

# COUNTY OF HAWAII

## DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

# PAHALA WASTEWATER TREATMENT PLANT PROJECT

## DESIGN/BUILD DOCUMENTS

COUNTY OF HAWAII

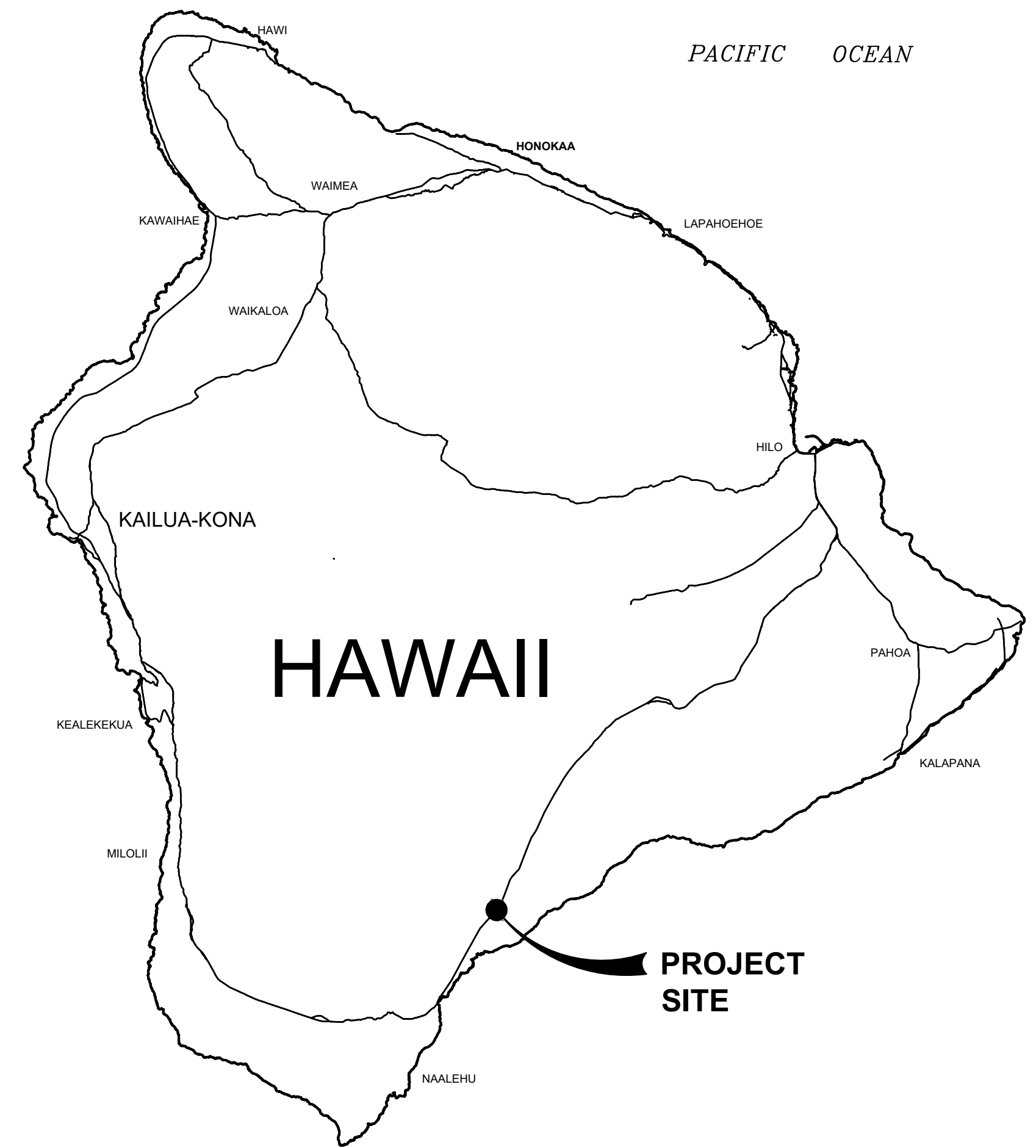
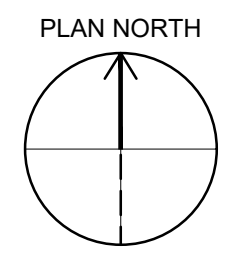
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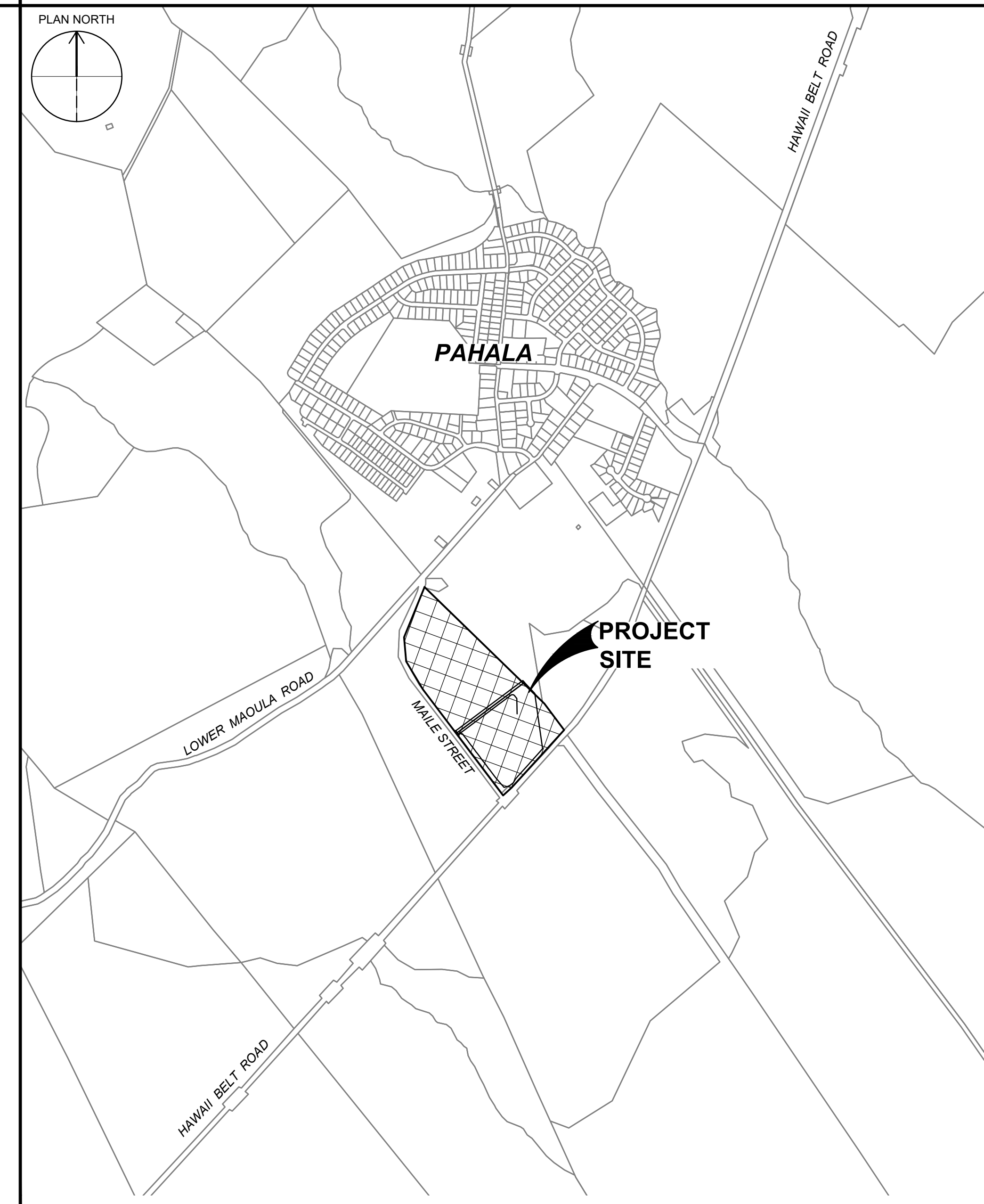
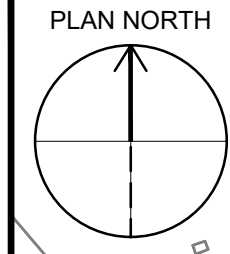
**VICINITY MAP**

**LOCATION MAP**

**PREPARED BY:**



**ISLAND OF HAWAII**  
NO SCALE



**LOCATION MAP**  
NO SCALE

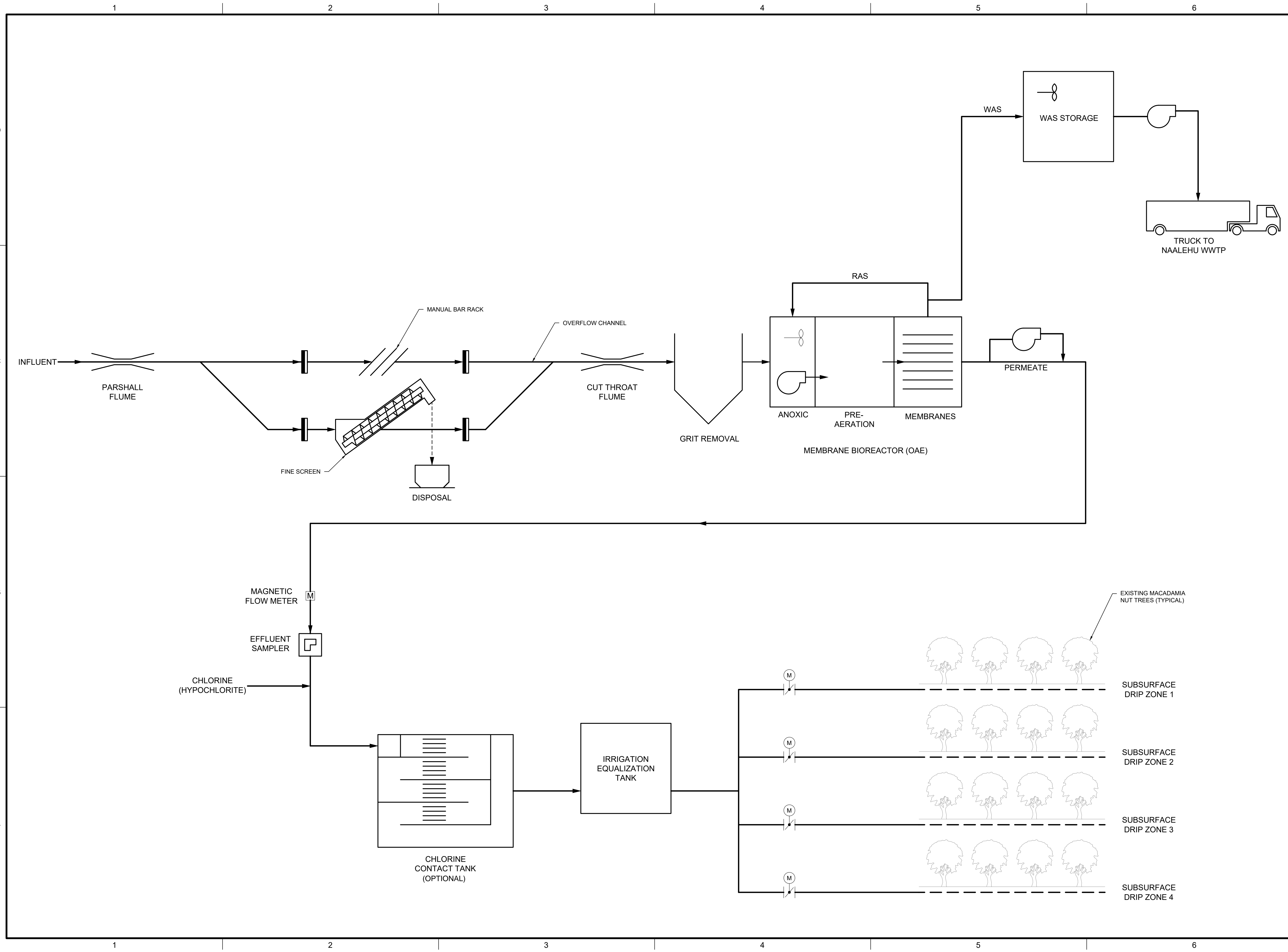


2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII 96793

**DRAWING INDEX**

SHEET NUMBER	DRAWING NUMBER	SHEET TITLE
<b>GENERAL</b>		
1	T-001	PROJECT TITLE, JOB INFO, VICINITY MAP, LOCATION MAP, AND DRAWING INDEX
2	G-001	PROCESS SCHEMATIC
<b>CIVIL</b>		
3	C-001	CIVIL LEGEND
4	C-002	OVERALL EXISTING AND DEMOLITION PLAN
5	C-003	OVERALL SITE PLAN
<b>P&amp;IDs</b>		
6	P-001	LEGENDS, ABBREVIATIONS, AND SYMBOLS - 1
7	P-002	LEGENDS, ABBREVIATIONS, AND SYMBOLS - 2
8	P-003	LEGENDS, ABBREVIATIONS, AND SYMBOLS - 3
9	P-101	HEADWORKS FACILITY P&ID
10	P-201	ANOXIC BASIN
11	P-202	PREAERATION BASIN
12	P-203	MEMBRANE BIOREACTOR BASIN 1
13	P-204	PERMEATE COLLECTION
14	P-205	PRE-AERATION AND MEMBRANE BIOREACTOR TOWERS
15	P-206	ACID CLEANING
16	P-207	PH ADJUSTMENT
17	P-208	EQUIPMENT GALLERY PUMP STATION
18	P-209	WAS STORAGE AND STAND-BY BLOWERS
19	P-210	WAS STORAGE BASIN
20	P-211	WAS PUMPS
21	P-401	DISINFECTION AND IRRIGATION EQUALIZATION TANK P&ID
22	P-501	SUBSURFACE DRIP EFFLUENT DISPOSAL P&ID
23	P-601	GENERATOR BULK FUEL STORAGE P&ID
24	P-602	GENERATOR DAY TANK P&ID
25	P-603	STANDBY GENERATOR P&ID

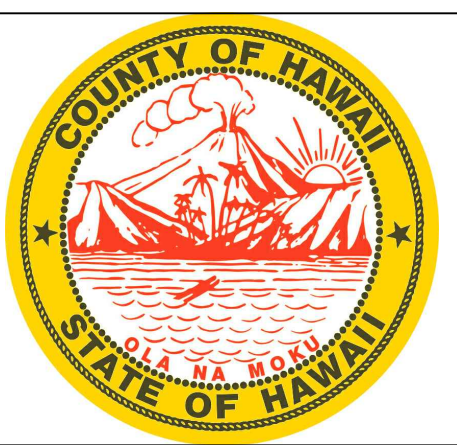
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

**DESIGN/BUILD DOCUMENTS**

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

**REVISIONS**

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:  
DRAWN:  
CHECKED:  
APPROVED:

FILENAME  
152964-G-001.DWG  
BC PROJECT NUMBER  
152964  
CLIENT PROJECT NUMBER

**GENERAL PROCESS SCHEMATIC**

DRAWING NUMBER  
**G-001**  
SHEET NUMBER OF  
2 OF 25

**SURVEY**

Survey Legend:

- Flowline
- Fence Line
- Overhead Line
- palm/coconut tree
- tree

Survey Abbreviations:

- ac asphalt
- cond concrete
- crm conduit
- elc electric utility pole
- ep edge of pavement
- jp joint pole (cable/elec/tele)
- rm3 reflective marker type 3
- tp telephone pole
- trav traverse point
- wm water meter
- wpru water pressure reducing unit

**GENERAL SYMBOLS**

- EXISTING EQUIPMENT OR MATERIAL TO BE REMOVED
- TO BE BUILT FOR FUTURE REMOVAL
- NEW FACILITIES (SOLID)
- EXISTING (OR SCREENED)
- PHOTO ARROW
- WATER SURFACE
- PROPERTY LINE, PHANTOM LINE OR MATCH LINE
- CENTERLINE
- HIDDEN LINE OR BURIED OR FUTURE IMPROVEMENTS

**PIPING SYSTEMS**

PIPING SYSTEMS ARE CALLED OUT BY SIZE FOLLOWED BY PIPING SYMBOL, ENCLOSED AS SHOWN.

EXISTING PIPING\* 12" DS

FUTURE PIPING 12" DS

PIPE SIZE

PIPING SYSTEM (SEE DRAWING \_\_\_\_ AND SEE SEC \_\_\_\_ OF SPECIFICATIONS)

\* PIPING SYSTEM DESIGNATIONS FOR EXISTING PIPE INDICATE TYPE OF SERVICE ONLY AND DO NOT IMPLY PIPE MATERIALS USED. SEE DWG \_\_\_\_ FOR EXISTING PIPING ABBREVIATIONS

**CIVIL**

NATURAL GROUND OR GRADE

GRANULAR MATERIAL SUCH AS CRUSHED ROCK OR GRAVEL

EDGE OF ASPHALT PAVEMENT IN PLAN

ASPHALT PAVEMENT IN SECTION

GRAVEL SURFACE OR ROADWAY

ASPHALT SURFACE OR ROADWAY

CONCRETE SURFACE, SLAB OR BLOCK

WATER MAIN INSPECTION

ASPHALT REMOVAL

DELINEATED WETLAND

WETLAND MITIGATION AREA

GENERAL TREE REMOVAL AREA

FENCE (EXISTING SCREENED)

EXISTING GRADE CONTOURS (OR SCREENED)

FINISH GRADE CONTOURS

EXISTING SPOT ELEVATION (OR SCREENED)

FINISH GRADE SPOT ELEVATION

TOP OF CURB ELEVATION

GUTTER OR GROUND ELEVATION

SWALE OR DEPRESSION

EDGE OF WATER; FLOWLINE WITH DIRECTIONAL ARROW

SLOPE (3 HOR TO 1 VERT), PLAN

SLOPE (3 HOR TO 1 VERT), SECTION

TREES

**GENERAL NOTES**

- THIS DRAWING IS GENERAL IN NATURE. SOME SYMBOLS SHOWN HEREON MAY NOT BE USED ON THE CONTRACT DRAWINGS.
- SEE OTHER DRAWINGS FOR ABBREVIATIONS AND ADDITIONAL SYMBOLS.
- SYMBOLS ARE ARRANGED ON SPECIFIC DRAWINGS AND IN CATEGORIES FOR CONVENIENCE ONLY; SYMBOLS MAY BE USED ON ANY OF THE CONTRACT DRAWINGS.
- PROTECTION OF THE ENVIRONMENT:** NO CONSTRUCTION RELATED ACTIVITY SHALL CONTRIBUTE TO THE DEGRADATION OF THE ENVIRONMENT, ALLOW MATERIAL TO ENTER SURFACE OR GROUND WATERS, OR ALLOW PARTICULATE EMISSIONS TO THE ATMOSPHERE, WHICH EXCEED STATE OR FEDERAL STANDARDS. ANY ACTIONS THAT POTENTIALLY ALLOW A DISCHARGE TO STATE WATERS MUST HAVE PRIOR APPROVAL OF THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY.

