penticton.ca

Alternate Measures of Control (AMC) for Primary Clarifiers (3) Confined Space Entries Medium Hazard Atmosphere

City of Penticton AWWTP
February 16, 2016

Alternate Measures Submission Elements:

1. The three confined spaces are rectangular concrete tanks. The primary clarifiers are located just east of the plant entrance. The tanks are 5.7 m wide x 4.5m deep x 53 m long for a total volume of 1,359 m^3 each. There are two adjacent concrete channels, the inlet (upstream) channel and the outlet (Downstream) channel. The inlet (Upstream) channel is gravity feed from the headworks building and is typical of screened municipal raw wastewater (Typical water level (TWL) 343.5m). The outlet channel (downstream) is gravity fed from downstream of primary clarifiers (TWL 343.0 m). Bottom of the tank elevation is 339.4 m. There is one 200 mm suction line that penetrates the concrete and enters into the sump of the tank.
2. The space is isolated by:
    a. The inlet gravity feed channel has 2 Armtec 200mm x 1990mm aluminum wall mounted hand pull gates for each primary clarifier (3). They were installed in 2012, and are exercised at a minimum annually (no provision for double block and bleed or blanking). Drawing attached. The total head pressure of water applied against each hand pull gate from the upstream channel is 1600 mm or 2.25 psi of head pressure
    b. The outlet of each tank consists of three 450 mm diameter submerged launderers, which each have Armtec aluminum flat back gates (458 mm x 458 mm) for isolation. They were installed in 2012 and are exercised at a minimum annually (no provision for double block and bleed or blanking). Drawing attached. The total head pressure of water applied to each isolation gate from the upstream channel is 1000 mm or <1.4 psi of head pressure.
    c. One 200 mm adjacent suction pipe installed in 2012 and is isolated by a single Knife Gate. The total head pressure of water applied to the knife gate from the upstream side is 8 m or 12 psi of head pressure.
    d. One 150 mm adjacent gravity drain pipe installed in 2012 and is isolated by a single Knife Gate. The total head pressure of water applied to the knife gate from the upstream side is 8 m or 12 psi of head pressure.

3. Glenn Robertson, CRSP the City's Safety Coordinator 250-490-2553 glenn.roberston@penticton.ca administers the Confined Space program for the City of Penticton. Glenn Robertson and Randy Craig (AWWTP Supervisor) prepared the Alternate Measures and Hazard Identification/Risk Assessment (HIRA). This AMC includes information from Gary Marsden (Op III) and Gord Austrom (Op III), workers health and safety representatives at the AWWTP
4. Hazards to be addressed see the attached HIRA. The characteristic of the water on both the upstream and downstream side is that of typical raw screened municipal wastewater. No work will be performed that will contribute to the likelihood of material flowing into the space. Work to be performed under this AMC includes both corrective and preventative maintenance as per the equipment manufacturers Operation and Maintenance manual.
5. Alternate Measures;

    - The analysis of valves as a control measure should assume that all valves leak. However, there is no expectation that a properly installed and maintained valve will fail catastrophically if no work is being performed on it. It is recognized that systems will often permit some leakage; a means of pumping out the fluid will be undertaken.
    - Any potential leakage from the upstream hand pull gate will be continuously monitored by the standby person and a submersible pump will be used to remove any leakage. The water level in the upstream channel (400 mm freeboard) will be continuously monitored with a local audio/visual high level float. If the water level rises above 200 mm the alarm will sounds and a light will turn on (leaving 200mm of freeboard). The confined space will be evacuated and the issue will be addressed prior to re-entry.

    - Any potential leakage from the downstream gates will be continuously monitored by the standby person and a submersible pump will be used to remove any leakage. The level in the downstream channel (460mm freeboard) will be continuously monitored with a local audio/visual high level float. If the water level rises above 200 mm the alarm will sounds and a light will flash (leaving 260mm of freeboard). and the confined space will be evacuated and the issue will be addressed prior to re-entry.
    - See moderate hazard entry procedure for ventilation and atmospheric monitoring requirements
    - Communication will be verbal between worker and stand-by person. The stand-by person will have radio and cell phone contact
    - See attached emergency procedures

6. Workers will be orientated to this AMC and required to sign off on their orientation
7. AMC will be supervised by AWWTP Supervisor and regular visits documented
8. Time frame that the AMC is needed is 3 years, with annual engineering reviews
9. Up to three workers will be allowed in the space
10. The standby person will attend the confined space continuously

11. Decontamination of worker; worker in space will be wearing long sleeve coveralls and all pertinent PPE and if any contamination occurs, coveralls and PPE will be removed and laundered by our coverall service provider (Unifirst). There will also be an emergency wash station available to the worker at the site. Worker can shower if any area of their body gets contaminated.
12. Admin controls included in HIRA are; Installing fence, 3 point stance when on ladder, clean channel floor, good housekeeping, source of CO away from blower, pre flushing of space & sharps, electrical cord safety,
13. If we had to extract the worker it would take <60 sec, to winch him out
14. Response time by the Fire Department is from Station 201 the response time from time of call would be 7min depending on traffic and road conditions
15. Portable gas detector (Industrial Scientific Ventis MX4 http://www.indsci.com/products/multi-gas-detectors/ventis) used to monitor the confined space. The alarm set points are set at; H2S low 5 ppm, high 10 ppm. LEL low 5%, high 10%. CO Low 13 ppm, high 25 ppm, STEL 100 ppm, TWA 25 ppm. O2 low 20.5%, high 23.5 %
16. Evacuation will be by a Pelsue davit arm http://www.pelsue.com/product/davit-arm-retrieval-system-2/ top mounted to the concrete channel. Rescue Winch is a DBI Self Retracting Lifeline (SRL) model # 23403-1 s/n # 033794, it was certified by Carleton Rescue on Jan 16th 2016
17. To adequately ventilate the 53m long space the work plan will include 6,000 CFM of ventilation equipment (one 3,000 cfm and two 1500 cfm blowers) supplying clean respirable air. The 3000 cfm fan will be maintained at the main work location(s). The other two 1500 cfm fans will be positioned to maintain clean respirable air throughout reminder of the tank. Additionally, tank lids/covers will be removed at strategic locations along the space. Due to the length (53m), volume and the number of openings of the tank installing one blower with sufficient capacity to adequately ventilate the space or maintain 20 air changes per hr is impractical.

PENTAGON ENGINEERING LTD.

142 PENROSE COURT
PENTICTON, BC, V2A 9B6
TELEPHONE: (250) 809-9933

E-MAIL: P-ENG@OUTLOOK.COM

Date: February 16, 2016

City of Penticton AWWTP
459 Waterloo Ave
Penticton, BC

Via email: randy.craig@penticton.ca

Attention: **Randy Craig**

RE: Penticton AWWTP – Alternate Measures of Control (AMC), Primary Clarifiers (3)

Dear Mr. Craig,

The Armtec gates inlet and outlet are of adequate engineering, construction and maintenance to hold back the head applied to it for the time required to be in the confined space. The analysis of the gate as a control measure assumes that all gates leak. However, there is no expectation that a properly installed and maintained valve will fail catastrophically if no work is being performed on it which these gates are. It is recognized that systems will often permit some leakage; a means of pumping out the fluid should be undertaken. The upstream and downstream water should be continuously monitored and if the level rises too high that space should be evacuated.

Given these facts it is our opinion that the proposed AMC for entering the Primary Clarifiers (3) confined space is adequate. This AMC is adequate for one year and after that time it should be revisited to ensure its adequacy.

PENTAGON ENGINEERING LTD.
Per:

Rob Linder, P.Eng.
Director

THE CITY OF Penticton

CONFINED SPACE ENTRY PROCEDURES & RESCUE PLAN

< back

Primary Tank Preventative & Corrective Maintenance

Work to be performed or location of confined space

Prepared By: Randy Craig

Technical Information By: Gary Marsden, Gord Austrom & Glenn Roberston

	Atmospheric Conditions	Details	P			Control Measures	P		
2	Hydrogen Sulphide (H2S)	Possible H2S	2	2	B	H2S (Hydrogen sulfide) gas detector - continuous monitoring, Min. 5000 cfm fan in push mode continuous	1	2	A
14	Combustible Gases	Possible Methane	2	2	B	LEL (combustible) gas detector - continuous monitoring, Min. 5000 cfm fan in push mode continuous	1	2	A
9	Oxygen (O2) Deficiency / Enrichment	Possible low O2	2	2	B	O2 (Oxygen) gas detector - continuous monitoring, Min. 5000 cfm fan in push mode continuous	1	2	A
1	Carbon Monoxide (CO)	General	2	2	B	CO (Carbon monoxide) gas detector - continuous monitoring, Min. 5000 cfm fan in push mode continuous	1	2	A
			Initital				Final		
	Hazards / Exposure	**Details**	**P**			**Control Measures**	**P**		
37	Falling Hazard	Possible fall when inside guard rails	2	3	C	Install Modulock fence around openings. Fall proctection (Harness Self retracting life line) must been worn when inside fencing and when ascending or descending on the ladder, ensure staff performing the entry/work do not have an existing fear of heights, Caution when climbing ladder(s) - maintain 3-point contact	1	3	B
32	Mechanical / Moving Part Hazards	Mechanical Flights	2	2	B	Lockout procedures attached	1	2	A
35	Engulfment or Immersion Hazards	Possible Flooding	2	2	B	Lockout procedures attached • Any potential leakage from the upstream hand pull gate will be continuously monitored by the standby person and a submersible pump will be used to remove any leakage. The water level in the upstream channel will be continuously monitored with a local audio/visual high level float set to alarm at 200 mm of free board while space is occupied. If the water level rises above 200 mm the alarm will sounds and a light will flash (leaving 200mm of freeboard). The confined space will be evacuated and the issue will be addressed prior to re-entry. • Any potential leakage from the downstream gates will be continuously monitored by the standby person and a submersible pump will be used to remove any leakage. • Any potential leakage from the downstream gates will be continuously monitored by the standby person and a submersible pump will be used to remove any leakage. The level in the downstream channel (460mm freeboard) will be continuously monitored with a local audio/visual high level float. If the water level rises above 200 mm the alarm will sounds and a light will flash (leaving 260mm of freeboard). and the confined space will be evacuated and the issue will be addressed prior to re-entry.Any leakage into the space will be continuously monitored by the stand by person and a sump pump will be installed to pump out as required	1	2	A

19	Sharps / Puncture Wounds	Follow SWP for Sharps	2	2	B	Sharps container & tongs	1	2	A
46	Adjacent Work Site Hazards	Ensure no internal combustion engines are running near ventilators	2	2	B	Place air intake away from source of CO	1	2	A
50	Overhead / Falling Object Hazards	Ensure Hardhats are worn while in space	2	2	B	Keep area around openings free of tools and equipment. If lowering or raising equipment ensure engineered "Tough Buckets" are used	1	2	A
38	Slipping / Tripping Hazard	Ensure floor is clean	2	2	B	Clean floor of slippery material	1	2	A
33	Electrical / Electrocution Hazards	Electrical cord safety	2	2	B	Electrical cords are in good condition (not damaged or frayed), Use GFI	1	2	A
52	Other (Specify)	Potential contact with Wastewater	2	2	B	Ensure proper PPE is worn for the work to be performed.	1	2	A

