

PLAN VIEW  
SCALE: 1:30

TAG	TAG DESCRIPTION	CONNECTION SIZE	ELEVATION FTOS		PROJECTION	
A	WATER INLET	6"-150CL RFWN	14 1/2"	369mm	7"	179mm
B	WATER OUTLET	3"-150CL RFWN	37 3/4"	959mm	7"	179mm
C	PSV OUTLET	2"-150CL RFWN	81 3/4"	2077mm	7"	179mm
D	INSTRUMENT AIR	1"-NPT 3000LB	48"	1219mm	6"	152mm
E	DRAIN	1"-NPT 3000LB	5 1/8"	130mm	6"	152mm

PIPING MAY NOT BE EXACTLY AS SHOWN


SHIPPING DIMENSIONS

LENGTH: 30'-7" [9322mm]  
 WIDTH: 15'-6" [4724mm]  
 HEIGHT: 12'-4" [3759mm]  
 APPROX. WEIGHT: 44,000LBS [19,960kgs]

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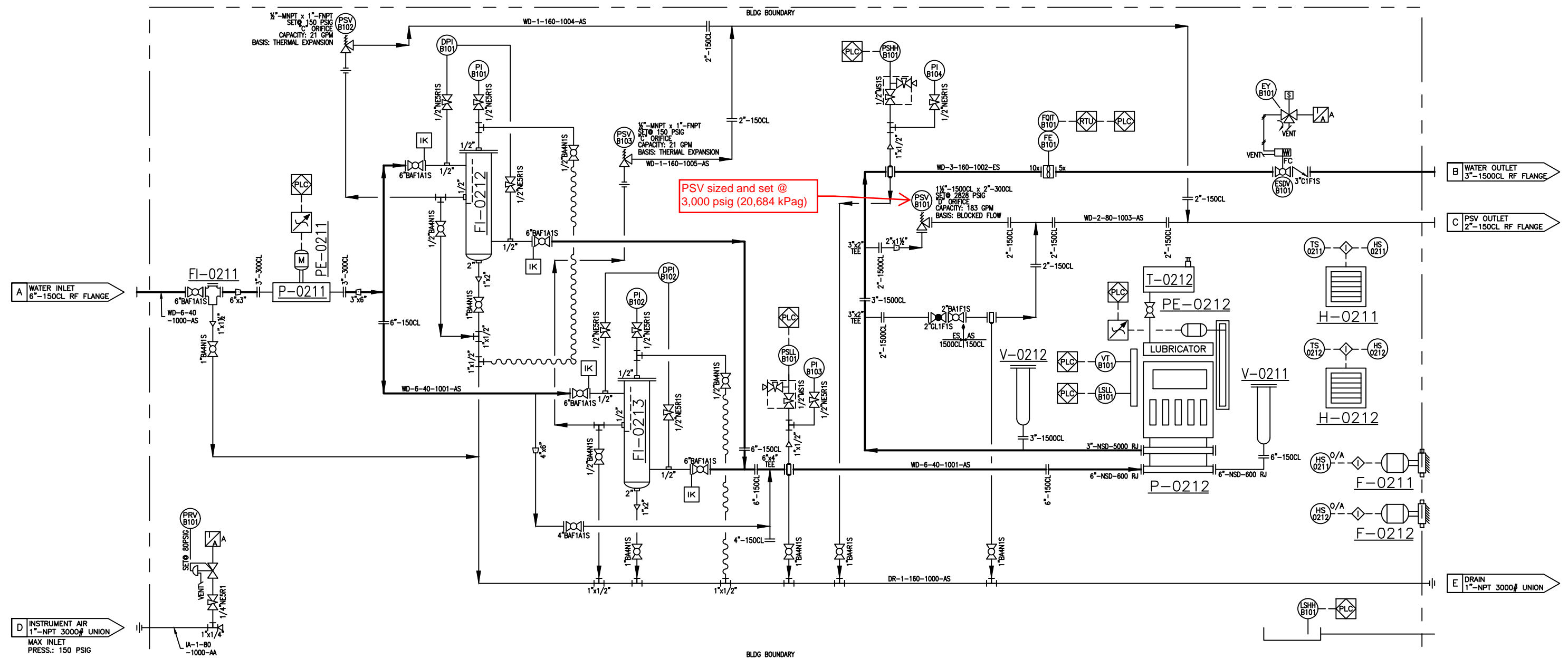
STAMPS, PERMITS AND APPROVALS

A	22-04-11	ISSUED FOR APPROVAL	KG	BP	
NO.	DATE	REVISIONS	DWN	CHK'D	APP.

