

**REPAIR NOTES:**

- A. SPALLS AND DELAMINATIONS ARE CALLED OUT AS SPALLS ON PLANS, AND NO SEPARATE DISTINCTION IS MADE SINCE REPAIRS ARE THE SAME.
- B. REMOVE DELAMINATED OR DETERIORATED CONCRETE OR CMU UNTIL SOUND CONCRETE OR CMU IS ENCOUNTERED. CHIPPED OUT AREA MUST EXTEND AN ADDITIONAL 2 INCHES ALL AROUND. SOUND CONCRETE OR CMU MUST BE SPALL FREE WITHOUT CRACKS, DELAMINATIONS, VOIDS AND MUST BE FIRMLY BONDED TO SURROUNDING CONCRETE OR CMU. WHEN STRUCK WITH A HAMMER, SOUND CONCRETE OR CMU WILL NOT PRODUCE A HOLLOW SOUND.
- C. CHECK SURFACES TO ENSURE THAT IT IS FREE FROM LOOSE AGGREGATE OR ADDITIONAL DELAMINATIONS.
- D. CHIPPED OUT AREA MUST NOT BE LESS THAN 1 INCH CLEAR BELOW, ABOVE, OR BEHIND EXPOSED REINFORCING BARS.
- E. EDGES OF CHIPPED OUT AREA MUST BE SAW CUT PERPENDICULAR TO CONCRETE OR CMU SURFACE FOR A MINIMUM DEPTH OF AT LEAST 3/4 INCH. DO NOT SAW CUT THROUGH EXISTING REINFORCING BARS.
- F. EXPOSED REINFORCING STEEL BARS MUST BE CLEANED OF SCALE, RUST, DIRT, OIL OR ANY OTHER DELETERIOUS MATERIAL. ABRASIVE AND HYDROBLASTING IS PROHIBITED.
- G. AFTER REINFORCING STEEL BAR HAS BEEN CLEANED BY HAND TOOLS OR WIRE BRUSH, MEASURE DIAMETER OF EXPOSED REINFORCING STEEL BARS AT EDGE OF CHIPPED OUT AREA TO DETERMINE ORIGINAL BAR SIZE. COMPARE BAR DIAMETERS WITHIN CHIPPED OUT AREA WITH ALLOWABLE BAR DIAMETER CHART AND SPLICE BARS AS REQUIRED.
- H. FORMWORK REQUIRED FOR SPALL AREAS TWO SQUARE FEET OR GREATER.
- I. REMOVE EXCESS CEMENT AND PARTICULATE SLURRY BEFORE CURING.
- J. DO NOT FEATHER EDGES OF REPAIR.
- K. AFTER REPAIRS HAVE BEEN CURED A MINIMUM OF 14 DAYS, REPAIRED AREAS MUST BE CLEANED AND COATED WITH A CONCRETE SEALER. COATED AREA MUST EXTEND A MINIMUM OF 6 INCHES AROUND THE REPAIR AREA.
- L. VERIFY WITH CONTRACTING OFFICER REPAIR TYPES THAT DIFFER FROM CONTRACT DRAWINGS. DO NOT PROCEED WITH WORK UNTIL APPROVED BY CONTRACTING OFFICER.

**REPAIR MATERIAL:**

- A. REPAIR MORTAR MUST BE POLYMER-MODIFIED, CEMENTITIOUS REPAIR MORTAR FOR VERTICAL SURFACES HAVING A MINIMUM COMPRESSIVE STRENGTH OF 6,000 PSI AT 28 DAYS.