Area Preparation:
1. Drain and clean tank 2. Keep area around tank clear of tools and equipment - testing of separate lines - creating different places
Confined Space Entry Procedures - Supplementary Instructions:
1. Follow moderate hazard confined space entry procedure and lock out procedure
Confined Space Entry Rescue Plan:
1. Follow confined space emergency procedure

Lockout-Tagout Posted Procedure

LOCKOUTPRO™ 3.0

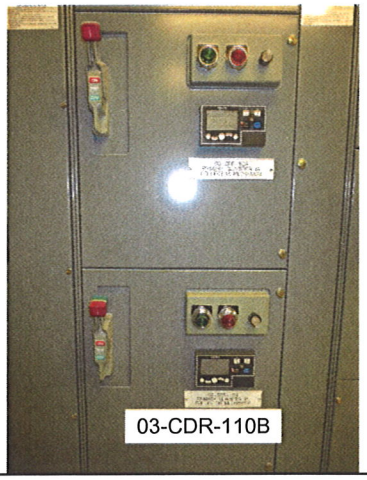
ID#: Primary tank #1 Created: 2/10/16 Revised: 2/11/16	Facility: AWWTP	Location: Area 3
	Description: Primary Sed Tank	

10 Lockout Points

Lockout Application Process

1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

Lockout Steps

Step #	Action	Info
1 Electrical Primary Feed	The E-1 Disconnect is located on the UV MCC room side of the machine.Turn Disconnect to the off position and lock out. Use a Lock and hasp device.	 03-CDR-110A
2 Electrical Primary Feed	The E-2 Disconnect is located on the UV MCC room side of the machine.Turn Disconnect to the off position and lock out. Use a Lock and hasp device.	 03-CDR-110B

Lockout-Tagout Posted Procedure

LOCKOUTPRO™ 3.0

ID#: Primary tank #1 Created: 2/10/16 Revised: 2/11/16	Facility: AWWTP	Location: Area 3
	Description: Primary Sed Tank	

10 Lockout Points

Lockout Application Process

1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

Lockout Steps

Step #	Action	Info
3 Hydraulic Inlets	The H-1 Hand Pull Gate is located on the Inlet side of the machine.HPG Use a Lock and hasp device.	
4 Hydraulic Secondary Feed	The H-2 Knife gate is located on the Suction side of the machine. Use a Lock and chain device.	

Lockout-Tagout Posted Procedure

LOCKOUTPRO™ 3.0

ID#: Primary tank #1 Created: 2/10/16 Revised: 2/11/16	Facility: AWWTP	Location: Area 3	
	Description: Primary Sed Tank		

10 Lockout Points

Lockout Application Process

1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

Lockout Steps

Step #	Action	Info
5 Hydraulic Inlets	The H-3 Hand Pull Gate is located on the Inlet side of the machine.HPG Use a Lock and hasp device.	
6 Hydraulic Discharge	The H-4 Gate is located on the Outlet side of the machine.Gate Use a Lock and hasp device.	
7 Hydraulic Discharge	The H-5 Gate is located on the Outlet side of the machine.Gate Use a Lock and hasp device.	

Lockout-Tagout Posted Procedure

LOCKOUTPRO™ 3.0

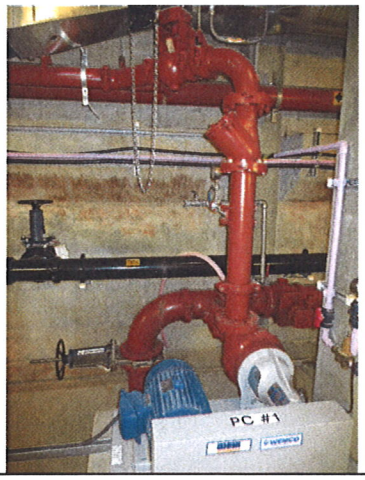
ID#: Primary tank #1 Created: 2/10/16 Revised: 2/11/16	Facility: AWWTP	Location: Area 3	
	Description: Primary Sed Tank		

10 Lockout Points

Lockout Application Process

1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

Lockout Steps

Step #	Action	Info
8 Hydraulic Discharge	The H-6 Gate is located on the Outlet side of the machine.Gate Use a Lock and hasp device.	 03-SG-112C
9 Hydraulic Secondary Feed	The H-7 Knife gate is located on the drain line in the basement of the Primary Gallery. Use a Lock and chain device to lock out.	 PC #1

Lockout-Tagout Posted Procedure

LOCKOUTPRO™ 3.0

ID#: Primary tank #1 Created: 2/10/16 Revised: 2/11/16	Facility: AWWTP	Location: Area 3	
	Description: Primary Sed Tank		

10 Lockout Points

Lockout Application Process

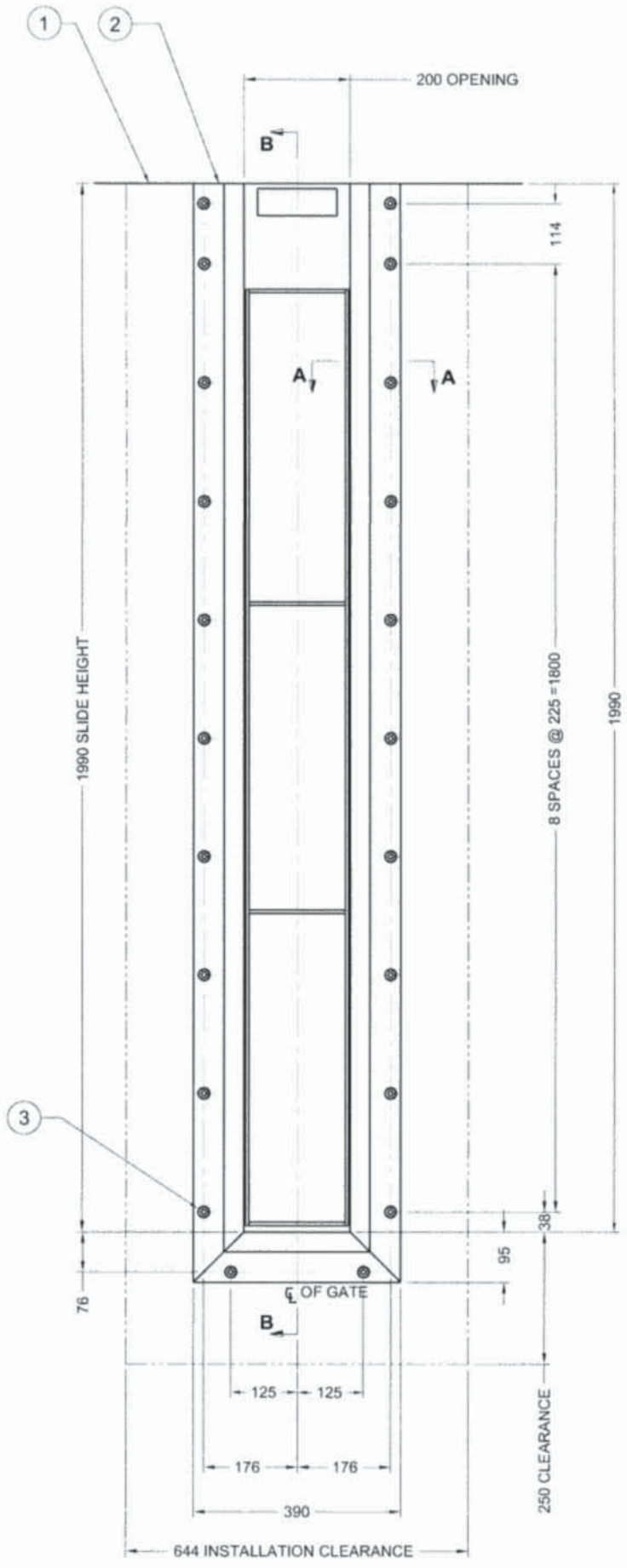
1. Notify affected personnel. 2. Properly shut down machine. 3. Isolate all energy sources. 4. Apply lockout devices, locks, & tags. 5. Verify total de-energization of all sources.

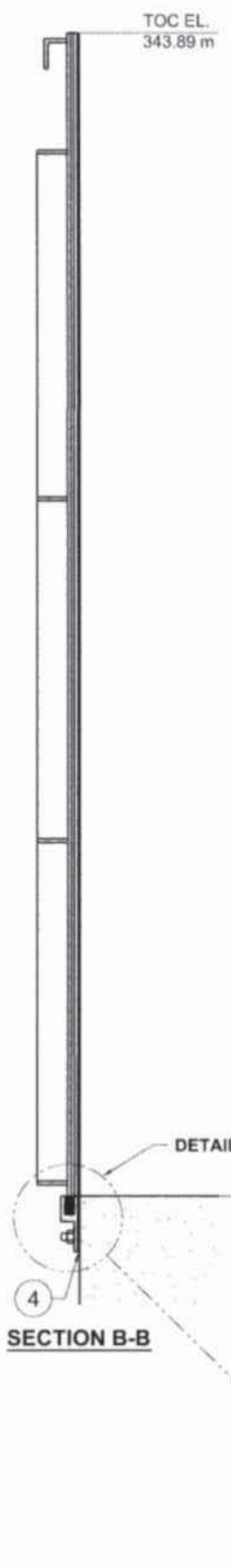
Lockout Steps

Step #	Action	Info
10 Hydraulic Secondary Feed	The H-8 Rotork is located on the Top of tank. Use a Lock and hasp device.	 Skimmer Rotork

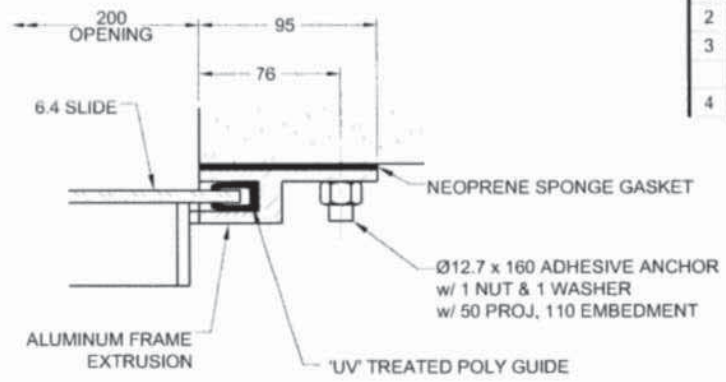
Lockout Removal Process

1. Ensure all tools and items have been removed. 2. Confirm that all employees are safely located. 3. Verify that controls are in neutral. 4. Remove lockout devices and reenergize machine. 5. Notify affected employees that servicing is completed.