**FACILITY NUMBERING SYSTEM**

100	HEADWORKS FACILITY
200	MEMBRANE BIOREACTOR (OAE)
300	CHLORINE CONTACT TANK (OPT)
400	IRRIGATION EQUALIZATION TANK
500	SUBSURFACE DRIP EFFLUENT DISPOSAL SYSTEM
600	OPERATIONS BUILDING/STANDBY GENERATOR
700	POTABLE WATER TANK

**PIPING SYSTEM IDENTIFICATION**

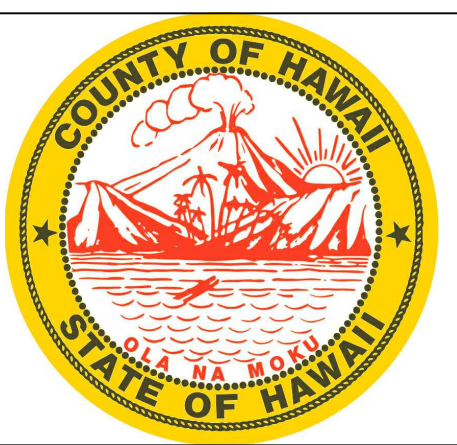
A	AERATION AIR	MES	METHANOL SOLUTION
AA	AGITATION AIR	MET	METHANOL
ACH	ALUMINUM CHLOROHYDRATE	ML	MIXED LIQUOR
AFE	AIR FLOTATION EFFLUENT	MS	MIXED SLUDGE
AL	ALUM	MSG	MEDIUM PRESSURE SLUDGE GAS
ASC	ASCORBIC ACID	NG	NATURAL GAS
BC	BIOFILTER CIRCULATION	OF	OVERFLOW
BCTL	BOILER CHEMICAL TREATMENT, LOW PRESSURE	OLP	OXYGEN LOW PRESSURE
BCTM	BOILER CHEMICAL TREATMENT, MEDIUM PRESSURE		
BDL	BOILER BLOWDOWN, LOW PRESSURE	PA	PREAERATION AIR
BDM	BOILER BLOWDOWN, MEDIUM PRESSURE	PD	PUMPED DRAINAGE
BFE	BOILER EFFLUENT	PE	PRIMARY EFFLUENT
BFL	BOILER FEEDWATER, LOW PRESSURE	PF	PRESSURIZATION FLOW
BFM	BOILER FEEDWATER, MEDIUM PRESSURE	PLE	PLANT EFFLUENT
BS	BLENDED SLUDGE	POL	POLYMER
BWW	BACK WASH WASTE	PRP	PROPANE
CCW	CONDENSER COOLING WATER	PS	PRIMARY SLUDGE
CD	CHEMICAL DRAIN	PSC	PRIMARY SCUM
CEN	CENTRATE	RAS	RETURN ACTIVATED SLUDGE
CL	CONDENSATE, LOW PRESSURE	RS	RAW SEWAGE
CLA	CLASS A RECLAIMED WATER	RW	RAW WATER
CLG	CHLORINE GAS	RWP	RAINWATER PIPE
CLL	CHLORINE LIQUID	RWR	RECLAIMED WATER (CLASS B, C, OR D)
CLS	CHLORINE SOLUTION	SA	SERVICE AIR
CLV	CHLORINE VACUUM	SCC	SCREENINGS
CM	CONDENSATE, MEDIUM PRESSURE	SCR	STEAM CLEAN RINSE
CS	CIRCULATING SLUDGE	SCS	STEAM CLEAN SUPPLY
CSE	COAGULATED SECONDARY EFFLUENT	SDR	SANITARY DRAIN
D	DRAIN	SE	SECONDARY EFFLUENT
DC	DIGESTER CLEANING	SG	SEPTAGE
DCR	DIGESTER CLEANING RETURN	SN	SUPERNATANT
DIW	DEIONIZED WATER	SPW	SPRAY WATER
DMS	DIGESTER MIXING SLUDGE	SS	SANITARY SEWAGE
DR	FOUL AIR DRAIN	SSC	SECONDARY SCUM
DS	DIGESTED SLUDGE	STA	STARTING AIR
DSF	DIESEL FUEL	STD	STORM DRAIN
DSS	SCREENED DIGESTED SLUDGE	SW	SEAL WATER
DW	DISTILLED WATER	TBSR	THICKENED BOTTOM SLUDGE RETURN
EE	ENGINE EXHAUST	TD	TANK DRAIN
ES	EQUALIZED SLUDGE	TE	THICKENER EFFLUENT
F	FLOAT	THS	THICKENED SLUDGE
FA	FOUL AIR	TO	THICKENER OVERFLOW
FD	FOUNDATION DRAIN	TPS	THICKENED PRIMARY SLUDGE
FLT	FILTRATE	TS	TRANSFER SLUDGE
FOR	FUEL OIL RETURN	TWS	TEMPERED WATER SYSTEM
FOS	FUEL OIL SUPPLY	TWAS	THICKENED WASTE ACTIVATED SLUDGE
FP	FIRE PROTECTION	V/VTR	VENT OR VENT TO ROOF
FS	FLOTATION SLUDGE	VA	VACUUM
FSE	FILTERED SECONDARY EFFLUENT	VC	CHEMICAL VENT
FTW	FILTER TO WASTE	VP	PETROLEUM VENT
GC	GAS CIRCULATION	WAS	WASTE ACTIVATED SLUDGE
GLR	GLYCOL RETURN	WML	WASTE MIXED LIQUOR
GLS	GLYCOL SUPPLY		
GT	GRIT		
HOCL	SODIUM HYPOCHLORITE		
HRR	HEAT RESERVOIR RETURN	1W	POTABLE WATER (COUNTY WATER)
HRS	HEAT RESERVOIR SUPPLY	1WS	POTABLE SOFT WATER
HSG	HIGH PRESSURE SLUDGE GAS	2HW	NONPOTABLE HOT WATER
HW	DOMESTIC POTABLE HOT WATER	2W	NONPOTABLE COUNTY WATER
HWR	LOW TEMPERATURE HEATING RETURN	2WL	LANDSCAPE IRRIGATION
HWS	LOW TEMPERATURE HEATING SUPPLY	3W	NO.3 WATER (SECONDARY EFFLUENT)
IA	INSTRUMENT AIR	3WHP	NO.3 WATER HIGH PRESSURE
JWR	JACKET WATER RETURN	3WLC	NO.3 WATER LOW PRESSURE CHLORINATED
JWS	JACKET WATER SUPPLY	3WLP	NO.3 WATER LOW PRESSURE
LA	LABORATORY AIR	3WS	NO.3 SPRAY WATER
LOW	LUBE OIL WASTE	4W	LANDSCAPING IRRIGATION
LSG	LOW PRESSURE SLUDGE GAS	SPW	NO. 3 SPRAY WATER
LV	LABORATORY VACUUM		



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**REVISIONS**

REV	DATE	DESCRIPTION

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CHECKED:  
CHECKED:  
APPROVED:

FILENAME	152964-C-001_CIVIL_LEGEND.DWG
BC PROJECT NUMBER	152964
CLIENT PROJECT NUMBER	

**CIVIL CIVIL LEGEND**

DRAWING NUMBER	<b>C-001</b>
SHEET NUMBER	<b>3</b>
OF	<b>25</b>

COUNTY OF HAWAII Seal.jpg  
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**GENERAL NOTES**

1. ALL OTHER UTILITIES AND SITE FEATURES OUTSIDE OF THE DEMOLITION LIMITS OF WORK SHALL BE CONSIDERED "EXISTING TO REMAIN" UNLESS NOTED OTHERWISE. ALL STRUCTURES, UTILITIES AND APPURTENANCES, AND FACILITIES THAT REMAIN, PERMANENTLY OR TEMPORARILY, SHALL BE PROTECTED FROM DAMAGE. CONTRACTOR SHALL REPAIR OR REPLACE EXISTING UTILITIES THEY DAMAGE AT ITS OWN EXPENSE. FIELD LOCATED UTILITIES THAT REMAIN PRIOR TO DEMOLITION ACTIVITIES.
2. CONTRACTOR SHALL DEMOLISH, REMOVE OR ABANDON IN-PLACE ALL STRUCTURES, TREES, UTILITIES, AND OTHER SITE FEATURES THAT HAVE BEEN IDENTIFIED FOR DEMOLITION. THE CONTRACTOR SHALL PREPARE THE BID BASED ON A THOROUGH SITE RECONNAISSANCE CONDUCTED AFTER THE ADVERTISING DATE. ABSENCE OF OBJECT FROM THESE SHEETS DOES NOT RELIEVE THE CONTRACTOR FROM THE OBLIGATION TO REMOVE MATERIALS OR STRUCTURES NOT TO REMAIN WITHIN DEMOLITION LIMITS.

**GENERAL NOTES (CONT)**

3. COORDINATE DEMOLITION OF EXISTING UTILITIES WITH NEW INSTALLATIONS, AS APPLICABLE. CONTRACTOR SHALL INSTALL TEMPORARY OR PERMANENT STORMWATER DRAINAGE FACILITIES, INCLUDING BYPASS PIPELINES AND OUTFALLS, TO CONTROL SURFACE WATER RUNOFF PRIOR TO DEMOLITION OF EXISTING STORM DRAINAGE FACILITIES.
4. CONTRACTOR IS RESPONSIBLE FOR STORMWATER MANAGEMENT AND EROSION CONTROL FOR THIS CONTRACT AT ALL TIMES DURING CONSTRUCTION. THE CONTRACTOR SHALL SEQUENCE DEMOLITION AND CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH EROSION AND SEDIMENT CONTROL SHEETS AND SPECIFICATIONS OF THE CONTRACT DOCUMENTS.

**KEY NOTES**

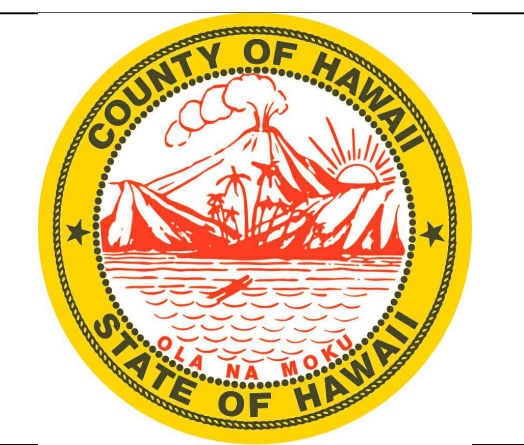
1. CONTRACTOR SHALL REMOVE ABOVE AND BELOW GRADE STRUCTURES, UTILITIES, TREES, AND PAVEMENT WITHIN THE DEMOLITION LIMITS OF WORK AS NEEDED TO COMPLETE THE PROJECT. THE MATERIALS TO BE ABANDONED IN-PLACE OR DEMOLISHED AND REMOVED INCLUDE, BUT ARE NOT LIMITED TO, UNDERGROUND OR AT GRADE IRRIGATION PIPING AND FIXTURES, ASPHALT PAVEMENT, ELECTRICAL WIRING, VEGETATION, SIGNS, UTILITIES, AND MISCELLANEOUS DEBRIS. PORTIONS OF EXISTING ORCHARD SHALL BE "EXISTING TO REMAIN."
2. REMOVE AC PAVEMENT AND DRIVEWAY APRON. PROVIDE A VERTICAL FULL DEPTH SAW CUT ALONG MAILE STREET OUTSIDE OF THE TRAVEL WAY.
3. REMOVE TWO PINE TREES AND CLEAR AND GRUB FOR NEW DRIVEWAY APRON.
4. REMOVE UNPAVED ROAD BED.
5. FIELD VERIFY AND REMOVE IRRIGATION APPURTENANCE. COORDINATE WITH LOT 1 OWNER FOR RELOCATION OF WATER SERVICE TO LOT 1.
6. TRENCHING FOR UTILITY POINT OF CONNECTIONS.



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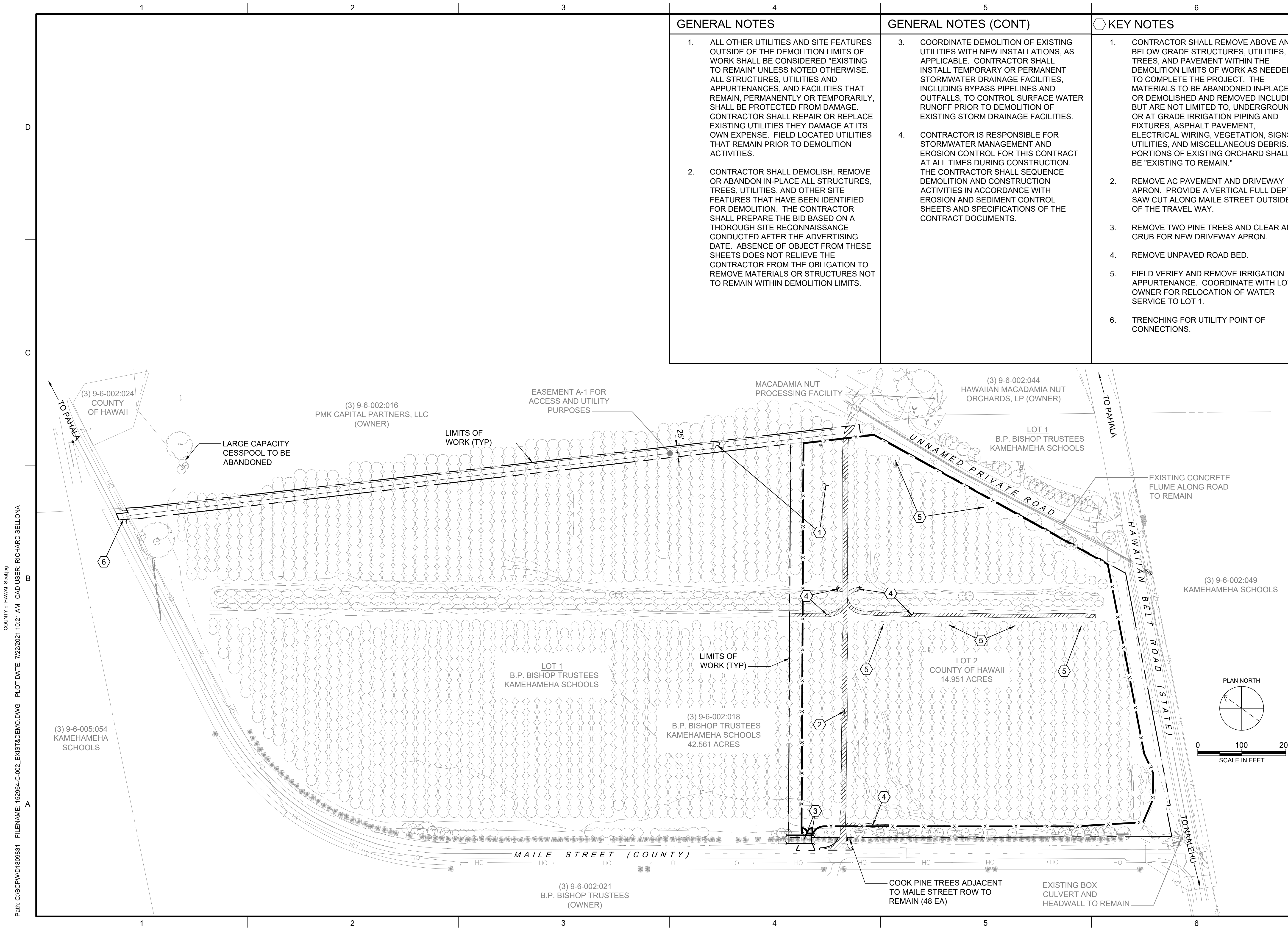
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 APPROVED: \_\_\_\_\_

FILENAME
152964-C-002_EXIST&DEMO.DWG
BC PROJECT NUMBER
152964
CLIENT PROJECT NUMBER

**CIVIL OVERALL EXISTING AND DEMOLITION PLAN**

DRAWING NUMBER  
**C-002**  
SHEET NUMBER OF  
**4** OF **25**



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 COUNTY OF HAWAII Seal.jpg

COUNTY OF HAWAII Seal.jpg  
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PROCESS AREA	
100	HEADWORKS
200	MEMBRANE BIOREACTOR (OAE)
300	CHLORINE CONTACT TANK (OPT)
400	IRRIGATION EQUALIZATION TANK
500	EFFLUENT DISPOSAL
600	UTILITY BUILDING
700	POTABLE WATER TANK

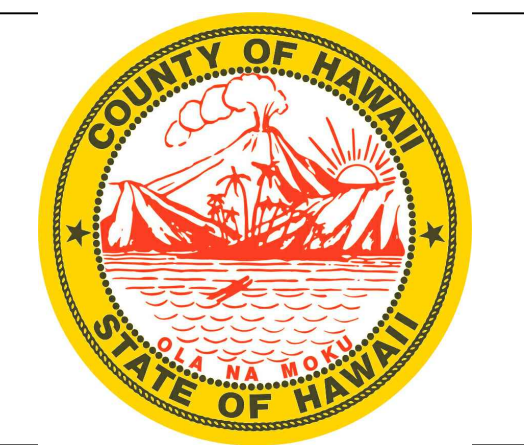
- GENERAL NOTES**
- SEE CIVIL LEGEND FOR FACILITY NAMES.
  - SEE TYPICAL ROADWAY SECTION SHEETS.
  - MEMBRANE BIOREACTOR OR APPROVED EQUIVALENT SECONDARY TREATMENT SYSTEM (OAE).

- KEY NOTES**
- PAD MOUNT ELECTRICAL TRANSFORMER.
  - BULK FUEL STORAGE TANK.
  - 6' CHAIN LINK FENCE.
  - POINT OF CONNECTION AREA FOR ELECTRICAL SERVICE AND RAW SEWER CONVEYANCE.



