CITY OF UNALASKA
PYRAMID WTP MICROTURBINE PROJECT
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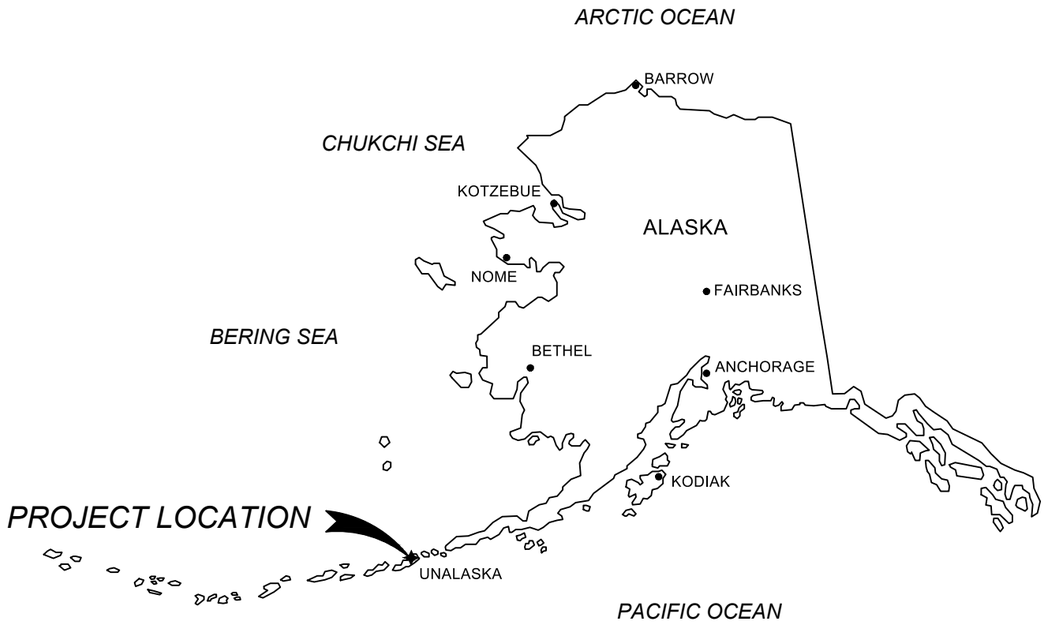

NOTE:

THIS SCOPE OF THIS PROJECT IS FOR MODIFICATIONS TO THE EXISTING PYRAMID CREEK WATER TREATMENT PLANT. THIS PLAN SET INCLUDES EXCERPTS FROM THE ORIGINAL RECORD DRAWINGS. NEW WORK IS SHOWN IN BOLD OR CLOUDING FOR CLARITY.

PREPARED BY:

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No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

COVER PAGE

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. G1.0
Date: 4/17/2020	
Scale: N/A	

DRAWING INDEX

DRAWING NUMBER	DRAWING TITLE
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	STRUCTURAL DRAWINGS
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S6.2	PIPE RACK BEAM DETAILS
S6.3	STRAINER TROLLEY DETAILS
S6.4	PIPE SUPPORT DETAILS
S6.5	EQUIPMENT PAD DETAILS
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P1.1	PROCESS NARRATIVE, SHEET 2 OF 2
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E7.3D	MAIN CONTROL PANEL (MCP) - MODIFIED DISCRETE 120VAC INPUT SCHEMATIC - DEMOLITION
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E7.4D	MAIN CONTROL PANEL (MCP) - MODIFIED DISCRETE OUTPUT SCHEMATIC - DEMOLITION
E7.4	MAIN CONTROL PANEL (MCP) - MODIFIED DISCRETE OUTPUT SCHEMATIC
E7.5D	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG INPUT SCHEMATIC, SHEET 1 OF 2 - DEMOLITION
E7.5	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG INPUT SCHEMATIC, SHEET 1 OF 2
E7.6D	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG INPUT SCHEMATIC, SHEET 2 OF 2 - DEMOLITION
E7.6	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG INPUT SCHEMATIC, SHEET 2 OF 2
E7.7	MAIN CONTROL PANEL (MCP) - DISCRETE INPUT SCHEMATIC
E7.8D	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG OUTPUT SCHEMATIC, SHEET 1 OF 2 - DEMOLITION
E7.8	MAIN CONTROL PANEL (MCP) - MODIFIED ANALOG OUTPUT SCHEMATIC, SHEET 1 OF 2
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CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

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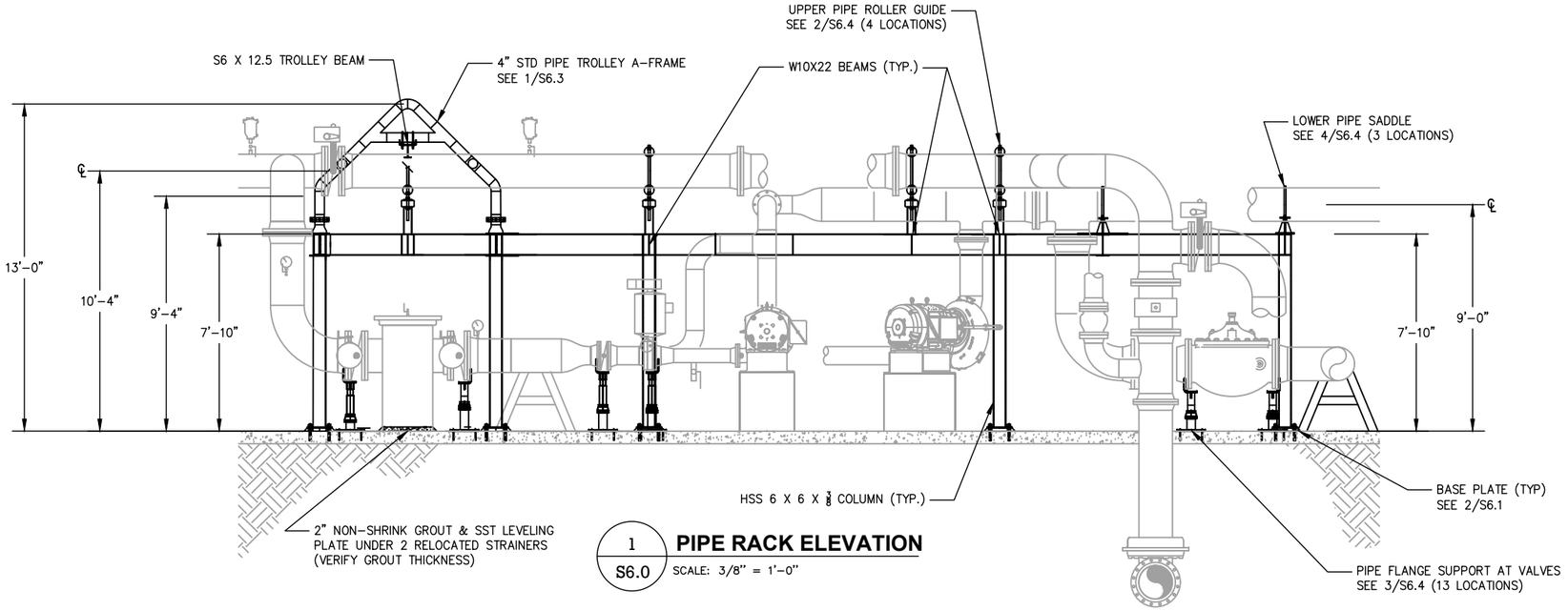
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

DRAWING INDEX

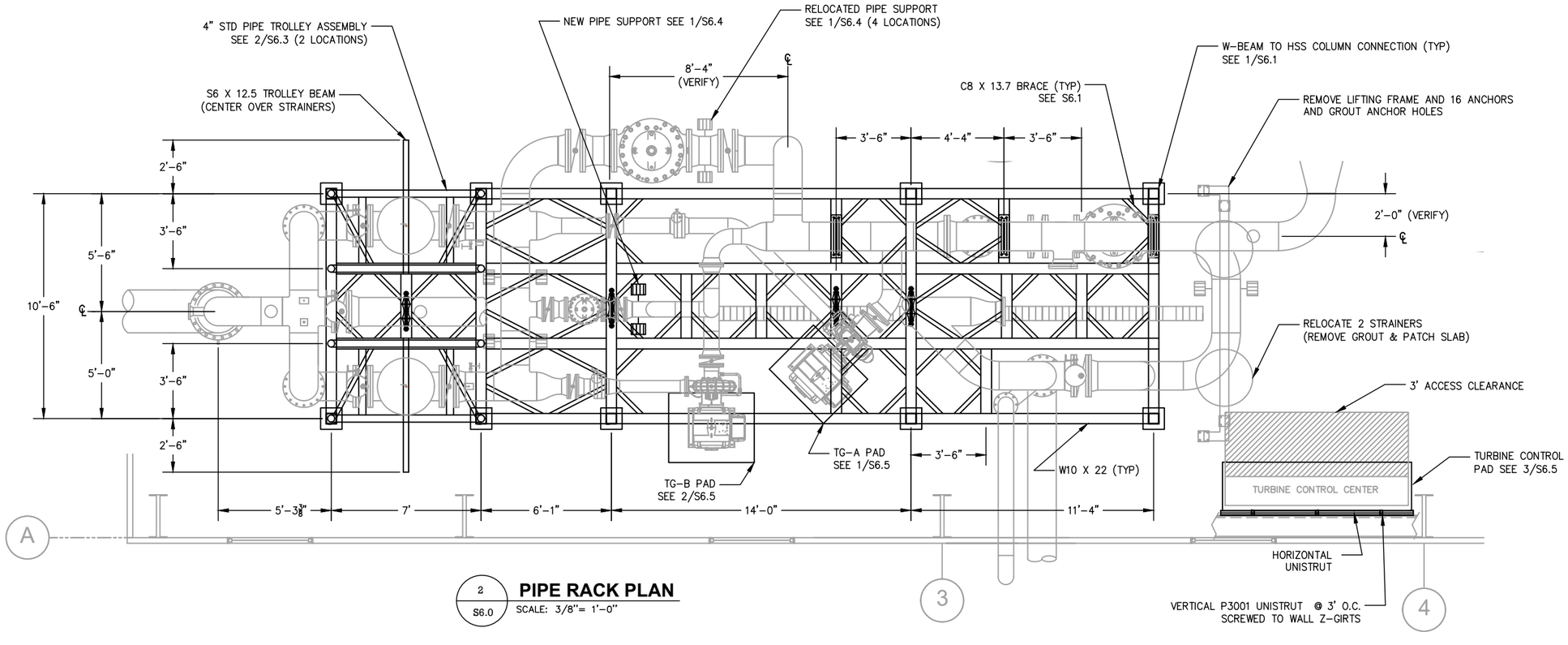
Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. G2.0
Date: 4/17/2020	
Scale: N/A	



1 / S6.0 **PIPE RACK ELEVATION**

SCALE: 3/8" = 1'-0"



2 / S6.0 **PIPE RACK PLAN**

SCALE: 3/8"= 1'-0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Curtis R. Nuttall
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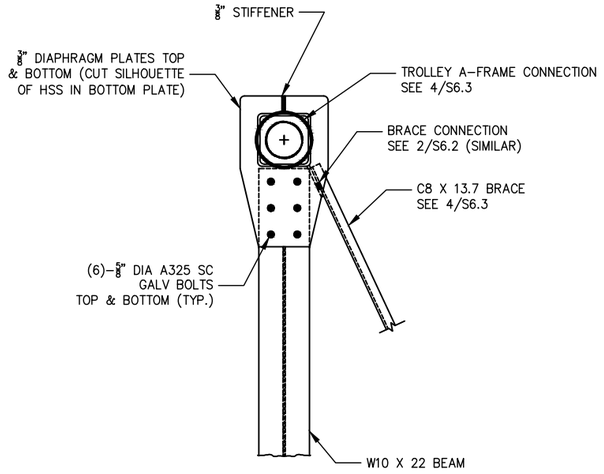
CITY OF UNALASKA

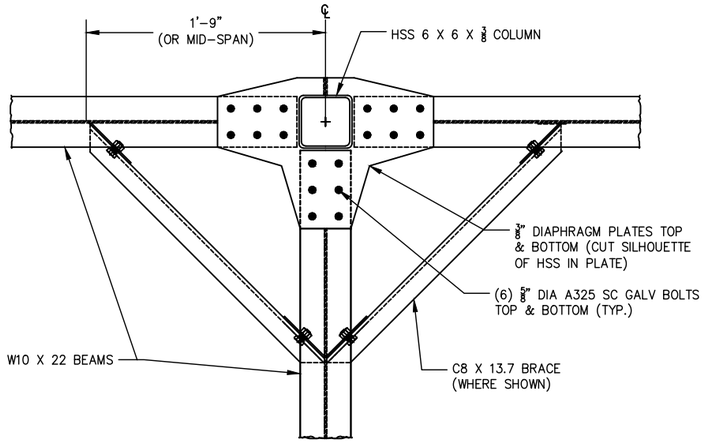
PYRAMID WATER TREATMENT PLANT

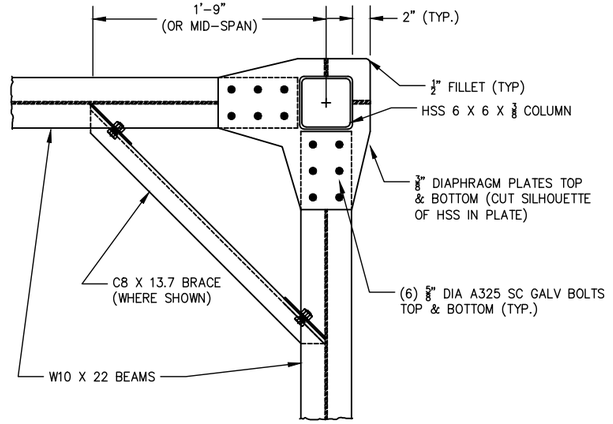
MICROTURBINE PROJECT
PIPE RACK PLAN & ELEVATION

Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

SN Project No.: -	Drawing No. S6.0
Date: 4/17/2020	
Scale: SCALE AS SHOWN	







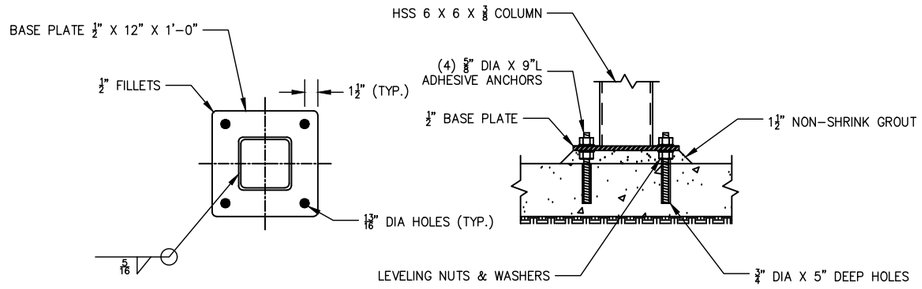
BOTTOM HALF OF COLUMNS TO RECEIVE GRAY, ABRASION RESISTANT TOPCOAT WITH 4-INCH SAFETY YELLOW BAND AT 48" HEIGHT

1 / S6.1 **W-BEAM TO HSS-COLUMN CONNECTION**

SCALE: 1-1/2" = 1'-0"

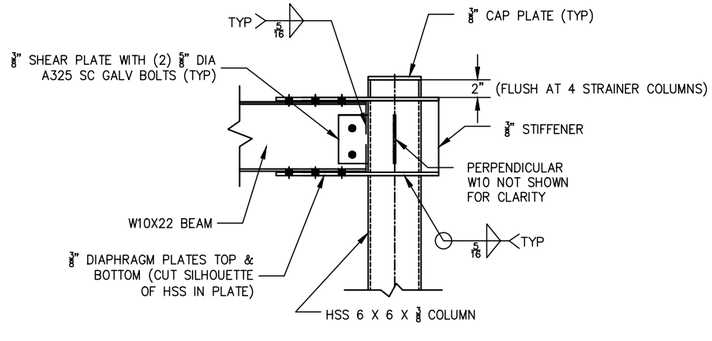
STRUCTURAL STEEL:

1) STRUCTURAL STEEL SHALL BE FABRICATED, ERECTED AND TESTED IN ACCORDANCE WITH THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) *STEEL CONSTRUCTION MANUAL* AND *AISC 303 CODE OF STANDARD PRACTICES FOR STEEL BUILDINGS AND BRIDGES*. SUBMIT SHOP DRAWINGS, ERECTION DRAWINGS AND MILL TEST REPORTS (MTRs) FOR APPROVAL PRIOR TO FABRICATION.
2) STRUCTURAL STEEL MATERIALS:
   A. W-SHAPES: ASTM A572/A572M, GRADE 50
   B. S-SHAPES, CHANNELS AND ANGLES: ASTM A36/A36M.
   C. PLATE AND BAR: ASTM A36/A36M.
   D. HOLLOW STRUCTURAL SECTIONS: ASTM A500/A500M, GRADE B, STRUCTURAL TUBING.
   E. STEEL PIPE: ASTM A53/A53M, TYPE E OR TYPE S, GRADE B.
   F. FINISH: SSPC PAINT 20, TYPE II, ORGANIC ZINC-RICH EPOXY, RCSC CLASS B
3) BOLTED STRUCTURAL JOINTS SHALL CONFORMING TO RESEARCH COUNCIL ON STRUCTURAL CONNECTIONS (RCSC) *SPECIFICATION FOR STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS*.
   A. HIGH-STRENGTH BOLTS, NUTS, AND WASHERS: ASTM F3125 GRADE A325 TYPE 1 HEAVY-HEX STEEL STRUCTURAL BOLTS; ASTM A563 GRADE DH HEAVY-HEX CARBON-STEEL NUTS; AND ASTM F436 TYPE 1 HARDENED CARBON-STEEL WASHERS.
   I. FINISH: HOT-DIP ZINC COATING, ASTM F2329/F2329M.
   II. DIRECT-TENSION INDICATORS: ASTM F959 TYPE 325 COMPRESSIBLE-WASHER TYPE WITH MECHANICALLY DEPOSITED ZINC COATING FINISH.
   III. JOINT TYPE: SLIP-CRITICAL (SC), CLASS B SLIP COEFFICIENT.
4) STRUCTURAL STEEL WELDING SHALL BE IN ACCORDANCE WITH AMERICAN WELDING SOCIETY (AWS) *D1.1 STRUCTURAL WELDING CODE*. ELECTRODE SHALL BE MINIMUM E70-XX. WELDERS SHALL BE CURRENTLY CERTIFIED BY THE AWS. SUBMIT WELDING PROCEDURES AND WELDER QUALIFICATIONS FOR APPROVAL PRIOR TO FABRICATION.
5) ERECT STRUCTURAL STEEL ACCURATELY IN LOCATIONS INDICATED AND INSTALL TEMPORARY CONSTRUCTION BRACING AS REQUIRED. BEFORE ASSEMBLY, CLEAN BEARING SURFACES AND OTHER SURFACES THAT ARE IN PERMANENT CONTACT WITH MEMBERS. ALIGN, LEVEL, PLUMB AND ADJUST VARIOUS MEMBERS THAT FORM PART OF COMPLETE FRAME OR STRUCTURE BEFORE PERMANENT FASTENING. PERFORM NECESSARY ADJUSTMENTS TO COMPENSATE FOR DISCREPANCIES IN ELEVATION AND ALIGNMENT.
6) DO NOT USE THERMAL CUTTING DURING ERECTION.
7) IMMEDIATELY AFTER ERECTION, CLEAN EXPOSED AREAS WHERE PAINT IS DAMAGED OR MISSING AND TOUCHUP WITH THE SAME MATERIAL AS USED FOR SHOP PAINTING TO COMPLY WITH SSPC-PA 1. CLEAN AND PREPARE SURFACES BY SSPC-SP 3 POWER-TOOL CLEANING.



2 / S6.1 **HSS-COLUMN BASE PLATE**

SCALE: 1-1/2" = 1'-0"



3 / S6.1 **HSS COLUMN TO W BEAM CONNECTION**

SCALE: 1-1/2" = 1'-0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA 49 TH
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APR 17, 2020
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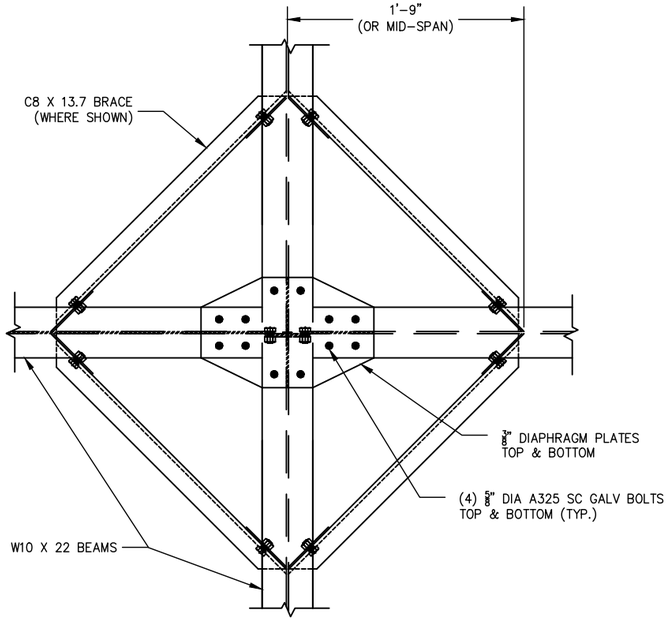
CITY OF UNALASKA

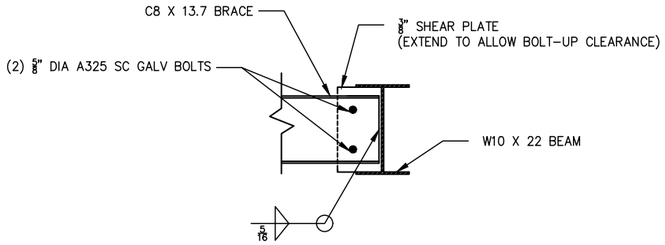
PYRAMID WATER TREATMENT PLANT

MICROTURBINE PROJECT
PIPE RACK COLUMN DETAILS

Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

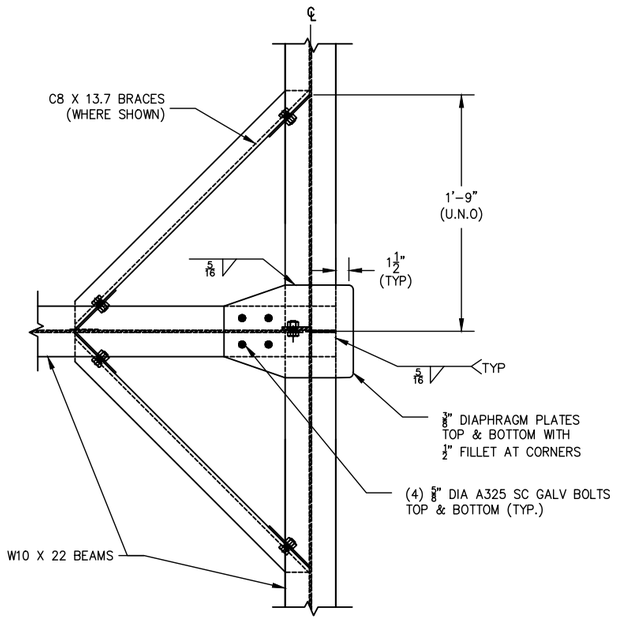
SN Project No.: -	Drawing No. S6.1
Date: 4/17/2020	
Scale: SCALE AS SHOWN	





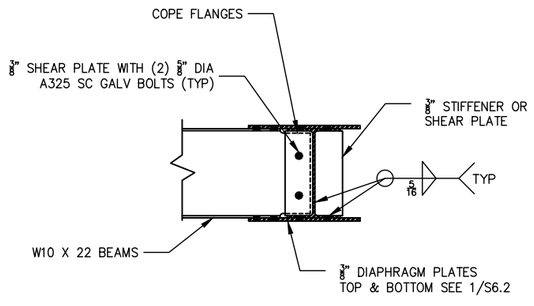
2 / S6.2 **C-BRACE TO W-BEAM CONNECTION**

SCALE: 1-1/2" = 1'-0"



1 / S6.2 **W-BEAM TO W-BEAM CONNECTION**

SCALE: 1 1/2" = 1'-0"



3 / S6.2 **W-BEAM TO W-BEAM SHEAR CONNECTION**

SCALE: 1-1/2" = 1'-0"

CITY OF UNALASKA
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MICROTURBINE PROJECT
PIPE RACK BEAM DETAILS

Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

SN Project No.: -	Drawing No. S6.2
Date: 4/17/2020	
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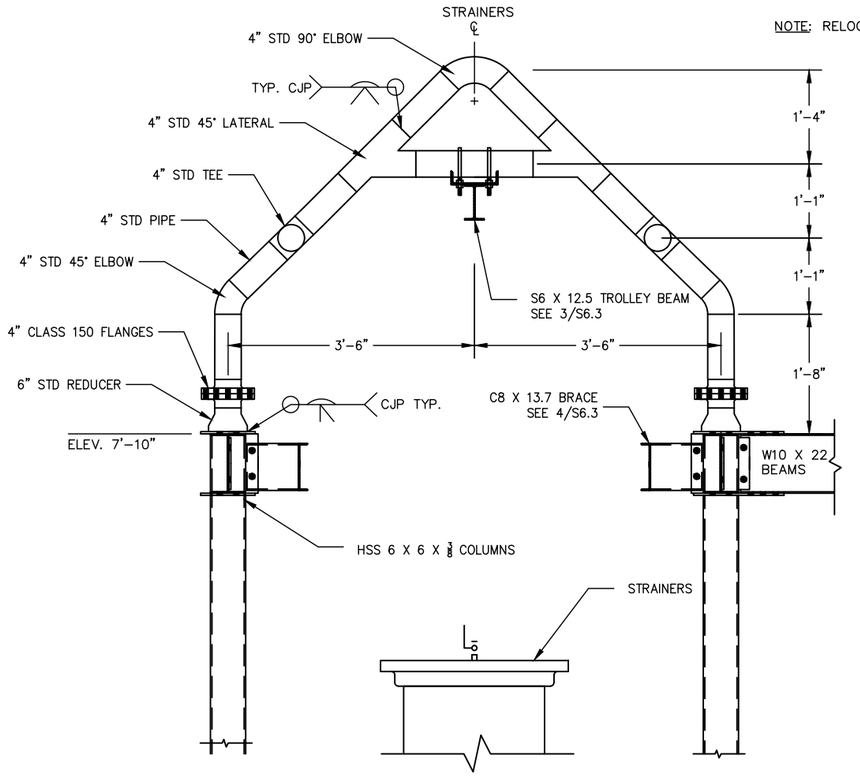
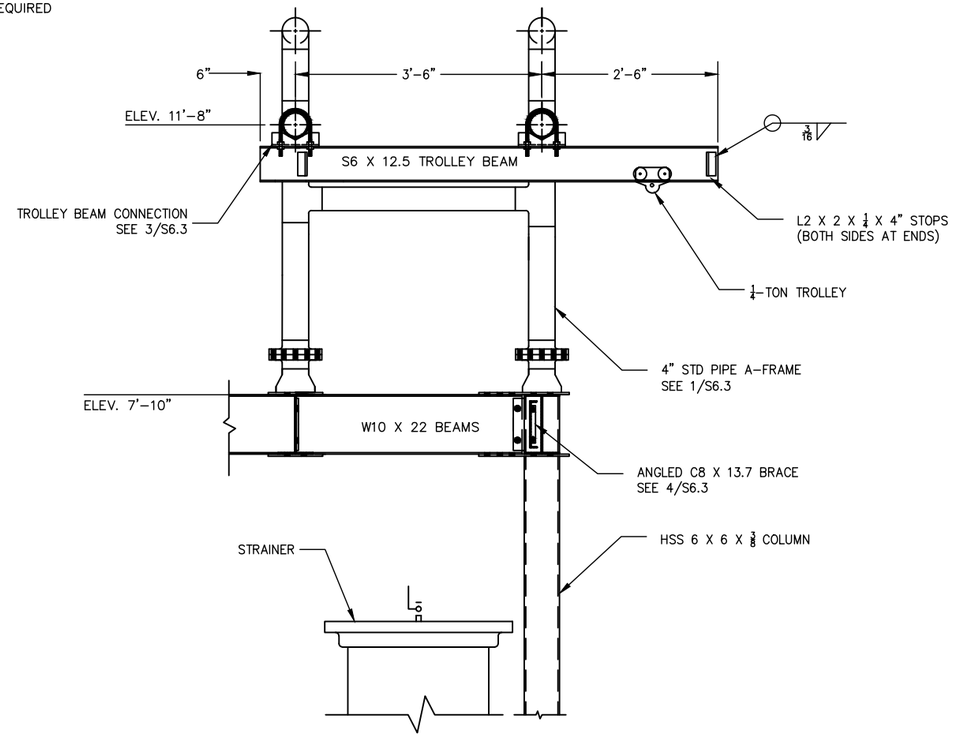


1 / S6.3 **TROLLEY A-FRAME AT STRAINERS (4 REQUIRED)**

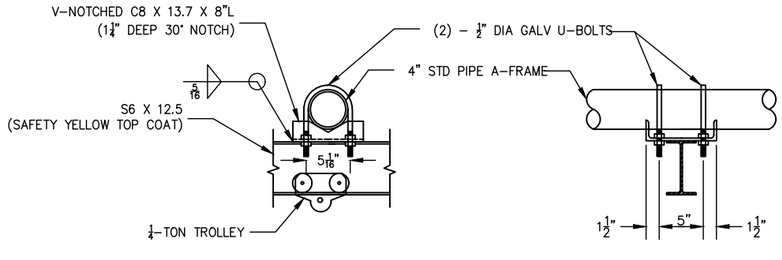
SCALE: 1" = 1'–0"

NOTE: RELOCATED HANGING LIGHTS IF REQUIRED



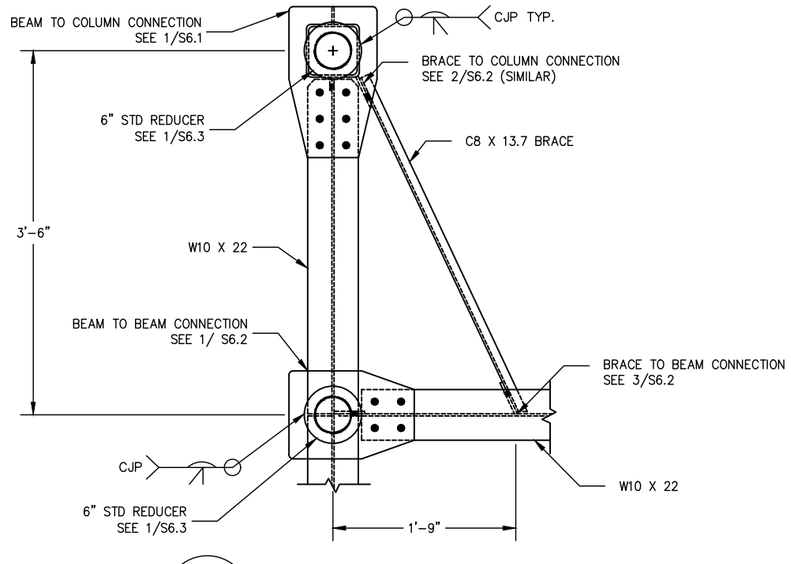
2 / S6.3 **TROLLEY ASSEMBLY AT STRAINERS (2-LOCATIONS)**

SCALE: 1" = 1'–0"



3 / S6.3 **TROLLEY BEAM TO A-FRAME CONNECTION**

SCALE: 1 1/2" = 1'–0"



4 / S6.3 **TROLLEY A-FRAME TO PIPE RACK CONNECTION**

SCALE: 1 1/2" = 1'–0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
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CITY OF UNALASKA

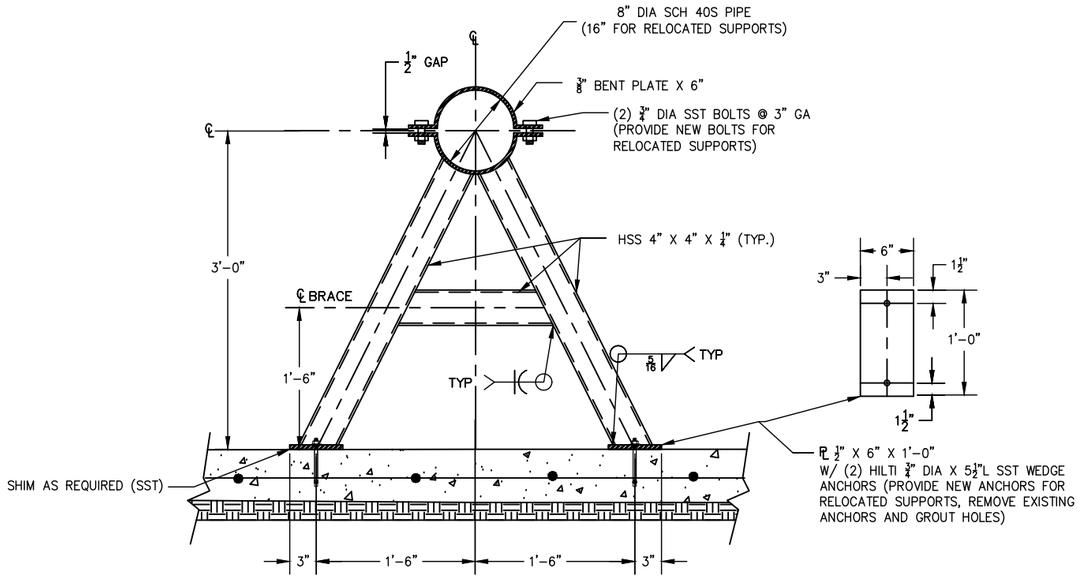
PYRAMID WATER TREATMENT PLANT

MICROTURBINE PROJECT
STRAINER TROLLEY DETAILS

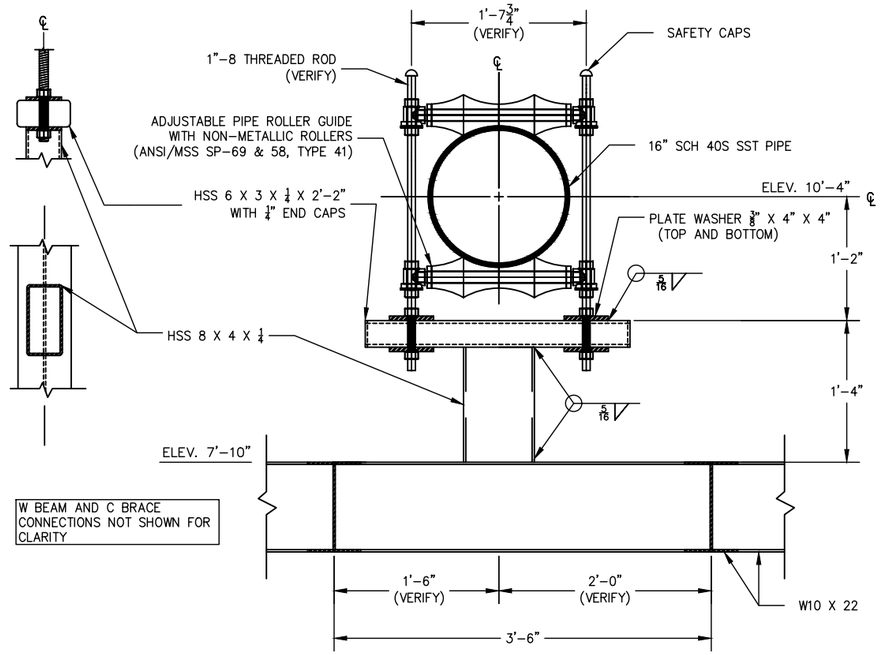
Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

SN Project No.: -	Drawing No. S6.3
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

NOTE:
1) ALL PIPE SUPPORT, FLANGE SUPPORT AND SADDLE MATERIALS TO BE TYPE 304/304L STAINLESS STEEL
2) CONTRACTOR TO VERIFY ELEVATIONS & DIMENSIONS PRIOR TO FABRICATION
3) ADJUSTABLE FLANGE SUPPORTS TO BE EATON B-LINE SERIES TYPE 304/304L STAINLESS STEEL, OR EQUAL

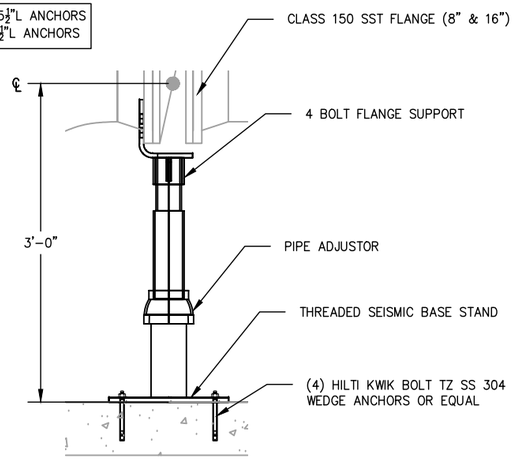


1 / S6.4 **PIPE SUPPORT (4 RELOCATED 16" & 1 NEW 8")**
SCALE: 1 1/2" = 1'-0"

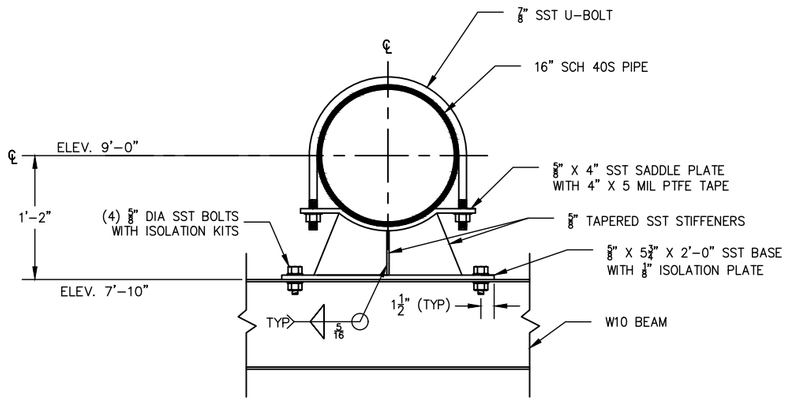


2 / S6.4 **ADJUSTABLE PIPE ROLLER GUIDE (UPPER PIPE)**
SCALE: 1 1/2" = 1'-0"

(9) 16" PIPE FLANGE SUPPORTS W/ 3/4" DIA X 5 1/2"L ANCHORS
(4) 8" PIPE FLANGE SUPPORTS W/ 1/2" DIA X 5 1/2"L ANCHORS



3 / S6.4 **ADJUSTABLE FLANGE SUPPORT AT VALVES**
SCALE: 1 1/2" = 1'-0"



4 / S6.4 **PIPE RACK SADDLE (LOWER PIPE)**
SCALE: 1 1/2" = 1'-0"

CITY OF UNALASKA
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CITY OF UNALASKA
PYRAMID WATER TREATMENT PLANT
MICROTURBINE PROJECT
PIPE SUPPORT DETAILS

Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

SN Project No.: -	Drawing No. S6.4
Date: 4/17/2020	
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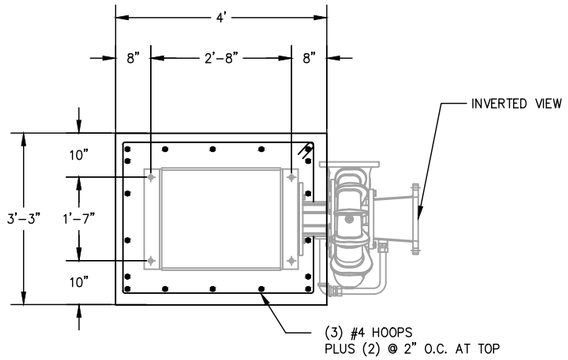
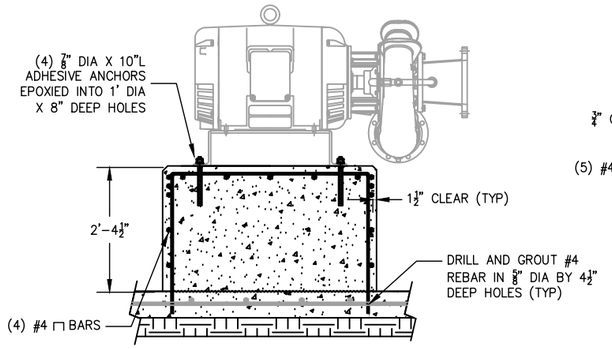
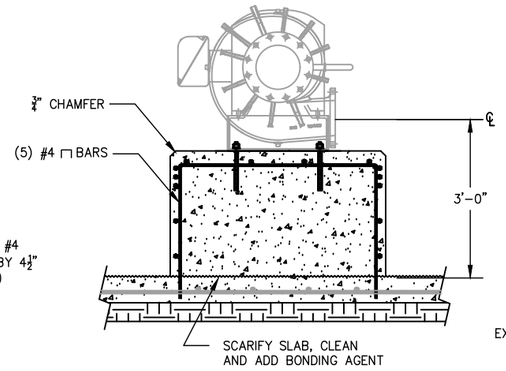
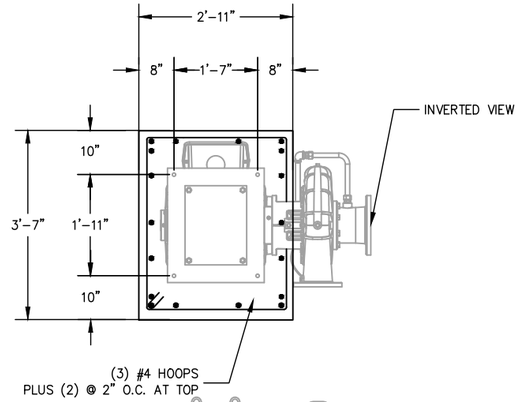
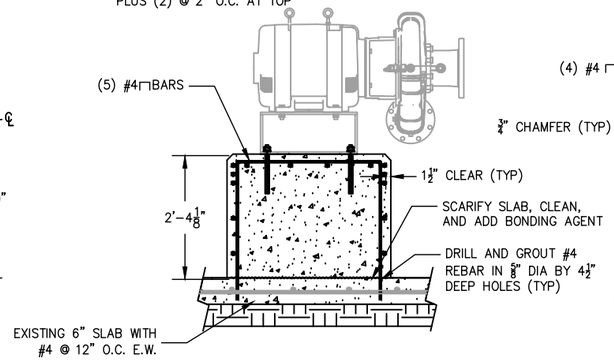
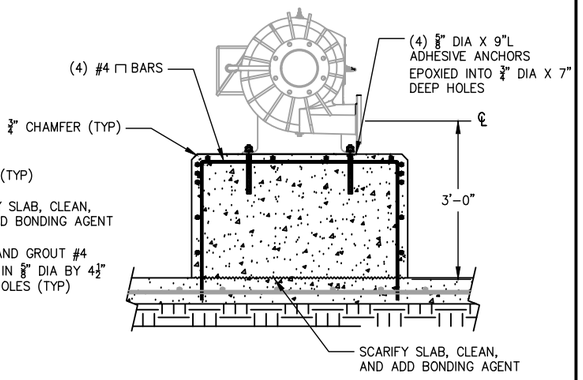










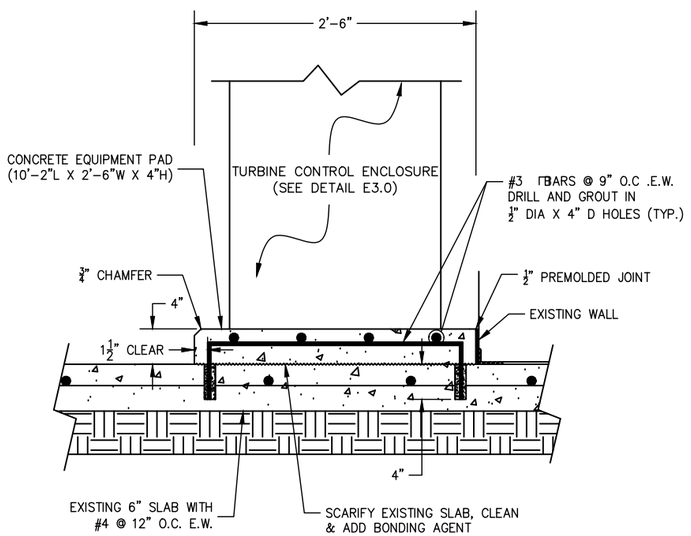


1 / S6.5 **CONCRETE PAD FOR TG-A**

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

2 / S6.5 **CONCRETE PAD FOR TG-B**

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



3 / S6.5 **TURBINE CONTROL CENTER PAD DETAIL**

SCALE: 1-1/2"= 1'-0"

CONCRETE:

1) ALL CONCRETE CONSTRUCTION SHALL CONFORM TO IBC CHAPTER 19.
2) CONCRETE SHALL BE *QUIKRETE CRACK RESISTANT CONCRETE MIX* (OR EQUAL) INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SUBMIT DATA SHEETS FOR APPROVAL. (EQUIVALENT READY-MIXED CONCRETE CAN BE USED IF AVAILABLE)
3) COMPRESSIVE STRENGTH OF CONCRETE SHALL BE A MINIMUM OF 4,000 PSI IN 28 DAYS.
4) NO CHLORIDES PERMITTED.
5) MAXIMUM SLUMP OF CONCRETE SHALL BE 3 INCHES, PLUS OR MINUS 1 INCH.
6) ALL CONCRETE SHALL CONTAIN AN AIR-ENTRAINING ADMIXTURE MEETING ASTM C260 AND PROVIDING 4 TO 8% AIR CONTENT.
7) CONCRETE MIX SHALL CONTAIN SYNTHETIC REINFORCING COMPLYING WITH ASTM C1116.
8) WHERE NEW CONCRETE IS PLACED AGAINST EXISTING CONCRETE, SCARIFY EXISTING FACE TO ¼" MINIMUM AMPLITUDE. CLEAN AND APPLY *QUIKRETE CONCRETE BONDING ADHESIVE* (OR EQUAL) IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
9) CURE CONCRETE WITH *QUIKRETE ACRYLIC CURE & SEAL* (OR EQUAL) IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
10) NON-SHRINK GROUT SHALL BE *QUIKRETE NON-SHRINK PRECISION GROUT* (OR EQUAL) COMPLYING WITH ASTM C1107. INSTALL PER MANUFACTURERS INSTRUCTIONS.
11) ALL STEEL REINFORCING BARS SHALL BE ASTM A615 GRADE 60. SUBMIT MILL TEST REPORTS (MTRS) FOR APPROVAL.
12) ALL CONCRETE REINFORCEMENT SHALL BE DETAILED, FABRICATED, IDENTIFIED, SUPPORTED, AND PLACED IN FORMS AND SECURED IN PLACE IN ACCORDANCE WITH THE LATEST EDITION OF THE "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" ACI 318, AND THE "MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES," ACI 315 INCLUDING APPENDIX A. SUBMIT STEEL REINFORCING SHOP DRAWINGS FOR APPROVAL PRIOR TO FABRICATION.
13) WELDING OR TACK WELDING OF REINFORCING BARS TO OTHER BARS, OR TO PLATES AND ANGLES ETC, IS PROHIBITED EXCEPT FOR REINFORCING STEEL NOT REQUIRED BY THE DESIGN.
14) AT THE TIME CONCRETE IS PLACED, REINFORCEMENT SHALL BE CLEAN AND FREE FROM GREASE, OIL, MUD, OR OTHER NON-METALLIC COATINGS THAT DECREASE BOND. TIGHT RUST AND MILL SCALE IS PERMITTED IF THE MINIMUM DIMENSIONS (INCLUDING HEIGHT OF DEFORMATIONS) AND THE WEIGHT OF A HAND WIRE-BRUSHED TEST SPECIMEN ARE NOT LESS THAN APPLICABLE SPECIFICATION REQUIREMENTS.
15) MINIMUM CONCRETE COVER FOR REINFORCING BARS SHALL BE AS GIVEN IN ACI 318:

1 ½" BEAMS, COLUMNS & EQUIPMENT PAD.