  
 P.O. BOX# 216  
 HALKIRK AB T0C 1M0  
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 Phone: (403)263-8078 Fax: (403)261-3609

DATE	22-04-08	CLIENT	
DESIGNED BY	CAPE MFG.	TITLE	GENERAL ARRANGEMENT DRAWING FOR 200HP SOUR WATER DISPOSAL PUMP SKID 2828 PSIG @ -20°F / 100°F
DRAWN BY	KG	JOB NO.:	CML-221860
CHECKED BY	LA	VESSEL SERIAL NO.	-
APPROVED BY	BP	UNIT NO.:	BU-1000
SCALE:	SEE DWG	SHEET NO.:	1 OF 3
		DRAWING NO.:	CML-221860PLAN
		REV. NO.:	

- P-0211 CHARGE PUMP**  
MAKE: GRUNDFOS  
MODEL: CRN 45-2-2  
TYPE: CENTRIFUGAL  
FLOWRATE: 168 GPM  
MAX DISCHARGE PRESSURE: 50 PSIG  
NPSHR: 3 PSIG (7.46 FEET)
- PE-0211 CHARGE PUMP MOTOR**  
MAKE: TECO  
MODEL: 254TC  
VOLTAGE: 230/460V/3PH/60Hz  
POWER: 11 kW (15HP)  
SPEED: 3400 RPM  
ENCLOSURE: TEFC  
CLASSIFICATION: CLASS I DIV II
- P-0212 QUINTUPLEX PLUNGER PUMP**  
MAKE: NOV (CRUSADER SUPPLIED)  
MODEL: 300Q-5M  
2 1/2" PLUNGERS  
DESIGN FLOWRATE: 153 GPM  
DESIGN DISCHARGE PRESSURE: 2755 PSIG  
MAX FLOWRATE: 153 GPM @ 400 RPM  
MAX DISCHARGE PRESSURE: 3000 PSIG  
c/w 5 FEED LUBRICATOR, METRIX HIGH VIBRATION TRANSMITTER, EL-150 EX LUBE OIL LEVEL SWITCH, ALUMINUM BELT GAURD
- PE-0212 QUINTUPLEX PUMP MOTOR**  
MAKE: TECO (CRUSADER SUPPLIED)  
MODEL: 449T  
VOLTAGE: 480V/3PH/60Hz  
POWER: 150 kW (200HP)  
SPEED: 1200 RPM  
ENCLOSURE: TEFC  
CLASSIFICATION: CLASS I DIV II
- FI-0211 BASKET STRAINER**  
MAKE: ALTA  
MODEL: BFS150  
MAWP: 285 PSIG  
SCREEN SIZE: 1/8" 304 SS  
6"-150CL RF, WCB BODY, NACE
- FI-0212/0213 7 BAG FILTER HOUSINGS**  
MAKE: FIL-TREK (CRUSADER SUPPLIED)  
MODEL: S6LP24-712-6F-DA-150  
MAWP: 150 PSIG  
DESIGN TEMP: 400°F  
FLOW RATE: 350 GPM  
0" CORROSION ALLOWANCE  
4"-150CL RF, 316SST BODY
- V-0211 PULSATION DAMPENERS**  
MAKE: COORSTEK  
MODEL: T-1506-F-HNBR  
MAWP: 150 PSIG  
VOLUME: 600in<sup>3</sup>  
(CRUSADER SUPPLIED)
- V-0212 PULSATION DAMPENERS**  
MAKE: COORSTEK  
MODEL: T-35403-F-HNBR  
MAWP: 3540 PSIG  
VOLUME: 600in<sup>3</sup>  
(CRUSADER SUPPLIED)
- H-0211/0212 ELECTRIC HEATERS**  
MAKE: HAZLOC  
MODEL: XEU1-12-100-480360-B-Y-B  
10kW/480V/3PH/60Hz  
c/w T1: BTX1-N-A THERMOSTAT  
c/w PMB-12 MOUNTING BRACKET
- T-0212 OIL DAY TANK**  
CAPACITY: 55 GAL  
SINGLE WALL  
c/w LEVEL GAUGE  
(CRUSADER SUPPLIED)
- F-0211/0212 EXHAUST FANS**  
MAKE: ENERTECH  
MODEL: ET12-1XP  
VOLTAGE: 120V/1PH/60Hz  
POWER: .188 kW (1/4HP)  
500 CFM (12ACPH)  
c/w HOOD