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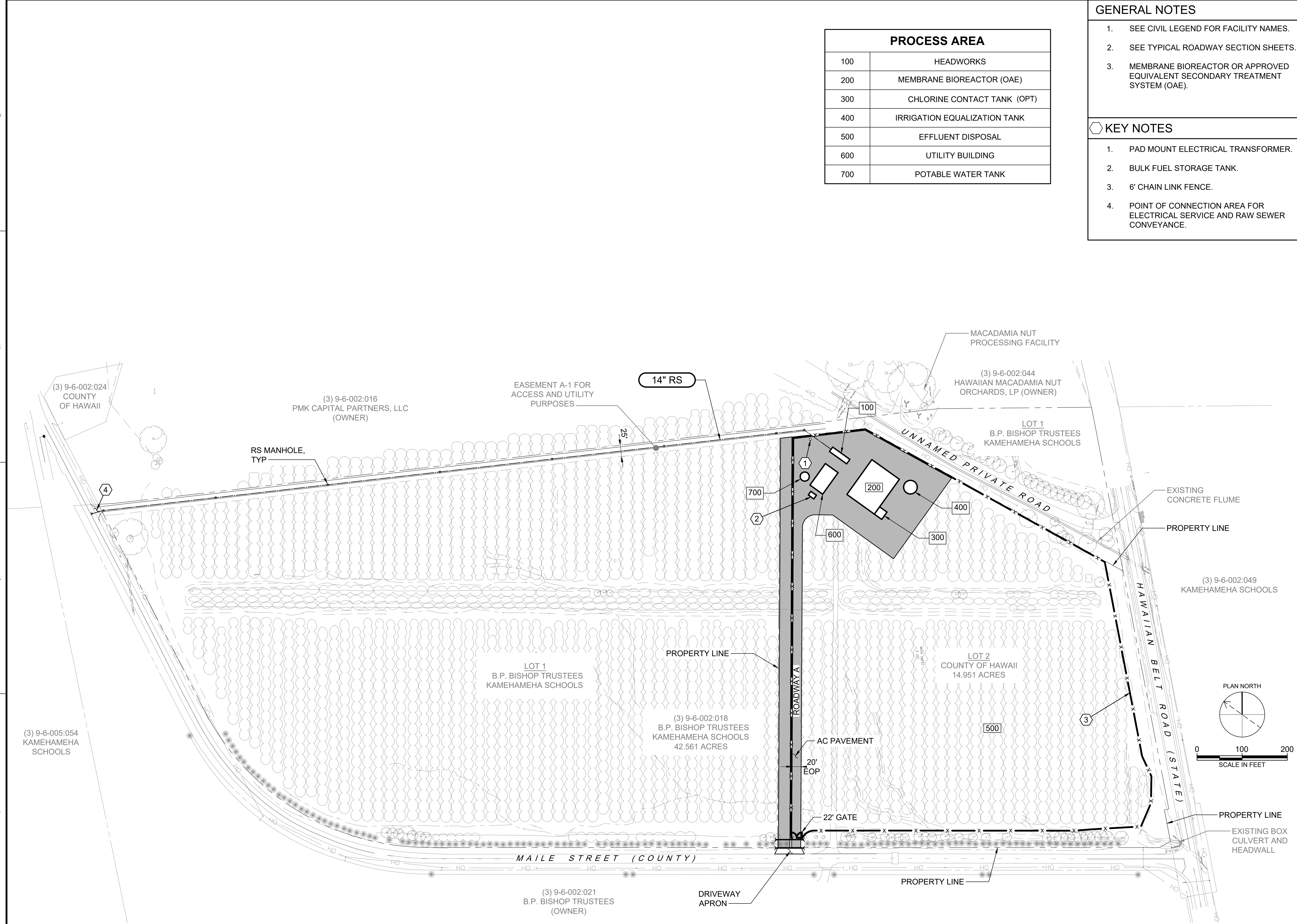
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152964-C-003\_SITE.DWG  
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**CIVIL OVERALL SITE PLAN**

DRAWING NUMBER  
**C-003**  
 SHEET NUMBER OF  
5 OF 25



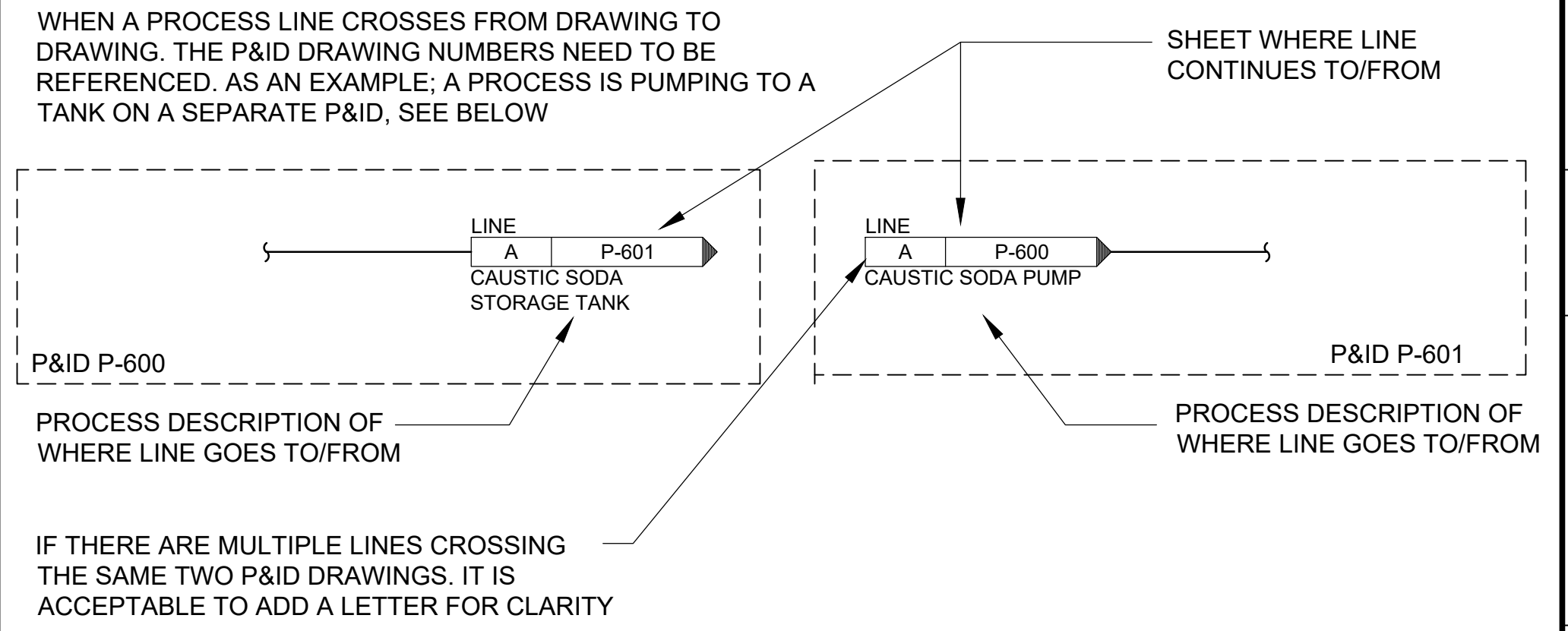
FUNCTIONAL IDENTIFICATION

VARIABLE	MEASURED OR INITIATING VARIABLE DESCRIPTION	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C	CONDUCTIVITY			CONTROL	CLOSE
D	DENSITY, SPECIFIC GRAVITY	DIFFERENTIAL			DEVIATION
E	VOLTAGE, SOLENOID		PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO			
G	FIRE, SMOKE		GLASS		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER		SCAN		
K	TIME, SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOISTURE, HUMIDITY, MOTION	MOMENTARY			MIDDLE, INTERMEDIATE
N	EQUIPMENT STATUS				
O	DISSOLVED OXYGEN		ORIFICE		OPEN
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		RUN
S	SPEED, FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE, TORQUE		WELL, PROBE		
X	UNCLASSIFIED	X AXIS			
Y	EVENT, STATE OR PRESENCE	Y AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, FINAL CONTROL ELEMENT	

INSTRUMENT SIGNAL LINES

- INSTRUMENT SUPPLY, PROCESS TAPS
- - - ELECTRICAL SIGNAL (ANALOG OR DISCRETE)
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ~ ELECTROMAGNETIC OR SONIC SIGNAL (UNGUIDED)
- - - SOFTWARE OR DATA LINK
- ES >— ELECTRIC POWER SUPPLY 120 VAC 60 HZ UNLESS OTHERWISE NOTED. (e.g. ES-480 VAC)

PROCESS AND SIGNAL CROSS REFERENCE SYSTEM



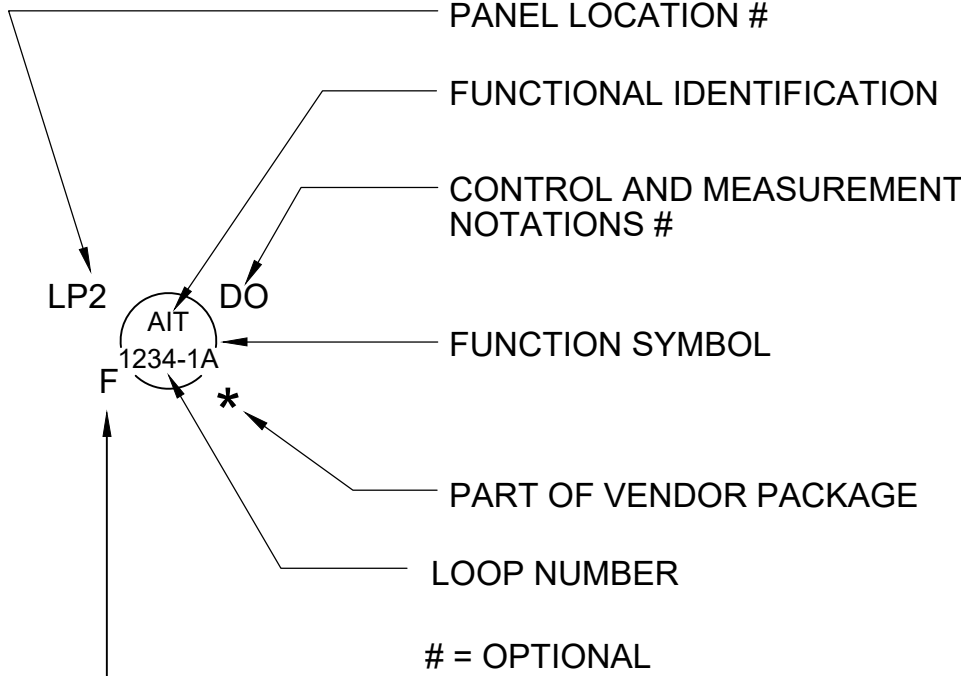
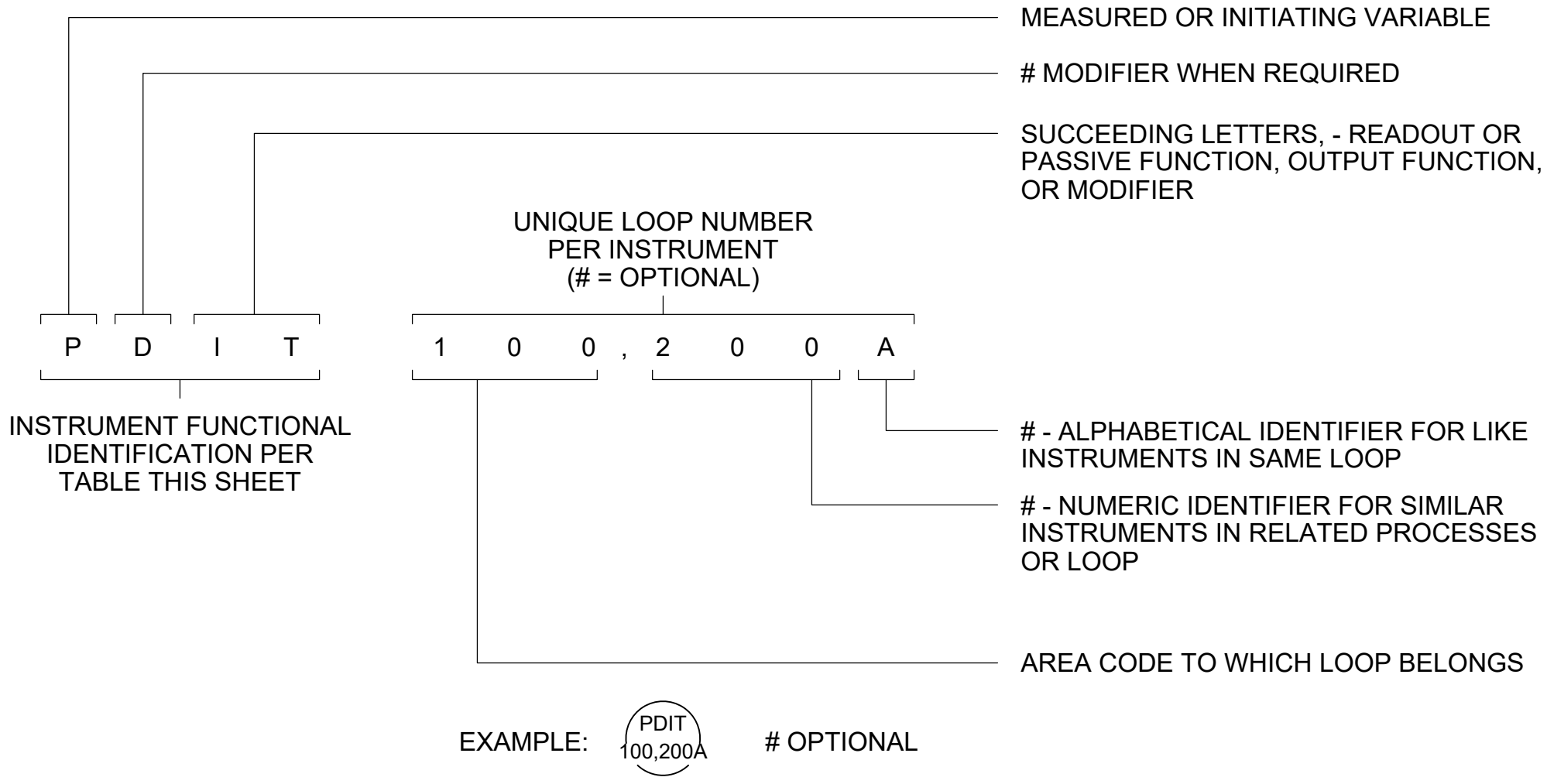
TYPICAL INSTRUMENT IDENTIFICATION

AREA CODE	
CODE	DESCRIPTION
100	HEADWORKS
200	MEMBRANE BIOREACTOR (OAE)
300	CHLORINE CONTACT TANK
400	IRRIGATION EQUALIZATION TANK
500	SUBSURFACE DRIP EFFLUENT DISPOSAL SYSTEM
600	OPERATIONS BUILDING
700	POTABLE WATER TANK

PROCESS LINES

- NEW PRIMARY PROCESS FLOW
- NEW SECONDARY PROCESS FLOW
- NEW UTILITY PROCESS FLOW
- - - FUTURE
- EXISTING PROCESS FLOW, EQUIPMENT, OR SIGNAL PATH (SCREENED)
- NEW/EXISTING CONNECTIONS
- - - TEMPORARY PIPING
- - - PROCESS AREA
- - - VENDOR PACKAGE BOUNDARY

INSTRUMENT TAG AND LOOP IDENTIFICATION



CONTROL AND MEASUREMENT NOTATIONS

- |     |                       |     |                           |
|-----|-----------------------|-----|---------------------------|
| 1/0 | START/STOP            | OP  | OPEN                      |
| ACK | ACKNOWLEDGE           | OSC | OPEN/STOP/CLOSE           |
| AM  | AUTO/MAN              | PAL | LOW PRESSURE              |
| BYP | BYPASS                | PB  | PUSH BUTTON               |
| CL  | CLOSE                 | pH  | pH                        |
| CL2 | CHLORINE              | POT | POTENTIOMETER             |
| DS  | DISCONNECT SWITCH     | RDY | READY                     |
| ESP | EMERGENCY STOP        | RNG | RUNNING                   |
| FLT | FAULT                 | ROF | REVERSE/OFF/FORWARD       |
| FWD | FORWARD               | RST | RESET                     |
| F/R | FORWARD/REVERSE       | SP  | STOP                      |
| F/S | FAST/SLOW             | ST  | START                     |
| HOA | HAND/OFF/AUTO         | TBL | TROUBLE                   |
| HOR | HAND/OFF/REMOTE       | UVT | ULTRAVIOLET TRANSMITTANCE |
| LCS | LOCAL CONTROL STATION | UVI | ULTRAVIOLET INTENSITY     |
| LL  | LEAD/LAG              | VCP | VENDOR CONTROL PANEL      |
| LOR | LOCAL/OFF/REMOTE      |     |                           |
| LOS | LOCKOUT STOP          |     |                           |
| L/R | LOCAL/REMOTE          |     |                           |
| OAC | OPEN/CLOSE/AUTO       |     |                           |
| OC  | OPEN/CLOSE            |     |                           |
| OCV | PURGE VALVE           |     |                           |
| OL  | OVERLOAD              |     |                           |

EQUIPMENT IDENTIFICATION SYSTEM

- RAPID MIXER • EQUIPMENT NAME
- MX 210,101 • EQUIPMENT NUMBER
- SPEC: 46 41 11 • SPECIFICATION REFERENCE

NETWORK TYPE	
E	ETHERNET
M-TCP	MODBUS TCP

- Typical Analog Hardwired I/O Grouping: FIC, FY
- Typical Discrete Hardwired I/O Grouping: FAL, EY

GENERAL NOTES:

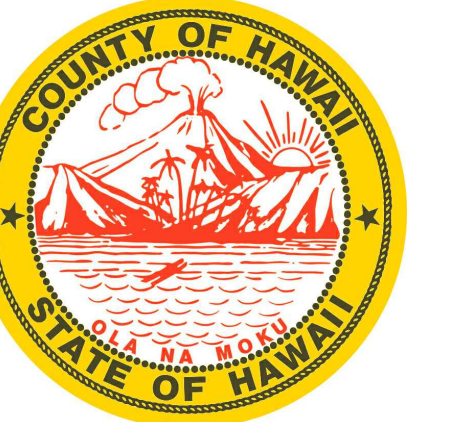
- THIS DRAWING IS GENERAL IN NATURE. SOME SYMBOLS AND IDENTIFICATIONS SHOWN HEREON MAY NOT BE USED ON THE CONTRACT DRAWINGS.
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