EMBEDED ANCHORS AND REBAR:

1) ADHESIVE ANCHORS SHALL BE GALVANIZED HILTI *HAS-E-55 HDG* WITH HILTI *HIT-HY200-A* ADHESIVE (OR EQUAL) INSTALLED PER MANUFACTURER'S INSTRUCTIONS
2) EPOXY GROUTED REBAR SHALL BE SET WITH HILTI *HIT-HY200-A* ADHESIVE (OR EQUAL) USED IN ACCORDANCE WITH MANUFACTURER'S RECCOMMENDATIONS.
3) EXPANSION ANCHORS SHALL BE HILTI *KWIK BOLT TZ SS 304* (OR EQUAL) INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
4) SUBMIT DATA SHEETS FOR ALL EMBEDDED ANCHORS AND ADHESIVES FOR APPROVAL.
5) LOCATE EXISTING REBAR BY GPR, X-RAY OR OTHER MEANS PRIOR TO DRILLING TO AVOID HITTING REINFORCING.
6) CONTRACTOR SHALL ENSURE INSTALLATION PERSONNEL ARE ADEQUATELY QUALIFIED AND FAMILIAR WITH THE MANUFACTURER'S INSTALLATION PROCEDURES.

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Curtis R. Nuttall
CE-7371
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MICROTURBINE PROJECT EQUIPMENT PAD DETAILS

Drawn By:	BDH
Checked By:	ZBB
Approved By:	CRN

SN Project No.: -	Drawing No. S6.5
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

PROCESS DESCRIPTION

1.0 SYSTEM OVERVIEW

UNTREATED WATER ENTERS THE CITY OF UNALASKA PUBLIC WATER SYSTEM AT ICY CREEK RESERVOIR (ICR) AND FLOWS TO THE PYRAMID WATER TREATMENT PLANT (WTP) UNDER GRAVITY PRESSURE THROUGH A 24-INCH DIAMETER, 1.2-MILE LONG, DUCTILE IRON RAW WATER LINE. TREATMENT IS ACCOMPLISHED WITH A COMBINATION OF ULTRAVIOLET (UV) IRRADIATION AND CHLORINE CONTACT THAT INACTIVATES MICROORGANISMS IN ACCORDANCE WITH FEDERAL AND STATE DRINKING WATER REGULATIONS.

WATER ENTERING THE WTP PROCESS BAY INITIALLY PASSES THROUGH ONE OF TWO STRAINERS TO REMOVE LARGER PARTICULATE MATTER. AFTER THE STRAINERS THE WATER PASSES THROUGH EITHER POWER GENERATING TURBINES OR PRESSURE REDUCING VALVES (PRV) BRINGING THE PRESSURE DOWN TO APPROXIMATELY 20 PSIG (VARIABLE). UV DISINFECTION IS ACCOMPLISHED USING CALGON 24-INCH 5X10 REACTORS. THE TWO INLINE REACTORS ARE ARRANGED IN PARALLEL. NO MORE THAN ONE UNIT IS TO OPERATE AT A GIVEN TIME. EACH REACTOR IS SIZED TO TREAT BETWEEN 300 AND 6,250 GALLONS PER MINUTE (GPM) FOR FULL UV DISINFECTION REDUNDANCY.

GASEOUS CHLORINE DISPENSING EQUIPMENT AND ONE-TON STORAGE CONTAINERS ARE LOCATED IN A CHLORINE ROOM SEPARATE FROM THE PROCESS BAY. A TWO-INCH LINE FEEDS UN-CHLORINATED WATER FROM THE PROCESS MAIN INTO THE CHLORINE ROOM WHERE IT IS CHLORINATED BEFORE BEING ROUTED BACK AND INTO THE MAIN. AN INJECTION DIFFUSER AND INLINE STATIC MIXER ENSURE THAT CHLORINE SOLUTION IS QUICKLY AND THOROUGHLY MIXED INTO THE PROCESS STREAM.

WATER FLOW RATE THROUGH THE TREATMENT PROCESS IS CONTROLLED BY ONE OF TWO BUTTERFLY CONTROL VALVES THAT OPEN AND CLOSE ACCORDING TO WATER SURFACE LEVEL IN THE CHLORINE CONTACT TANK. WHEN TANK LEVEL DROPS IN RESPONSE TO INCREASED SYSTEM DEMAND, THE BUTTERFLY VALVE OPENS TO ALLOW HIGHER FLOW THROUGH THE PLANT. AS TANK LEVEL RECOVERS, THE VALVE CLOSES TO REDUCE FLOW. PLACED IN PARALLEL, EITHER VALVE CAN CONTROL THE PROCESS STREAM WHILE THE OTHER IS ON STANDBY OR OFFLINE FOR MAINTENANCE OR REPAIR. BUTTERFLY VALVE RESPONSE TO TANK LEVEL IS THE PRIMARY FLOW CONTROL ELEMENT IN THE WTP TREATMENT PROCESS.

WATER FLOW RATE THROUGH THE TURBINES IS THE COMBINATION OF THE TREATMENT PROCESS FLOW RATE AND THE DISCHARGE FLOW RATE. THE FLOW RATE THROUGH THE DISCHARGE SYSTEM IS CONTROLLABLE WITH A PRV INSTALLED IN THE DISCHARGE PIPING IN THE WTP. THE PRV MAINTAINS ADEQUATE BACKPRESSURE TO ENSURE THE CHLORINE CONTACT TANK CAN BE FILLED AT ALL TIMES.

2.0 PROCESS INSTRUMENTATION AND CONTROL

A PROGRAMMABLE LOGIC CONTROLLER (PLC) IS SET UP TO ACCOMPLISH THE FOLLOWING AUTOMATED FUNCTIONS OF WTP OPERATION.

- DATA COLLECTION
- STATUS MONITORING
- EQUIPMENT CONTROL
- ALARMS

WATER QUALITY, LEVEL, FLOW, PRESSURE AND OTHER READINGS ARE ROUTED CONTINUOUSLY TO THE PLC. THIS INFORMATION IS PROCESSED, ORGANIZED, STORED, AND TRANSMITTED TO AUTOMATICALLY OPERATE PLANT EQUIPMENT AND FEED INFORMATION TO THE CITY'S SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM.

3.0 RAW WATER PARAMETERS

- FLOW RANGE - 300 TO 6,250 GPM
- FLOW RATE - CONTROLLED ACCORDING TO WATER LEVEL IN THE CHLORINE CONTACT TANK
- WATER QUALITY MONITORING AT ICR INLET - TURBIDITY, UV TRANSMITTANCE (UVT)
- HIGH TURBIDITY ALARM AT ICR INLET - 3 NEPHELOMETRIC TURBIDITY UNITS (NTU)
- MINIMUM UVT ALARM AT ICR INLET - 85%
- MAXIMUM ALLOWABLE TURBIDITY IN PROCESS WATER - 4.99 NTU
- MINIMUM ALLOWABLE UVT IN PROCESS WATER - 85%

4.0 TREATMENT OPERATIONS, REDUNDANCY, VALVE CONTROLS

SYSTEMS AT THE WTP CAN BE MONITORED AND CONTROLLED ON THE PREMISES OR REMOTELY FROM THE DEPARTMENT OF PUBLIC UTILITIES (DPU) WATER SHOP. TREATMENT OBJECTIVE IS TO SEQUENTIALLY IRRADIATE AND CHLORINATE RAW WATER TO ACHIEVE 3-LOG INACTIVATION OF CRYPTOSPORIDIUM FOLLOWED BY 3-LOG INACTIVATION OF *GIARDIA LAMBLIA* AND 4-LOG INACTIVATION OF VIRUSES IN THE CHLORINE CONTACT TANK.

SHOULD TURBIDITY OR UVT FALL OUTSIDE ACCEPTABLE LEVELS AT THE MONITORING LOCATIONS, THE PROCESS STREAM AUTOMATICALLY SHUTS OFF. REDUNDANCY IS PROVIDED FOR ALL CRITICAL SYSTEMS INCLUDING:

- INLET STRAINING
- UV IRRADIATION
- CHLORINATION
- FLOW CONTROL

IF MANUAL MODE IS DESIRABLE, THE OPERATOR MAY CONTROL VALVES AND TREATMENT SYSTEMS THROUGH THE PLC BY USING THE TOUCH SCREEN OPERATOR INTERFACE DISPLAY LOCATED ON THE DOOR OF THE CONTROL PANEL. IT IS ALSO POSSIBLE TO CONTROL THESE SAME FUNCTIONS REMOTELY THROUGH THE PLC WITH THE SCADA SYSTEM. BY UTILIZING THE VIRTUAL SWITCHES ON THE SCREEN THE FOLLOWING FUNCTIONS CAN BE INCORPORATED. ONE POSITION POWERS EQUIPMENT ON THE 'A' SIDE WHILE THE OTHER POSITION CONTROLS 'B' SIDE COMPONENTS. SPECIFICALLY:

- WITH THE STRAINER SWITCH IN POSITION A, VALVE V102A WILL ACTIVATE. TURNING THE SWITCH TO POSITION B DE-ACTIVATES V102A AND ACTIVATES V102B. VALVES 103A/B ON THE OUTLET TO THE STRAINERS ARE MANUAL ISOLATION VALVES.
- WITH THE REACTOR SWITCH IN POSITION A, POWER AND CONTROL SIGNALS WILL BE SENT TO V105A, UVR101A, AND V106A. TURNING THE SWITCH TO POSITION B SENDS POWER AND CONTROL SIGNALS TO V105B, UVR101B, AND V106B.
- WITH THE FLOW CONTROL SWITCH IN POSITION A, VALVE 109A WILL BE POWERED (ALLOWING IT TO BE OPERATED AUTOMATICALLY ACCORDING TO WATER LEVEL IN THE TANK). TURNING THE SWITCH TO POSITION B, DE-POWERS V109A AND ACTIVATES V109B.

WHEN SWITCHING FROM TREATMENT SIDE A TO SIDE B, THE ASSOCIATED AUTOMATED VALVES FOR EACH SIDE WILL OPEN/ACTIVATE SIMULTANEOUSLY. IN THE CASE OF THE UV REACTORS, BEFORE THE VALVES IN AND OUT OF A GIVEN REACTOR BEING ACTIVATED CAN OPEN, THE REACTOR MUST FIRST BE TURNED ON AND IN OPERATION. SIMILARLY, THE REACTOR BEING SHUT DOWN MUST NOT BE TURNED OFF UNTIL THE ASSOCIATED INLET AND OUTLET VALVES HAVE CLOSED. REGARDLESS OF THE POSITION OF THE SIDE A AND SIDE B SWITCHES, INDIVIDUAL VALVE SWITCHES MAY STILL BE PLACED IN MANUAL MODE FOR MAINTENANCE PURPOSES.

AUTOMATIC ISOLATION VALVES FOR THE INLET TO THE STRAINERS (V102A/B), BYPASS (V101), AND UV REACTORS (V105A/B, V106A/B) ARE ELECTRICALLY ACTUATED. ALL AUTOMATED VALVES ARE EQUIPPED FOR MANUAL OVERRIDE. VALVES V101, V104, AND V102A/B ARE EQUIPPED WITH PROGRAMMABLE SLOW OPERATING ACTUATORS (3-5 MINUTES TO REACH FULL CLOSURE/OPENING) TO CONTROL WATER HAMMER IN THE SYSTEM. HAND-OPERATED VALVES USED TO STOP OR START PROCESS STREAM FLOWS SHALL BE OPENED AND CLOSED AT EQUALLY SLOW RATES.

ISOLATION VALVES FOR THE OUTLET FROM THE STRAINER (V103A/B) AND THE OUTLET SIDE OF THE PRIMARY FLOW CONTROL VALVES (V108A/B) WILL BE OPERATED MANUALLY.

IN THE EVENT OF FAILURE OF THE PLC, THE SYSTEM MAY BE RUN UTILIZING "HAND" OPERATION OF VALVES AND TREATMENT EQUIPMENT.

5.0 CONTROL AND TREATMENT ELEMENTS

5.1 FLOW CONTROL

PLANT FLOW CONTROL IS ACCOMPLISHED BY ONE OF TWO ELECTRONICALLY CONTROLLED, BUTTERFLY VALVES (V109A/B). INPUT IS FROM A CHLORINE CONTACT TANK LEVEL SENSOR. THE VALVES MODULATE OPEN AS NECESSARY TO MAINTAIN NEAR -FULL LEVEL IN THE TANK. THE ACTUAL VALVE POSITION IS CONTROLLED BY THE PLC. IN THE SITUATION OF A POWER FAILURE, THE TURBINE INLET CONTROL VALVES AND PARALLEL PRVs WILL FAIL CLOSED. IF PROCESS FLOW IS TO BE AUTOMATICALLY SHUT OFF, V109A/B WILL BE THE FIRST VALVES TO CLOSE. FOR AUTOMATIC SHUT OFF OR STARTUP, THESE VALVES ARE PROGRAMMED TO CLOSE SLOWLY (3-5 MINUTES TO REACH FULL CLOSURE/OPENING). WHERE APPROPRIATE, THE PLC WILL BE USED TO CONTROL VALVE CLOSURE SPEED.

5.1.1 ICY CREEK RESERVOIR INPUTS - AUTOMATIC SHUT DOWN

INSTRUMENTATION AT THE ICR HEADWORKS MONITORS: INLET WATER TURBIDITY, INLET WATER UVT; AND RESERVOIR WATER LEVEL. AUTOMATIC SHUTDOWN FROM INPUTS AT ICR WILL OCCUR IN RESPONSE TO EITHER OF THE FOLLOWING EVENTS:

A. WATER LEVEL < 12 FEET

B. SUSTAINED INLET TURBIDITY > 2.8 NTU

EVENT A (LOW WATER AT ICR) WILL AUTOMATICALLY STOP FLOW TO THE WTP USING THE FOLLOWING VALVE CLOSURE SEQUENCE. VALVE POSITIONS WILL BE MONITORED TO ENSURE THAT THE FIRST VALVE IS FULLY CLOSED BEFORE THE SECOND VALVE INITIATES CLOSURE AND LIKEWISE FOR THE THIRD VALVE.

1. THE PLANT FLOW CONTROL VALVE IN OPERATION AT THE TIME (V109A/V109B)
2. THE STRAINER CONTROL VALVE IN OPERATION AT THE TIME (V102A/V102B)
3. INLET VALVE AT ICR HEADWORKS

EVENT B (SUSTAINED HIGH TURBIDITY) MAY BE HANDLED IN ONE OF THE FOLLOWING TWO WAYS: STOP FLOW TO THE WTP USING THE ABOVE 3-STEP SEQUENCE; OR BYPASS THE WTP AS DESCRIBED BELOW.

5.1.2 PYRAMID WATER TREATMENT PLANT INPUT - AUTOMATIC SHUT DOWN

PROCESS FLOW WILL BE AUTOMATICALLY STOPPED IN RESPONSE TO EITHER OF THE FOLLOWING WTP READINGS:

A. SUSTAINED INCOMING TURBIDITY > 3.0 NTU

B. SUSTAINED INCOMING UVT < 85%

IN EITHER EVENT, THE RAW WATER WILL BYPASS THE PROCESS LINE AND TURBINES (FOR LINE FLUSHING OR OTHER PURPOSES) AND DISCHARGE TO WASTE

IN BYPASS MODE, FLOW TO THE WTP WILL BE DIVERTED AT THE PLANT, BUT BEFORE TREATMENT AND TURBINES. THE OPERATING FLOW CONTROL (V109A/B) WILL BEGIN TO CLOSE WHILE THE BYPASS VALVE (V101) IS OPENING. VALVE POSITIONS WILL BE MONITORED AND, AFTER V109A/B IS FULLY CLOSED, THE TIMED FLUSH SEQUENCE WILL BEGIN. THE TIMED FLUSHING SEQUENCE WILL CONTINUE AT LEAST LONG ENOUGH TO COMPLETELY CHANGE THE WATER IN THE RAW WATER LINE FROM ICR. IF FLUSHING DOES NOT SUCCESSFULLY BRING TURBIDITY AND/OR UVT INTO AN ACCEPTABLE RANGE, THEN A COMPLETE SHUTDOWN OF THE RESERVOIR AND WTP WILL BE INITIATED..

READINGS OF HIGH TURBIDITY AND LOW UVT MUST BE SUSTAINED OVER A PERIOD OF TIME (INITIALLY SET AT 30 SECONDS) BEFORE AUTOMATICALLY TRIGGERING FLOW BYPASS AND STOPPAGE .

5.1.3 RESTART OF THE TREATMENT PROCESS

TREATMENT MAY BE RE-STARTED MANUALLY OR AUTOMATICALLY. AUTOMATIC RESTART IS INITIATED WHEN TURBIDITY AT ICR DROPS BELOW 2.6 NTU AND RESERVOIR WATER LEVEL EXCEEDS 15 FEET. THE FOLLOWING RESTART SEQUENCE WILL BE FOLLOWED:

1. OPEN THE INLET VALVE AT THE ICR HEADWORKS.
2. ONCE THE VALVE AT ICR BEGINS TO OPEN, THE BYPASS CONTROL VALVE (V104) WILL ALSO BEGIN TO OPEN TO FLUSH THE RAW WATER LINE. OPENINGS WILL BE CONTROLLED BY THE PLC.
3. FLUSHING WILL CONTINUE UNTIL TURBIDITY AT THE TREATMENT PLANT INLET DROPS BELOW 2.6 NTU AND UVT IS ABOVE 85%, WHEREUPON V101 SLOWLY CLOSES AS V102A/B OPENS. V109A/B ACTIVATES AND MODULATES FLOW ACCORDING TO WATER LEVEL IN THE CHLORINE CONTACT TANK.
4. IF TURBIDITY REMAINS ABOVE 2.6 NTU OR THE UVT REMAINS BELOW 85% AFTER 10 MINUTES OF FLUSHING, THE FLUSHING PROCESS WILL CONTINUE FOR A MAXIMUM OF 10 ADDITIONAL MINUTES. IF EITHER PARAMETER DOES NOT COME INTO ACCEPTABLE RANGE IN THAT PERIOD, FLOW TO THE WTP STOPS ACCORDING TO THE 3-STEP SEQUENCE IN 5.1.1.

SHOULD THE FLUSHING SEQUENCE EXTEND LONGER THAN 1 COMPLETE PIPELINE VOLUME, THE SYSTEM WILL ALARM AND REQUIRE A MANUAL RESET VIA THE TOUCHSCREEN DISPLAY ON THE CONTROL PANEL DOOR. MANUAL RESTART OF THE PLANT WILL BE REQUIRED.

5.2 FOREIGN MATTER CONTROL

INCOMING RAW WATER UNDERGOING TREATMENT FLOWS THROUGH ONE OF TWO STRAINERS, ST101A/B, WITH 60-MESH SCREENS. DIFFERENTIAL PRESSURE IS MONITORED ACROSS EACH STRAINER AND SIGNALS AN ALARM WHEN THE DIFFERENTIAL REACHES 5 PSI. THE ALARM, VIEWABLE ON THE CONTROL PANEL DOOR AND AT THE DPU WATER SHOP, INDICATES THE STRAINER IS FOULED. THE OPERATOR ON DUTY CAN ROUTE FLOW THROUGH THE ALTERNATE STRAINER FROM EITHER THE WTP OR FROM THE DPU WATER SHOP. THE ALARM LIGHT ON THE STRAINER GOING OFFLINE WILL REMAIN ON UNTIL RESET MANUALLY AFTER THE STRAINER HAS BEEN SERVICED.

STRAINERS WILL BE CLEANED IN ACCORDANCE WITH MANUFACTURER INSTRUCTIONS AND THE FOLLOWING SEQUENCE:

1. VERIFY THAT THE INLET VALVE TO THE STRAINER TO BE CLEANED IS CLOSED.
2. MANUALLY CLOSE THE OUTLET VALVE FROM THE STRAINER TO BE CLEANED.
3. RELIEVE PRESSURE IN THE STRAINER BY OPENING THE PRESSURE RELIEF VALVE ON THE TOP.
4. LOOSEN THE DOGS HOLDING THE LID IN PLACE.
5. OPEN THE LID USING A FLOOR CRANE OR OTHER SUITABLE LIFTING DEVICE.
6. LIFT THE STRAINER BASKET WITH THE FLOOR CRANE AND PLACE ON OR NEAR THE TRENCH GRATE.
7. WASH OUT THE CONTAMINANTS IN THE BASKET. USE HOSES, BRUSHES OR OTHER TOOLS AS NECESSARY.
8. REASSEMBLE THE STRAINER, REVERSING STEPS 4-6.
9. MAKE SURE THE PRESSURE RELIEF VALVE IS CLOSED.
10. SLOWLY OPEN THE OUTLET VALVE, ALLOWING WATER TO SLOWLY FILL THE STRAINER.
11. AS WATER ENTERS, OPEN THE PRESSURE RELIEF VALVE ON THE TOP OF THE STRAINER TO ALLOW AIR TO ESCAPE.
12. WHEN ALL AIR HAS BEEN REMOVED, CLOSE THE RELIEF VALVE AND FULLY OPEN THE OUTLET VALVE.

5.3 UV TREATMENT

UV TREATMENT IS ACCOMPLISHED WITH EITHER OF TWO CALGON 24" 5X10 REACTORS. A UVT METER CONTINUOUSLY ANALYZES WATER ENTERING THE REACTOR AND TRANSMITS A SIGNAL TO THE UVT PANEL AND PLC.

ISOLATION VALVES FOR THE UV REACTORS ARE AUTOMATICALLY ACTIVATED. INLET AND OUTLET VALVES FOR EACH REACTOR OPEN AND CLOSE SIMULTANEOUSLY. REACTORS MUST BE IN OPERATION PRIOR TO THE VALVES' OPENING AND MUST STAY ON UNTIL BOTH VALVES ARE CLOSED.

EACH REACTOR IS EQUIPPED WITH A CONTROL PANEL THAT MONITORS AND ADJUSTS UV LAMP INTENSITY ACCORDING TO UVT IN THE PROCESS STREAM (UVT-3)AND UV INTENSITY MEASURED WITHIN THE REACTOR. THE PLC IS PROGRAMMED TO AUTOMATICALLY SWITCH FROM ONE REACTOR TO THE OTHER AND SIGNAL AN ALARM IN THE EVENT OF LAMP BREAKAGE OR OTHER PROBLEMS.

SHOULD A LAMP AND ITS CONTAINING QUARTZ SLEEVE BREAK, THE TEE TRAP AND TWO-INCH VALVE (V112A/B) CAN BE USED TO DRAIN MERCURY-CONTAMINATED WATER FROM THE BOTTOM OF THE VESSEL INTO PORTABLE CONTAINERS FOR DISPOSAL. ONCE THE VESSEL IS EMPTY, THE BLIND FLANGE ALLOWS ACCESS FOR CLEANING, INSPECTION, OR REPAIR. CARE MUST BE TAKEN TO SLOWLY REFILL SO AS TO ALLOW AIR TO VENT.

WHENEVER HIGH INCOMING TURBIDITY, LOW INCOMING UVT, OR OTHER CONDITIONS PRECLUDE UV TREATMENT, THE INLET AND OUTLET VALVES TO THE ACTIVE REACTOR WILL CLOSE PRIOR TO THE REACTOR SHUTTING DOWN. INLET AND OUTLET VALVES ARE NEVER TO BE OPENED UNLESS THE ASSOCIATED REACTOR IS OPERATING.

SHOULD UVT-3 FAIL, THE ACTIVE REACTOR WILL BE PROGRAMMED TO INCREASE TO FULL POWER TO ENSURE THAT WATER ENTERING THE SYSTEM IS FULLY TREATED. THIS OPERATING CONDITION WILL CONTINUE UNTIL THE UVT METER IS REPAIRED OR REPLACED.

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CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
ZACHARY B BOLDRICK
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APR 17, 2020
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

PROCESS NARRATIVE, SHEET 1 OF 2

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.0
Date: 4/17/2020	
Scale: N/A	

PROCESS DESCRIPTION (CONT'D)

5.4 CHLORINE INJECTION

WATER IS DRAWN FROM THE PROCESS STREAM THROUGH A TWO-INCH FEED LINE, PUMPED INTO THE CHLORINE ROOM TROUGH ONE OF TWO REDUNDANT VFD-DRIVEN PUMPS, INJECTED WITH CHLORINE GAS, AND RETURNED TO THE PROCESS BAY WHERE IT IS RE-INJECTED INTO THE MAIN.

REDUNDANT CHLORINE INJECTION SYSTEMS ARE PROVIDED WITH FOUR PROCESS FLOW RANGES: 200-940 GPM, 300-1,875 GPM, 400-3,750 GPM AND 1,000-6,250 GPM. IF NECESSARY FOR HIGH FLOWS, TWO OR MORE PARALLEL SYSTEMS CAN BE RUN SIMULTANEOUSLY. VFD'S, CHLORINE SYSTEM PUMPS, PRESSURE GAUGES, AND INLINE STRAINERS ARE LOCATED IN THE PROCESS BAY, ALLOWING OPERATORS TO SERVICE AND ADJUST PUMPS AND VALVES WITHOUT ENTERING THE CHLORINE ROOM. PIPING IS STAINLESS STEEL IN THE PROCESS BAY AND KYNAR IN THE CHLORINE ROOM. SILENT CHECK VALVES PREVENT BACKFLOW.

THE CHLORINATION SYSTEM DELIVERS A CONCENTRATED HYPOCHLOROUS SOLUTION TO THE PROCESS STREAM THROUGH KYNAR PIPING AND A KYNAR DIFFUSER (DIF1), FOLLOWED BY AN INLINE KOMAX 3-ELEMENT STATIC MIXER TO ENSURE THOROUGH MIXING.

CHLORINE INJECTION INTO THE PROCESS STREAM IS FLOW PACED BASED UPON FLOW METER M102. THE VFD WILL DRIVE THE PUMP AT THE APPROPRIATE SPEED TO OPERATE THE CHLORINE INJECTION SYSTEM SIZED FOR THE CURRENT PLANT FLOW RATE.

5.5 FLOW MONITORING

PROCESS STREAM FLOW IS CONTINUOUSLY MEASURED WITH A ROSEMOUNT 8750 MAGNETIC FLOW METER WITH THE RESULTS TRANSMITTED TO THE PLC. ACCURATE FLOW DATA ARE NECESSARY TO FACILITATE PLANT OPERATIONS, CONTROL UV REACTORS, PACE CHLORINE INJECTION, ENSURE REGULATORY COMPLIANCE, ASSIST TROUBLESHOOTING, CALCULATE UNIT COSTS, AND SERVE A VARIETY OF PLANT AND WATER SYSTEM PLANNING FUNCTIONS.

THE SAME MODEL FLOW METERS WILL BE INSTALLED IN THE TANK OUTLET LINE AND THE BYPASS LINE. THESE WILL MONITOR WATER DEMAND/USAGE AND WATER THAT IS FLUSHED FROM THE SYSTEM THROUGH THE BYPASS LINE.

5.6 BACKFLOW PREVENTION

PROCESS STREAM BACKFLOW IS PREVENTED BY A DANFOSS MODEL 92LW SWING-CHECK VALVE LOCATED NEAR THE PLANT OUTLET.

5.7 AIR RELEASE VALVES

FOUR AIR RELEASE VALVES (V131A/B, V132, V137) ARE INSTALLED AT HIGH POINTS IN THE PROCESS MAIN AND ATOP THE UV REACTORS. DESIGNED TO DISPEL AIR WHILE LINES ARE RE-FILLED WITH WATER, V131A/B WILL NOT FUNCTION UNDER SYSTEM PRESSURE. HOWEVER, EITHER UV UNIT (WITH ITS AIR RELEASE VALVE) CAN BE ISOLATED, DRAINED, REPAIRED, AND RE-FILLED WHILE THE OTHER IS KEPT IN OPERATION. VALVES V132 AND V137 WILL DISPEL AIR CONTINUOUSLY DURING PLANT OPERATIONS.

5.8 PROCESS MONITORING

WATER QUALITY MONITORING AT ICR AND IN THE WTP WILL GENERATE AUTOMATED ALARM AND CONTROL SIGNALS FROM THE PLC. THESE FUNCTIONS CAN, AT OPERATOR DISCRETION, BE OVERRIDDEN. REASONS FOR OVERRIDING AN ALARM OR CONTROL MAY INCLUDE:

- KNOWN PROBLEMS WITH THE CONTROLLING INSTRUMENTATION
- ONGOING MAINTENANCE ON AN INSTRUMENT
- WATER QUALITY, WATER HANDLING, OR OTHER EMERGENCY
- PERSONNEL OR PUBLIC SAFETY

CONTINUOUS READINGS FROM THE THREE UVT METERS (ICR HEADWORKS, WTP INLET, AND UV REACTOR INLET) CAN BE COMPARED FOR CONSISTENCY. TURBIDITY IS ALSO MEASURED AT FOUR LOCATIONS (ICR HEADWORKS, WTP INLET, UV REACTOR INLET, CT TANK OUTLET), LIKEWISE ALLOWING OPERATORS TO COMPARE AND CHECK ON INSTRUMENT RELIABILITY. THE TURBIDIMETER AT THE UV REACTOR INLET IS THE ONE USED FOR REGULATORY REPORTING.

CHLORINE CONCENTRATION IS ANALYZED IN TREATED WATER EXITING THE WTP. READINGS FROM A HACH CL17 FREE CHLORINE RESIDUAL ANALYZER ARE CONTINUOUSLY TRANSMITTED TO THE PLC WHICH USES THE DATA TO INFORM OPERATORS, AND GENERATE REPORTS. A SECOND HACH CL17 MONITORS FREE CHLORINE CONCENTRATION IN FINISH WATER LEAVING THE CONTACT TANK, SENDING ITS RESULTS TO THE PLC. FINISH WATER CHLORINE CONCENTRATIONS ARE USED TO ESTABLISH REGULATORY COMPLIANCE. THEY CAN ALSO BE COMPARED WITH TREATED WATER READINGS AS AN INDICATOR OF WATER QUALITY CONDITIONS IN THE TANK.

PRESSURE IS MONITORED, BOTH WITH IN-LINE PRESSURE TRANSDUCERS AND PRESSURE GAUGES MOUNTED ADJACENT TO THE TRANSDUCERS, AT THE FOLLOWING PAIRED LOCATIONS. GAUGES WILL BE PLACED TO BE VIEWABLE FROM BOTH SIDES OF THE PROCESS MAIN.

- INLET TEE BEFORE THE STRAINERS
- OUTLET TEE AFTER THE STRAINERS
- INLET TO EACH UV REACTOR LINE
- OUTLET FROM EACH UV REACTOR LINE
- INLET BEFORE THE CLA-VAL FLOW CONTROL VALVES
- OUTLET AFTER THE CLA-VAL FLOW CONTROL VALVES

COMPARISON OF PRESSURE ACROSS STRAINERS, REACTORS, AND FLOW CONTROL VALVES PROVIDES AN INDICATION OF FLOW CONDITIONS AND HEADLOSS ACROSS EACH UNIT.

5.9 UPS CONNECTIONS

THE UNINTERRUPTIBLE POWER SUPPLY (UPS) IS DESIGNED TO KEEP ALL PROCESS AND CONTROL EQUIPMENT IN OPERATION DURING A POWER FAILURE UNTIL BACK-UP GENERATION IS ONLINE. EQUIPMENT CONNECTED TO THE UPS INCLUDES (BUT IS NOT LIMITED TO) THE FOLLOWING.

- UV REACTORS
- ALL PRESSURE TRANSDUCERS
- CLA-VAL FLOW CONTROL VALVES
- CHLORINATION EQUIPMENT
- FLOW METERS (M101 AND M102)
- ALL SCADA EQUIPMENT
- ALL MONITORING INSTRUMENTATION INCLUDING THE INLET TURBIDIMETER (TURB-2), THE TREATED WATER TURBIDIMETER (TURB-3), THE INLET UVT METER (UVT-2), THE UV REACTOR UVT METER (UVT-3), THE TREATED WATER CHLORINE RESIDUAL ANALYZER (CL17-1), AND THE FINISHED WATER CHLORINE RESIDUAL (CL17-2, LEAVING THE TANK).
- CHLORINE ROOM PUMPS (PMP101A/B, PMP102A/B).
- ALL CHLORINE ROOM VALVING AND EQUIPMENT.
- NORMAL PLANT SHUTDOWN WILL OCCUR WHEN COMMANDED BY THE PLC AS A RESULT OF ACTIVATING THE PLANT E-STOP BUTTON, A VIRTUAL E-STOP THROUGH THE SCADA SYSTEM OR WHEN UTILITY POWER IS LOST AND THE GENERATOR FAILS TO START. NORMAL PLANT SHUTDOWN WILL BE PROGRAMMED INTO THE MAIN CONTROL PLC BASED ON A SEQUENCE OF OPERATIONS PROVIDED BY THE PROCESS ENGINEER, AND WILL INCLUDE BUT NOT LIMITED TO THE FOLLOWING: CLOSING OF VALVES IN THE PROPER SEQUENCE (USING PROPER CLOSING RATES), SHUTDOWN OF THE CHLORINATION SYSTEM AND SHUTDOWN OF THE UV SYSTEM. SHUTDOWN AS A RESULT OF UTILITY POWER FAILURE WILL INCLUDE A TIME DELAY BASED ON FAILURE OF THE GENERATOR TO START WITHIN A PRESET TIME. THE PRESET TIME DELAY WILL BE BASED ON AN ALLOWANCE OF SUFFICIENT TIME TO COMPLETE THE PLANT SHUTDOWN BEFORE THE UPS RUNS OUT OF STORED ENERGY. ADDITIONALLY, THE FLOW CONTROL VALVES ARE TO BE EQUIPPED WITH NORMALLY OPEN SOLENOIDS THAT WILL SHUT THE VALVE UPON LOSS OF POWER. ADDITIONAL DETAILS OF THE SHUTDOWN SEQUENCE, INCLUDING TIME DELAYS, WILL BE INCLUDED IN THE O&M MANUAL.
- MANUAL OPERATION OF THE PLANT IS POSSIBLE WITH LOSS OF PLC CONTROL. HOWEVER, POWER IS REQUIRED TO OPERATE THE UV AND THE CHLORINATION SYSTEMS. MANUAL SAMPLING AND RECORD KEEPING FUNCTIONS WOULD BE REQUIRED TO MEET DEC REGULATIONS. IT WILL BE POSSIBLE TO OPERATE THE VALVES MANUALLY TO ALLOW FLOW THROUGH THE SYSTEM UTILIZING HAND WHEELS ON THE ACTUATED VALVES. OPERATING IN THIS MANNER WILL REQUIRE AROUND THE CLOCK OPERATOR SUPERVISION IN ORDER TO ADJUST VALVES AND TO CONDUCT REQUIRED SAMPLING ACTIVITIES. DETAILS OF THE MANUAL PROCEDURES WILL BE PROVIDED IN THE O&M MANUAL.
- SEMI-AUTOMATED OPERATION OF THE SYSTEM WILL BE POSSIBLE IF THE PLC IS FUNCTIONING, BY OVER-RIDING PRESET PARAMETERS SUCH AS FLOW RATES, ETC. DETAILS OF THE USE OF THE SCADA SYSTEM FOR PLANT OPERATION WILL BE PROVIDED IN THE O&M MANUAL.

6.0 POWER GENERATING TURBINES

UNDER NORMAL CONDITIONS THE FULL FLOW FROM THE ICR WILL PASS THROUGH ONE OR BOTH TURBINES FOR THE PURPOSE OF GENERATING ELECTRICITY. THE TURBINE PLC WILL MODULATE THE INLET CONTROL VALVE FOR EACH TURBINE TO MAINTAIN PROPER DIFFERENTIAL PRESSURE ACROSS THE TURBINE BASED ON SIGNALS FROM PT114 AND PT115 AND THE COMBINED FLOWRATE FROM M101 AND M102.

VALVE V234B WILL BE ENABLED WHILE THE TURBINES ARE ONLINE TO HANDLE ANY TRANSIENT FLOW CONDITIONS DURING TURBINE OPERATION. V234B ALSO HAS AN ADJUSTABLE SETPOINT TO COMPENSATE FOR THE VARYING DOWNSTREAM PRESSURES ACROSS THE ENTIRE FLOWRANGE OF THE TURBINES. THE SETPOINT WILL CHANGE BASED ON FEEDBACK FROM THE FLOWMETERS.

WHEN ENABLED BY THE SCADA OPERATOR, THE PLC WILL OPEN V104 AND ALLOW RAW WATER DISCHARGE TO PYRAMID CREEK FOR ADDITIONAL POWER GENERATION.

THE PRV V238 WILL MAINTAIN 20 PSIG BACKPRESSURE TO ENSURE THE WATER TREATMENT PROCESS HAS ADEQUATE PRESSURE TO CONTINUE TO FILL THE CHLORINE CONTACT TANK DURING WATER TREATMENT PROCESSING.

FULL TURBINE BYPASS TO THE WATER TREATMENT PROCESS IS HANDLED BY TWO PRVs INSTALLED PARALLEL TO THE TURBINES. THE 16" PRV IS CAPABLE OF THE FULL 6,250 GPM PROCESS FLOW RATE. THE 8" PRV IS SIZED TO HANDLE PRESSURE TRANSIENTS DURING TURBINE OPERATION.

6.1 TURBINE STARTUP SEQUENCE

WHEN THE TURBINES ARE IN 'HAND' OR 'AUTO' MODE THE PLC WILL START THE TURBINES WHEN ALL THE PARAMETERS HAVE BEEN MET FOR OPERATION.

- INLET AND DISCHARGE PRESSURES ARE ABOVE AND BELOW SETPOINTS RESPECTIVELY
- ALL DIAGNOSTIC CONDITIONS ARE CLEARED ON THE TURBINE CONTROL PANEL
- THE 'E-STOP' SWITCH IS NOT DEPRESSED

WHEN THESE PERMISSIVES ARE MET, THE RESPECTIVE TURBINE INLET CONTROL VALVE WILL SLOWLY OPEN UNTIL THE TURBINE IS UP TO SPEED. AT THIS TIME THE ASSOCIATED CONTACTOR WILL CLOSE AND CONNECT THE UNIT TO THE GRID.

6.2 PLANNED TURBINE SHUTDOWN SEQUENCE

THE RESPECTIVE TURBINE INLET CONTROL VALVE SHALL SLOWLY CLOSE UNTIL IT REACHES 35% CLOSURE. THEN THE TURBINE GENERATOR WILL BE DISCONNECTED FROM THE GRID. THE INLET CONTROL VALVE WILL THEN FULLY CLOSE AT A SLOW ENOUGH RATE TO PREVENT EXCESSIVE SURGE.