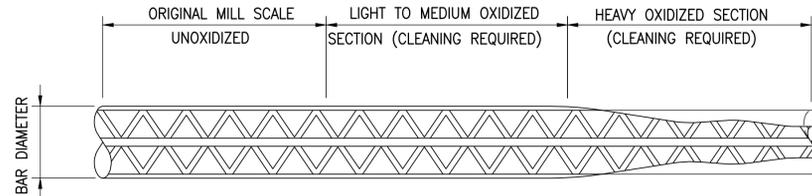
**REINFORCING STEEL:**

- A. REINFORCING STEEL BARS MUST CONFORM TO ASTM A615/A615M GRADE 60 OR ASTM A706/A706M GRADE 60 FOR WELDED REINFORCING.
- B. MINIMUM CONCRETE COVER FOR REINFORCING STEEL BARS AS INDICATED.
  - 1. CAST AGAINST AND PERMANENTLY IN CONTACT WITH GROUND.....3"
  - 2. EXPOSED TO WEATHER OR IN CONTACT WITH GROUND.....2"
- C. WELDING OF REINFORCING BARS MUST BE IN ACCORDANCE WITH AWS D1.4/1.4M STRUCTURAL WELDING CODE-REINFORCING STEEL.
- D. WHEN WELDING TO EXISTING REINFORCING STEEL BARS, REPRESENTATIVE SAMPLES OF THE BARS MUST BE ANALYZED TO DETERMINE WELDING REQUIREMENTS.

**CONCRETE:**

- A. CONCRETE MUST HAVE THE FOLLOWING MINIMUM 28-DAY COMPRESSIVE STRENGTHS.
 

	28 DAYS STRENGTH (PSI)	MAX. SIZE AGGREGATE	WATER CEMENT RATIO
FOOTINGS	4000	3/4"	0.40
COLUMNS	4000	3/4"	0.40
WALLS	4000	3/4"	0.40
- B. USE OF ADMIXTURE AT CONTRACTOR'S OPTION, BUT SUBJECT TO CONTRACTING OFFICER APPROVAL.
- C. UNLESS OTHERWISE SHOWN, COORDINATE CONSTRUCTION JOINTS LOCATION WITH THE CONTRACTING OFFICER. THEY MUST BE SO LOCATED AS TO LEAST IMPAIR STRENGTH OF STRUCTURE AND TO MINIMIZE SHRINKAGE STRESSES. PROVIDE DOWELS AS DIRECTED AND THOROUGHLY CLEAN AND ROUGHEN SURFACES BEFORE PROCEEDING WITH NEXT PLACEMENT (THIS REQUIREMENT APPLIES TO FLOORS AND WALLS).
- D. USE OF CALCIUM CHLORIDE IN CONCRETE IS PROHIBITED.

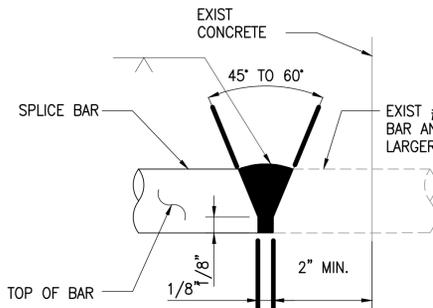


**ALLOWABLE BAR DIAMETER NOTES:**

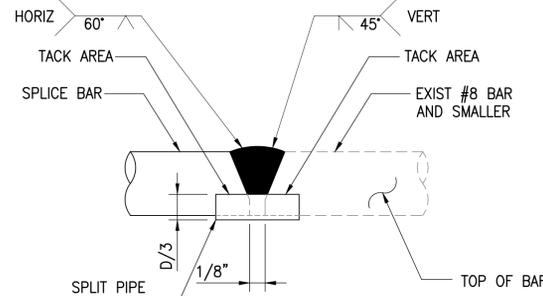
- 1. REMOVE HEAVY CORROSION AND SCALE FROM REINFORCING STEEL BARS.
- 2. IF REINFORCING STEEL BAR SIZE, AFTER CLEANING IS LESS THAN MINIMUM DIAMETER SHOWN IN ALLOWABLE BAR SIZE CHART, REPAIR PER

**ALLOWABLE BAR SIZE CHART**

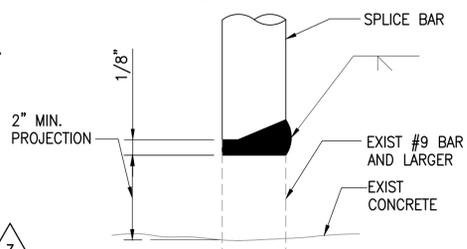
ORIGINAL DIAMETER	BAR SIZE	MINIMUM DIAMETER
3/8"	#3	5/16"
1/2"	#4	7/16"
5/8"	#5	1/2"
3/4"	#6	5/8"
7/8"	#7	3/4"
1"	#8	7/8"
1-1/8"	#9	1"
1-1/4"	#10	1"



