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Building what matters

Sewage Treatment Plant (STP)

Agnico Eagle Mines Limited Whale Tail

Design Report

653281-0004-40ER-0001_0

December 14, 2018

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LIST OF REVISIONS

Revision				Revised Pages	Remarks
No.	By	Rev.	Date		
A	IG	TG, MPM, AP	2018-12-14		

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1. Introduction

1.1 Site Location and Access

Agnico Eagle is developing the Whale Tail Project in the Kivalliq Region of Nunavut (65°24’25” N, 96°41’50” W). The 99,878-hectare Amaruq property is located on Inuit-owned and federal crown land, approximately 55 km north of the Meadowbank mine. The Meadowbank mine is accessible from Baker Lake, located 70 kilometers to the south.

1.2 Site Facilities

Agnico Eagle Mines Limited—Meadowbank Division (Agnico Eagle) is developing Whale Tail Pit and Haul Road Project, on a satellite deposit located on the Amaruq property, to extend mine operations and milling at Meadowbank Mine.

A conventional open pit mining operation is forecasted on the Whale Tail deposit. Access to the site is via a 64-kilometer road from Meadowbank mine. On-site facilities will include a power plant, maintenance facilities, tank farm for fuel storage, Arsenic water treatment plant, sewage treatment plant (STP), drinking water treatment plant, as well as accommodation and kitchen facilities for approximately 400 people. Figure 1 presents the STP location on site.

1.3 Purpose of Document

This report includes the final design and construction drawings for the STP. The sewage to be treated will be sourced from camp and adjacent building which are not connected to the STP directly (sucker truck will discharge sewage from this building directly into the STP). The treated water generated by the STP will be pumped through a pipeline and discharged to the Whale Tail attenuation pond. The design report was written according to Water License 2AM-WTP1826 Part D Item 1(b) and 2.

1.4 Scope of Work

SNC Lavalin was retained by Agnico Eagle to design the pipelines for the STP to the discharge location. Newterra was in charge of the STP design and supply and SNC Lavalin and Agnico Eagle for the construction. This report describes the STP main components and design. Construction drawings of the listed infrastructure are presented in Appendix A of this report.

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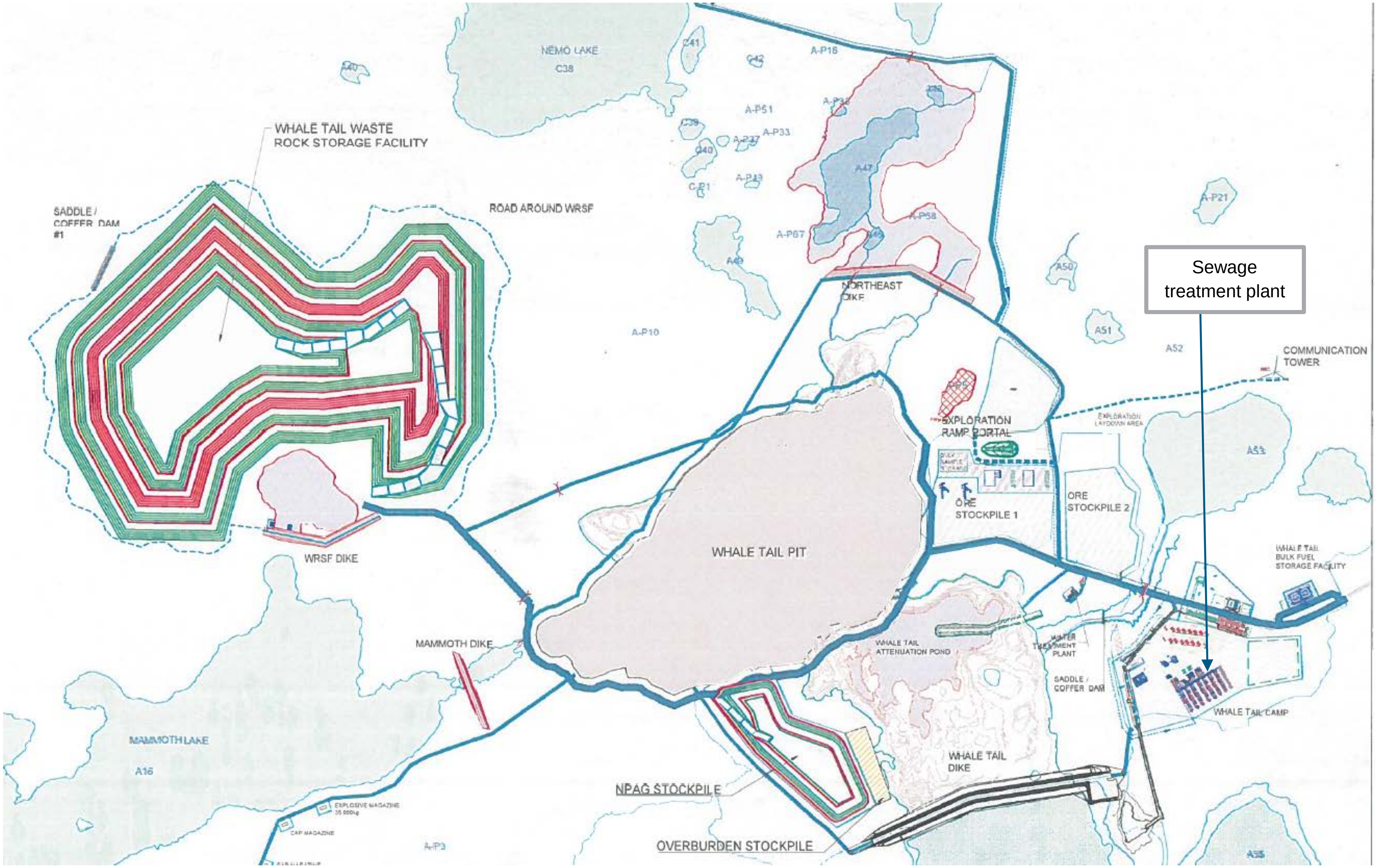


Figure 1: STP location

2. Design Methodology

2.1 Design rational, requirements, criteria and parameters

The plant is designed to meet the following criteria presented in Table 1. Note that the treated water from STP is not directly discharge to the environment. The target concentration presented in the following table for the treated water from STP, are set to limit effect on the receiving Environnement after mixing with surface water into the attenuation pond and treatment in the AsWTP. There are no Water License criteria for the STP treated water. Reaching these values assure Agnico Eagle to operate the STP at a highest level of efficiency.

Table 1: STP treated water quality operational target

Parameters	Unit	Effluent
pH	s.u.	6.5 – 9.5
Oil, Grease	mg/L	<5
Biological Oxygen Demand (BOD)	mg/L	<25
Total Suspended Solids (TSS)	mg/L	<25
Total Kjeldahl Nitrogen (TKN)	mgN/L	-
Unionized Ammonia Nitrogen (NH3-N)	mgN/L	<1.25
Nitrate Nitrogen (NO3-N)	mgN/L	<5
Total Phosphorus (TP)	mgP/L	<0.5
Fecal Coliform	CFU/100 ml	<200
Total Residual Chlorine	mg/L	<0.02

2.2 Design standards analysis and methods

Each component of the STP was selected to achieve the requirement for the water quality of the STP effluent. The selection of each of these components was based on typical process used in the sewage treatment sector. The robustness and redundancy of equipment were also taken into account during equipment/supplier selection.

2.3 Design assumptions and limitations

The STP is design for a maximum camp occupation of 400 persons. The water consumption assumed per person is selected at 240 L/day/person. It is also assumed that Oil and grease from kitchen will be caught mainly inside the camp (abroad the boundary of the STP). Finally, it is assumed that no harmful chemicals will be deposed into the sewage network that can affect the process within the STP.

2.4 Water Management Strategy

The global surface water strategy at Amaruq site is to collect water into the Whale Tail attenuation pond before treatment in the AsWTP and discharge to the environment at Mammoth Lake. Treated water coming from the STP is discharged into the Whale Tail attenuation pond and not directly to the environment.

2.5 Methodology

The STP should integrate the following component to successfully treat sewage and respect operational discharge water quality target:

› Screening step to remove coarse material;
› Oil and grease removal system;
› Aerobic bioreactor tank to remove dissolves organic matter;
› Phosphorus removal step with metallic salt;
› Nitrification and denitrification steps to remove both ammonia and nitrate;
› Solid liquid separation step to remove TSS and excess of biomass.

3. General Site Conditions and Other Data Input for Design

3.1 Characteristics of sewage

The composition of sewage to be treated was estimated through Agnico Eagle existing operations sewage quality (from Meadowbank for example). Table 2 present the typical sewage composition used for the design.

Table 2: Sewage typical chemical composition

Parameters	Unit	Design Value
Biochemical Oxygen Demand (BOD_5)	mg/L	952
Total Suspended Solids (TSS)	mg/L	300
Total Kjeldahl Nitrogen (TKN)	mg/L	130
Ammonia nitrogen (NH_3-N)	mg/L	130
Oil and Grease	mg/L	30
pH	-	6 to 9.5
Water Temperature	^oC	10 to 25
Alkalinity	mg/L as $CaCO_3$	471.1

3.2 Effluent Flow Rates

The plant is design based on the occupation maximum of the camp for 400 persons (240L per day and per persons). Table 3 presents the design parameter used for the hydraulic loading.

Table 3: Design flow

Parameters	Design Value	Unit
Per capita design flow	240	L/p/d
Number of persons	400	People
Average daily flow (ADF)	96	m^3/d
Maximum Daily Flow (MDF)	192	m^3/d
Peak Hourly Flow (PHF)	24	m^3/h
Overall time for speak to occur	2	hours
Maximum number of speak events per day	2	Qty

4. Design of the Sewage Treatment Plant (STP)

4.1 Process summary

Figure 2 presents the STP layout.

The sewage treatment plant receives two streams of sewage as presented in figure 3 (basic flowsheet of the STP). The first source is domestic sewage, which is fed directly to the fine screening process to remove any fibers or debris that might damage the membranes. The second source is kitchen sewage which is pre-treated in the oil and grease tanks to remove oil and grease prior to being fed into the fine screens. The combined screened sewage is pumped to the equalization tank. The equalization tank buffers variability in the influent flow rate and concentrations of influent constituents, maintaining a consistent flow rate and sewage strength through the Membrane bioreactor (MBR) system. Sewage is then pumped from the equalization tank to the pre-anoxic tank for denitrification.

In the pre-anoxic tank, screened sewage containing organics is combined with recycled mixed liquor from the aeration tank containing nitrates. Bacteria use some of the organics to drive the denitrification process, converting nitrate into nitrogen gas. This process occurs in an anoxic environment where there is minimal oxygen. As such a pump and eductors are used to mix the tank to prevent addition of oxygen. The denitrification process is used to meet the effluent nitrate limit, reduce oxygen requirements and to recover alkalinity, thus reducing chemical consumption.

Mixed liquor from the anoxic tank flows by gravity to the first aerobic tank followed by the second aeration tank for aerobic biological degradation of the influent constituents (organics and ammonia). In the aerobic tanks the nitrification process converts ammonia to nitrate in order to meet the effluent ammonia limit. This process consumes alkalinity, so a caustic soda or soda ash dosing pump is used to control the pH. Additionally, liquid alum is dosed into the anoxic zone to precipitate phosphorus in order to meet the effluent phosphorus limit. Mixed liquor flows by gravity from the second aeration tank to the post-anoxic tank for final denitrification polishing. In the post-anoxic tank there are minimal dissolved influent organics to drive the denitrification process. As such, an external carbon source in the form of Micro C is dosed to supplement the organics and drive the denitrification process.

Mixed liquor is pumped from the post-anoxic tank to the membrane tanks. The membrane tanks serve as additional volume for aerobic biological treatment to remove any excess MicroC (which would other cause BOD in the effluent) and house the membrane filters used for solid-liquid separation. A treated effluent is drawn through the membranes by vacuum pumps.

Since the solid-liquid separation process results in an accumulation of solids in the membrane tank, the mixed liquor (containing both solids and filtrate) is continuously recycled to the first aeration tank. This prevents excessive solids build-up in the membrane tank, and maintains sufficient biomass in the anoxic and aeration tanks. The solids that accumulate in the system consist of biomass that has grown from the influent organics and ammonia, as well as non-biodegradable solids from the influent sewage. In order to maintain an optimal concentration of mixed liquor suspended solids (MLSS) (typically 10 g/L), a portion of the mixed liquor is periodically wasted by pumping from the Aeration Tank to the sludge holding tank. Wasted sludge in the sludge holding tank is thickened by decanting supernatant back to the screen tank. Thickened sludge accumulates in the sludge holding tanks until it is eventually pumped out for disposal.