DESIGNED: \_\_\_\_\_  
DRAWN: \_\_\_\_\_  
CHECKED: \_\_\_\_\_  
CHECKED: \_\_\_\_\_  
APPROVED: \_\_\_\_\_

FILENAME: P-001.DWG  
BC PROJECT NUMBER: 152964  
CLIENT PROJECT NUMBER: \_\_\_\_\_

P&IDS LEGENDS, ABBREV., SYMBOLS - 1

DRAWING NUMBER  
**P-001**

SHEET NUMBER OF  
**6** OF **25**

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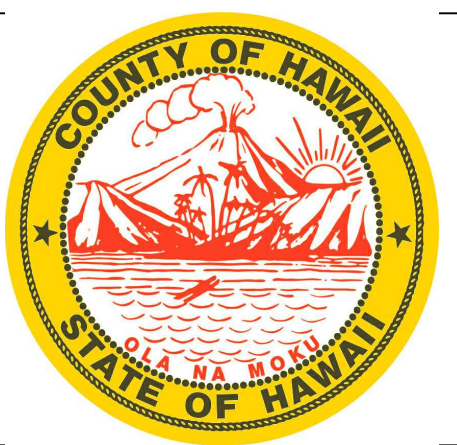
1	2		3		4		5		6																																																																																	
MISCELLANEOUS SYMBOLS	PRIMARY ELEMENT SYMBOLS					VALVES																																																																																				
MCC (MOTOR CONTROL/STARTER) PURGE OR FLUSHING DEVICE RESET FOR LATCH-TYPE OPERATOR SEAL WATER CONTROL UNIT INTERLOCKING OR CONTROL FUNCTION INTRINSIC SAFETY BARRIER DISCRETE INPUT DISCRETE OUTPUT ANALOG INPUT ANALOG OUTPUT CAMERA (CCTV) VARIABLE FREQUENCY DRIVE VARIABLE SPEED DRIVE	ORIFICE PLATE VENTURI OR FLOW TUBE NOZZLE FLOW PITOT TUBE PROPELLER OR TURBINE METER FLUME WEIR VARIABLE AREA FLOW INDICATOR (ROTAMETER) DIAPHRAGM SEAL IN-LINE ANNULAR SEAL					MAGNETIC FLOWMETER SONIC FLOWMETER (DOPPLER OR TRANSIT TIME) POSITIVE DISPLACEMENT METER THERMAL FLOW ELEMENT VORTEX FLOW ELEMENT CORIOLIS FLOW ELEMENT FLOAT LEVEL ELEMENT ULTRASONIC LEVEL ELEMENT BUBBLER LEVEL TUBE SUBMERSIBLE LEVEL TRANSMITTER HYDROSTATIC LEVEL PROBE RADAR OR ULTRASONIC LEVEL ELEMENT					<table border="0"> <tr> <td>NORMALLY OPEN</td> <td>NORMALLY CLOSED</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>					NORMALLY OPEN	NORMALLY CLOSED																																																																									
NORMALLY OPEN	NORMALLY CLOSED																																																																																									
<b>ACTUATORS/MOTORS/POWER</b> ADJUSTABLE SPEED DRIVE (MECHANICAL) ROTARY PISTON ACTUATORS, VALVE OR GATE LINEAR PISTON ACTUATORS, VALVE OR GATE SOLENOID ACTUATOR, VALVE MANUAL OR HAND ACTUATOR, VALVE OR GATE (OR BLANK) MOTOR (ACTUATOR, VALVE, GATE OR EQUIPMENT) ENGINE EJECTOR, PNEUMATIC GENERATOR	<b>FUNCTION SYMBOLS</b> SHARED DISPLAY, PROCESS CONTROL SYSTEM SOFTWARE FUNCTIONALITY FIELD OR PANEL DEVICE <b>LOCATION AND ACCESSIBILITY MODIFIERS FOR FUNCTION SYMBOLS</b> STAND ALONE DEVICE, OPERATOR ACCESSIBLE LOCATED ON FRONT OF PANEL OR CONSOLE, OPERATOR ACCESSIBLE LOCATED IN REAR OF PANEL OR CONSOLE, OPERATOR INACCESSIBLE					<b>INSTRUMENTATION SYMBOLS</b> INTEGRAL INSTRUMENT CLOSE COUPLED INSTRUMENT SEPARATE OR REMOTE MOUNTED INSTRUMENT MULTI VARIABLE INSTRUMENT SEPARATE OR REMOTE MOUNTED INSTRUMENT SEPARATE OR REMOTE MOUNTED INSTRUMENT SEPARATE OR REMOTE MOUNTED INSTRUMENT SINGLE VARIABLE INSTRUMENT FLANGE OR ELEMENT TAPS PIPE TAPS COMBINATION TAPS					<b>SLIDE AND SLUICE GATES</b> <table border="0"> <tr> <td>NORMALLY OPEN</td> <td>NORMALLY CLOSED</td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </table>					NORMALLY OPEN	NORMALLY CLOSED																																																																									
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

**REVISIONS**

REV	DATE	DESCRIPTION

DESIGNED: \_\_\_\_\_  
 DRAWN: \_\_\_\_\_  
 CHECKED: \_\_\_\_\_  
 APPROVED: \_\_\_\_\_

FILENAME P-002.DWG
BC PROJECT NUMBER 152964
CLIENT PROJECT NUMBER

**P&IDS LEGENDS, ABBREV., SYMBOLS - 2**

DRAWING NUMBER <b>P-002</b>
SHEET NUMBER 7 OF 25

COUNTY OF HAWAII Seal.jpg  
 CAD USER: RICHARD SELLONA  
 PLOT DATE: 7/22/2021 10:55 AM  
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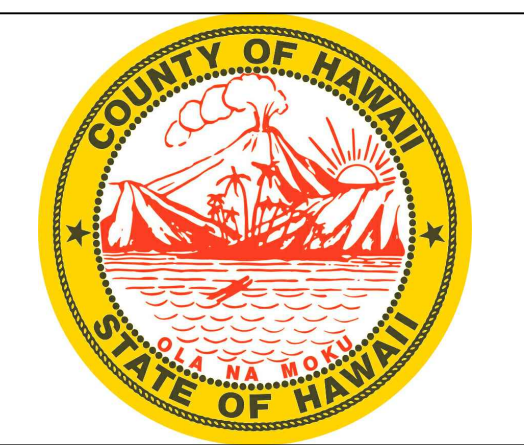
1	2	3	4	5	6												
<b>PUMPS</b>	<b>PIPE LINE DEVICES</b>			<b>HVAC RELATED</b>	<b>MIXERS</b>												
				<b>SCREENS AND CONVEYORS</b>													
<b>BLOWERS/COMPRESSORS</b>																	
		<b>SLIDE AND SLUICE GATES</b>															
		<table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">NORMALLY OPEN</th> <th style="width: 50%;">NORMALLY CLOSED</th> </tr> <tr> <td> FLAP GATE</td> <td> FLAP GATE</td> </tr> <tr> <td> BUTTERFLY GATE</td> <td> BUTTERFLY GATE</td> </tr> <tr> <td> STOP GATE</td> <td> STOP GATE</td> </tr> <tr> <td> SLIDE GATE</td> <td> SLIDE GATE</td> </tr> <tr> <td> SLUICE GATE</td> <td> SLUICE GATE</td> </tr> </table>		NORMALLY OPEN	NORMALLY CLOSED	FLAP GATE	FLAP GATE	BUTTERFLY GATE	BUTTERFLY GATE	STOP GATE	STOP GATE	SLIDE GATE	SLIDE GATE	SLUICE GATE	SLUICE GATE		
NORMALLY OPEN	NORMALLY CLOSED																
FLAP GATE	FLAP GATE																
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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

**REVISIONS**

REV	DATE	DESCRIPTION

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DESIGNED:  
DRAWN:  
CHECKED:  
CHECKED:  
APPROVED:

FILENAME: P-003.DWG  
BC PROJECT NUMBER: 152964  
CLIENT PROJECT NUMBER:

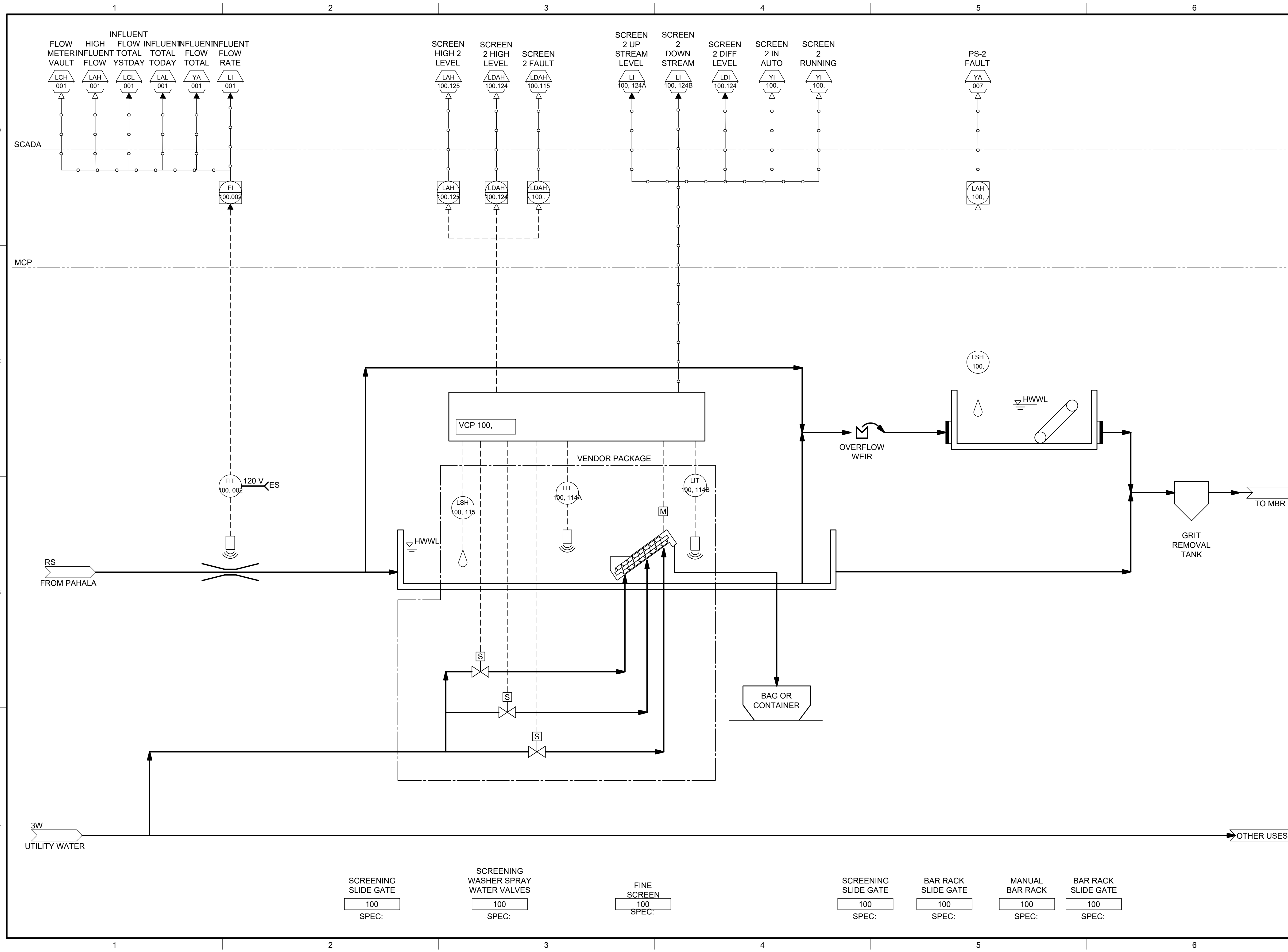
**P&IDS LEGENDS, ABBREV., SYMBOLS - 3**

DRAWING NUMBER  
**P-003**

SHEET NUMBER OF  
**8** OF **25**



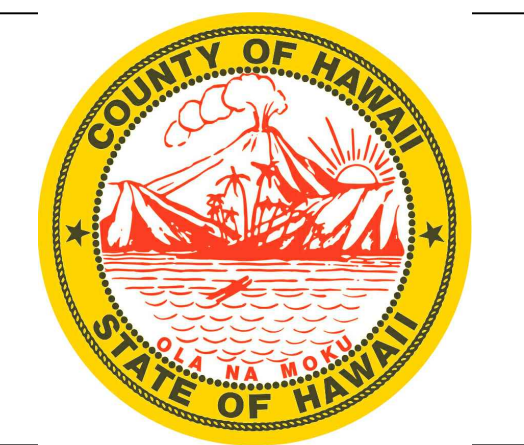
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WAILUKU, HAWAII

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS		
REV	DATE	DESCRIPTION

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 CHECKED:  
 CHECKED:  
 APPROVED:

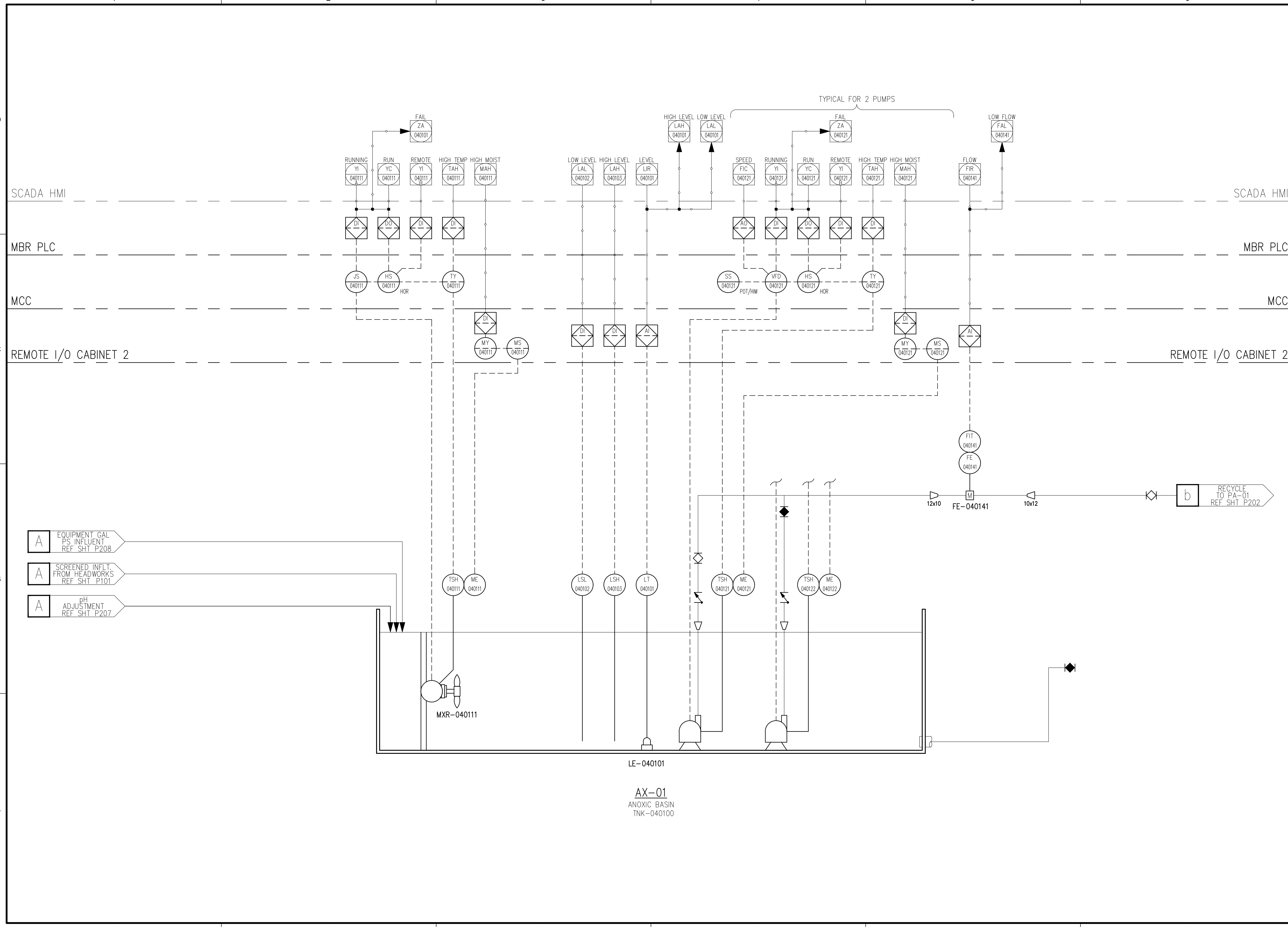
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P&IDS

HEADWORKS FACILITY P&ID

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 SHEET NUMBER OF: 9 OF 25

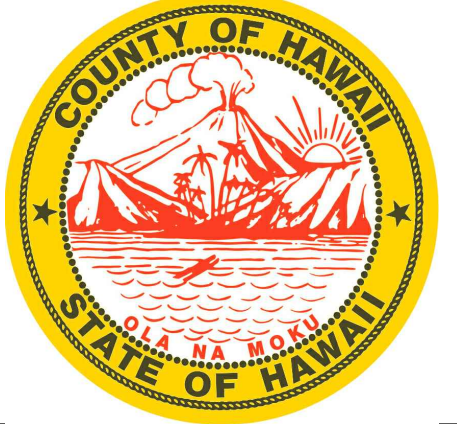
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

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REV	DATE	DESCRIPTION

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DESIGNED:  
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CHECKED:  
CHECKED:  
APPROVED:

FILENAME  
P-200 P&IDS.DWG  
BC PROJECT NUMBER  
151870  
CLIENT PROJECT NUMBER

**P&IDS ANOXIC BASIN**

DRAWING NUMBER  
**P-201**  
10 SHEET NUMBER OF 25

1 2 3 4 5 6

D

D

SCADA HMI

SCADA HMI

REMOTE I/O CABINET 2

REMOTE I/O CABINET 2

MCC

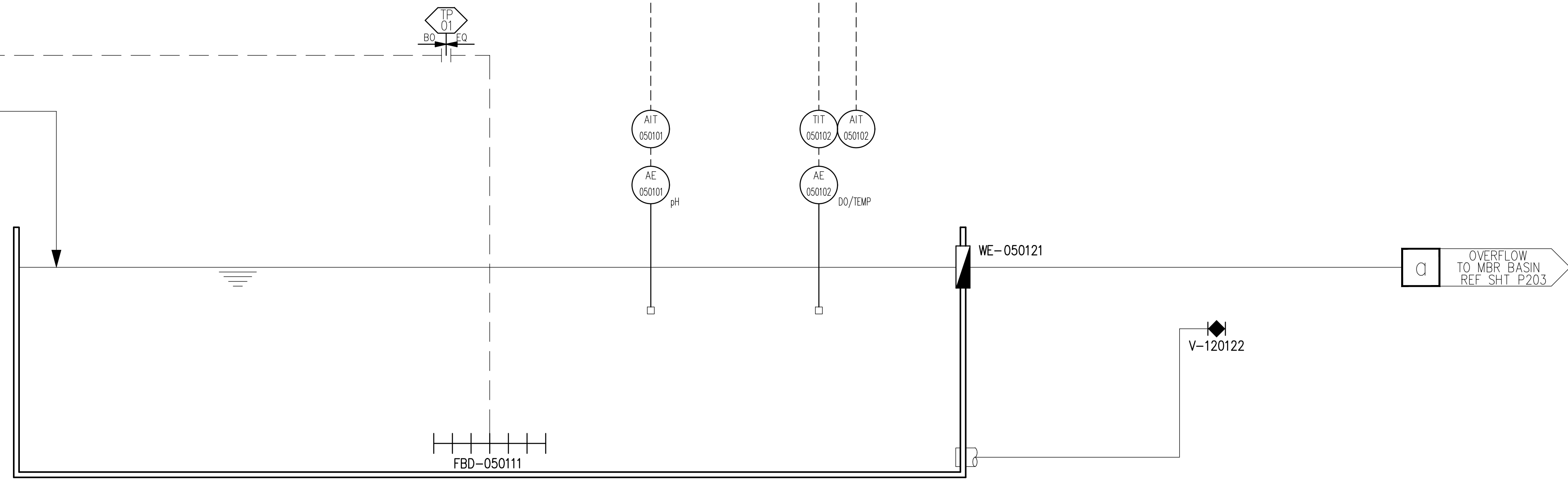
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C

