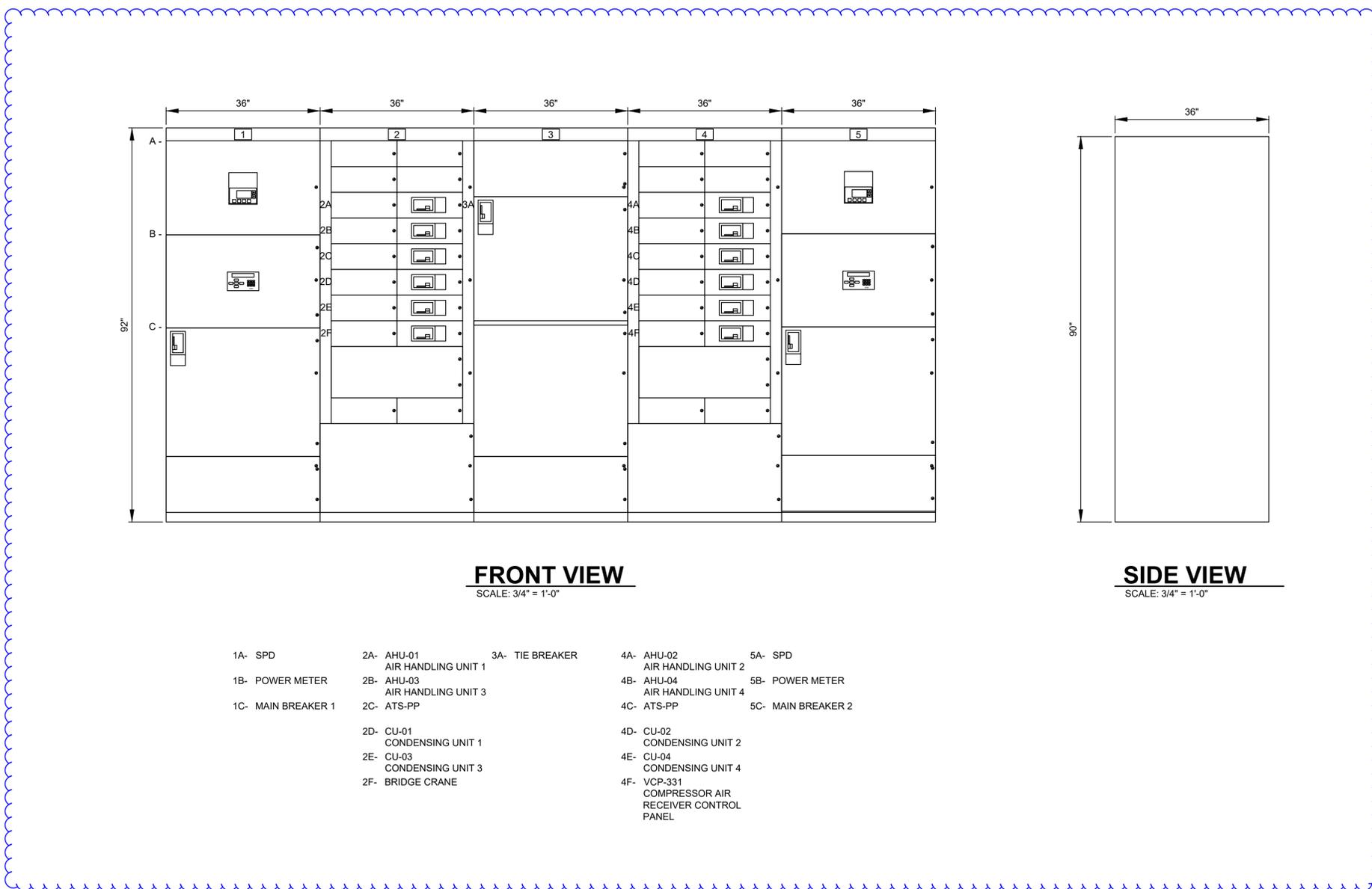


CITY OF THORNTON
 THORNTON WATER PROJECT
 SOURCE WATER PUMP STATION
 ELECTRICAL
 SWITCHGEAR SWGR-UT1 ELEVATION

VERIFY SCALES
 BAR IS ONE INCH ON ORIGINAL DRAWING
 0 1"
 IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO. 203505
 DRAWING NO. 30E10
 SHEET NO. 94 OF 160

