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Arsenic Water Treatment Plant

Agnico Eagle Mines Limited Whale Tail

Design Report

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LIST OF REVISIONS

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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 kilometres 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. The proposed open-pit mine, mined by the truck-and-shovel operation, will produce 19 M tons of ore grading at 3.68 g/t for a total of 2.1 M ounces from 2019 to 2025.

The Amaruq Mineral Deposit is considered to be an extension of the currently operating Meadowbank mine and most positions will be filled by Meadowbank employees. A conventional open pit mining operation is forecasted on the Whale Tail deposit. Access to the site is via a 64-kilometre road from Meadowbank mine. On-site facilities will include a power plant, maintenance facilities, tank farm for fuel storage, Arsenic water treatment plant (AsWTP), sewage treatment plant, drinking water treatment plant, as well as accommodation and kitchen facilities for approximately 400 people.

The global concept for water treatment at Amaruq is based on the reuse of the two Actiflo® from Meadowbank. Actiflo® is designed to treat mainly suspended solids (TSS). In Amaruq, it is expected to have arsenic (As) in the surface water due to the leachability of the rock. Therefore, the Actiflo® will be integrated into a treatment chain able to remove As to acceptable levels.

Figure 1 presents the AsWTP location.

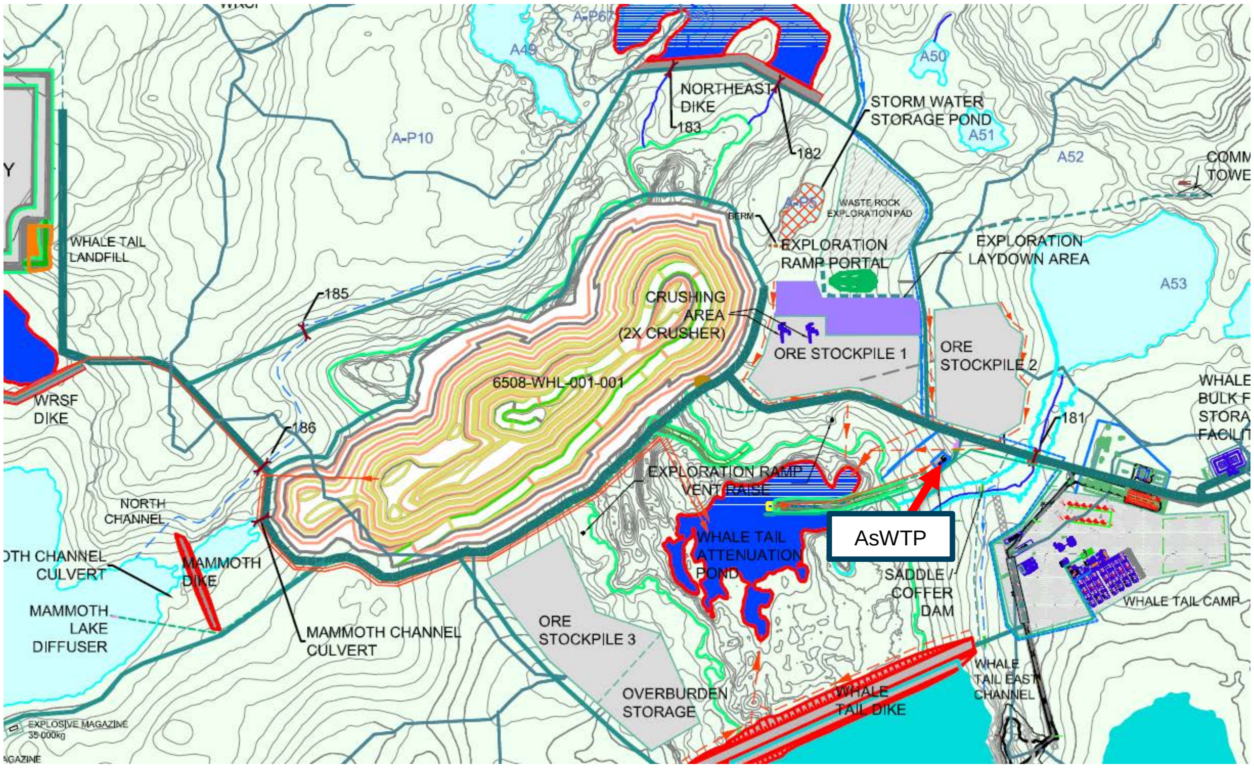


Figure 1: Location of the AsWTP

1.3 Purpose of Document

This report includes the final design and construction drawings for the AsWTP. The water to be treated will be sourced from Whale Tail Attenuation Pond. The effluent water generated by the AsWTP will be pumped through a pipeline and discharged to Mammoth Lake. . The design report was written according to Water License 2AM-WTP1826 Part I Item 1 and 2.

1.4 Scope of Work

SNC Lavalin was retained by Agnico Eagle to design the feed pump, pipelines, and effluent water outfall to the discharge location. Veolia was in charge of the AsWTP design and SNC Lavalin and AEM for the construction. This report describes the AsWTP, pumps and pipelines design. Construction drawings of the listed infrastructure are presented in Appendix A of this report.

2. Design Methodology

2.1 Water Management Strategy

During the operational phase of the project, all of the contact water originating from affected areas on the mine site will be intercepted, diverted and collected within the various collection ponds and eventually pumped and stored in the Whale Tail Attenuation Pond. The contact water will be treated by an AsWTP prior to discharge to the receiving environment (i.e. Mammoth Lake) or reused in operations when possible. The sludge generated by the AsWTP will be dewatered with centrifuges and stored into the waste rock storage facility. During closure, water treated on site will be directed into the open pits and the north basin to fill them. Finally, water will be treated as long as it is required to respect the discharge criteria.