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STAMPS, PERMITS AND APPROVALS				DATE 22-04-08	TITLE PIPING & INSTRUMENTATION DRAWING FOR 200HP SOUR WATER DISPOSAL PUMP SKID 2828 PSIG @ -20°F / 100°F
				DESIGNED BY CAPE MFG.	
				DRAWN BY KG	CRUSADER JOB NO.:
				CHECKED BY LA	UNIT NO.: BU-1000
				APPROVED BY BP	SHEET NO.: 1 OF 2
				SCALE: N.T.S.	DRAWING NO.: CML-221860PID
					REV. NO.: A
A 22-04-11 ISSUED FOR APPROVAL		KG	BP	PO. BOX# 216 HALKIRK, ALBERTA T0C 1M0 Phone: (403)884-2442 Email: sales@capemfg.ca	
NO.	DATE	REVISIONS		DWN	CHK'D APP.

PERMIT AND PROFESSIONAL STAMP AFFIXED APPLIES TO THE LATEST REVISION AS INDICATED IN TITLEBLOCK AND BY CLOADED AREAS IF SHOWN.

**NOTES:**

- QUANTITIES IN B.O.M. ARE FOR ONE (1) UNIT.
- ALL PIPING TO BE IN ACCORDANCE WITH THE LATEST EDITION OF ASME B31.3 PRESSURE PIPING CODE.
- CORROSION ALLOWANCE: 1/8"
- WELDED PIPING TO BE: SA-106B SMLS;
  - SPEC DS - 1" THRU 3": SCH. 160 **XXS**
  - SPEC AS - 1" THRU 2": SCH. XS
  - 3" & UP: SCH. 40
- THREADED PIPING TO BE: SA-106B SMLS;
  - SPEC DS - 1/2" THRU 1 1/2": SCH. XXS
  - SPEC AS - 1/2": SCH. XXS
  - 3/4" THRU 1 1/2": SCH. 160
- WELDED FITTINGS TO BE: SA-234-WPB c/w SA-105N FLANGES.
- FORGED STEEL FITTINGS TO BE: SA-105N;
  - CL6000 (min.) RATING FOR SCH. XXS PIPE,
  - CL3000 (min) RATING FOR SCH. 160 & UNDER.
- TUBING DETAILS;
  - INSTRUMENT: 3/8"(0.035"WT) 316SS TUBING
  - PROCESS: 1/2"(0.049"WT) 316SS TUBING
  - c/w SWAGelok 316SS FITTINGS & FERRULES.
- PROTECT ALL OPENINGS FOR SHIPMENT.
- VENT ALL INSTRUMENTS OFF SKID (o/s).
- PIPING & INSTRUMENTS SECURELY SUPPORTED.
- ELECTRICAL SUPPLIES & EQUIPMENT INSTALLED BY OTHERS.
- 100% X-RAY** OF ALL WELDED PIPING.
- NO PWHT** ON PIPING.
- 10%** OF ALL WELDED PIPING TO BE **HARDNESS TESTED** (<200BHN).
- 100% MPI** OF ALL PIPING FILLET WELDS.