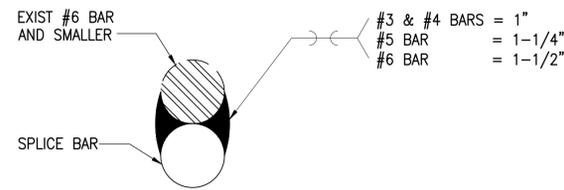
**A HORIZONTAL**



**B HORIZONTAL AND VERTICAL**



**C VERTICAL**

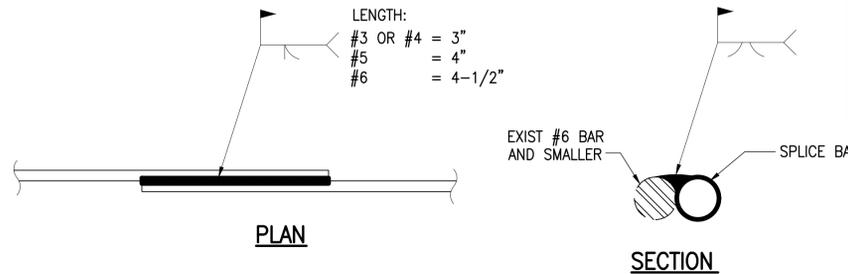


**D LAP AND SPLICE WELD**

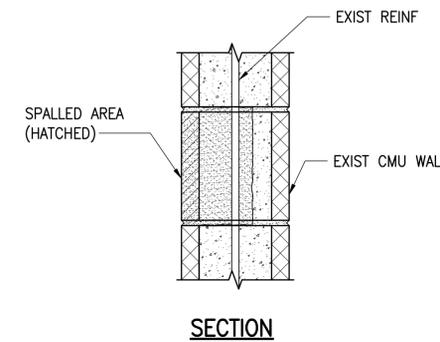
**REINFORCING WELDING NOTES:**

- 1. CHIP, GRIND, OR GOUGE TO SOUND METAL BEFORE WELDING.
- 2. USE E70 ELECTRODES FOR STIRRUPS, E90 ELECTRODES FOR ALL OTHERS.
- 3. SEE AWS D1.4 FOR WELDING PROCESS PREHEATING, COOLING CONTROLS, AND OTHER DETAILS, FOR WELDING EXISTING REINFORCING STEEL BARS NOT IN CONFORMANCE WITH ASTM A706/A706M.

**A2 S-501 TYPICAL WELDED BAR SPLICE DETAIL NOT TO SCALE**



**C4 S-501 ALTERNATE LAP WELD SPLICE DETAIL NOT TO SCALE**



**SPALL REPAIR DETAIL NOTES:**

- 1. LOCATE AND MARK DAMAGED AREA.
- 2. SAWCUT JOINTS AROUND PERIMETER OF SPALLED MASONRY CELLS. ENSURE NO REINFORCING STEEL BARS ARE DAMAGED. REMOVE SPALLED CELL.
- 3. UNDERCUT EXPOSED, CORRODED BARS A MINIMUM OF 1 INCH. MINIMUM BAR CAVITY DEPTH MUST BE 1 INCH.
- 4. CHIP SUBSTRATE TO OBTAIN A SURFACE PROFILE OF +/- 1/8 INCH MINIMUM AMPLITUDE WITH A FRACTURED AGGREGATE SURFACE. TRACES OF RUST AND SCALE MUST BE REMOVED FROM REINFORCING STEEL BARS BY MECHANICAL CLEANING.
- 5. WHEN CROSS-SECTIONAL AREA OF REINFORCING STEEL BAR LOST DUE TO CORROSION IS LESS THAN MINIMUM BAR DIAMETER, WELD SPLICE CORRODED BAR WITH ONE BAR TO MATCH EXISTING BAR SIZE. EXTEND BAR GREATER OF 2'-0" OR 48 BAR DIAMETERS BEYOND AREA OF BAR WITH MORE THAN 25 PERCENT CROSS SECTIONAL AREA LOSS DUE TO CORROSION.
- 6. SUBSTRATE MUST BE SATURATED SURFACE DRY (SSD) WITH NO STANDING WATER. REMOVE ALL DETERIORATED CMU, DUST, OIL, GREASE, DIRT, CONTAMINANTS, AND OTHER BOND-INHIBITING MATERIALS FROM AREA REPAIRED.
- 7. APPLY BONDING AGENT TO REINFORCING STEEL AND CMU COMPATIBLE WITH REPAIR MORTAR.
- 8. FILL CHIPPED AREAS WITH REPAIR MORTAR TO EXISTING SURFACE. IF CHIPPED AREAS ARE GREATER THAN 1-INCH DEPTH, ADD 3/8-INCH COARSE AGGREGATE TO REPAIR MORTAR.
- 9. SPALL AREA REPAIR FINISH MUST MATCH EXISTING SURFACE AREA FINISH INCLUDING BLOCK JOINTS.