2.2 Methodology

Volume and water quality information used for design are based on water balance and water quality Model. Based on the information available to date, the AsWTP will be designed to treat the contact water for As and TSS. To do so, the ASWTP will include the following treatment steps that are detailed in section 4:

1. Oxidation to oxidize the arsenic from As (III) to As (V).
2. pH adjustment.
3. Coagulation using ferric sulfate in order to co-precipitate the As (V) as ferric-arsenate precipitate.
4. Flocculation to enhance the settling of the precipitate formed in the coagulation step.
5. Clarification to separate the treated water from the precipitate. High-rate ballasted floc clarifiers will be used for this step of the treatment process.
6. Sludge thickening process to decrease storage requirements.

3. General Site Conditions and Other Data Input for Design

3.1 Environmental Data

The Amaruq Mineral Deposit is located in the tundra region of the central sub-Arctic (the Barrenlands) at the lower end of the Northern Arctic Ecozone, and within the Wager Bay Plateau Ecoregion. The physical features of the region have largely been determined by glaciation. The terrain consists predominantly of broadly rolling uplands and lowlands with little topographical relief (very few hills). Strung out across the landscape is long, sinuous eskers. This undulating landscape is studded with innumerable lakes, ponds, and wetlands. Cryosols are the dominant soils, and are underlain by continuous permafrost with active layers that are usually moist or wet throughout the summer. Large boulder field areas are encountered.

The topography in the immediate area of the project is generally flat, with relief in the order of 10 to 12 m near the main deposit areas, and as high as 50 m locally. Elevations vary from about 150 metres above sea level (masl) along the shoreline of Whale Lake to about 200 masl. Much of the limited topographic relief in the area can be attributed to land features typical of glaciated and permafrost terrain.

Throughout the Nunavut Territory, the vegetation is composed of dwarf shrubs, sedges and grasses, mosses, and lichens. A short but intense summer produces many small but brilliant flowers, including purple saxifrage, sedge, lousewort, fireweed and wintergreen. Other common flowers in the south of the Amaruq region include dandelions, chamomile daisies, harebells and buttercups. About 200 species of flowers grow in the Barrenlands.

The animal population in the Amaruq region includes mammals such as caribou, muskox, barren-ground grizzly bear, wolf, wolverine, fox, ermine, lemming and hare. Caribou alone outnumber Nunavut's human population 25 to 1. Bird species include gyrfalcon, snowy and short-eared owl, rough-legged hawk, golden eagle, ptarmigan, jaeger, snow goose, pintail and long-tailed duck, goldeneye duck, lesser scaup and green-winged teal. Fish include lake trout, arctic grayling, arctic char, walleye, whitefish and northern pike. Mosquitoes breed in the shallow tundra lakes.

Arctic winter conditions occur from October through May, with temperatures ranging from +5 to -40º C. Light to moderate snowfall is accompanied by variable winds up to 70 km/h, creating large, deep drifts and occasional whiteout conditions. Summer temperatures can range from -5 to +25º C, with isolated rainfall increasing through September. In the area of the Amaruq Mineral Deposit, ice is present on lakes from mid-September to mid-July.

3.2 Characteristics of the Effluent

Amaruq ore contains Arsenopyrite and other minor phase containing As. Arsenopyrite mineral is well known to produce As leachate when in presence of oxygen and water.

Depending on the redox condition and pH, As could be found under arsenate (As (V)—AsO_4^{3-}) and arsenite (As (III)—AsO_3^{3-}). In reductive condition, As III could be predominant and in oxidative condition As V will be the major phase. This As speciation will have an important impact on the water treatment strategy because As III and V will not be treated at the same pH. The best approach will be to oxidize As III into V form in order to treat all As in the same step.

AsWTP is designed for an average As concentration of 1.5 mg/l (3.2 maximum mg/L)[1]. TSS used for design (line recirculation, pump) are at 500 ppm in average (max 1000 ppm). It is assumed that other metal will not be problematic on site.

Table 1[2] presents the discharge water quality based on Licence A for the treated water. The AsWTP will treat TSS and As which will ensure compliance for those elements as well as iron (Fe) and pH. Other constituents are not expected to require treatment during the treatment period[3].

[1] 6115-S-265-001-QUO-001
[2] License A: 2AM-WTO1826
[3] Golder, 2018. File excel: WQ Prelim_Results_Dissolved_Concs_1Aug2018

Table 1: Water Discharge Criteria

Parameters	Unit	Monthly Concentration Mean	Maximum Concentration in a Grab Sample
pH	-	6–9.5	6–9.5
Total Suspended Solids	mg/l	15	30
Total Dissolved Solids	mg/l	1400	1400
Total Ammonia	mg-N/l	16	32
Total Phosphorus	mg-P/l	0.3	0.6
Aluminum	mg/L	0.5	1
Arsenic	mg/L	0.1	0.2
Cadmium	mg/L	0.002	0.004
Chromium	mg/L	0.02	0.04
Cupper	mg/L	0.1	0.2
Iron	mg/L	1	2
Lead	mg/L	0.05	0.1
Mercury	mg/L	0.004	0.008
Nickel	mg/L	0.25	0.5
Zinc	mg/L	0.1	0.2
Total petroleum hydrocarbons	mg/L	3	6

3.3 Effluent Flow Rates

The expected flow rates in the Whale Tail attenuation pond are presented in table 2[4].