PIPE SPECS		PIPE SPECS	
A	150 CL	AS	150CL SOUR
AA	150 PSI	AGS	150PSI SOUR
AG	150 PSI	BS	300CL SOUR
B	300 CL	CS	600CL SOUR
C	600 CL	DS	900CL SOUR
D	900 CL	ES	1500CL SOUR
E	1500 CL	FS	2500CL SOUR
F	2500 CL		

VALVE LIST				BILL OF MATERIALS			
TAG	QTY.	MAKE	DESCRIPTION	TAG	QTY.	MAKE	DESCRIPTION
1/2"BA4N1S	4	MERIDIAN	1/2"-NPT 2000WOG RP BALL VALVE, 316SST TRIM, RPTFE SEATS, A105 BODY, BAR STOCK, NACE	DPI-B101 DPI-B102	2	MIDWEST	DIFFERENTIAL PRESSURE GAUGE, NON-FILLED MODEL: 122AA-02-00, 2 1/2" FACE x (2) 1/4"-NPT, 0-15PSIG
1"BA4N1S	4	MERIDIAN	1"-NPT 2000WOG RP BALL VALVE, 316SST TRIM, RPTFE SEATS, A105 BODY, BAR STOCK, NACE	ESDV-B101	1	CVS	EMERGENCY SHUTDOWN VALVE, MODEL: C210SR-10 80 PSIG SUPPLY PNEUMATIC ACT., FAIL CLOSED c/w 3"-1500CL RF, RP, NACE, CVS BALL VALVE
1"BA4R1S	1	MERIDIAN	1"-NPT 6000WOG RP BALL VALVE, 316SST TRIM, RTFE SEATS, WCB BODY, NACE	EY-B101	1	ASCO	3-WAY SOLENOID VALVE, 1/4"-NPT, 303SST BODY MODEL: EF8320G202-24VDC, 3/2 NC, 11.6W
2"BA1F1S	1	MERIDIAN	2"-1500CL RF RP BALL VALVE, ENP TRIM, RPTFE SEAT, LF2 BOLTED BODY, NACE	FE-B101	1	PRIMARY FLO	TURBINE METER, 3"-1500CL EZE-IN, MODEL: WM0200X3 2" METERING 40-400 GPM CAPACITY c/w MAGNETIC PICK-UP
4"BAF1A1S	1	MERIDIAN	4"-150CL RF FP BALL VALVE, ENP TRIM, RTFE SEAT, WCB BOLTED BODY, NACE	FQIT-B101	1	NUFLO	MCIII FLOW ANALYZER, 4-20mA OUTPUT
6"BAF1A1S	5	MERIDIAN	6"-150CL RF FP BALL VALVE, ENP TRIM, RTFE SEAT, WCB BOLTED BODY, NACE	LSHH-B101	1	SOR	1550C HIGH LEVEL SWITCH, 2"-NPT, ELECTRIC 435 PSIG MAWP, SNAP ACTING, NACE, 5" INSERTION DEPTH MODEL: 1550C-F2A-C-L1-ES-CSCV
3"C1F1S	1	FZV	3"-1500CL RF SWING CHECK VALVE, TRIM #16, LCC BODY, BOLTED BONNET, NACE	LSLL-B101	1	MURPHY (CRUSADER SUPPLIED)	LIQUID LEVEL & LOW LEVEL SWITCH MODEL: EL150-EX
2"GL1F1S	1	FZV	2"-1500CL RF GLOBE VALVE, TRIM #12, BOLTED BONNET, WCB BODY, OS&Y, NACE	PI-B101- PI-B103	3	WGI	PRESSURE GAUGE, SILICONE FILLED, SS 4" FACE x 1/2"-NPT, 0-200 PSIG
1/4"NE5R1	1	GAUGETECH	1/4"-NPT MxF 6000PSIG NEEDLE VALVE, HARD SEAT A105N BODY, STD	PI-B104	1	WGI	PRESSURE GAUGE, SILICONE FILLED, SS 4" FACE x 1/2"-NPT, 0-5000 PSIG
1/2"NE5R1S	8	GAUGETECH	1/2"-NPT MxF 6000PSIG NEEDLE VALVE, HARD SEAT 316SST BODY, NACE	PRV-B101	1	CVS	PRESSURE REGULATOR, 1/4"-NPT, 250 PSIG MAWP MODEL: 67CFR, 0-125 PSIG RANGE, STD
1/2"M5S1S	2	WGI	1/2"-NPT MxF 10000PSIG 2-VALVE TEST MANIFOLD, HARD SEAT, 316SST BODY, NACE, MODEL: WN9734	PSHH-B101	1	CCS	PRESSURE SWITCH, 1/2"-NPT, ELECTRIC, 5000PSIG MAWP MODEL: 6900GZE24, 1800-3400PSIG RISING, NACE