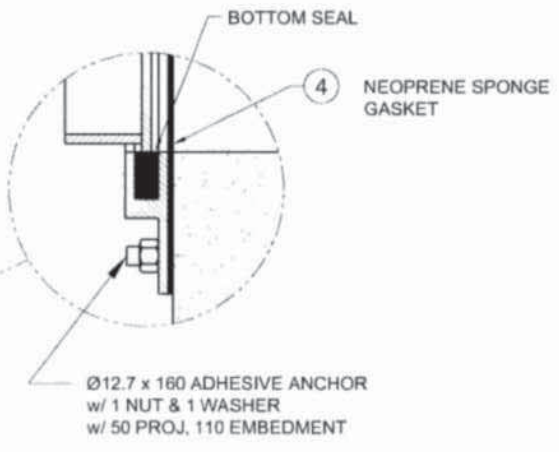




SECTION B-B



SECTION A-A



DETAIL 'C'

BILL OF MATERIAL					
NO.	QTY	DESCRIPTION	MAT'L	WT.	PART/DWG NO.
1	1	HANDPULL SLIDE	Al	12.4	09-1097706-076
2	1	HANDPULL FRAME	Al	14.3	09-1097706-075
3	22	Ø 12.7 x 160 LG ADHESIVE ANCHOR	304SS	6.8	ABD13160S0
		w/ 1 NUT & 1 WASHER			
4	1	9.5 x 102 x 4500 SOFT NEOP	RUBB	0.1	AK10209040

NOTES:

1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2) SEE MANUAL G-1900-1 FOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS
3) DO NOT SCALE DRAWING
4) INSTALL ANCHOR BOLTS USING THE EMBEDDED DEPTHS AND PROJECTIONS AS SHOWN ON DRAWING AND MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS. PROPER INSTALLATION OF THE ANCHOR BOLTS IS THE RESPONSIBILITY OF THE CONTRACTOR
5) ALL ANCHOR BOLT PROJECTIONS ASSUME NO GROUT
6) **CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS**
7) MAT'L: **SLIDE PLATE** - AL 6061-T6
EXTRUSIONS - AL 6061 - T6
ALL OTHER AL - 6061 - T6
STRUCTURAL FASTENERS: 304SS-ASTM F593, F594 SSTL, TYPE 304
ANCHORS: 304SS - ASTM A276 SSTL TYPE 304 COND. A.
POLY - LOW DENSITY BLACK POLYETHYLENE EXTRUSION
NEOPRENE GASKET: RUBB - SOFT SC41 NEOPRENE SPONGE
PSA - 1S ASTM D1056-67
8) ALL PAINTED SURFACES SUPPLIED w/ MANUFACTURER'S STANDARD COATING, UNLESS NOTED OTHERWISE
9) ALL STAINLESS STEEL FASTENERS SHOULD BE INSTALLED WITH AN ANTI-SEIZE LUBRICANT SUCH AS FELPRO C5A COPPER BASE ANTI-SEIZE LUBRICANT
10) GATE AND LIFT DESIGNED FOR 1.6 m SEATING AND 1.6 m UNSEATING HEAD MEASURED FROM INVERT

TAG NO.
03- HPG-111A
03-HPG-111B
03-HPG-121A
03-HPG-121B
03-HPG-131A
03-HPG-131B

NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
2	10/05/03	ISSUED FOR CONSTRUCTION	AL	
1	10/03/02	RE-ISSUED FOR APPROVAL	AL	JB
0	09/11/06	ISSUED FOR APPROVAL	MMC	JB

MAPLE REINDERS INC.
CITY OF PENTICTON - AWWTP UPGRADE

200 x 1990 ALUMINUM
WALL MOUNTED
HANDPULL GATE

DATE 2009/10/26
DRAWN MMC
CHECKED JB
REVIEWED
SCALE N.T.S.

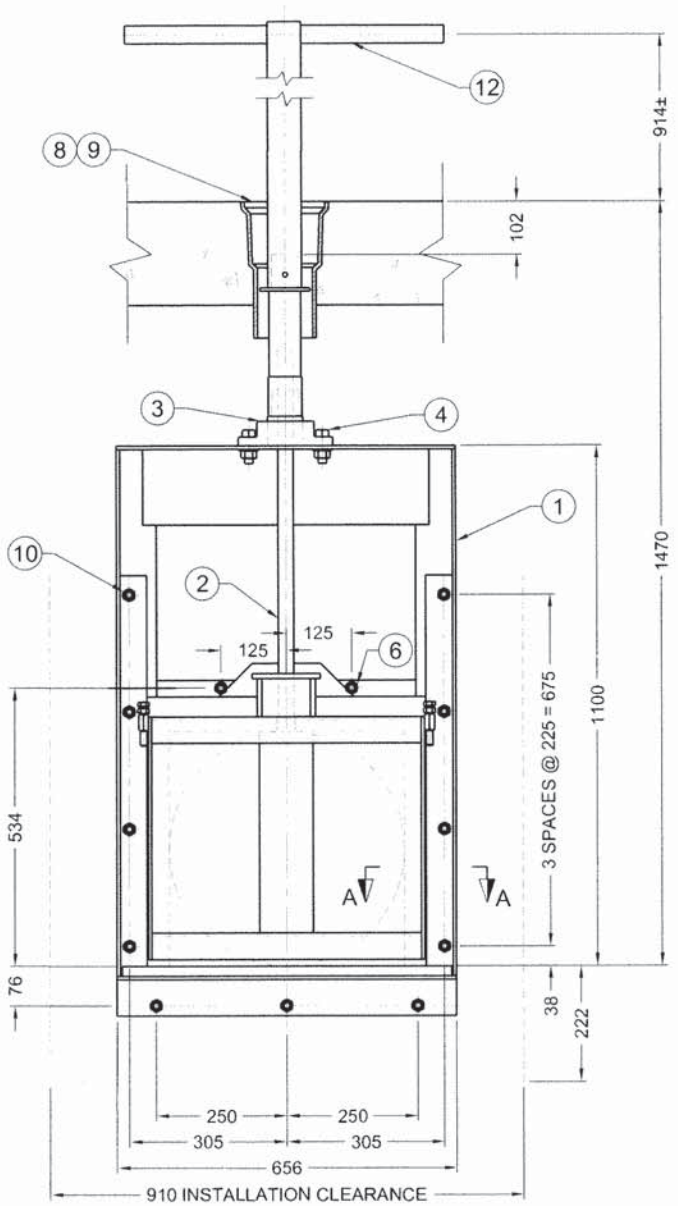
TAG NO. SEE ABOVE

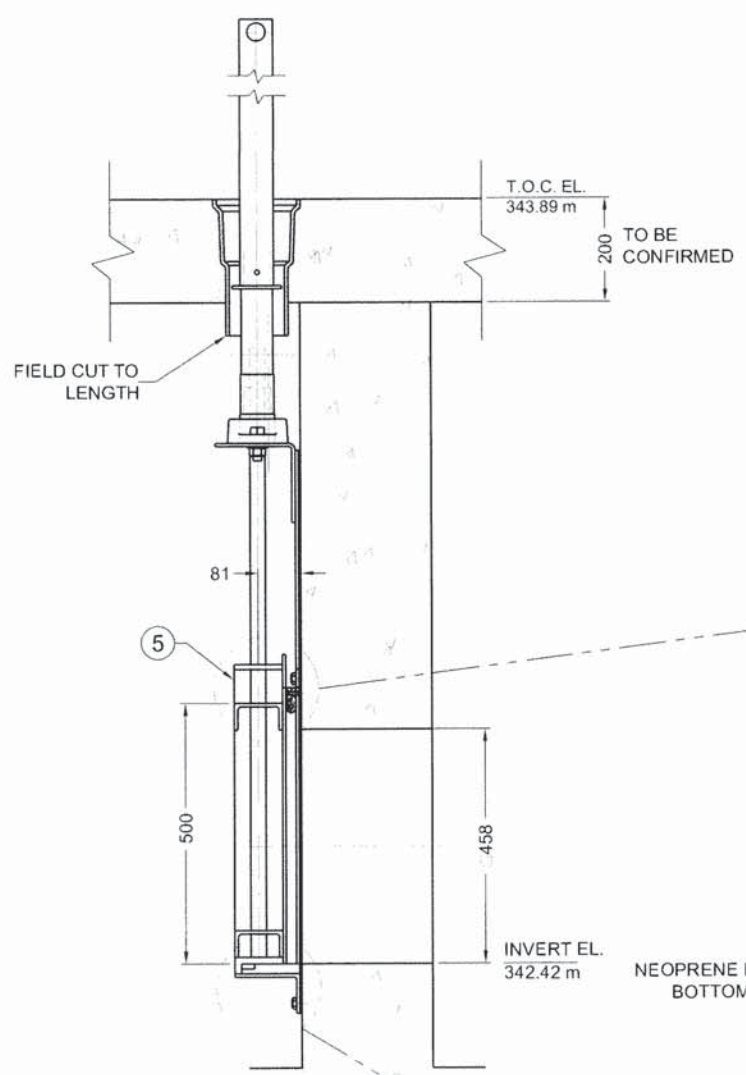
BR. - SG# **580-1097706**

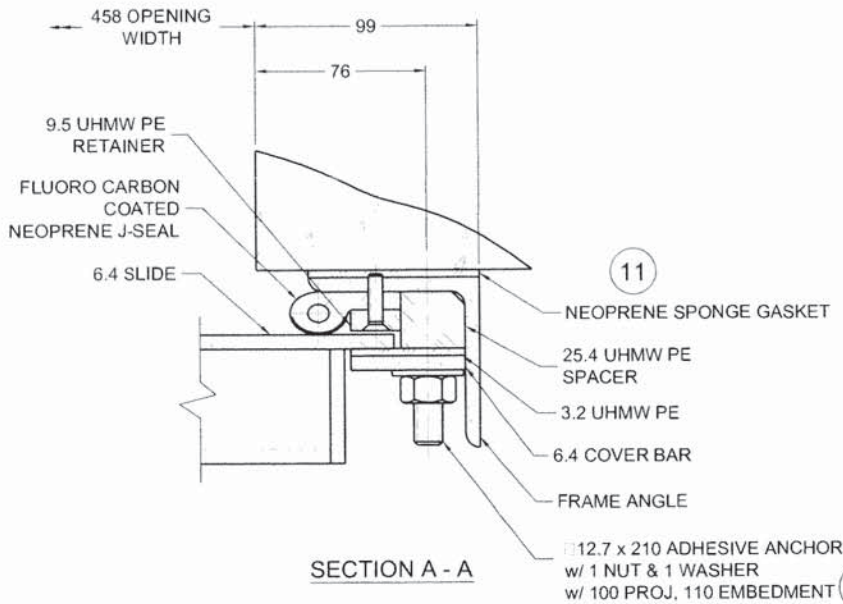
armtec
ARMTEC LIMITED PARTNERSHIP

QUANTITY 6
WT 33.6 kg

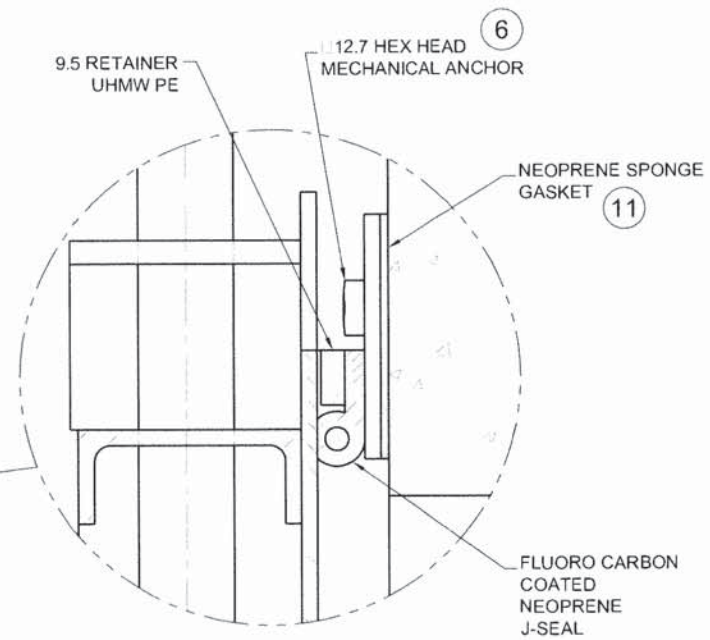
DRAWING NO. **09 , 1097706 , 006**
REV **2**
SHEET 6 OF 21