Table 2: Treatment flow rate requirement

Month	Volume to be treated m^3	Month	Volume to be treated m^3
2019 Apr	345 600	2021 Apr	30 000
2019 May	804 720	2021 May	29 762
2019 Jun	453 499	2021 Jun	519 270
2019 Jul	108 040	2021 Jul	86 097
2019 Aug	125 117	2021 Aug	108 355
2019 Sep	181 336	2021 Sep	183 380
2020 Jun	507 141	2021 Oct	29 659
2020 Jul	91 941	2021 Nov	28 812
2020 Aug	115 489	2021 Dec	29 659
2020 Sep	194 912	2022 Jan	29 194
2020 Oct	31 000	2022 Feb	26 675
2020 Nov	30 000	2022 Mar	29 194
2020 Dec	31 000	2022 Jun	683 172
2021 Jan	31 000	2022 Jul	115 024
2021 Feb	28 000	2022 Aug	128 886
2021 Mar	31 000	2022 Sep	222 991

The design flow rate in summer is set at 1600 m^3/h and 84 m^3/h in winter.

[4] 1789310_204_Phase2_WaterBalance_RevA

4. Design of the As Water Treatment Plant (AsWTP)

As presented herein, the global strategy is based on the following steps:

1. Oxidation to oxidize the arsenic from As (III) to As (V).
2. pH adjustment.
3. Coagulation using ferric sulfate in order to co-precipitate the As (V) as ferric-arsenate precipitate.
4. Flocculation to enhance the settling of the precipitate formed in the coagulation step.
5. Clarification to separate the treated water from the precipitate. High-rate ballasted floc clarifiers will be used for this step of the treatment process.
6. Sludge thickening process to decrease storage requirements.

4.1 Process summary for summer operation

The purpose of the AsWTP (using Actiflo ACP-700R) is to remove Total Suspended Solids (TSS) and As from the influent water pumped from Whale Tail Attenuation Pond. The equipment has an operational range of 6,250 m^3/d. to 38,400 m^3/d.

AsWTP is composed mainly of two treatment lines:

- One (1) As removal reactors used for pH adjustment, As oxidation, As precipitation.
- Two (2) Actiflo® treating the exit of the As removal reactor, with sludge recirculation.
- A sludge dewatering chain with two (2) centrifuges (centrate is recirculating into the Actiflo®).

The AsWTP overflow is designed to meet the Type A Licence final effluent discharge criteria for TSS concentrations and As. The final effluent will be monitored for pH and turbidity, which will be monitored continuously. Flow rate will be measured continuously.

The AsWTP general flow diagram is illustrated in Figure 2. The following sections describe the AsWTP components.