C

A PROCESS AIR FROM BLOWERS REF SHT P205  
 B RECYCLE FROM AX-01 REF SHT P201

C OVERFLOW TO MBR BASIN REF SHT P203



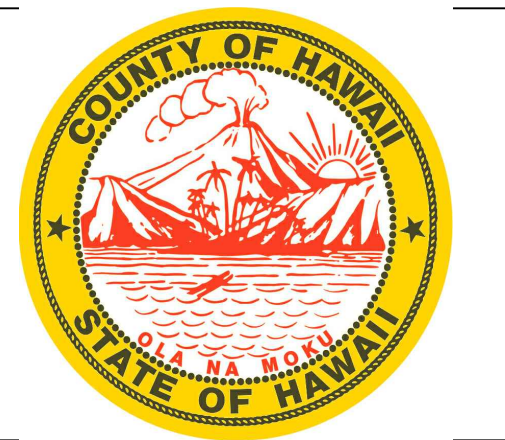
PA-01  
 PRE-AERATION BASIN  
 TNK-050100



2261 AUPUNI STREET, SUITE 201  
 WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:  
 DRAWN:  
 CHECKED:  
 CHECKED:  
 APPROVED:

FILENAME  
 P-200 P&IDS.DWG  
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P&IDS  
 PRE-AERATION BASIN

DRAWING NUMBER  
 P-202

11 SHEET NUMBER OF 25

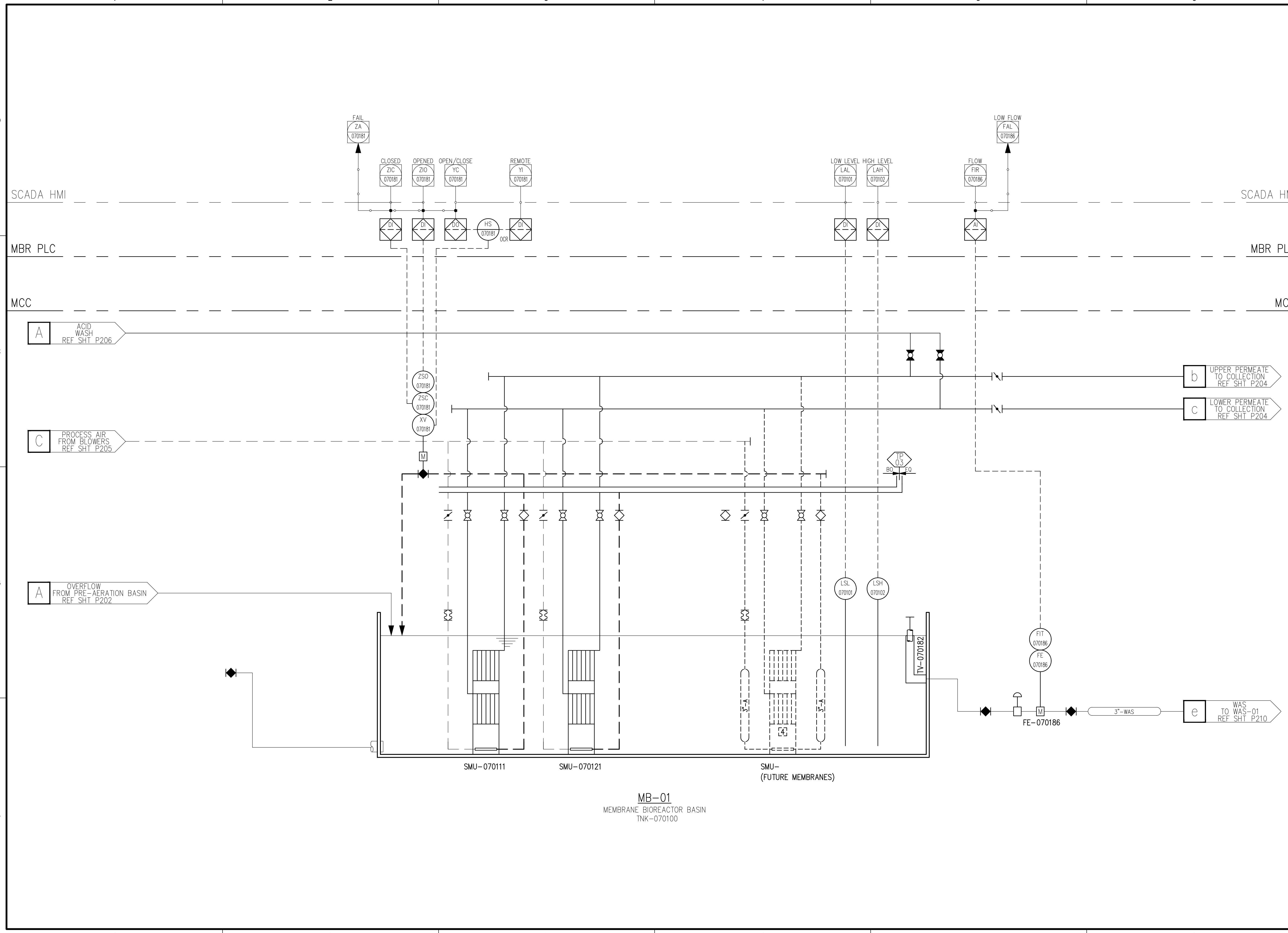
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A

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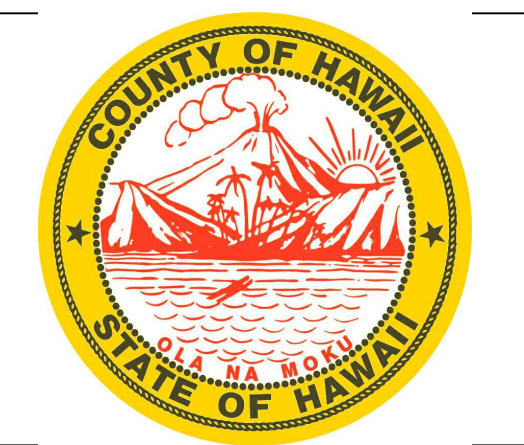
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

REVISIONS

REV	DATE	DESCRIPTION

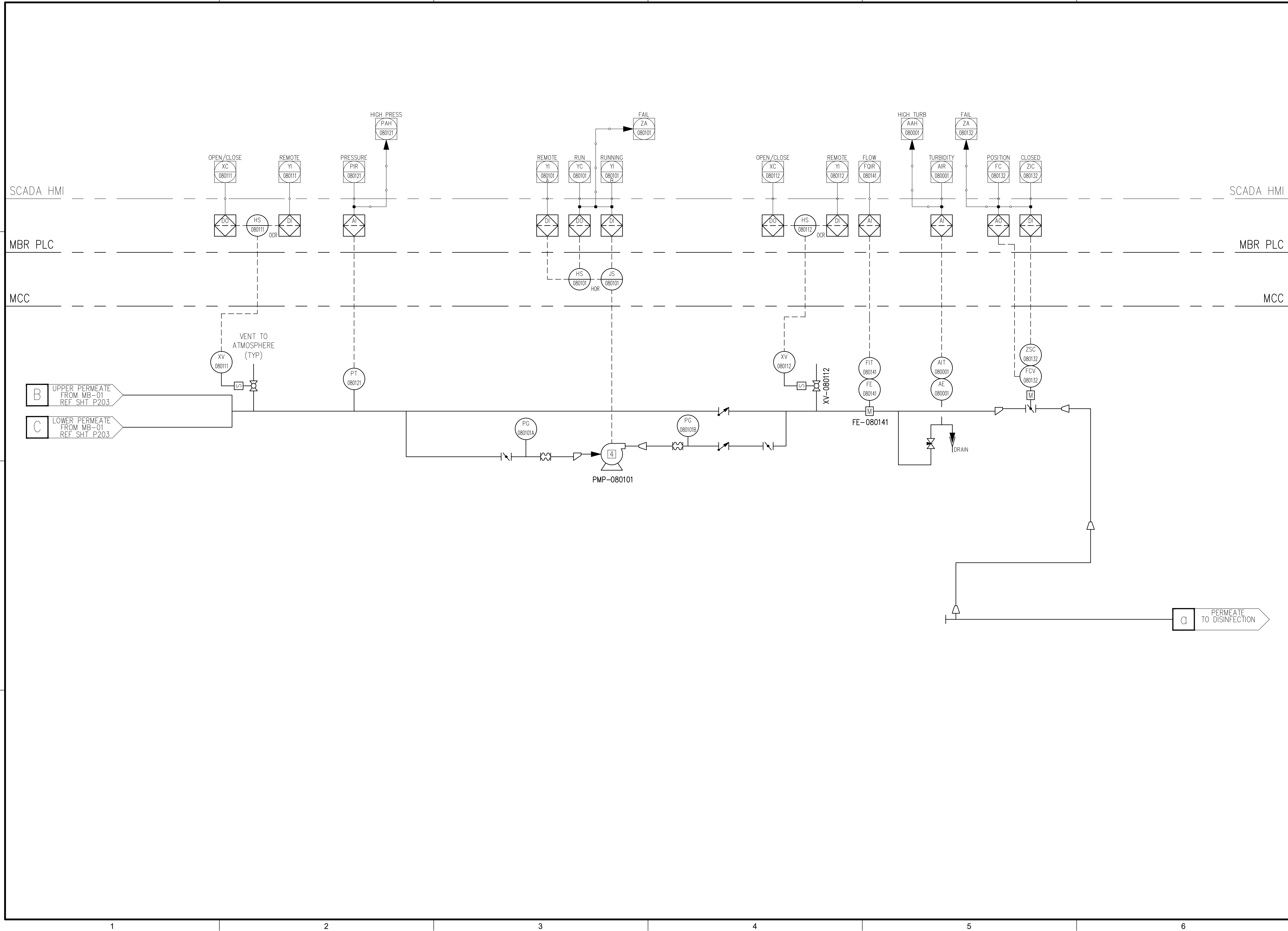
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LINE IS 2 INCHES AT FULL SIZE

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 BC PROJECT NUMBER: 151870  
 CLIENT PROJECT NUMBER: \_\_\_\_\_

**P&IDS MEMBRANE BIOREACTOR BASIN**

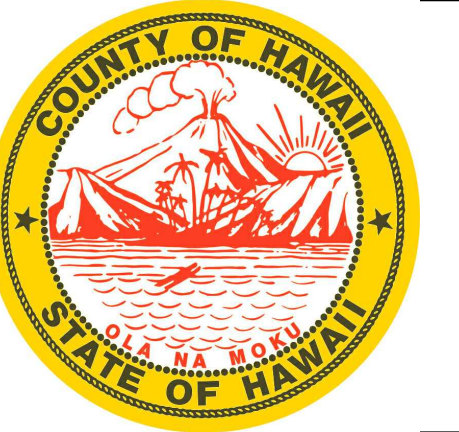
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD  
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PAHALA  
WASTEWATER  
TREATMENT PLANT  
DESIGN/BUILD  
DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES  
AT FULL SIZE

DESIGNED:  
DRAWN:  
CHECKED:  
CHECKED:  
APPROVED:

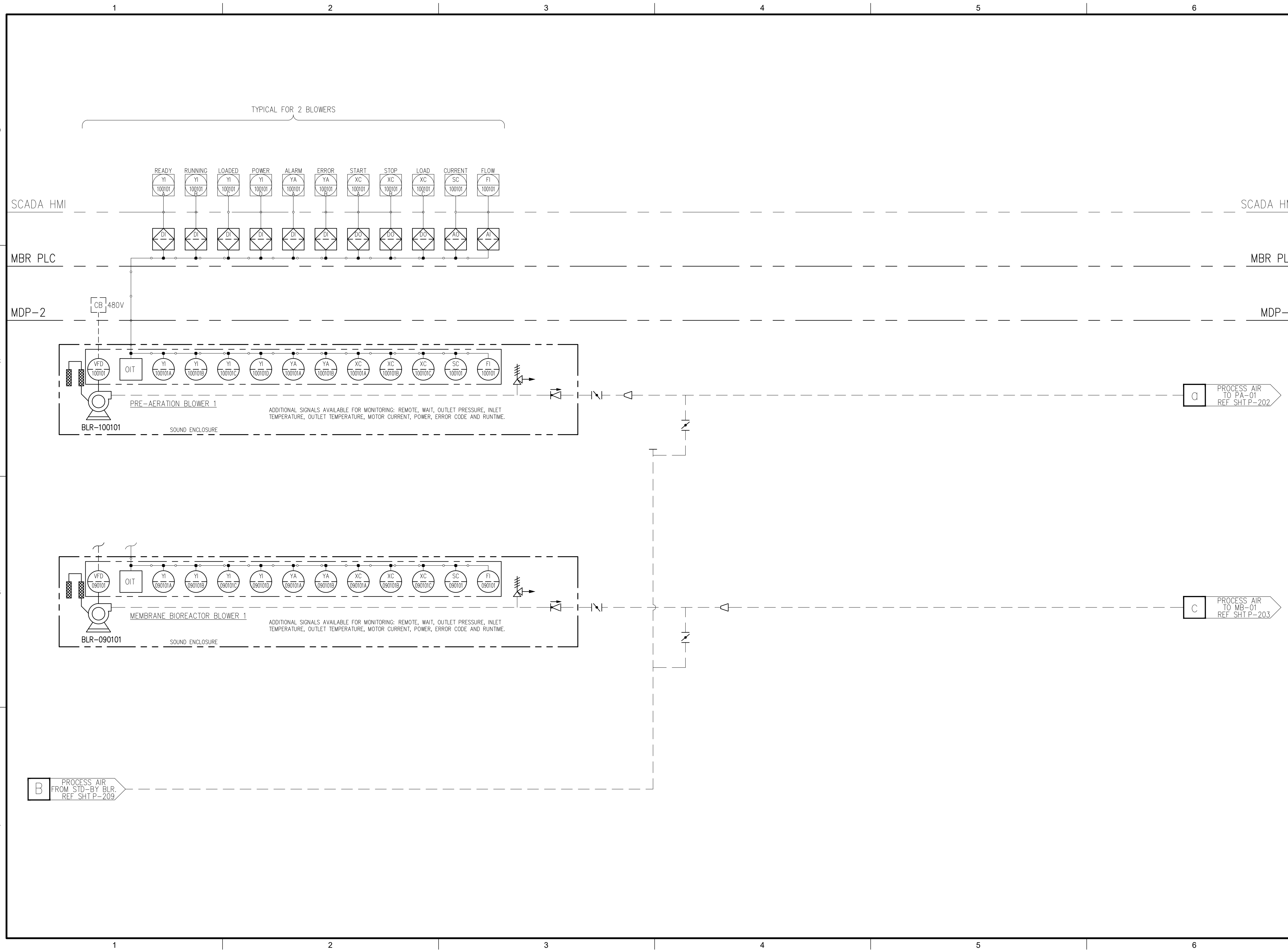
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P&IDS  
PERMEATE  
COLLECTION

DRAWING NUMBER  
**P-204**

13 SHEET NUMBER OF 25

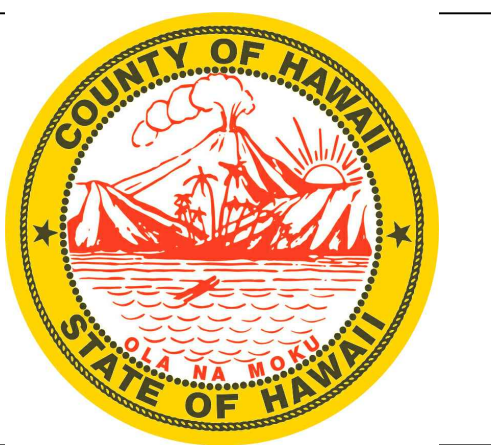
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD  
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PAHALA  
WASTEWATER  
TREATMENT PLANT  
DESIGN/BUILD  
DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES  
AT FULL SIZE

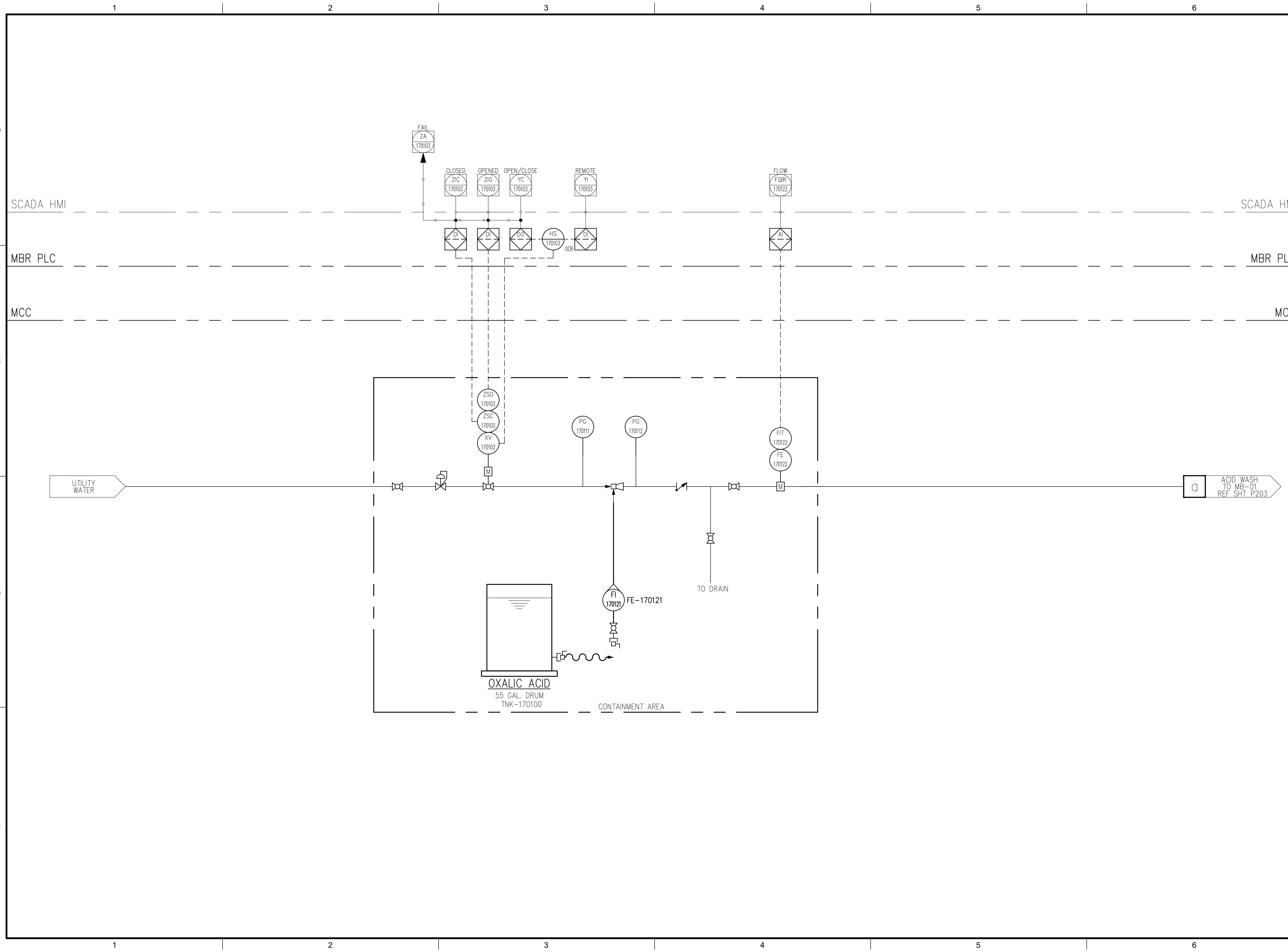
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BC PROJECT NUMBER  
151870  
CLIENT PROJECT NUMBER