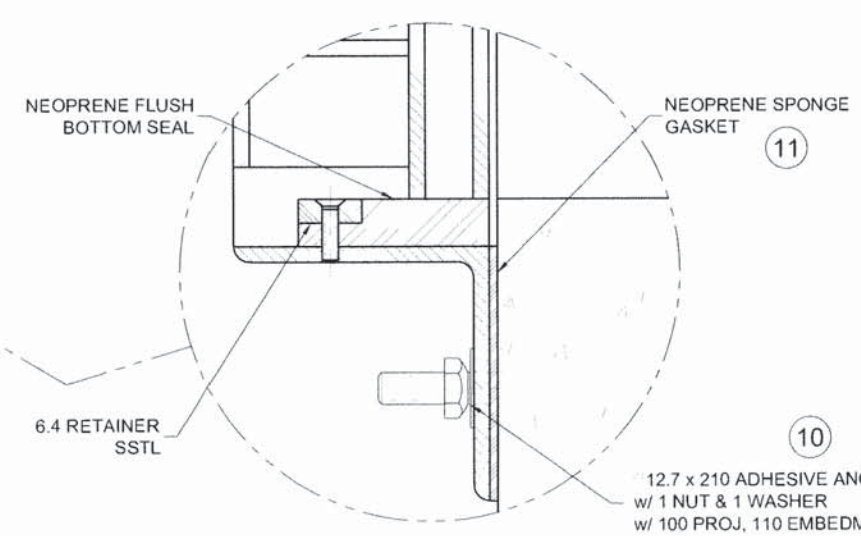






SECTION A - A





BILL OF MATERIAL

NO.	QTY	DESCRIPTION	MAT'L	WT.	PART/DWG NO.
1	1	GATE ASSEMBLY	Al	31.1	09-1097706-070
2	1	38.1 x 746 LG STEM	303SS	6.8	09-1097706-074
3	1	LWB LIFT w/ 38.1 BRZ LIFT NUT		4.0	ALWB038BLL
4	2	9.5 x 51 MACH BOLT w/ 1 WASHER	304SS	0.2	ABM16051S0
5	1	89 x 89 x 64 STEM BLOCK	BRZ	3.0	AR089BBTRH
6	2	12.7 x 121 HEX HEAD MECHANICAL ANCHOR	304SS	0.1	ABQ13121SH
7					
8	1	FLOOR BOX (420 LG)	C.I.	5.0	AF70000000
9	1	FLOOR BOX COVER	C.I.	1.3	AF80000000
10	11	12.7 x 210 ADHESIVE ANCHOR w/ 1 NUT AND 1 WASHER	304SS	3.4	ABD13210S0
11	1	9.5 x 76 x 3300 NEOPRENE	RUBB	0.6	AK07609040
12	1	'T' WRENCH (1067 LG)	AL	4.0	AHT1067000

NOTES:

1) ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE
2) SEE MANUAL G-1900-1 FOR INSTALLATION AND ADJUSTMENT INSTRUCTIONS
3) STEM THREAD - MODIFIED SINGLE ACME LEFT HAND, 4 THREADS PER 25.4 mm
   STEM MATERIAL - STAINLESS STEEL ASTM A582, TYPE 303
4) DO NOT SCALE DRAWING
5) GATE OPENS WHEN OPERATOR IS TURNED COUNTER-CLOCKWISE
6) INSTALL ANCHOR BOLTS USING THE EMBEDDED DEPTHS AND PROJECTIONS AS SHOWN ON DRAWING AND MANUFACTURER'S RECOMMENDED INSTALLATION INSTRUCTIONS. PROPER INSTALLATION OF THE ANCHOR BOLTS IS THE RESPONSIBILITY OF THE CONTRACTOR
7) ALL ANCHOR BOLT PROJECTIONS ASSUME NO GROUT
8) **CONTRACTOR TO VERIFY ALL DIMENSIONS AND ELEVATIONS**
9) MATERIAL: - **Al** - STRUCTURAL: ALUMINUM 6061-T6
   - PLATES: ALUMINUM ASTM B-209, ALLOY 6061 T-6
   - FASTENERS: **304SS** - STAINLESS STEEL ASTM F593, F594 TYPE 304
   - ANCHORS: STAINLESS STEEL AISI TYPE 304
   - **POLY**: BLACK ULTRA HIGH MOLECULAR WEIGHT POLYETHYLENE (UHMW PE)
   - SEALS: **RUBB** - NEOPRENE ASTM D2000 NON RECLAIMED w/ FLUORO CARBON COATED NOSING
   - FLUSH BOTTOM: NEOPRENE ASTM D2000
   - NEOPRENE GASKET: **RUBB** - SOFT SC41 NEOPRENE SPONGE PSA-1S ASTM D1056-67
10) ALL PAINTED SURFACES SUPPLIED w/ MANUFACTURER'S STANDARD COATING, UNLESS NOTED OTHERWISE
11) ALL STAINLESS STEEL FASTENERS SHOULD BE INSTALLED WITH AN ANTI-SEIZE LUBRICANT SUCH AS FELPRO C5A COPPER BASE ANTI-SEIZE LUBRICANT
12) STOP NUT MUST BE SET PRIOR TO OPERATING THE GATE
13) GATE AND LIFT DESIGNED FOR 1.1 m SEATING AND 1.1 m UNSEATING HEAD MEASURED FROM INVERT

TAG NO.
03-SG-112A, 03-SG-112B, 03-SG-112C,
03-SG-122A, 03-SG-122B, 03-SG-122C,
03-SG-132A & 03-SG-132C

NO.	DATE	DESCRIPTION OF REVISION	BY	CK'D
2	10/05/05	ISSUED FOR CONSTRUCTION	AL	JB
1	10/03/02	RE-ISSUED FOR APPROVAL	AL	JB
0	09/11/09	ISSUED FOR APPROVAL	dp	JB

MAPLE REINDERS INC.
CITY OF PENTICTON - AWWTP UPGRADE

458 mm x 458 mm
ALUMINUM FLAT BACK GATE
w/ FLOOR BOX
AND "T" WRENCH

DATE 09/10/26
DRAWN dp
CHECKED JB
REVIEWED
SCALE N.T.S.

TAG NO. SEE ABOVE

BR.-SG# 580-1097706

armtec
ARMTEC LIMITED PARTNERSHIP

QUANTITY 8

WT 59.5 kg

DRAWING NO. 09 1097706 007 REV 2

SHEET 7 OF 21

ITT

Fabri-Valve®

Heavy Duty Knife Gate Valve

Figure CF37

Revision 3

Engineered for life

Fabri-Valve® CF37 Heavy Duty Knife Gate Valve

Figure C37 with energized cored packing.

Energized cored packing is standard with 6" (DN 150) and larger C37 valves and all F37 valves.

Fabri-Valve Figures C37 and F37 are some of the most popular knife gate valve configurations. Figure C37 knife gate valves through 24", feature a heavy duty, rugged one-piece cast body, chest and flanges (except 5", which is fabricated – F37). Sizes larger than 24" are fabricated from heavy plate. The Figure C/F37 is available in all stainless steel (designated "S") or with alloy steel wetted parts and carbon steel external parts (designated "R"). In sizes 1.5" through 24", the "S" and the "R" share the same solid cast body. Sizes larger than 24" feature fabricated bodies configured to the service conditions. The Figure C/F37 is available with the widest range of seats in the industry including: integral metal, replaceable hardfaced metal, rubber "D" ring, replaceable rubber, polyurethane, UHMW-P, and PTFE. Standard body materials include 304, 316, and 317L stainless steel. Special alloys such as 254 SMO® are also available. Special flange drillings are also available.

All Figure C/F37 knife gate valves with handwheels include a provision for a locking device. Consult factory for details.

Specifications

Size Range

1.5" – 96"

Pressure Rating

1.5" – 24":	150 psi (10.3 bar) CWP (cold working pressure)
25" – 48":	Designs available in 50 psi (3.5 bar), 100 psi (6.9 bar) or 150 psi (10.3 bar) CWP
Larger than 48":	Manufactured to customer specification

Temperature Rating

1.5" – 48" 450°F (232°C).
Service temperatures above 400°F (204°C) require high temperature fasteners. Specify service temperature on paperwork. Consult factory for sizes larger than 48" (DN 1200) and for service temperatures up to 1500°F (816°C).

Flange Drilling

ANSI 125/150

Testing

Every Fabri-Valve Figure C/F37 valve is fully tested prior to shipment. Testing includes a body shell test, a seat test and a cycling test to insure proper functioning of moving parts. Additional testing is also available. Please let us know your requirements.

Standard Shell test:

- Hydro test at 1.5 times the rated CWP (cold working pressure) – Zero allowable leakage

Standard Seat test:

- Metal Seat: Hydro test at 40 psi (2.8 bar) and at the rated CWP
- Resilient Seat: Hydro test at 15 psi (1 bar) and rated CWP

Pressure/Temperature Ratings

The tables below are the Maximum Pressure/Temperature Ratings for the metallic components only. When checking pressure/temperature ratings, check the temperature rating and chemical compatibility of the packing material and, if applicable, the resilient seat material. In a majority of knife gate valve designs, the temperature limit or the chemical compatibility of the seat and/or packing material determines the practical pressure/temperature limitations.