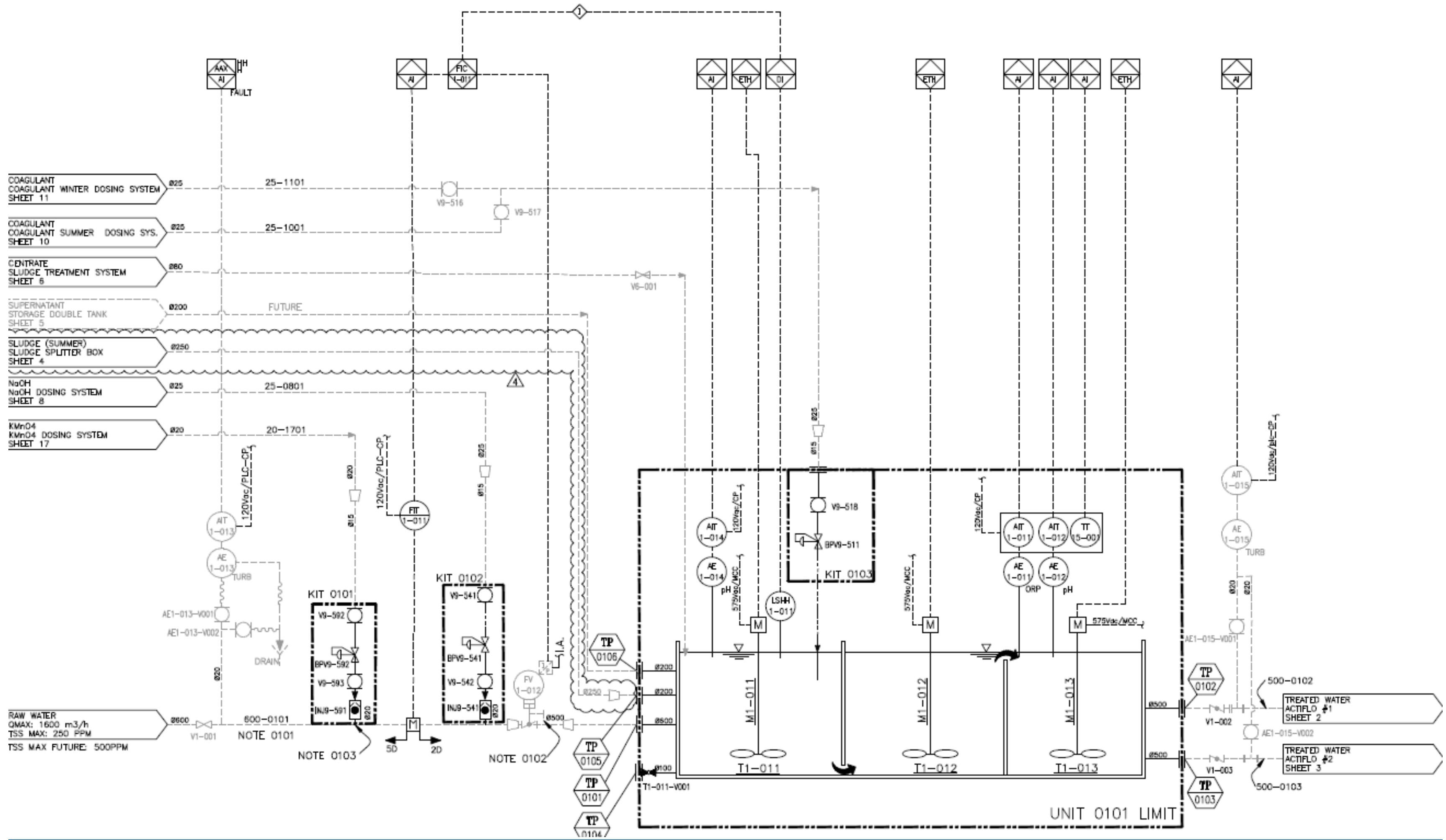


Figure 2a—AsWTP Flowsheet (summer operation)—As removal reactor

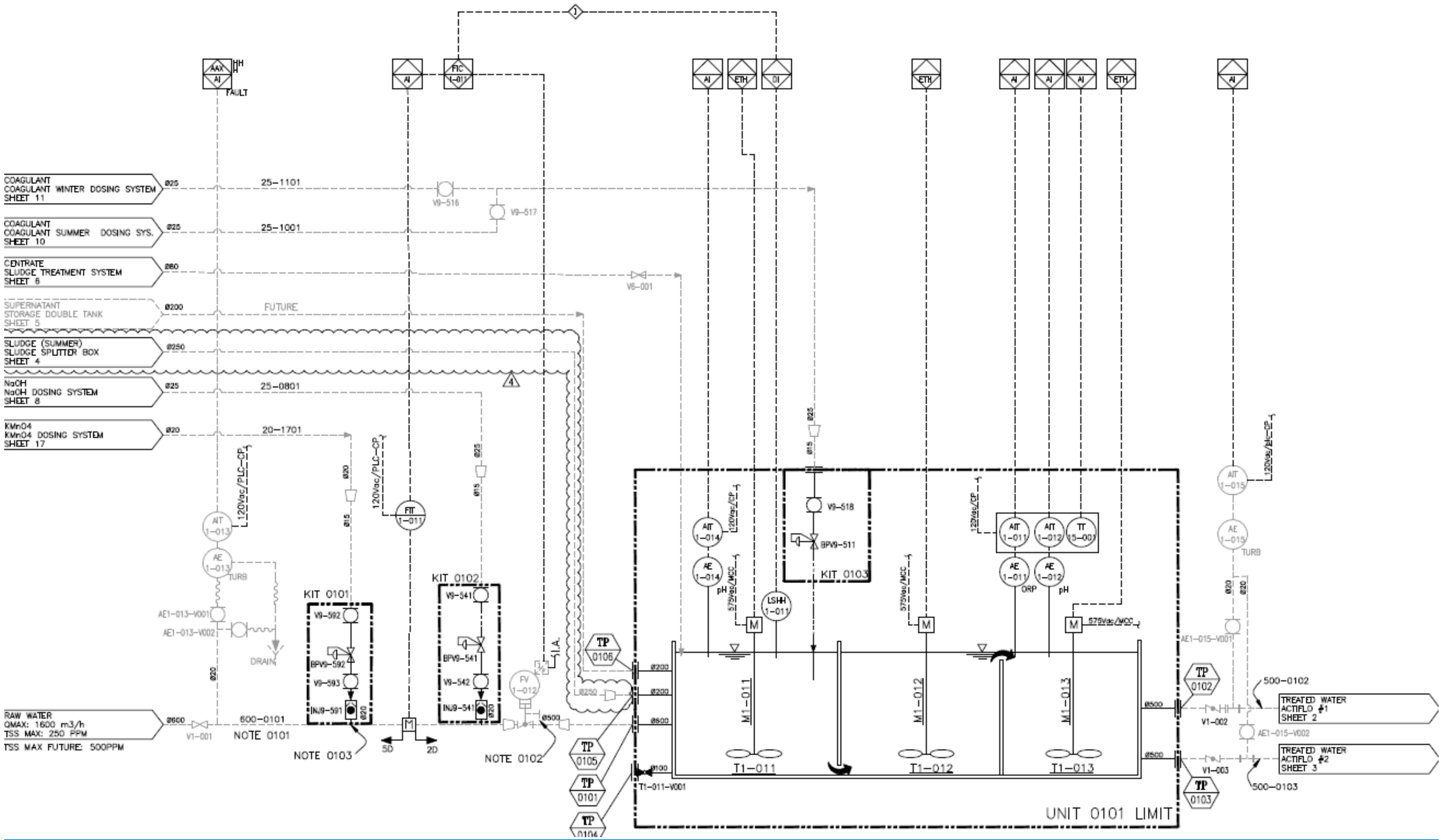


Figure 2b—AsWTP Flowsheet (summer operation)—Actiflo

4.1.1 Arsenic Oxidation

The As present in water can be found under two main forms: As (III) and As (V). Depending on the redox potential of water in the Whale Tail Attenuation Pond, As (III) will be oxidized into As (V). Before entering the Arsenic Removal Reactor, a $KMnO_4$ (potassium permanganate) solution will be added to oxidize the As (III) to As (V).

4.1.2 pH Adjustment

To precipitate As, ferric sulfate will be added. This reagent acidifies water and if the feed water has insufficient alkalinity, caustic soda will be added to adjust the pH before the water enters the Arsenic Removal Reactor. A pH of 7 is targeted for As uptake.

4.1.3 Arsenic Co-precipitation

The influent will be sent to the Arsenic Removal Reactor. In this reactor (RX75-3 from Veolia), the influent will be mixed with ferric sulfate ($Fe_2(SO_4)_3$) and recycled sludge to produce a slurry. The ferric sulfate forms a floc of ferric hydroxide ($Fe(OH)_3$) which acts both as a bridge to tie colloidal particles together and as an active surface which forms surface complexes with many metals, such as As. The ferric sulfate will also lower the pH in the vicinity of 7.0 where the surface complexation is optimal for As (V).