P&IDS  
PRE-AERATION AND  
MEMBRANE  
BIOREACTOR  
TOWERS

DRAWING NUMBER  
**P-205**

14 SHEET NUMBER OF 25

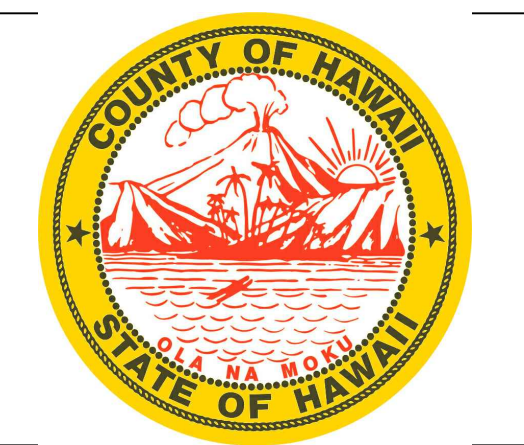
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2261 AUPUNI STREET, SUITE 201  
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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

REVISIONS

REV	DATE	DESCRIPTION

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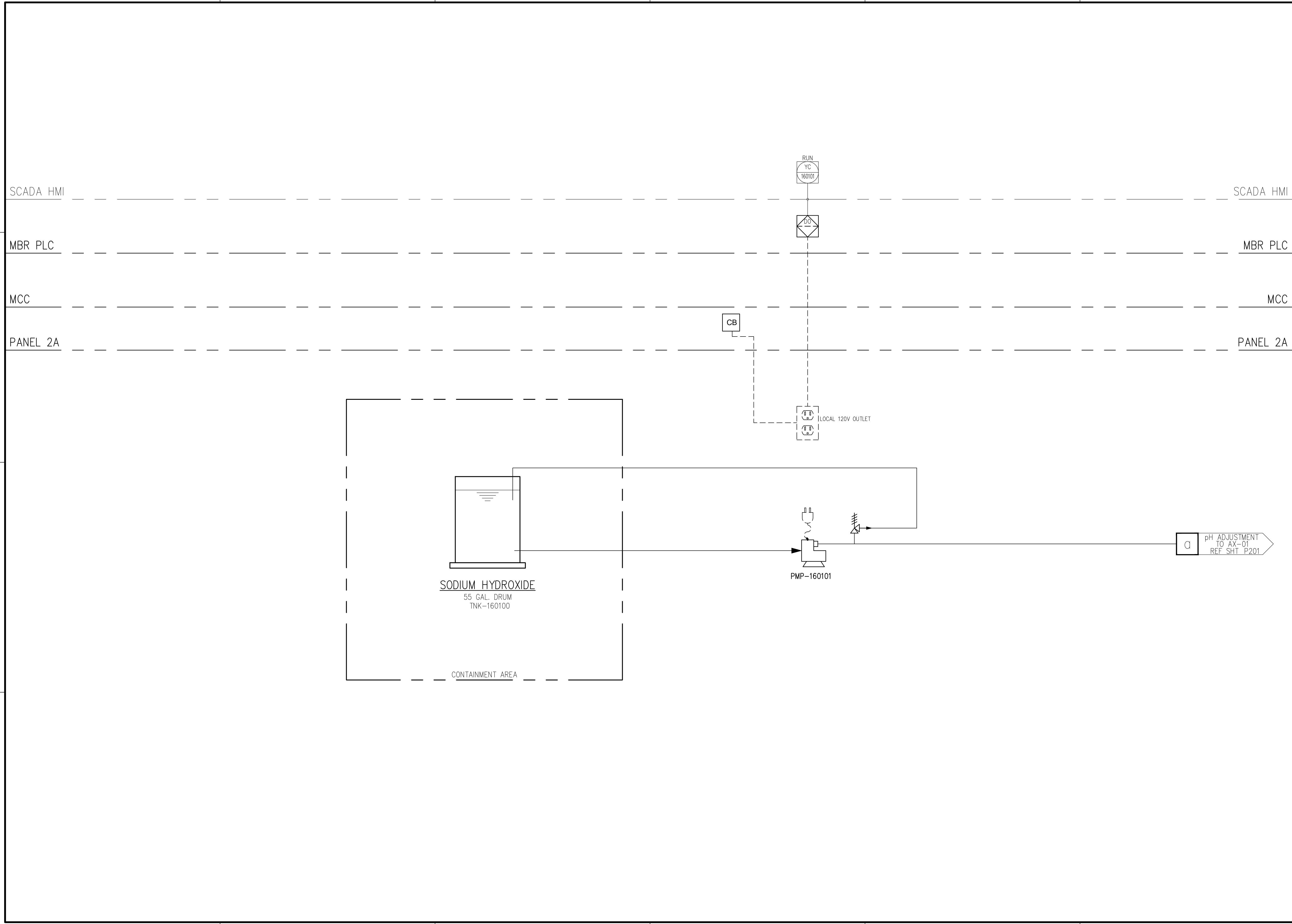
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151870  
CLIENT PROJECT NUMBER

**P&IDS ACID CLEANING**

DRAWING NUMBER  
**P-206**

15 SHEET NUMBER OF 25

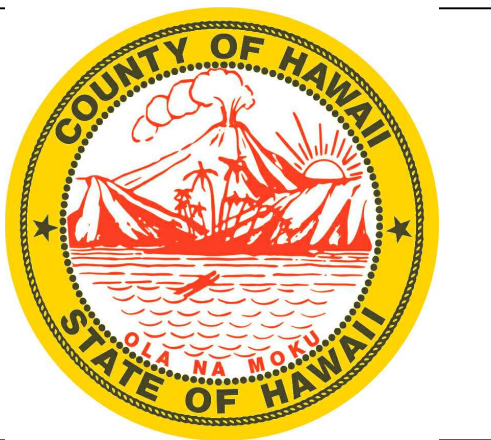
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2261 AUPUNI STREET, SUITE 201  
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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

**REVISIONS**

REV	DATE	DESCRIPTION

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DRAWN:

CHECKED:

APPROVED:

FILENAME  
P-200 P&IDS.DWG  
BC PROJECT NUMBER  
151870  
CLIENT PROJECT NUMBER

**P&IDS  
PH ADJUSTMENT**

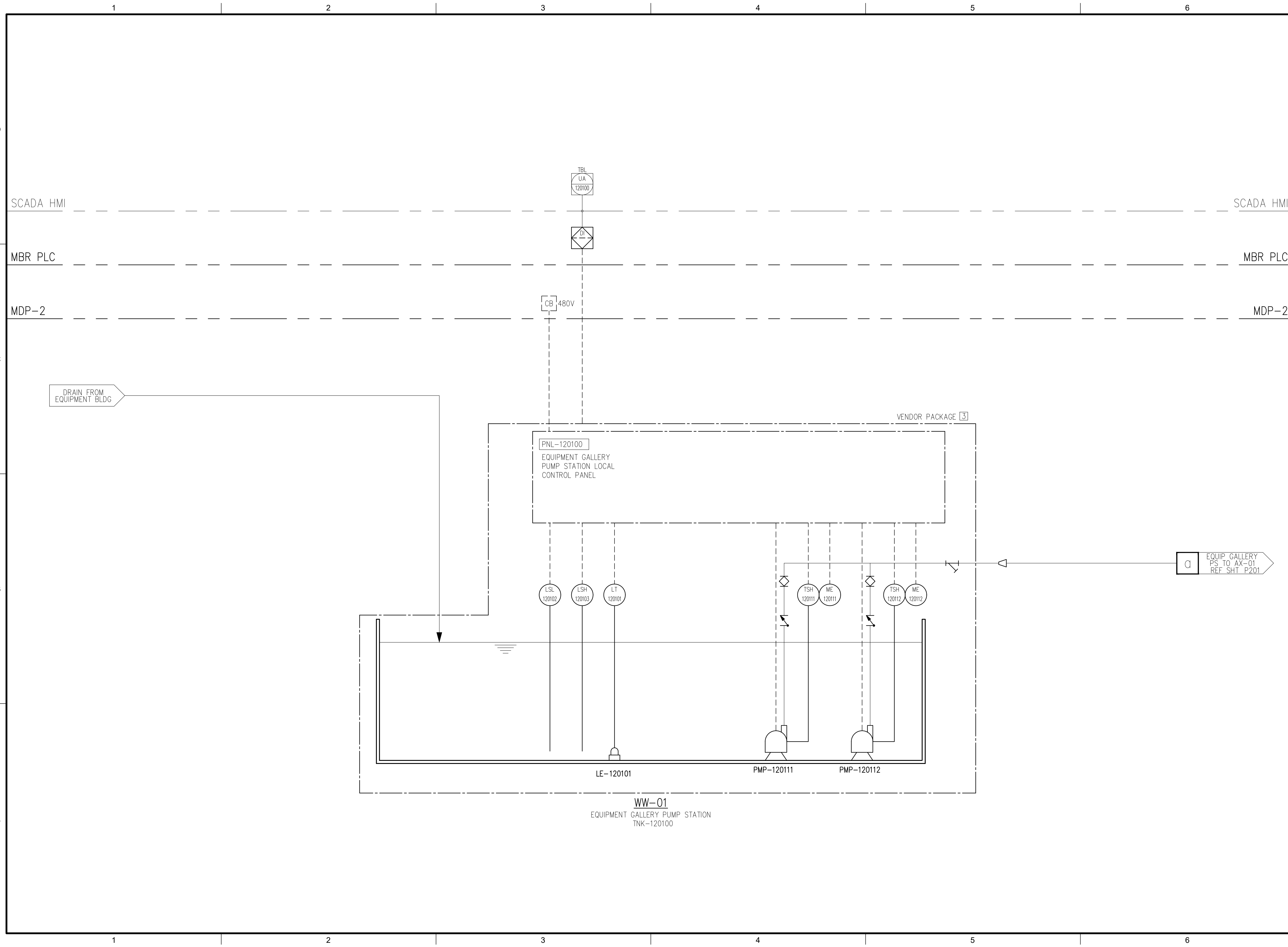
DRAWING NUMBER

**P-207**

16 SHEET NUMBER OF 25



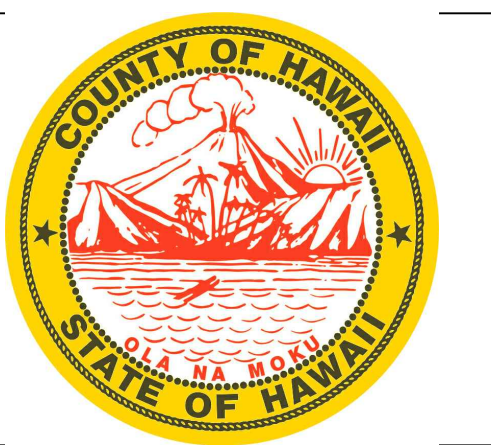
COUNTY OF HAWAII Seal.jpg  
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

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REV	DATE	DESCRIPTION

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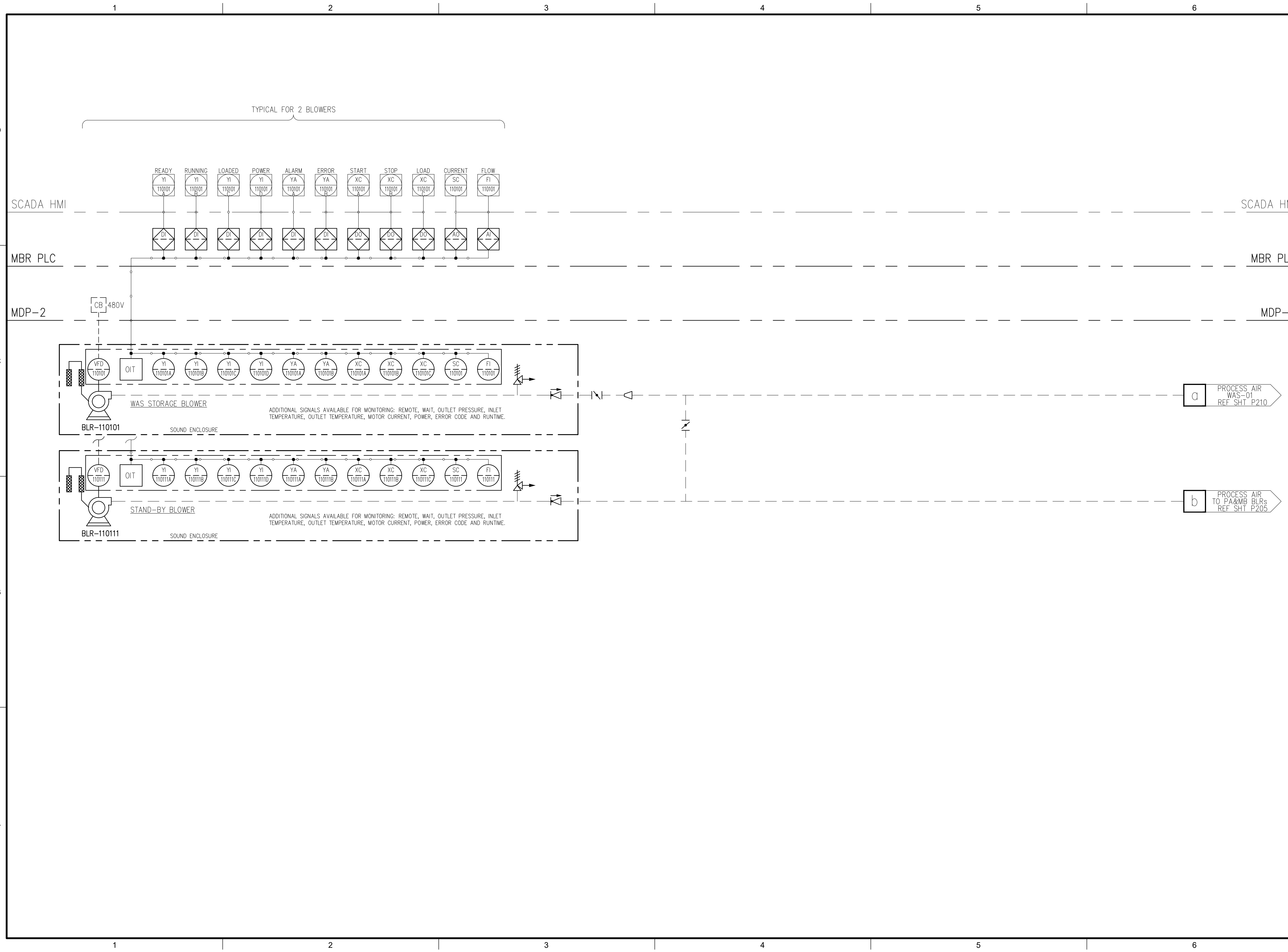
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CLIENT PROJECT NUMBER

**P&IDS EQUIPMENT GALLERY PUMP STATION**

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**P-208**

17 SHEET NUMBER OF 25

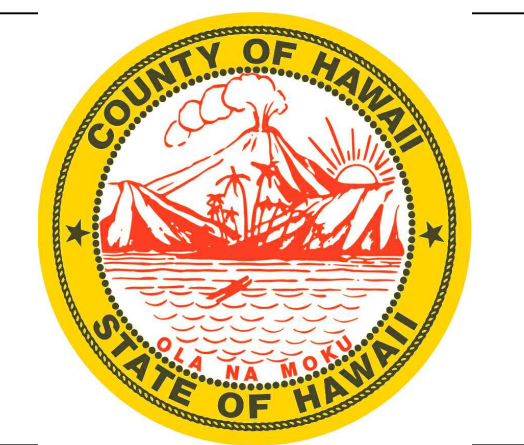
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD  
DOCUMENTS

THESE DRAWINGS WERE PREPARED FOR SUBMISSION TO EPA IN JULY 2021 TO PROVIDE A GENERAL UNDERSTANDING OF THE PROJECT CONCEPT AND ARE NOT INTENDED TO REFLECT DESIGN REQUIREMENTS.