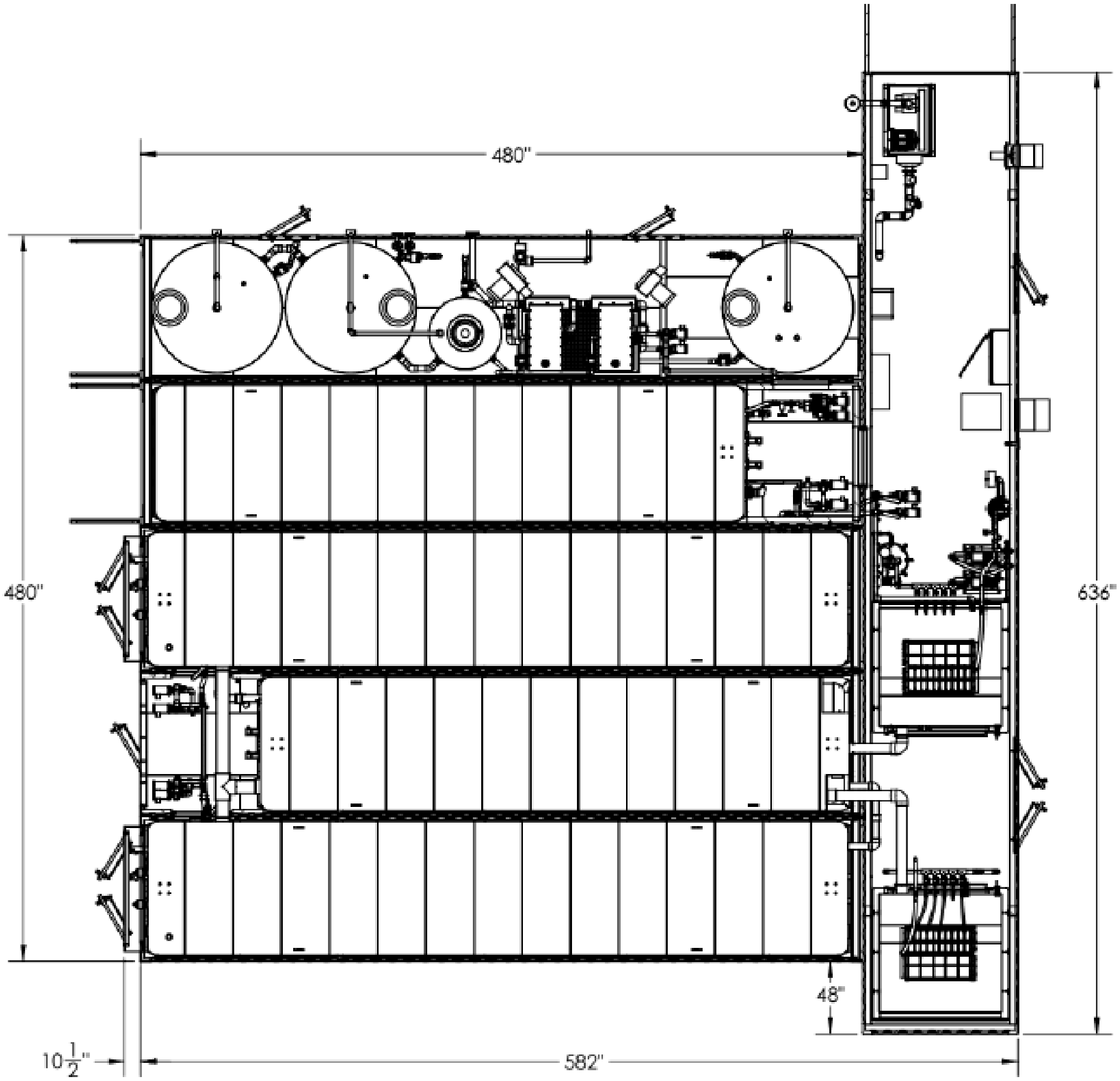


Figure 2: STP layout

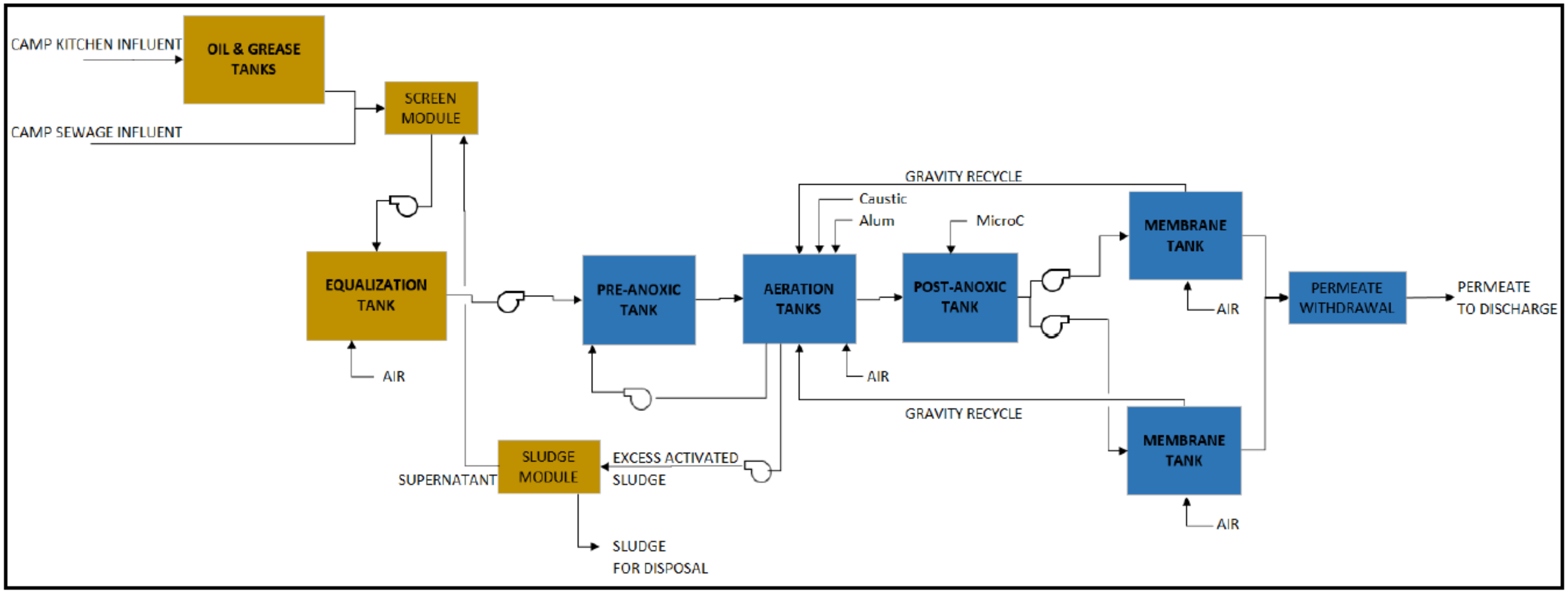


Figure 3: Basic flowsheet

4.2 Equipment details

The following section presents more in detail each equipment of the STP.

Oil and Grease removal

Raw sewage from the kitchens entering the system can contain high levels of fats, oils and grease that can damage equipment and membranes downstream. To remove the oil and Grease from the system a double trap grease interceptor is installed prior to the kitchen sewage entering the fine screen. Floating grease is removed via a vacuum truck hookup that will be used when the sludge tank is emptied. A pipe and vacuum truck hookup is also provided to remove any debris that sunk to the bottom of the tanks. Vacuumed debris, oil and grease are to be disposed at the Meadowbank stailing pond.

Fine Screening

Raw sewage entering the MBR system contains particulates and solids that could damage the equipment and membranes down-stream. 0.5mm wedge wire fine screening protects the down-stream equipment by removing large solids and fibrous material. Two screens are provided for redundancy so that no unscreened influent enters the EQ tank. Redundant pumps are provided to move the screened influent to the equalization tank.

Flow-Equalization

Throughout the day the flow and strength of the sewage will vary. To accommodate this an equalization tank will buffer the flow and homogenize the loading. The equalization tank is aerated to maintain an aerobic environment to reduce odors and to maintain suspension of solids and pumps transfer sewage to biological treatment. This tank is provided with tank heaters. All wetted materials in this tank are either stainless steel or polypropylene to eliminate the possibility of corrosion. In addition, the tank has two liners, one primary, one secondary, with interstitial monitoring, providing the protection of a double wall tank.

Biological Treatment

In the anoxic zone, the pre-treated sewage is combined with return activated sludge from the aerobic tank and is kept mixed while maintaining a low level of dissolved oxygen (DO). Denitrification occurs as specific microorganisms convert nitrates to nitrogen gas – reducing the total nitrogen (TN) in the mixed liquor. Additionally, the anoxic stage optimizes the biological treatment process, which recovers alkalinity, aids in stabilizing pH, and improves energy efficiency by reducing overall aeration demand. In the aerobic zone, fine bubble diffusers create an aerobic environment where the organics contributing to biological oxygen demand (BOD) and ammonia (TAN) are oxidized by the biology. Dissolved oxygen is continuously measured and aeration blowers controlled to maintain it in the range of 2 to 3 mg/L for process optimization and energy savings. In the post-anoxic zone, return activated sludge from the aerobic tank is kept mixed while maintaining a low level of dissolved oxygen (DO). The denitrification process continues in the post anoxic zone to reduce the TN even further.

Phosphorous Reduction

Chemical precipitation is used to remove inorganic phosphate. An aluminum sulphate or "Alum" solution is dosed into the mixed liquor casting dissolved phosphate to precipitate and coagulate. The suspended phosphate cannot pass through the MicroClear Ultra Filtration membrane (UF), and the phosphate is eventually removed from the system as a solid with the waste activated sludge (WAS).

Membrane Filtration

After being treated biologically, the treated effluent is separated from the mixed liquor and solids by the Newterra MicroClearTM membrane modules and the permeate extraction system. The membrane modules are continually air scoured to induce flow of mixed liquor over the flat sheet membrane surface and prevent fouling and buildup of solids on the membrane surface without the use of chemicals. The mixed liquor is then transferred to the inlet of the biological treatment to maintain even distribution of solids throughout the system and to introduce activated biology to the raw sewage. MicroClear membranes are produced with true ultrafiltration membrane material with 0.04 um pore size, which blocks all bacteria and most viruses. Secondary disinfection is not required to exceed effluent requirements. Figure 4 presents a schematic view of the UF process.

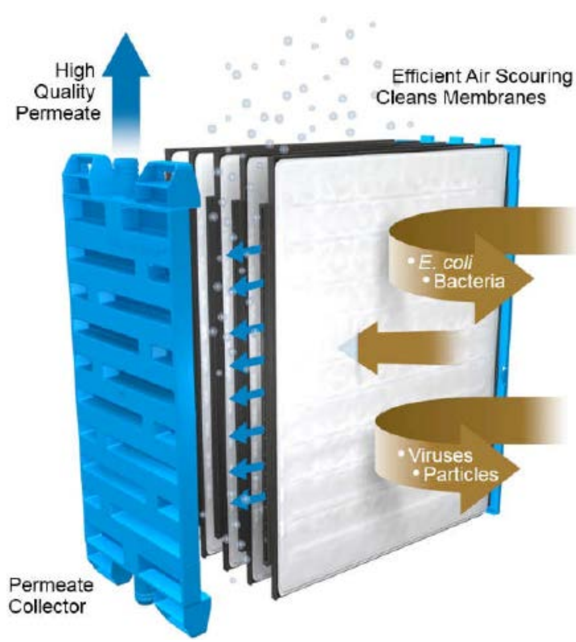


Figure 4: UF filtration module

Table 4 presents a summary of the design parameter of the STP.