**A4 S-501 TYPICAL CMU SPALL REPAIR DETAIL NOT TO SCALE**



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

4/30/2026

SIGNATURE EXPIRATION DATE

APP. NO.	DATE	DESCRIPTION
3/2/24	4/1/24	
APP. NO. 1		
APP. NO. 2		
APP. NO. 3		

CONSTRUCTION DOCUMENTS

3/01/2024

DEPARTMENT OF DEFENSE

DIAMOND HEAD STATE MONUMENT

TMK: 3-1-042:006

4204 DIAMOND HEAD RD HONOLULU, HI 96816

BIRKHMIR EMERGENCY OPERATIONS CENTER (EOC)

UPGRADES AND IMPROVEMENTS

STRUCTURAL NOTES AND REPAIR DETAILS

STATE OF HAWAII

SCALE:

AS NOTED

STATE JOB NO. CA-202313-C

FEDERAL PROJECT NO.

SHEET OF 123

S-501



**ELECTRIC WATER HEATER SCHEDULE**

MARK	LOCATION	AREA SERVED	RECOVERY RATE	TANK STORAGE (GAL)	E-POWER (Y/N)	ELECTRICAL				MAXIMUM DIAMETER (IN)	QTY	REMARKS
						INPUT (KW)	VOLTS	PH	HZ			
EW-1	WATER HEATER CLOSET	KITCHEN, MENS AND WOMENS RESTROOMS	21GPH @ 90F RISE	50	NO	4.5	240	1	60	20.25	1	PROVIDE DRAIN PAN WITH DRAINPIPE ROUTED TO NEAREST FLOOR DRAIN

**HOT WATER RECIRCULATION PUMP SCHEDULE**

MARK	LOCATION	SERVED	FLOW RATE (GPM)	HEAD (FT)	E-POWER (Y/N)	ELECTRICAL					QTY	REMARKS
						V	PH	HZ	WATTS	AMPS		
HWRP-1	MEN'S AND WOMEN'S RESTROOM AND KITCHEN	EW-1	1.25	2.3	NO	115	1	60	25	0.22	1	PROVIDE WITH AQUASTAT AND TIMER.

**WATER HEATER EXPANSION TANK SCHEDULE**

UNIT	LOCATION	SYSTEM SERVE	TYPE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	MAX WORKING PRESSURE (PSI)	DIAMETER (IN)	HEIGHT (IN)	OPER. WEIGHT (IN)	NOTES
ET-1	WATER HEATER CLOSET	DOMESTIC HOT WATER SYSTEM	BLADDER TYPE	4.5	2.5	100	11	15.5	10	IN-LINE TANK

**THERMOSTATIC MIXING VALVE SCHEDULE**

UNIT	BUILDING	LOCATION	MAX OPERATING PRESSURE (PSI)	MAX OUTLET TEMP (*S)	HOT WATER INLET TEMP (*F)	OUTLET TEMP SETPOINT (*F)	INLET, OUTLET SIZE (IN)
TMV	BIRKHIRMER	WATER HEATER CLOSET	125	140	140	110	3/4", 1"

**WATER FILTRATION SKID SCHEDULE**

UNIT	SYSTEM SERVE	FLOW (GPM)	DESCRIPTION	E-POWER (Y/N)	ELECTRICAL		
					V	P	HZ
WFS-1	DOMESTIC WATER; UWST-1	68	FILTRATION UNITS IN PARALLEL OPERATION. PROVIDE WITH DOMESTIC WATER SYSTEM CONTROL PANEL ON THE SKID FOR MONITORING OF UWST-1. PROVIDE WITH UV LIGHT ON RECIRCULATION LINE FOR DISINFECTION.	YES	120	1	60

**UNDERGROUND WATER STORAGE TANK SCHEDULE**

UNIT	SYSTEM SERVE	TYPE	TANK VOLUME (GAL)	DIAMETER	LENGTH	MAX OPERATING PRESSURE (PSI)	REMARKS
UWST-1	DOMESTIC WATER SYSTEM	UNDERGROUND, HORIZONTAL	15,000	10'-0"	30'-10"	60	PROVIDE WITH (2) BOLT ON COFFERDAM; 84"L x 48"W AND 48" DIA.