PAHALA WASTEWATER TREATMENT PLANT  
DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

DESIGNED:  
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CHECKED:  
APPROVED:

FILENAME  
P-200 P&IDS.DWG  
BC PROJECT NUMBER  
151870  
CLIENT PROJECT NUMBER

P&IDS  
WAS STORAGE AND STAND-BY BLOWERS

DRAWING NUMBER  
**P-209**

18 SHEET NUMBER OF 25

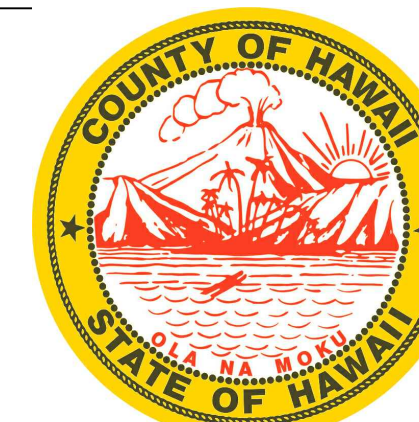
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

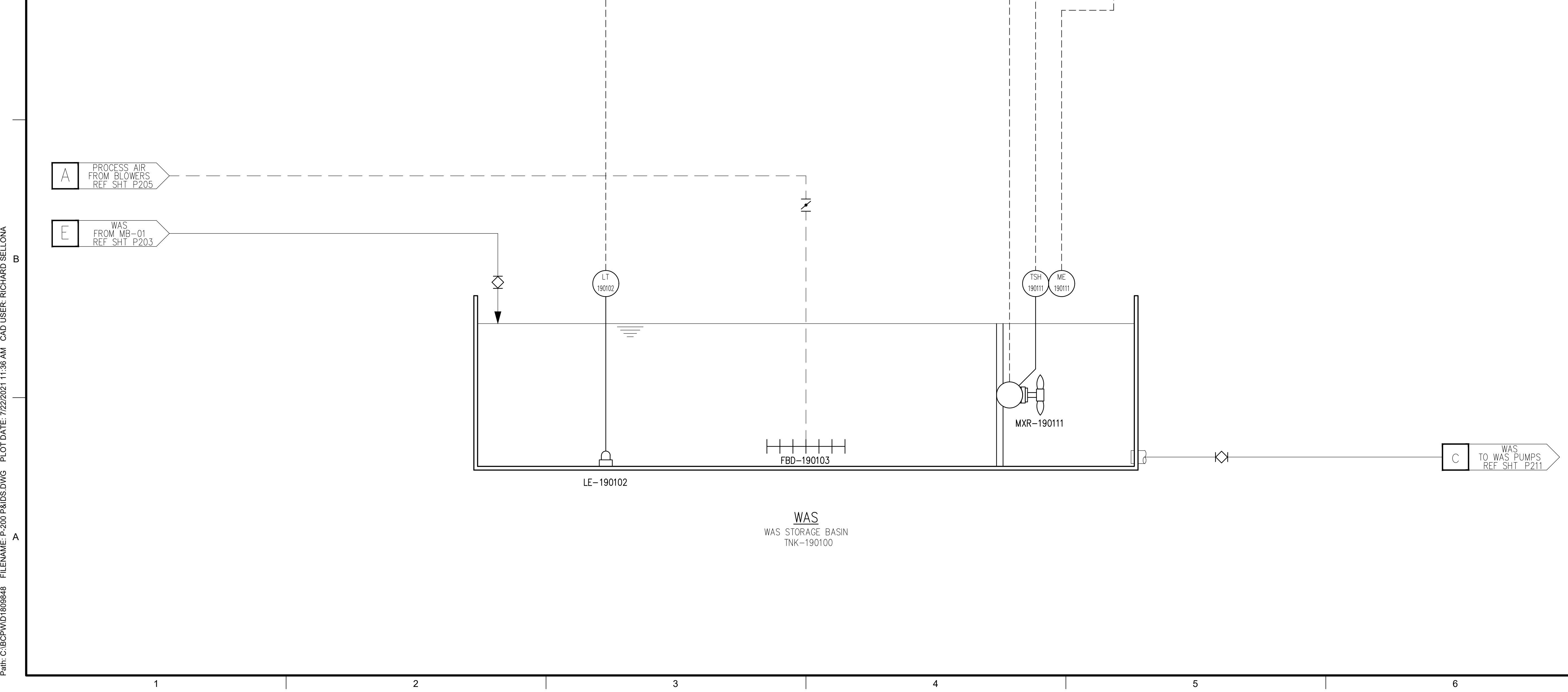
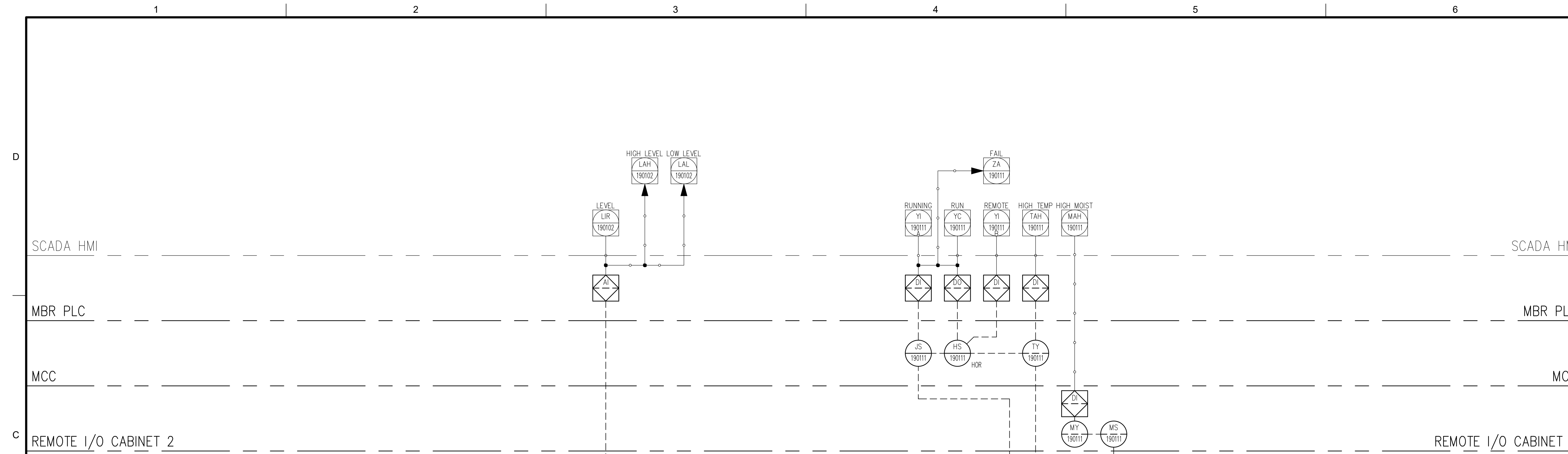
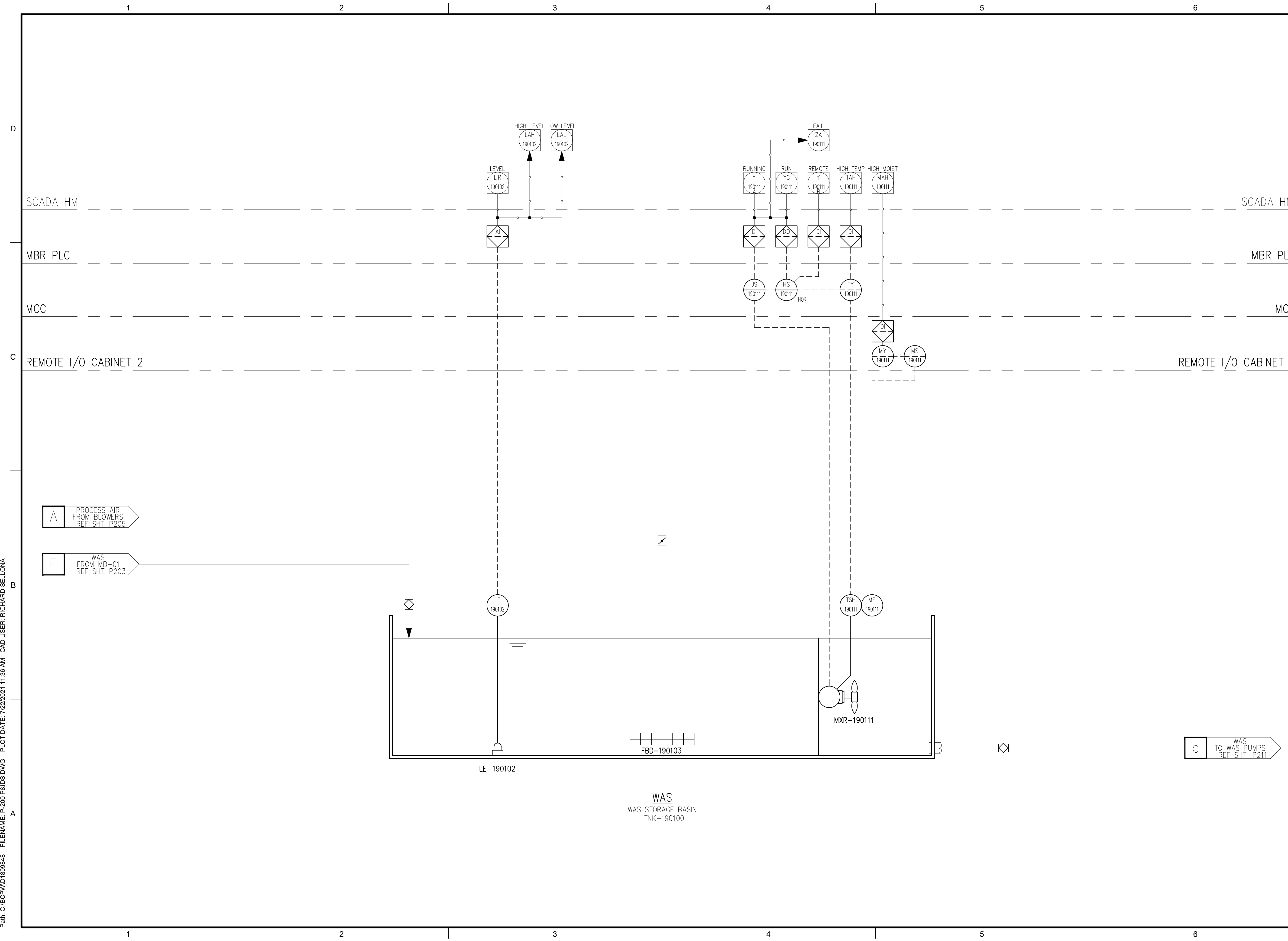
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FILENAME  
P-200 P&IDS.DWG  
BC PROJECT NUMBER  
151870  
CLIENT PROJECT NUMBER

P&IDS  
WAS STORAGE BASIN

DRAWING NUMBER  
P-210

19 SHEET NUMBER OF 25



D

SCADA HMI

SCADA HMI

MBR PLC

MBR PLC

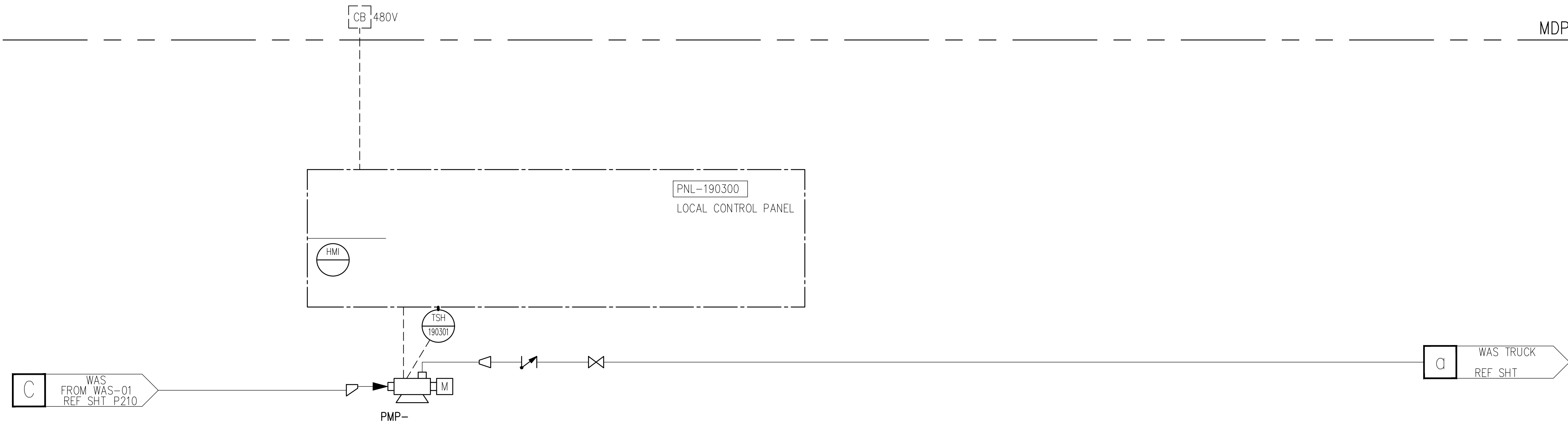
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MDP-2

C

B

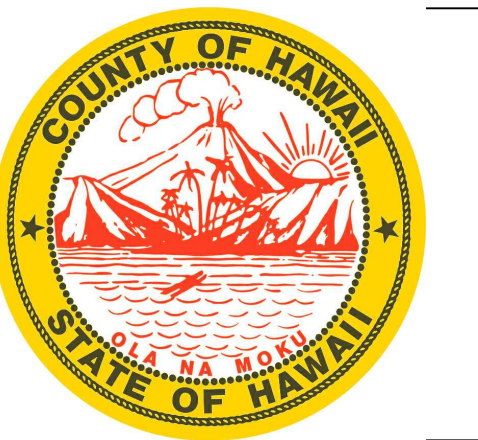
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

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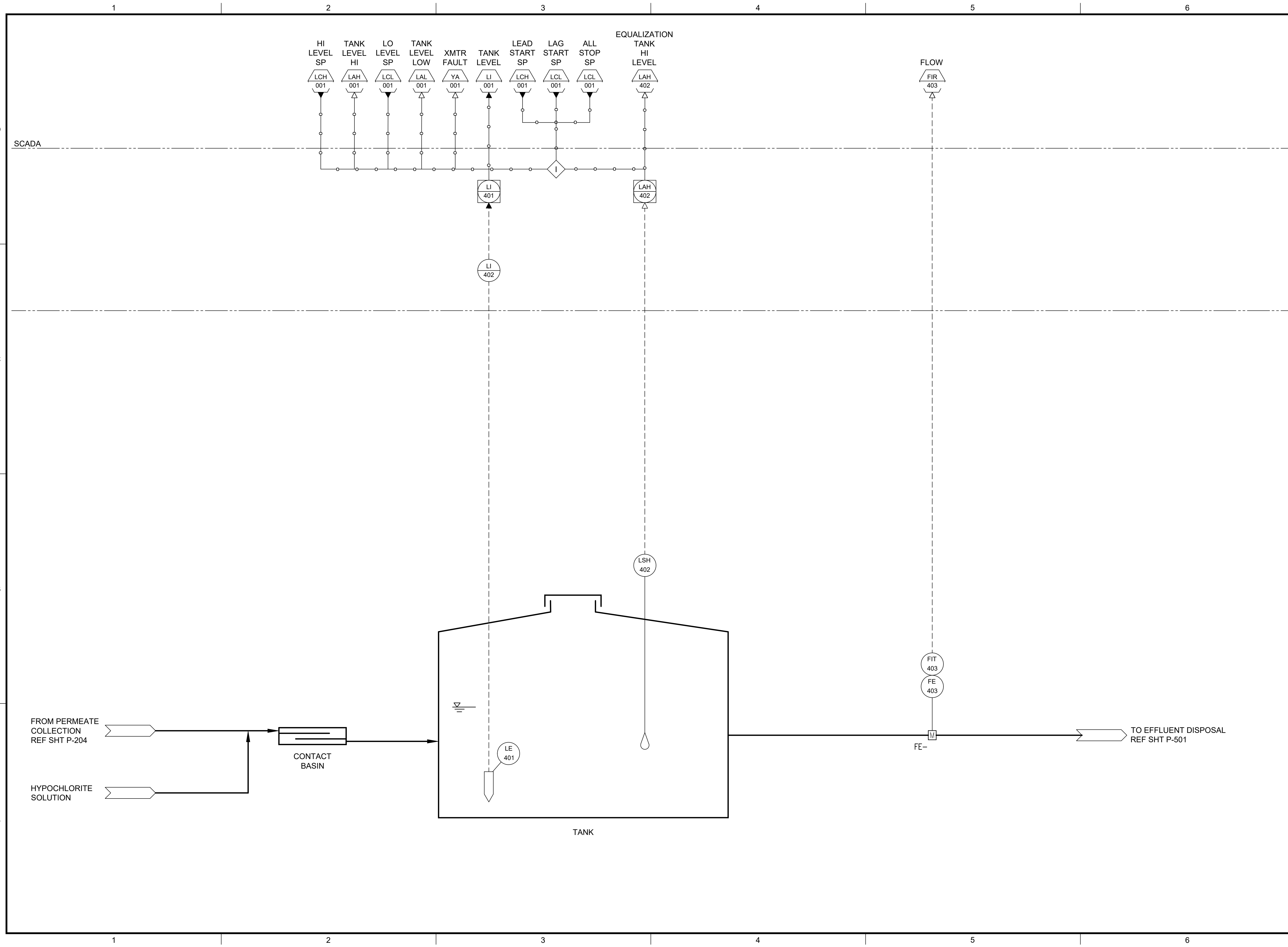
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CLIENT PROJECT NUMBER

P&IDS  
WAS PUMP

DRAWING NUMBER  
P-211

20 SHEET NUMBER OF 25

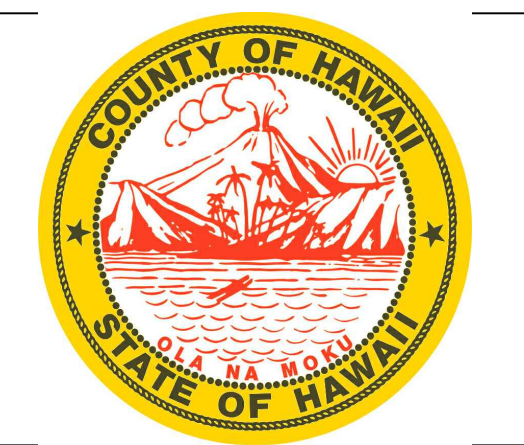
COUNTY OF HAWAII Seal.jpg  
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WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS		
REV	DATE	DESCRIPTION