Table 4: STP design parameters

DESIGN LOADING	SI UNITS
Design Hydraulic Load	96 m^3/d
Organic Load	87.1 kgBOD/d
TKN Load	12.5 kgTKN/d
Phosphorus Load	1.15 kgTP/d
PROCESS TANKS	**SI UNITS**
Three (3) Oil & Grease Tanks (TNK-101/TNK-102/TNK-103) with a total volume	12 m^3
One (1) Equalization Tank (TNK-301) with effective volume	40 m^3
One (1) Pre-Anoxic Tank (401) with effective volume	46 m^3
Two (2) Aeration Tanks (TNK-501/TNK-502) with total effective volume	76.5 m^3
One (1) Post-Anoxic Tank (TNK-401) with effective volume	8.6 m^3
Two (2) Membrane Tanks (TNK-601/TNK-602)	8.0 m^3
Two (2) Sludge Holding Tnak (TNK-901) each with effective volume	7.0 m^3
MEMBRANE BIOREATOR (MBR) INCLUDING ANOXIC TANKS, AERATION TANKS AND MEMBRANE TANKS – TOTAL EFFECTIVE VOLUME	147.1 m^3
Design Hydraulic Retention Time (HRT)	36.8 h
Sludge Age	26.5 d
Mixed Liquor Return Ratio – from Membrane Tank to Aerobic Tanks	5 X
Mixed Liquor Return Ratio – from Aerobic Tanks to Pre-Anoxic Tank	8 X
Design net flux (average)	13 LMH
Design Sludge Wasting Rate	5.36 m^3/d
Minimum design operating temp	10 ^oC

4.3 Controls

STP's control and automation system is based on several instrument measuring key parameter of the process, combined with a PLC. The STP don't require continuous operator intervention except for daily inspection and maintenance. The user interface can be accessed on-site from control panel mounted touchscreen HMIs or remotely from a computer. Alarm messages can be setup to alert operators to issues, More information is provided in the Operation and Maintenance Manual.

4.4 Reagents

As presented below, some chemicals are required for treatment operation and also for Membrane cleaning. MSDS are provide in the Operation and Maintenance Manual. Table 5 presents the estimated chemical consumption per year.

Table 5: Chemical consumption

Consumable		Usage Rate			
Purpose	**Name**	**Value**	**Unit**	**Value**	**Unit**
Supplemental Alkalinity	Dry Soda Ash	6.28	kg/d	2292	Kg/year
Phosphorus Removal	Liquid Alum, 48%	14.6	L/d	5346	L/year
Nitrate Removal	MicroC 2000	16.5	L/d	6025	L/year
Membrane Cleaning	Sodim Hyprochlorite, 12%	-	L/d	150	L/year

4.5 Sludge management

As solids laden sewage enters the system and solids free effluent is discharged, the suspended solids concentration in the mixed liquor (MLSS) will increase. To maintain the proper level of MLSS, solids must be removed from the system as Waste Activated Sludge (WAS) which is mixed liquor discharged from the aerobic tank at approximately 0.8% dry WAS is discharged to a tank for holding and decanting. The holding tank is aerated to maintain an aerobic environment to reduce odors. In the decanting process the WAS is allowed to settle and supernatant is pumped off, and returned to the MBR, thickening the sludge in the holding tank. By thickening the sludge to approximately 2% dry solids by weight, the total volume that must be disposed of is decreased, extending holding time and reducing operational costs. Level control in the tank indicates when the tank should be decanted or a vacuum truck should be scheduled to dispose of the WAS.

Excess sludge will be trucked to Meadowbank and disposed of in the Tailings Storage Facility (TSF) or shipped south for disposal.

5. CONSTRUCTION

5.1 General construction methods and procedures

The STP component will be pre-mounted into sea can and ready to operate. Piping from one Sea can to the other will be interconnected on site as well as power distribution and controls. Each sea can will be installed at their final location using crane. The STP will be built on the permanent camp pad. Since the

STP will be constructed further than 31 m from the shore, no specific attenuation method is planned for the erosion and sediment re-suspension into the nearest water body.

5.2 Material specifications

The rockfill required for earth work construction can be sourced from available material on site classified Non-Acid Generating / Non-metal leaching waste rock.

Treated water exiting the STP will be pumped through a pipeline and discharged to the Whale Tail attenuation pond. This pipeline will be a 3” HDPE DR17 pipe insulated and heat traced to prevent heat lost and freezing of the water circulating from the STP to the attenuation pond.

5.3 Construction Quality Control and Survey

A quality control/assurance program will be required during construction and commissioning of each of the infrastructure components to ensure that construction-sensitive features of the design are achieved. Surveying will be carried out by Agnico Eagle to document the as-built report.

5.4 Testing and inspection

Prior to start up, interconnecting pipe and pipelines (for effluent discharge to Whale Tail attenuation pond) will be tested for leaks at fusion weld and flange joints with treated water. If leaks are found, the joint will be re-welded or re-torqued. STP inspection and testing will be performed according the Newterra operation and maintenance manual. After start up, an annual inspection, performed by Agnico Eagle personal, will be done to ensure pipeline integrity.

5.5 Timeline

The STP construction will start in March 2019 and commissioning is planned for the end of May 2019.

Appendix A

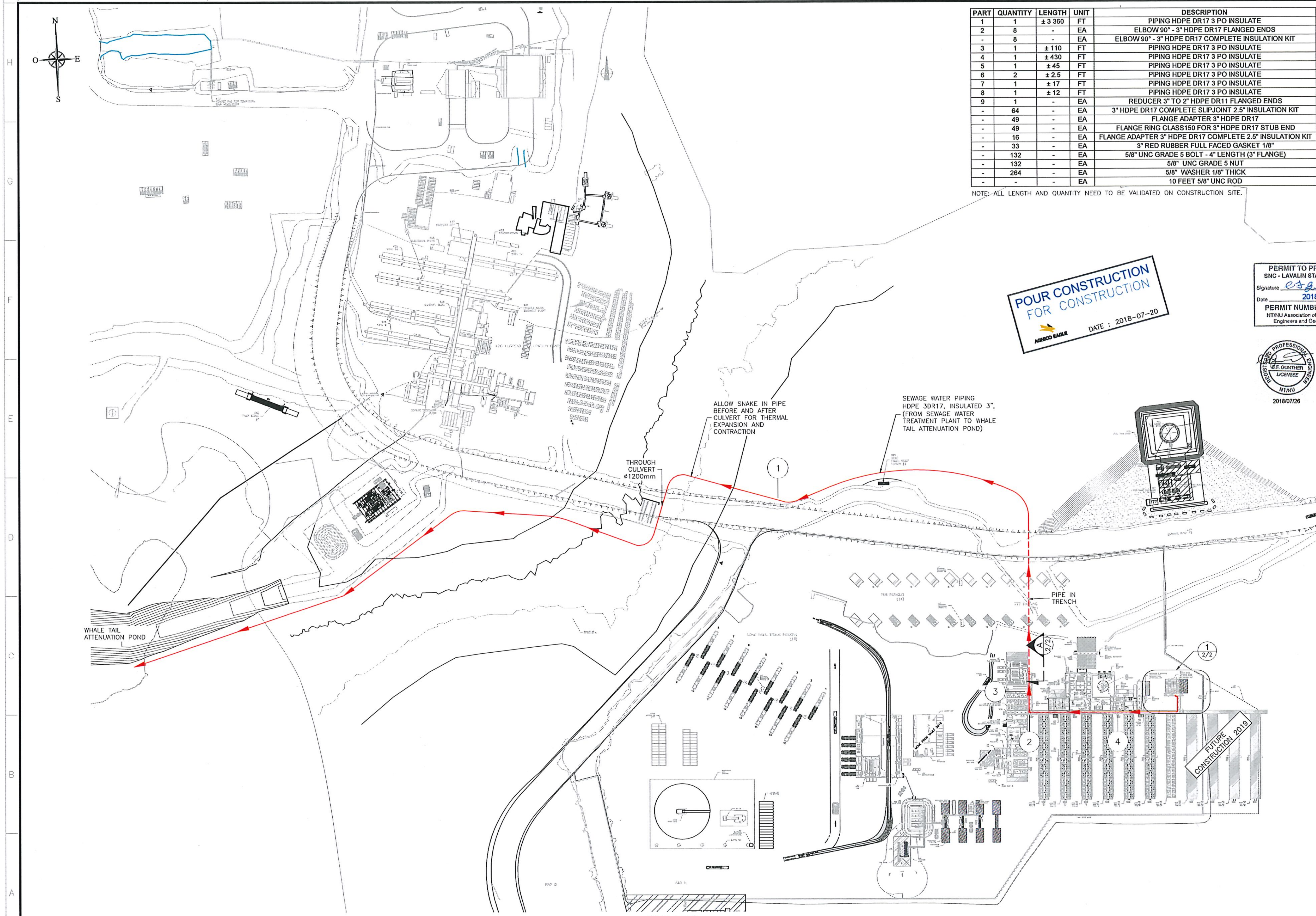
Construction drawings

NO. DESSIN DRAWING NO. 61-460-270-201-1_R0

FORMAT ARCHD

PART	QUANTITY	LENGTH	UNIT	DESCRIPTION	ORDER
1	1	± 3 360	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
2	8	-	EA	ELBOW 90° - 3" HDPE DR17 FLANGED ENDS	OC - 707903
-	8	-	EA	ELBOW 90° - 3" HDPE DR17 COMPLETE INSULATION KIT	OC - 707903
3	1	± 110	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
4	1	± 430	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
5	1	± 45	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
6	2	± 2.5	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
7	1	± 17	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
8	1	± 12	FT	PIPING HDPE DR17 3 PO INSULATE	OC - 703225
9	1	-	EA	REDUCER 3" TO 2" HDPE DR11 FLANGED ENDS	OC - 707903
-	64	-	EA	3" HDPE DR17 COMPLETE SLIPJOINT 2.5" INSULATION KIT	OC - 707903
-	49	-	EA	FLANGE ADAPTER 3" HDPE DR17	OC - 707903
-	49	-	EA	FLANGE RING CLASS150 FOR 3" HDPE DR17 STUB END	OC - 707903
-	16	-	EA	FLANGE ADAPTER 3" HDPE DR17 COMPLETE 2.5" INSULATION KIT	OC - 707903
-	33	-	EA	3" RED RUBBER FULL FACED GASKET 1/8"	OC - 707903
-	132	-	EA	5/8" UNC GRADE 5 BOLT - 4" LENGTH (3" FLANGE)	OC - 707903
-	132	-	EA	5/8" UNC GRADE 5 NUT	OC - 707903
-	264	-	EA	5/8" WASHER 1/8" THICK	OC - 707903
-	-	-	EA	10 FEET 5/8" UNC ROD	OC - 707903

NOTE: ALL LENGTH AND QUANTITY NEED TO BE VALIDATED ON CONSTRUCTION SITE.



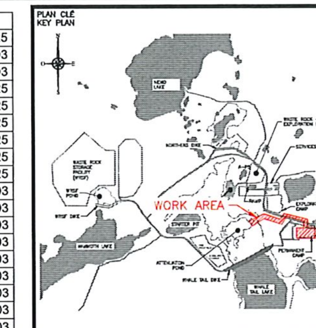
PLAN VIEW
SCL: N.T.S.

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE
DATE : 2018-07-20

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018/07/26
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

C.I. GUNTHER
LICENSEE
NT/NU
2018/07/26

PLAN CLÉ
KEY PLAN



NOTES GÉNÉRALES / GENERAL NOTES

1. ALL LENGTH AND QUANTITY NEED TO BE VALIDATED ON CONSTRUCTION SITE.

PIPING ON GROUND
PIPING IN TRENCH

THE DESIGN AND MATERIALS ON THIS DRAWING ARE ASSUMED BY AGNICO EAGLE.

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Project # : 644819-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-07-20	ISSUED FOR CONSTRUCTION	N.B.G.	C.I.G.	K.P.M.