**DOMESTIC WATER BOOSTER PUMP SCHEDULE**

MARK	LOCATION	AREA SERVED	TYPE	FLOW (GPM)	HEAD (FT)	# OF PUMPS	ELECTRICAL					REMARKS	
							V	PH	HZ	HP (PER PUMP)	FLA (PANEL)		MCA (PANEL)
DWP-1	ROOM 10 - PUMP ROOM	BUILDING DOMESTIC WATER	VERTICAL MULTISTAGE CENTRIFUGAL	68	112	2	208	3	60	3	23.2	25.9	DUPLEX PUMP SET WITH VFD

**ABOVEGROUND FUEL STORAGE TANK SCHEDULE**

UNIT	SYSTEM SERVE	TYPE	FUEL TYPE	TANK VOLUME (GAL)	DIMENSIONS			OPER. WEIGHT (LBS)
					LENGTH	WIDTH	HEIGHT	
AST-2	GENERATOR FUEL	ABOVEGROUND, HORIZONTAL	DIESEL	6,000	17'-7"	8'-0"	8'-9"	101,600

**PLUMBING FIXTURE SCHEDULE**

FIXTURE	SYMBOL	QUANTITY	WASTE	VENT	COLD WATER	HOT WATER	ELECTRICAL POWER	REMARKS
WATER CLOSET	WC	7	4"	2"	1"	---	---	WHITE, LOW FLOW TYPE (1.28 GAL/FLUSH), FLOOR MOUNTED FLOOR OUTLET, SIPHON JET, MANUAL FLUSH VALVE, TOP INLET SPUD, ELONGATED BOWL.

**CONTROL VALVE SCHEDULE**

VALVE NO.	EQUIPMENT	MAX FLOW (GPM)	MAX PRESSURE DROP (FT HEAD)	PIPE SIZE (IN)	VALVE SIZE (IN)	VALVE Cv AT FULL FLOW	VALVE TYPE	CONFIG.	ACTION	NORMAL POSITION	E-POWER (Y/N)	ELECTRICAL
												V/P/HZ
CV-1	UWST-1	140	9.8	2-1/2"	2-1/2"	68	GLOBE	2-WAY	SOLENOID	CLOSE	YES	120/1/60
CV-2	WFS-1	100	4.8	2"	2"	47	GLOBE	2-WAY	SOLENOID	CLOSE	YES	120/1/60

**FUEL MONITORING SYSTEM SCHEDULE**

UNIT	SYSTEM SERVE	FUEL TYPE	DESCRIPTION	E-POWER (Y/N)	ELECTRICAL			
					V	P	HZ	AMPS
FMS-2	MFP-2; AST-2	DIESEL	PROVIDE WITH CONNECTIONS FOR FUEL PIPING LEAK DETECTION CABLES AND FUEL TANK LEVEL MONITORING CABLE.	YES	120	1	60	10

**MANUAL FUEL PORT SCHEDULE**

UNIT	SYSTEM SERVE	FUEL TYPE	DESCRIPTION	E-POWER (Y/N)	ELECTRICAL			
					V	P	HZ	AMPS
MFP-2	AST-2	DIESEL	MANUAL FILL SYSTEM FOR ABOVEGROUND STORAGE TANK WITH EXTERIOR CONNECTION FOR FUEL TRUCK. PROVIDE WITH TANK LEVEL MONITOR AND INTERNAL OVERFLOW ALARM. CONTROLS IN NEMA 4X ENCLOSURE.	YES	120	1	60	10