6.3 UNPLANNED TURBINE SHUTDOWN SEQUENCE

THE TURBINE WILL DISCONNECT FROM THE GRID AND THE INLET CONTROL VALVE WILL FULLY CLOSE AT A RATE SLOW ENOUGH TO PREVENT EXCESSIVE SURGE. THE FOLLOWING CONDITIONS WILL INITIATE A SHUTDOWN SEQUENCE:

- LOSS OF 480VAC GRID POWER
- TURBINE OVER/UNDER SPEED
- GENERATOR VOLTAGE OR FREQUENCY OUT OF NORMAL BOUNDS
- GROUND FAULT CONDITION
- INLET/DISCHARGE PRESSURES OUT OF ACCEPTABLE RANGE
- ACTUATION OF E-STOP SWITCH
- EXCESSIVE GENERATOR WINDING OR BEARING TEMPERATURE

CITY OF UNALASKA
PORT OF DUTCH HARBOR
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REGISTERED PROFESSIONAL ENGINEER

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0	ISSUED FOR CONSTRUCTION	4/17/20

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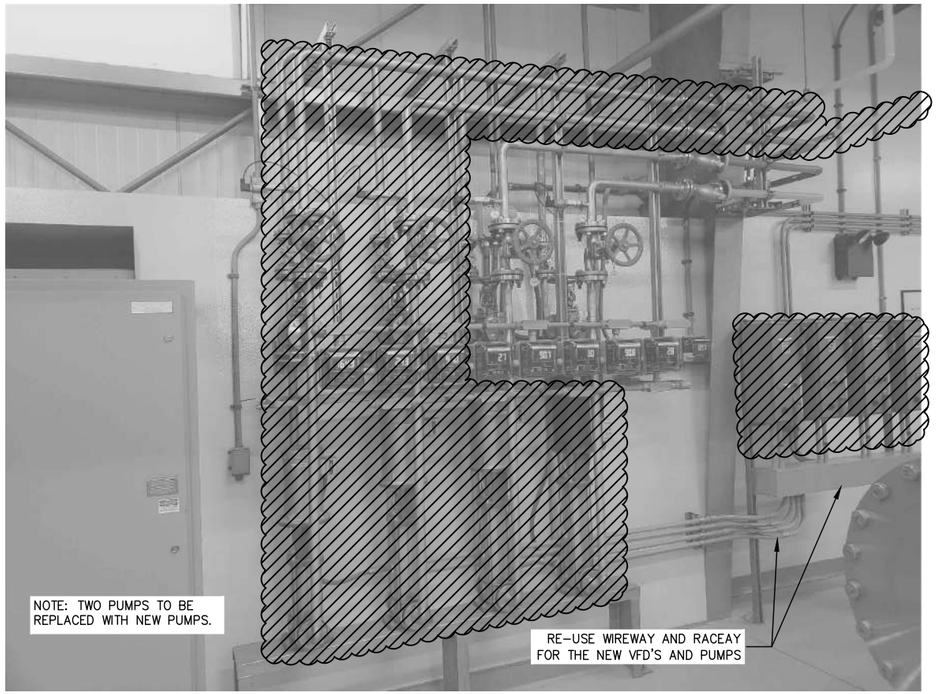
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

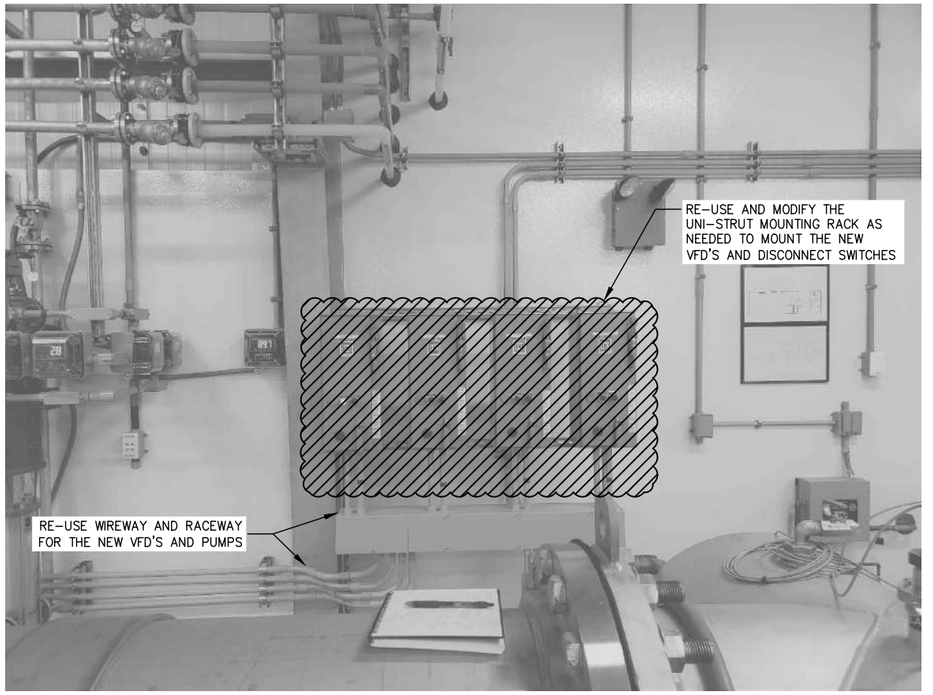
PROCESS NARRATIVE, SHEET 2 OF 2

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

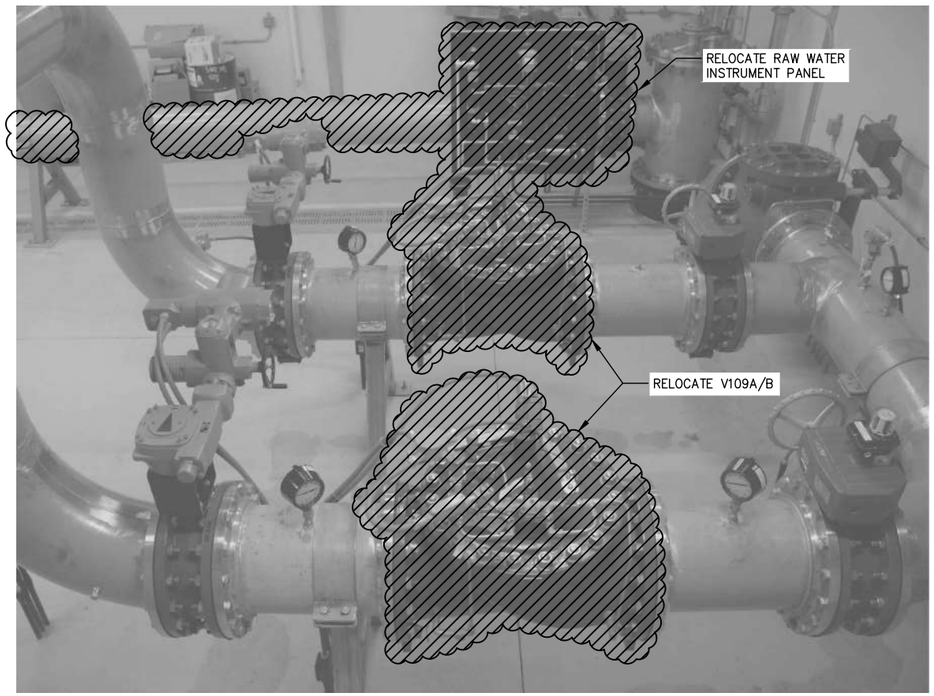
SN Project No.: -	Drawing No. P1.1
Date: 4/17/2020	
Scale: N/A	



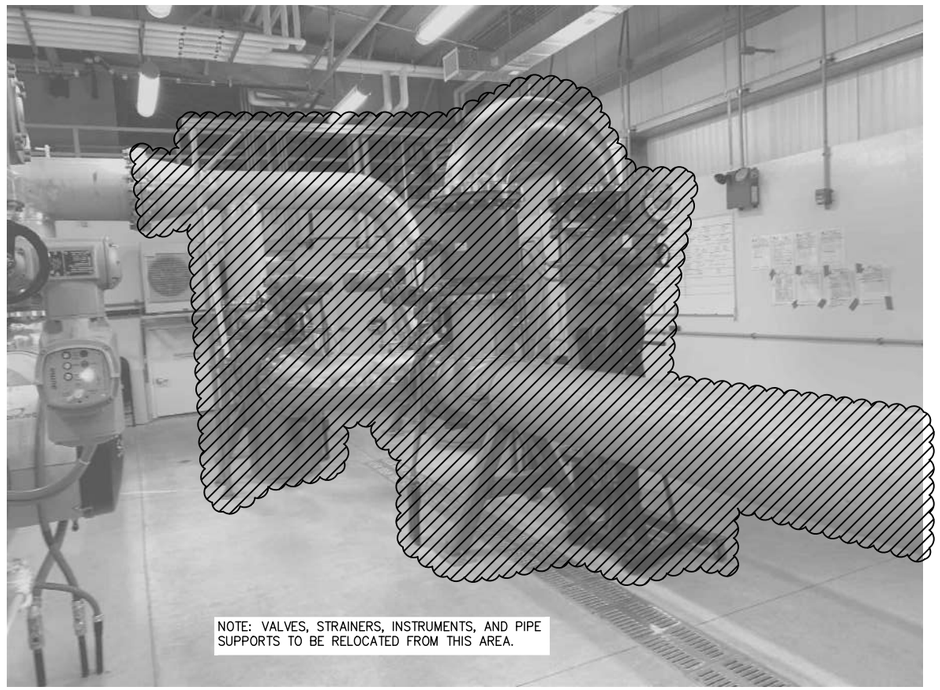
1 - CHLORINE PUMPS DEMOLITION
SCALE: N/A



2 - MOTOR SWITCHES DEMOLITION
SCALE: N/A



3 - PRV'S DEMOLITION
SCALE: N/A



4 - STRAINERS AND METER DEMOLITION
SCALE: N/A

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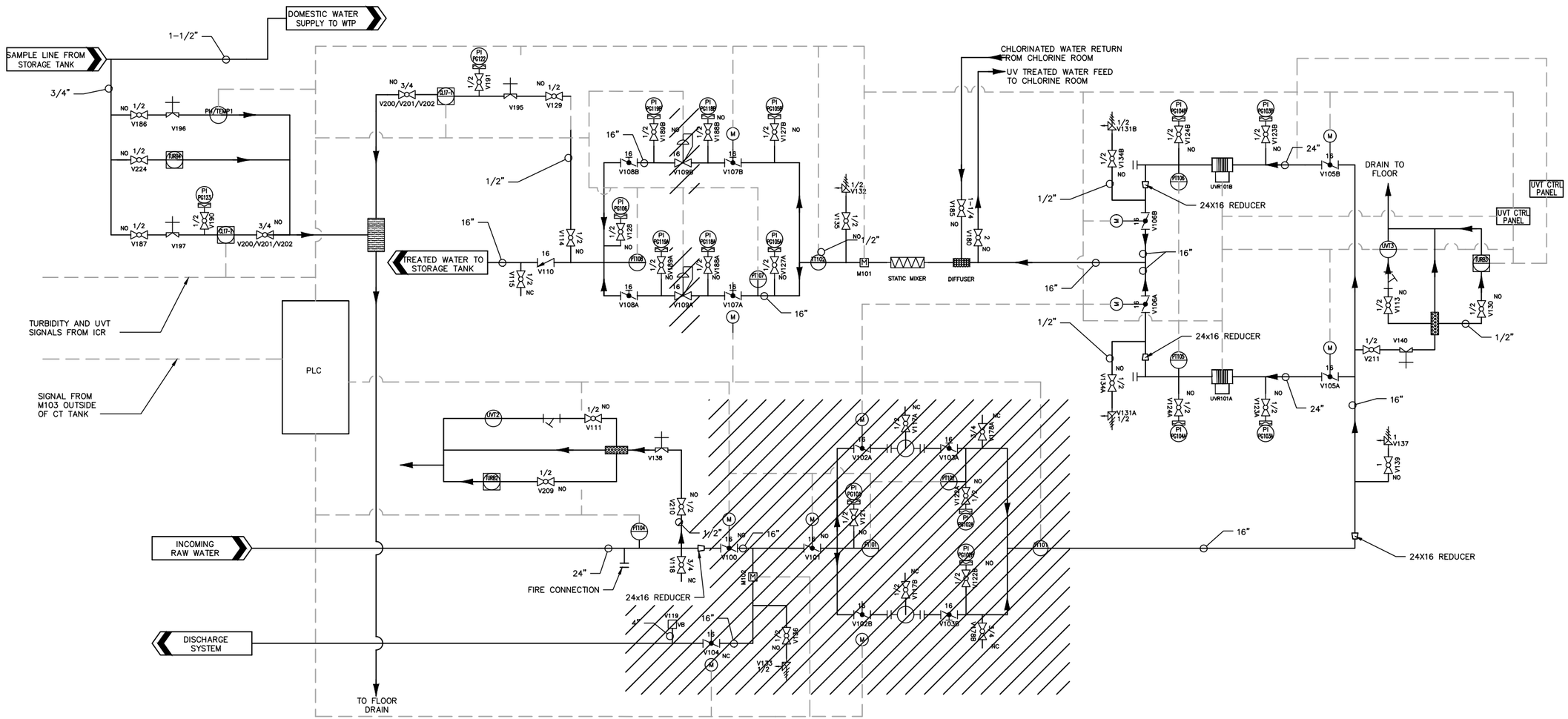
PYRAMID WATER TREATMENT PLANT

GENERAL DEMOLITION

Drawn By:	BDH
Checked By:	ZBB
Approved By:	ZBB
SN Project No.: -	Drawing No. P1.2D
Date: 4/17/2020	
Scale: N/A	

P&ID LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PROCESS FLOW		BLIND FLANGE	PT108	PRESSURE TRANSDUCER	CL17-3	HACH CL-17 CHLORINE ANALYZER	M 16 V102B	AUTOMATIC BUTTERFLY VALVE	PH/TEMP1	HACH DPD1P1 PH TEMPERATURE SENSOR
	CONTROL SIGNAL LINE		UV REACTOR	UVT1	UV TRANSMITTANCE MONITOR	16 V108A	MANUAL BUTTERFLY VALVE				DIAPHRAGM VALVE
	FLOW DIRECTION		STRAINER	16 V110	CHECK VALVE	V132 1/2	AIR RELIEF VALVE			VB	VACUUM BREAKER
	PIPE REDUCER	NO 1/2 V129	BALL VALVE NO–NORMALLY OPEN NC–NORMALLY CLOSED		DIFFUSER	PI PC106 1/2 V128	PRESSURE GAUGE WITH ISOLATION VALVE	16 V109A	ALTITUDE FLOW CONTROL VALVE		BUBBLE TRAP
	STATIC MIXER	CL-17	CHEMTRAC CHLORINE MONITOR		STRAINER						
M	MAGNETIC FLOW METER	TURB2	TURBIDIMETER		ACTIVATED CARBON FILTER						



FLOW PROCESS & INSTRUMENTATION DIAGRAM

SCALE: NOT TO SCALE

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PYRAMID WATER TREATMENT PLANT

PROCESS P&ID - DEMOLITION

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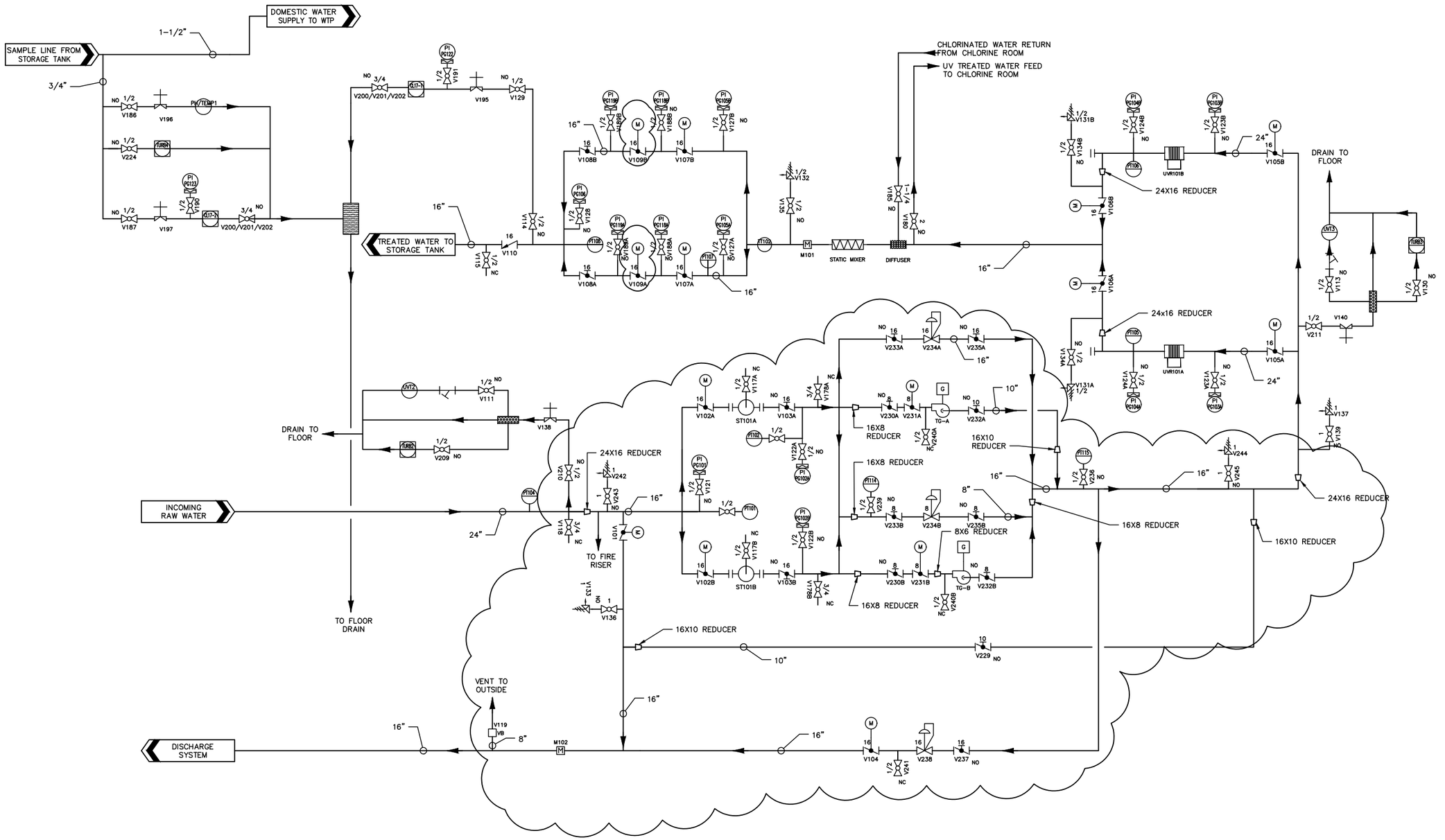
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.3D
Date: 4/17/2020	
Scale: N/A	

P&ID LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	PROCESS FLOW		BLIND FLANGE	PT106	PRESSURE TRANSDUCER	CL17-1	HACH CL-17 CHLORINE ANALYZER	M 16 V102B	AUTOMATIC BUTTERFLY VALVE	PH/TEMP1	HACH DPD1P1 PH TEMPERATURE SENSOR
	CONTROL SIGNAL LINE		UV REACTOR	UVT1	UV TRANSMITTANCE MONITOR	16 V108A	MANUAL BUTTERFLY VALVE				
	FLOW DIRECTION		STRAINER	16 V110	CHECK VALVE	V132 1/2	AIR RELIEF VALVE	16 V109A	ALTITUDE FLOW CONTROL VALVE		DIAPHRAGM VALVE
	PIPE REDUCER	NO 1/2 V129	BALL VALVE NO–NORMALLY OPEN NC–NORMALLY CLOSED		DIFFUSER	PI PC106 1/2 V128	PRESSURE GAUGE WITH ISOLATION VALVE	G C	TURBINE	VB	VACUUM BREAKER
	STATIC MIXER	TURB3	TURBIDIMETER		STRAINER						BUBBLE TRAP
M	MAGNETIC FLOW METER				ACTIVATED CARBON FILTER						



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PYRAMID WATER TREATMENT PLANT

PROCESS P&ID

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Approved By:	ZBB

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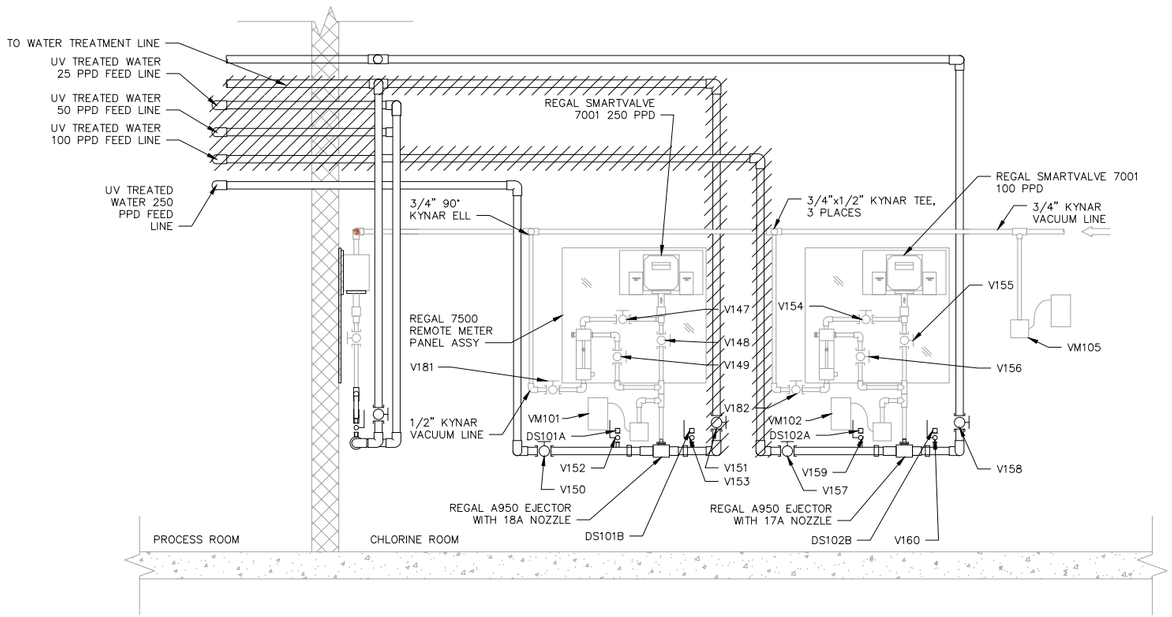
Scale: N/A	

NOTE:

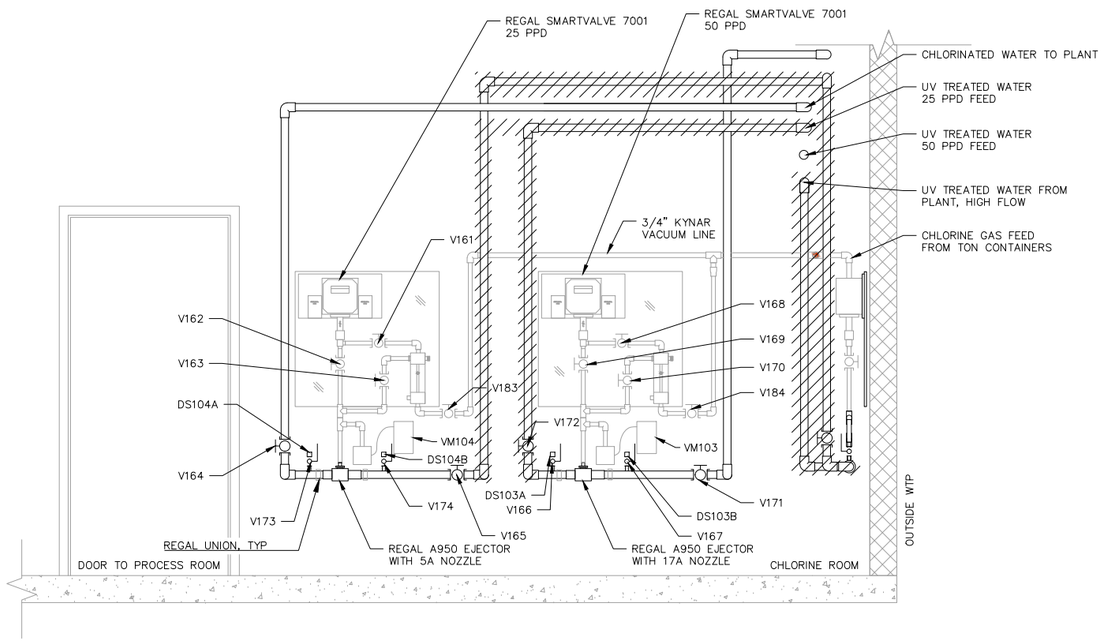
ALL PIPING HANDLING WATER FLOW IN THE CHLORINE ROOM WILL BE 1-1/2" KYNAR

DEMOLITION



CHLORINATION ELEVATION SOUTH WALL

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



CHLORINATION ELEVATION EAST WALL

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

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PYRAMID WATER TREATMENT PLANT

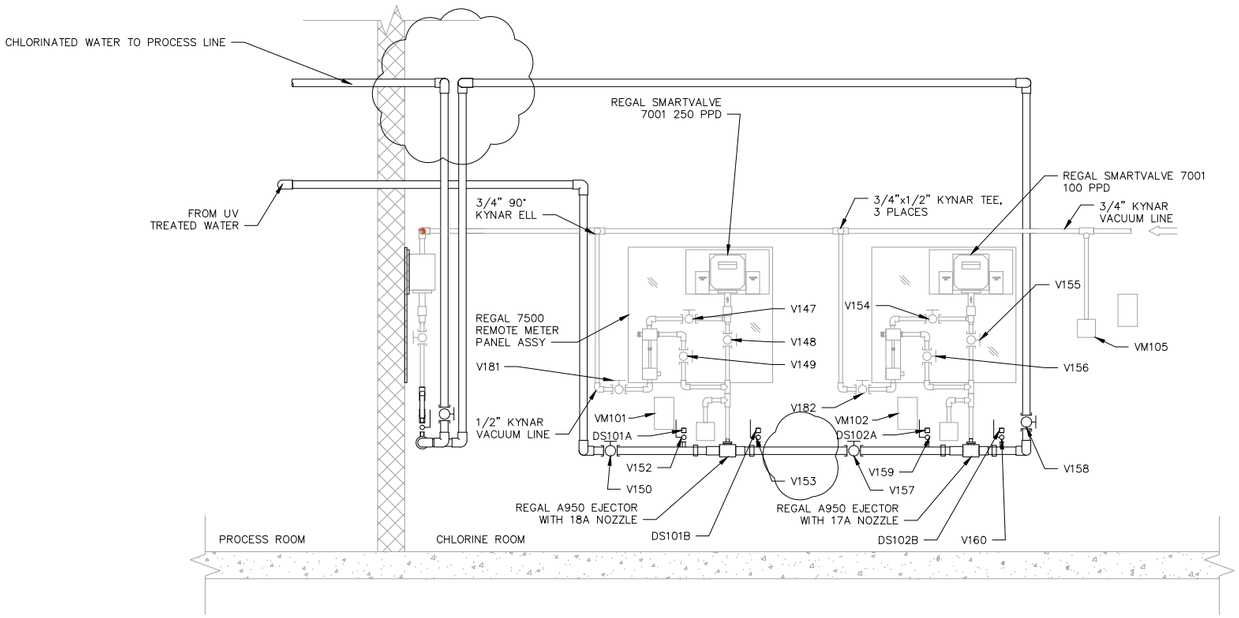
CHLORINATION ELEVATIONS - DEMOLITION

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.4D
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

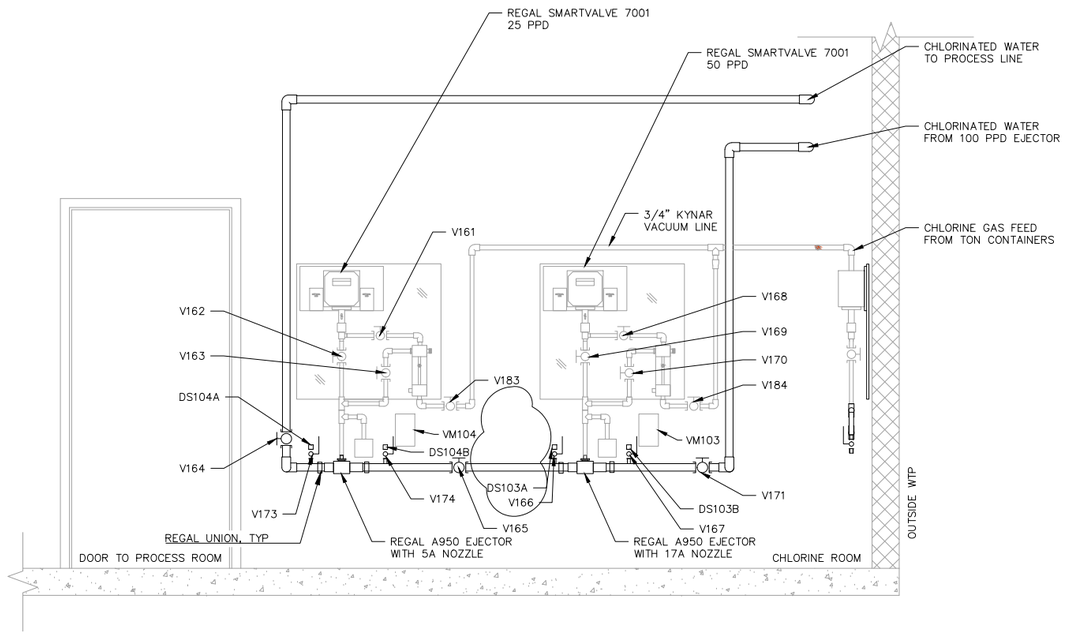
CONSTRUCTION NOTES:

1. ALL PIPING HANDLING WATER FLOW IN THE CHLORINE ROOM WILL BE 1-1/2" KYNAR
2. CHLORINE PANELS TO BE PIPED IN SERIES FROM CHLORINE PUMPS TO THE INJECTION POINT



CHLORINATION ELEVATION SOUTH WALL

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



CHLORINATION ELEVATION EAST WALL

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

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PYRAMID WATER TREATMENT PLANT

CHLORINATION ELEVATIONS

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Approved By:	ZBB

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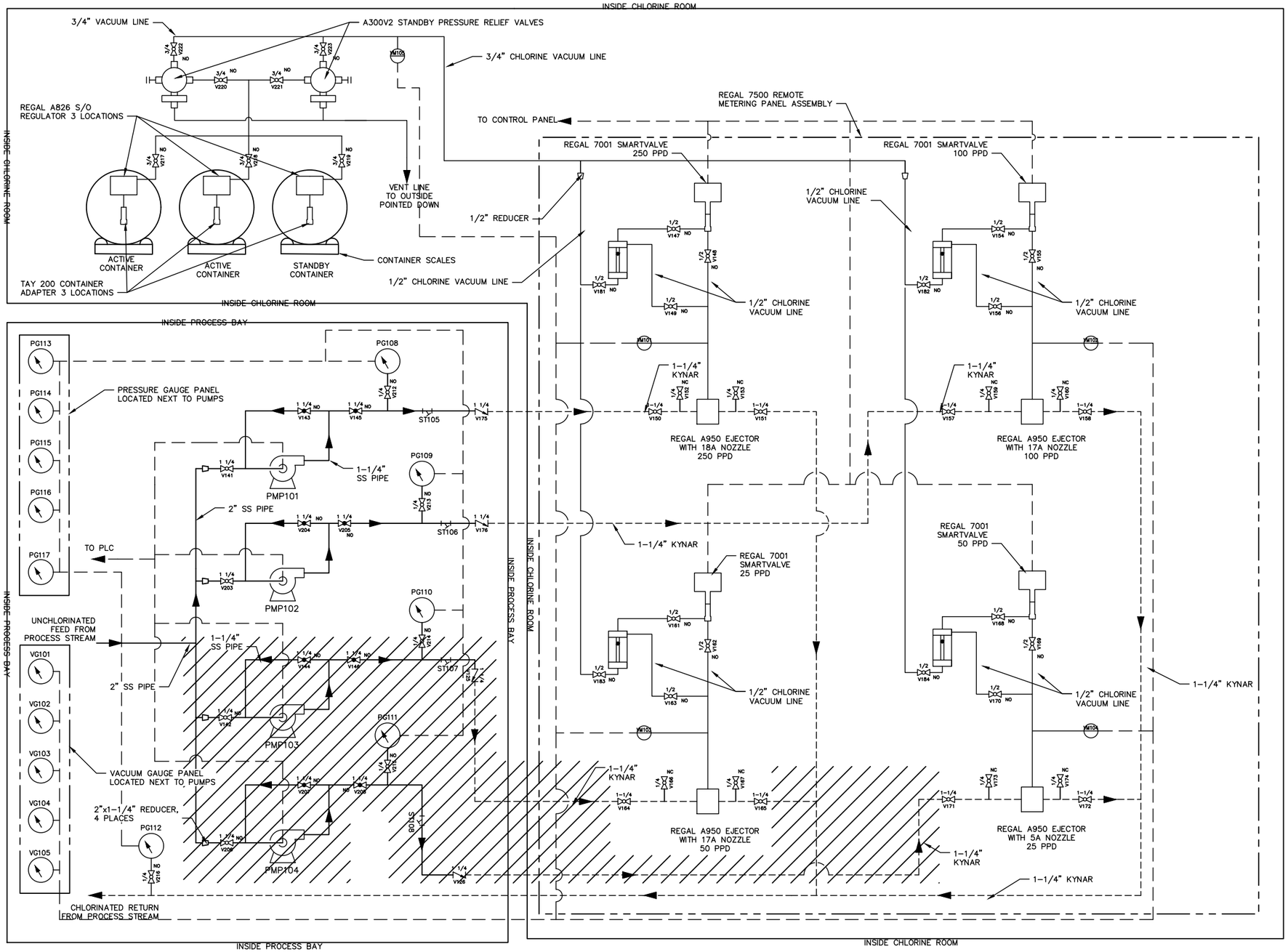

CHLORINATION PROCESS & INSTRUMENTATION DIAGRAM

SCALE: NOT TO SCALE

LEGEND

SYMBOL	DESCRIPTION
	REGAL SMARTVALVE
	FLOWMETER
1/2 V168	BALL VALVE
1 1/4 V145B	GLOBE VALVE
	CHLORINE EJECTOR
	STANDBY PRESSURE RELIEF VALVE
	TAY 200 ADAPTER
	PUMP
	Y-STRAINER
1 1/4 V176	CHECK VALVE
	KYNAR PIPING
	KYNAR VACUUM LINE
	REMOTE METERING PANEL ASSEMBLY
	SS PIPING
	CONTROL SIGNAL LINE
	PRESSURE GAUGE
	CHLORINE REGULATOR

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

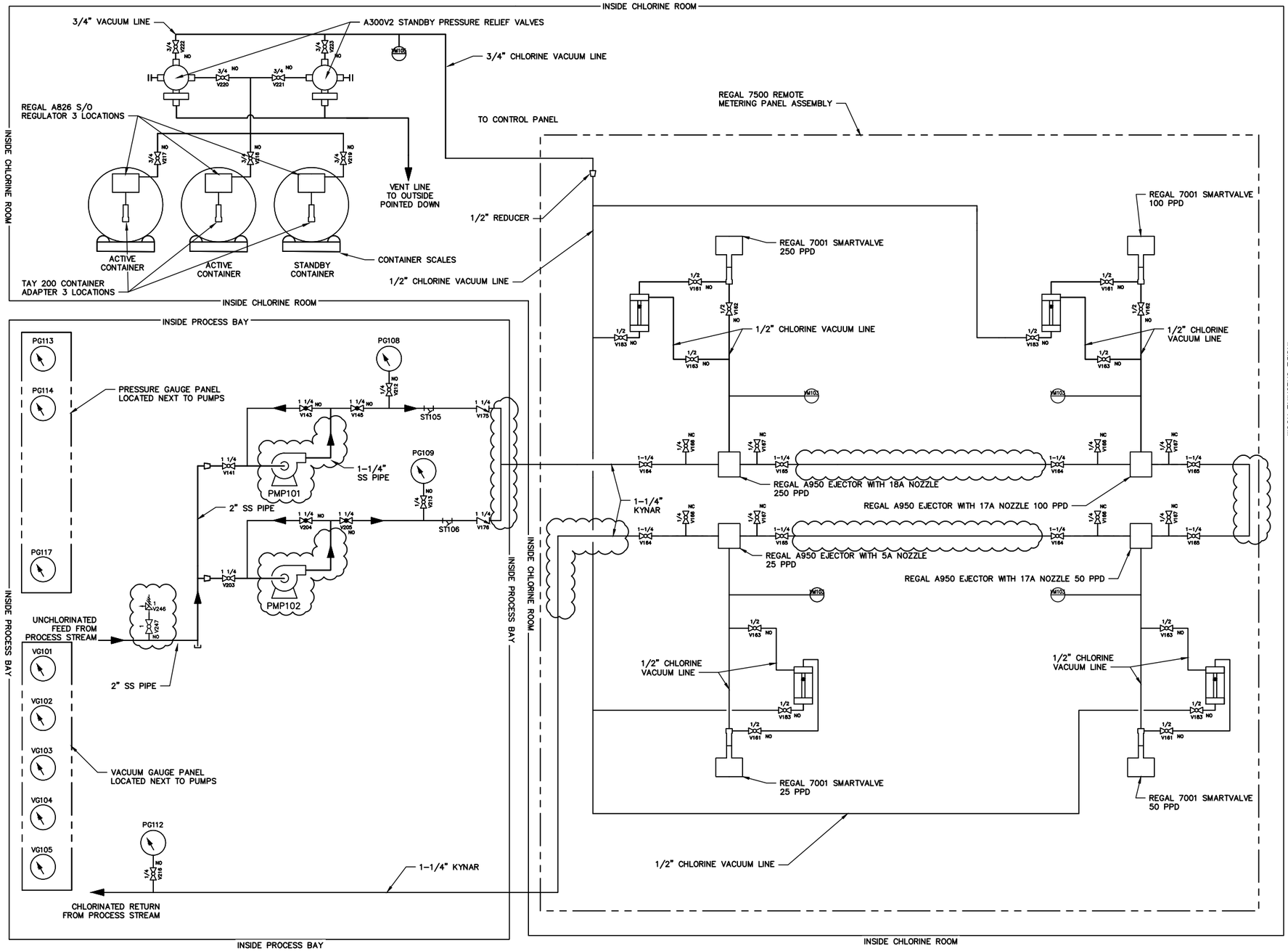
CHLORINATION P&ID - DEMOLITION

Drawn By:	RFK
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.5D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. CHLORINE DOSING PIPING RECONFIGURED IN THE CHLORINE ROOM. CHLORINE EJECTORS SHALL BE PIPED IN A 'SERIES' CONFIGURATION BEFORE REINJECTING INTO THE PROCESS STREAM.
2. TWO NEW VFD DRIVEN CHLORINE PUMPS TO BE INSTALLED
3. CHLORINE PUMP DISCHARGE PIPING TIED TOGETHER PRIOR TO ENTERING THE CHLORINE ROOM
4. NEW AIR RELIEF VALVE INSTALLED IN CHLORINE PUMP SUCTION LINE



LEGEND

SYMBOL	DESCRIPTION
	REGAL SMARTVALVE
	FLOWMETER
1/2 V168	BALL VALVE
1 1/4 V145B	GLOBE VALVE
	CHLORINE EJECTOR
	STANDBY PRESSURE RELIEF VALVE
	TAY 200 ADAPTER
	PUMP
	Y-STRAINER
1 1/4 V178	CHECK VALVE
	KYNAR PIPING
	KYNAR VACUUM LINE
	REMOTE METERING PANEL ASSEMBLY
	SS PIPING
	CONTROL SIGNAL LINE
	PRESSURE GAUGE
	CHLORINE REGULATOR

CITY OF UNALASKA PORT OF DUTCH HARBOR 53° 54' N 166° 32' W

STATE OF ALASKA 49 TH
ZACHARY B BOLDRICK
ME-14283
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

taku engineering
406 W Fireweed Ln.
Anchorage, AK 99503

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

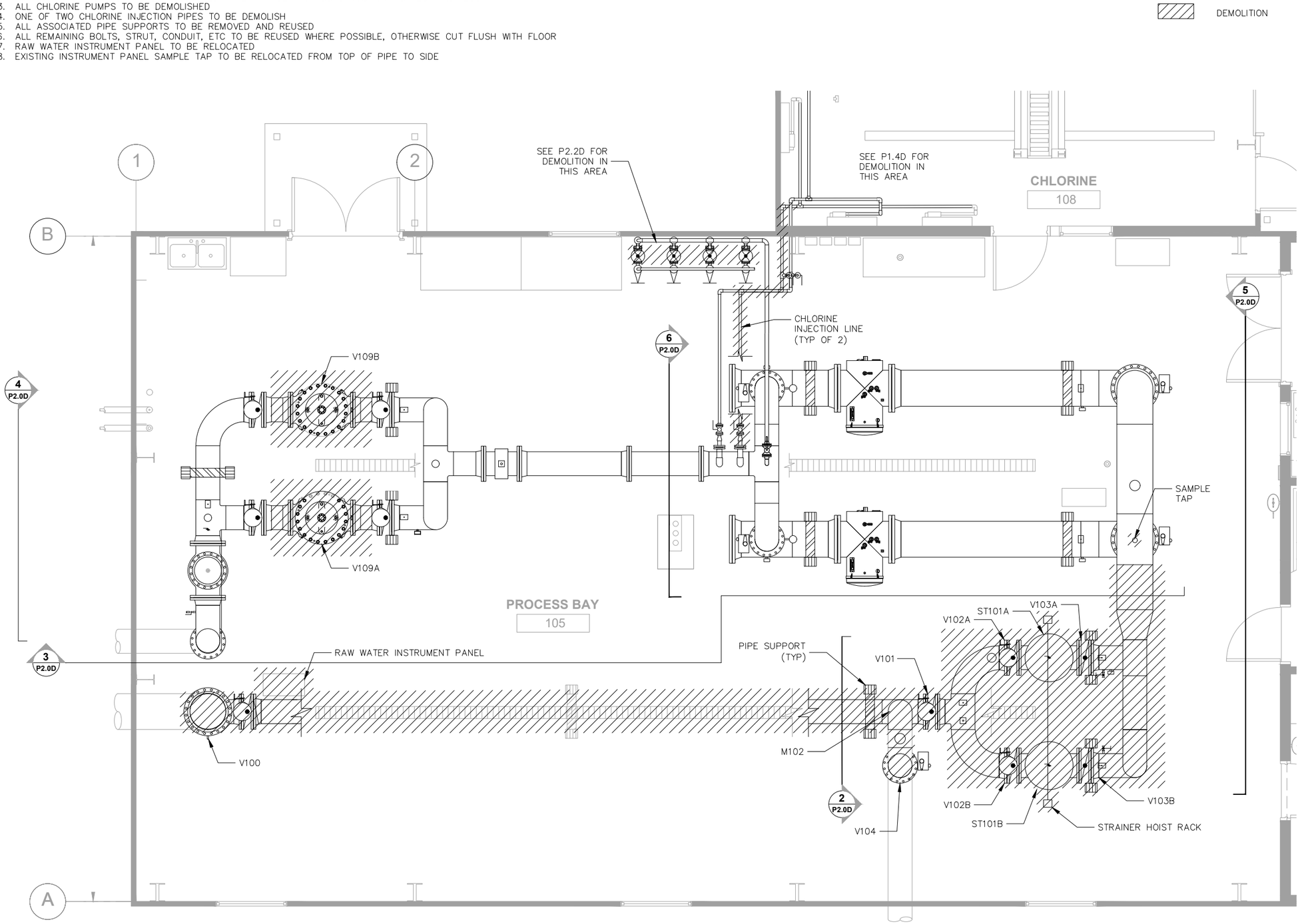
CHLORINATION P&ID

Drawn By:	RFK
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.5
Date: 4/17/2020	
Scale: N/A	

DEMOLITION NOTES:

1. FILTERS, ASSOCIATED VALVING, AND PIPING TO BE RELOCATED IN PHASE 2 OF CONSTRUCTION
2. 16" CLA-VAL V109 A&B TO BE RELOCATED AFTER PHASE 1 OF CONSTRUCTION AS V234A & V238
3. ALL CHLORINE PUMPS TO BE DEMOLISHED
4. ONE OF TWO CHLORINE INJECTION PIPES TO BE DEMOLISH
5. ALL ASSOCIATED PIPE SUPPORTS TO BE REMOVED AND REUSED
6. ALL REMAINING BOLTS, STRUT, CONDUIT, ETC TO BE REUSED WHERE POSSIBLE, OTHERWISE CUT FLUSH WITH FLOOR
7. RAW WATER INSTRUMENT PANEL TO BE RELOCATED
8. EXISTING INSTRUMENT PANEL SAMPLE TAP TO BE RELOCATED FROM TOP OF PIPE TO SIDE



PIPING PLAN

SCALE: 3/8"= 1'-0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 53' N 166° 32' W

STATE OF ALASKA
49 TH
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

PIPING PLAN - DEMOLITION

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -

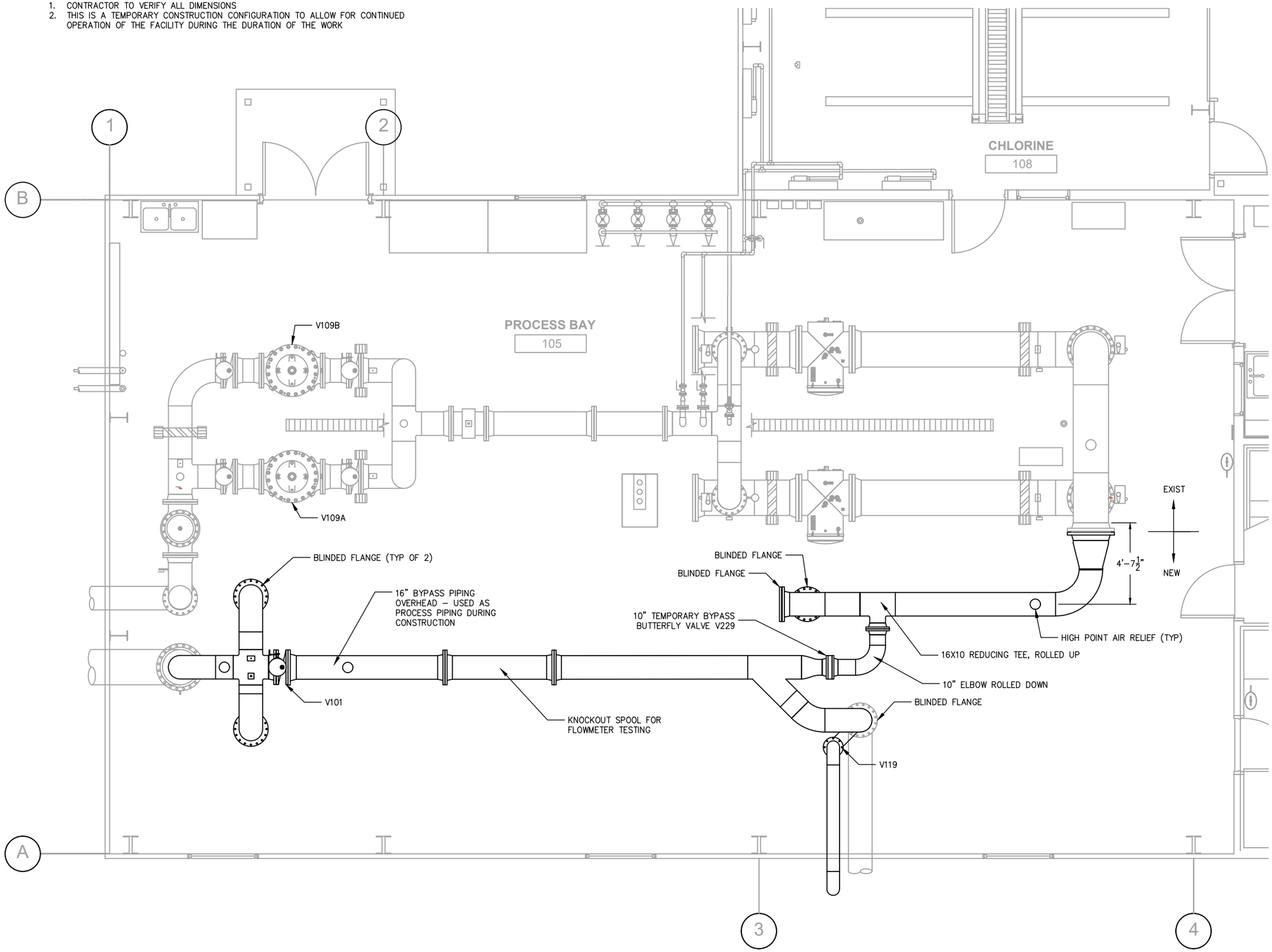
Date: 4/17/2020

Scale: SCALE AS SHOWN

Drawing No. **P1.6D**

CONSTRUCTION NOTES:

1. CONTRACTOR TO VERIFY ALL DIMENSIONS
2. THIS IS A TEMPORARY CONSTRUCTION CONFIGURATION TO ALLOW FOR CONTINUED OPERATION OF THE FACILITY DURING THE DURATION OF THE WORK