Figure C37

Pressure/Temperature Rating - psi

Temp °F	Temp °C	Cast 304	Cast 304L	Cast 316	Cast 316L	Cast 317L	Cast WCB A-216	Cast DI
150	66	150	150	150	150	150	150	150
200	93	142	142	150	150	135	150	150
250	121	135	135	142	142	128	150	147
300	149	129	129	134	134	121	150	143
350	177	123	123	128	128	116	150	139
400	204	118	118	123	123	112	150	135
450	232	114	114	118	118	108	150	131
500	260	111	111	114	114	105	150	127
600	316	104	104	108	108	100	150	119
700	371	101	101	104	104	96	142	
800	427	96	96	100	100	92	103	
900	482	93		99			57	
1000	538	89		97			21	
1100	593	64		76				
1200	649	41		46				
1300	704	28		29				
1400	760	20		20				
1500	816	15		14				

Figure F37

Pressure/Temperature Rating - psi

Temp °F	Temp °C	304	304L	316	316L	317L	A 36	A516Gr70
150	66	150	133	150	133	150	150	150
200	93	133	114	141	113	135	137	150
250	121	126	108	133	107	128	135	150
300	149	120	102	124	101	121	133	150
350	177	115	98	119	97	116	131	150
400	204	110	93	114	93	112	128	150
450	232	107	90	110	90	108	125	150
500	260	103	87	106	87	105	121	150
600	316	97	82	101	83	100	111	150
700	371	94	80	97	80	96	108	142
800*	427*	89	77	93	77	92		103
900*	482*	87		92				57
1000*	538*	83		90				21
1100*	593*	78		88				
1200*	649*	49		59				
1300*	704*	30		33				
1400*	760*	18		18				
1500*	816*	11		10				

* "R" Series valves have external, non-wetted, carbon steel components. Standard "R" Series valves are limited to 700°F (371°C); however alternate "R" Series constructions are available to 1000°F (538°C)

NOTE: Each valve is identified by Size-Figure-Series-etc. The "How To Order" section explains the Valve Model Codes.

Shutoff Performance

Metal Seat

- Single integral metal seat
  - 1.5" – 24" 40cc / minute / inch of valve size
  - 25" – 48" 60cc / minute / inch of valve size
  - Above 48" Consult Factory
- Single hardfaced integral metal seat
  - 1.5" – 24" 80cc / minute / inch of valve size
  - 25" – 48" 120cc / minute / inch of valve size
  - Above 48" Consult Factory
- Dual metal seats
  - Consult factory. All sizes.
- Single hardfaced replaceable metal seat
  - 1.5" – 24" 80cc / minute / inch of valve size
  - Above 24" Consult Factory

Resilient Seat

- Single "D" ring, or single replaceable resilient seat (excluding PTFE)
  - Zero leakage. All sizes.
- Dual seats
  - Consult Factory. All sizes.
- Single replaceable PTFE seat
  - Consult Factory. All sizes.

Low Pressure Operation

Metal seated knife gate valves are seat tested at 40 psid (2.8 bar) in the preferred flow direction. When pressure falls below the 40 psid (2.8 bar) test pressure, less force is pushing the gate into the seat, which may result in additional seat leakage. When improved low-pressure shutoff performance is required, optional chest buttons and/or centerline buttons should be specified.

Fabri-Valve® CF37 Heavy Duty Knife Gate Valve

Available Options

- "D" Ring Seat
- Lever Operator
- Dual Seats
- Poly Replaceable Seats
- UHMW Replaceable Seats
- PTFE Replaceable Seats
- Rubber Replaceable Seats
- Hard Faced Replaceable Seats
- Elastomer Replaceable Seats
- Hard Faced Gate Edge
- Hard Gate Material
- Nickel-TFE Coated Gate
- Epoxy Coating
- Thru Drilled Flanges
- Flush Ports
- Chest Buttons: Not available 2"-6"
- Centerline Buttons
- Backing Ring
- Extra Wedges
- V-Port
- Cast Ni-Hard Deflection Cones Available 3"-16"
- Fabricated Deflection Cones
- Locking Devices
- Live Loaded Packing
- Self-Supporting Yokes
- Alternate Flange Drilling
- Bevel Gear
- Chainwheels
- Cylinder Actuators
- Electric Actuators
- Ratchet
- Extended Stems
- Gate Support Strips
- Rod Boots

Dimensions

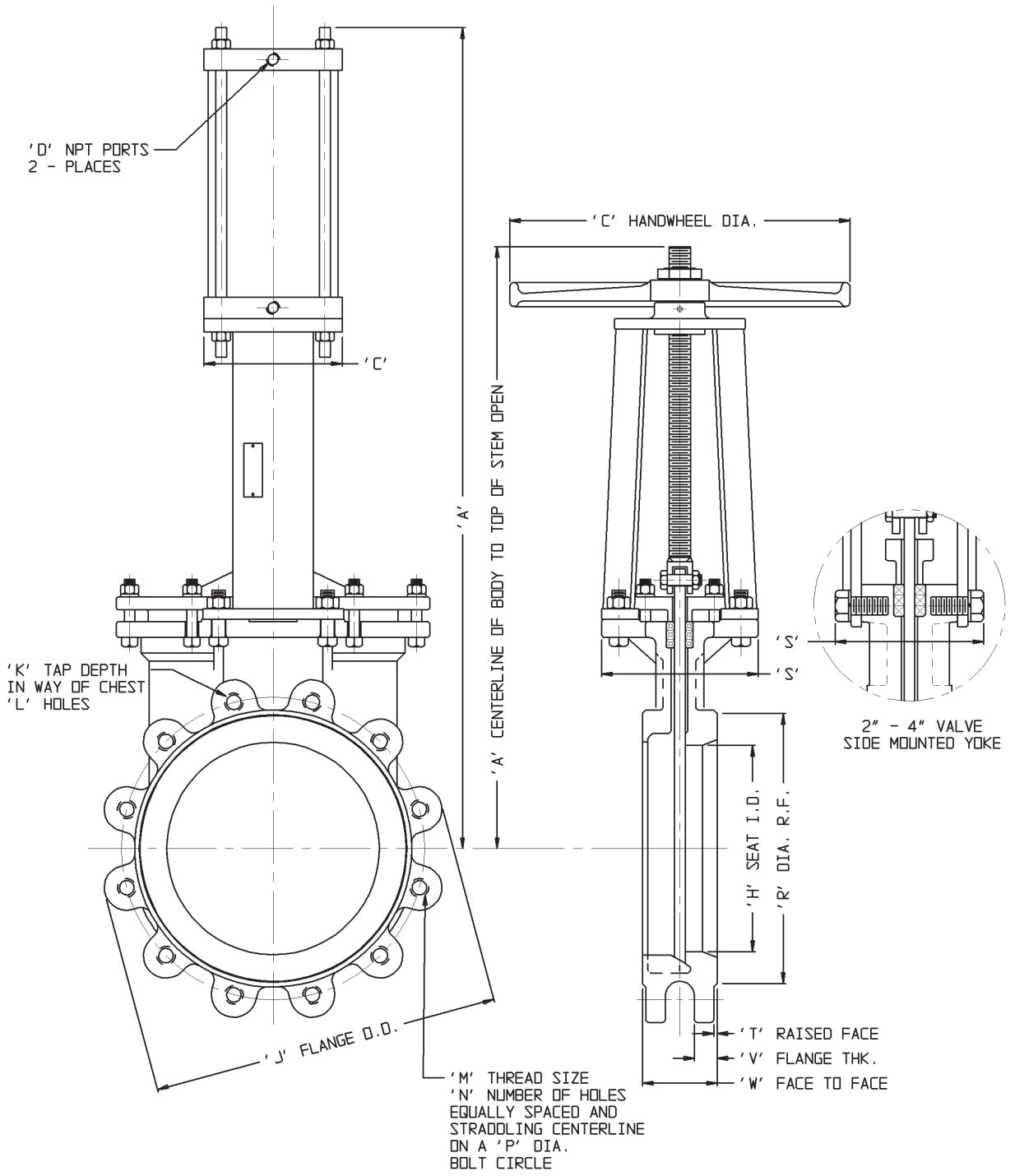
Valve Size		TABLE 1			DIMENSION Inches (mm) Figure C37 with HANDWHEEL OR CYLINDER																	Weight **	
Inches	DN	A			C			D		H*	J	K	L	M	N	P	R	S	T	V	W	lb	kg
		HW	2-1/2 CYL	3-1/4 CYL	HW	2-1/2 CYL	3-1/4 CYL	2-1/2 CYL	3-1/4 CYL														
2	50	13-11/16 (348)	18-3/8 (467)	16-7/8 (429)	8 (203)	3 (76)	4 (102)	3/8-18	1/4-18	2 (51)	6 (152)	3/8 (10)	2	5/8-11NC	4	4-3/4 (121)	3-5/8 (92)	4 (102)	1/16 (2)	9/16 (14)	1-7/8 (48)	17	8
		HW	2-1/2 CYL	3-1/4 CYL	HW	2-1/2 CYL	3-1/4 CYL	2-1/2 CYL	3-1/4 CYL														
3	80	16-7/16 (418)	20-7/8 (530)	19-3/8 (492)	8 (203)	3 (76)	4 (102)	3/8-18	1/4-18	3 (76)	7-1/2 (191)	13/32 (10)	2	5/8-11NC	4	6 (152)	5 (127)	4 (102)	1/16 (2)	9/16 (14)	2 (51)	21	10
		HW	3-1/4 CYL	4 CYL	HW	3-1/4 CYL	4 CYL	3-1/4 CYL	4 CYL														
4	100	19-3/16 (487)	22-1/8 (562)	22-7/8 (581)	8 (203)	4 (76)	4-1/2 (114)	1/4-18	3/8-18	4 (102)	9 (229)	13/32 (10)	2	5/8-11NC	8	7-1/2 (191)	6-3/16 (157)	4 (102)	1/16 (2)	11/16 (17)	2 (51)	30	14
		HW	4 CYL	6 CYL	HW	4 CYL	6 CYL	4 CYL	6 CYL														
6	150	25-5/16 (643)	28-7/8 (733)	29-1/4 (743)	10 (254)	4-1/2 (114)	6-1/2 (165)	3/8-18	3/8-18	6 (152)	11 (279)	7/16 (11)	2	3/4-10NC	8	9-1/2 (241)	8-1/2 (216)	7-3/8 (187)	1/16 (2)	5/8 (16)	2-1/4 (57)	75	34
		HW	6 CYL	8 CYL	HW	6 CYL	8 CYL	6 CYL	8 CYL														
8	200	32-5/8 (829)	35-13/16 (910)	36-5/16 (922)	12 (305)	6-1/2 (165)	8-5/8 (219)	3/8-18	3/8-18	8 (203)	13-1/2 (343)	5/8 (16)	2	3/4-10NC	8	11-3/4 (298)	10-5/8 (270)	7-3/8 (187)	1/16 (2)	13/16 (21)	2-3/4 (70)	94	45
		HW	8 CYL	10 CYL	HW	8 CYL	10 CYL	8 CYL	10 CYL														
10	250	37-3/4 (959)	41-7/16 (1053)	42-3/16 (1072)	16 (406)	8-5/8 (219)	10-7/8 (276)	3/8-18	1/2-14	10 (254)	16 (406)	1/2 (13)	4	7/8-9NC	12	14-1/4 (362)	12-3/4 (324)	7-3/8 (187)	1/8 (3)	15/16 (24)	2-3/4 (70)	126	57
		HW	8 CYL	10 CYL	HW	8 CYL	10 CYL	8 CYL	10 CYL														
12	300	44-9/16 (1132)	48 (1219)	48-3/4 (1238)	16 (406)	8-5/8 (219)	10-7/8 (276)	3/8-18	1/2-14	12 (305)	19 (483)	1/2 (13)	4	7/8-9NC	12	17 (432)	15 (381)	7-1/2 (191)	3/16 (5)	1 (25)	3 (76)	177	80
		HW	12 CYL	14 CYL	HW	12 CYL	14 CYL	12 CYL	14 CYL														
14	350	49-1/4 (1251)	54-1/16 (1373)	55-3/16 (1402)	20 (508)	12-3/4 (324)	14-3/4 (375)	1/2-14	3/4-14	13-1/4 (337)	21 (533)	7/16 (11)	4	1-8NC	12	18-3/4 (476)	16-1/4 (413)	7-3/4 (197)	3/16 (5)	15/16 (24)	3 (76)	215	98
		HW	12 CYL	14 CYL	HW	12 CYL	14 CYL	12 CYL	14 CYL														
16	400	56-1/2 (1435)	61-1/16 (1551)	62-3/16 (1580)	20 (508)	12-3/4 (324)	14-3/4 (375)	1/2-14	3/4-14	15-1/4 (387)	23-1/2 (597)	9/16 (14)	6	1-8NC	16	21-1/4 (540)	18-1/2 (470)	11-1/4 (286)	3/16 (5)	1-1/16 (27)	3-1/2 (89)	268	122
		HW	12 CYL	14 CYL	HW	12 CYL	14 CYL	12 CYL	14 CYL														
18	450	63-5/16 (1608)	66-1/2 (1689)	67-5/8 (1718)	20 (508)	12-3/4 (324)	14-3/4 (375)	1/2-14	3/4-14	17-1/4 (438)	25 (635)	5/8 (16)	6	1-1/8-7NC	16	22-3/4 (578)	21 (533)	11-1/4 (286)	3/16 (5)	1-1/16 (27)	3-1/2 (89)	407	185
		HW	14 CYL	16 CYL	HW	14 CYL	16 CYL	14 CYL	16 CYL														
20	500	68-5/8 (1743)	72-15/16 (1853)	73-7/16 (1865)	20 (508)	14-3/4 (375)	17 (432)	3/4-14	3/4-14	19-1/4 (489)	27-1/2 (699)	29/32 (23)	8	1-1/8-7NC	20	25 (635)	23 (584)	14 (356)	3/16 (5)	1-3/16 (30)	4-1/2 (114)	523	237
		HW	16 CYL	18 CYL	HW	16 CYL	18 CYL	16 CYL	18 CYL														
24	600	79-13/16 (2027)	84-11/16 (2151)	86-5/8 (2200)	20 (508)	17 (432)	19 (483)	3/4-14	3/4-14	23-1/4 (591)	32 (813)	13/16 (21)	8	1-1/4-7NC	20	29-1/2 (749)	27-1/4 (692)	14-1/8 (359)	3/16 (5)	1-5/16 (33)	4-1/2 (114)	713	321