REVISIONS

TITRE / TITLE
AGNICO EAGLE – WHALE TAIL (AMARUQ)
460 – SEWAGE WATER TREATMENT PLANT
270 – PIPING
PLAN VIEW
SEWAGE WATER PIPING (ROUTING)
FROM TREATMENT PLANT TO ATTENUATION POND

DESSINÉ PAR DRAWN BY	NICOLAS BORDELEAU G., TECH.	DATE 2018-06-12
VERIFIÉ PAR CHECKED BY	KEVEN PLANTE-MARQUIS, ING.	2018-07-20
APPROUVÉ PAR APPROVED BY	CHRISTIAAN IAN GUNTHER, ING.	2018-07-20
ÉCHELLE SCALE N.T.S.	DATE	2017-12-01

NO. DESSIN DRAWING NO. 61-460-270-201

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6115	0	1 / 2

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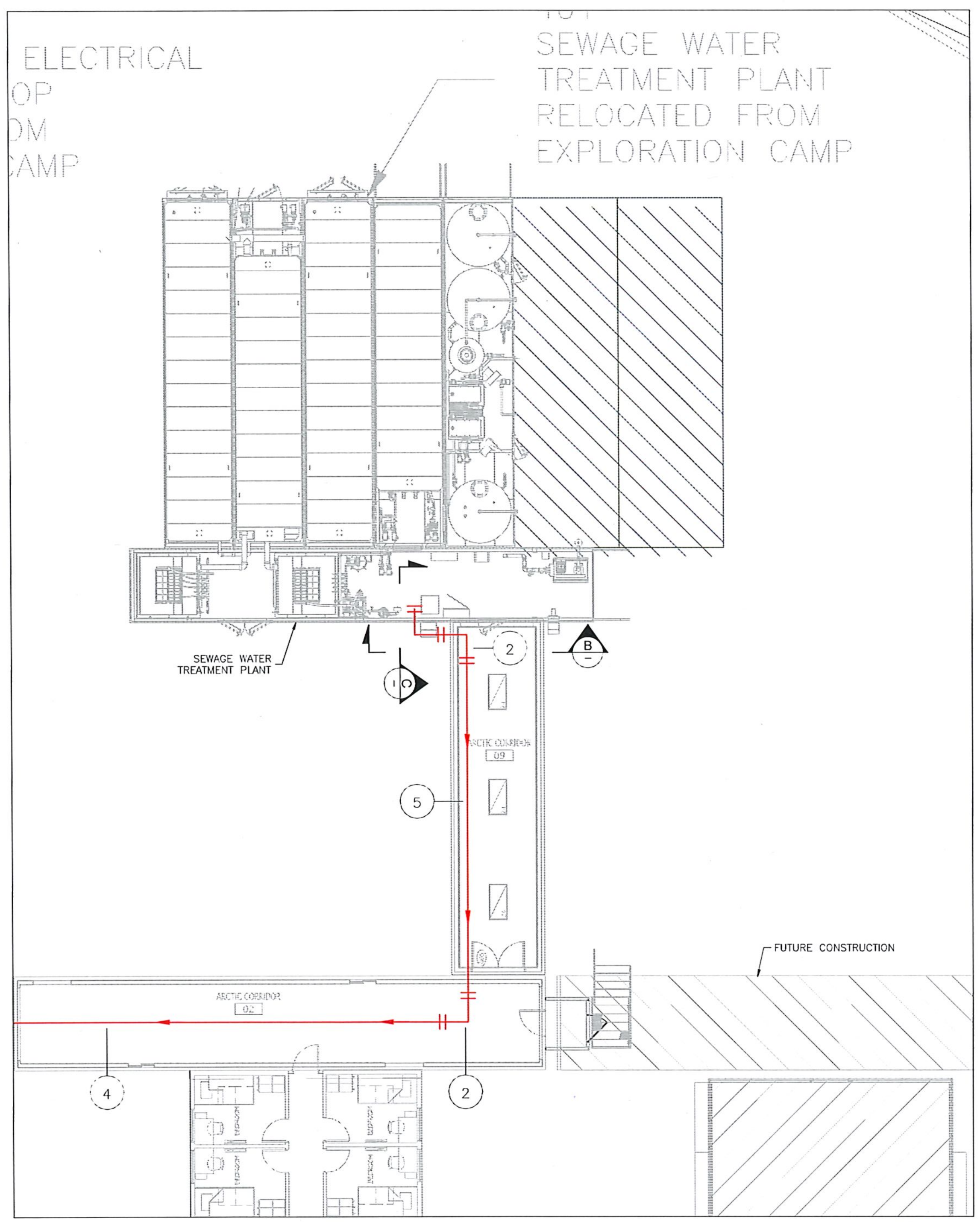
FOR CONSTRUCTION
DATE : 2018-07-20
AGNICO EAGLE



DETAIL 1/1/2
SCALE: N.T.S.

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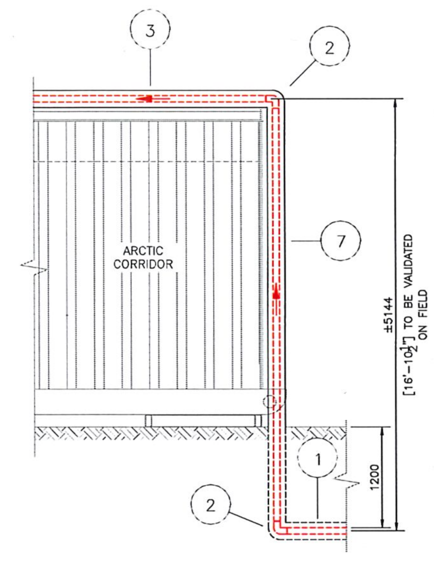
-	-	-	EA	10 FEET 5/8" UNC ROD	OC - 707903

NOTE: ALL LENGTH AND QUANTITY NEED TO BE VALIDATED ON CONSTRUCTION SITE.



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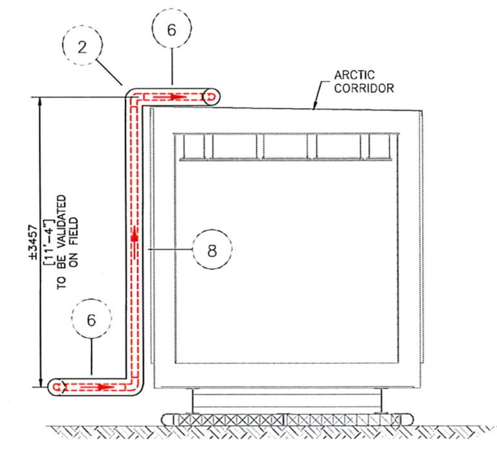
SCL. N.T.S.



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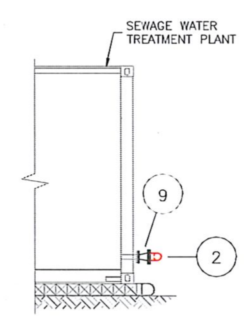
SCL. N.T.S.

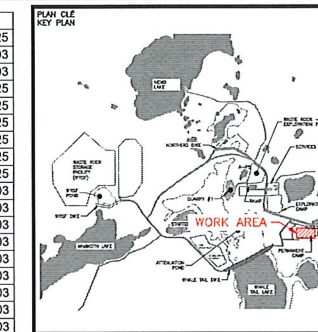


SECTION C
SCL. N.T.S.

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018/07/26
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

REGISTERED PROFESSIONAL ENGINEER C.I. GUNTHER LICENSEE NT/NU
2018/07/26

PLAN CLÉ
KEY PLAN



NOTES GÉNÉRALES / GENERAL NOTES

1. ALL LENGTH AND QUANTITY NEED TO BE VALIDATED ON CONSTRUCTION SITE.

——— PIPING ON GROUND
------ PIPING IN TRENCH

THE DESIGN AND MATERIALS ON THIS DRAWING ARE ASSUMED BY AGNICO EAGLE.

SNC·LAVALIN
SNC-Lavalin Stavibel inc.
150, rue Gamble Ouest
Rouyn-Noranda (Québec) J9X 2R7
Tél.: 819 764-5181 Fax: 819 797-0158
www.sncl avalin.com

Project # : 644819-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
-	-
-	-
-	-
-	-
-	-

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-07-20	ISSUED FOR CONSTRUCTION	N.B.G.	C.I.G.	K.P.M.

REVISIONS

TITRE / TITLE
AGNICO EAGLE — WHALE TAIL (AMARUQ)
460 — SEWAGE WATER TREATMENT PLANT
270 — PIPING
DETAILS & SECTIONS
SEWAGE WATER PIPING (ROUTING)
FROM TREATMENT PLANT TO ATTENUATION POND

DESSINÉ PAR DRAWN BY	NICOLAS BORDELEAU G., TECH.	DATE 2018-06-12
VERIFIÉ PAR CHECKED BY	KEVEN PLANTE-MARQUIS, ING.	2018-07-20
APPROUVÉ PAR APPROVED BY	CHRISTIAAN IAN GUNTHER, ING.	2018-07-20
ÉCHELLE SCALE N.T.S.	DATE 2017-12-01	

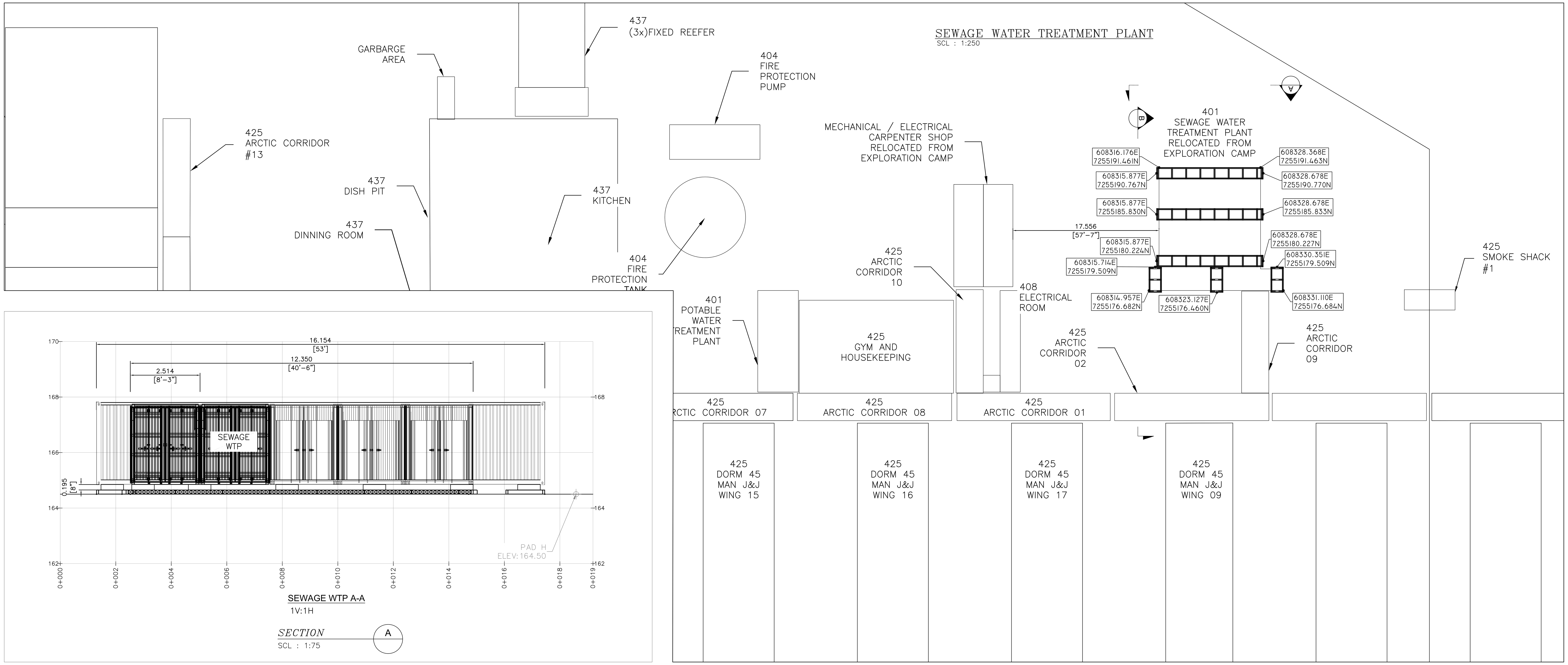
NO. DESSIN DRAWING NO. 61-460-270-201

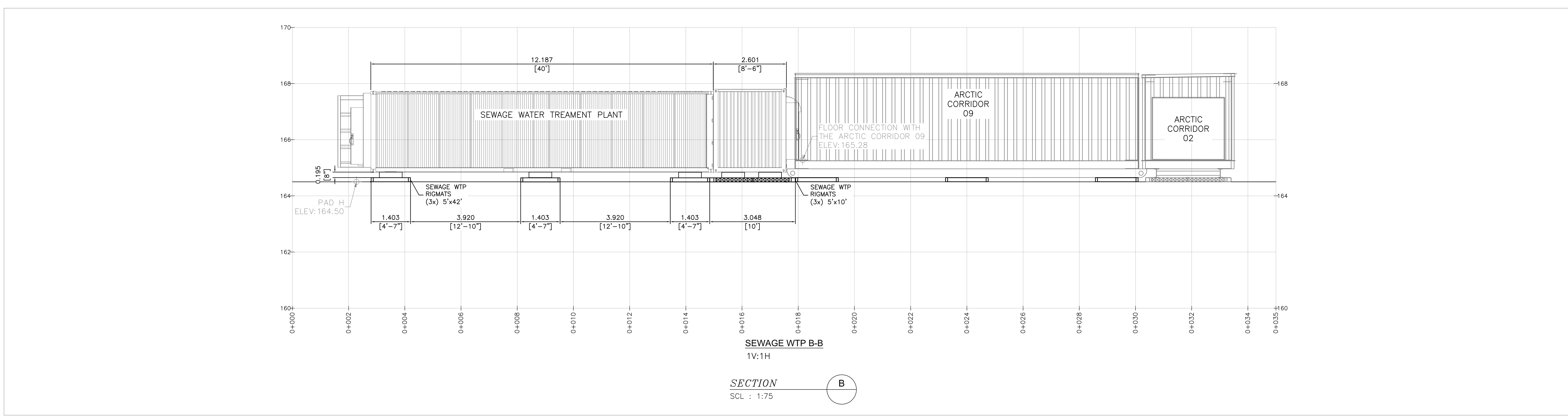
NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6115	0	2/2