The volume of the reactor is 176 m^3.

A portion of the sludge collected in the Actiflo® are recycled in the Arsenic Removal Reactor to allow a longer contact time between As and iron hydroxide sludge (rate of 4:1).

According to Veolia estimation, the retention time into the Arsenic removal reactor will be approximately 3.5 min which will allow for As uptake on ferric hydroxides.

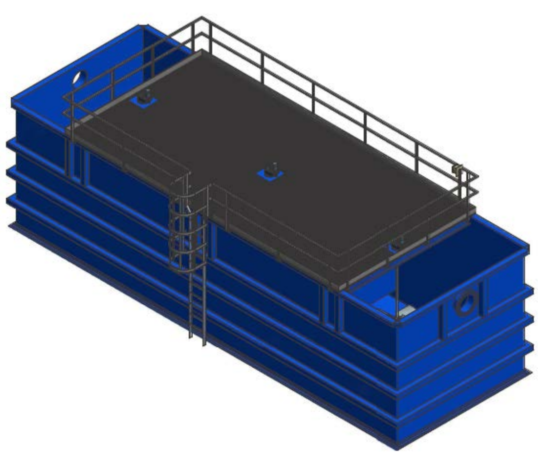


Figure 3: As Removal Reactor

4.1.4 TSS Removal

The slurry from the Arsenic Removal Reactor will flow to the two (2) Actiflo® (ACP-700R).The proposed Actiflo® is designed to remove TSS from the raw water (assumption is that raw water has 500 ppm TSS). To optimize the clarification step (settling rate of 60 m/h), the maximum flow for each Actiflo® should be 800 m^3/h to respect the settling rate (60 m/h).

Actiflo® are sand-ballasted settling units with a high-rate coagulation/flocculation/sedimentation process that utilizes microsand as a seed for floc formation. The microsand provides a surface area that enhances flocculation and acts as a ballast or weight. The resulting floc settles very fast, allowing for compact clarifier designs with high overflow rates and short retention times. The use of microsand also permits the unit to perform well under dramatically changing flow rates without impacting final effluent quality.

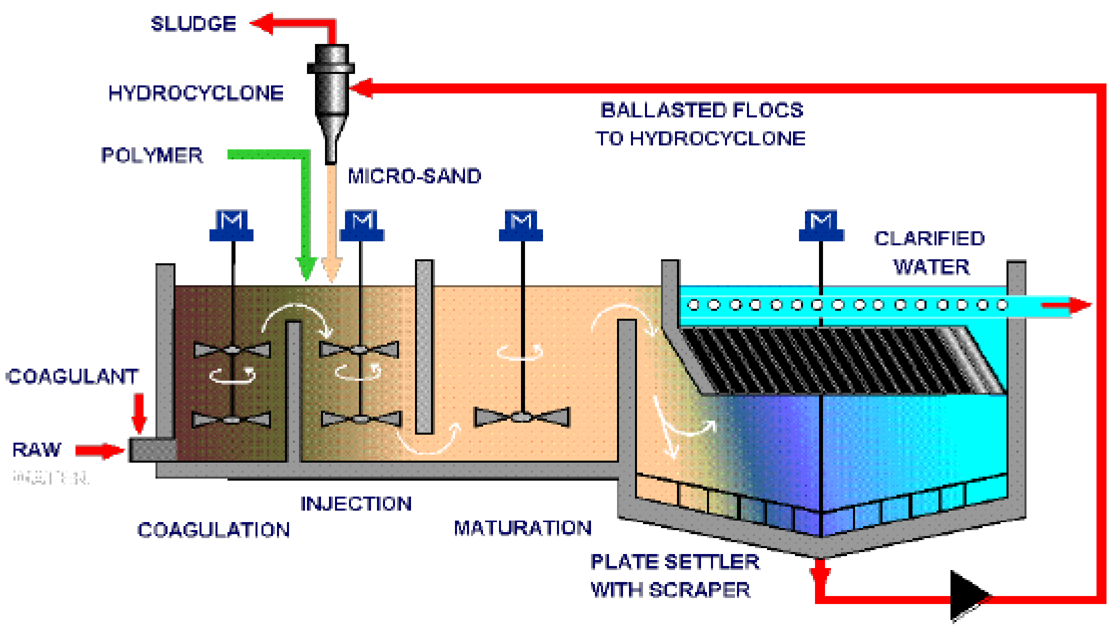


Figure 4—Actiflo® Process

The slurry flows to the first basin, the coagulation chamber, where the reaction is optimized. The coagulated water then overflows to a second tank section called the injection tank. There, the microsand and flocculent aid polymer are added. The microsand provides a large contact area for floc attachment and acts as ballast, thereby accelerating the settling of the flocs. The flocculent aid polymer binds the destabilized suspended solids to the microsand particles by forming polymer bridges. From the injection tank, the water underflows to a third tank section called the maturation tank. In this section, the microsand and sludge flocs agglomerate and grow into high-density flocs known as microsand ballasted flocs.

From the maturation zone, the water overflows to the settling section of the tank. In the settling zone, the microsand ballasted flocs settle quickly to the bottom of the unit. In the settling zone, the settling efficiency is further increased by the use of the lamella tubes. The clarified water exits the system via a series of collection troughs or wires. The clarified water is monitored for turbidity.

The sand-sludge mixture settles to the bottom of the clarifier. Scrapers force the sludge collected at the bottom of the clarifier into a centre cone from which it is continuously withdrawn and pumped to a hydro cyclone where the sludge and microsand are separated by centrifugal force. After separation, the higher density microsand is discharged from the bottom of the hydro cyclone and reinjected into the process for reuse. The lighter density sludge is discharged from the top of the hydro cyclone and directed to the sludge storage tank and recirculated into the As removal reactor or to the sludge management facilities.