PROCESS BAY PIPING PLAN - PHASE 1

SCALE: 3/8"= 1'-0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

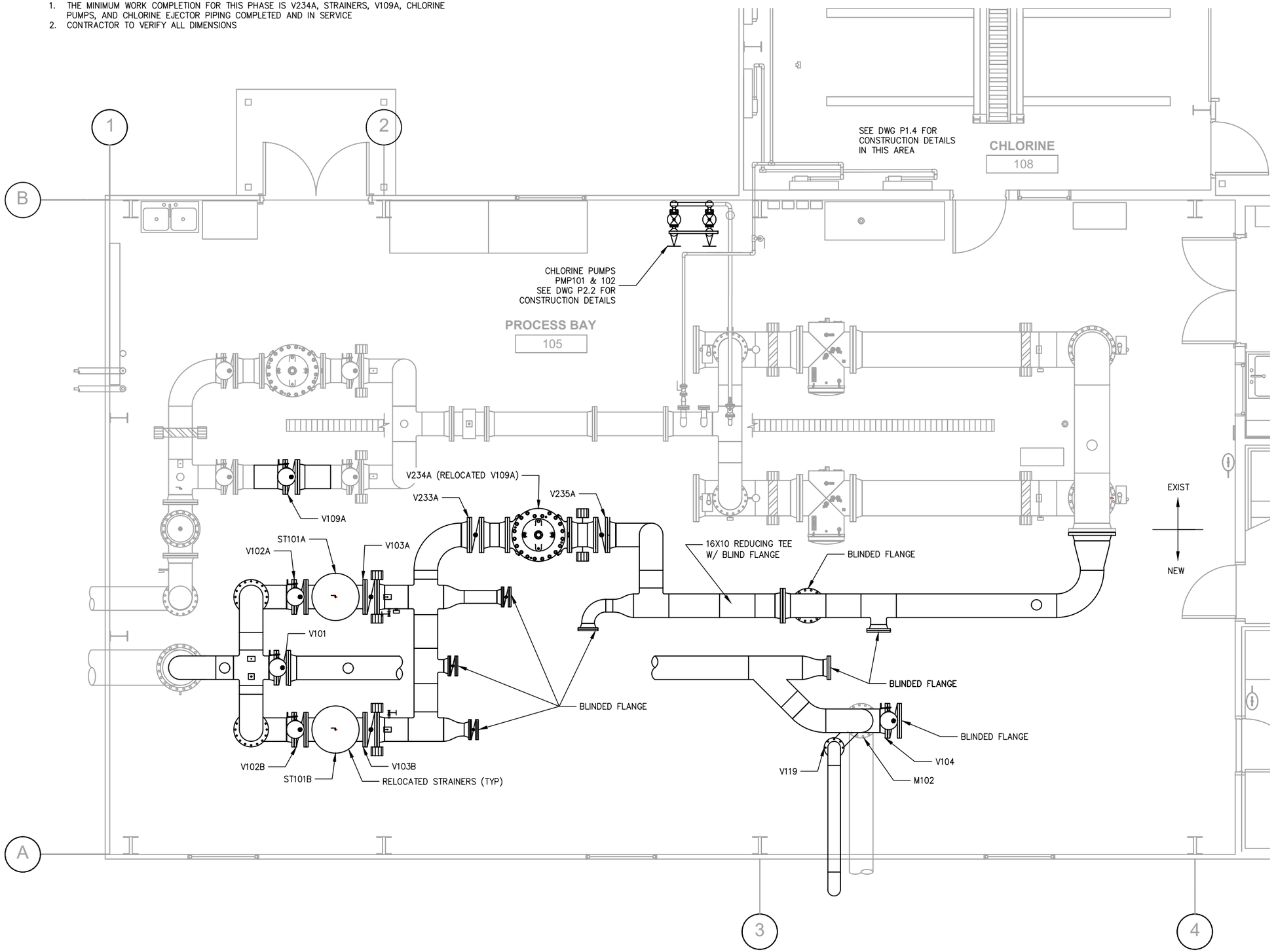
PIPING FLOOR PLAN - PHASE 1

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.6A
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

CONSTRUCTION NOTES:

1. THE MINIMUM WORK COMPLETION FOR THIS PHASE IS V234A, STRAINERS, V109A, CHLORINE PUMPS, AND CHLORINE EJECTOR PIPING COMPLETED AND IN SERVICE
2. CONTRACTOR TO VERIFY ALL DIMENSIONS



PROCESS BAY PIPING PLAN - PHASE 2

SCALE: 3/8"= 1'-0"

CITY OF UNALASKA
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

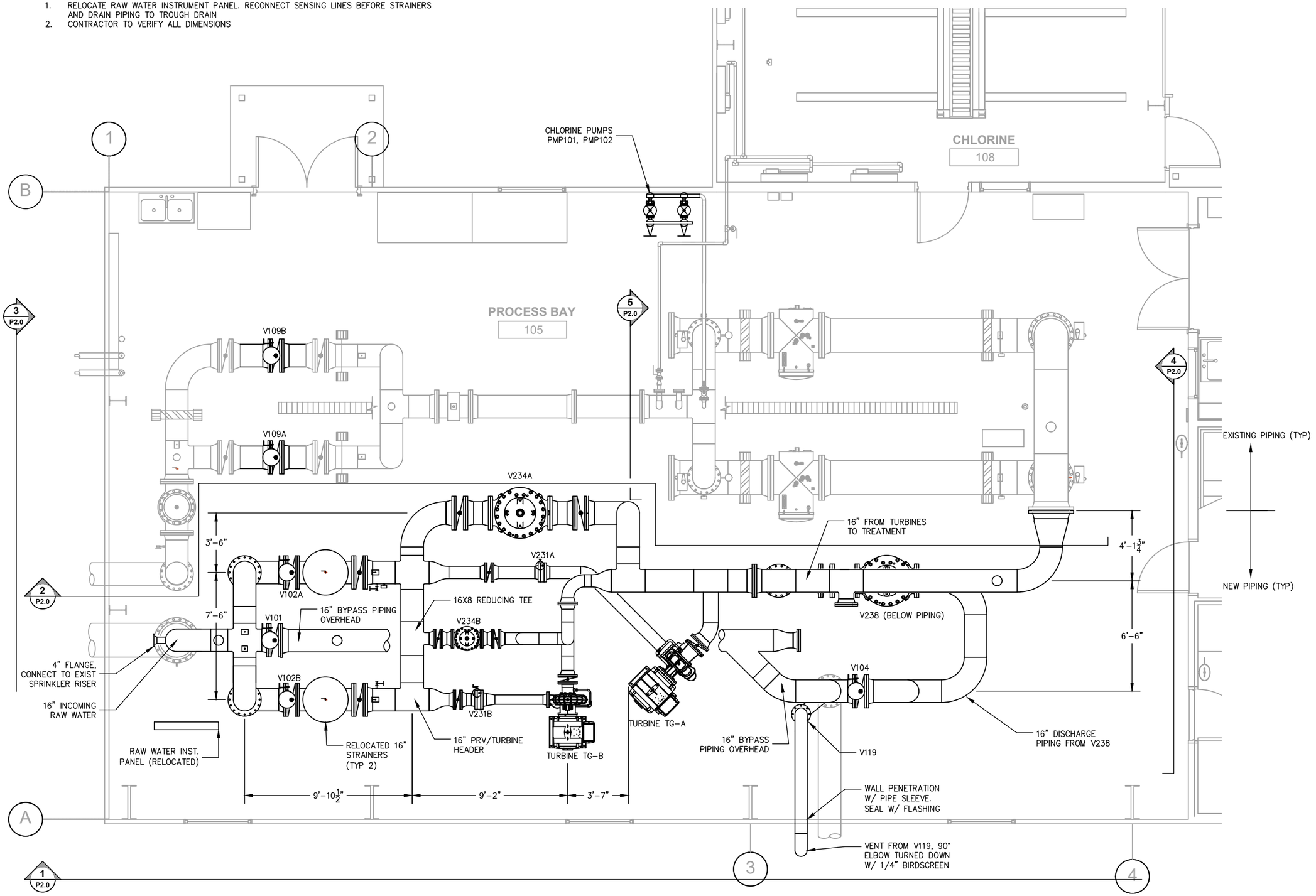
PIPING FLOOR PLAN - PHASE 1

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P1.6B
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

CONSTRUCTION NOTES:

1. RELOCATE RAW WATER INSTRUMENT PANEL. RECONNECT SENSING LINES BEFORE STRAINERS AND DRAIN PIPING TO TROUGH DRAIN
2. CONTRACTOR TO VERIFY ALL DIMENSIONS



PROCESS BAY PIPING PLAN

SCALE: 3/8"= 1'-0"

CITY OF UNALASKA
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53° 54' N 166° 32' W

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

PIPING FLOOR PLAN - COMPLETED

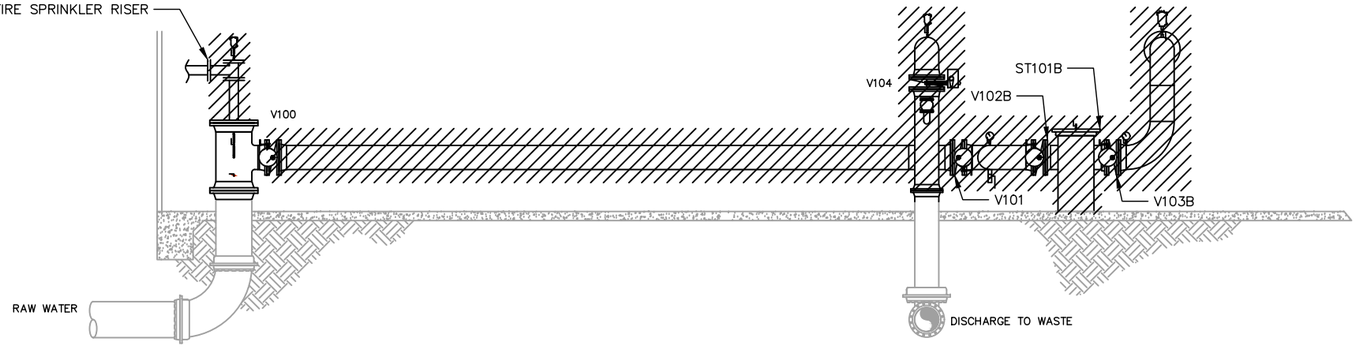
Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -
Date: 4/17/2020
Scale: SCALE AS SHOWN
Drawing No. P1.6

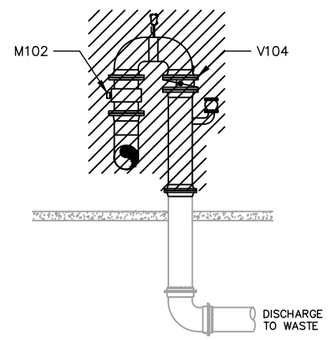
DEMOLITION NOTES:

1. V109 A&B TO BE RELOCATED AS V234A & V238
2. EXISTING INSTRUMENT PANEL SAMPLE TAP TO BE RELOCATED TO SIDE OF 24" PIPE

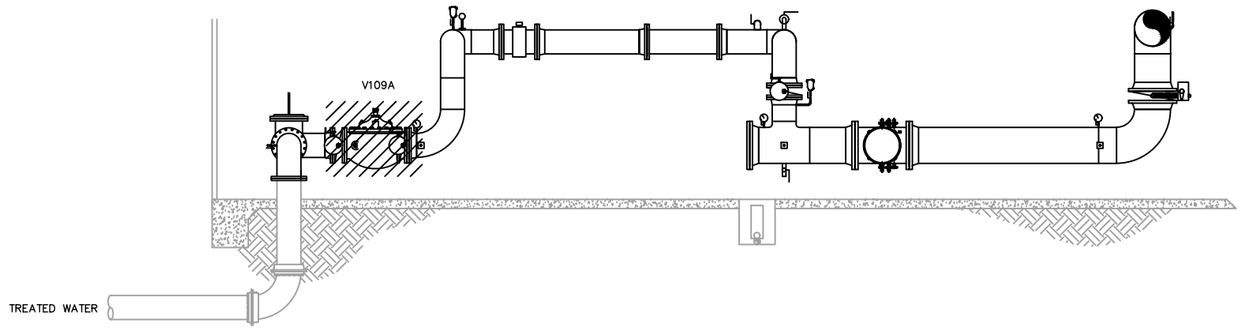
DEMOLITION



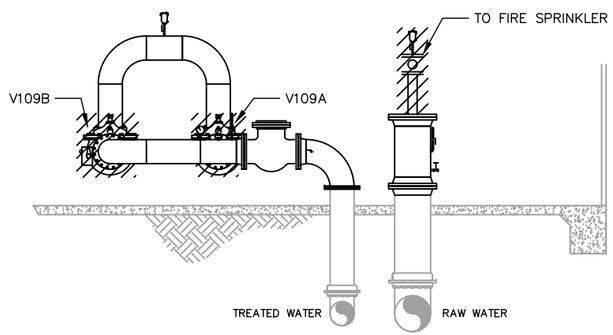
1 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"



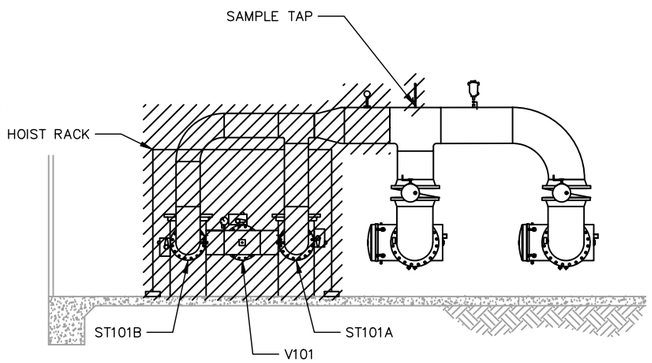
2 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"



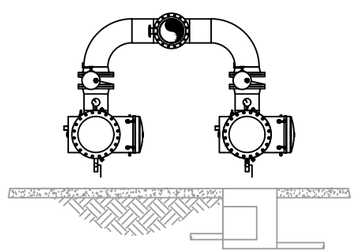
3 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"



4 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"



5 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"



6 P2.0 **SECTION**
SCALE: 1/4"= 1'-0"

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CITY OF UNALASKA

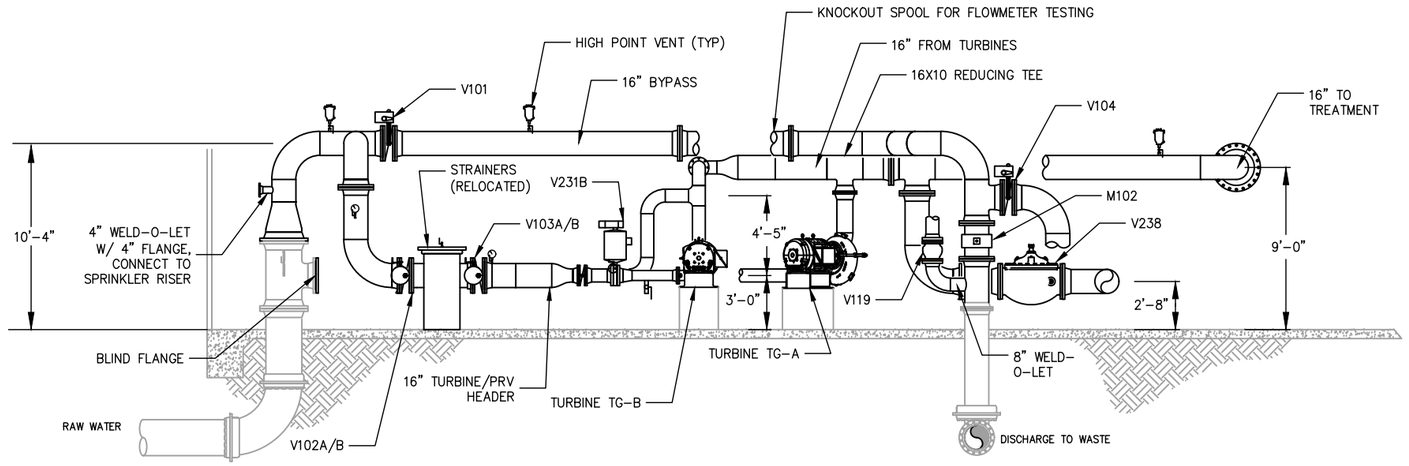
PYRAMID WATER TREATMENT PLANT

PIPING SECTIONS - DEMOLITION

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB
SN Project No.: -	Drawing No. P2.0D
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

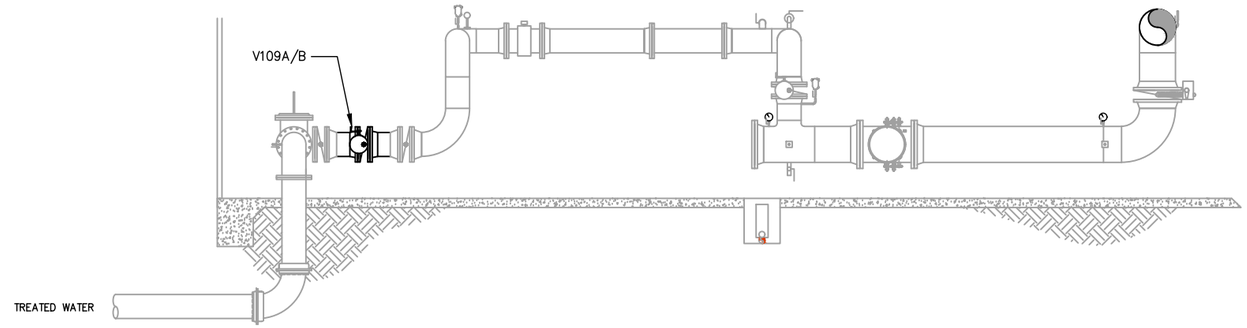
CONSTRUCTION NOTES:

1. PIPE SUPPORTS OMITTED FOR CLARITY, SEE STRUCTURAL FOR DETAILS
2. VERIFY ALL DIMENSIONS



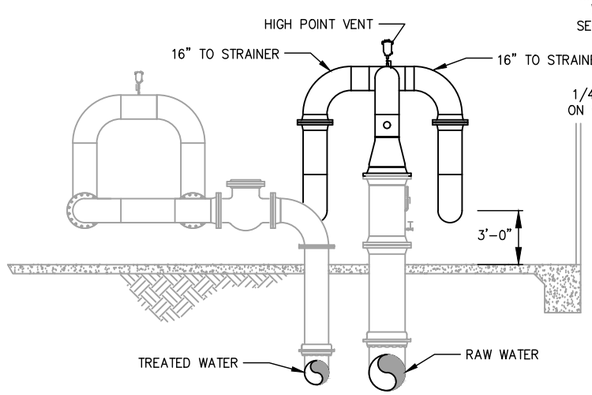
1 P2.0 SECTION

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



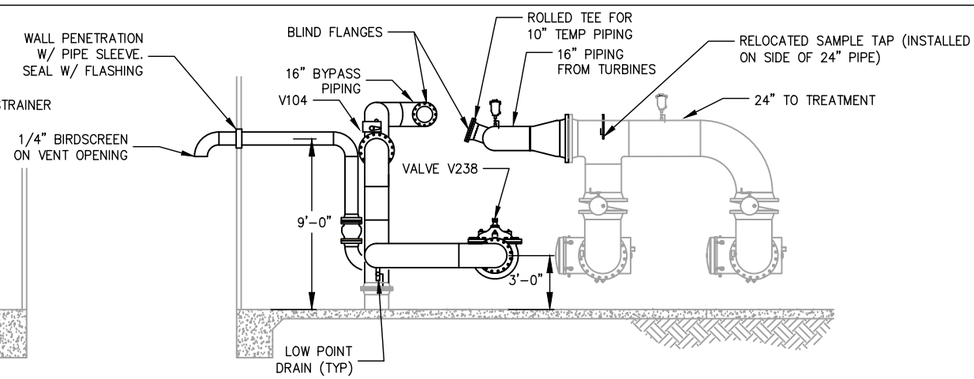
2 P2.0 SECTION

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



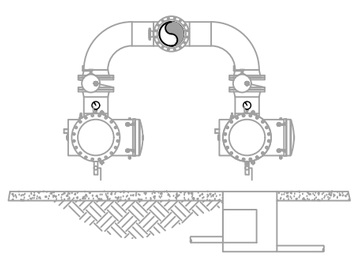
3 P2.0 SECTION

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



4 P2.0 SECTION

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



5 P2.0 SECTION

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

CITY OF UNALASKA
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53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
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ME-14283
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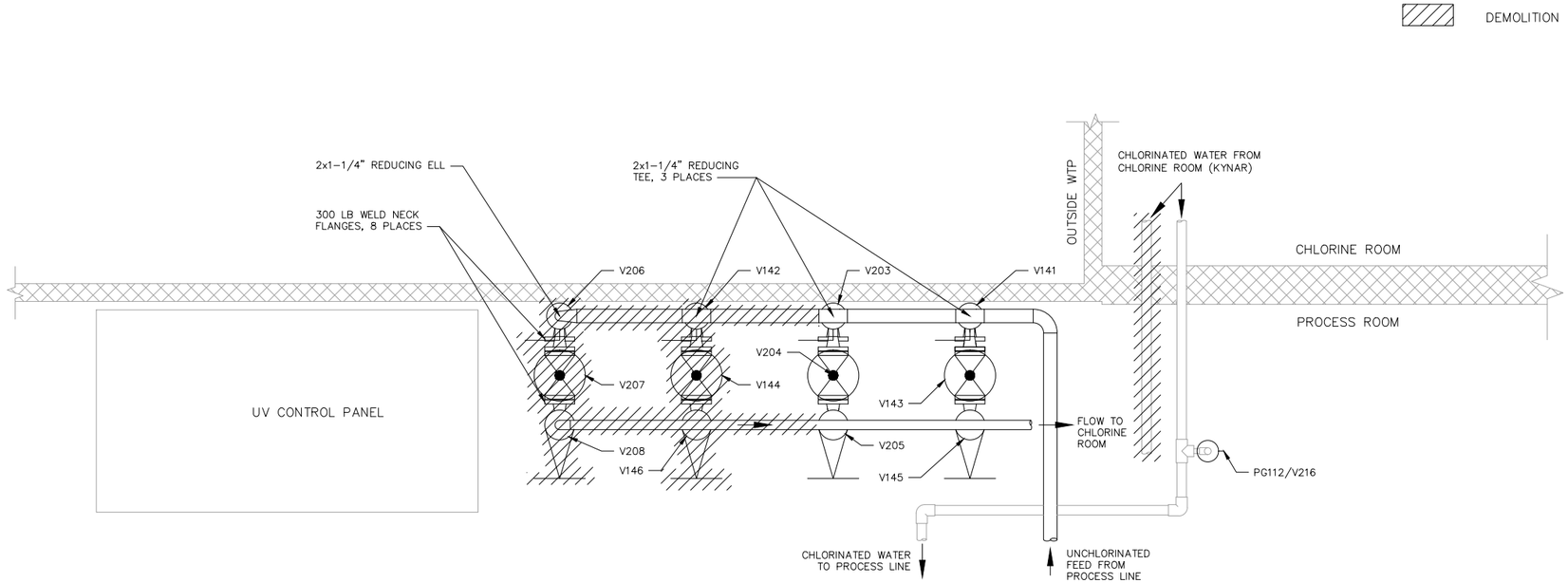
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

PIPING SECTIONS - COMPLETED

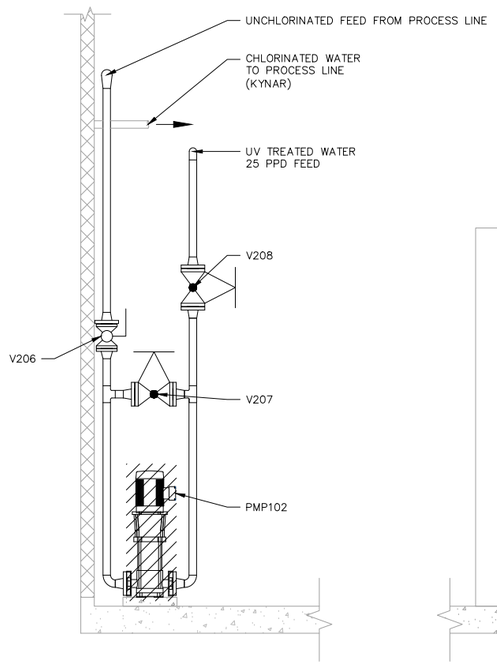
Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P2.0
Date: 4/17/2020	
Scale: SCALE AS SHOWN	



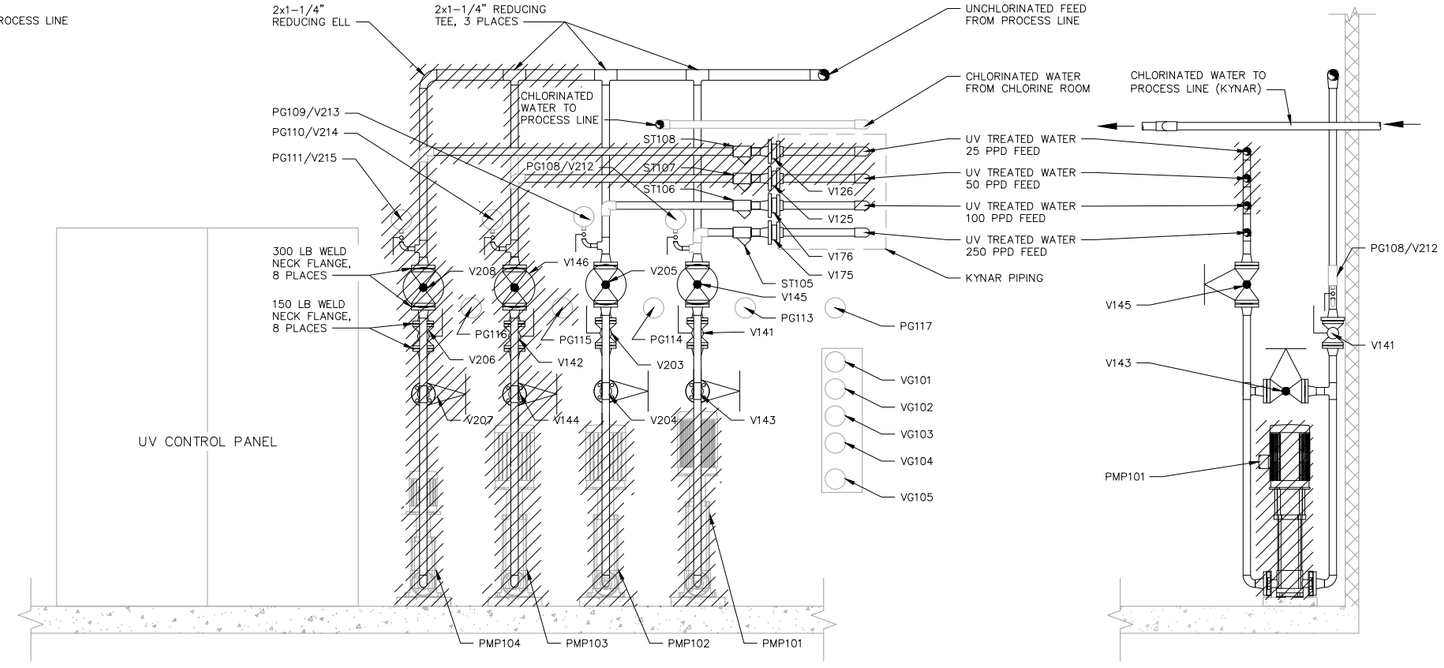
CHLORINE PUMPS PLAN

SCALE: 1" = 1'-0"



CHLORINE PUMPS LEFT ELEVATION

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



CHLORINE PUMPS FRONT ELEVATION

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

CHLORINE PUMPS RIGHT ELEVATION

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

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CITY OF UNALASKA

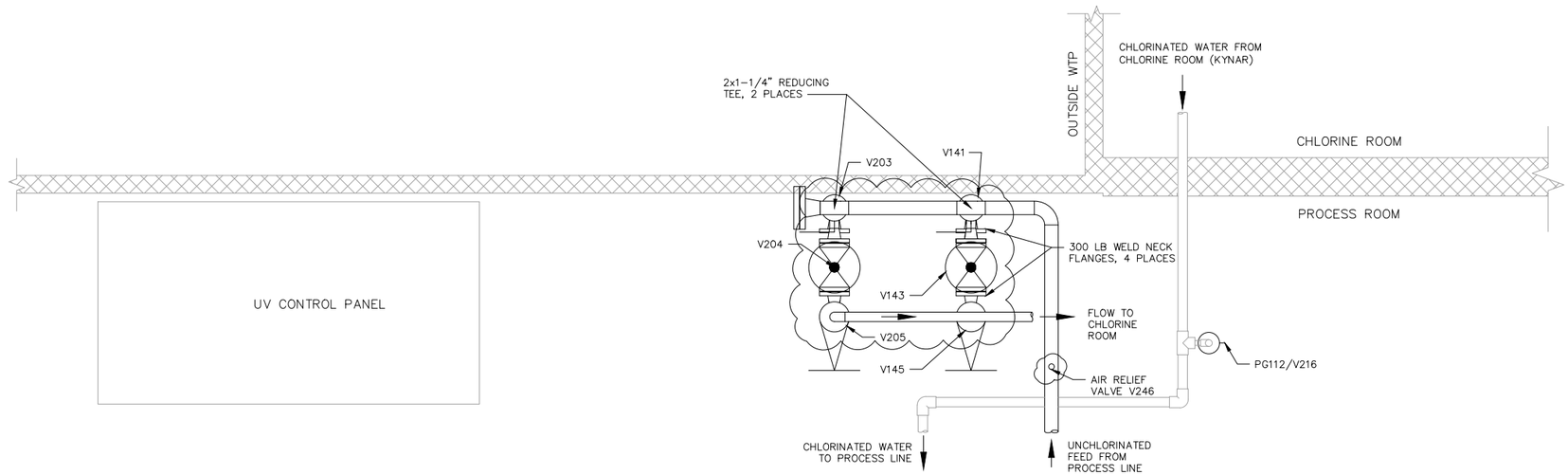
PYRAMID WATER TREATMENT PLANT

CHLORINE PUMPS PLANS AND ELEVATIONS - DEMOLITION

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB
SN Project No.: -	Drawing No. P2.2D
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

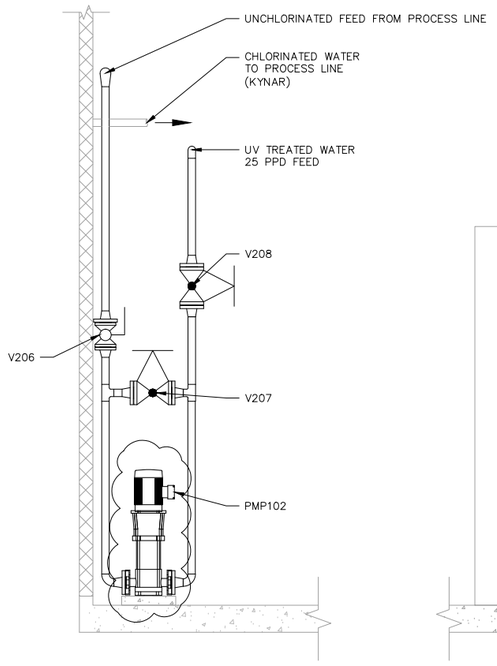
CONSTRUCTION NOTES:

1. CONTRACTOR IS RESPONSIBLE FOR FINAL FIT UP
2. MOUNT PUMPS PMP101 & PMP102 TO EXIST CONCRETE BASE



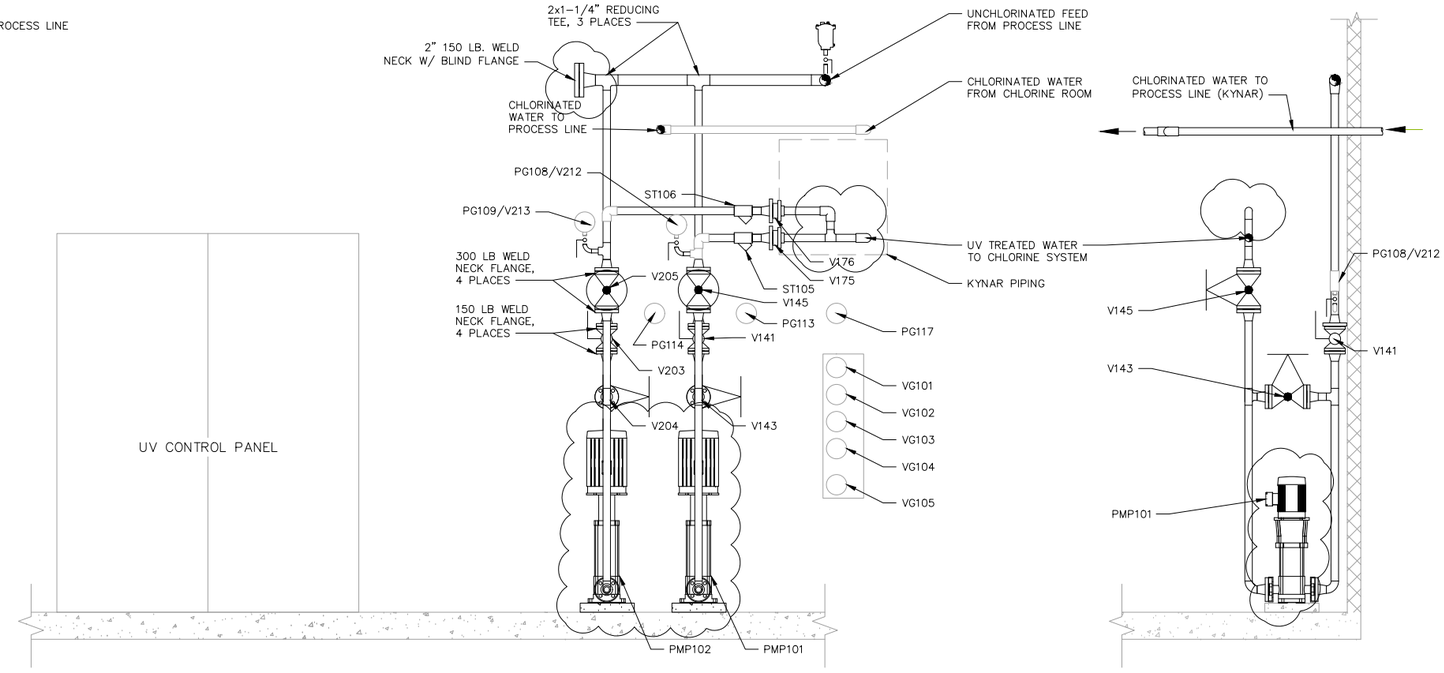
CHLORINE PUMPS PLAN

SCALE: 1" = 1'-0"



CHLORINE PUMPS LEFT ELEVATION

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



CHLORINE PUMPS FRONT ELEVATION

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

CHLORINE PUMPS RIGHT ELEVATION

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

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

CHLORINE PUMPS PLANS AND ELEVATIONS

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB
SN Project No.: -	Drawing No. P2.2
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

UNALASKA VALVE AND CONTROL SCHEDULE

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
CL17-1	DPD CHLORINE ONLINE TEST	-	MONITOR TREATED WATER INITIAL CHLORINE LEVEL	-	HACH	CL17	-	N/A	
CL17-2	DPD CHLORINE ONLINE TEST	-	MONITOR CHLORINE LEVEL ON EFFLUENT FROM STORAGE	-	HACH	CL17	-	N/A	
DIF1	DIFFUSER	-	INJECT CHLORINATED WATER INTO THE PROCESS FLOW	2	INYO PROCESS	CS200SK8F	-	N/A	
DS101A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS101B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS102A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS102B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS103A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS103B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS104A	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
DS104B	DIAPHRAGM SEAL	-	PREVENT HIGHLY CHLORINATED WATER FROM ENTERING GAUGE	1/2	ASHCROFT	100-50YKY04TCG	-	N/A	
EJCT1	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 250 PPD	-	REGAL	950/18A NOZZLE	-	N/A	
EJCT2	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 100 PPD	-	REGAL	950/17A NOZZLE	-	N/A	
EJCT3	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 50 PPD	-	REGAL	950/17A NOZZLE	-	N/A	
EJCT4	EJECTOR NOZZLE	-	VENTURI TO EJECT CHLORINE INTO WATER - 25 PPD	-	REGAL	950/5A NOZZLE	-	N/A	
F101	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
F102	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
F103	JOHNSON FILTER HOUSING	-	REMOVE DPD FROM CL-17 EFFLUENT	-	JOHNSON FILTER	JPH130R	-	N/A	
M101	MAGNETIC FLOWMETER	-	MONITOR TREATED WATER FLOW	16	ROSEMOUNT 8750WA	8750WA 32ES T 1 A 1 F T S A 160 S A1 DA1 L1 DW	REMOTE MOUNTED TRANSMITTER	N/A	
M102	MAGNETIC FLOWMETER - BYPASS LINE	-	MONITOR WATER ROUTED THROUGH THE BYPASS LINE	16	ROSEMOUNT 8750WA	8750WA 32ES T 1 A 1 F T S A 160 S A1 DA1 L1 DW	REMOTE MOUNTED TRANSMITTER	N/A	RELOCATED
PG101	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER INLET	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	RELOCATED
PG102A	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER OUTLET ST101A	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	RELOCATED
PG102B	PRESSURE GAUGE	-	PRESSURE GAUGE AT STRAINER OUTLET ST101B	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	RELOCATED
PG103A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO UV REACTOR 101A	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG103B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET UV REACTOR 101B	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG104A	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO UV REACTOR 101A	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG104B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO UV REACTOR 101B	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG105A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO CLA-VAL VALVE V109A	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG105B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO CLA-VAL VALVE V109B	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG106	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF CLA-VAL VALVE	-	ASHCROFT	45-1279SL04LM0/160	1279	N/A	
PG107A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO EJECTOR NOZZLE	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	DO NOT INSTALL
PG107B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET TO EJECTOR NOZZLE	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	DO NOT INSTALL
PG108	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO 250 PPD EJECTOR	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	
PG109	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO 100 PPD EJECTOR	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	
PG110	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO 50 PPD EJECTOR	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	
PG111	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET TO 25 PPD EJECTOR	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	
PG112	PRESSURE GAUGE	-	PRESSURE GAUGE ON OUTLET LINE FROM EJECTORS	1/2	ASHCROFT	45-1279SL04LM0/300	2279	N/A	
PG113	PRESSURE GAUGE	-	REMOTE GAUGE CORRESPONDING TO PG108, 250 PPD EJECTOR	-	PRECISION DIGITAL	PD765-6R2-00	N/A	N/A	
PG114	PRESSURE GAUGE	-	REMOTE GAUGE CORRESPONDING TO PG109, 100 PPD EJECTOR	-	PRECISION DIGITAL	PD765-6R2-00	N/A	N/A	
PG115	PRESSURE GAUGE	-	REMOTE GAUGE CORRESPONDING TO PG110, 50 PPD EJECTOR	-	PRECISION DIGITAL	PD765-6R2-00	N/A	N/A	
PG116	PRESSURE GAUGE	-	REMOTE GAUGE CORRESPONDING TO PG111, 25 PPD EJECTOR	-	PRECISION DIGITAL	PD765-6R2-00	N/A	N/A	
PG117	PRESSURE GAUGE	-	REMOTE GAUGE CORRESPONDING TO PG112, RETURN LINE	-	PRECISION DIGITAL	PD765-6R2-00	N/A	N/A	
PG118A	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET OF V109A	1/2	ASHCROFT	45-2279S04LMF0/300	2279	N/A	
PG118B	PRESSURE GAUGE	-	PRESSURE GAUGE AT INLET OF V109B	1/2	ASHCROFT	45-2279S04LMF0/300	2279	N/A	
PG119A	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF V109A	1/2	ASHCROFT	45-2279S04LMF0/300	2279	N/A	
PG119B	PRESSURE GAUGE	-	PRESSURE GAUGE AT OUTLET OF V109B	1/2	ASHCROFT	45-2279S04LMF0/300	2279	N/A	
PG120	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
PG121	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
PG122	LOW RANGE PRESSURE GAUGE, 0 - 5 PSI	-	MONITOR PRESSURE AT INLET TO CL17-1	1/4	WIKA 611.10	9851933	-	N/A	
PG123	LOW RANGE PRESSURE GAUGE, 0 - 5 PSI	-	MONITOR PRESSURE AT INLET TO CL17-2	1/4	WIKA 611.10	9851933	-	N/A	
PH/TEMP1	PH/TEMPERATURE MEASUREMENT	-	MEAURE PH & TEMPERATURE	-	HACH	DPD1P1/ 9180100			
PT101	PRESSURE TRANSDUCER	-	MONITOR INLET PRESSURE	-	ROSEMOUNT	3051TG2A2B21J	-	-	RELOCATED
PT102	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AFTER STRAINERS	-	ROSEMOUNT	3051TG2A2B21J	-	-	RELOCATED
PT103	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
PT104	PRESSURE TRANSDUCER	-	MONITOR INLET PRESSURE	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT105	PRESSURE TRANSDUCER	-	MONITOR PRESSURE - OUTLET TO UV REACTOR 101A	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT106	PRESSURE TRANSDUCER	-	MONITOR PRESSURE - OUTLET TO UV REACTOR 101B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT107	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT INLET OF FLOW CONTROL VALVES V109A/B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT108	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT OUTLET OF FLOW CONTROL VALVES V109A/B	-	ROSEMOUNT	3051TG2A2B21J	-	-	
PT114	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT TURBINE INLET	-	ROSEMOUNT	3051TG2A2B21J	-	N/A	NEW
PT115	PRESSURE TRANSDUCER	-	MONITOR PRESSURE AT TURBINE DISCHARGE	-	ROSEMOUNT	3051TG2A2B21J	-	N/A	NEW
DP101	DIFFERENTIAL PRESSURE GAUGE	-	MEASURE DIFFERENTIAL PRESSURE ACROSS STRAINERS	-	ASHCROFT	60-1132-SS-25S-LX V2-8PSI	-		
SM101	STATIC MIXER	-	MIX CHLORINE INTO TREATED WATER STREAM	16	KOMAX	60270	-	-	
ST101A	BASKET STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER	16	KECKLEY	FBQ-SS-150-16	-	-	
ST101B	BASKET STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER	16	KECKLEY	FBQ-SS-150-16	-	-	
ST103	IN LINE STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER (UVT1)	1/2	EATON	85Y	Y STRAINER	-	
ST104	IN LINE STRAINER	-	REMOVE DEBRIS FROM INCOMING WATER (UVT2)	1/2	EATON	85Y	Y STRAINER	-	
ST105	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST106	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST107	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
ST108	IN LINE STRAINER	-	REMOVE DEBRIS FROM WATER TO CHLORINATION ROOM	1 1/4	EATON	85Y	Y STRAINER	-	
TURB-2	TURBIDIMETER	-	MONITOR INCOMING WATER TURBIDITY	-	HACH	1720E	-	-	
TURB-3	TURBIDIMETER	-	MONITOR INCOMING WATER TURBIDITY	-	HACH	1720E			
TURB-4	TURBIDIMETER	-	MONITOR TURBIDITY IN WATER FROM CT TANK	-	HACH	1720E	-	-	
UVR-101A	UV REACTOR	-	DISINFECTION	24	CALGON	5X10	-	-	
UVR-101B	UV REACTOR	-	DISINFECTION	25	CALGON	5X10	-	-	
UVT-2	UV TRANSMITTANCE METER	-	MEASURE UVT IN WATER	-	HACH	UVAS SC	-	-	
UVT-3	UV TRANSMITTANCE METER	-	MEASURE UVT IN WATER	-	HACH	UVAS SC	-	-	
V100	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V101	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	BYPASS CONTROL VALVE	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	RELOCATED
V102A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO STRAINER ST101A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	RELOCATED
V102B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO STRAINER ST101B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	RELOCATED
V103A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET CONTROL FROM STRAINER ST101A	16	PRATT	HP250II	OP/CL	N/A	RELOCATED
V103B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET CONTROL FROM STRAINER ST101B	16	PRATT	HP250II	OP/CL	N/A	RELOCATED
V104	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	DISCHARGE CONTROL VALVE	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	RELOCATED
V105A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO UV REACTOR UVR101A	24	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	
V105B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET CONTROL INTO UV REACTOR UVR101B	24	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	
V106A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	OUTLET CONTROL FROM UV REACTOR UVR101A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	
V106B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	OUTLET CONTROL FROM UV REACTOR UVR101B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 53' N 166° 32' W

STATE OF ALASKA
49 TH
ZACHARY B BOLDRICK
ME-14283
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

VALVE SCHEDULE, SHEET 1 OF 3

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P3.0
Date: 4/17/2020	
Scale: N/A	