FORMAT ARCHD
AE-CART-ARCH D
N:\Projet\Amaruq\050 Studies\6115 Amaruq Infra Eng Project\For approval\Prêt à sceller\61-460-270-201-1_R0.dwg

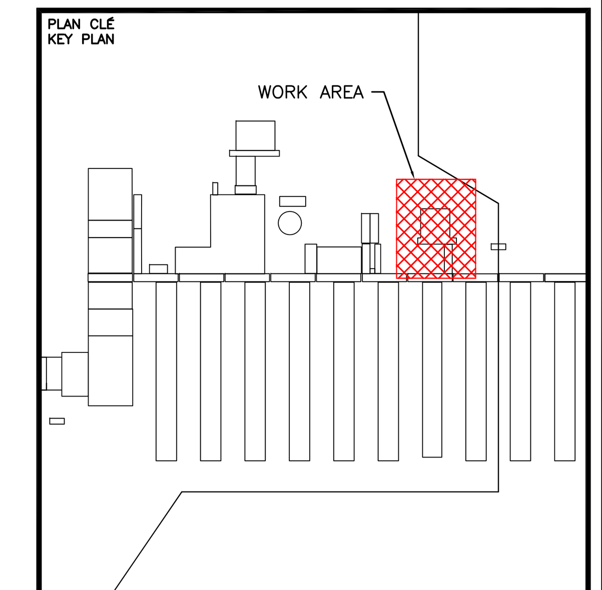
NO. DESSIN DRAWING NO. 61-401-230-003_R0

FORMAT ARCHD





PLAN CLÉ KEY PLAN



NOTES GÉNÉRALES / GENERAL NOTES

- VALIDATE THE LOCATION OF THE SEWAGE WTP DOORS IN RELATION WITH THE ARCTIC CORRIDOR 09.

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE
DATE : 2018-12-13

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
–	–
–	–
–	–
–	–
–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-12-13	ISSUED FOR CONSTRUCTION	L.R.F.	D.L.	S.R.

REVISIONS

AMARUQ PROJECT

TITRE / TITLE
AGNICO EAGLE – MEADOWBANK DIVISION
401 – WATER
230 – GENERAL EARTH WORKS
PLAN
OPERATION CAMP – SEWAGE WATER TREATMENT PLANT
2018 INSTALLATION PLAN

		DATE
DESSINÉ PAR DRAWN BY	L. R. FRENETTE	2018-11-19
VÉRIFIÉ PAR CHECKED BY	D. LAFLAMME	2018-11-19
APPROUVÉ PAR APPROVED BY	D. LAFLAMME	2018-11-19
ÉCHELLE SCALE	AS SHOWN	2018-11-19

NO. DESSIN DRAWING NO. 61-401-230-003

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6115	0	1 / 1

AE-CART-ARCH D

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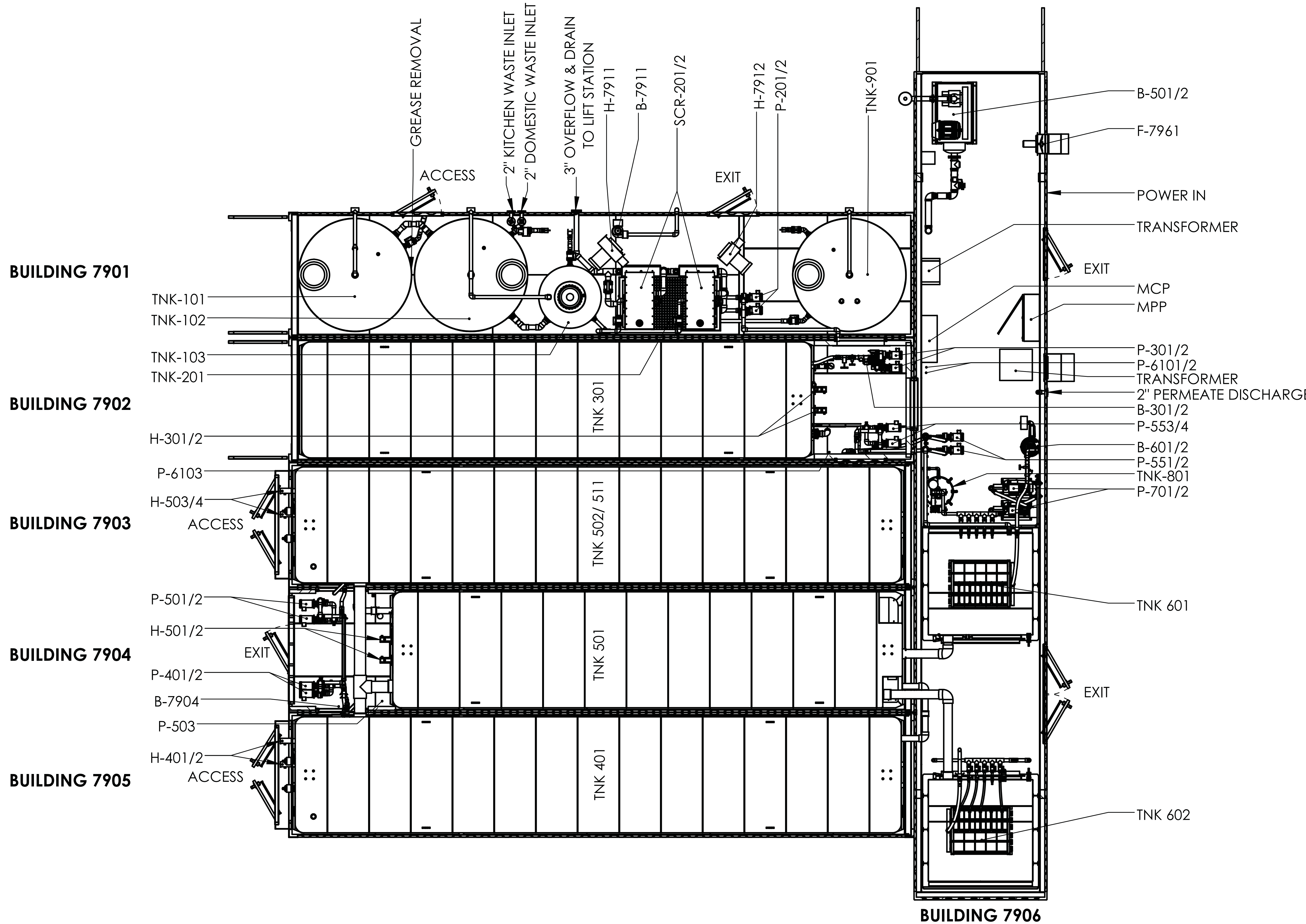

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GENERAL TOLERANCES
.XX ± 1/8"
.XXX ± 1/16"
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

THIS INFORMATION IS THE PROPERTY OF newterra AND CANNOT BE REUSED OR REPRODUCED WITHOUT WRITTEN CONSENT.

LEVEL	DATE	BY	REVISION
C1	11/08/17	AH	AS BUILT
B1	07/06/17	GH	FOR PRODUCTION
B	06/06/17	GH	FOR PRODUCTION
A2	25/05/17	GH	REVISED LAYOUT
A	19/05/2017	GH	FOR REVIEW

DWG. NO:

PROJECT NUMBER: 1704432

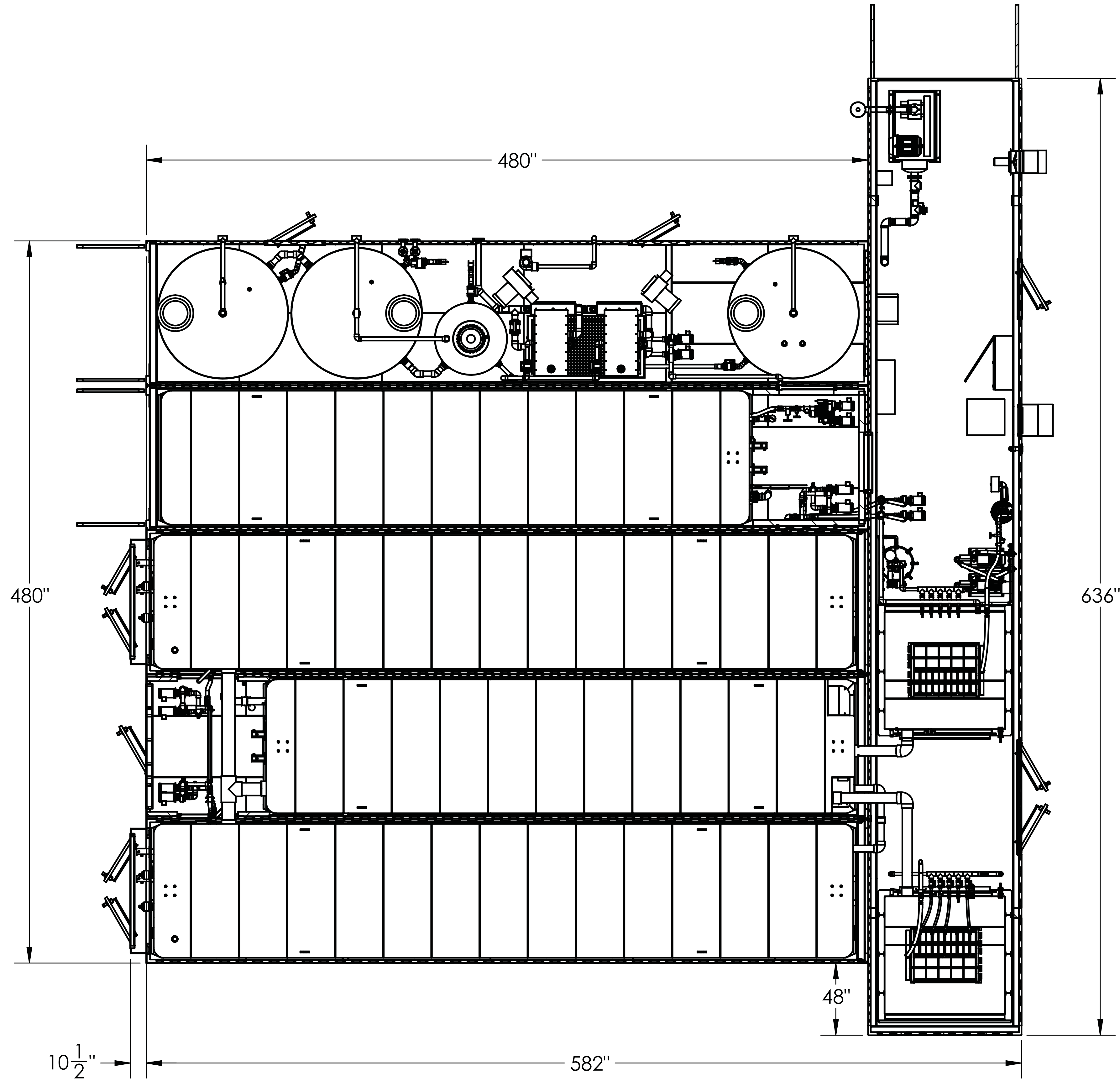
TITLE: SYSTEM LAYOUT

CUSTOMER: AGNICO EAGLE

DRAWN BY: GH

DATE: 19/05/17

SHEET 1 OF 4



newterra

GENERAL TOLERANCES
.XX ± 1/8"
.XXX ± 1/16"
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