TAG		QTY.	DESCRIPTION			
BUILDING			14'-0" WIDE x 30'-0" LONG, SELF FRAMER			
ROOF			GABLE STYLE, 9'-0" EAVE, 3:12 PITCH			
INSULATION			R12 IN WALLS & R20 IN ROOF c/w 6 MIL VAPOR BARRIER			
EXTERIOR			22 GA GALVALUME			
INTERIOR			24 GA PLAIN FLUTED ALUMINUM			
DOORS		2	6' x 7' 20 GA STEEL DOUBLE c/w GPW WINDOW			
HARDWARE			CHECK CHAIN, PANIC BAR, LOCK, & WEATHER STRIPPING			
WINDOW		1	40" x 40" DOUBLE GLAZED SLIDING w/ SCREEN			
VENTS		2	12" x 12" ADJUSTABLE LOUVRES & SCREENS			
		1	6" x FULL LENGTH RIDGE VENT			
HEATER		1	HAZLOC, SEE PID			
EXHAUST FAN		1	ENERTECH, SEE PID			
ACCESSORIES			ICE RAKES, EAVES TROUGH & DOWNSPOUTS			
SKID			14'-0" WIDE x 30'-0" LONG			
FLOOR			3/8" CHECKER PLATE, 2" CONTAINMENT, 12"x16" FLOOR DRAIN			
INSULATION			2" THK. MIN. POLYURETHANE INSULATION UNDERSKID			
SKID & SUPPORTS			SSPC-SP3, 1 COAT CLOVERDALE PRIMER, 1 COAT CLOVERDALE GREY ENAMEL			
PIPE EXTERIOR			SSPC-SP3, 1 COAT CLOVERDALE PRIMER, 1 COAT CLOVERDALE GREY ENAMEL			
PIPE INTERNAL			SSPC-SP5, DEVOE 253 TO MANUFACTURE SPECS			

2

ACCESSORIES

12

BLIND & TAPPED FLANGES		
QTY.	DESCRIPTION	
2	2"-150CL RF HUB BLIND FLANGE TAPPED 1"-NPT, SA-105N	
2	4"-150CL RF BLIND FLANGE, SA-105N	
1	2"-150CL RF BLEED RING, 2" LG, w/ 1"-NPT PORT, 316SST	
1	3"-1500CL RF BLEED RING, 2" LG, w/ (2) 1"-NPT PORTS 180', 316SST	
1	6"-150CL RF BLEED RING, 2" LG, w/ (2) 1"-NPT PORTS 180', 316SST	
4	6"-150CL RF ISOLATION KITS	
2	1/2"-NPT HYDRAULIC HOSE x 7FT LG, SWIVEL ONE END	

PSV sized and set @ 3,000 psig (20,684 kPag)

**END CONNECTION:**

- FLANGED RF= 1
- FLANGED RTJ= 2
- BUTTWELDED= 3
- THREADED F-F= 4
- THREADED M-F= 5
- SOCKETWELD= 6
- SW/THRD= 7
- TUBING= 8
- THRD/FLG= 9