UNALASKA VALVE AND CONTROL SCHEDULE -CONT'D

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V107A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	
V107B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	Auma SA07.6-54B/GS100.3 /VZ4.3/AM01.2	
V108A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109A	16	PRATT	HP250II	OP/CL	N/A	
V108B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	OUTLET ISOLATION VALVE FOR BUTTERFLY CONTROL VALVE V109B	16	PRATT	HP250II	OP/CL	N/A	
V109A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/ VZ4.3/AC01.2	RELOCATED
V109B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	FLOW CONTROL	16	PRATT	HP250II	MODULATING	AUMA SAR7.5/GS100.3/ VZ4.3/AC01.2	RELOCATED
V110	CHECK VALVE - SWING	AUTOMATED	BACKFLOW PREVENTION	16	FLOWMATIC	92LW	OP/CL	N/A	
V111	BALL VALVE	MANUAL	ISOLATION OF UVT-1	1/4	-	-	OP/CL	N/A	
V112A	BALL VALVE	MANUAL	DRAIN UVR101A REACTOR LINE	2	-	-	OP/CL	N/A	
V112B	BALL VALVE	MANUAL	DRAIN UVR101B REACTOR LINE	2	-	-	OP/CL	N/A	
V113	BALL VALVE	MANUAL	ISOLATION OF UVT-2	1/4	-	-	OP/CL	N/A	
V114	BALL VALVE	MANUAL	ISOLATION OF CL17 AND HACH 1720E	1/2	-	-	OP/CL	N/A	
V115	BALL VALVE	MANUAL	SAMPLE	1/2	-	-	OP/CL	N/A	
V116	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V117A	BALL VALVE	MANUAL	VENT ON STRAINER ST101A	1/2	-	-	OP/CL	N/A	RELOCATED
V117B	BALL VALVE	MANUAL	VENT ON STRAINER ST101B	1/2	-	-	OP/CL	N/A	RELOCATED
V118	HOSE BIBB	MANUAL	SAMPLE	3/4	-	-	MODULATING	N/A	RELOCATED
V119	VACUUM BREAKER	AUTOMATIC	PREVENTS NEGATIVE PRESSURE IN DISCHARGE LINE	8	VALMATIC	1808VB.1	AUTOMATIC	N/A	NEW
V120	BALL VALVE	MANUAL	DRAIN AT INLET TO STRAINERS	2	-	-	OP/CL	N/A	RELOCATED
V121	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG101	1/2	-	-	OP/CL	N/A	RELOCATED
V122A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102A	1/2	-	-	OP/CL	N/A	RELOCATED
V122B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG102B	1/2	-	-	OP/CL	N/A	RELOCATED
V123A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103A	1/2	-	-	OP/CL	N/A	
V123B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG103B	1/2	-	-	OP/CL	N/A	
V124A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104A	1/2	-	-	OP/CL	N/A	
V124B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG104B	1/2	-	-	OP/CL	N/A	
V125	STAINLESS STEEL CHECK VALVE	-	CHECK VALVW, PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V126	STAINLESS STEEL CHECK VALVE	-	CHECK VALVW, PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V127A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105A	1/2	-	-	OP/CL	N/A	
V127B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG105B	1/2	-	-	OP/CL	N/A	
V128	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE GAUGE PG106	1/2	-	-	OP/CL	N/A	
V129	BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-1	1/4	-	-	OP/CL	-	
V130	BALL VALVE	MANAL	ISOLATION VAVLE FOR TURB-2	1/4	-	-	OP/CL	N/A	
V131A	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE A (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V131B	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UV REACTOR LINE B (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V132	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1/2	VALMATIC	VMC-100S	AUTOMATIC	N/A	
V133	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED METER LINE (DURING FILLING/START UP)	1	VALMATIC	VMC-100S	AUTOMATIC	-	RELOCATED
V134A	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131A AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V134B	BALL VALVE	MANUAL	ISOLATION VALVE FOR V131B AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V135	BALL VALVE	MANUAL	ISOLATION VALVE FOR V132 AIR/VACUUM RELEASE	1/2	-	-	OP/CL	N/A	
V136	BALL VALVE	MANUAL	ISOLATION VALVE FOR V133 AIR/VACUUM RELEASE	1	-	-	OP/CL	N/A	RELOCATED
V137	AIR RELEASE VALVE	AUTOMATIC	RELEASE AIR COLLECTED BETWEEN STRAINERS AND UV REACTORS (DURING OPERATON)	1	VALMATIC	VMC-38	AUTOMATIC	N/A	
V138	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V139	BALL VALVE	MANUAL	ISOLATION VALVE FOR V137 AIR RELEASE	1	-	-	MANUAL	N/A	
V140	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH TURB-1	1/2	GEMU	TYPE 611	MANUAL	N/A	
V141	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP101	1 1/4	-	-	MANUAL	N/A	
V142	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP103	1 1/4	-	-	MANUAL	N/A	
V143	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 250 PPD	1 1/4	-	-	MANUAL	N/A	
V144	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 50 PPD	1 1/4	-	-	MANUAL	N/A	
V145	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP101 (250 PPD)	1 1/4	-	-	MANUAL	N/A	
V146	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP103 (50 PPD)	1 1/4	-	-	MANUAL	N/A	
V147	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V148	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V149	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V150	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 250 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V151	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 250 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V152	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V153	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V154	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V155	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V156	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V157	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 100 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V158	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 100 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V159	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V160	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V161	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V162	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V163	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V164	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 50 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V165	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 50 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V166	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V167	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V168	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #1, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V169	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #2, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V170	KYNAR BALL VALVE	MANUAL	CHLORINE CONTROL #3, 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V171	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 25 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V172	KYNAR BALL VALVE	MANUAL	FLOW CONTROL, 25 PPD SYSTEM	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V173	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V174	KYNAR BALL VALVE	MANUAL	PRESSURE GAUGE ISOLATION	1/4	MILLER PLASTICS	-	MANUAL	N/A	
V175	STAINLESS STEEL CHECK VALVE	-	PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V176	STAINLESS STEEL CHECK VALVE	-	PREVENT BACKFLOW TO CHLORINE PUMPS	1-1/4	FLOWMATIC	812X - 2423X	-	-	
V177	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101A	3/4	-	-	MANUAL	N/A	
V178	HOSE BIBB	MANUAL	SAMPLE EFFLUENT FROM ST101B	3/4	-	-	MANUAL	N/A	
V178A	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101A	3/4	-	-	OP/CL	N/A	RELOCATED
V178B	BALL VALVE	MANUAL	LOW POINT DRAIN AFTER STRAINER ST101B	3/4	-	-	OP/CL	N/A	RELOCATED
V179	REMOVED FROM SYSTEM	-	-	-	-	-	MANUAL	N/A	
V180	BALL VALVE	MANUAL	ISOLATION FOR WATER TO CHLORINE PUMPS	2	-	-	MANUAL	N/A	
V181	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 250 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V182	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 100 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V183	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 50 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V184	KYNAR BALL VALVE	MANUAL	CHLORINE GAS FEED TO 25 PPD SYSTEM	1/2	MILLER PLASTICS	-	MANUAL	N/A	
V185	KYNAR BALL VALVE	MANUAL	ISOLATION VALVE ON CHLORINE RETURN LINE	1-1/4	MILLER PLASTICS	-	MANUAL	N/A	
V186	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR PH/TEMP INSTRUMENT	1/2	GEORGE FISHER	514	MANUAL	N/A	
V187	PVC BALL VALVE	MANUAL	ISOLATION VALVE FOR CL17-2	1/4	-	-	MANUAL	N/A	
V188A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118A	1/2	-	-	MANUAL	N/A	
V188B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG118B	1/2	-	-	MANUAL	N/A	
V189A	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119A	1/2	-	-	MANUAL	N/A	
V189B	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG119B	1/2	-	-	MANUAL	N/A	
V190	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG123	1/4	-	-	MANUAL	N/A	
V191	BALL VALVE	MANUAL	ISOLATION VALVE FOR PG122	1/4	-	-	MANUAL	N/A	
V192	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V193	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V194	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V195	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-1	1/4	GEMU	TYPE 611	MANUAL	N/A	
V196	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH PH/TEMP	3/8	GEMU	TYPE 611	MANUAL	N/A	
V197	DIAPHRAGM VALVE	MANUAL	FLOW CONTROL THROUGH CL17-2	1/4	GEMU	TYPE 611	MANUAL	N/A	
V198	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V199	REMOVED FROM SYSTEM	-	-	-	-	-	-	-	
V200	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V201	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
ZACHARY B BOLDRICK
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APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

VALVE SCHEDULE, SHEET 2 OF 3

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

SN Project No.: -	Drawing No. P3.1
Date: 4/17/2020	
Scale: N/A	

UNALASKA VALVE AND CONTROL SCHEDULE -CONT'D

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V202	BALL VALVE	MANUAL	ISOLATION VALVE FOR CARBON FILTER	3/4	-	-	MANUAL	N/A	
V203	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP102	1 1/4	-	-	MANUAL	N/A	
V204	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 100 PPD	1 1/4	-	-	MANUAL	N/A	
V205	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP102 (100 PPD)	1 1/4	-	-	MANUAL	N/A	
V206	BALL VALVE 150 LB	MANUAL	INLET TO PUMP PMP104	1 1/4	-	-	MANUAL	N/A	
V207	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	THROTTLING VALVE ON CHLORINE RETURN, 25 PPD	1 1/4	-	-	MANUAL	N/A	
V208	STAINLESS STEEL GLOBE VALVE 300 LB	MANUAL	OUTLET FROM PUMP PMP104 (25 PPD)	1 1/4	-	-	MANUAL	N/A	
V209	BALL VALVE	MANUAL	ISOLATION VAVLE FOR TURB-3	1/4	-	-	OP/CL	N/A	
V210	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V211	BALL VALVE	MANUAL	ISOLATION VALVE FOR INSTRUMENT FLOW	1/2	-	-	OP/CL	N/A	
V212	BALL VALVE	MANUAL	ISOLATION OF PG108	1/4	-	-	OP/CL	N/A	
V213	BALL VALVE	MANUAL	ISOLATION OF PG109	1/4	-	-	OP/CL	N/A	
V214	BALL VALVE	MANUAL	ISOLATION OF PG110	1/4	-	-	OP/CL	N/A	
V215	BALL VALVE	MANUAL	ISOLATION OF PG111	1/4	-	-	OP/CL	N/A	
V216	BALL VALVE	MANUAL	ISOLATION OF PG112	1/4	-	-	OP/CL	N/A	
V217	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V218	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V219	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V220	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V221	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V222	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V223	KYNAR BALL VALVE	MANUAL	CHLORINE SYSTEM ISOLATION	3/4	MILLER PLASTICS	-	MANUAL	N/A	
V224	BALL VALVE	MANUAL	ISOLATION VALVE FOR TURB-4	1/4	-	-	OP/CL	N/A	
V225	ISOLATION VALVE	MANUAL	ISOLATION OF PRESSURE GAUGE TO PH/TEMP INSTRUMENT	3/8	-	-	MANUAL		
V229	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	TEMPORARY PROCESS BYPASS	10	PRATT	HP250II	OP/CL	N/A	NEW
V230A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-A	8	PRATT	HP250II	OP/CL	N/A	NEW
V230B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	NEW
V231A	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-A	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	FAIL CLOSED, NEW
V231B	ELECTRICALLY OPERATED BUTTERFLY VALVE	AUTOMATED	INLET TO TG-B	8	PRATT	HP250II	MODULATING	AUMA FQMR12.1/AC01.2	FAIL CLOSED, NEW
V232A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION TG-A	10	PRATT	HP250II	OP/CL	N/A	NEW
V232B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR TG-B	8	PRATT	HP250II	OP/CL	N/A	NEW
V233A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	NEW
V233B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	UPSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	NEW
V234A	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	631G-36BCSY	MODULATING	N/A	RELOCATED, PREVIOUSLY V109A
V234B	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	SURGE RELIEF/FLOW CONTROL	8	CLA-VAL	690G-01BCP1P2SYKCO W/CRD-34	MODULATING	N/A	NEW
V235A	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234A	16	PRATT	HP250II	OP/CL	N/A	NEW
V235B	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DOWNSTREAM ISOLATION FOR V234B	8	PRATT	HP250II	OP/CL	N/A	NEW
V236	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT115	1/2	-	-	OP/CL	N/A	NEW
V237	MANUALLY OPERATED BUTTERFLY VALVE	MANUAL	DISCHARGE PRV ISOLATION	16	PRATT	HP250II	OP/CL	N/A	NEW
V238	PRESSURE REDUCING CONTROL VALVE	AUTOMATED	FLOW CONTROL	16	CLA-VAL	50-90 PRESS SUSTAINING TRIM	MODULATING	N/A	RELOCATED, PREVIOUSLY V109B
V239	BALL VALVE	MANUAL	ISOLATION VALVE FOR PRESSURE TRANSDUCER PT114	1/2	-	-	OP/CL	N/A	NEW
V240A	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-A	1/2	-	-	OP/CL	N/A	NEW
V240B	BALL VALVE	MANUAL	LOW POINT DRAIN BEFORE TG-B	1/2	-	-	OP/CL	N/A	NEW

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/SUPPLIER	MODEL NO	TYPE	ACTUATOR	NOTES
V241	BALL VALVE	MANUAL	LOW POINT DRAIN ON DISCHARGE PIPE	1/2	-	-	OP/CL	N/A	NEW
V242	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM ELEVATED INCOMING RAW WATER LINE	1	VALMATIC	VMC-100S	AUTOMATIC	-	NEW
V243	BALL VALVE	MANUAL	ISOLATION VALVE FOR V242 AIR RELEASE	1	-	-	MANUAL	N/A	NEW
V244	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR AFTER ALL TURBINES	1	VALMATIC	VMC-100S	AUTOMATIC	-	NEW
V245	BALL VALVE	MANUAL	ISOLATION VALVE FOR V244 AIR RELEASE	1	-	-	MANUAL	N/A	NEW
V246	AIR/VACUUM RELEASE VALVE	AUTOMATIC	RELEASE AIR FROM UNCHLORINATED FEED FROM PROCESS STREAM	1	VALMATIC	VMC-100S	AUTOMATIC	-	NEW
V247	BALL VALVE	MANUAL	ISOLATION VALVE FOR V246 AIR RELEASE	1	-	-	MANUAL	N/A	NEW
VG101	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 250 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG102	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 100 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG103	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 50 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG104	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 25 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VG105	REMOTE VACUUM GAUGE	-	MONITOR VACUUM IN CHLORINE SYSTEM, 25 PPD SYSTEM	-	ASHCROFT	45-1279-SSL-04L 30/0 HG IMV	-	N/A	
VM101	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM102	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM103	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM104	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	
VM105	VACUUM MONITOR	-	MONITOR VACUUM IN CHLORINE SYSTEM	-	REGAL	VAC 1000	AUTOMATIC	N/A	

CONSTRUCTION NOTE:
TURBINE GENERATORS SUPPLIED BY THE CITY OF UNALASKA FOR THIS PROJECT

UNALASKA TURBINE GENERATOR SCHEDULE

TAG NO.	ITEM	OPERATION	FUNCTION	SIZE	MANUFACTURER/ SUPPLIER	MODEL NO	NOTES
TG-A	TURBINE	AUTOMATED	POWER GENERATION	8	CORNELL	8TR3	OWNER SUPPLIED, NEW
TG-B	TURBINE	AUTOMATED	POWER GENERATION	6	CORNELL	6TR3	OWNER SUPPLIED, NEW

UNALASKA PUMP SCHEDULE

PUMP NO.	MAX FLOW			MAX HEAD		MAUFACTURER/SUPPLIER	PRODUCT LINE	RPM	NO. OF STAGES	CONFIG OPTIONS	HP RATING	HZ/ PHASE	VOLTAGE		ENCLOSURE		MODEL NO.
	GPM	M3/HR	CALLOUT	PSI	FT								VOLTAGE	CALLOUT	TYPE	CALLOUT	
PMP 101	30.6	6.9	5	22	50	GOULD	SV	1750	6	ROUND 304	3/4	60/3	230/460	F	TEFC	2	10SV6FB8F60
PMP 102	30.6	6.9	5	22	50	GOULD	SV	1750	6	ROUND 304	3/4	60/3	230/460	F	TEFC	2	10SV6FB8F60

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
ZACHARY B BOLDRICK
ME-14283
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

VALVE SCHEDULE, SHEET 3 OF 3

Drawn By:	ZBB
Checked By:	ZBB
Approved By:	ZBB

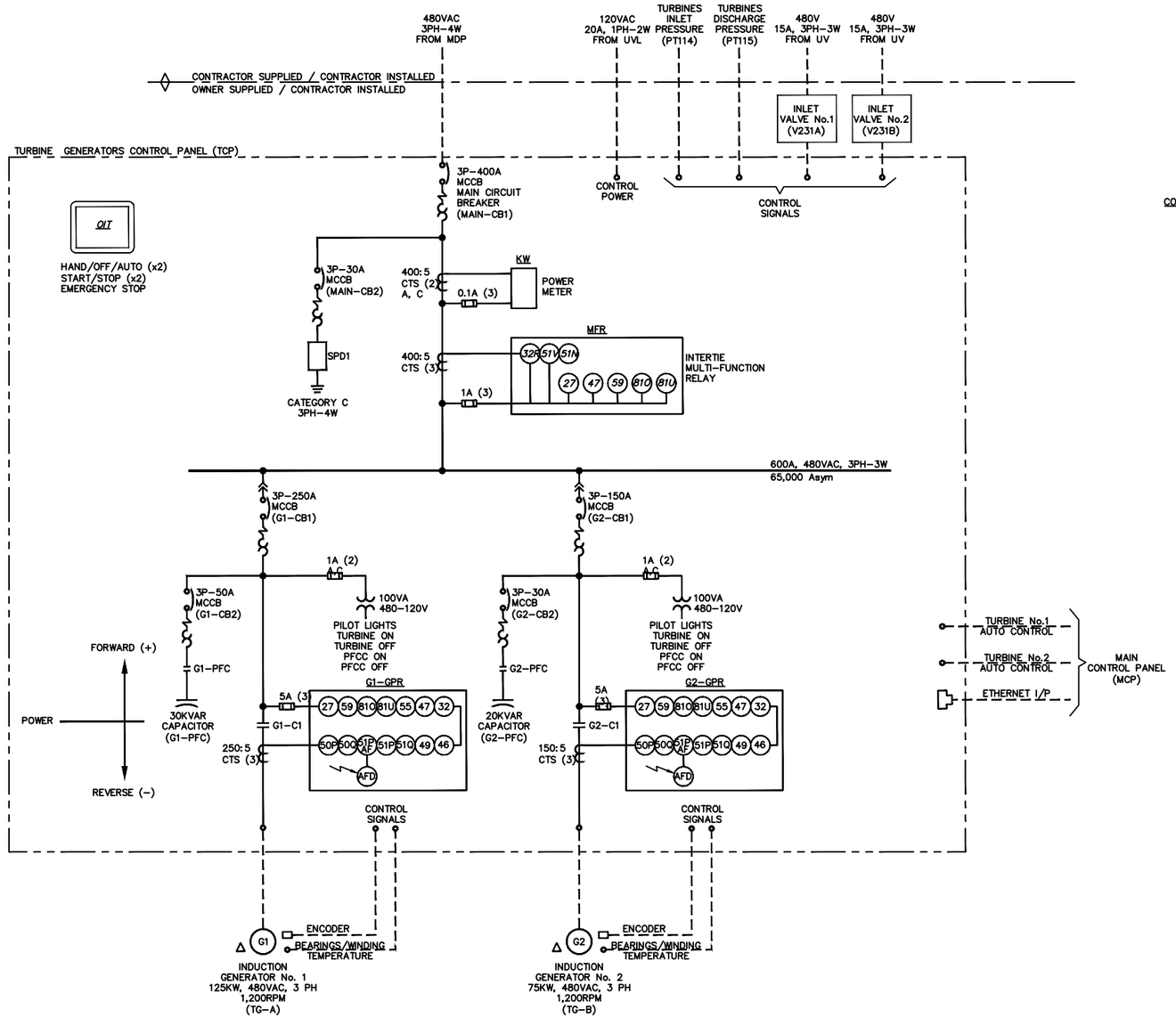
SN Project No.: -	Drawing No. P3.2
Date: 4/17/2020	
Scale: N/A	

SINGLE LINE DIAGRAM SYMBOLS

BUS
ENCLOSURE
FIELD WIRING
G1 GENERATOR
DEVICE
MAGNETIC CONTACTOR
FUSE
POTENTIAL/CONTROL TRANSFORMER
3 PHASE WYE CONNECTION SOLIDLY GROUNDED
MOLDED CASE CIRCUIT BREAKER THERMAL / MAGNETIC (MCCB)
OVERLOAD
CAPACITOR
PHASE CURRENT TRANSFORMER
AIR SWITCH
M METER
POWER TRANSFORMER
GROUND
3 PHASE DELTA CONNECTION
27 UNDERVOLTAGE RELAY
32 DIRECTIONAL POWER
32R REVERSE POWER
46 NEGATIVE SEQUENCE OVERCURRENT
47 NEGATIVE SEQUENCE OVERVOLTAGE
49 THERMAL MODEL
50P PHASE OVERCURRENT
50Q NEGATIVE SEQUENCE OVERCURRENT
51P/AF ARC-FLASH PHASE OVERCURRENT
51N NEUTRAL OVERCURRENT
51P PHASE TIME OVERCURRENT
51Q NEGATIVE SEQUENCE TIME OVERCURRENT
51V OVERCURRENT w/VOLTAGE RESTRAINT
55 POWER FACTOR
59 OVERVOLTAGE RELAY
81O OVER FREQUENCY
81U UNDER FREQUENCY
AFD ARC-FLASH DETECTOR

SINGLE LINE ABBREVIATIONS

MCCB	MOLDED CASE CIRCUIT BREAKER
OL	OVER LOAD
SS	SOLID STATE
A	AMPERE
G	GENERATOR
C	CONTACTOR
V	VOLTS
FLT	FAULT
SPD	SURGE PROTECTIVE DEVICE
KW	KILOWATTS
KVAR	KILOVOLT – AMPERE REACTIVE
KVA	KILOVOLT – AMPERE
CT	CURRENT TRANSFORMER
PH	PHASE
W	WIRE
GPR	GENERATOR PROTECTION RELAY



CONSTRUCTION NOTE:

1. DRAWINGS E1.0, E2.0, E3.0 AND E4.0–E4.3 DEPICT EQUIPMENT BEING PROVIDED BY THE OWNER. THEY ARE BEING SHOWN FOR REFERENCE. PLEASE NOTE THAT THE FIELD WIRING SHOWN ON THESE DRAWINGS SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.

CITY OF UNALASKA — PORT OF DUTCH HARBOR — 53° 54' N 166° 32' W

STATE OF ALASKA — 49TH — Jeremie D. Smith — EE-11789 — APR 17, 2020 — REGISTERED PROFESSIONAL ENGINEER

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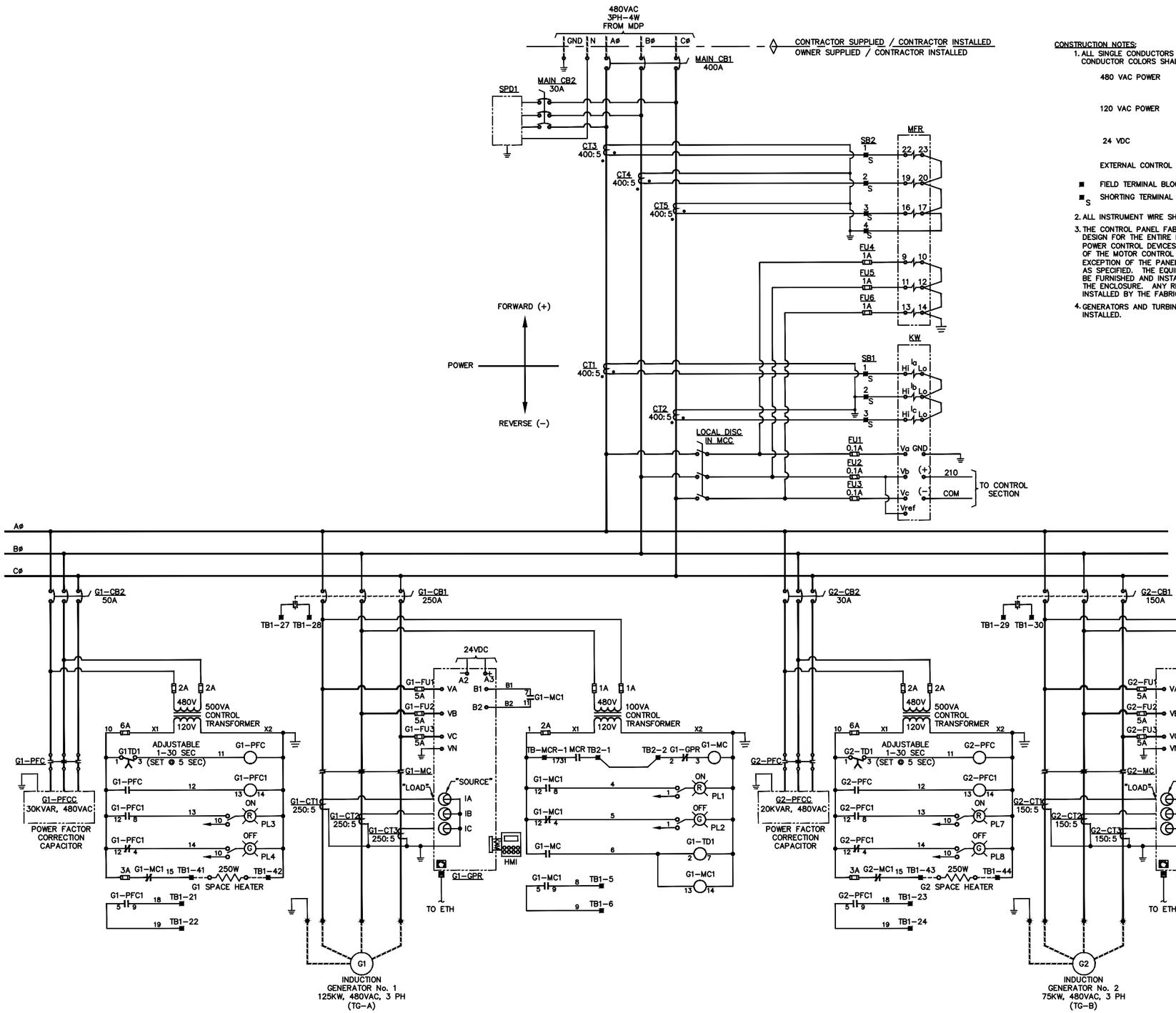
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS ONE-LINE DIAGRAM

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E1.0
Date: 4/17/2020	
Scale: N/A	



CONSTRUCTION NOTES:

1. ALL SINGLE CONDUCTORS SHALL BE TYPE MTW 600V, SIZED BY THE CONTROL PANEL FABRICATOR CONDUCTOR COLORS SHALL BE AS FOLLOWS:

480 VAC POWER	UNGROUNDED – BLACK GROUNDED – WHITE GROUND – GREEN
120 VAC POWER	UNGROUNDED – RED GROUNDED – WHITE GROUND – GREEN
24 VDC	POSITIVE (+) – BLUE NEGATIVE (–) – BLUE/WHITE TRACER
EXTERNAL CONTROL YELLOW	

■ FIELD TERMINAL BLOCK

■S SHORTING TERMINAL BLOCK

2. ALL INSTRUMENT WIRE SHALL BE 600V, #18AWG, SHIELDED TWISTED PAIR OR TRIADS.
3. THE CONTROL PANEL FABRICATOR SHALL UTILIZE A STANDARD MOTOR CONTROL CENTER DESIGN FOR THE ENTIRE ENCLOSURE. THE POWER DISTRIBUTION COMPONENTS AND POWER CONTROL DEVICES ARE INTENDED TO BE SIZED/SUPPLIED BY THE MANUFACTURER OF THE MOTOR CONTROL CENTER UTILIZING THEIR LINE OF PRODUCTS, WITH THE EXCEPTION OF THE PANEL POWER METER (KW). THE POWER METER SHALL BE SUPPLIED AS SPECIFIED. THE EQUIPMENT OUTLINED ON THE BILL OF MATERIALS ARE INTENDED TO BE FURNISHED AND INSTALLED BY THE FABRICATOR INSIDE THE CONTROL SECTION OF THE ENCLOSURE. ANY REQUIRED INTERCONNECTING WIRING SHALL BE FURNISHED AND INSTALLED BY THE FABRICATOR.
4. GENERATORS AND TURBINE CONTROL CENTER OWNER SUPPLIED / CONTRACTOR INSTALLED.

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53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Jeremie D. Smith
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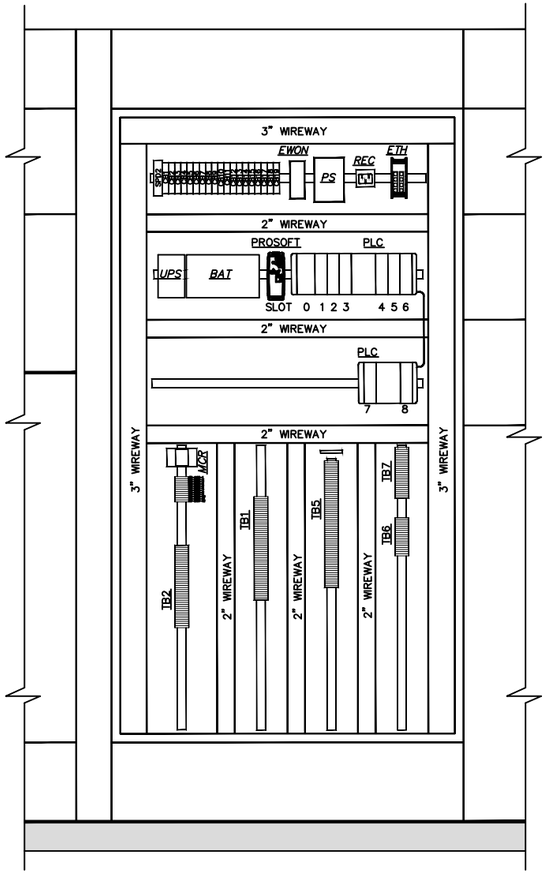
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS 3-LINE DIAGRAM

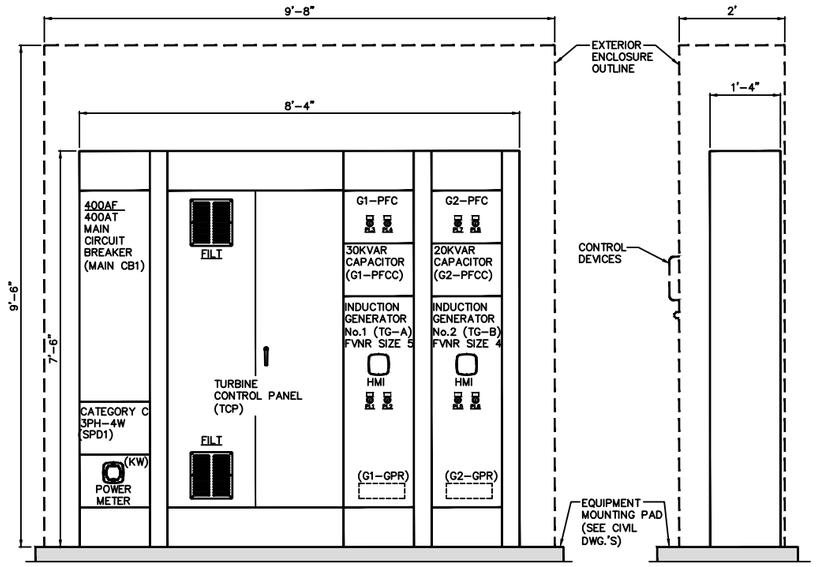
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E2.0
Date: 4/17/2020	
Scale: N/A	



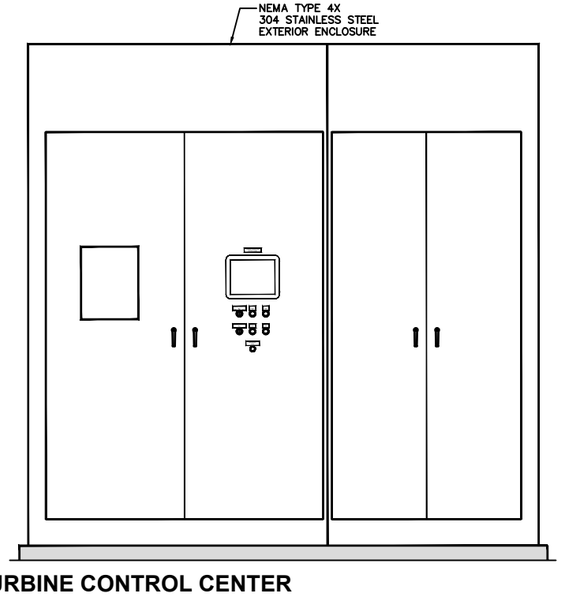
TURBINE CONTROL CENTER INTERIOR LAYOUT

SCALE: 1 1/2" = 1'-0"



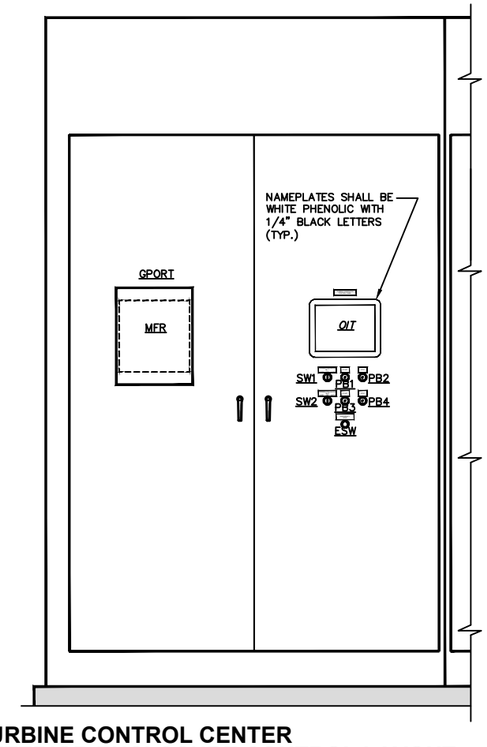
TURBINE CONTROL CENTER ELEVATION DETAIL

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



TURBINE CONTROL CENTER EXTERIOR ENCLOSURE ELEVATION

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



TURBINE CONTROL CENTER EXTERIOR ENCLOSURE CONTROL LAYOUT

SCALE: 1" = 1'-0"

CONSTRUCTION NOTES:

1. PROVIDE SIX (6) SPARE FUSES FOR EACH DIFFERENT TYPE OF FUSE INCLUDED IN THE PANEL. THIS SHALL INCLUDE FUSES SUPPLIED WITH INDIVIDUAL COMPONENTS (i.e. MFR).
2. TURBINE CONTROL CENTER IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.
3. TURBINE CONTROL CENTER EQUIPMENT MOUNTING PAD AND SUPPORTS ARE CONTRACTOR SUPPLIED AND CONTRACTOR INSTALLED.

TURBINE GENERATORS CONTROL PANEL (TCP) BILL OF MATERIALS

ID	DESCRIPTION	MFG	PART No.
DR	DIN RAIL	ALLEN-BRADLEY	199-DR1
TB	30A FEED-THROUGH TERMINAL BLOCK	ALLEN-BRADLEY	1492-HM1
MCR	CONTROL RELAY, 12 POLE, 24VDC, 10A	ALLEN-BRADLEY	700DC-P800DZ24 700-PC40 700-DRA
CB1	277VAC/48VDC 1 POLE 20A CIRCUIT BREAKER	ALLEN-BRADLEY	1492-SP1C200
CB2-CB5	277VAC/48VDC 1 POLE 10A CIRCUIT BREAKER	ALLEN-BRADLEY	1492-SP1C100
CB6,CB8 CB12-CB16 CB18-CB19	277VAC/48VDC 1 POLE 5A CIRCUIT BREAKER	ALLEN-BRADLEY	1492-SP1C050
CB9, CB10, CB11	277VAC/48VDC 1 POLE 3A CIRCUIT BREAKER	ALLEN-BRADLEY	1492-SP1C030
CB7, CB17	277VAC/48VDC 1 POLE 2A CIRCUIT BREAKER	ALLEN-BRADLEY	1492-SP1C020
BAT	UPS BATTERY MODULE	SOLA	SDU 24-BAT
ETH	8 PORT ETHERNET SWITCH	ALLEN-BRADLEY	1783-US08T
ESW	EMERGENCY STOP SWITCH, 4 NC CONTACTS	ALLEN-BRADLEY	800FP-MT44PX04
KW	POWER METER, 3P4W	ELECTRO INDUSTRIES	SHARK 100-60-10-V2-D-INP10-X
MFR	MULTIFUNCTION RELAY	BECKWITH	M-3410A-1B1P10
PS	POWER SUPPLY,90-264VAC IN,24VDC OUT,20A	MEANWELL	SDR-480-24
OIT	10" TOUCH SCREEN OPERATOR INTERFACE	ALLEN-BRADLEY	2711C-T10C
SPD2	120VAC SURGE PROTECTIVE DEVICE	TRANSTECTOR	I^2R STORM-120-10kA
SW1-SW2	THREE POSITION SELECTOR SWITCH, 30mm	ALLEN-BRADLEY	800H-JR2B
UPS	UPS POWER MODULE, 480 VA, 24 VDC, 20 A	SOLA	SDU20-24
PLC	COMPACTLOGIX ETHERNET PROCESSOR	ALLEN-BRADLEY	1769-L33ER
	16 DIGITAL INPUT MODULE, 24VDC	ALLEN-BRADLEY	1769-IQ16
	8 DIGITAL OUTPUT MODULE	ALLEN-BRADLEY	1769-OW8
	4 CHANNEL ANALOG INPUT MODULE	ALLEN-BRADLEY	1769-IF4I
	4 CHANNEL ANALOG OUTPUT MODULE	ALLEN-BRADLEY	1769-OF4CI
	6 CHANNEL RTD MODULE	ALLEN-BRADLEY	1769-IR6
	RIGHT TO RIGHT BANK EXPANSION	ALLEN-BRADLEY	1769-CRR1
	LEFT END CAP TERMINATOR	ALLEN-BRADLEY	1769-ECL
	120/240V AC POWER SUPPLY	ALLEN-BRADLEY	1769-PB4
REC	CONVENIENCE RECEPTACLE	ALTECH	DMRBA
PB1, PB3	N.O. PUSHBUTTON, 30mm, GREEN	ALLEN-BRADLEY	800H-AR1D1
PB2, PB4	N.O. PUSHBUTTON, 30mm, RED	ALLEN-BRADLEY	800TH-AR6D1
FILT	FILTER/ LOUVER KIT	SAGINAW CONTROL	SCE-AVK88 SCE-FLT88
G1-GPR, G2-GPR	SOLID STATE OVERLOAD RELAY W/HMI DISPLAY	SCHWEITZER ENGINEERING	084900201000000 3421XXX1
PROSOFT	ETHERNET I/P TO MODBUS TCP COMMUNICATION	PROSOFT TECHNOLOGY	PLX31-EIP-MBTCP
EWON	REMOTE ACCESS GATEWAY	EWON	EC61330
GPORT	POLYCARBONATE THERMOPLASTIC COVER KIT	GRACEPORT+	H-X-YE7

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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406 W Fireweed Ln.
Anchorage, AK 99503

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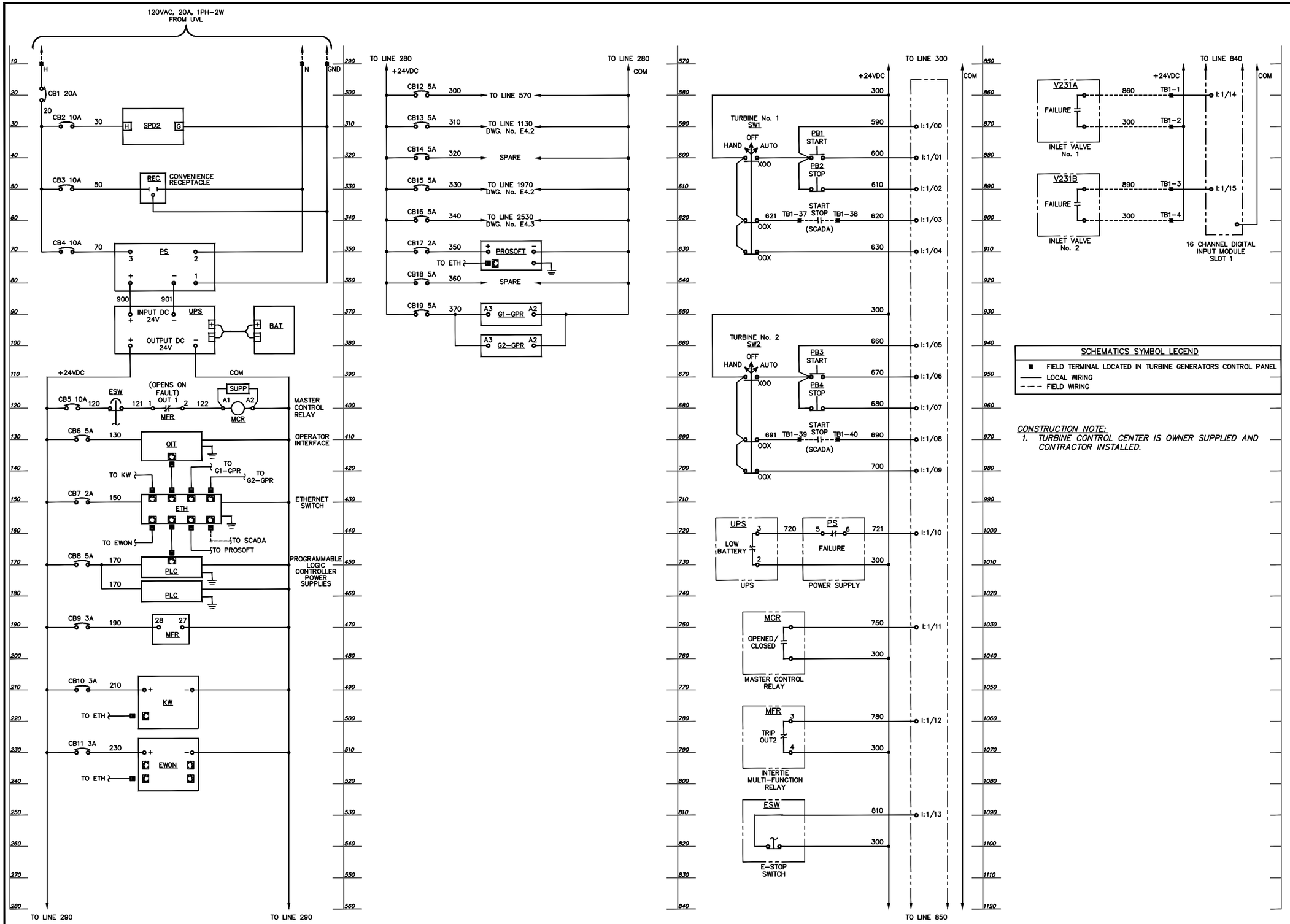
rentricity

CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS CONTROL PANEL LAYOUT

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E3.0
Date: 4/17/2020	
Scale: N/A	



SCHEMATICS SYMBOL LEGEND

- ■ FIELD TERMINAL LOCATED IN TURBINE GENERATORS CONTROL PANEL
- —— LOCAL WIRING
- - - - FIELD WIRING

CONSTRUCTION NOTE:

1. *TURBINE CONTROL CENTER IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.*

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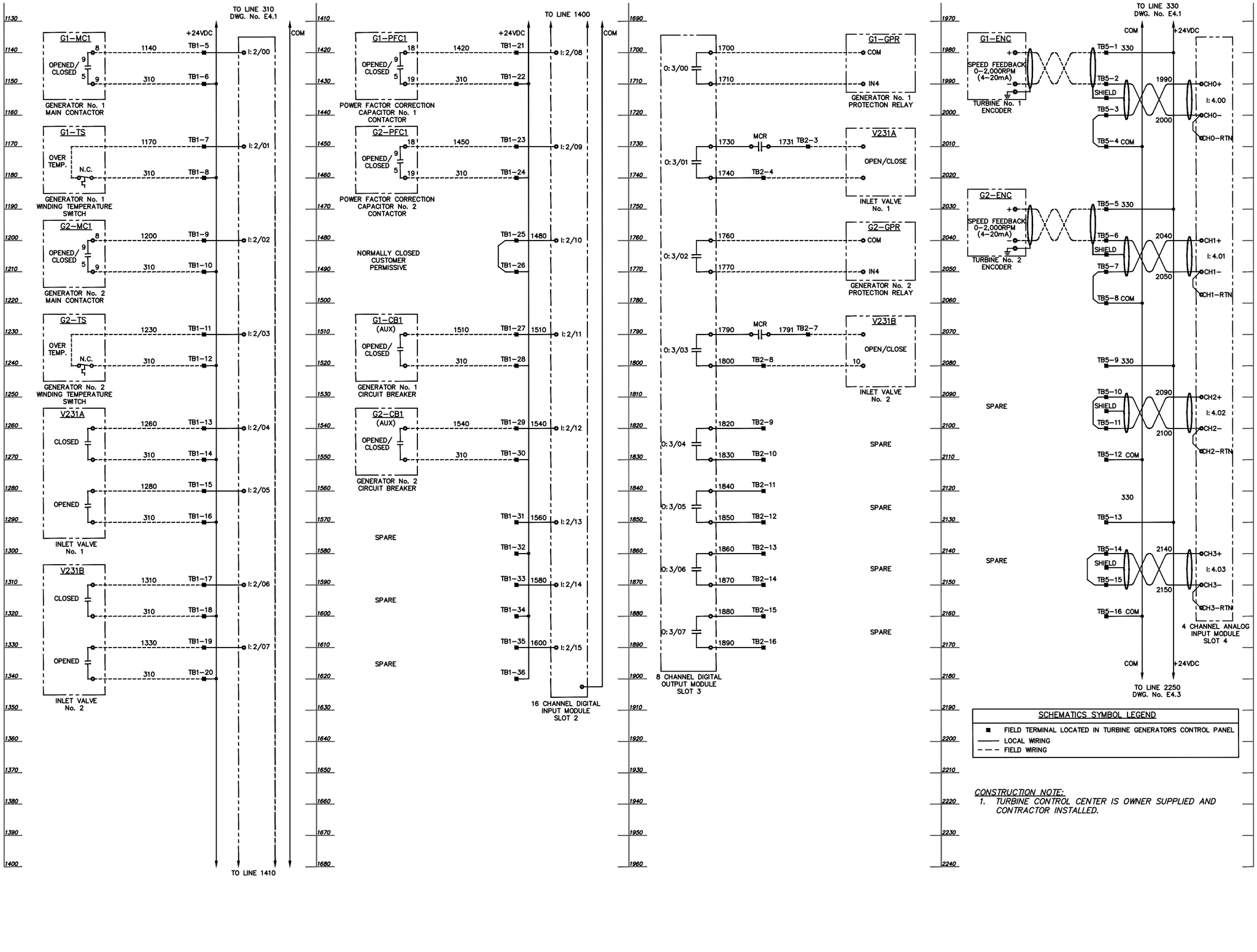
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS SCHEMATIC, SHEET 1 OF 4

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E4.0
Date: 4/17/2020	
Scale: N/A	



SCHEMATICS SYMBOL LEGEND	
■	FIELD TERMINAL LOCATED IN TURBINE GENERATORS CONTROL PANEL
———	LOCAL WIRING
- - -	FIELD WIRING

CONSTRUCTION NOTE:

1. *TURBINE CONTROL CENTER IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.*