LEVEL	DATE	BY	REVISION
C1	11/08/17	AH	AS BUILT
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A	19/05/17	GH	FOR REVIEW

DWG. NO:

PROJECT NUMBER: 1704432

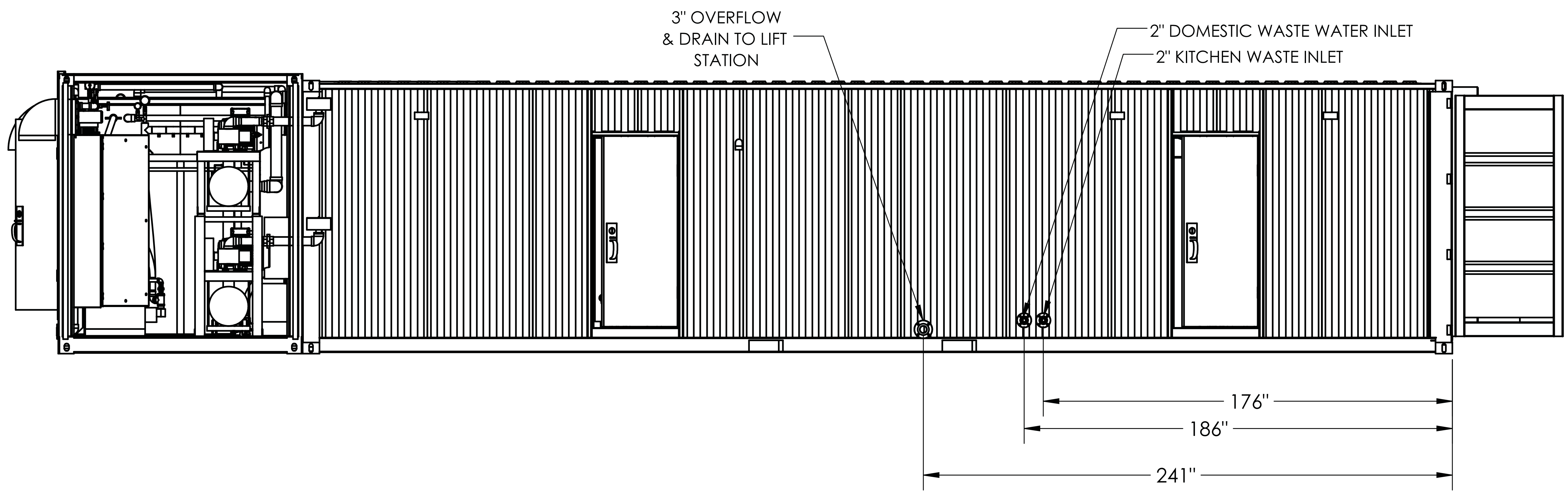
TITLE: SYSTEM LAYOUT

CUSTOMER: AGNICO EAGLE

DRAWN BY: GH

DATE: 19/05/17

SHEET 2 OF 4



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GENERAL TOLERANCES
.XX ± 1/8"
.XXX ± 1/16"
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES

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LEVEL	DATE	BY	REVISION
C1	11/08/17	AH	AS BUILT
B1	07/06/17	GH	FOR PRODUCTION
B	06/06/17	GH	FOR PRODUCTION

DWG. NO:

PROJECT NUMBER: 1704432

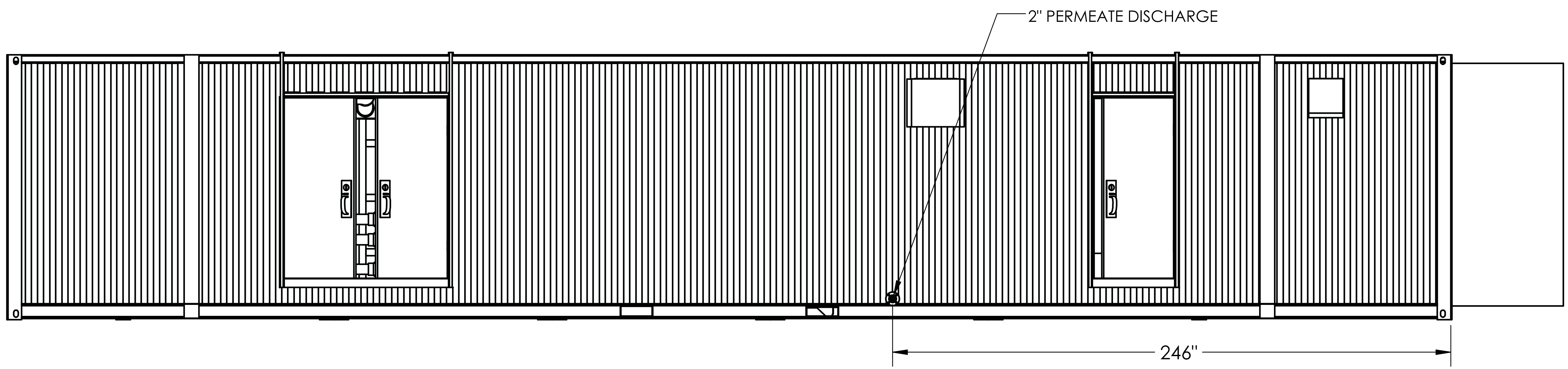
TITLE: SYSTEM LAYOUT

CUSTOMER: AGNICO EAGLE

DRAWN BY: GH

DATE: 06/06/17

SHEET 3 OF 4



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GENERAL TOLERANCES
.XX ± 1/8"
.XXX ± 1/16"
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

LEVEL	DATE	BY	REVISION
C1	11/08/17	AH	AS BUILT
B1	07/06/17	GH	FOR PRODUCTION
B	06/06/2017	GH	FOR PRODUCTION

DWG. NO:

PROJECT NUMBER: 1704432

TITLE: SYSTEM LAYOUT

CUSTOMER: AGNICO EAGLE

DRAWN BY: GH

DATE: 06/06/17

SHEET 4 OF 4

Appendix B

P&ID STP

INDEECO
TAG = H-7911,
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 10000 W
VOLTAGE & PHASE = 480v 3P
FULL-LOAD AMPS =

INDEECO
TAG = H-7912
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 15000 W
VOLTAGE & PHASE = 480v 3P
FULL-LOAD AMPS =

SCR 50
TAG = SCR-201 / 202
FLOWRATE & PRESSURE = 50 GPM MAX
HORSEPOWER = 0.25 HP
VOLTAGE & PHASE = 480v 3P
FULL-LOAD AMPS =

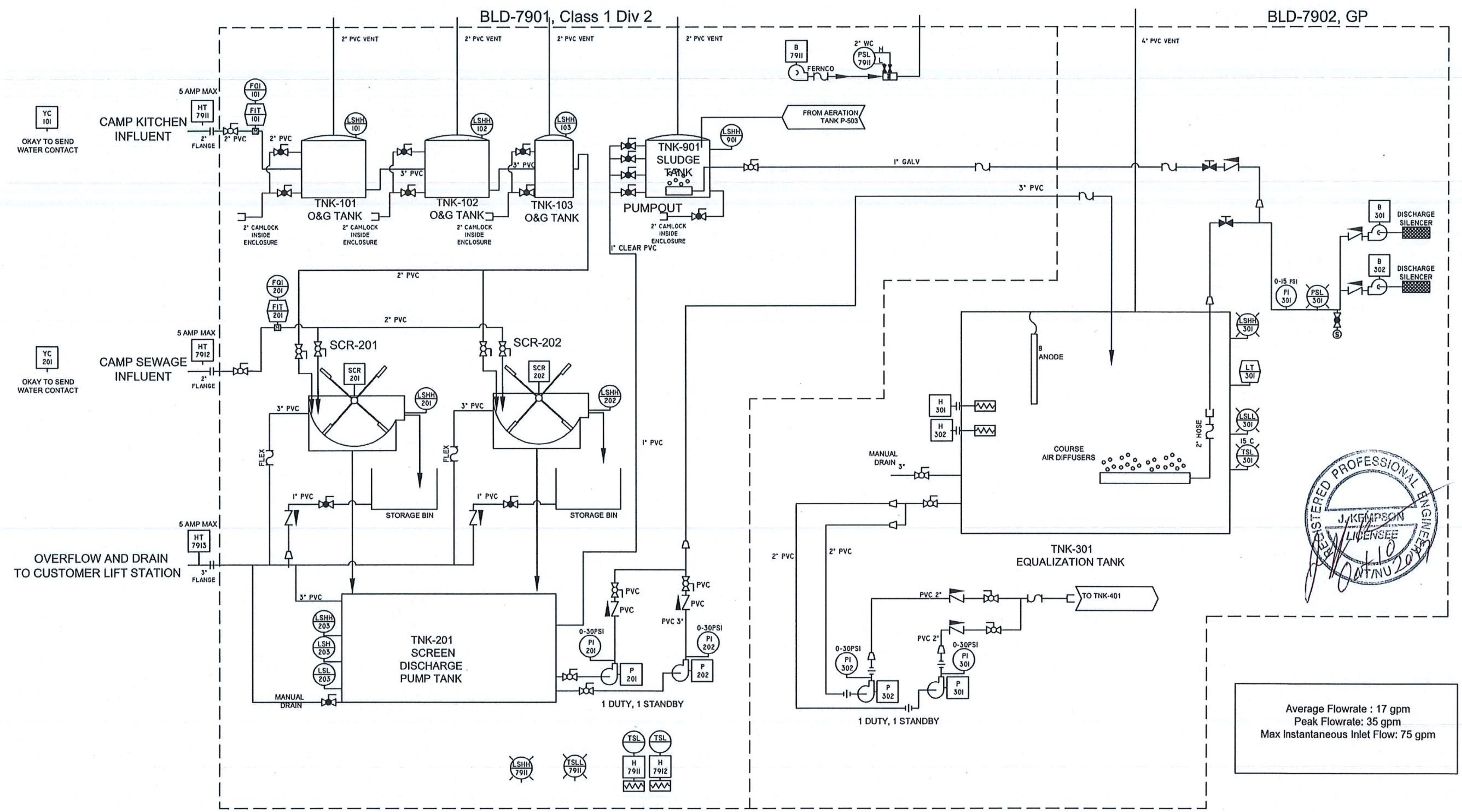
PRICE RC200
TAG = P-201,P-202
FLOWRATE & PRESSURE = 95 GPM 15'TDH
HORSEPOWER = 1 HP
VOLTAGE & PHASE = 480V, 3 PH, TEFC, CL I DIV 2
FULL-LOAD AMPS =

CINCINNATI LM-4
TAG = B-7911
FLOWRATE & PRESSURE = 170 CFM@ 1/2"WC
HORSEPOWER = 0.5 HP
VOLTAGE & PHASE = 115V 1P PH EXP
FULL-LOAD AMPS = 0.8 A

PRICE PUMPS RC-200
TAG = P-301, P-302
FLOWRATE & PRESSURE = 50 GPM @ 20 FT
HORSEPOWER = 3/4HP
VOLTAGE & PHASE = 480V, 3 PH, TEFC, CL I DIV 2
FULL-LOAD AMPS =

ELMO 2BH7420
TAG = B-301/302
FLOWRATE & PRESSURE = 40 CFM @ 4 PSI
HORSEPOWER = 2.4
VOLTAGE & PHASE = 480V, 3 PH,
FULL-LOAD AMPS = 4.4A

CALORITEC CXFT306F347
TAG = H-301, H-302
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 6000 W
VOLTAGE & PHASE = 480V, 3 PH
FULL-LOAD AMPS = 10.4 A



Average Flowrate : 17 gpm
Peak Flowrate: 35 gpm
Max Instantaneous Inlet Flow: 75 gpm

NOTES

IS INPUT WIRING TO BE WIRED FOR OUTDOORS, ACCORDING CEC FOR HAZARDOUS LOCATIONS.

WIRING TO BE CLASS I DIVISION 2, AS PER THE CEC.