Reference dimensions in (parentheses)

* For 14" - 24" valves with rubber replaceable seats, use the port I.D. dimensions show in the Flow Coefficients Table (see last page).

** Figures C37R and C37S with Handwheels

Refer to TABLE 1 for dimensions



with Cylinder

with Handwheel

Fabri-Valve® CF37 Heavy Duty Knife Gate Valve

Dimensions

		Valve Size TABLE 2 DIMENSION Inches (mm) Figure C37 with BEVEL GEAR																
Inches	DN	A	B	C	D	E	H	J	K	L	M	N	P	R	S	T	V	W
6	150	25-5/16 (643)	19-11/16 (500)	12 (305)	12-3/8 (314)	6-1/2 (165)	6 (152)	11 (279)	7/16 (11)	2	3/4-10NC	8	9-1/2 (241)	8-1/2 (216)	7-3/8 (187)	1/16 (2)	5/8 (16)	2-1/4 (57)
8	200	32-15/16 (837)	24-5/8 (625)	12 (305)	12-3/8 (314)	6-1/2 (165)	8 (203)	13-1/2 (343)	5/8 (16)	2	3/4-10NC	8	11-3/4 (298)	10-5/8 (270)	7-3/8 (187)	1/16 (2)	13/16 (21)	2-3/4 (70)
10	250	38-1/16 (967)	27-9/16 (700)	12 (305)	12-3/8 (314)	6-1/2 (165)	10 (254)	16 (406)	1/2 (13)	4	7/8-9NC	12	14-1/4 (362)	12-3/4 (324)	7-3/8 (187)	1/8 (3)	15/16 (24)	2-3/4 (70)
12	300	44-9/16 (1132)	31-13/16 (808)	12 (305)	12-3/8 (314)	6-1/2 (165)	12 (305)	19 (483)	1/2 (13)	4	7/8-9NC	12	17 (432)	15 (381)	7-1/2 (191)	3/16 (5)	1 (25)	3 (76)
14	350	49-5/16 (1252)	34-3/4 (883)	12 (305)	12-3/8 (314)	6-1/2 (165)	13-1/4 (337)	21 (533)	7/16 (11)	4	1-8NC	12	18-3/4 (476)	16-1/4 (413)	7-3/4 (197)	3/16 (5)	15/16 (24)	3 (76)
16	400	56-9/16 (1437)	40-3/8 (1026)	12 (305)	12-1/16 (306)	6-1/2 (165)	15-1/4 (387)	23-1/2 (597)	9/16 (14)	6	1-8NC	16	21-1/4 (540)	18-1/2 (470)	11-1/4 (286)	3/16 (5)	1-1/16 (27)	3-1/2 (89)
18	450	63-5/16 (1608)	43-13/16 (1113)	12 (305)	12-1/16 (306)	6-1/2 (165)	17-1/4 (438)	25 (635)	5/8 (15)	6	1-1/8-7NC	16	22-3/4 (578)	21 (533)	11-1/4 (286)	3/16 (5)	1-1/16 (27)	3-1/2 (89)
20	500	68-5/8 (1543)	47-15/16 (1218)	12 (305)	12-1/16 (306)	6-1/2 (165)	19-1/4 (489)	27-1/2 (699)	29/32 (23)	8	1-1/8-7NC	20	25 (635)	23 (584)	14 (356)	3/16 (5)	1-3/16 (30)	4-1/2 (114)
24	600	79-7/8 (2029)	55-3/16 (1402)	12 (305)	12-1/16 (306)	6-1/2 (165)	23-1/4 (591)	32 (813)	13/16 (21)	8	1-1/4-7NC	20	29-1/2 (749)	27-1/4 (692)	14-1/8 (359)	3/16 (5)	1-5/16 (33)	4-1/2 (114)

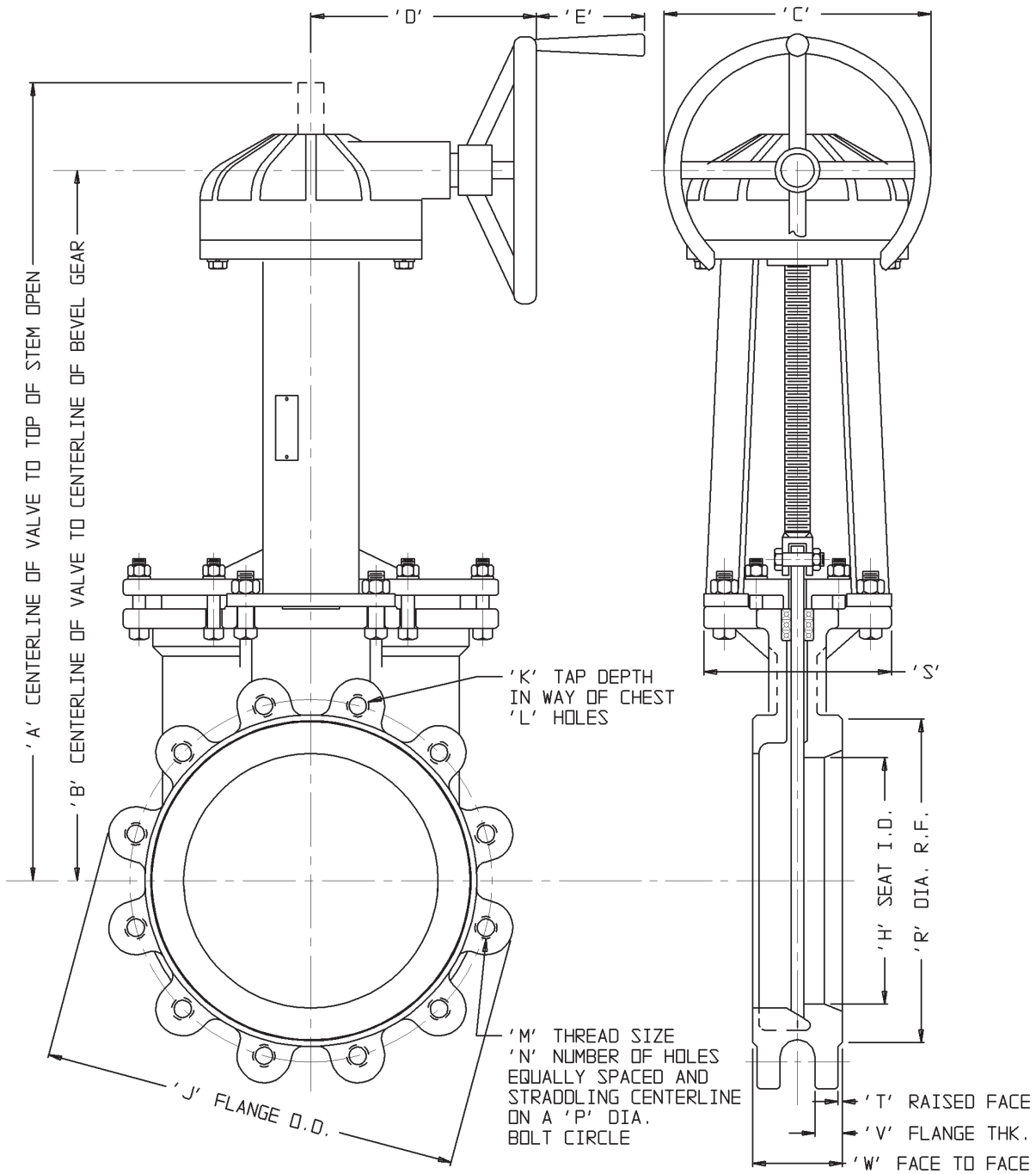
Reference dimensions in (parentheses)
6" - 14" valves have a bevel gear ratio of 3:1
16" - 24" valves have a bevel gear ratio of 4:1

Materials of Construction

Part	Materials	
	C37R & F37R	C37S & F37S
Body and Chest	1.5" – 24"(except 5") solid one piece. C37R-304: Cast 304 stainless steel C37R-316: Cast 316 stainless steel C37R-317L: Cast 317L stainless steel Larger than 24" and the 5" are fabricated with stainless steel wetted parts and carbon steel exterior parts.	1.5" - 24" (except 5") solid one piece. C37S-304: Cast 304 stainless steel C37S-316: Cast 316 stainless steel C37S-317L: Cast 317L stainless steel Larger than 24" and the 5" are fabricated of all stainless steel
Seat	Integral seat to 1500°F (816°C) with appropriate packing RH: Replaceable hardfaced seat to 750°F (399°C) standard Up to 1600°F(871°C) with proper packing and gaskets RT: Replaceable PTFE seat to 400°F (204°C) RW: Replaceable UHMWP seat to 140°F (60°C) RP: Replaceable polyurethane seat to 180°F (82°C)	
Gate	Stainless steel of same grade used in body, finished to 32 RMS	
Yoke	1.5" - 4", Cast ductile iron 6" and above fabricated carbon steel	1.5" - 4", cast 304 stainless steel 6" and above fabricated 304 stainless steel
Yoke Fasteners	Plated steel	Stainless steel
Stem	304 stainless steel	
Stem Nut	Acid resistant bronze	
Lubrication Fitting	Plated steel	
Packing	Acrylic/PTFE/silicone[1]	
Packing Follower	Ductile iron/carbon steel with plated steel bolts	304 stainless steel with stainless steel bolts
Handwheel	Cast iron	
Handwheel Retaining Nut	Malleable iron	Stainless steel
Tab Washer	Stainless steel	

[1] Energized cored packing is standard with 6" (DN150) and larger C37 valves and all F37 valves.