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Jeremie D. Smith
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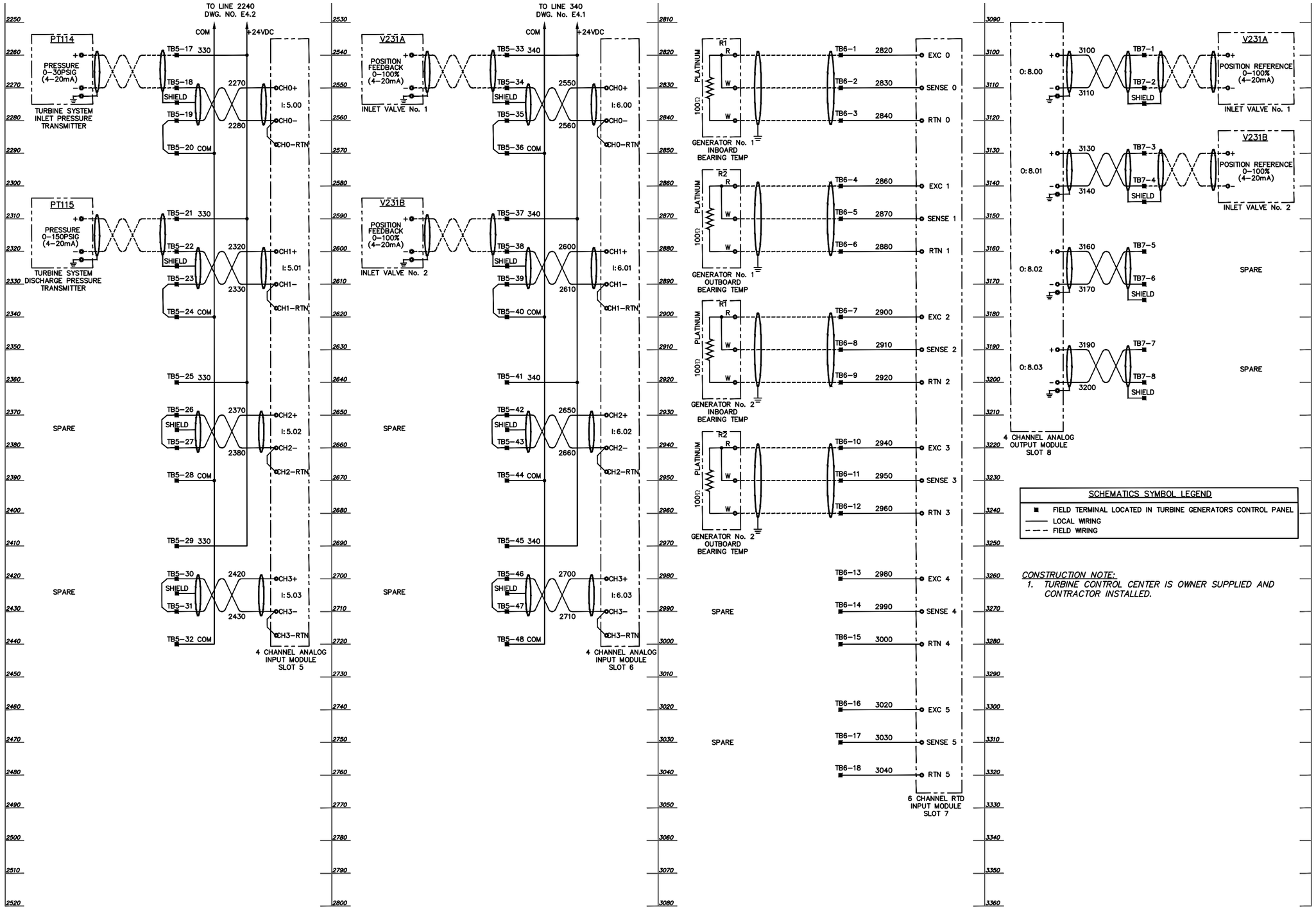
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS SCHEMATIC, SHEET 2 OF 4

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E4.1
Date: 4/17/2020	
Scale: N/A	



SCHEMATICS SYMBOL LEGEND

- ■ FIELD TERMINAL LOCATED IN TURBINE GENERATORS CONTROL PANEL
- —— LOCAL WIRING
- – – – FIELD WIRING

CONSTRUCTION NOTE:

1. *TURBINE CONTROL CENTER IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.*

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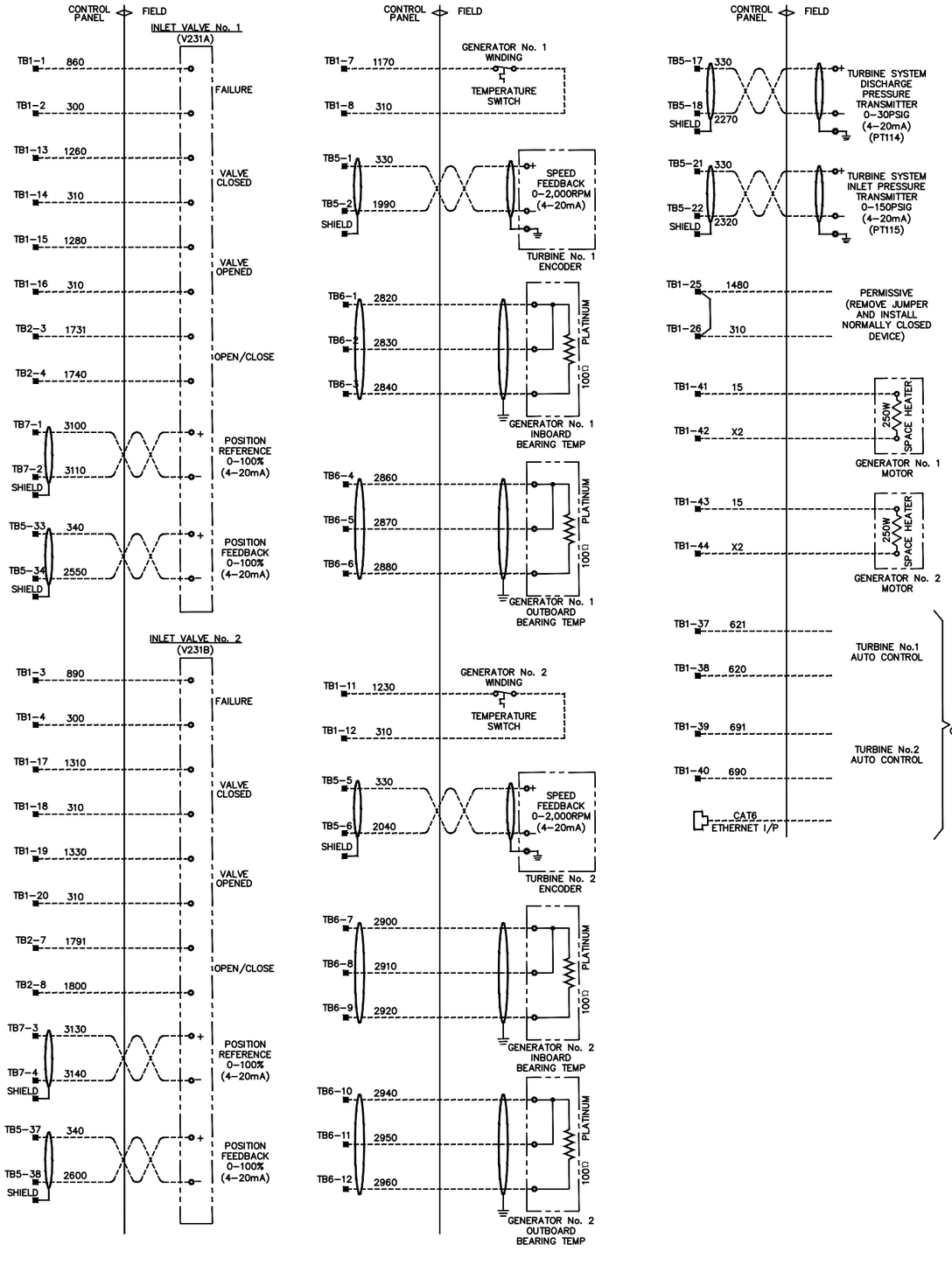
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS SCHEMATIC, SHEET 3 OF 4

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E4.2
Date: 4/17/2020	
Scale: N/A	



SCHEMATICS SYMBOL LEGEND	
■	FIELD TERMINAL LOCATED IN TURBINE GENERATORS CONTROL PANEL
——	LOCAL WIRING
- - -	FIELD WIRING

CONSTRUCTION NOTE:

1. *TURBINE CONTROL CENTER IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.*

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Jeremie D. Smith
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CITY OF UNALASKA

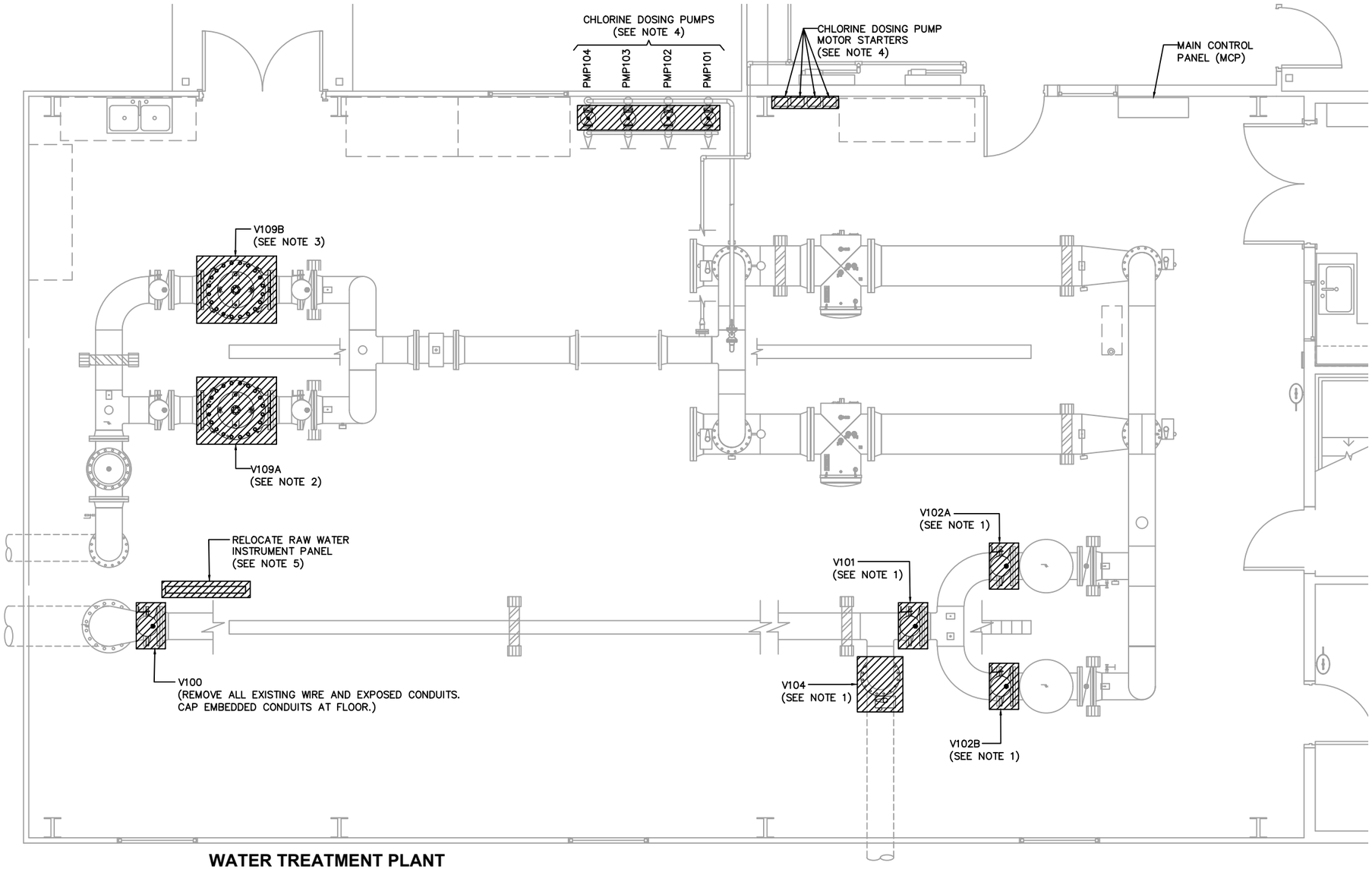
PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS SCHEMATIC, SHEET 4 OF 4

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E4.3
Date: 4/17/2020	
Scale: N/A	

DEMOLITION NOTES:

1. V101, V102A, V102B, & V104 ARE EXISTING VALVES WITH MOTOR OPERATED VALVE ACTUATORS THAT ARE BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATIONS. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
2. V109A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (WILL BE TAGGED AS V234A) THAT IS BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATION. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
3. V109B IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (WILL BE TAGGED AS V238) THAT IS BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATION. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
4. THE FOUR CHLORINE DOSING PUMPS, PMP101–PMP104, ARE BEING REPLACED WITH TWO SMALLER PUMPS. THE PUMP MOTOR CONTROLS ARE BEING UPGRADED FROM SINGLE SPEED ON/OFF OPERATION TO VARIABLE SPEED. TO FACILITATE THIS UPGRADE, THE ELECTRICAL CONTRACTOR SHALL DISCONNECT AND REMOVE THE FOUR EXISTING MOTOR STARTERS. USING THE SAME SUPPORT STRUCTURE, THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A NEW DISCONNECT AND VARIABLE FREQUENCY DRIVE (VFD) FOR EACH OF THE TWO NEW PUMP MOTORS. THE POWER CONDUIT/CONDUCTORS FROM PANEL "UV" SHALL RE–USED AND EXTENDED AS REQUIRED TO CONNECT TO THE NEW DISCONNECTS AND VFDS. THE CONDUCTORS AND RACEWAY FOR PUMPS PMP103 AND 104 SHALL BE REMOVED. THE CIRCUIT BREAKERS IN PANEL "UV" FOR PUMPS PMP103 AND 104 SHALL BE MADE SPARE. THE EXISTING WIREWAY BELOW THE MOTOR STARTERS SHALL REMAIN FOR RE–USE. THE EXISTING RACEWAY BETWEEN THE WIREWAY AND CHLORINE PUMPS PMP101 AND PMP102 SHALL REMAIN FOR RE–USE.
5. THE EXISTING RAW WATER INSTRUMENT PANEL SHALL BE RELOCATED TO ACCOMMODATE THE NEW PIPING CONFIGURATION. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT AND THEN EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE NEW LOCATION OF THE INSTRUMENT PANEL, COORDINATING WITH THE OWNER AND THE OTHER TRADES.
6. CONTRACTOR SHALL COORDINATE WITH THE OWNER REGARDING THE DISPOSITION OF DEMO'ED EQUIPMENT. CONTRACTOR TO PROPERLY DISPOSE OF ALL EQUIPMENT THE OWNER DOES NOT SALVAGE.
7. DEMO ALL EXISTING CIRCUITS THAT ARE NOT REUSED AND THAT PENETRATE THE CONCRETE FLOOR IN THE WATER TREATMENT ROOM. REMOVE THE EXISTING CONDUCTORS FROM THE RACEWAY. DEMO THE RACEWAYS AT THE CONCRETE FLOOR. PLUG THE RACEWAYS BELOW THE FINISHED FLOOR AND PATCH AND FILL THE AREA AS NEEDED. PROVIDE A FINISHED FLOOR PATCH THAT IS FLUSH WITH AND THAT MATCHES THE TYPE AND TEXTURE OF THE SURROUNDING FINISHED CONCRETE FLOOR.
8. EQUIPMENT IN THE MAIN PROCESS AREA ARE FED FROM IN SLAB RACWAYS. EQUIPMENT LOCATED ALONG THE MAIN PROCESS AREA PERIMETER/WALL ARE FED FROM SURFACE MOUNTED RACEWAYS.



WATER TREATMENT PLANT
ELECTRICAL DEMOLITION FLOOR PLAN

SCALE: 3/8" = 1'–0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

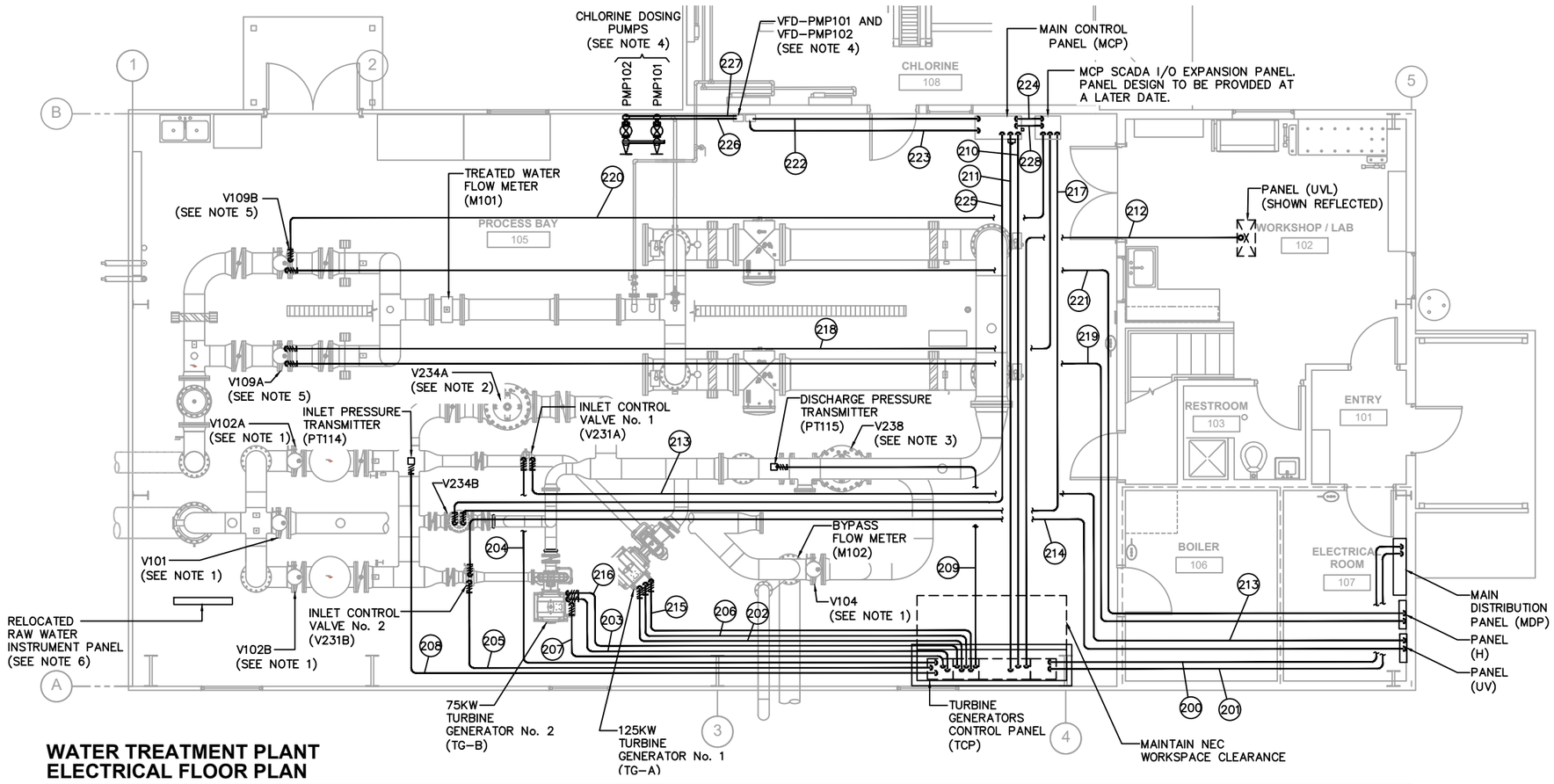
TURBINE GENERATORS ELECTRICAL FLOOR PLAN - DEMOLITION

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E5.0D
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

CONSTRUCTION NOTES:

1. V101, V102A, V102B, & V104 ARE EXISTING VALVES WITH MOTOR OPERATED VALVE ACTUATORS THAT ARE BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATIONS. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
2. V234A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109A) THAT IS BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATION. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
3. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED. THE ELECTRICAL CONTRACTOR SHALL EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE RELOCATED LOCATION. WHEN EXTENDING EXISTING CONDUCTORS, A NEMA TYPE 4X TERMINAL BOX SHALL BE UTILIZED AT THE POINT OF EXTENSION. CONDUCTOR SPLICING IS NOT ALLOWED. ALTERNATIVELY, A NEW CONDUIT/CONDUCTOR RUN MAY BE INSTALLED IN LIEU OF RELOCATING THE EXISTING. SEE THE NEW "CIRCUIT SCHEDULE" FOR THE EXISTING MATERIALS.
4. THE FOUR CHLORINE DOSING PUMPS, PMP101–PMP104, ARE BEING REPLACED WITH TWO SMALLER PUMPS. THE PUMP MOTOR CONTROLS ARE BEING UPGRADED FROM SINGLE SPEED ON/OFF OPERATION TO VARIABLE SPEED. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A NEW DISCONNECT AND VARIABLE FREQUENCY DRIVE (VFD) FOR EACH OF THE TWO NEW PUMP MOTORS. THE EXISTING SUPPORT STRUCTURE SHALL BE MODIFIED AS REQUIRED TO SUPPORT THE NEW DISCONNECTS AND VFDS. THE POWER RACEWAY AND CONDUCTORS FROM PANEL "UV" SHALL RE–USED AND EXTENDED AS REQUIRED TO CONNECT TO THE NEW DISCONNECTS AND VFDS. THE EXISTING WIREWAY BELOW THE MOTOR STARTERS SHALL REMAIN FOR RE–USE. THE EXISTING RACEWAY BETWEEN THE WIREWAY AND CHLORINE PUMPS PMP101 AND PMP102 SHALL REMAIN FOR RE–USE AND MODIFIED AS NECESSARY. THE CONTROLS SHALL BE MODIFIED AS SHOWN ON DRAWING E7.2

   THE VARIABLE FREQUENCY DRIVES FOR THE TWO NEW CHLORINE DOSING PUMPS SHALL MEET THE FOLLOWING MINIMUM SPECIFICATIONS:
   - 1HP, 480VAC, 60HZ, 3–PHASE, SIX PULSE PWM
   - NEMA TYPE 4X STAINLESS STEEL ENCLOSURE
   - FLANGE MOUNT DISCONNECT AND HEAT SINK
   - RED RUN PILOT, SPEED POTENTIOMETER
   - LOCAL H–O–A SELECTOR SWITCH
   - ENHANCED LCD, FULL NUMERIC KEYPAD
   - I/O AS REQUIRED W/OPTIONAL I/O CARD(S)
   - BASIS OF DESIGN – ROCKWELL AUTOMATION POWERFLEX 753 (20F11FD2P1JA4NNNNN)
5. V109A AND V109B ARE NEW VALVES THAT WILL BE EQUIPPED WITH MOTOR OPERATED VALVE ACTUATORS. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL NEW POWER AND CONTROL WIRING AS SHOWN ON THE DRAWINGS.
6. THE EXISTING RAW WATER INSTRUMENT PANEL SHALL BE RELOCATED TO ACCOMMODATE THE NEW PIPING CONFIGURATION. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT AND EXTEND THE EXISTING CONDUIT/CONDUCTORS TO THE NEW LOCATION OF THE INSTRUMENT PANEL. COORDINATE WITH THE OWNER AND THE OTHER TRADES.
7. M102 IS AN EXISTING METER THAT WILL NEED TO BE DISCONNECTED AND RECONNECT DURING CONSTRUCTION TO ACCOMMODATE THE PIPING CHANGES.



WATER TREATMENT PLANT ELECTRICAL FLOOR PLAN

SCALE: 1/4" = 1'–0"

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
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CITY OF UNALASKA

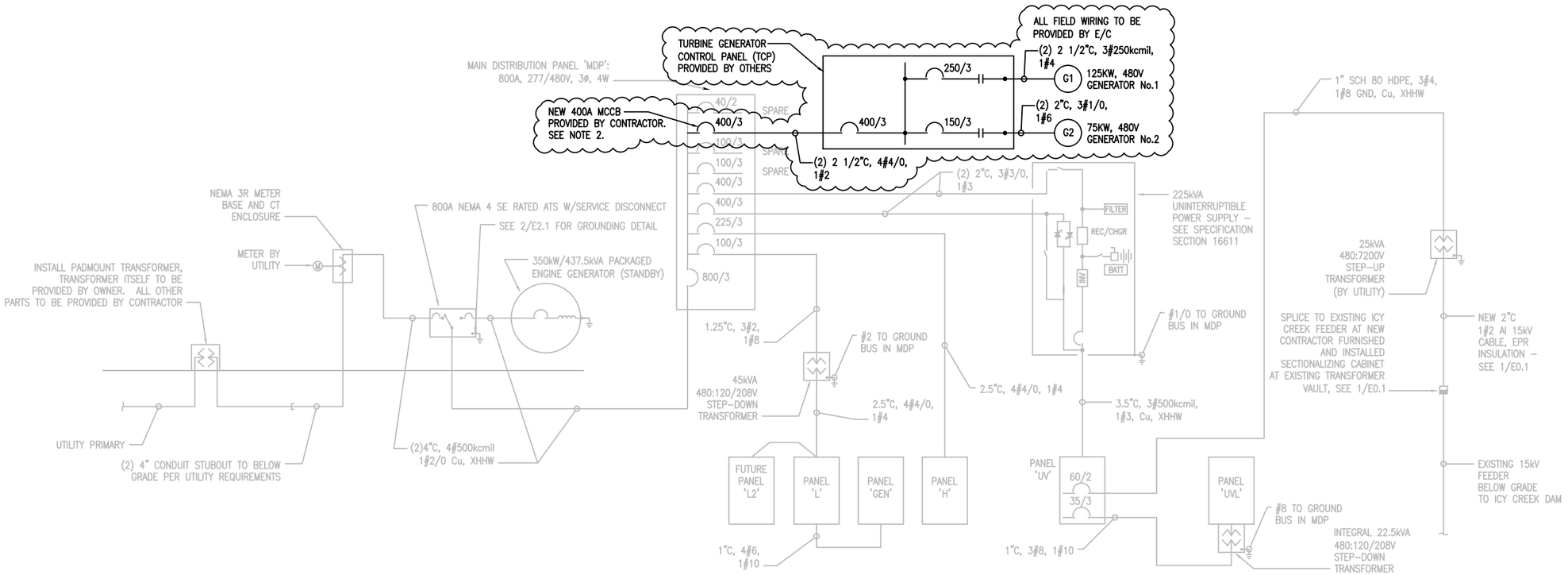
PYRAMID WATER TREATMENT PLANT

TURBINE GENERATORS ELECTRICAL FLOOR PLAN

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E5.0
Date: 4/17/2020	
Scale: SCALE AS SHOWN	

CONSTRUCTION NOTES:

1. DRAWINGS E6.0–E7.9 UTILIZE EXCERPTS FROM EXISTING FACILITY RECORD DRAWINGS, PREPARED BY OTHERS. FIELD INVESTIGATIONS MAY BE NECESSARY TO CONFIRM EXISTING CONDITIONS.
2. NEW 400A MCCB SHALL BE SQUARE–D LA36400 FOR USE IN AN I–LINE PANELBOARD.



WATER TREATMENT PLANT
MODIFIED POWER DISTRIBUTION ONE-LINE DIAGRAM

NOT TO SCALE

CITY OF UNALASKA PORT OF DUTCH HARBOR 53° 54' N 166° 32' W

STATE OF ALASKA 49 TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MODIFIED POWER DISTRIBUTION ONE-LINE DIAGRAM

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E6.0
Date: 4/17/2020	
Scale: N/A	

PANEL 'H'

MFR/MODEL: SQUARE 'D' TYPE NF | VOLTS: 277/480V,3PH,4W | ENCLOSURE: NEMA 1 | 225 A | MTG: SURFACE

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	3	30	SPARE		173			LTG	EXTERIOR LIGHTS	20	1	2	
	3	3	30	^^^			1180		LTG	LTS - 105 PROCESS BAY	20	1	4	
	5	3	30	^^^				950	LTG	LTS - 102 OFC/LAB	20	1	6	
	7	3	30	SPARE		718			LTG	LTS - 101, 103, 106, 107	20	1	8	
	9	3	30	^^^			841		LTG	LTS - 108 CHLORINE	20	1	10	
	11	3	30	^^^				1235	LTG	LTS - 201-203	20	1	12	
	13	3	15	EF-3	MOTR	582				SPARE	20	1	14	
	15	3	15	^^^	MOTR		582 1180		LTG	LTS - 105 PROCESS BAY	20	1	16	
	17	3	15	^^^	MOTR			582		SPARE	80	3	18	
	19	3	60	SPARE						^^^	80	3	20	
	21	3	60	^^^						^^^	80	3	22	
	23	3	60	^^^						SPARE	100	3	24	
	25	3	80	SPARE						^^^	100	3	26	
	27	3	80	^^^						^^^	100	3	28	
	29	3	80	^^^						SPACE	-	1	30	
	31	3	100	SPARE						SPACE	-	1	32	
	33	3	100	^^^						SPACE	-	1	34	
	35	3	100	^^^						SPACE	-	1	36	
	37	3	60	SPARE		748			MOTR	OHC	15	3	38	
	39	3	60	^^^			748		MOTR	^^^	15	3	40	
	41	3	60	^^^				748	MOTR	^^^	15	3	42	
				TOTAL V-A		2221	4531	3515		10,267 VA				
				TOTAL AMPS		8	16	13		12 A				
				A.I.C. RATING: 18,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'H')	6.28	0.00	3.99	0.56	0.00	0.00	0.00	0.00	10.3 KVA	12 A
CONNECTED LOAD IN KVA (BRANCH PANELS)									0.0 KVA	0 A
TOTAL CONNECTED LOAD IN KVA.	6.28	0.00	3.99	0.56	0.00	0.00	0.00	0.00	10.3 KVA	12 A
DEMAND LOAD IN KVA	7.85	0.00	3.99	0.56	0.00	0.00	0.00	0.00	12.4 KVA	15 A

PANEL NOTES:
a

PANEL OPTIONS:
MAIN LUGS ONLY

PANEL 'UV'

MFR/MODEL: SQUARE 'D' TYPE NF | VOLTS: 277/480V,3PH,4W | ENCLOSURE: NEMA 1 | 400 A | MTG: SURFACE

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	3	125	REACTOR 1 (CALGON)	MISC	23545 23545			MISC	REACTOR 2 (CALGON)	125	3	2	
	3	3	125	^^^	MISC		23545 23545		MISC	^^^	125	3	4	
	5	3	125	^^^	MISC			23545 23545	MISC	^^^	125	3	6	
	7	1	-	SPACE		1700			MOTR	V100, V101, V102(A) & (B)	15	3	8	
	9	1	-	SPACE			1700		MOTR	^^^	15	3	10	
	11	1	-	SPACE				1700	MOTR	^^^	15	3	12	
	13	1	-	SPACE		1700			MOTR	V106(A)(B), V107(A)(B)	15	3	14	
	15	1	-	SPACE			1700		MOTR	^^^	15	3	16	
	17	1	-	SPACE				1700	MOTR	^^^	15	3	18	
	19	3	20	PMP 101	LG.MT	3048 1275			MOTR	V104, 105(A) & (B)	15	3	20	
	21	3	20	^^^	LG.MT		3048 1275		MOTR	^^^	15	3	22	
	23	3	20	^^^	LG.MT			3048 1275	MOTR	^^^	15	3	24	
	25	3	15	PMP 102	MOTR	2100				SPACE	-	1	26	
	27	3	15	^^^	MOTR		2100			SPACE	-	1	28	
	29	3	15	^^^	MOTR			2100		SPACE	-	1	30	
	31	3	15	PMP 103	MOTR	2100				SPACE	-	1	32	
	33	3	15	^^^	MOTR		2100			SPACE	-	1	34	
	35	3	15	^^^	MOTR			2100		SPACE	-	1	36	
	37	3	15	PMP104	MOTR	1330 3310			EDR	PANEL 'UVL'	*	3	38	
	39	3	15	^^^	MOTR		1330 4308		EDR	^^^	*	3	40	
	41	3	15	^^^	MOTR			1330 3200	EDR	^^^	*	3	42	
			375	TOTAL V-A		[illegible]	[illegible]	[illegible]		191,847 VA				
				TOTAL AMPS		230	233	229		231 A				
				A.I.C. RATING: 18,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'UV')	0.00	0.00	39.76	2.29	141.27	0.00	0.00	0.00	181.0 KVA	218 A
CONNECTED LOAD IN KVA (BRANCH PANELS)	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	14 A
TOTAL CONNECTED LOAD IN KVA:	0.00	2.62	42.21	2.29	145.58	0.00	1.44	0.00	191.8 KVA	231 A
DEMAND LOAD IN KVA:	0.00	2.62	42.21	2.29	145.58	0.00	1.44	0.00	194.1 KVA	234 A

PANEL NOTES:
a

PANEL OPTIONS:
MAIN LUGS ONLY

PANEL 'UVL'

MFR/MODEL: SQUARE 'D' MPZB30T2FSS | VOLTS: 120/208V,3PH,4W | ENCLOSURE: NEMA 1 | 100 A | MTG: SURFACE

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	1	20	MULTI-GAS DETECTOR 101	MISC	180				SPARE	20	1	2	
	3	1	20	WBP-1	MOTR		[illegible]		RECP	[illegible] EQUIPMENT 203	20	1	4	
	5	1	20	RECP 107	RECP			180 360	RECP	TTB 202	20	1	6	
	7	1	30	PROCESS CONTROLS 105	MISC	2880				SPARE	20	1	8	
a	9	1	15	FACP 101	MISC		500 180		RECP	RECP ANTENNA 108	20	1	10	
	11	1	15	SECURITY PANEL 101	MISC			500 180	RECP	RECEP 105 H2O QUALITY	20	1	12	b
	13	1	15	TANK MONITOR 106	MISC	250				SPACE	-	1	14	
	15	1	15	SF-1 108	MOTR		528 180		RECP	RECP ANTENNA 108	20	1	16	
	17	1	15	SAMPLE HEATER	HEAT			1440 180	RECP	RECEP 105 H2O QUALITY	20	1	18	b
	19	1	20	SPARE						SPACE	-	1	20	
	21	1	20	SPARE						SPACE	-	1	22	
b	23	1	20	RECP 108	RECP			180 180	RECP	RECEP 105 H2O QUALITY	20	1	24	b
				TOTAL VA		3310	4308	3200		10,818 VA				
				TOTAL AMPS		28	36	27		30 A				
				A.I.C. RATING: 10,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'UVL')	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	30 A
CONNECTED LOAD IN KVA (BRANCH PANELS)									0.0 KVA	0 A
TOTAL CONNECTED LOAD IN KVA:	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	30 A
DEMAND LOAD IN KVA:	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	11.3 KVA	31 A

PANEL NOTES:
a PROVIDE RED HANDLE BREAKER AND LOCK-ON DEVICE FOR LOAD INDICATED
b PROVIDE 5mA GFCI CIRCUIT BREAKER FOR LOAD INDICATED

PANEL OPTIONS:
MAIN CIRCUIT BREAKER (SEE ONE-LINE FOR SIZE)

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MODIFIED EXISTING SCHEDULES - DEMOLITION

Drawn By: DW
Checked By: MM
Approved By: JDS

Project No.: AK-1
Date: 4/17/2020
Scale: N/A
Drawing No. E6.1D

PANEL 'H'

MFR/MODEL: SQUARE 'D' TYPE NF | VOLTS: 277/480V,3PH,4W | ENCLOSURE: NEMA 1 | 225 A

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	MTG: SURFACE TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	3	30	SPARE		173			LTG	EXTERIOR LIGHTS	20	1	2	
	3	3	30	^^^			1180		LTG	LTS - 105 PROCESS BAY	20	1	4	
	5	3	30	^^^				850	LTG	LTS - 102 OFC/LAB	20	1	6	
	7	3	30	SPARE		718			LTG	LTS - 101, 103, 106, 107	20	1	8	
	9	3	30	^^^			841		LTG	LTS - 108 CHLORINE	20	1	10	
	11	3	30	^^^				1235	LTG	LTS - 201-203	20	1	12	
	13	3	15	EF-3	MOTR	562				SPARE	20	1	14	
	15	3	15	^^^	MOTR		582 1180		LTG	LTS - 105 PROCESS BAY	20	1	16	
	17	3	15	^^^	MOTR			582		SPARE	80	3	18	
	19	3	15	V109A	MOTR	528				^^^	80	3	20	
	21	3	15	^^^	MOTR		528			^^^	80	3	22	
	23	3	15	^^^	MOTR			528		SPARE	100	3	24	
	25	3	15	V109B SEE NOTE 5	MOTR	528				^^^	100	3	26	
	27	3	15	^^^ ON DWG. No. E6.0	MOTR		528			^^^	100	3	28	
	29	3	15	^^^	MOTR			528		SPACE	-	1	30	
	31	3	100	SPARE						SPACE	-	1	32	
	33	3	100	^^^						SPACE	-	1	34	
	35	3	100	^^^						SPACE	-	1	36	
	37	3	60	SPARE		748			MOTR	OHC	15	3	38	
	39	3	60	^^^			748		MOTR	^^^	15	3	40	
	41	3	60	^^^				748	MOTR	^^^	15	3	42	
				TOTAL V-A		2221	4531	3515		10,267	VA			
				TOTAL AMPS		8	16	13		12	A			
				A.I.C. RATING: 18,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'H')	6.28	0.00	3.98	0.56	0.00	0.00	0.00	0.00	10.3 KVA	12 A
CONNECTED LOAD IN KVA (BRANCH PANELS)									0.0 KVA	0 A
TOTAL CONNECTED LOAD IN KVA	6.28	0.00	3.99	0.56	0.00	0.00	0.00	0.00	10.3 KVA	12 A
DEMAND LOAD IN KVA	7.85	0.00	3.99	0.56	0.00	0.00	0.00	0.00	12.4 KVA	15 A

PANEL NOTES:
a

PANEL OPTIONS:
MAIN LUGS ONLY

PANEL 'UV'

MFR/MODEL: SQUARE 'D' TYPE NF | VOLTS: 277/480V,3PH,4W | ENCLOSURE: NEMA 1 | 400 A

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	MTG: SURFACE TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	3	125	REACTOR 1 (CALGON)	MISC	23545 23545			MISC	REACTOR 2 (CALGON)	125	3	2	
	3	3	125	^^^	MISC		23545 23545		MISC	^^^	125	3	4	
	5	3	125	^^^	MISC			23545 23545	MISC	^^^	125	3	6	
	7	3	15	INLET VALVE No.1 V231A		1008 1700			MOTR	V101, V102(A) & (B)	15	3	8	
	9	3	15	^^^			1008 1700		MOTR	^^^	15	3	10	
	11	3	15	^^^				1008 1700	MOTR	^^^	15	3	12	
	13	3	15	INLET VALVE No.2 V231B		1008 1700			MOTR	V103(A)(B), V104(A)(B)	15	3	14	
	15	3	15	^^^			1008 1700		MOTR	^^^	15	3	16	
	17	3	15	^^^				1008 1700	MOTR	^^^	15	3	18	
	19	3	15	PMP 101	LG.MT	1008 1275			MOTR	V104, 105(A) & (B)	15	3	20	
	21	3	15	^^^	LG.MT		1008 1275		MOTR	^^^ SEE NOTE 1	15	3	22	
	23	3	15	^^^	LG.MT			1008 1275	MOTR	^^^ ON DWG. No. E6.0	15	3	24	
	25	3	15	PMP 102 SEE NOTE 4	MOTR	1008				SPACE	-	1	26	
	27	3	15	^^^ ON DWG. No. E6.0	MOTR		1008			SPACE	-	1	28	
	29	3	15	^^^	MOTR			1008		SPACE	-	1	30	
	31	3	15	SPARE	MOTR	–				SPACE	-	1	32	
	33	3	15	^^^	MOTR		–			SPACE	-	1	34	
	35	3	15	^^^	MOTR			–		SPACE	-	1	36	
	37	3	15	SPARE	MOTR	– 3310			EDR	PANEL 'UVL'	*	3	38	
	39	3	15	^^^	MOTR		– 4308		EDR	^^^	*	3	40	
	41	3	15	^^^	MOTR			– 3200	EDR	^^^	*	3	42	
			375	TOTAL V-A		63653	64651	63543		191,847	VA			
				TOTAL AMPS		230	233	229		231	A			
				A.I.C. RATING: 10,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'UV')	0.00	0.00	39.76	2.29	141.27	0.00	0.00	0.00	181.0 KVA	218 A
CONNECTED LOAD IN KVA (BRANCH PANELS)	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	14 A
TOTAL CONNECTED LOAD IN KVA	0.00	2.62	42.21	2.29	145.58	0.00	1.44	0.00	191.8 KVA	231 A
DEMAND LOAD IN KVA	0.00	2.62	42.21	2.29	145.58	0.00	1.44	0.00	194.1 KVA	234 A

PANEL NOTES:
a

PANEL OPTIONS:
MAIN LUGS ONLY

PANEL 'UVL'

MFR/MODEL: SQUARE 'D' MPZB30T2FSS | VOLTS: 120/208V,3PH,4W | ENCLOSURE: NEMA 1 | 100 A

NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	VOLT-AMPS A	VOLT-AMPS B	VOLT-AMPS C	MTG: SURFACE TYPE	SERVICE	AMPS	POLE	CIRC	NOTE
	1	1	20	MULTI-GAS DETECTOR 101	MISC	180 1000				TURBINE GENERATOR CP	20	1	2	
	3	1	20	WBP-1	MOTR		1020 1080		RECP	TALEXCOM EQUIPMENT 203	20	1	4	
	5	1	20	RECP 107	RECP			180 360	RECP	TTB 202	20	1	6	
	7	1	30	PROCESS CONTROLS 105	MISC	2880				SPARE	20	1	8	
a	9	1	15	FACP 101	MISC		500 180		RECP	RECP ANTENNA 108	20	1	10	
	11	1	15	SECURITY PANEL 101	MISC			500 180	RECP	RECP 105 H2O QUALITY	20	1	12	b
	13	1	15	TANK MONITOR 106	MISC	250				SPACE	-	1	14	
	15	1	15	SF-1 108	MOTR		528 180		RECP	RECP ANTENNA 108	20	1	16	
	17	1	15	SAMPLE HEATER	HEAT			1440 180	RECP	RECP 105 H2O QUALITY	20	1	18	b
	19	1	20	SPARE						SPACE	-	1	20	
	21	1	20	SPARE						SPACE	-	1	22	
b	23	1	20	RECP 108	RECP			180 180	RECP	RECP 105 H2O QUALITY	20	1	24	b
				TOTAL VA		4310	4308	3200		11,818	VA			
				TOTAL AMPS		36	36	27		33	A			
				A.I.C. RATING: 10,000										

	LTG	RECP	MOTR	LG.MT	MISC	KIT	HEAT	SPEC	TOTAL	AMPS
CONNECTED LOAD IN KVA (PANEL 'UVL')	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	30 A
CONNECTED LOAD IN KVA (BRANCH PANELS)									0.0 KVA	0 A
TOTAL CONNECTED LOAD IN KVA	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	10.8 KVA	30 A
DEMAND LOAD IN KVA	0.00	2.62	2.45	0.48	4.31	0.00	1.44	0.00	11.3 KVA	31 A

PANEL NOTES:
a PROVIDE RED HANDLE BREAKER AND LOCK-ON DEVICE FOR LOAD INDICATED
b PROVIDE 5mA GFCI CIRCUIT BREAKER FOR LOAD INDICATED

PANEL OPTIONS:
MAIN CIRCUIT BREAKER (SEE ONE-LINE FOR SIZE)

CONSTRUCTION NOTES:

1. POWER FOR VALVE ACTUATORS WILL BE 480V 3PH AND ORIGINATE FROM PANEL BOARDS.
2. MINIMUM CONDUIT SIZE IS 3/4".
3. MAXIMUM PERCENTAGE CONDUIT FILL IS 30%.
4. WHEN CONVENIENT, CONTRACTOR MAY COMBINE SEVERAL NAMED CONDUITS INTO A SINGLE CONDUIT OF THE SAME USE. CONTROL, POWER, AND SIGNAL WIRES MAY NOT BE COMBINED IN THE SAME CONDUIT. THE 30% CONDUIT FILL REQUIREMENT MUST BE MAINTAINED.
5. ALL CONDUITS SHALL BE IDENTIFIED IN THE FIELD AFTER INSTALLATION WITH TAPED LABELS. LETTERING SHALL BE BLACK ON WHITE AND 3/4" IN SIZE.
6. DUE TO THE CORROSIVE ATMOSPHERE, NON-METALLIC RACEWAY, BOXES, FITTINGS, AND ACCESSORIES SHALL BE USED THROUGHOUT THE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE.
7. 304 OR 316 STAINLESS STEEL SHALL BE USED FOR ALL FASTENERS, HANGERS, RODS, CHANNEL, STRUTS, AND OTHER MOUNTING HARDWARE UNLESS SPECIFICALLY NOTED OTHERWISE.