Also, to maintain a good extraction of sludge and good sand recirculation, the recirculation pumps that are existing on both Actiflo® will be upgraded to provide a sufficient recirculation pumping rate. For this project, extraction pumps need to be 70 m^3/h each, resulting in an upgrade of the recirculation line and Hydro cyclone (U10-gMAX-3037, Krebs).

The excess of sludge will then be sent to the centrifuges (expected solid content 3%).

4.2 Process summary for winter operation

During the winter months, the flow rate of the water to treat is significantly lower than in the summer months. These conditions require adjustments to the Actiflo® unit which is converted for the winter in a standard lamellar decanter also called Multiflo®. When in this mode, the system operates without microsand thus without microsand recirculation.

To modify the Actiflo® unit into the Multiflo® mode, microsand needs to be purged from the system. This is done by a sludge extraction pump that is added to the system. Sludge treatment remains the same; centrifuge will just work less often than in summer. The sludge tank was designed to accept one day of water treatment at 84 m^3/h with a maximum concentration of 1000 ppm TSS (winter conditions, worse case TSS). Since the chemical dosage requirement is less (due to 10–15 times less flow to treat in the winter), different sets of skid/dosing pumps per chemical will be used to improve system robustness.

4.3 Sludge Management Strategy

The last step of the AsWTP system is the sludge dewatering, which aims to reduce sludge volume and produce a solid cake. The sludge from the Actiflo® is sent to a holding tank. As presented previously, a recirculation pump is added to recycle a portion of the sludge in the Arsenic Removal Reactor. The recycled sludge increases the reagent efficiency and promotes solid growth and thickens the sludge therefore avoiding the need to add a thickener equipment before the dewatering stage. The remaining sludge is pumped to a sludge storage Tank which will feed the centrifuges Feed as shown on Figure 5a.

The sludge from the sludge storage Tank is pumped in two (2) centrifuges (Andritz D4L) in parallel, capable of producing a cake of about 25 ± 5% solid content. The sludge dryness is dependent on the dewatering method, TSS content in the influent, flow rate and nature of the solid particles. In addition to the solids included in raw water that enters the AsWTP, the sludge will contain adsorbed As as well as ferric hydroxides from the coagulant addition.

The centrifuges (Figure 5b) are fed continuously with constant solid content slurry. A cationic polymer is injected in the feed pipe to increase the cake dryness. The separation between liquid and solid is achieved using centrifugal forces 500 to 3000 times the force of gravity. Centrate contains cationic polymer and can be recycled back upstream of the water treatment plant. The centrifuge is automatic such that minor manual operation is required.

The cake produced by the Centrifuges will go into a container trailer, while the centrifuge filtrate is returned to the Arsenic Removal Reactor.

The volume of sludge will be 2–4 m^3/h approximately (depending on the TSS concentration which can vary from 250 to 500 ppm).

The cakes will be disposed at the WRSF.