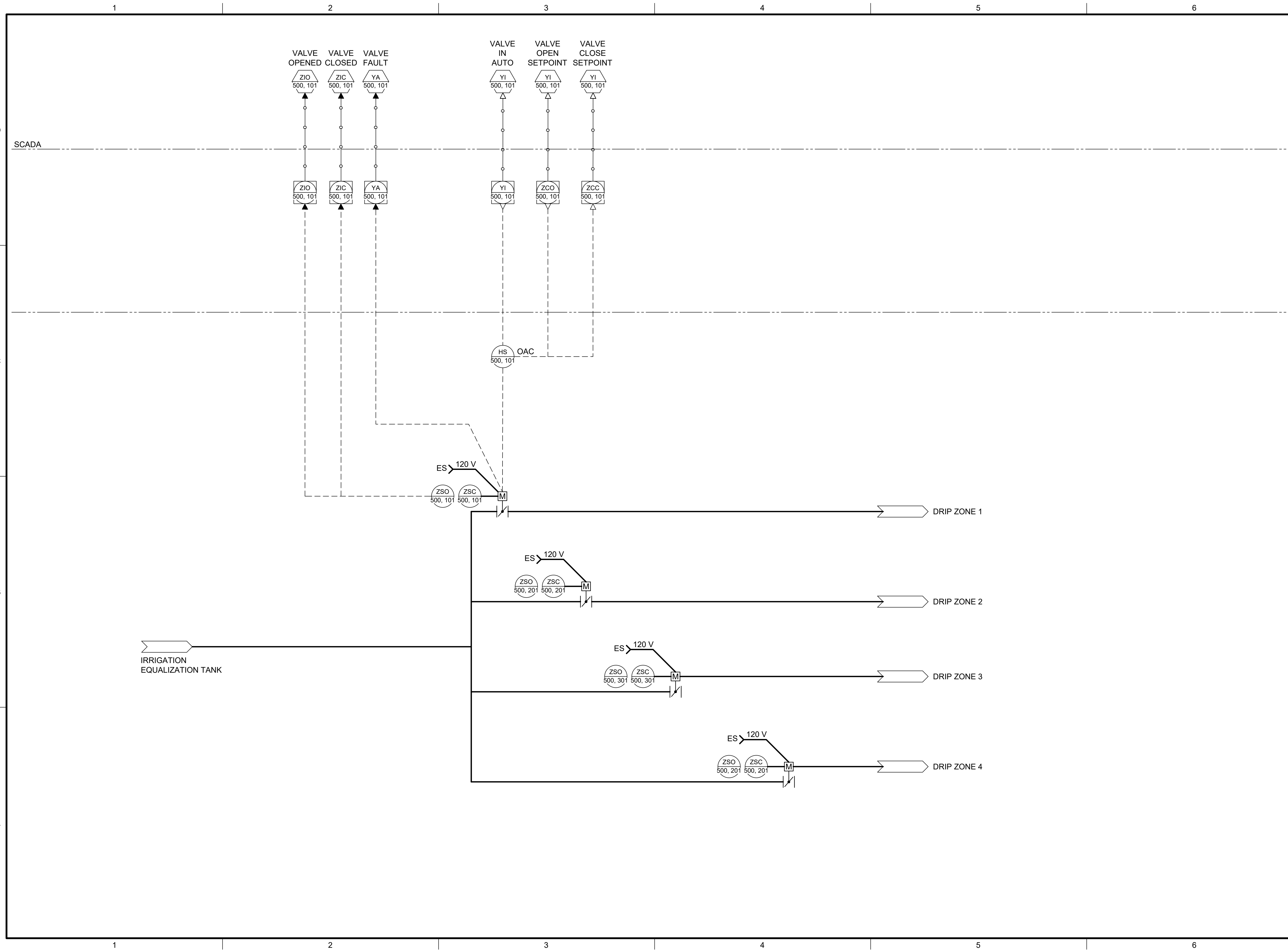
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P&IDS  
 IRRIGATION EQUALIZATION TANK P&ID

DRAWING NUMBER: P-401  
 21 SHEET NUMBER OF 25

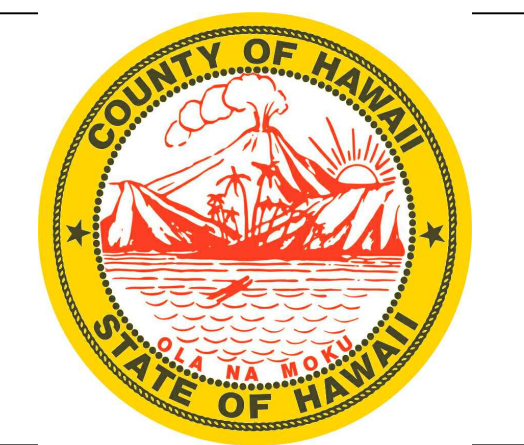
COUNTY OF HAWAII Seal.jpg  
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WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

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BC PROJECT NUMBER  
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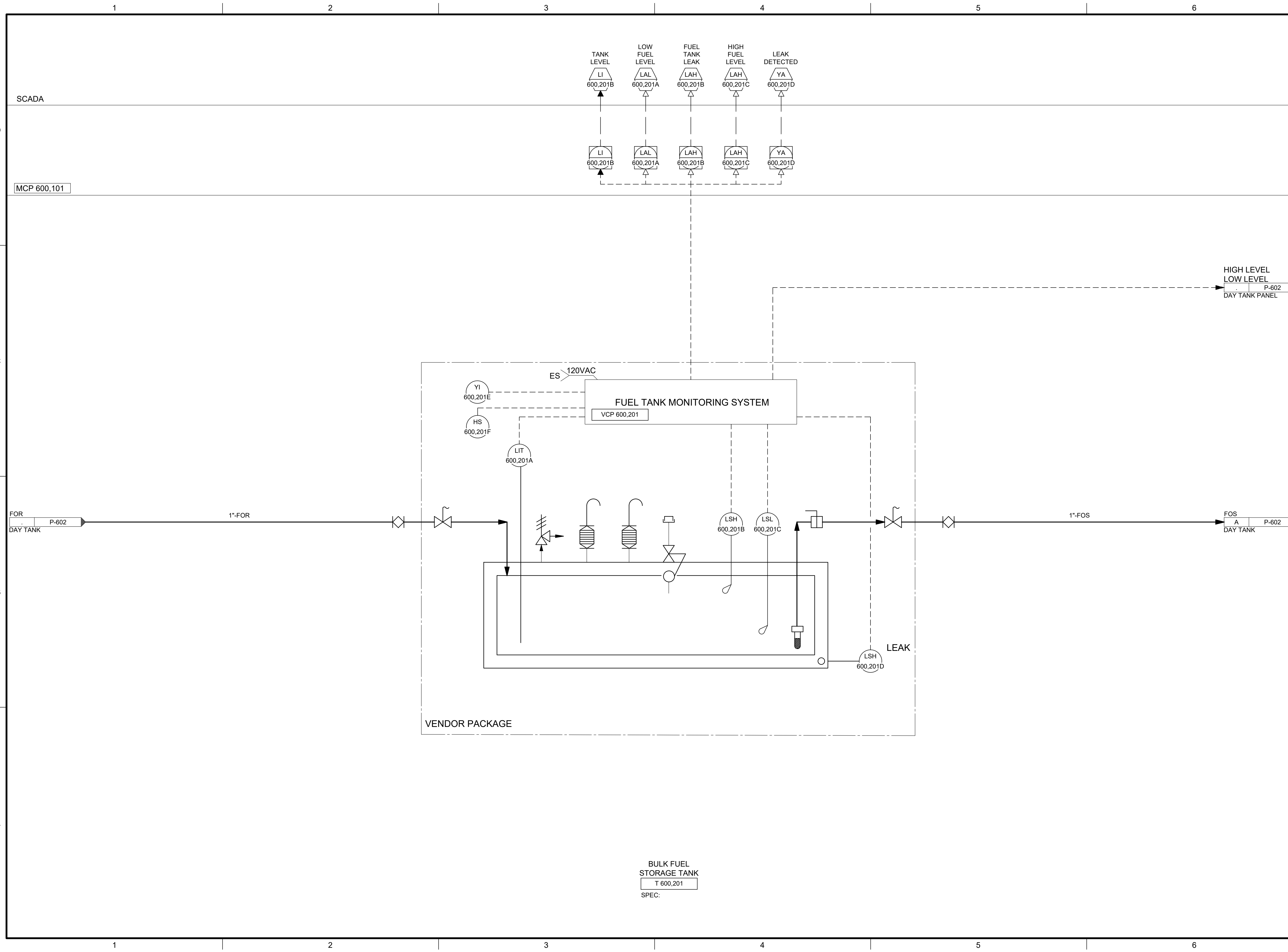
P&IDS

SUBSURFACE DRIP EFFLUENT DISPOSAL P&ID

DRAWING NUMBER  
**P-501**

22 SHEET NUMBER OF 25

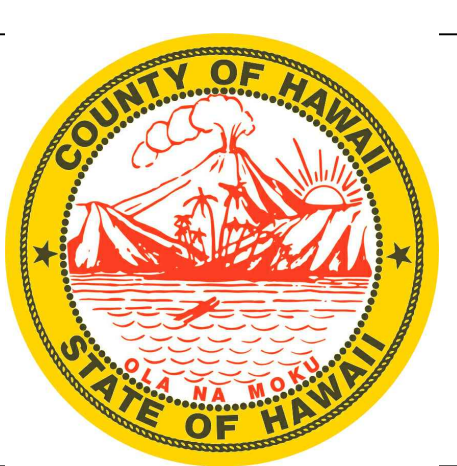
COUNTY OF HAWAII Seal.jpg  
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2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

**DESIGN/BUILD DOCUMENTS**

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

REVISIONS

REV	DATE	DESCRIPTION

LINE IS 2 INCHES AT FULL SIZE

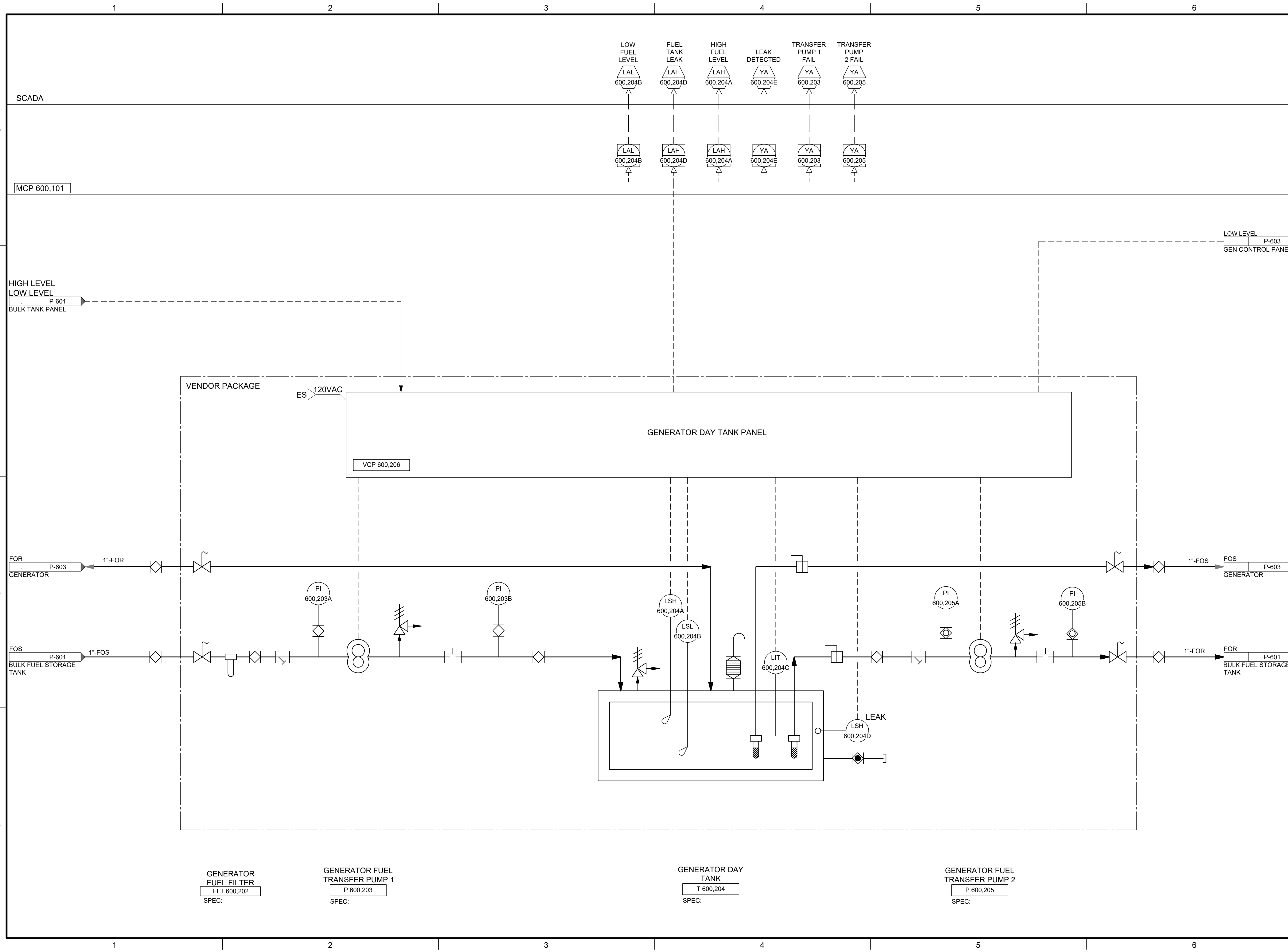
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FILENAME: P-601.DWG  
BC PROJECT NUMBER: 152964  
CLIENT PROJECT NUMBER:

**P&IDS GENERATOR BULK FUEL STORAGE P&ID**

DRAWING NUMBER: **P-601**  
SHEET NUMBER OF: **23** OF **25**

Path: C:\BPCPWD\1609648 FILENAME: P-602.DWG PLOT DATE: 7/22/2021 11:28 AM CAD USER: RICHARD SELLONA COUNTY OF HAWAII Seal.jpg



GENERATOR FUEL FILTER  
FLT 600,202  
SPEC:

GENERATOR FUEL TRANSFER PUMP 1  
P 600,203  
SPEC:

GENERATOR DAY TANK  
T 600,204  
SPEC:

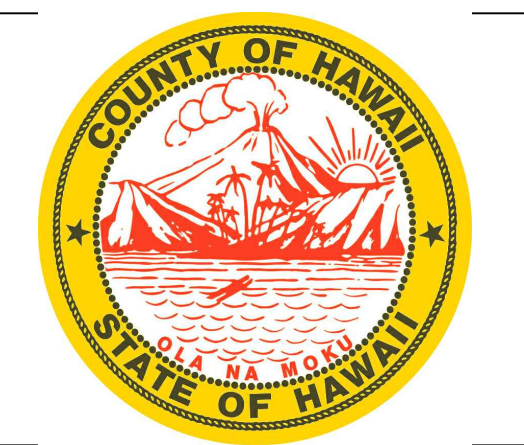
GENERATOR FUEL TRANSFER PUMP 2  
P 600,205  
SPEC:



2261 AUPUNI STREET, SUITE 201  
WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS

REVISIONS

REV	DATE	DESCRIPTION

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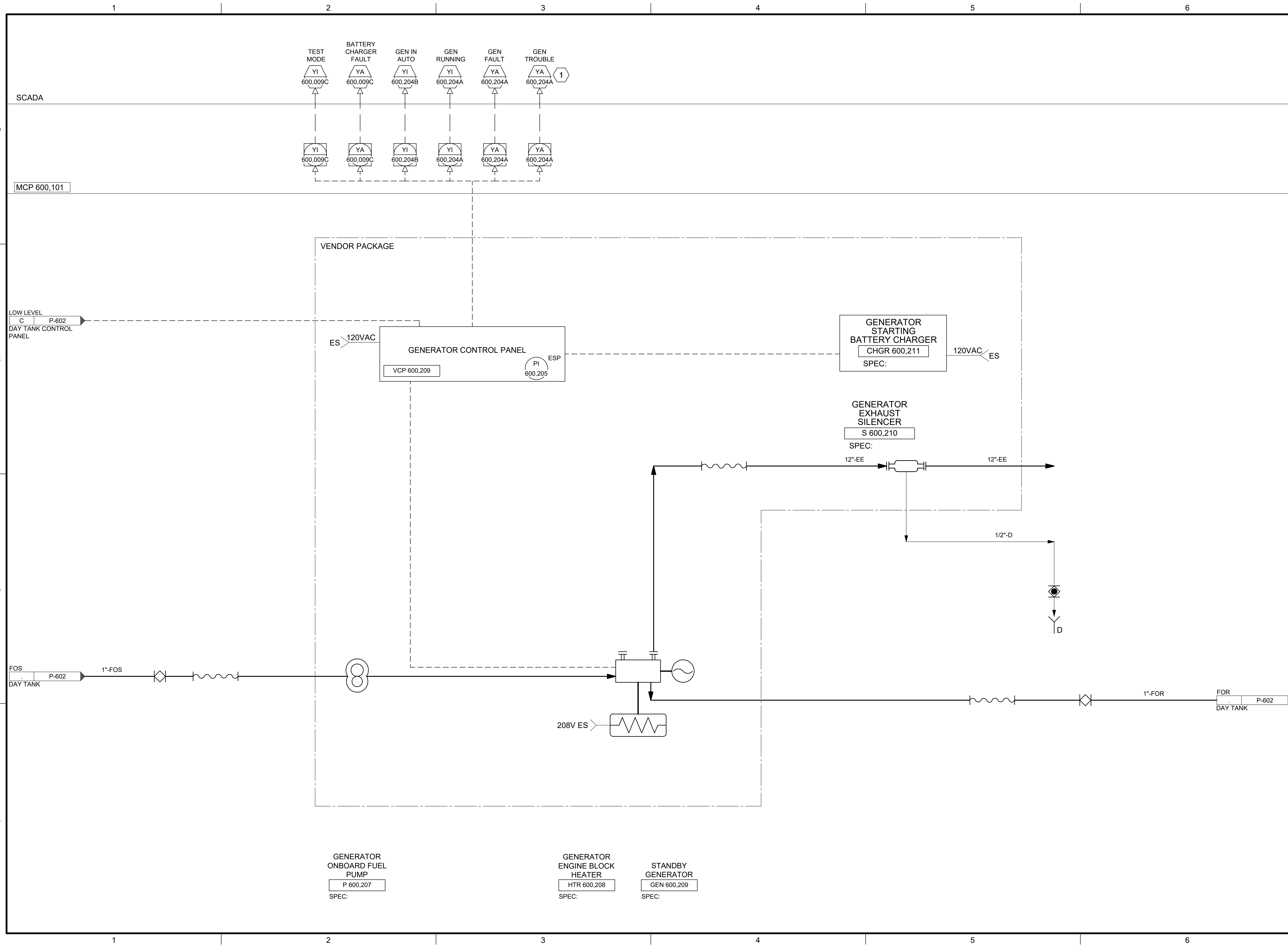
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CLIENT PROJECT NUMBER

P&IDS  
GENERATOR DAY TANK P&ID

DRAWING NUMBER  
**P-602**  
SHEET NUMBER OF  
24 OF 25



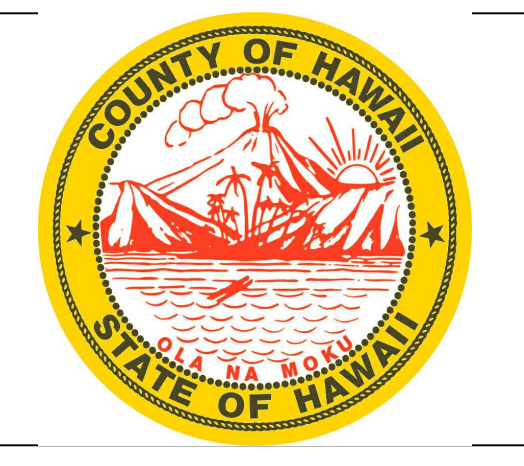
COUNTY OF HAWAII Seal.jpg  
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**Brown AND Caldwell**  
 2261 AUPUNI STREET, SUITE 201  
 WAILUKU, HAWAII

DESIGN/BUILD DOCUMENTS

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**PAHALA WASTEWATER TREATMENT PLANT DESIGN/BUILD DOCUMENTS**

REVISIONS		
REV	DATE	DESCRIPTION

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 CHECKED:  
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 BC PROJECT NUMBER: 152964  
 CLIENT PROJECT NUMBER:

**P&IDS  
 STANDBY  
 GENERATOR P&ID**

DRAWING NUMBER: **P-603**  
 SHEET NUMBER OF: 25 OF 25