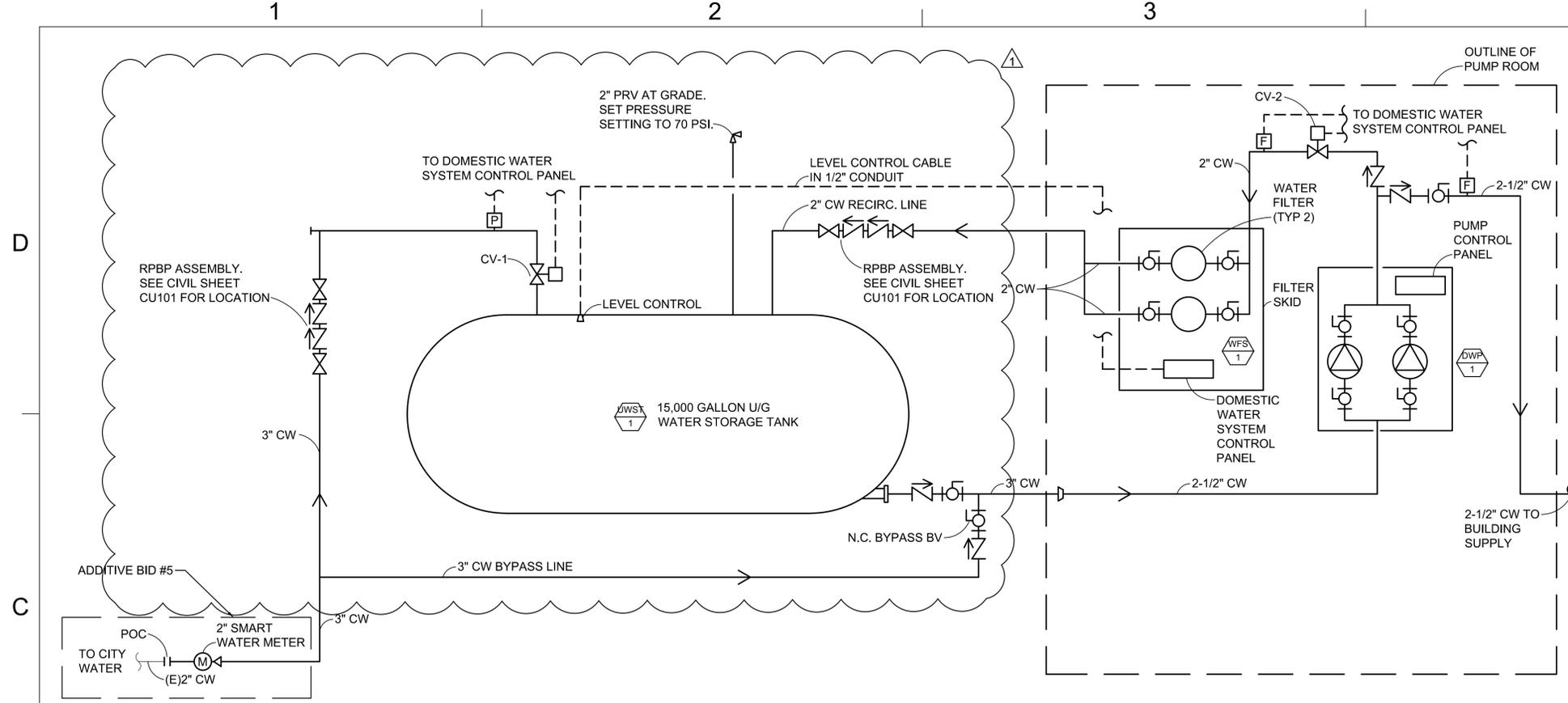


THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
 SIGNATURE: *[Signature]* EXPIRATION DATE: 4/30/2026

ADDENDUM 1	DATE	DESCRIPTION
ADDENDUM 3		

SUBMITTAL PHASE: CONSTRUCTION DOCUMENTS  
 SUBMITTAL DATE: 03/01/2024

STATE OF HAWAII  
 DEPARTMENT OF DEFENSE  
 DIAMOND HEAD STATE MONUMENT  
 4204 DIAMOND HEAD RD HONOLULU, HI 96816  
 TMNK: 3-1-042:006  
 BIRKHIRMER EMERGENCY OPERATIONS CENTER (EOC) UPGRADES AND IMPROVEMENTS  
 PLUMBING SCHEDULES  
 SCALE: AS NOTED  
 STATE JOB NO. CA-202313-C  
 FEDERAL PROJECT NO. -  
 SHEET 81 OF 123  
**PB601**