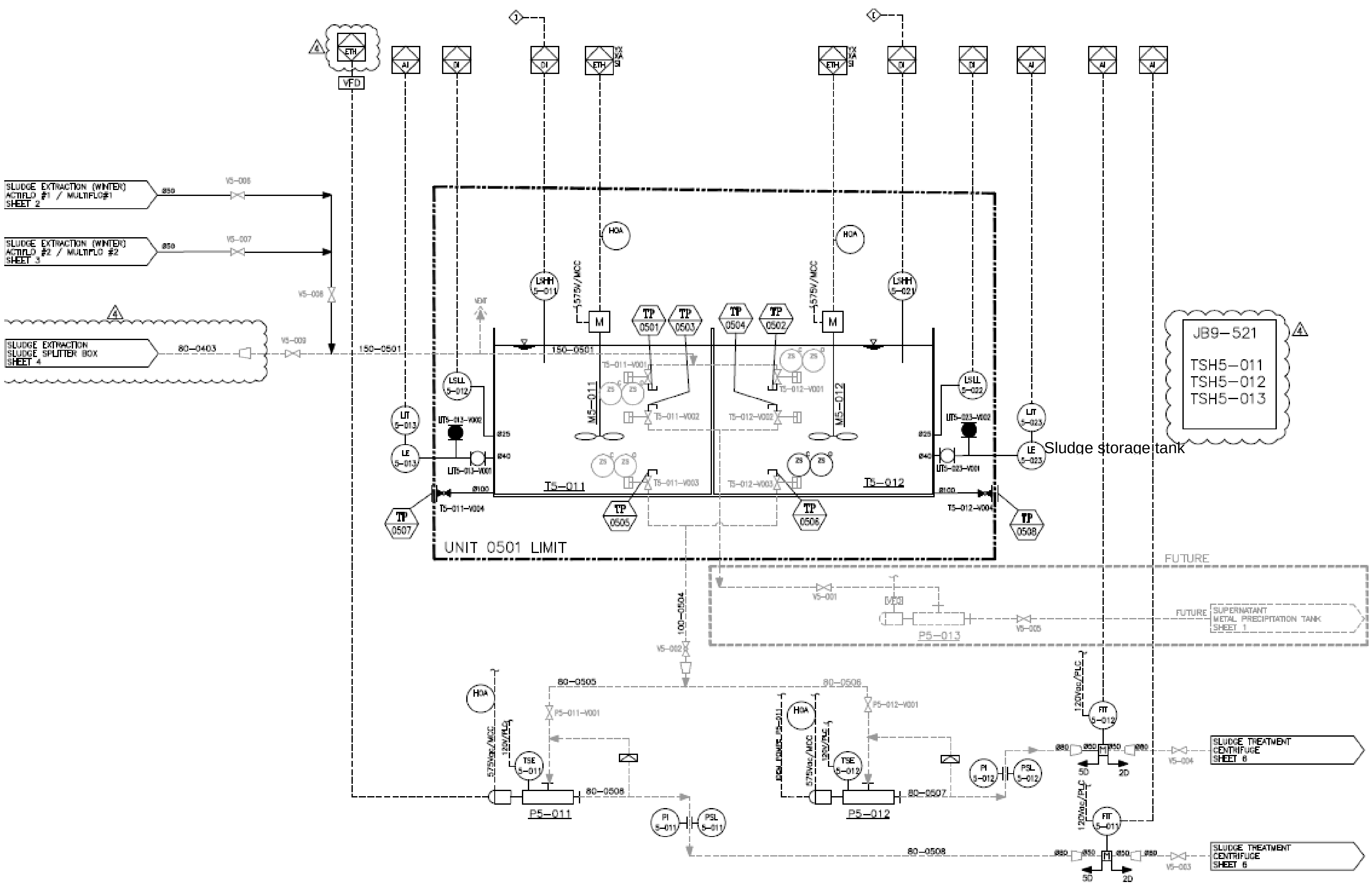


Figure 6a—AsWTP Sludge dewatering Flowsheet—sludge storage tank

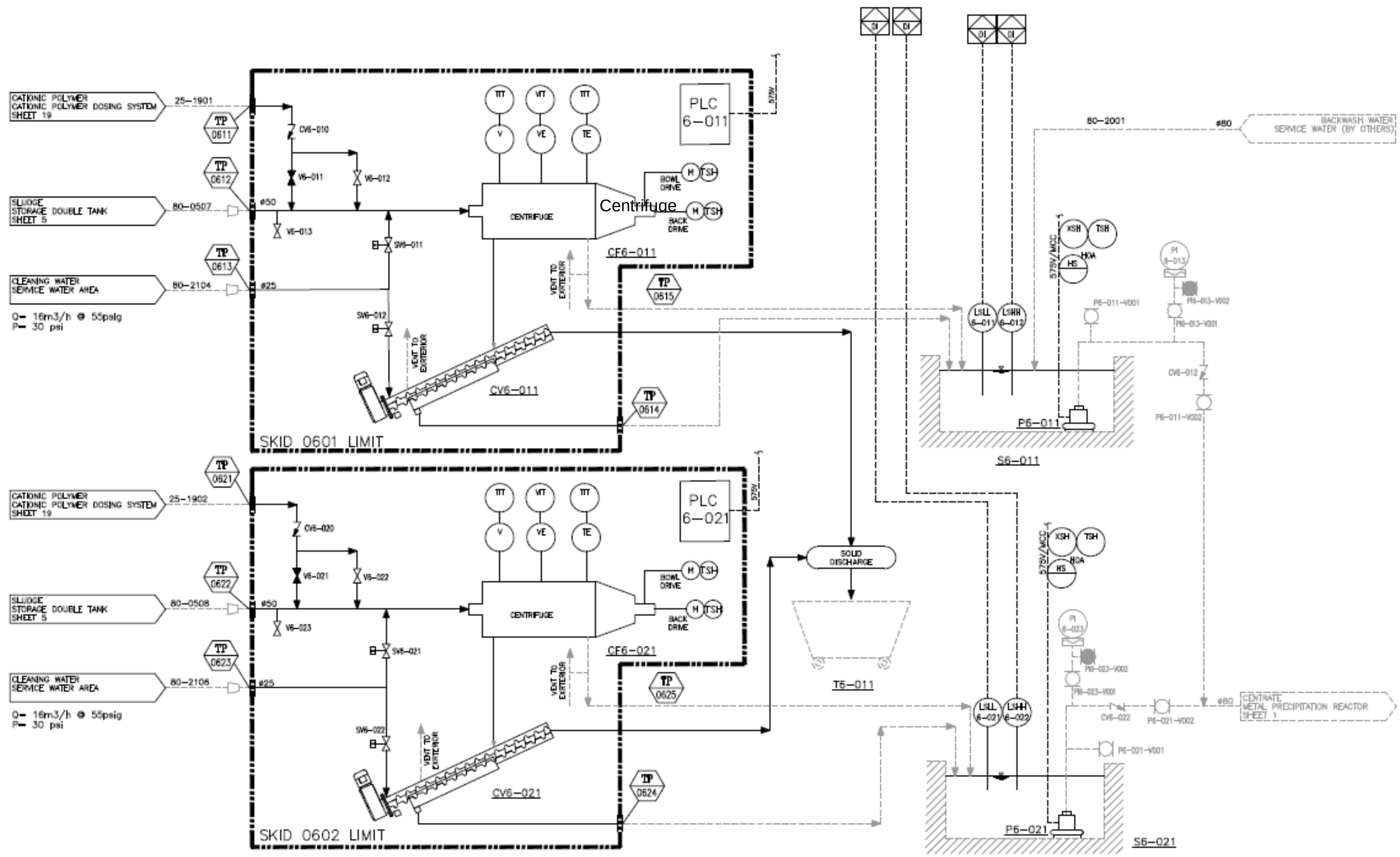


Figure 6b—AsWTP Sludge dewatering Flowsheet showing both centrifuge

4.4 Service Water System

The service water system consists of two (2) multimedia filters, two (2) heaters, one (1) filtered water tank and two (2) service water pumps. Service water is used in the preparation of reagent solutions made of dry chemicals, and for polymer makeup systems. Coagulant and polymer require filtered heated water. Treated water from the AsWTP is used to produce service water.