Refer to TABLE 2 for dimensions



Flow Coefficients

The Cv values below represent U.S. gallons per minute 60°F water through a 100% open valve at a pressure drop of 1 psi. The metric equivalent, Kv, is the flow of water at +16°C through the valve in cubic meters per hour at a pressure drop of 1 kg/cm2. To convert Cv to Kv, multiply the Cv by 0.8569.

Figures C37 and F37
Cv Ratings, Port Diameter, and Area

Valve Size		Standard Port			With V-Seat			With Replaceable Poly or Replaceable Rubber seat		
In.	DN	Cv	Port I.D. Inches	Port Area Sq. In.	Cv	Port Inside Inches	Port Area Sq. In.	Cv	Port I.D. Inches	Port Area Sq. In.
2	50	288	2.00	3.1	165	2.00	2.8	288	2.00	3.1
3	75	648	3.00	7.1	355	3.00	6.3	648	3.00	7.1
4	100	1,152	4.00	12.6	515	4.00	9.5	1,152	4.00	12.6
6	150	2,592	6.00	28.3	1,350	6.00	24.9	2,592	6.00	28.3
8	200	4,608	8.00	50.3	2,050	8.00	38.1	4,608	8.00	50.3
10	250	7,208	10.00	78.5	3,200	10.00	59.0	7,208	10.00	78.5
12	300	10,400	12.00	113.1	4,450	12.00	82.3	10,400	12.00	113.1
14	350	12,650	13.25	137.9	5,350	13.25	98.8	10,080	12.00	113.1
16	400	16,750	15.25	182.6	6,950	15.25	128.4	14,200	14.25	159.5
18	450	21,450	17.25	233.7	10,700	17.25	198.2	18,500	16.25	207.4
20	500	26,700	19.25	291.0	13,250	19.25	245.4	22,700	18.00	254.5
24	600	38,900	23.25	424.6	15,400	23.25	284.7	33,900	22.00	380.1
30*	750*	49,850	26.69	559.4	Consult Factory					
36*	900*	74,800	32.69	839.2						
42*	1050*	104,800	38.69	1175.5						
48*	1200*	136,700	44.19	1533.5						

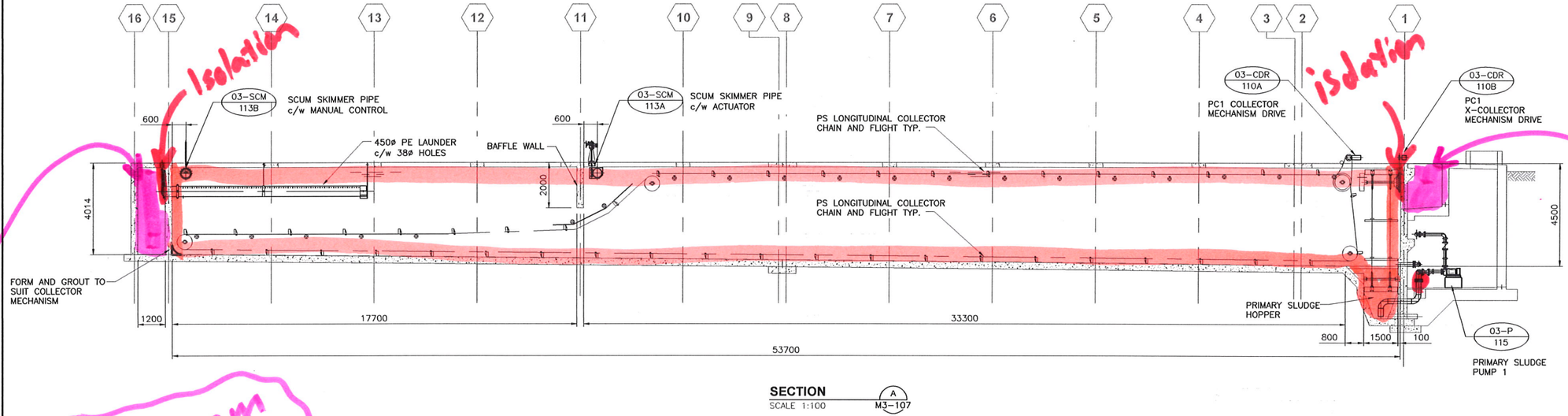
*50 psi (3.5 bar) CWP valve design. Contact factory for higher pressure designs.

Engineered Valves

For more information contact:
Engineered Valves
1110 Bankhead Avenue
Amory, MS 38821 USA
Phone: (800) 541-1849
(662) 256-7185
Fax: (662) 256-7932
Web site: www.engvalves.com
E-mail: engvalves.custserv@itt.com

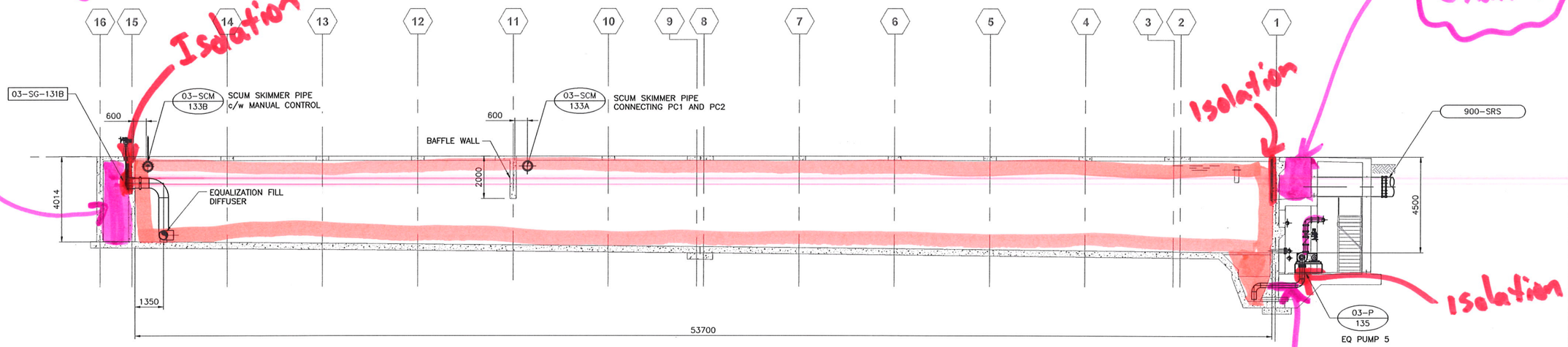
ITT

Engineered for life



SECTION (A / M3–107)
SCALE 1:100

SCUM SKIMMER PIPE



SECTION (B / M3–107)
SCALE 1:100

Downstream channel

Isolation

Upstream channel

Isolation

Isolation

Isolation

200mm Adjoint pipe

isolation

Tanks

NO.	DESCRIPTION	DRN	CHK	DATE (Y/M/D)
3	RECORD DRAWING	CJM	KJW	2013/08/09
2	REVISED PUMP ARRANGEMENT	KJW	LN	2010/02/26
1	ISSUED FOR CONSTRUCTION	PTL	KM	2009/08/31
0	ISSUED FOR TENDER	KJW	KM	2009/05/25

DRN BY: KJW
DES BY: PG
CHK BY: LN
APP BY: KM

PREPARED FOR: THE CITY OF Penticton

PREPARED BY: AECOM
Suite 201, 3275 LAKESHORE ROAD,
KELOWNA, BC, CANADA
V1W 3S9
250-762-3727

CITY OF PENTICTON AWWTP UPGRADE PENTICTON, B.C.