**VALVE LEGEND**

2" BA 1 D 1S

**VALVE SERVICE:**

- NORMAL TEMP, SWEET PROCESS=1
- NORMAL TEMP, SOUR PROCESS=1S
- LOW TEMP, SWEET PROCESS=2
- LOW TEMP, SOUR PROCESS=2S

**ANSI CLASS:**

- CL150=A
- CL300=B
- CL400=C
- CL600=D
- CL900=E
- CL1500=F
- CL2500=G

**THREADED/SOCKET WELDED CLASS:**

- API 602 WOG
- CLASS 800=H 250 WOG=L
- CLASS 1500=J 1000 WOG=M
- CLASS 2500=K 2000 WOG=N
- 2160 WOG=O
- 3000 WOG=P
- 3600 WOG=Q
- 6000 WOG=R
- 10000 WOG=S
- TUBING RATING=T

STAMPS, PERMITS AND APPROVALS

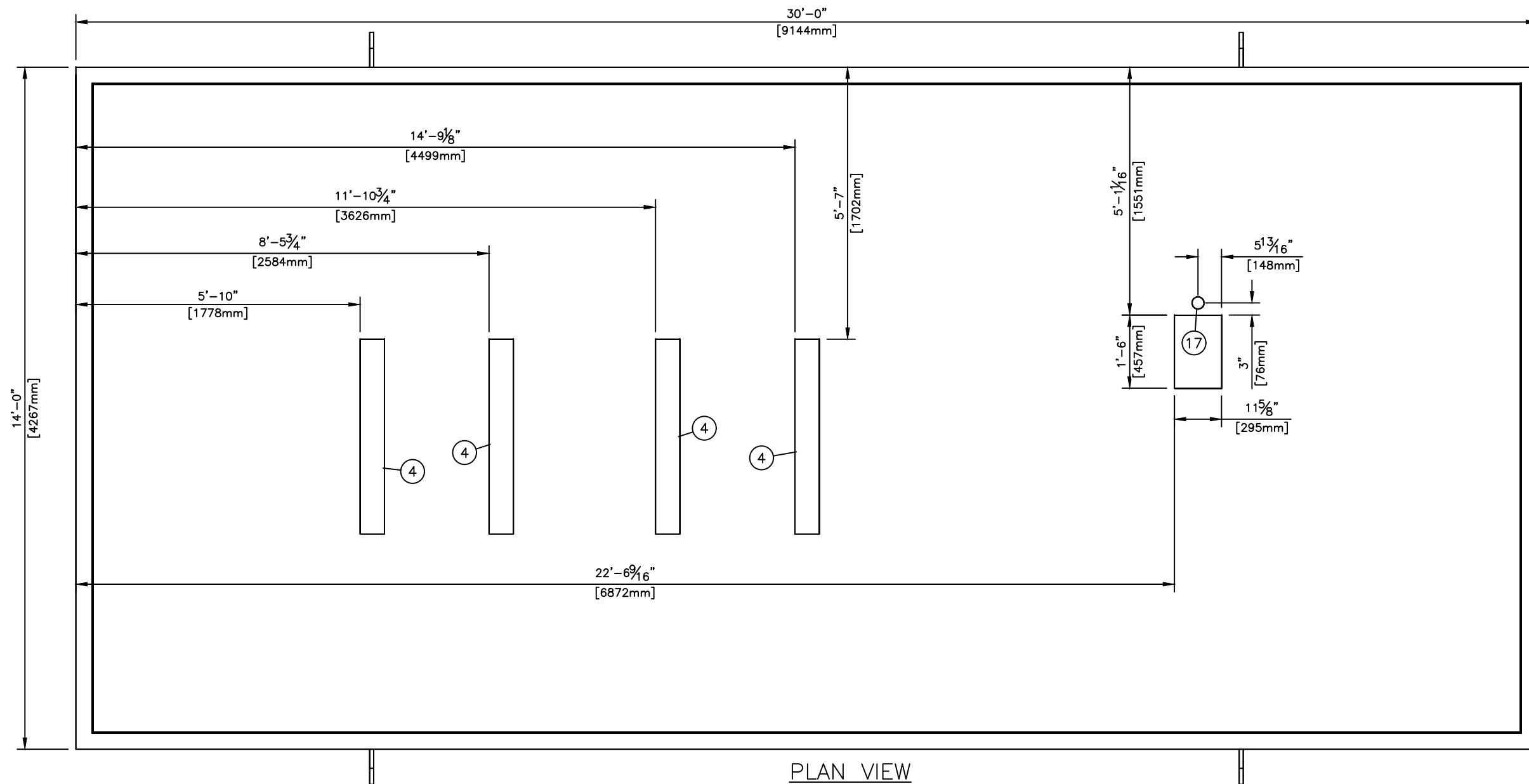
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DATE	22-04-08	DESIGNED BY	CAPE MFG.	TITLE	BILL OF MATERIALS FOR			
DRAWN BY	KG	CHECKED BY	LA		200HP SOUR WATER DISPOSAL PUMP SKID			
APPROVED BY	BP	JOB NO.:	CML-221860	CRUSADER JOB NO.:		UNIT NO.:	BU-1000	
SCALE:	N.T.S.	SHEET NO.:	2 OF 2	DRAWING NO.:	CML-221860BOM		REV. NO.:	A