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(800) 420-4056
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LEVEL	REVISION	DATE (mm/dd/yy)	BY
D	T-401 MIX PIPE SIZE	10/10/17	JJK
C	AS-BUILT	13/08/17	JJK
B	PRODUCTION	06/06/17	JJK
A2	SUBMITTAL REVISIONS	26/05/17	JJK
A	SUBMITTAL	23/05/17	JJK

PROJECT NUMBER: 1704432

TITLE AND LOCATION: P&ID AMARUQ MINE

CUSTOMER: AGNICO EAGLE MINE

DRAWN BY	DATE	SHEET	SHEETS
MH		1	4

PRICE PUMPS RC-200
TAG = P-401,402
FLOWRATE & PRESSURE = 300 GPM @ 60 FT
HORSEPOWER = 5HP
VOLTAGE & PHASE = 480V, 3 PH, TEFC, CL I DIV 2
FULL-LOAD AMPS =

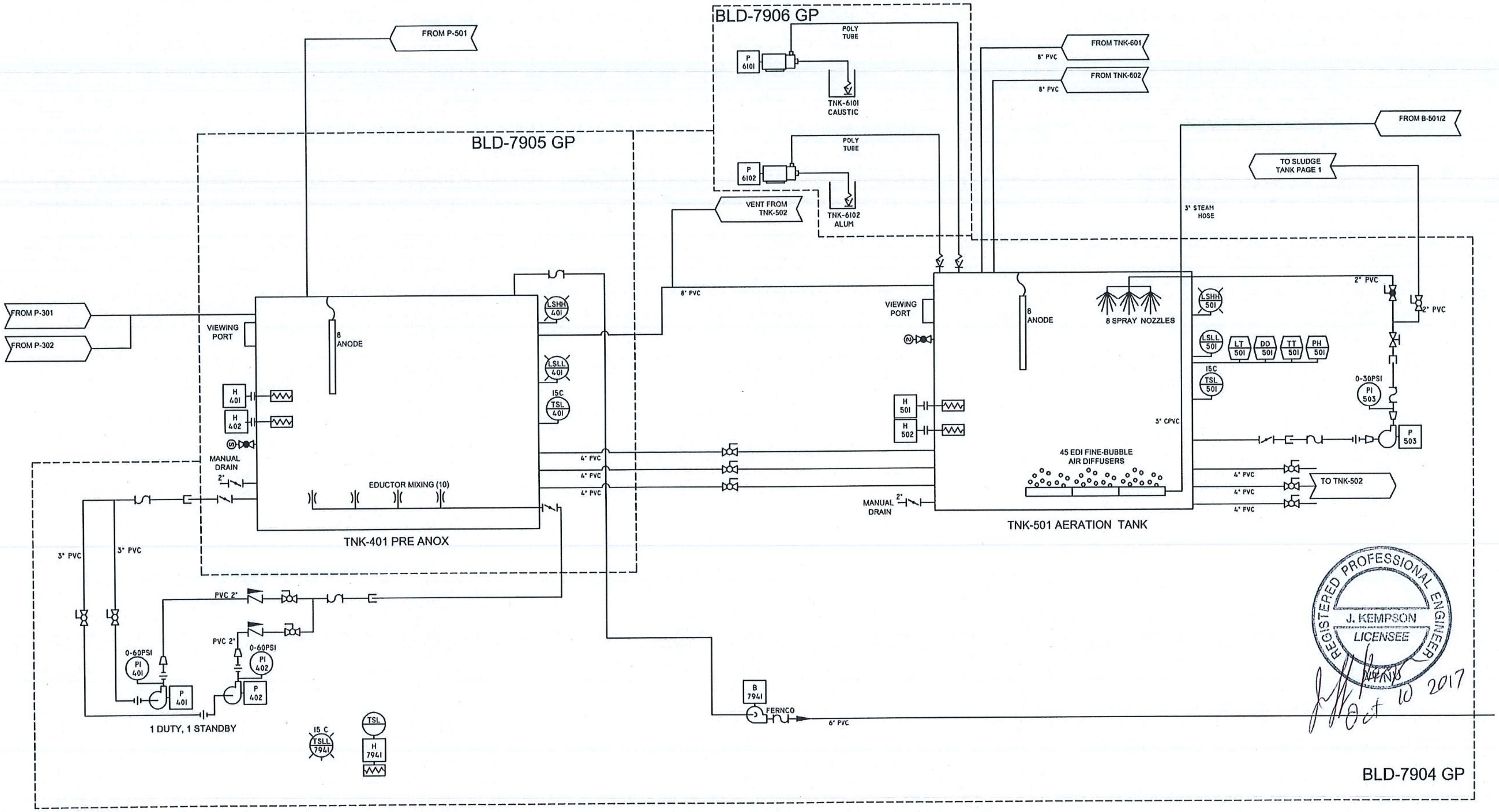
CALORITEC CXFT306F347R83
TAG = H-401,402,501,502
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 6000 W
VOLTAGE & PHASE = 480V, 3 PH
FULL-LOAD AMPS = 10.4 A

CINCINNATI LM6
TAG = B-7941
FLOWRATE & PRESSURE = 700 CFM@ 2"WC
HORSEPOWER = 1.5 HP
VOLTAGE & PHASE = 480V 3P PH
FULL-LOAD AMPS =

OUELLET OAC04808BL
TAG = H-7941
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 4800 W
VOLTAGE & PHASE = 480 V, 1 PH
FULL-LOAD AMPS = 8.34

PRICE PUMPS RC-200
TAG = P-503
FLOWRATE & PRESSURE = 50 GPM @ 10 FT
HORSEPOWER = 1/4 HP
VOLTAGE & PHASE = 480V, 3 PH, TEFC, CL I DIV 2
FULL-LOAD AMPS =

PROMINENT BETA 4
TAG = P-6101, 6102
FLOWRATE & PRESSURE = 3.2 GPH@58PSI
HORSEPOWER = N/A
VOLTAGE & PHASE = 120 V, 1 PH
FULL-LOAD AMPS = N/A



NOTES

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LEVEL	REVISION	DATE (mm/dd/yy)	BY
D	T-401 MIX PIPE SIZE	10/10/17	JJK
C	AS-BUILT	13/08/17	JJK
B	PRODUCTION	06/06/17	JJK
A2	SUBMITTAL REVISIONS	26/05/17	JJK
A	SUBMITTAL	23/05/17	JJK

PROJECT NUMBER: 1704432

TITLE AND LOCATION: P&ID AMARUQ MINE

CUSTOMER: AGNICO EAGLE MINE

DRAWN BY: MH | DATE: | SHEET: 2 | SHEETS: 4

SUTORBILT 4L
TAG = B-501,B-502
FLOWRATE & PRESSURE = 487CFM @ 4.4 PSI
HORSEPOWER = 15
VOLTAGE & PHASE = 480V, 3 PH, TEFC
FULL-LOAD AMPS =

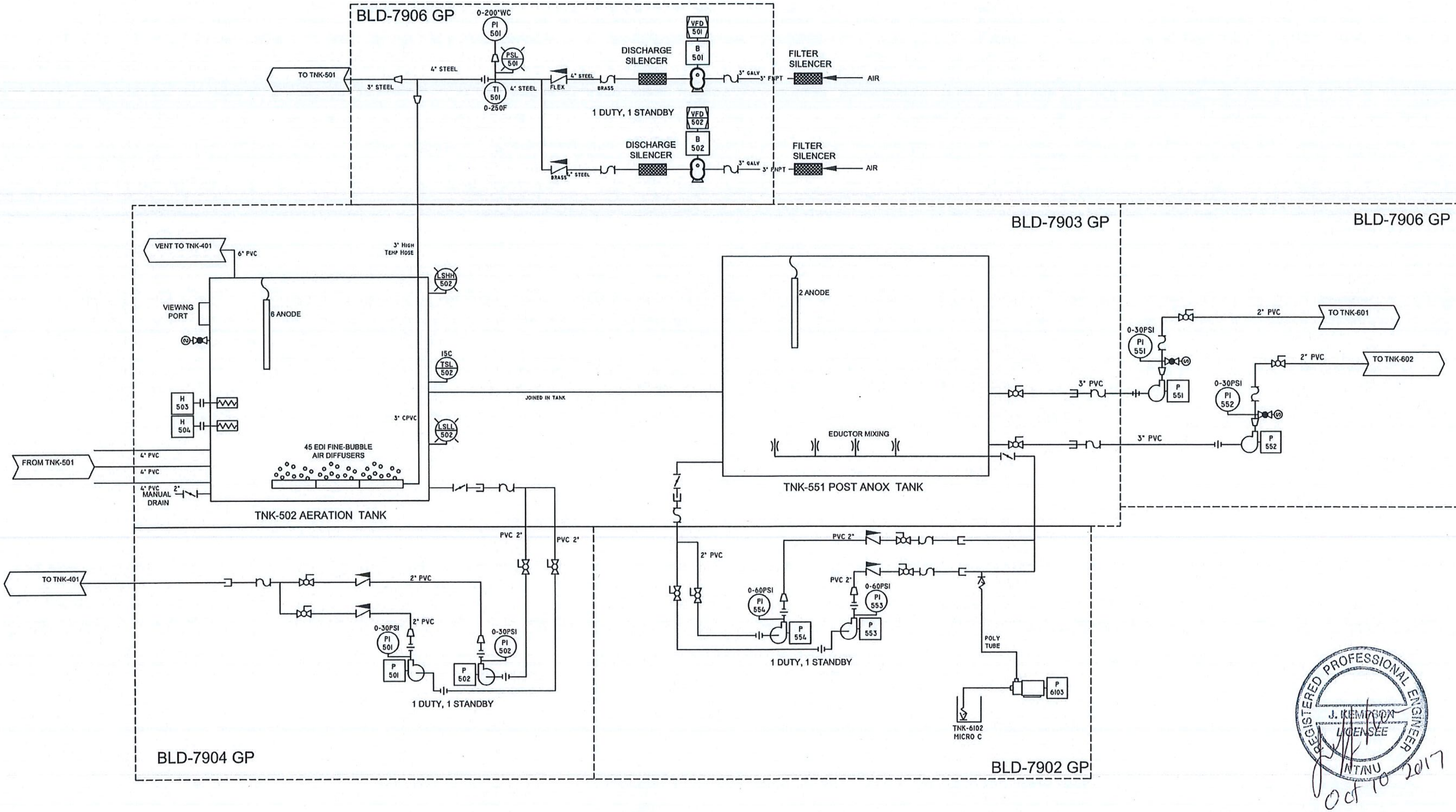
PRICE PUMPS RC-300
TAG = P-501, P-502
FLOWRATE & PRESSURE = 140GPM @ 20'
HORSEPOWER = 2 HP
VOLTAGE & PHASE = 480 V, 3 PH
FULL-LOAD AMPS =

PROMINENT BETA 4
TAG = P-6103
FLOWRATE & PRESSURE = 3.2 GPH@58PSI
HORSEPOWER = N/A
VOLTAGE & PHASE = 120 V, 1 PH
FULL-LOAD AMPS = N/A

CALORITEC CXFT306F347R83
TAG = H-503,504
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 6000 W
VOLTAGE & PHASE = 480V, 3 PH
FULL-LOAD AMPS = 10.4 A

PRICE PUMPS RC-300
TAG = P-553, 554
FLOWRATE & PRESSURE = 50GPM @ 55'
HORSEPOWER = 3 HP
VOLTAGE & PHASE = 480 V, 3 PH
FULL-LOAD AMPS =

PRICE PUMPS RC-200
TAG = P-551, 552
FLOWRATE & PRESSURE = 60GPM @ 20'
HORSEPOWER = 3/4 HP
VOLTAGE & PHASE = 480 V, 3 PH
FULL-LOAD AMPS =



NOTES

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LEVEL	REVISION	DATE (mm/dd/yy)	BY
D	T-401 MIX PIPE SIZE	10/10/17	JJK
C	AS-BUILT	13/08/17	JJK
B	PRODUCTION	06/06/17	JJK
A2	SUBMITTAL REVISIONS	26/05/17	JJK
A	SUBMITTAL	23/05/17	JJK