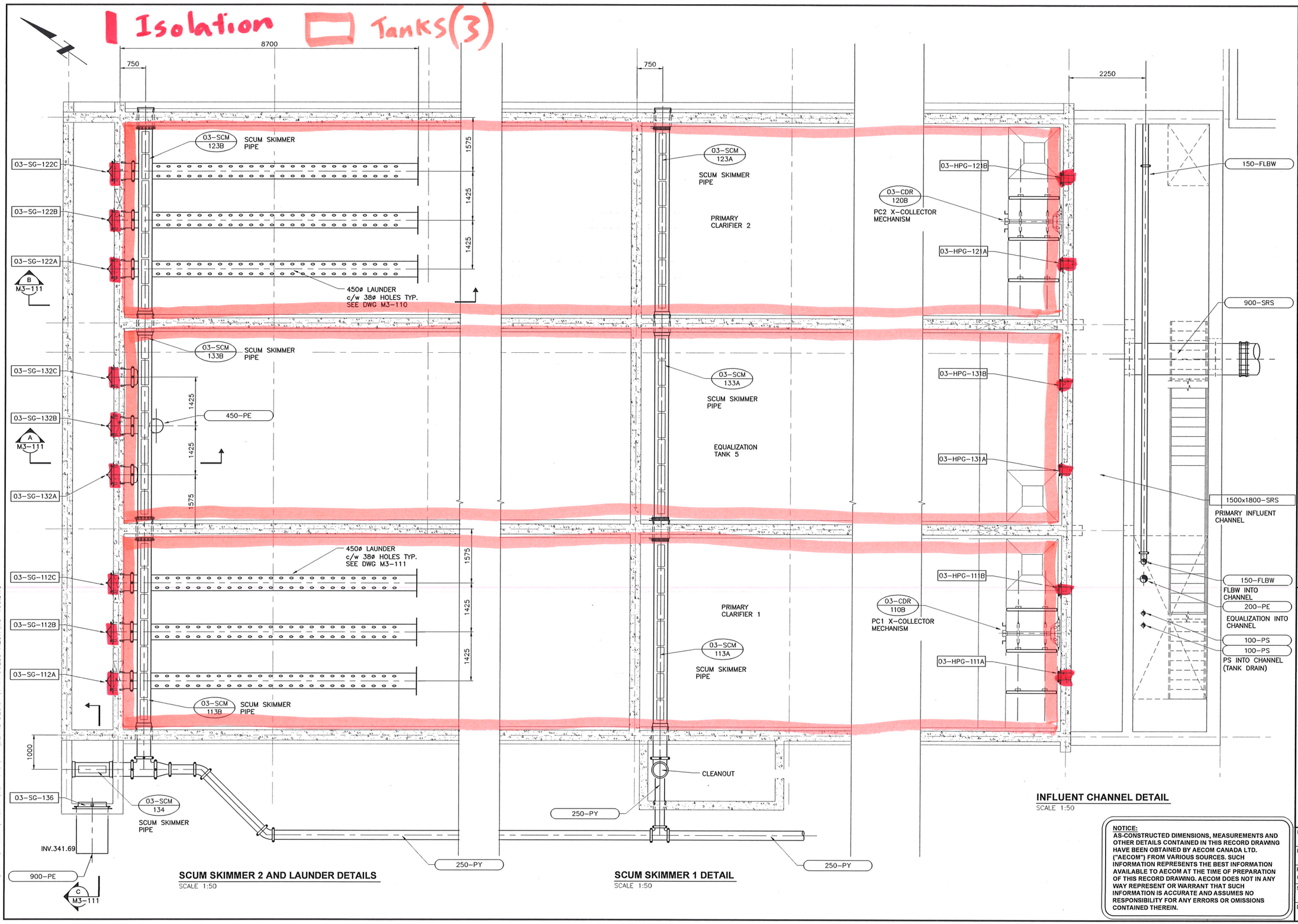
PROCESS MECHANICAL PRIMARY CLARIFIERS AND EQUALIZATION SECTIONS AND DETAILS

NOTICE:
AS-CONSTRUCTED DIMENSIONS, MEASUREMENTS AND OTHER DETAILS CONTAINED IN THIS RECORD DRAWING HAVE BEEN OBTAINED BY AECOM CANADA LTD. ("AECOM") FROM VARIOUS SOURCES. SUCH INFORMATION REPRESENTS THE BEST INFORMATION AVAILABLE TO AECOM AT THE TIME OF PREPARATION OF THIS RECORD DRAWING. AECOM DOES NOT IN ANY WAY REPRESENT OR WARRANT THAT SUCH INFORMATION IS ACCURATE AND ASSUMES NO RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS CONTAINED THEREIN.

PROJECT START DATE (M/Y)	APRIL 2008
PROJECT NO.	102949
FILENAME	M3-109.dwg
SHEET NO.	
DRAWING NO.	M3-109

Plotted By: rmillerc
Plot File Date Created: Aug/08/2013 11:00 AM
Layout–Sheet Name: M3–109
Filename: L:\WORK\102000\102949\02A–CAD\WAT\DETAIL DESIGN\6–PROCESS MECH\M3–109.DWG

Isolation Tanks (3)



SCUM SKIMMER 2 AND LAUNDER DETAILS
SCALE 1:50

SCUM SKIMMER 1 DETAIL
SCALE 1:50

INFLUENT CHANNEL DETAIL
SCALE 1:50

NOTICE:
AS-CONSTRUCTED DIMENSIONS, MEASUREMENTS AND OTHER DETAILS CONTAINED IN THIS RECORD DRAWING HAVE BEEN OBTAINED BY AECOM CANADA LTD. ("AECOM") FROM VARIOUS SOURCES. SUCH INFORMATION REPRESENTS THE BEST INFORMATION AVAILABLE TO AECOM AT THE TIME OF PREPARATION OF THIS RECORD DRAWING. AECOM DOES NOT IN ANY WAY REPRESENT OR WARRANT THAT SUCH INFORMATION IS ACCURATE AND ASSUMES NO RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS CONTAINED THEREIN.

REV	DESCRIPTION	DRN	CHK	DATE (Y/M/D)
2	RECORD DRAWING	CJM	KJW	2013/08/09
1	ISSUED FOR CONSTRUCTION	PTL	KM	2009/08/31
0	ISSUED FOR TENDER	KJW	KM	2009/05/25

DRN BY: KJW
DES BY: PG
CHK BY: LN
APP BY: KM

PREPARED FOR: THE CITY OF Penticton

PREPARED BY: AECOM
Suite 201, 3275 LAKESHORE ROAD, KELOWNA, BC, CANADA V1W 3X8
250-762-3727

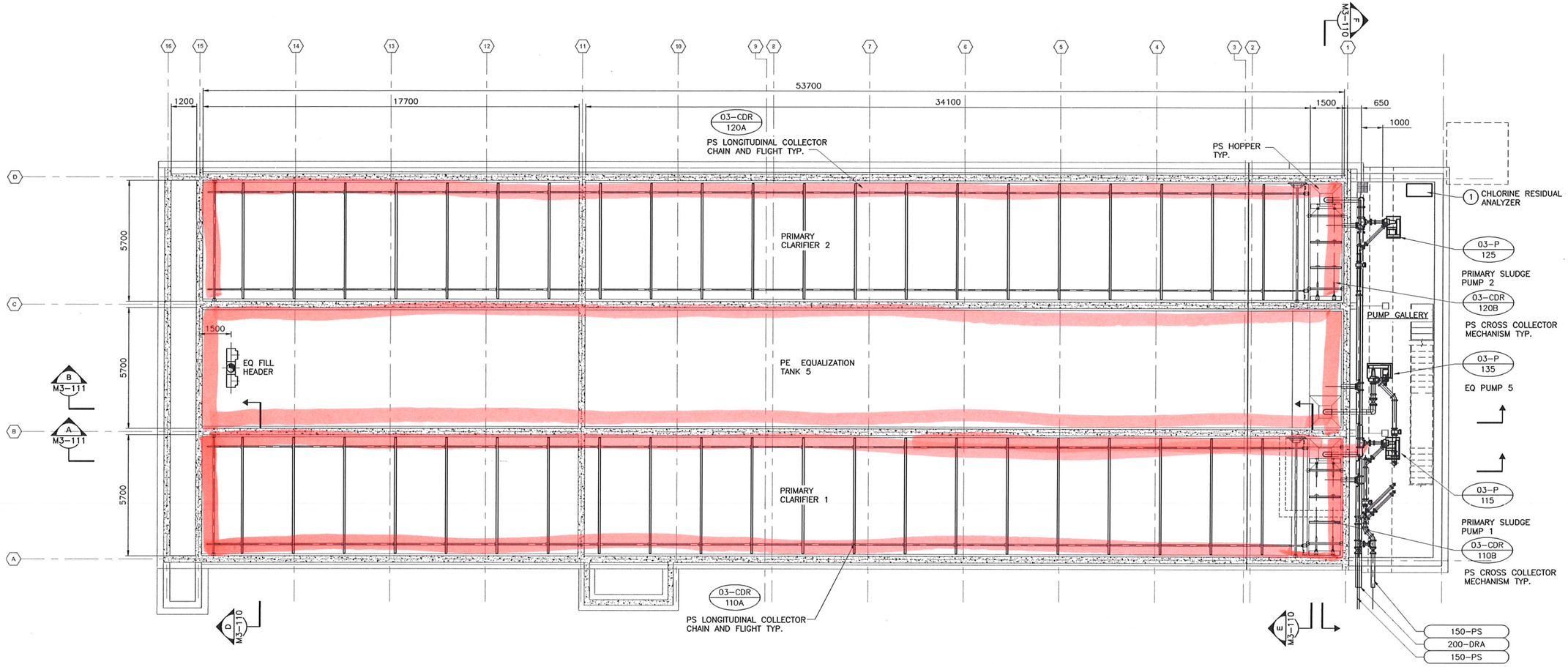
CITY OF PENTICTON AWWTP UPGRADE PENTICTON, B.C.

PROCESS MECHANICAL PRIMARY CLARIFIERS AND EQUALIZATION LOWER LEVEL DETAILS

PROJECT START DATE (M/Y)	APRIL 2008
PROJECT NO.	102949
FILENAME	M3-106.dwg
SHEET NO.	
DRAWING NO.	M3-106

Plotted By: millercj
Plot File Date Created: Aug/08/2013 10:59 AM
Layout-Sheet Name: M3-106
Filename: L:\WORK\102000\102949\02A-CAD\WAT_DETAIL DESIGN\6-PROCESS MECH\M3-106.DWG

Tanks (3)



LOWER LEVEL PLAN
SCALE 1:100

KEY NOTES

(1) INSTALL CHLORINE RESIDUAL ANALYZER COMPLETE WITH SAMPLE PIPING FROM FLOWMETER MANHOLE AND WASTE TO DRAIN

NOTICE:
AS-CONSTRUCTED DIMENSIONS, MEASUREMENTS AND OTHER DETAILS CONTAINED IN THIS RECORD DRAWING HAVE BEEN OBTAINED BY AECOM CANADA LTD. ("AECOM") FROM VARIOUS SOURCES. SUCH INFORMATION REPRESENTS THE BEST INFORMATION AVAILABLE TO AECOM AT THE TIME OF PREPARATION OF THIS RECORD DRAWING. AECOM DOES NOT IN ANY WAY REPRESENT OR WARRANT THAT SUCH INFORMATION IS ACCURATE AND ASSUMES NO RESPONSIBILITY FOR ANY ERRORS OR OMISSIONS CONTAINED THEREIN.

REV	DESCRIPTION	DRN	CHK	DATE (Y/M/D)
2	RECORD DRAWING	CJM	KJW	2013/08/09
2	REVISED PUMP ARRANGEMENTS	KJW	LN	2010/02/26
1	ISSUED FOR CONSTRUCTION	PTL	KM	2009/08/31
0	ISSUED FOR TENDER	KJW	KM	2009/05/25

DRN BY: KJW
DES BY: PG
CHK BY: LN
APP BY: KM

PREPARED FOR: THE CITY OF Penticton

PREPARED BY: AECOM
Suite 201, 3275 LAKESHORE ROAD,
KELOWNA, BC, CANADA
V1W 3S9
250-762-3727

CITY OF PENTICTON
AWWTP UPGRADE
PENTICTON, B.C.

PROCESS MECHANICAL
PRIMARY CLARIFIERS AND EQUALIZATION
GENERAL ARRANGEMENT - LOWER LEVEL

PROJECT START DATE (M/Y)	APRIL 2008
PROJECT NO.	102949
FILENAME	M3-104.dwg
SHEET NO.	
DRAWING NO.	M3-104

Plotted By: millercj
Plot File Date Created: Aug/08/2013 10:59 AM
Layout-Sheet Name: M3-104
Filename: L:\WORK\102000\102949\02A-CAD\WAT\DETAIL DESIGN\6-PROCESS MECH\M3-104.DWG