LAST SAVED BY: cglifford



FRONT VIEW
SCALE: 3/4" = 1'-0"

SIDE VIEW
SCALE: 3/4" = 1'-0"

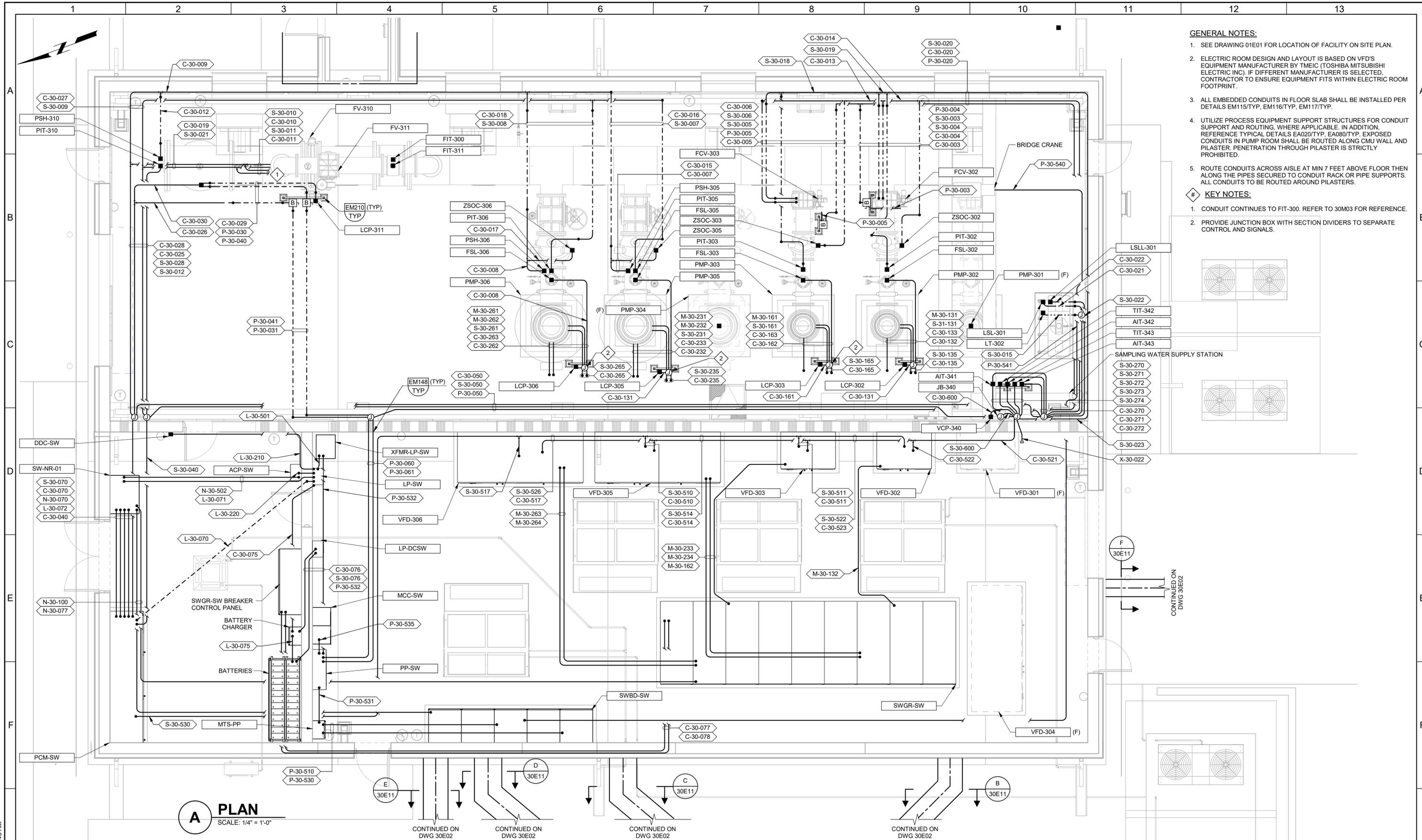
- | | | | | |
|--------------------|-----------------------------------|-----------------|--|--------------------|
| 1A- SPD | 2A- AHU-01
AIR HANDLING UNIT 1 | 3A- TIE BREAKER | 4A- AHU-02
AIR HANDLING UNIT 2 | 5A- SPD |
| 1B- POWER METER | 2B- AHU-03
AIR HANDLING UNIT 3 | | 4B- AHU-04
AIR HANDLING UNIT 4 | 5B- POWER METER |
| 1C- MAIN BREAKER 1 | 2C- ATS-PP | | 4C- ATS-PP | 5C- MAIN BREAKER 2 |
| | 2D- CU-01
CONDENSING UNIT 1 | | 4D- CU-02
CONDENSING UNIT 2 | |
| | 2E- CU-03
CONDENSING UNIT 3 | | 4E- CU-04
CONDENSING UNIT 4 | |
| | 2F- BRIDGE CRANE | | 4F- VCP-331
COMPRESSOR AIR
RECEIVER CONTROL
PANEL | |