**C2 DOMESTIC WATER STORAGE SYSTEM SCHEMATIC**  
SCALE: NOT TO SCALE

**SEQUENCE OF OPERATIONS (UWST-1):**

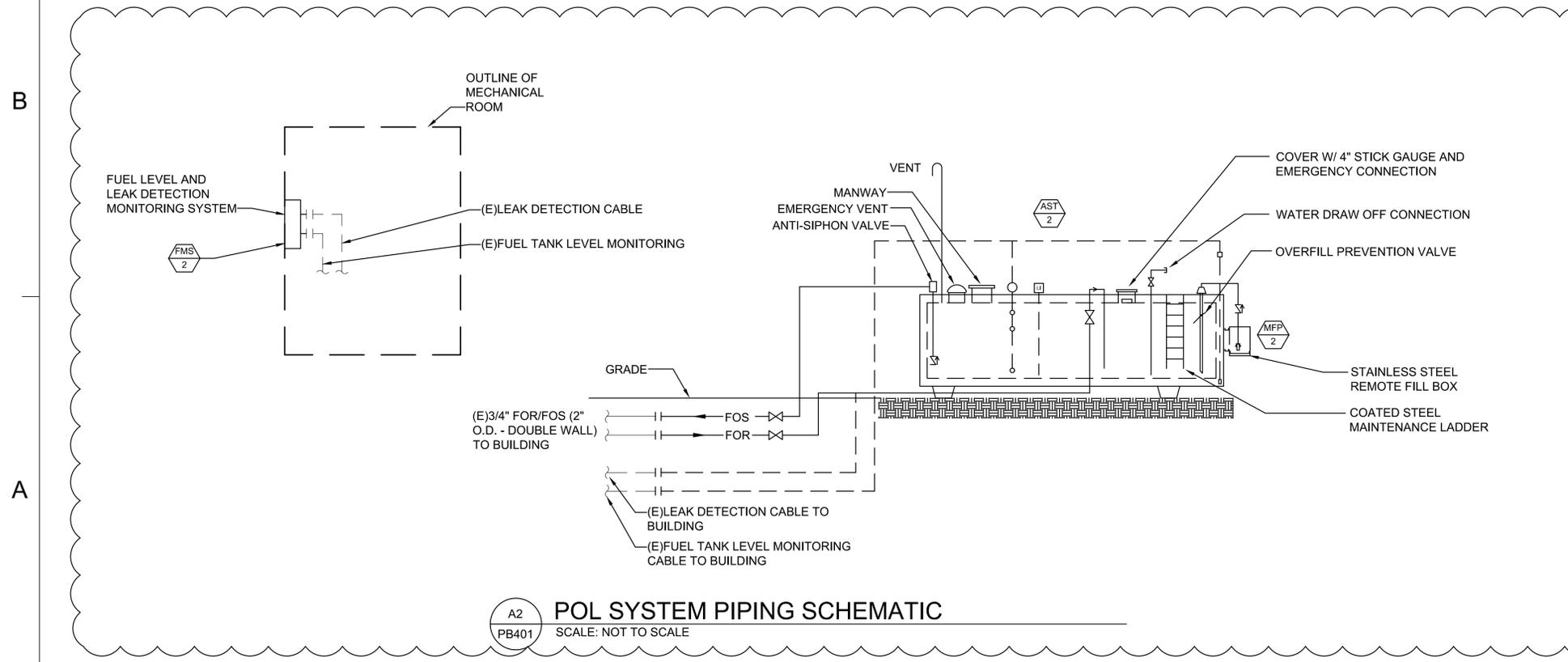
1. DOMESTIC COLD WATER FROM CITY SHALL FILL THE WATER STORAGE TANK (UWST-1) ON NORMAL OPERATION.
2. THE CONTROL VALVE (CV-1) SHALL INTERLOCK WITH THE DOMESTIC WATER CONTROL PANEL AND OPEN WHEN UWST-1 WATER LEVELS FALL BELOW 90% AND CLOSE WHEN WATER LEVELS ARE ABOVE 95%.
3. THE NORMALLY CLOSED VALVE ON THE BYPASS WATER LINE SHALL BE OPENED IN THE EVENT UWST-1, WFS-1, OR DWP-1 IS DOWN FOR MAINTENANCE.