CIRCUIT SCHEDULE

RACEWAY NO.	RACEWAY USE	RACEWAY SIZE	FROM	TO	CONDUCTORS TYPE	CONDUCTORS NO.	CONDUCTORS SIZE	CONDUCTORS GND	NOTES
108	J	3/4"	M102	MCP	TSP	2	18 AWG	-	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
108	P	3/4"	M102	MCP	TSP	2	18 AWG	-	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
108	M	3/4"	M102	MCP	FM	-	-	-	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
147	P	3/4"	V101	PANEL UV	A	3	12 AWG	12 AWG	EXISTING 480V POWER WIRING/RACEWAY. EXTEND AS REQUIRED
147	C	3/4"	V101	MCP	A	8	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
147	P	3/4"	V101	PANEL UV	A	3	12 AWG	12 AWG	EXISTING 480V POWER WIRING/RACEWAY. EXTEND AS REQUIRED
148	C	3/4"	V102A	MCP	A	8	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
148	P	3/4"	V102A	PANEL UV	A	3	12 AWG	12 AWG	EXISTING 480V POWER WIRING/RACEWAY. EXTEND AS REQUIRED
149	C	3/4"	V102B	MCP	A	8	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
149	P	3/4"	V102B	PANEL UV	A	3	12 AWG	12 AWG	EXISTING 480V POWER WIRING/RACEWAY. EXTEND AS REQUIRED
150	C	3/4"	V104	MCP	A	8	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
150	P	3/4"	V104	PANEL UV	A	3	12 AWG	12 AWG	EXISTING 480V POWER WIRING/RACEWAY. EXTEND AS REQUIRED
157	C	3/4"	V234A	MCP	A	10	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
157	C	3/4"	V234A	MCP	TSP	1	18 AWG	18 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
158	C	3/4"	V238	MCP	A	10	14 AWG	14 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
158	C	3/4"	MDP	MCP	TSP	1	18 AWG	18 AWG	EXISTING CONTROL WIRING/RACEWAY. EXTEND AS REQUIRED
200	P	2-1/2"	TCP	MDP	A	4	4/0 AWG	2 AWG	TURBINE CONTROL PANEL FEEDER - SET 1
201	P	2-1/2"	TCP	MDP	A	4	4/0 AWG	2 AWG	TURBINE CONTROL PANEL FEEDER - SET 2
202	P	2-1/2"	TG-A	TCP	A	3	250 KCMIL	4 AWG	GENERATOR NO. 1 LEADS
203	P	2"	TG-B	TCP	A	3	1/0 AWG	6 AWG	GENERATOR NO. 2 LEADS
204	C	1"	V231A	TCP	A	8	14 AWG	-	INLET CONTROL VALVE NO. 1 - DISCRETE
					TSP	2	18 AWG	-	INLET CONTROL VALVE NO. 1 - ANALOG
205	C	1"	V231B	TCP	A	8	14 AWG	-	INLET CONTROL VALVE NO. 2 - DISCRETE
					TSP	2	18 AWG	-	INLET CONTROL VALVE NO. 2 - ANALOG
206	C	1"	TG-A	TCP	A	2	14 AWG	-	GENERATOR NO. 1 - WINDING TEMPERATURE
					TSP	1	18 AWG	-	GENERATOR NO. 1 - SPEED
					TRIAD	2	18 AWG	-	GENERATOR NO. 1 - BEARING TEMPERATURE
207	C	1"	TG-B	TCP	A	2	14 AWG	-	GENERATOR NO. 2 - WINDING TEMPERATURE
					TSP	1	18 AWG	-	GENERATOR NO. 2 - SPEED
					TRIAD	2	18 AWG	-	GENERATOR NO. 2 - BEARING TEMPERATURE
208	C	3/4"	PT114	TCP	ISP	1	18 AWG	-	TURBINE SYSTEM INLET PRESSURE
209	C	3/4"	PT115	TCP	TSP	1	18 AWG	-	TURBINE SYSTEM DISCHARGE PRESSURE
210	I	1"	MCP	TCP	F	1	CAT 6	-	TCP SCADA NETWORK INTERCONNECTION
211	C	3/4"	MCP	TCP	A	4	14 AWG	-	TURBINE START/STOP
212	P	3/4"	TCP	PANEL UVL	A	2	12 AWG	12 AWG	TCP CONTROL POWER (UPS)
213	P	3/4"	V231A	PANEL UV	A	3	12 AWG	12 AWG	TURBINE INLET CONTROL VALVE NO. 1 - POWER
214	P	3/4"	V231B	PANEL UV	A	3	12 AWG	12 AWG	TURBINE INLET CONTROL VALVE NO. 2 - POWER
215	P	3/4"	TG-A	TCP	A	2	12 AWG	12 AWG	GENERATOR NO. 1 - SPACE HEATER POWER
216	P	3/4"	TG-B	TCP	A	2	12 AWG	12 AWG	GENERATOR NO. 2 - SPACE HEATER POWER
217	C	3/4"	V234B	I/O PANEL	TSP	1	18 AWG	-	NEW CONTROL WIRING/RACEWAY
218	C	1"	V109A	I/O PANEL	A	8	14 AWG	-	CONTROL VALVE - DISCRETE
					TSP	2	18 AWG	-	CONTROL VALVE - ANALOG
219	P	3/4"	V109A	PANEL H	A	3	12 AWG	12 AWG	CONTROL VALVE - POWER
220	C	1"	V109B	I/O PANEL	A	8	14 AWG	-	CONTROL VALVE - DISCRETE
					TSP	2	18 AWG	-	CONTROL VALVE - ANALOG
221	P	3/4"	V109B	PANEL H	A	3	12 AWG	12 AWG	CONTROL VALVE - POWER
222	C	3/4"	VFD-PMP101 & VFD-PMP102	MCP	TSP	2	18 AWG	-	CHLORINE DOSING PUMPS SPEED REFERENCE
223	J	3/4"	VFD-PMP101 & VFD-PMP102	MCP	E	2	CAT 6	-	CHLORING DOSING PUMPS NETWORK CONNECTIONS
224	J	3/4"	MCP	I/O PANEL	E	1	CAT 6	-	MCP TO I/O EXPANSION PANEL COMMUNICATIONS
225	C	3/4"	V234B	MCP	A	10	14 AWG	14 AWG	NEW CONTROL WIRING/RACEWAY
226	P	3/4"	PMP101	VFD-PMP101	A	3	12 AWG	12 AWG	NEW POWER WIRING - RE-USE RACEWAY
227	P	3/4"	PMP102	VFD-PMP102	A	3	12 AWG	12 AWG	NEW POWER WIRING - RE-USE RACEWAY
228	P	3/4"	MCP	I/O PANEL	A	3	12 AWG	12 AWG	NEW POWER WIRING/RACEWAY FOR I/O EXPANSION PANEL

LEGEND

CIRCUIT USE
P = POWER
C = CONTROL
J = ETHERNET
M = METERING

CONDUCTOR TYPE
A = SINGLE CONDUCTORS
E = ETHERNET CABLES
TSP = TWISTED SHEILDED PAIR
TRIAD = TWISTED SHEILDED TRIAD
M = SPECIALIZED CABLE FROM EQUIPMENT SUPPLIER

EQUIPMENT
MCP = MAIN CONTROL PANEL
MDP = MAIN DISTRIBUTION PANEL
TCP = TURBINE CONTROL PANEL
PT = PRESSURE TRANSMITTER
FM = FLOW METER

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

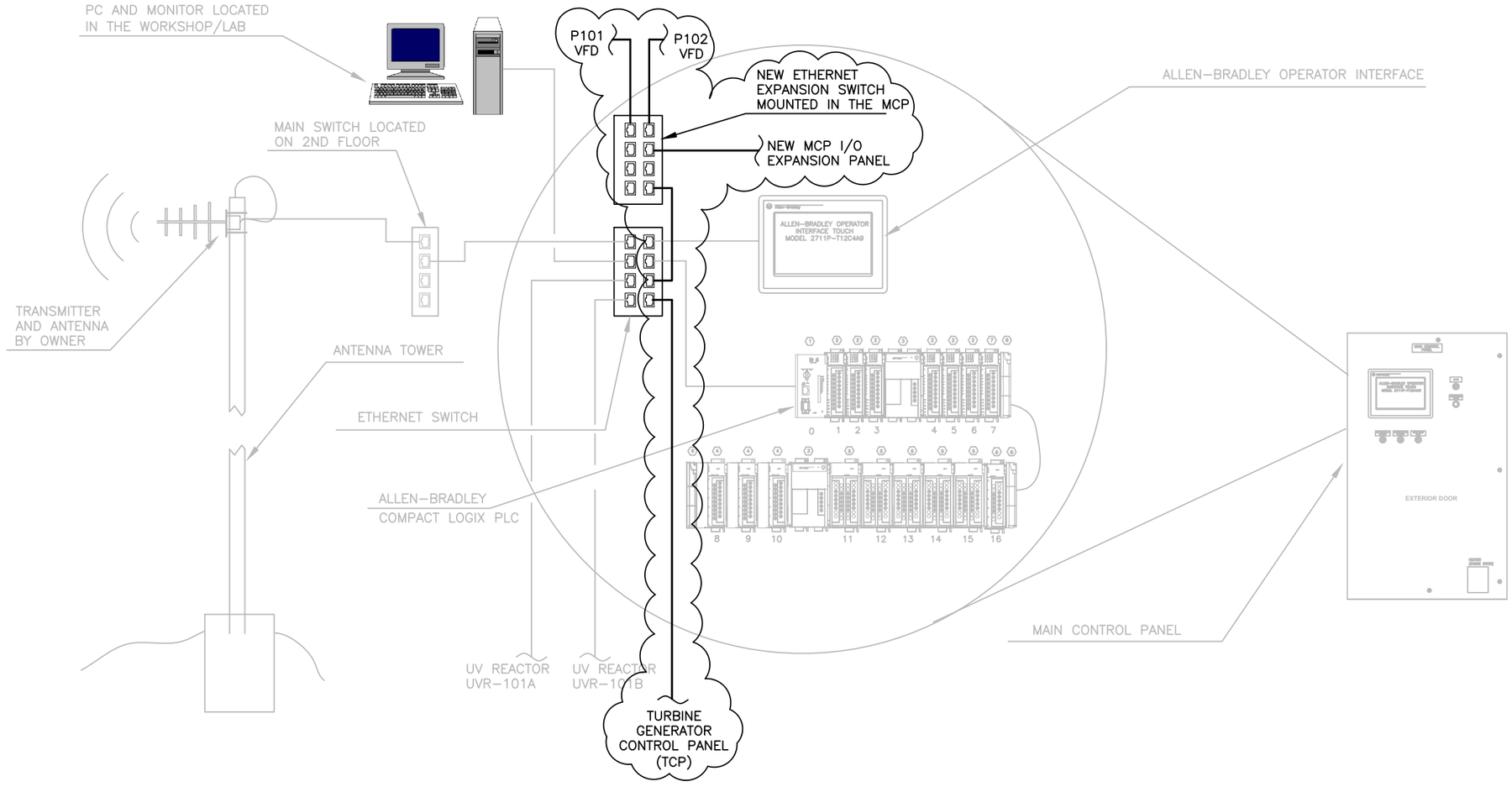
MODIFIED EXISTING SCHEDULES

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E6.1
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. PROVIDE AN ETHERNET SWITCH EXPANSION MODULE WITH 8X1 10/100 BASE-T (COPPER) PORTS. MATCH TO EXISTING EQUIPMENT.



WATER TREATMENT PLANT
MODIFIED NETWORK DIAGRAM

NOT TO SCALE

CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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Anchorage, AK 99503

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

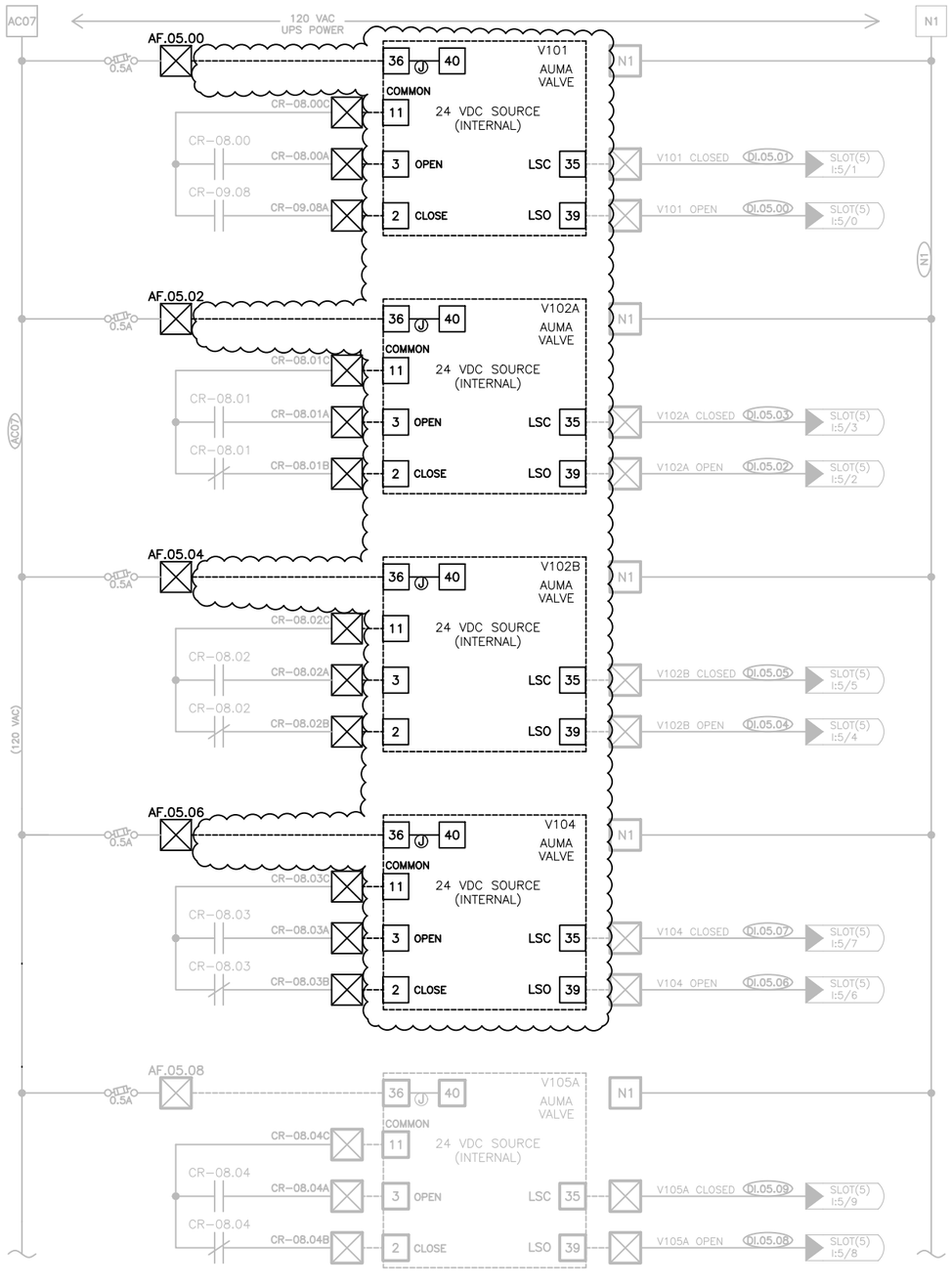
WATER TREATMENT PLANT MODIFIED NETWORK DIAGRAM

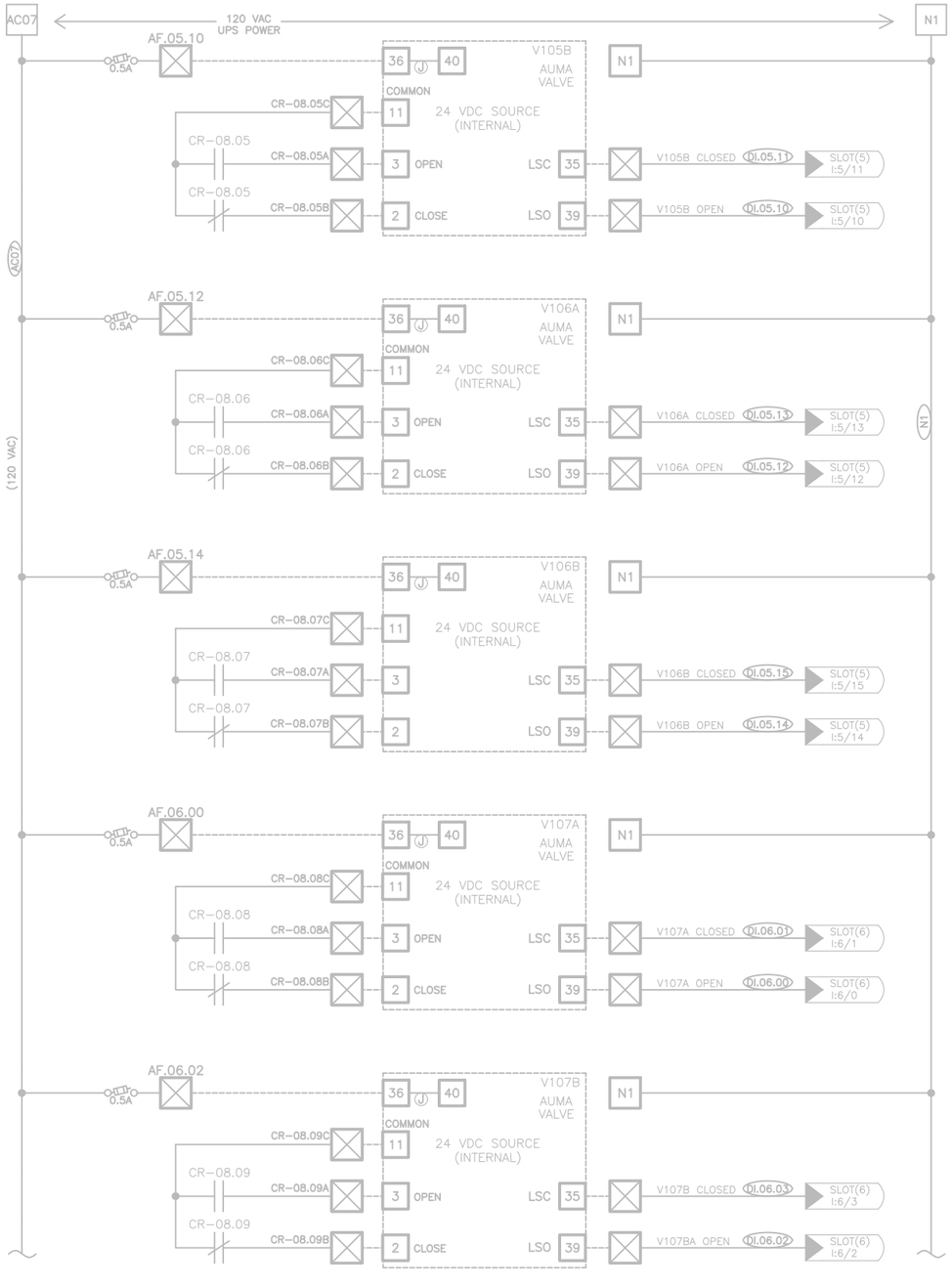
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.0
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTE:

1. V101, V102A, V102B, & V104 ARE EXISTING VALVES WITH MOTOR OPERATED VALVE ACTUATORS THAT ARE BEING RELOCATED.





CITY OF UNALASKA
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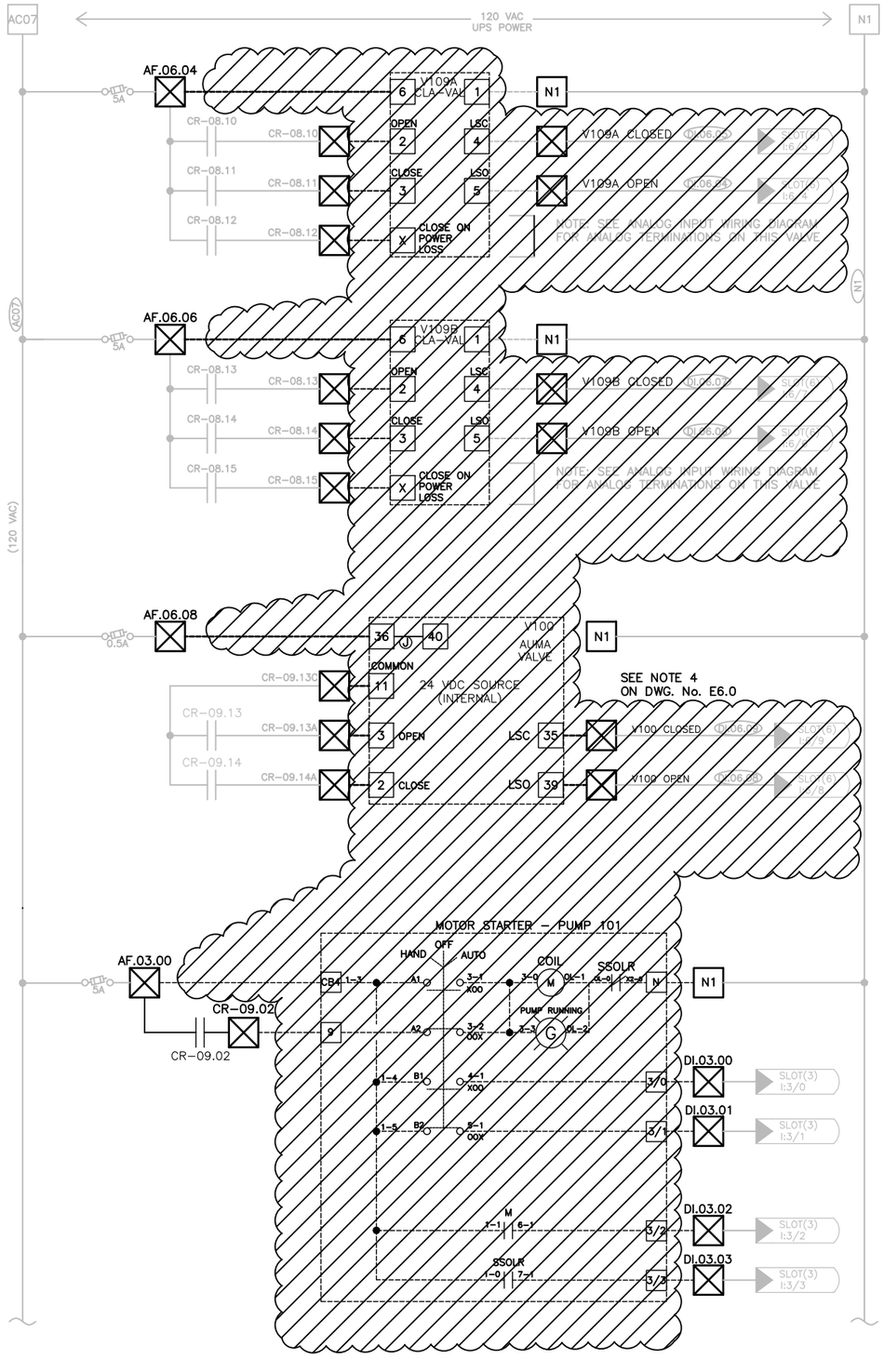
CITY OF UNALASKA

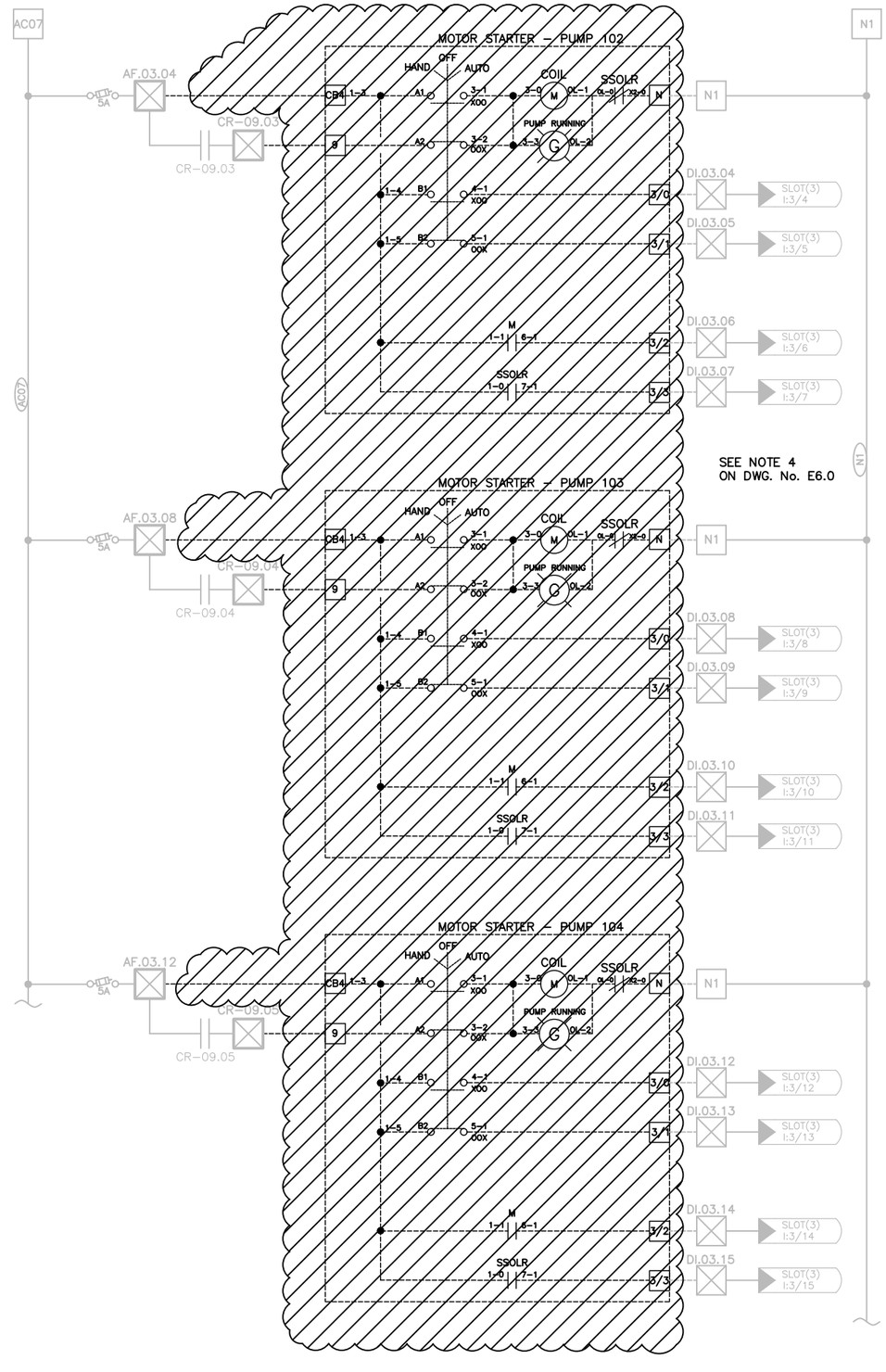
PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED DISCRETE I/O SCHEMATIC

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.1
Date: 4/17/2020	
Scale: N/A	





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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

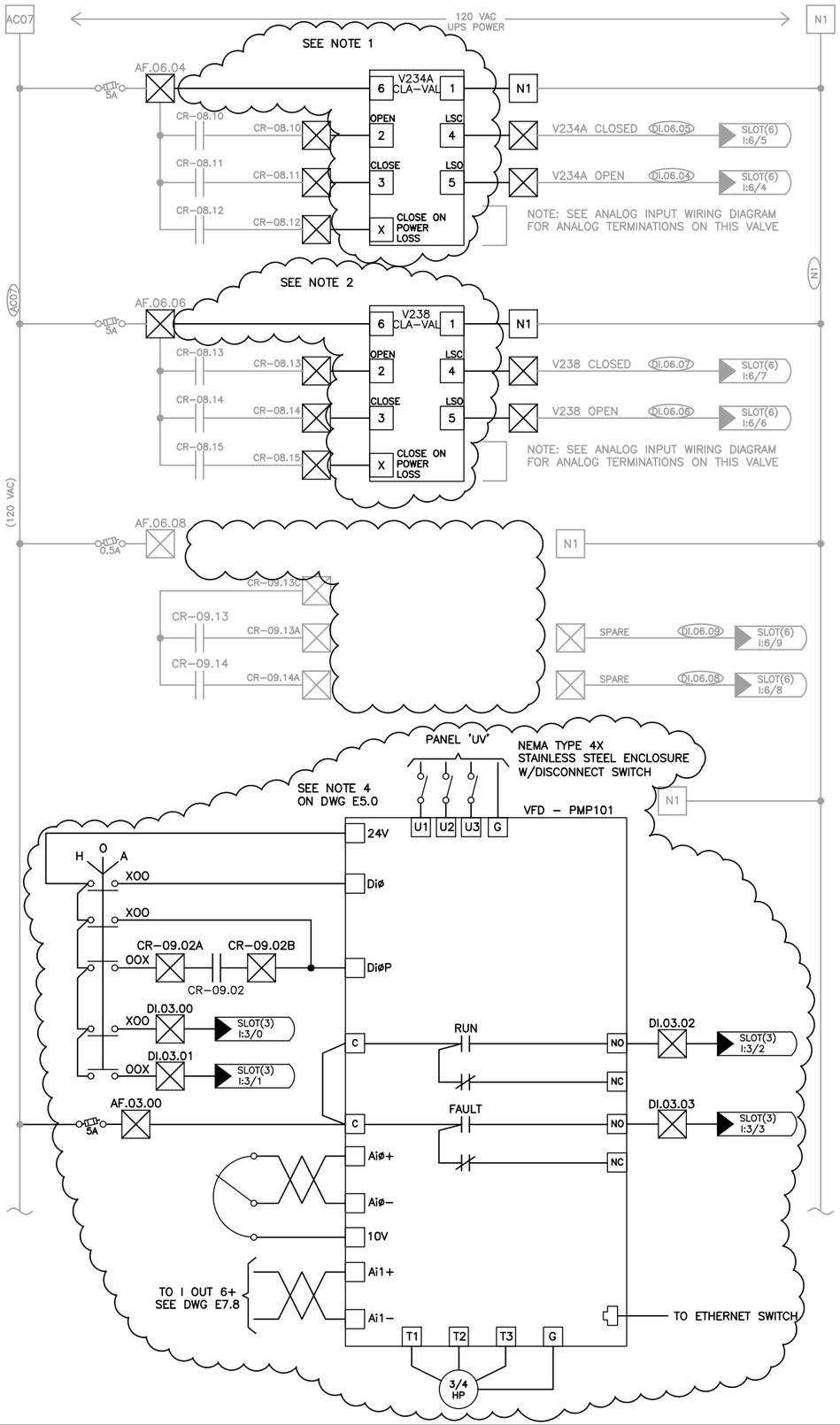
MAIN CONTROL PANEL (MCP) WIRING DIAGRAMS - DEMOLITION

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.2D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. V234A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109A) THAT IS BEING RELOCATED.
2. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED.
3. V109A AND V109B ARE NEW VALVES THAT WILL BE EQUIPPED WITH MOTOR OPERATED VALVE ACTUATORS. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL NEW POWER AND CONTROL WIRING AS SHOWN ON THE DRAWINGS.



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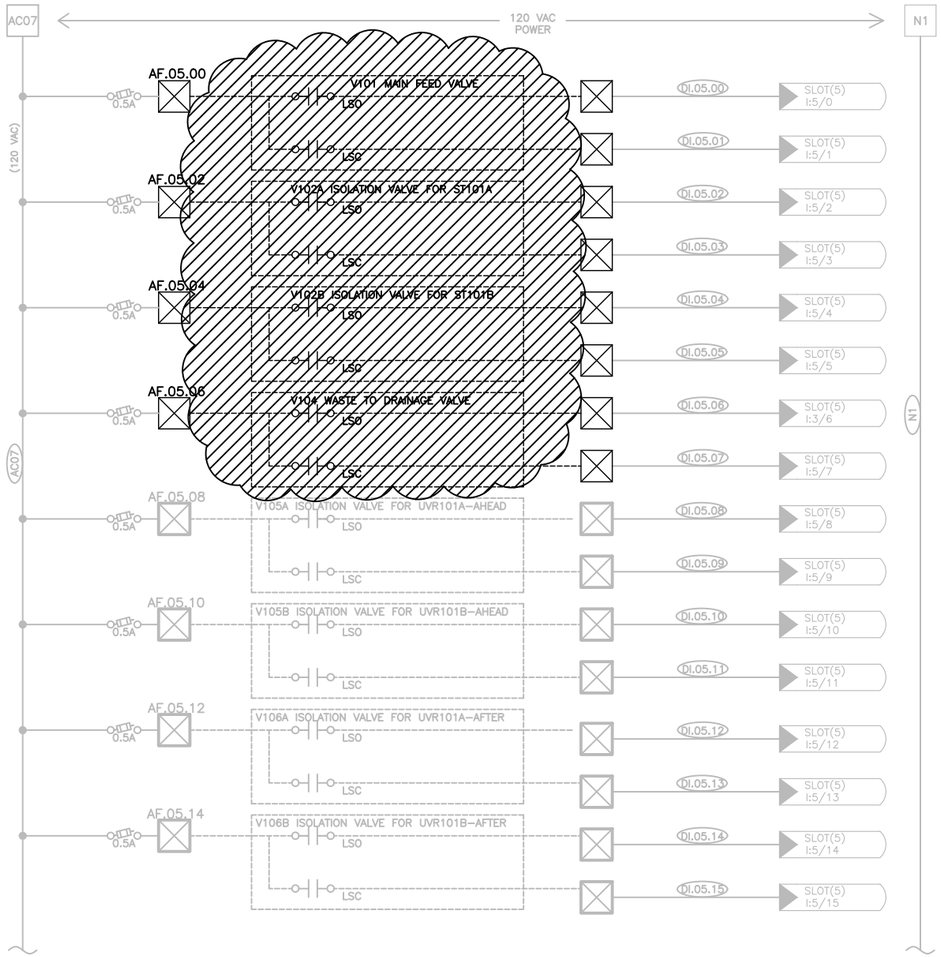
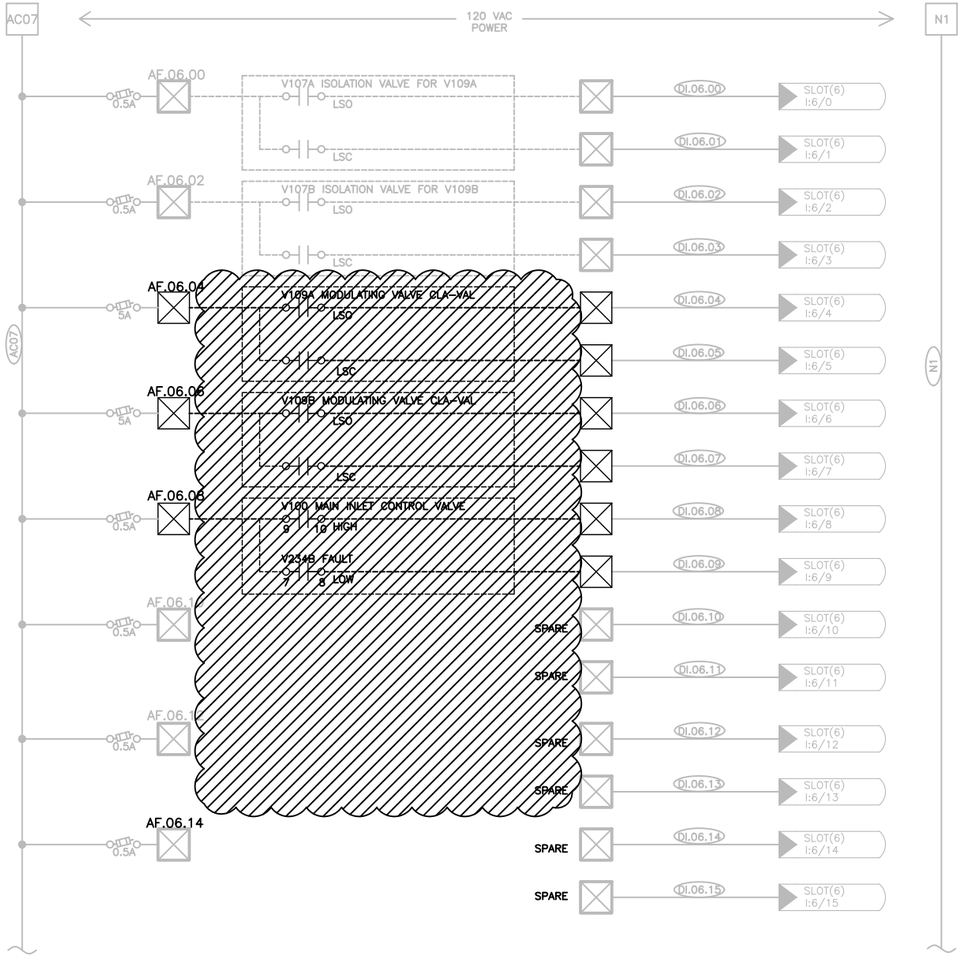
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED WIRING DIAGRAMS

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E7.2
Date: 4/17/2020	
Scale: N/A	





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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

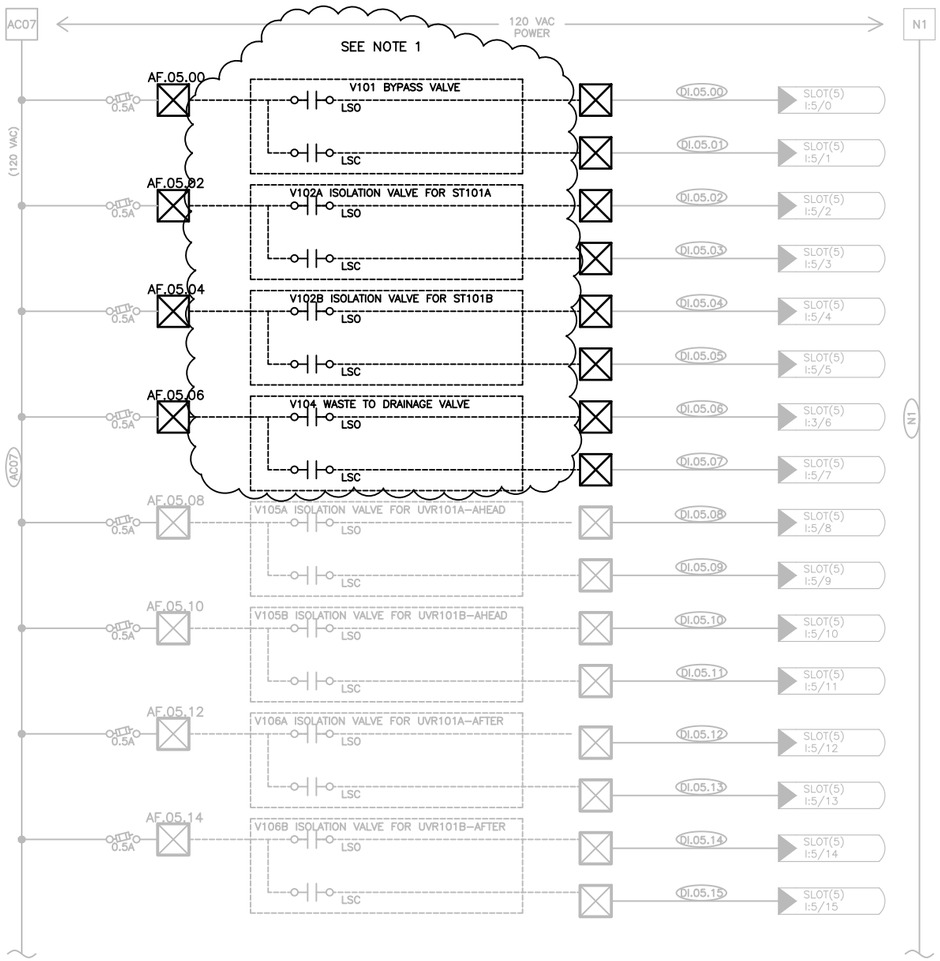
MAIN CONTROL PANEL (MCP) MODIFIED DISCRETE 120VAC INPUT SCHEMATIC - DEMOLITION

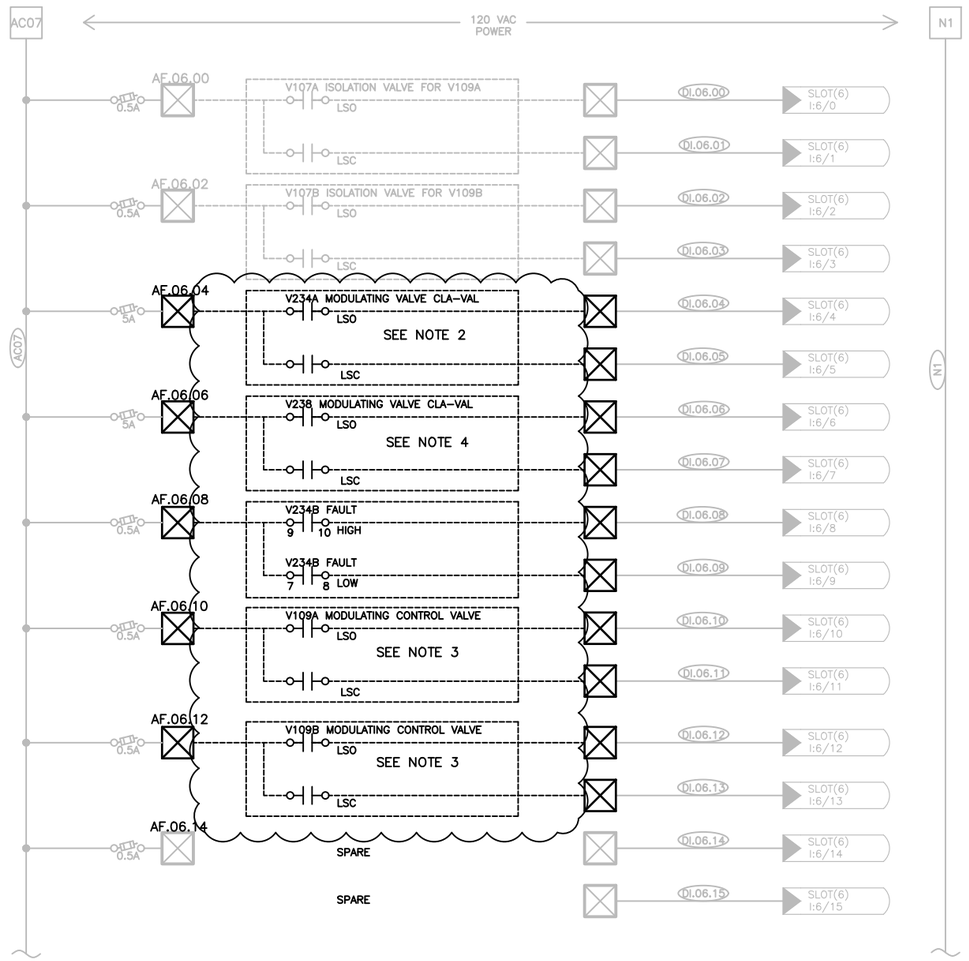
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.3D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. V101, V102A, V102B, & V104 ARE EXISTING VALVES WITH MOTOR OPERATED VALVE ACTUATORS THAT ARE BEING RELOCATED.
2. V234A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109A) THAT IS BEING RELOCATED.
3. V109A AND V109B ARE NEW VALVES THAT WILL BE EQUIPPED WITH MOTOR OPERATED VALVE ACTUATORS. THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL NEW POWER AND CONTROL WIRING AS SHOWN ON THE DRAWINGS.
4. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED.