PROJECT NUMBER: 1704432

TITLE AND LOCATION: P&ID AMARUQ MINE

CUSTOMER: AGNICO EAGLE MINE

DRAWN BY: MH
DATE:
SHEET: 3 SHEETS: 4

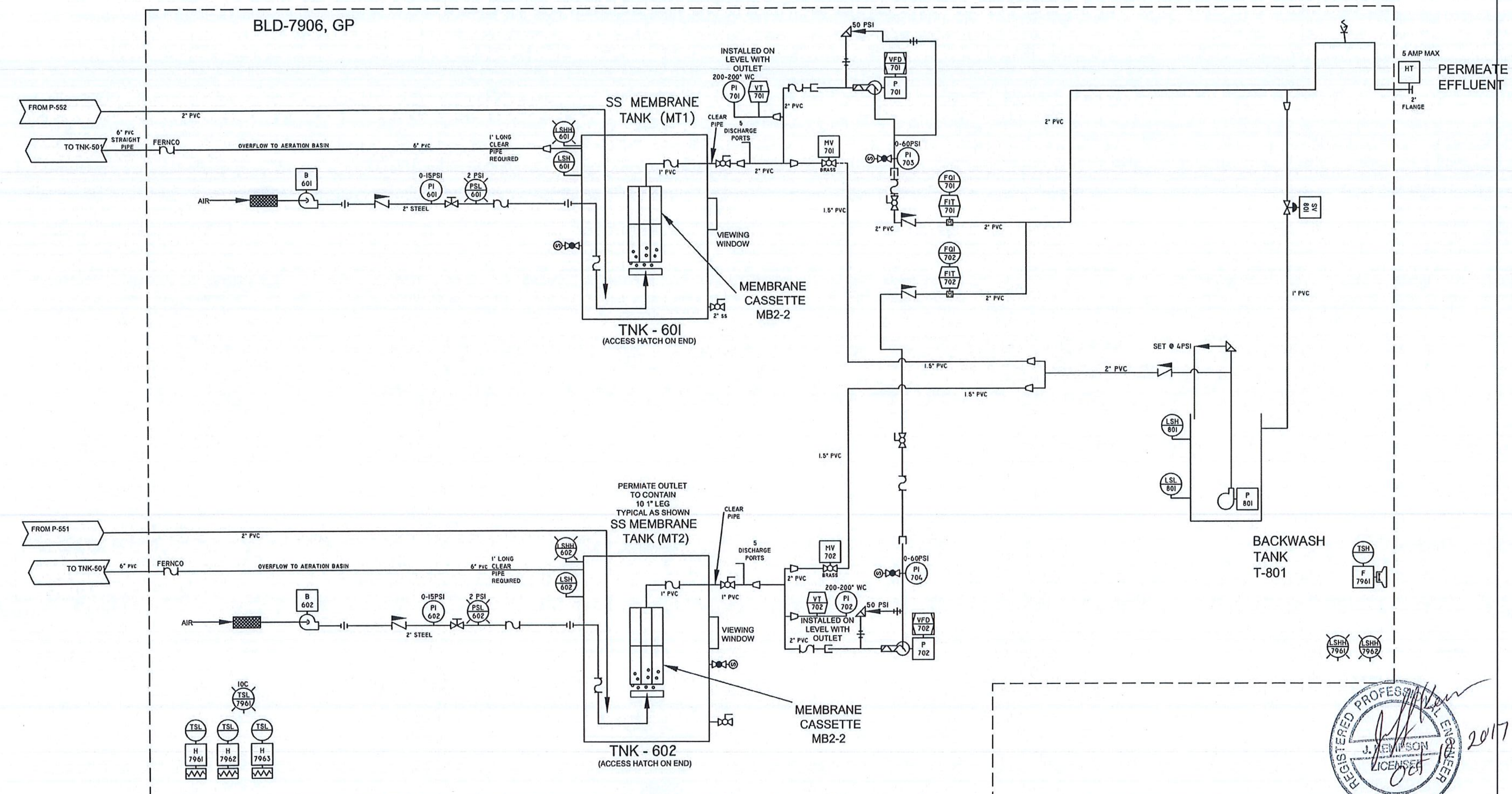
ELMO RIETCHLE 2BH-1510
TAG = B-601,B-602
FLOWRATE & PRESSURE = 95SCFM @ 4.4 PSI
HORSEPOWER = 6.2
VOLTAGE & PHASE = 480 V, 3 PH, TEFC
FULL-LOAD AMPS = 9.9

OUELLET OAC04808BL
TAG = H-7961,H-7962,H-7963
FLOWRATE & PRESSURE = N/A
HORSEPOWER = 4800 W
VOLTAGE & PHASE = 480V, 1 PH
FULL-LOAD AMPS = 8.34

MOYNO 356
TAG = P-701, P-702
FLOWRATE & PRESSURE = 0-20 GPM
HORSEPOWER = 2HP
VOLTAGE & PHASE = 480 V, 3 PH, TEFC
FULL-LOAD AMPS =

ZOELLER M72
TAG = P-801
FLOWRATE & PRESSURE = 0-40 GPM
HORSEPOWER = 1/2HP
VOLTAGE & PHASE = 115 V, 1 PH, TEFC
FULL-LOAD AMPS =

CAN ARM S18-F1
TAG = F-7961
FLOWRATE & PRESSURE =
HORSEPOWER = 1/3
VOLTAGE & PHASE = 115V 1 PHASE
FULL-LOAD AMPS = 6.6A



NOTES

D	T-401 MIX PIPE SIZE	10/10/17	JJK	
C	AS-BUILT	13/08/17	JJK	
B	PRODUCTION	06/06/17	JJK	
A2	SUBMITTAL REVISIONS	26/05/17	JJK	
A	SUBMITTAL	23/05/17	JJK	
LEVEL	REVISION	DATE (mm/dd/yy)	BY	

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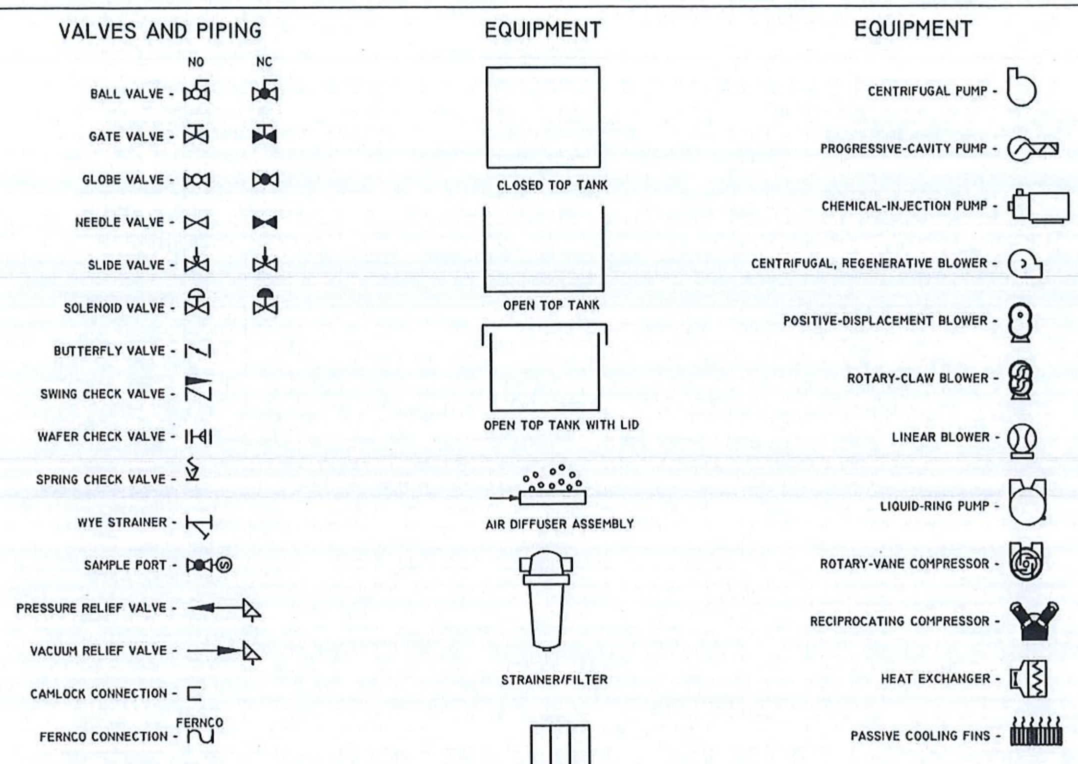
PROJECT NUMBER: 1704432

TITLE AND LOCATION: P&ID AMARUQ MINE

CUSTOMER: AGNICO EAGLE MINE

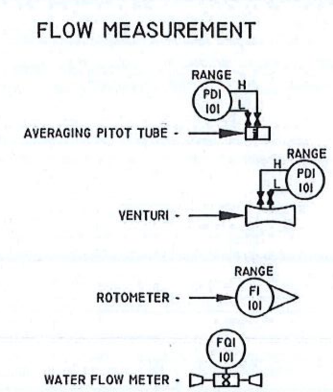
DRAWN BY: MH | DATE: | SHEET 4 | SHEETS 4

REGISTERED PROFESSIONAL ENGINEER J. JEMISON LICENSEE NT/NU 2017



EQUIPMENT

AV - ACTUATED VAVLE
B - BLOWER
F - FAN
H - HEATER
MBR - MEMBRANE BIOLOGICAL REACTOR
MV - MODULATED VALVE
P - PUMP
SV - SOLENOID VALVE
TNK - TANK
UV - ULTRA VIOLET LIGHT
VFD - VARIABLE FREQUENCY DRIVE



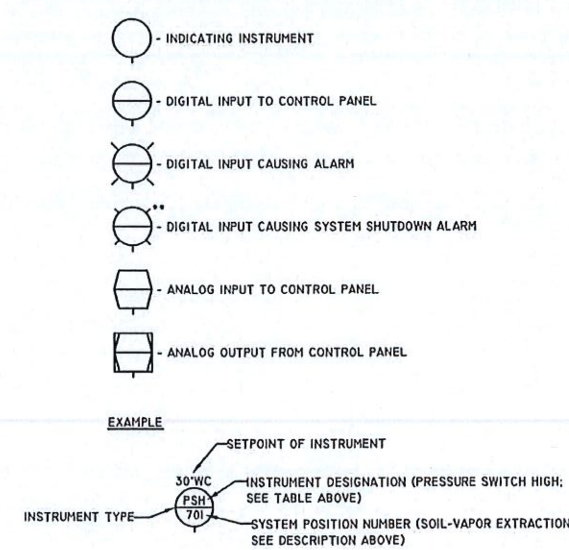
INSTRUMENT DESIGNATION

	INPUT	1ST MODIFIER	2ND MODIFIER	3RD MODIFIER	OUTPUT	1ST MODIFIER	
A							A
B						BLOWER	B
C	CYCLE					COMPRESSOR	C
D		DIFFERENTIAL				AIR DRYER	D
E							E
F	FLOW					FAN	F
G	GAS (LEL)		GAUGE				G
H				HIGH	HAND	HEATER	H
I	CURRENT		INDICATOR				I
J							J
K							K
L	LEVEL			LOW			L
M					MOTORIZED		M
N							N
O							O
P	PRESSURE				PNEUMATIC	PUMP	P
Q		QUANTITY					Q
R							R
S	SPEED		SWITCH		SOLENOID		S
T	TEMPERATURE		TRANSMITTER				T
U							U
V						VALVE	V
W							W
X							X
Y							Y
Z	POSITION						Z

SYSTEM POSITION DESIGNATION

1000 - LIFT STATION
2000 - INLET SCREEN
3000 - EQUALIZATION TANK
4901 - SCREEN DISCHARGE PUMP TANK
5000 - AERATION TANK
5500 - SLUDGE HOLDING TANK
6000 - MBR TANK
6100 - CHEMICAL INJECTION
7000 - PERMEATE
7500 - UV LIGHT
7900 - BUILDING,TRAILER OR SKID
8000 - DISCHARGE TANK
8200 - CONTROL PANEL
8300 - TELEMETRY
9900 - EXTRAS

INSTRUMENT IDENTIFICATION



REGISTERED PROFESSIONAL ENGINEER
J. KEMPSON
LICENSEE
NT/NU
Oct 2017

NOTES

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LEVEL	REVISION	DATE (mm/dd/yy)	BY
D	T-401 MIX PIPE SIZE	10/10/17	JJK
C	AS-BUILT	13/08/17	JJK
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A	SUBMITTAL	23/05/17	JJK

PROJECT NUMBER 1704432
TITLE AND LOCATION
P&ID
AMARUQ MINE

CUSTOMER
AGNICO EAGLE MINE

DRAWN BY MH
DATE
SHEET 4
SHEETS 4