**SEQUENCE OF OPERATIONS (WFS-1):**

1. THE WATER FILTRATION SKID (WFS-1) SHALL RE-CIRCULATE WATER BACK TO UWST-1 SO THAT THE TOTAL AMOUNT OF FRESH AND RE-CIRCULATED WATER INTO UWST-1 IS EQUAL TO THE TANK'S TOTAL CAPACITY (15,000 GALLONS) EVERY 3 DAYS.
2. INTERLOCK CV-2 WITH THE DOMESTIC WATER CONTROL PANEL. CV-2 SHALL OPEN EVERY 3 DAYS, DURING NON-BUSINESS HOURS TO RE-CIRCULATE WATER BACK INTO UWST-1. CV-2 SHALL CLOSE WHEN THE RE-CIRCULATION IS COMPLETE.

**SEQUENCE OF OPERATIONS (DWP-1):**

1. DOMESTIC WATER BOOSTER PUMP CONTROL PANEL SHALL BE EQUIPPED WITH A PACKAGED MICROPROCESSOR BASED STAND-ALONE PUMP CONTROL PANEL WHICH SHALL OPERATE THE PUMPS BASED ON THE PRESSURE SET POINT (ADJUSTABLE VIA CONTROL PANEL).
2. PUMP SKID SHALL BE PROVIDED WITH ONE (1) LEAD PUMP AND ONE (1) BACKUP PUMP. THE LAG PUMP SHALL BE 100% REDUNDANT.
3. THE LEAD AND LAG PUMP SHALL ALTERNATE EVERY DAY.
4. PRESSURE SET POINT OF 45 PSI.



**A2 POL SYSTEM PIPING SCHEMATIC**  
SCALE: NOT TO SCALE

**SEQUENCE OF OPERATION (AST-2):**

1. AST-2 SHALL FOLLOW THE EXISTING PRE-PROGRAMMED SEQUENCE OF OPERATION FROM THE (E)FP CONTROL PANELS AT BOTH THE 200KW AND 300KW GENERATORS WITHIN THE BIRKHMIR BUILDING.

**SEQUENCE OF INSTALLATION (AST-3/FP-1):**

1. THE TEMPORARY FUEL TANK (AST-3) SHALL BE PROVIDED WITH A TEMPORARY FUEL PUMP (FP-1).
2. THE TEMPORARY FUEL PUMP (FP-1) SHALL BE PROVIDED WITH DRY CONTACT CONNECTIONS FROM THE (E)FP CONTROL PANELS AT BOTH THE 200KW AND 300KW GENERATORS PRIOR TO THE INSTALLATION OF AST-3. SEE SHEETS PB105 AND PB107 FOR LOCATION OF (E)FP CONTROL PANELS.
3. FP-1 SHALL RUN WHEN EITHER OF THE (E)FPs AT THE 200KW OR 300KW GENERATOR IS RUNNING.
4. FP-1 SHALL REMAIN OFF WHEN BOTH OF THE (E)FPs AT THE 200KW AND 300KW GENERATORS ARE OFF.
5. PRIOR TO THE INSTALLATION OF THE PERMANENT AST-2, REMOVE ALL DRY CONTACT CONNECTIONS BETWEEN THE TEMPORARY FP-1 AND THE (E)FP CONTROL PANELS AT THE 200KW AND 300KW GENERATORS.



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION  
SIGNATURE: *[Signature]* EXPIRATION DATE: 4/30/2026

ADDENDUM	NO.	SYN	DESCRIPTION
ADDENDUM 1			
ADDENDUM 3			

CONSTRUCTION DOCUMENTS  
SUBMITTAL DATE: 03/01/2024

STATE OF HAWAII  
DEPARTMENT OF DEFENSE  
DIAMOND HEAD STATE MONUMENT  
4204 DIAMOND HEAD RD HONOLULU, HI 96816  
TMK: 3-1-042:006  
**BIRKHMIR EMERGENCY OPERATIONS CENTER (EOC) UPGRADES AND IMPROVEMENTS**  
WATER STORAGE SYSTEM SCHEMATIC

SCALE: AS NOTED  
STATE JOB NO. CA-202313-C  
FEDERAL PROJECT NO. -  
SHEET 78 OF 123  
**PB401**