AGENCY REVIEW			
DESIGNED JD	DRAWN CWG	CHECKED TDH	DATE OCTOBER 2025
REV	DATE	BY	DESCRIPTION



CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
SWITCHBOARD SWBD-SW ELEVATION

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING	JOB NO. 203505
0 1" IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. 30E12
	SHEET NO. 96 OF 160



- GENERAL NOTES:**
- SEE DRAWING 01E01 FOR LOCATION OF FACILITY ON SITE PLAN.
 - ELECTRIC ROOM DESIGN AND LAYOUT IS BASED ON VFD'S EQUIPMENT MANUFACTURER BY TMEIC (TOSHIBA MITSUBISHI ELECTRIC INC). IF DIFFERENT MANUFACTURER IS SELECTED, CONTRACTOR TO ENSURE EQUIPMENT FITS WITHIN ELECTRIC ROOM FOOTPRINT.
 - ALL EMBEDDED CONDUITS IN FLOOR SLAB SHALL BE INSTALLED PER DETAILS EM115/TYP, EM116/TYP, EM117/TYP.
 - UTILIZE PROCESS EQUIPMENT SUPPORT STRUCTURES FOR CONDUIT SUPPORT AND ROUTING, WHERE APPLICABLE. IN ADDITION, REFERENCE TYPICAL DETAILS EA020/TYP, EA080/TYP. EXPOSED CONDUITS IN PUMP ROOM SHALL BE ROUTED ALONG CMU WALL AND PILASTER. PENETRATION THROUGH PILASTER IS STRICTLY PROHIBITED.
 - ROUTE CONDUITS ACROSS AISLE AT MIN 7 FEET ABOVE FLOOR THEN ALONG THE PIPES SECURED TO CONDUIT RACK OR PIPE SUPPORTS. ALL CONDUITS TO BE ROUTED AROUND PILASTERS.

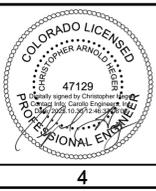
- KEY NOTES:**
- CONDUIT CONTINUES TO FIT-300. REFER TO 30M03 FOR REFERENCE.
 - PROVIDE JUNCTION BOX WITH SECTION DIVIDERS TO SEPARATE CONTROL AND SIGNALS.

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

CONTINUED ON DWG 30E02

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CHECKED TDH
DATE OCTOBER 2025