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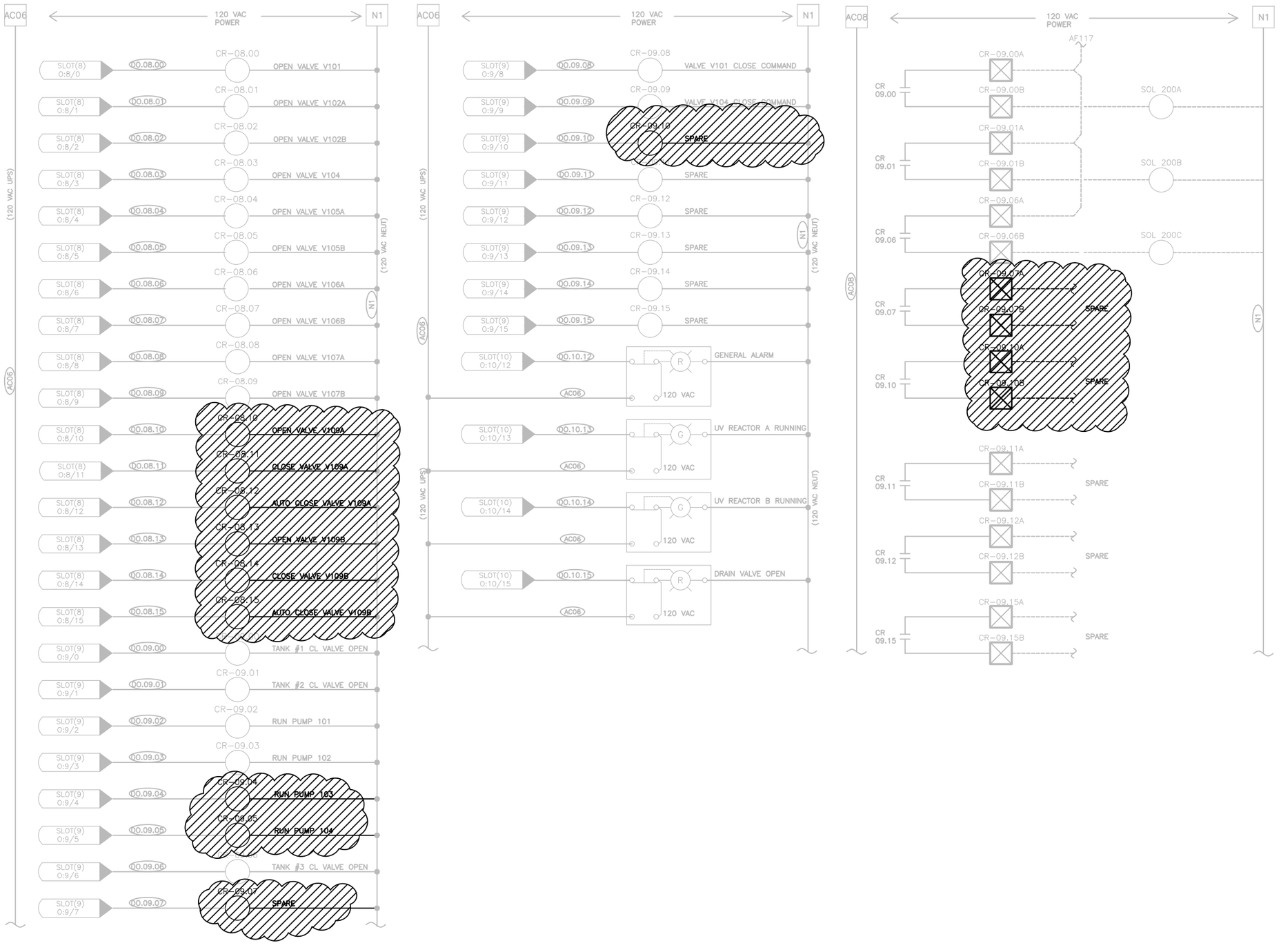
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED DISCRETE 120VAC INPUT SCHEMATIC

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.3
Date: 4/17/2020	
Scale: N/A	



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PYRAMID WATER TREATMENT PLANT

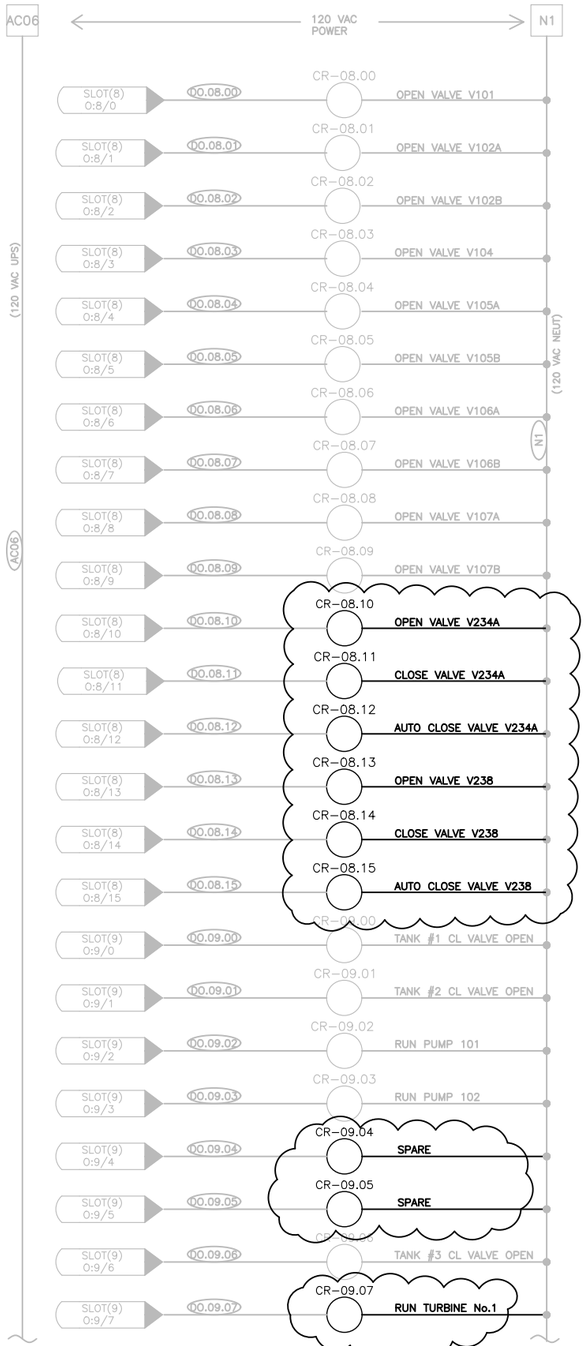
MAIN CONTROL PANEL (MCP) MODIFIED DISCRETE OUTPUT SCHEMATIC - DEMOLITION

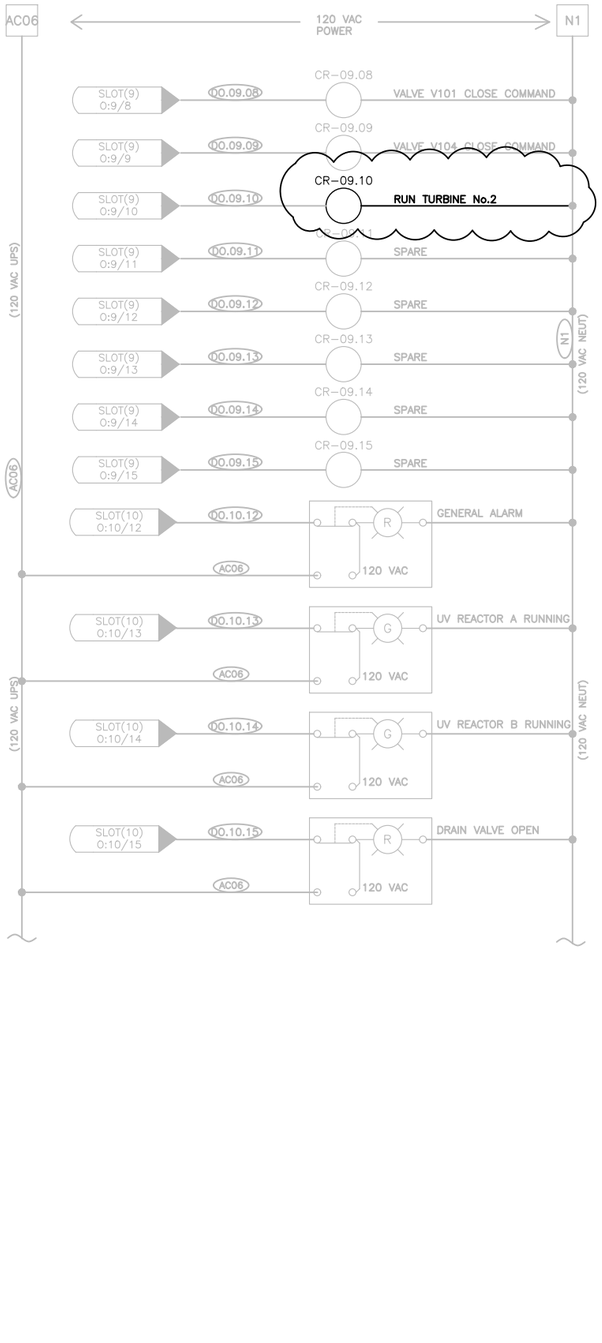
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

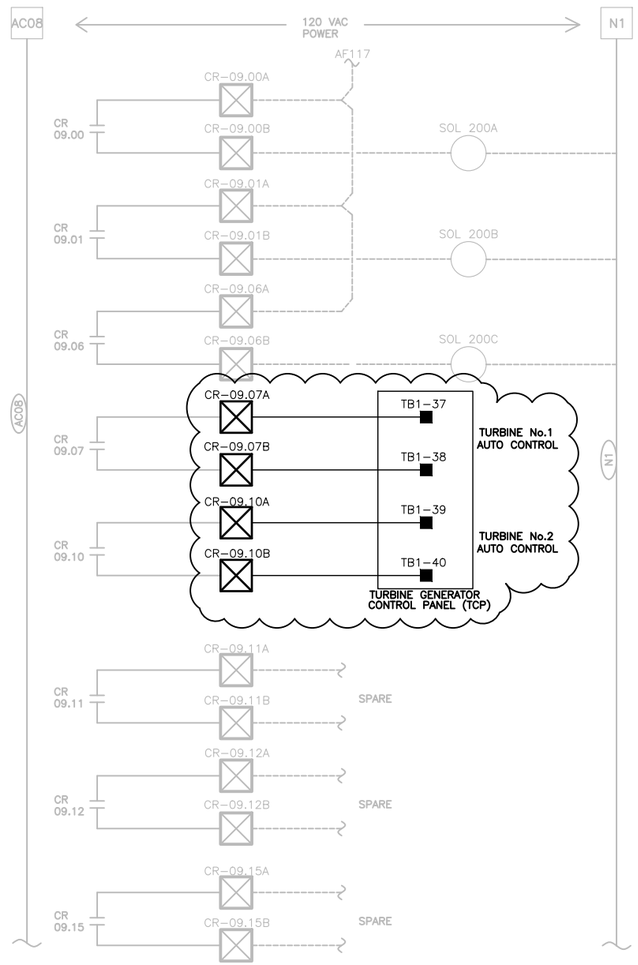
Project No.: AK-1	Drawing No. E7.4D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. V234A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109A) THAT IS BEING RELOCATED.
2. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED.







CITY OF UNALASKA
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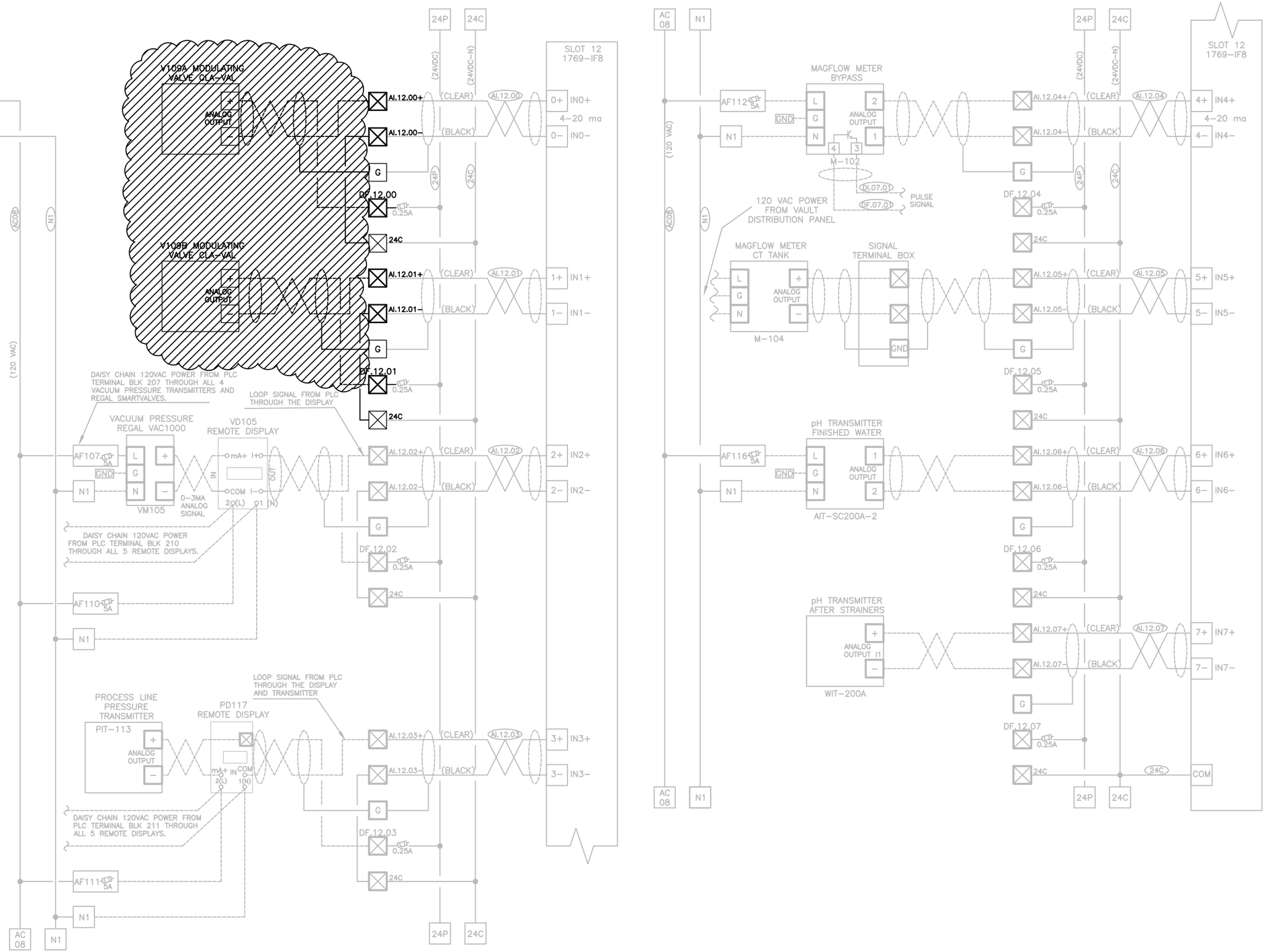
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED DISCRETE OUTPUT SCHEMATIC

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E7.4
Date: 4/17/2020	
Scale: N/A	



CITY OF UNALASKA
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APR 17, 2020
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

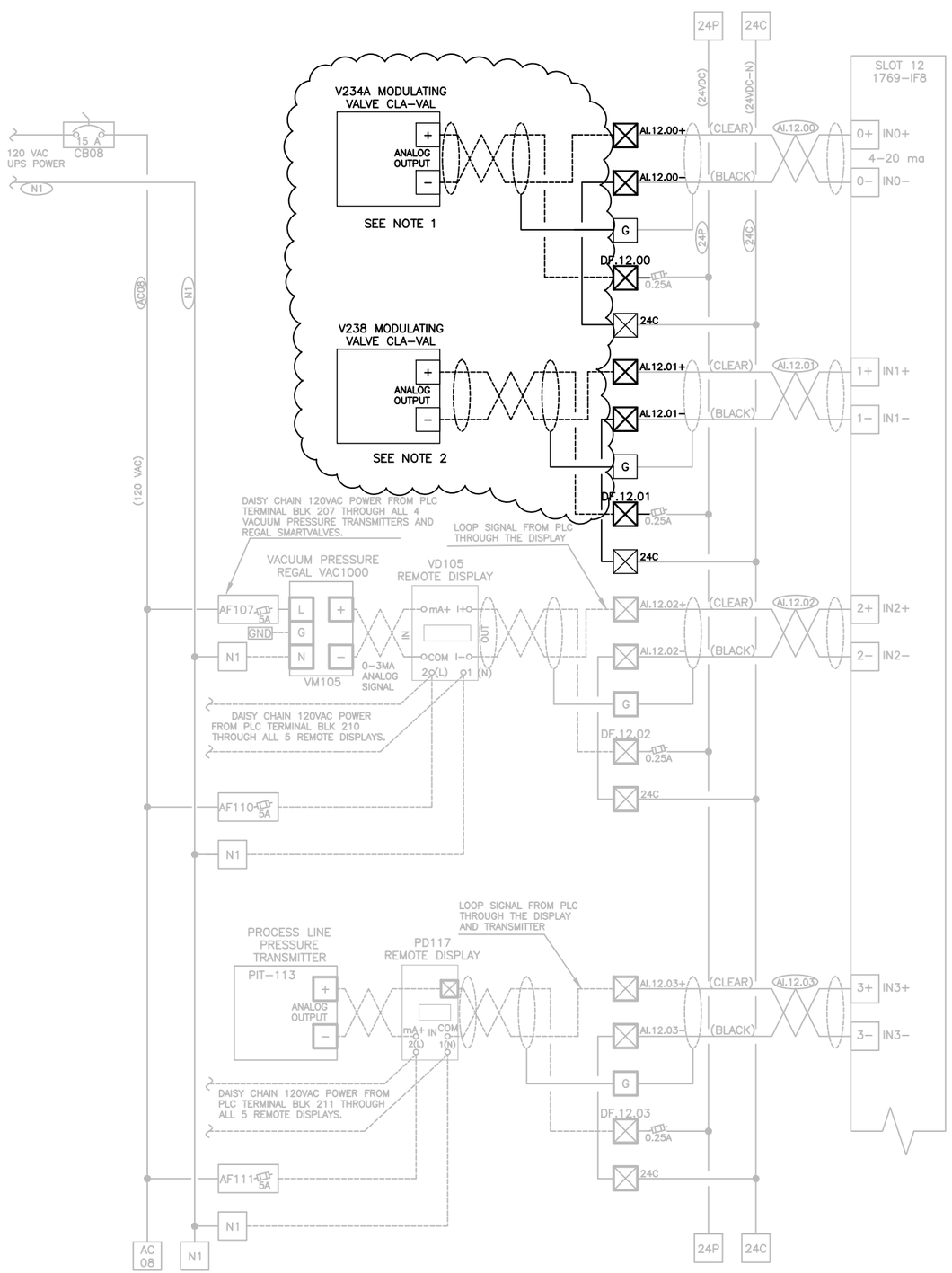
MAIN CONTROL PANEL (MCP) MODIFIED ANALOG INPUT SCHEMATIC, SHEET 1 OF 2 - DEMO

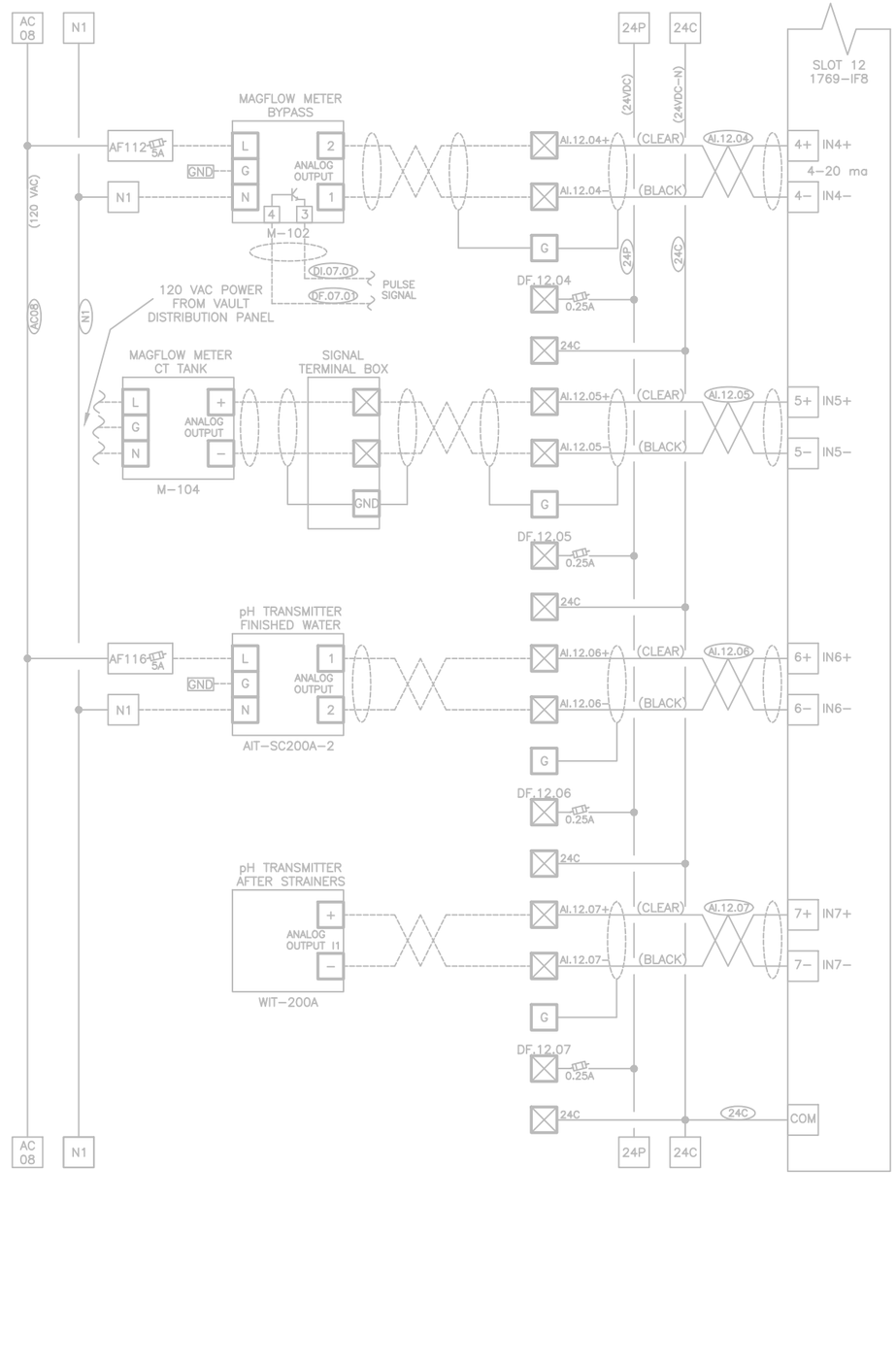
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.5D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTES:

1. V234A IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109A) THAT IS BEING RELOCATED.
2. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED.





No.	Revision/Issue	Date
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Jeremie D. Smith
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APR 17, 2020
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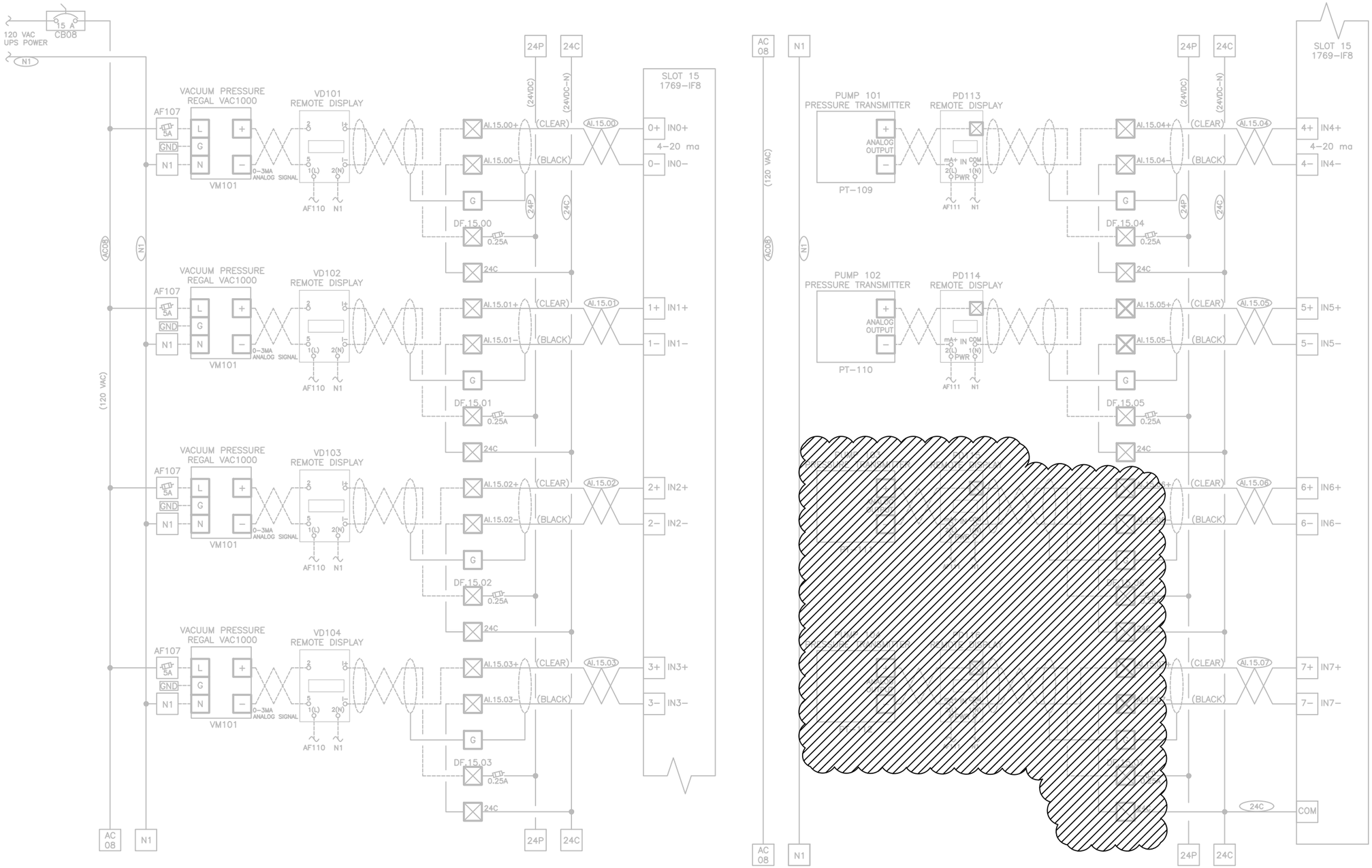
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED ANALOG INPUT SCHEMATIC, SHEET 1 OF 2

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E7.5
Date: 4/17/2020	
Scale: N/A	



CITY OF UNALASKA
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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

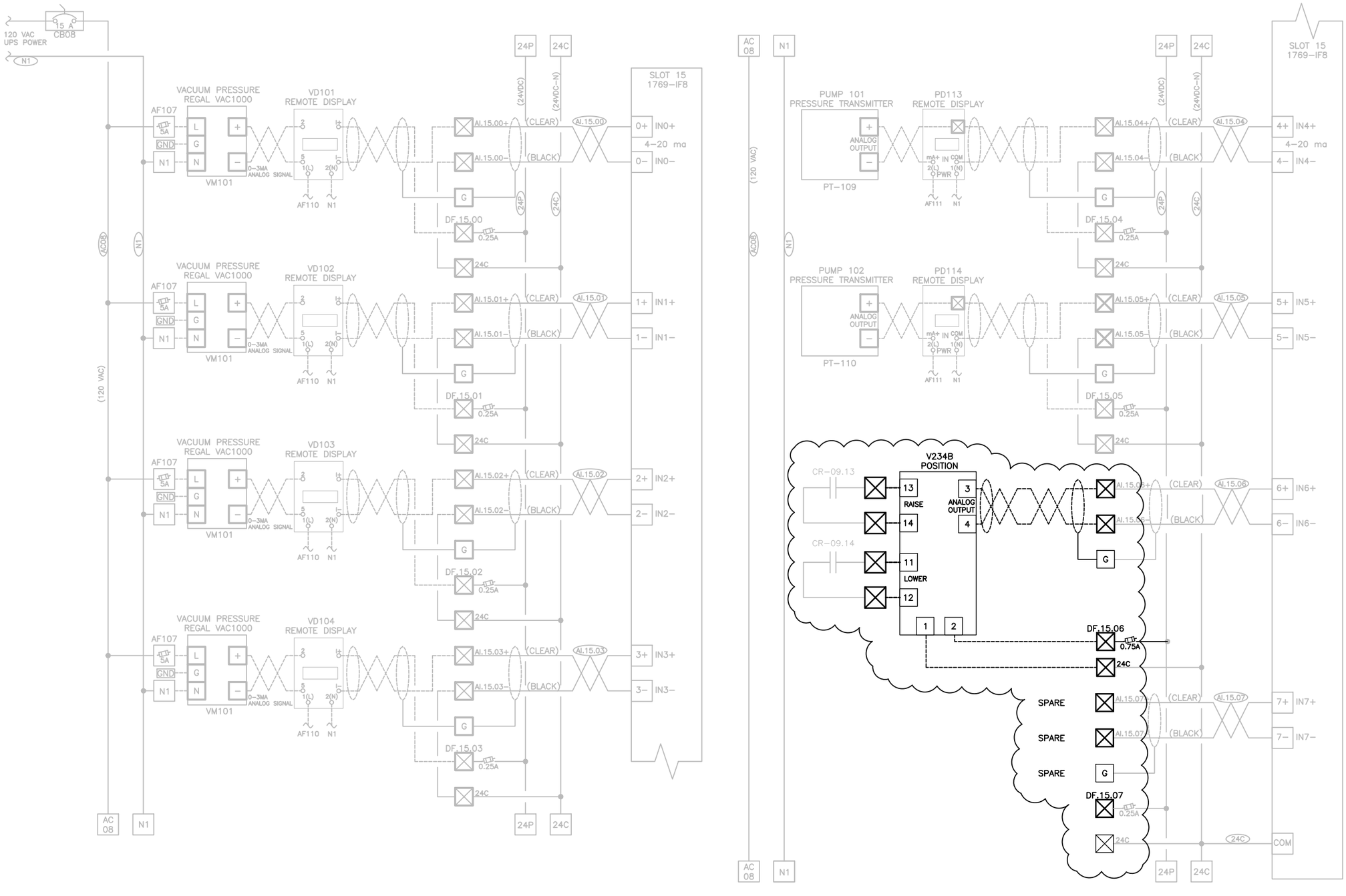
MAIN CONTROL PANEL (MCP) MODIFIED ANALOG INPUT SCHEMATIC, SHEET 2 OF 2 DEMO

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.6D
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTE:

1. V238 IS AN EXISTING ELECTRICALLY CONTROLLED VALVE (CURRENTLY TAGGED AS V109B) THAT IS BEING RELOCATED.



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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

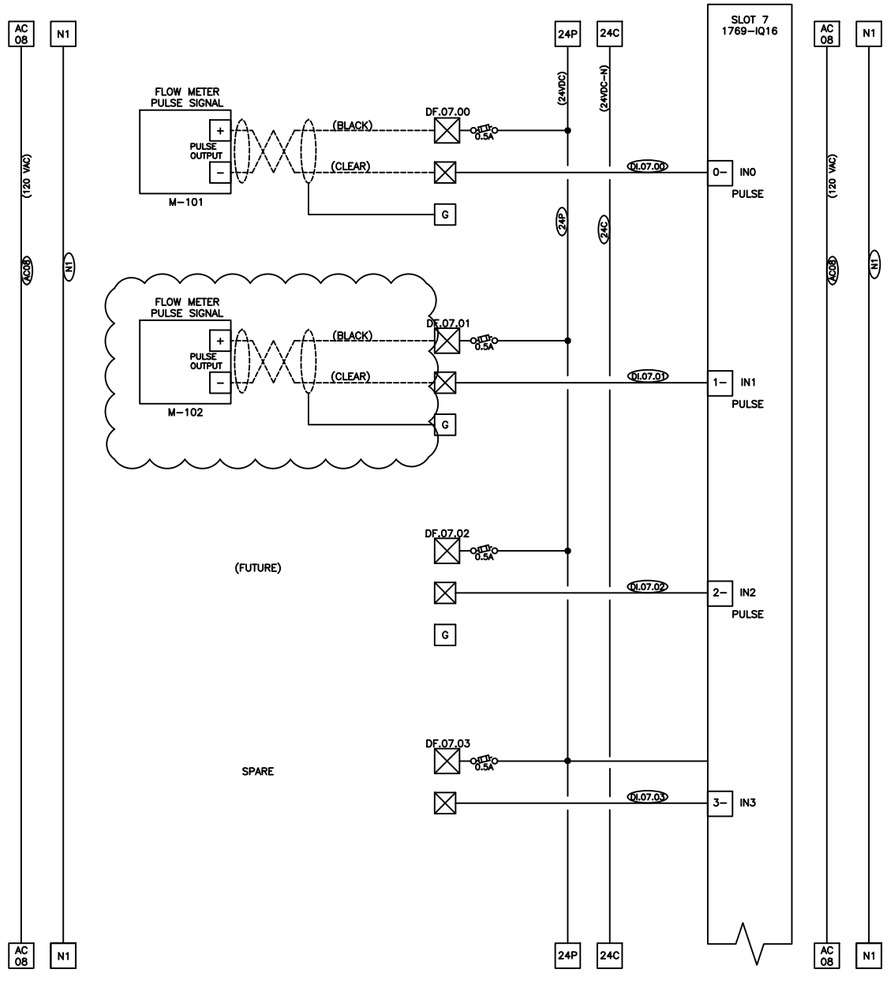
MAIN CONTROL PANEL (MCP) MODIFIED ANALOG INPUT SCHEMATIC, SHEET 2 OF 2

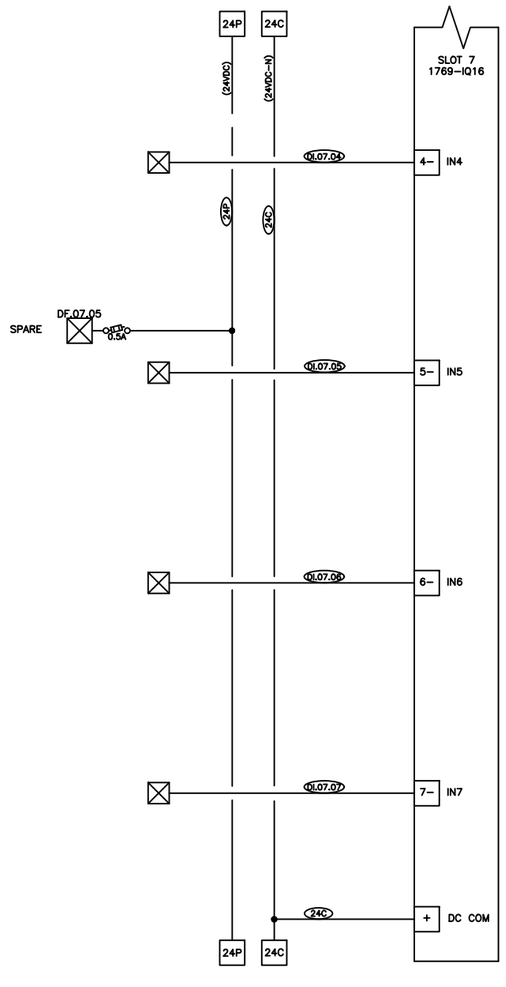
Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.6
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTE:

1. M102 IS AN EXISTING METER THAT WILL NEED TO BE DISCONNECTED AND RECONNECT DURING CONSTRUCTION TO ACCOMMODATE THE PIPING CHANGES.





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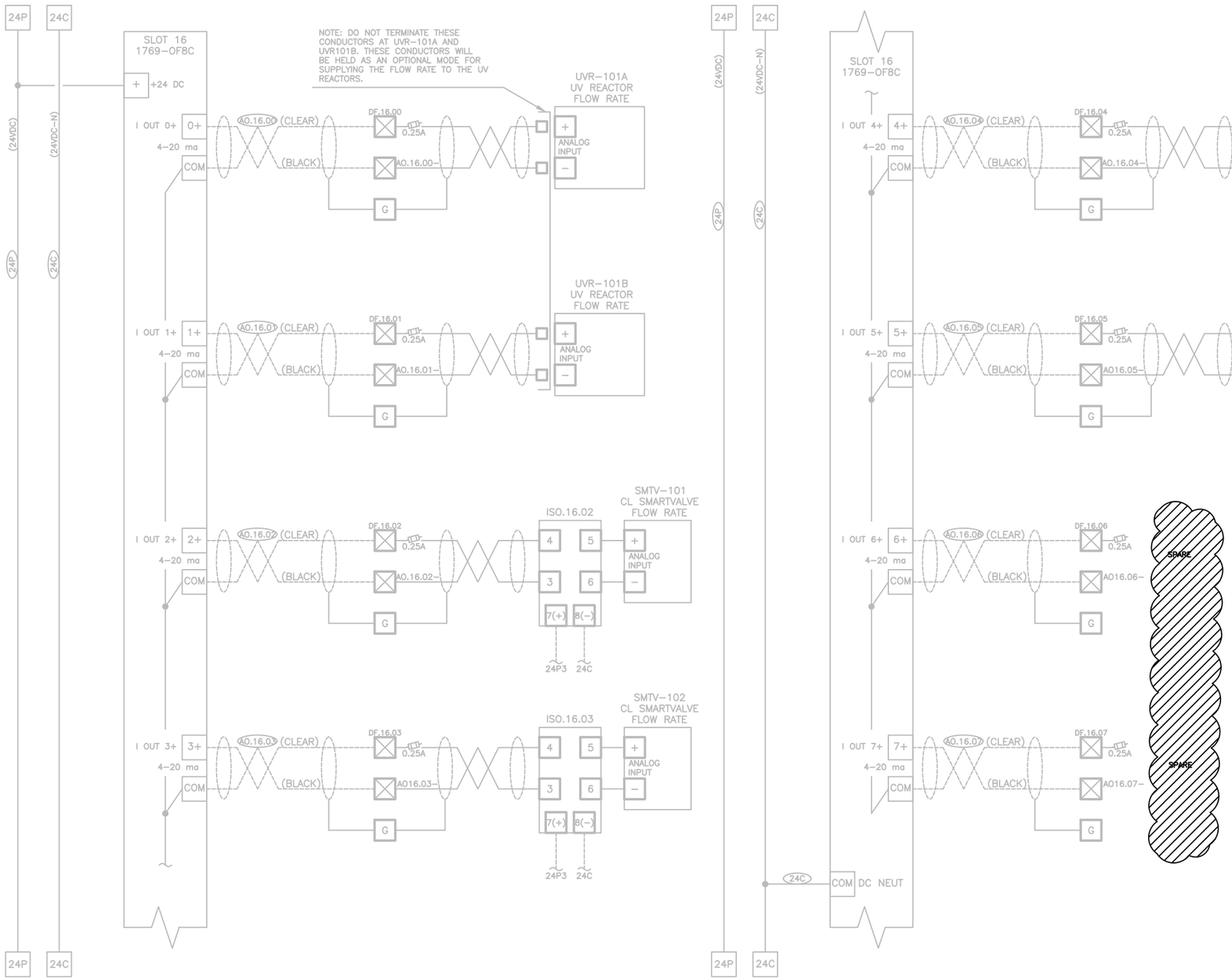
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) DISCRETE INPUT SCHEMATIC

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.7
Date: 4/17/2020	
Scale: N/A	



CITY OF UNALASKA
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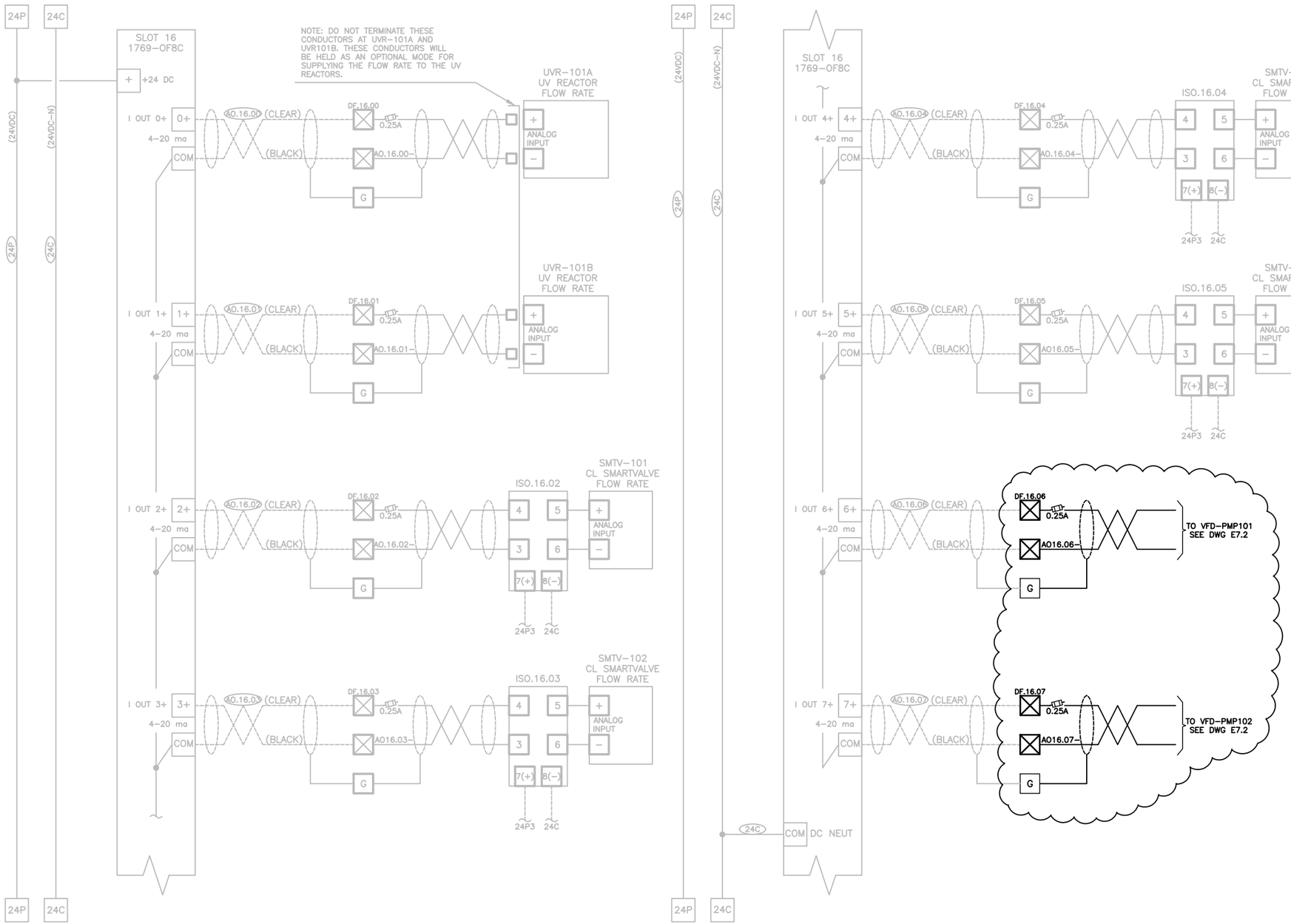
CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED ANALOG OUTPUT SCHEMATIC, SHEET 1 OF 2 DEMO

Drawn By:	DW
Checked By:	MM
Approved By:	JDS

Project No.: AK-1	Drawing No. E7.8D
Date: 4/17/2020	
Scale: N/A	



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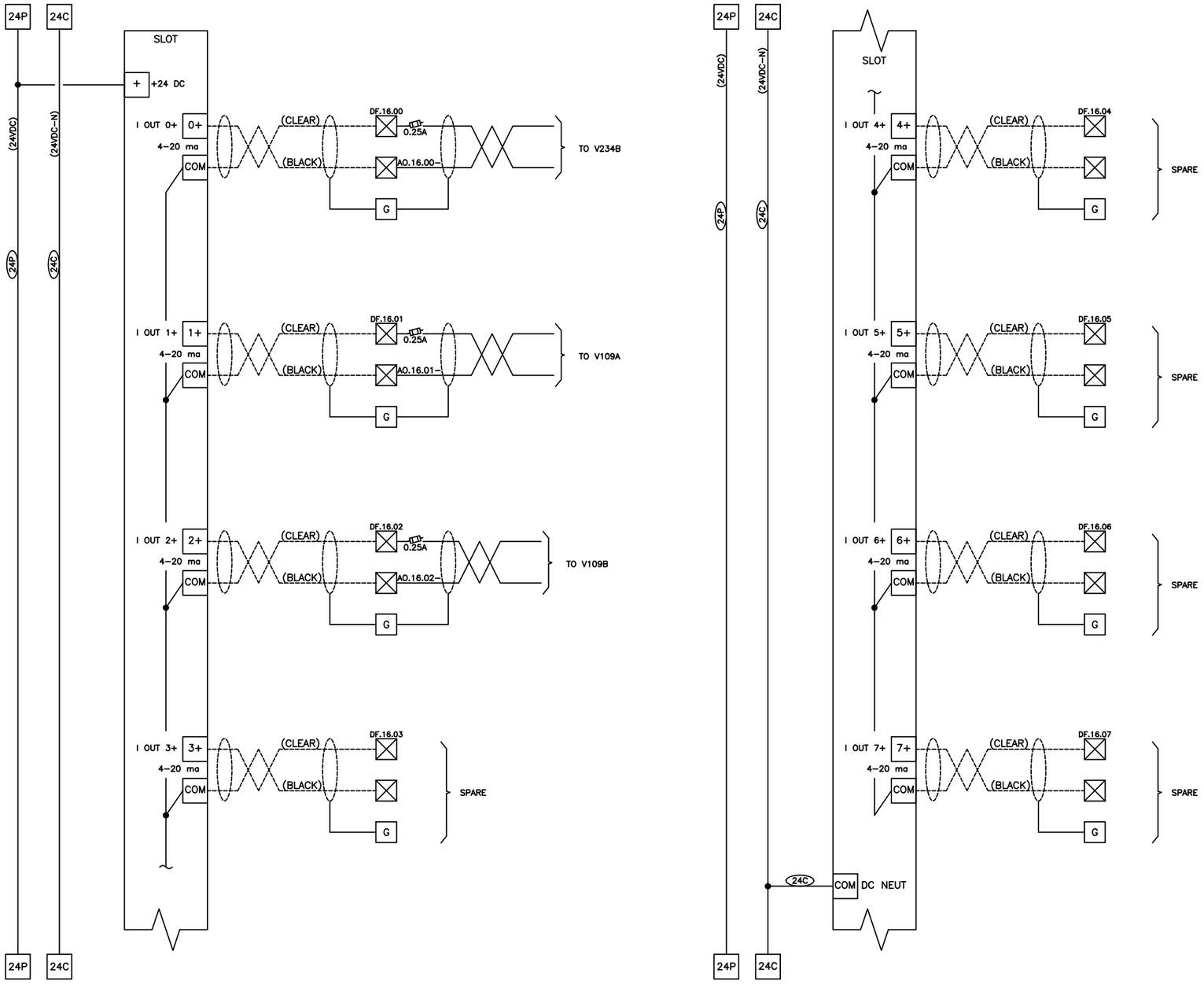
PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED ANALOG OUTPUT SCHEMATIC, SHEET 1 OF 2

Drawn By:	DW
Checked By:	MM
Approved By:	JDS
Project No.: AK-1	Drawing No. E7.8
Date: 4/17/2020	
Scale: N/A	

CONSTRUCTION NOTE:

1. THE DESIGN FOR THE WTP MAIN CONTROL PANEL (MCP) I/O EXPANSION PANEL WILL BE PROVIDED AT A LATER DATE AS A CHANGE. IN THE INTERIM, THIS DRAWING IS MEANT TO BE A REPRESENTATIVE PLACE HOLDER TO SHOW THE LANDING OF THE ANALOG OUT SIGNALS FOR V109A, V109B, AND V234B.



CITY OF UNALASKA
PORT OF DUTCH HARBOR
53° 54' N 166° 32' W

STATE OF ALASKA
49 TH
Jeremie D. Smith
EE-11789
APR 17, 2020
REGISTERED PROFESSIONAL ENGINEER

No.	Revision/Issue	Date
0	ISSUED FOR CONSTRUCTION	4/17/20

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CITY OF UNALASKA

PYRAMID WATER TREATMENT PLANT

MAIN CONTROL PANEL (MCP) MODIFIED ANALOG OUTPUT SCHEMATIC, SHEET 2 OF 2

Drawn By:	BDH
Checked By:	JDS
Approved By:	JDS
Project No.: AK-1	Drawing No. E7.9
Date: 4/17/2020	
Scale: N/A	