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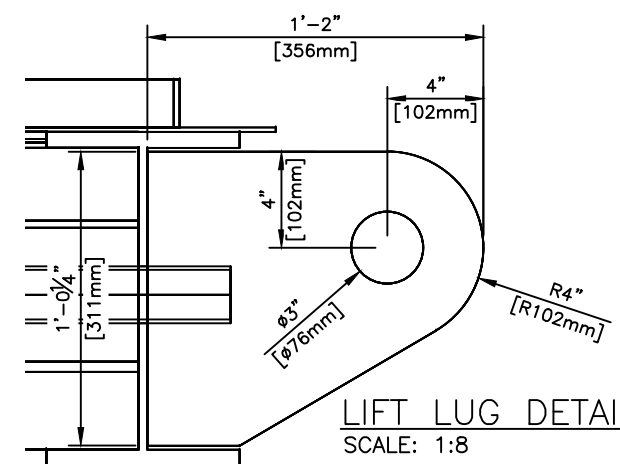




PLAN VIEW  
SCALE: 1:30

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BILL OF MATERIAL																		
						6	1	FB2"x1/4"	(CONTAINMENT)(WD-12)	1023"	.	145.18	13	2	W14X53 (WD-1)	106 3/4"	.	943.00
						7	4	PL-1"	(LIFT LUG) (WD-14)	14"	12 1/4"	155.48	14	5	W14X53 (WD-1)	156 7/16"	.	3457.59
1	3	C10X15.3 (WD-2)	78 7/8"	.	298.73	8	1	PIPE-2"	SCH 40	53"	.	16.17	15	2	W14X53	357"	.	3153.50
2	13	C4X5.4 (WD-18)	51 15/16"	.	303.87	9	2	W14X53 (WD-1)		51 15/16"	.	458.83	16	1	SUMP (S-SUMPRECT)	24"	12"	51.38
3	19	C4X5.4 (WD-18)	78 7/8"	.	667.76	10	1	W14X53 (WD-1)		67"	.	295.94	17	1	FULL CPLG-2" 3M	.	.	3.13
4	4	C6X8.2 (WD-12)	48"	.	131.20	11	1	W14X53 (WD-1)		67 7/16"	.	296.23	TOTAL WEIGHT: 14208.94 LBS					
5	1	CHKR PL-3 1/16"	360"	168"	3360.00	12	1	W14X53 (WD-1)		106 5/8"	.	470.95						



LIFT LUG DETAIL  
SCALE: 1:8

STAMPS, PERMITS AND APPROVALS



**CAPE**  
MANUFACTURING LTD.

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**crusader JV**

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Phone: (403)263-8078 Fax: (403)261-3609

DATE	22-04-19	CLIENT	
DESIGNED BY	CAPE MFG.	TITLE	SKID DRAWING FOR 200HP SOUR WATER DISPOSAL PUMP SKID c/w 14'-0" x 30'-0" BUILDING
DRAWN BY	KG	JOB NO.:	CML-221860
CHECKED BY	KC	VESSEL SERIAL NO.:	-
APPROVED BY	BP	UNIT NO.:	BU-1000
SCALE:	SEE DWG	SHEET NO.:	2 OF 2
		DRAWING NO.:	CML-221860S
		REV. NO.:	A