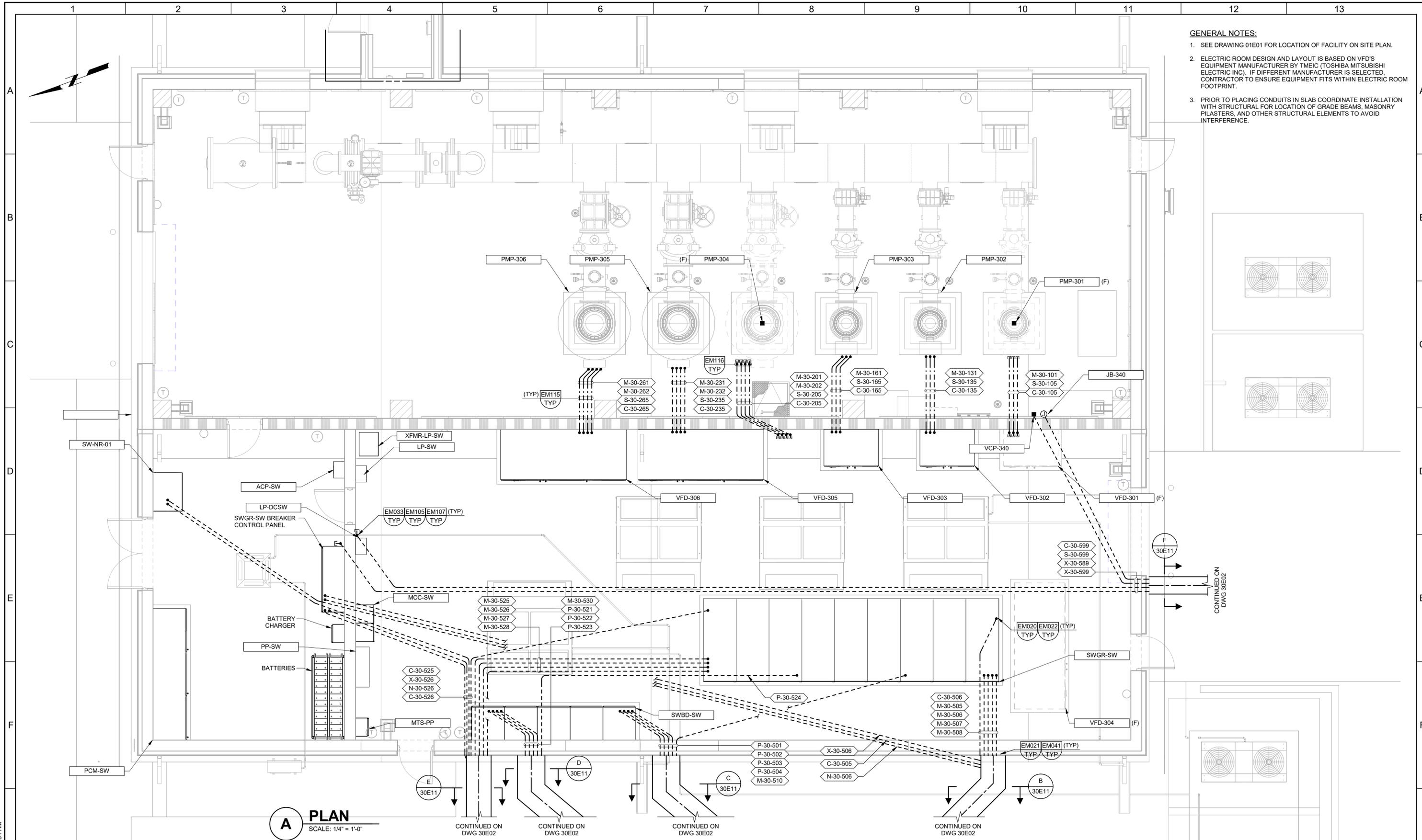
CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
EXPOSED POWER AND CONTROL PLAN

VERIFY SCALES BAR IS ONE INCH ON ORIGINAL DRAWING 0 1"	JOB NO. 203505
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY	DRAWING NO. 30E19
	SHEET NO. 101 OF 160

PLOT DATE: 10/30/2025 8:32:46 AM

GENERAL NOTES:

- SEE DRAWING 01E01 FOR LOCATION OF FACILITY ON SITE PLAN.
- ELECTRIC ROOM DESIGN AND LAYOUT IS BASED ON VFD'S EQUIPMENT MANUFACTURER BY TMEIC (TOSHIBA MITSUBISHI ELECTRIC INC). IF DIFFERENT MANUFACTURER IS SELECTED, CONTRACTOR TO ENSURE EQUIPMENT FITS WITHIN ELECTRIC ROOM FOOTPRINT.
- PRIOR TO PLACING CONDUITS IN SLAB COORDINATE INSTALLATION WITH STRUCTURAL FOR LOCATION OF GRADE BEAMS, MASONRY PLASTERS, AND OTHER STRUCTURAL ELEMENTS TO AVOID INTERFERENCE.



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

CONTINUED ON DWG 30E02

PLOT DATE: 10/30/2025 8:33:31 AM

REV	DATE	BY	DESCRIPTION
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CHECKED
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DATE
OCTOBER 2025



CITY OF THORNTON
THORNTON WATER PROJECT
SOURCE WATER PUMP STATION
ELECTRICAL
POWER AND CONTROL PLAN

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

JOB NO.
203505
DRAWING NO.
30E20
SHEET NO.
102 OF 160