4.5 Reagents

The main chemicals used in the AsWTP are presented below (MSDS sheets are available in Appendix D):

› **$KMnO_4$**

The potassium permanganate will oxidize the arsenic trivalent (As (III)) to produce arsenic pentavalent (As (V)) that is simpler to precipitate and separate from water. The selected oxidant to oxide As is Hydrex 9571 which will be delivered in a small bag of 25 kg (dosage 1 mg/l). The dosage is performed using a mechanical diaphragm metering pump.

› **Coagulant**

The selected coagulant is Hydrex 6266, a ferric sulfate coagulant. It will act as a sorbent for As. It will be received in bulk bags (approximately 600 kg). The dosage will be performed using a mechanical diaphragm metering pump. Sulfuric acid is required for the solution preparation. The dosage of coagulant will be set at 30 mg/l.

› **Sodium Hydroxide**

The coagulant consumes alkalinity from the water. In the event that the water doesn't contain enough alkalinity, an alkali source, such as sodium hydroxide, is added. The sodium hydroxide will be received in 25 kg bags. The expected dosage is 10–15 mg/l.

› **Polymer**

The use of a flocculation agent is essential for a metal removal process. Polymer enables the attachment of the floc onto the microsand and as such is required in order to obtain good process performance. The polymer will be Hydrex 6105 at a dosage rate of 1 mg/L. It is a solid, anionic polymer used to enhance flocculation and will be received in 25 kg bags. One existing Hydra-Pol automatic preparation system will be supplied to prepare a 0.2% solution. The water used for the polymer preparation is filtered at 10–20 °C. The automatic polymer preparation/dilution system is an automatically controlled batching unit capable of preparing polymers. The system utilizes sequential batching from a high shear first stage wetting system into a mix tank with a low shear mixer.

A second automatic polymer preparation system is required for the sludge dewatering step. The polymer type (cationic type Hydrex 3613/6324) dosage will be approx. 8 g/kg TSS.

› **Microsand**

The presence of microsand allows:

- An increase in the probability of encounters between particles;
- An increase in the exchange surface and consequently in the adsorption capacity compared to conventional flocculation;
- The formation of solid and dense ballasted flocs which will resist an energetic stirring followed by rapid settling.

These properties lead to very short residence times for flocculation as well as settling thus optimizing the process. The microsand is recycled in the process and the equivalent of approximately. During operation, it is estimated that 1gof microsand per cubic metre of raw water will be lost in the sludge. Therefore, 1 g of microsand per cubic metre of raw water will be added. The microsand will be supplied in 25 kg bags and will be added manually to the Actiflo® as required, approximately once or twice a week (the dosage of sand is not continuous but by batch).

Every spring, to convert the Multiflo® back to Actiflo®, 5000 kg of Actisand™ will need to be added.

› **Sulphuric Acid**

Sulphuric acid is used for ferric sulfate preparation. Sulphuric acid will be received in bulk containers of 1 m^3 capacity at 93% concentration. The product will be used as is and the dosage is done in using mechanical diaphragm metering pumps (7 mg/l approximately).

5. CONSTRUCTION TIMELINE

5.1 Timeline

The AsWTP construction will start November 5th 2018 and commissioning is planned for the end of February 2019.

6. DESIGN OF PUMPING STATION AND PIPELINE

6.1 General

The following section provides a description and information on the pumping and pipeline installation required to pump the raw water collected in the Whale Tail Attenuation Pond to the AsWTP, and the treated water from the AsWTP to Mammoth Lake.

Description and information on the other pumping and pipeline installations required to manage the water in other areas of the Amaruq site is detailed in the Amaruq Water Management Infrastructure Design Report (651298-8200-40ER-0001).

6.2 Pump narrative and pipelines

6.2.1 Raw water

Surface water and pit seepages collected at the Whale Tail site will be transferred to the Whale Tail Attenuation Pond. The untreated water (raw water) stored in the Whale Tail Attenuation Pond will then be pumped to the Amaruq AsWTP for treatment. Figure 6 presents the location of the Whale Tail Attenuation Pond pump stations and pipelines to the AsWTP.

Pumping to the AsWTP will be required year round:

- In the summer months (July to September), the AsWTP will treat a higher volume of water resulting from the snow and ice melts. The raw water pumping station is designed to provide a total flow rate of up to 1600 m^3/h;
- In the winter months (October to June), the AsWTP will treat a much lower flow coming primarily from pit seepages. The pumping station is designed to provide a maximum flow of 105 m^3/h.

In the summer months, the pumping installation consists of the following:

- Two (2) Godwin HL250 diesel pumps will be installed on the Whale Tail Attenuation Pond access ramp, close to the water;
- For each pump, a suction cage and suction hose will be installed in the pond and a 385 m long 14-in HDPE DR17 non-insulated pipeline will be connected from the discharge of the HL250 to the inlet of the AsWTP;
- As the water level changes, the diesel pumps and its suction line will be moved down the access ramp into the pond while the discharge pipeline will be lengthened;
- At the end of the summer pumping season, the two (2) pumps and its associated hoses and pipelines will be removed and stored for the winter;

- Each pump can provide a maximum pumping capacity of 800 m^3/h, for a total of 1600 m^3/h. The operating speed of the pump will be manually adjusted by the Operator based on the desired treatment flow.
- Flow and cumulative volume pumped will be measured using a portable magnetic flowmeter installed at the discharge of each pump and using the flowmeter located on the raw water inlet heater of the AsWTP.
- The local control panel and communication wireless hardware will be installed in the winter pump station. The winter months pump station will also be installed close to the HL250 diesel pumps to allow remote start/stop of the diesel pumps.

In the winter months, the pumping installation consists of the following:

- One (1) Godwin CD103 electrically powered pump installed inside a heated container will be installed on the Whale Tail Attenuation Pond access ramp, close to the water.
- A suction strainer and hoses will be installed in the pond and a 385 m long 6-in HDPE DR17, insulated and heat-traced pipeline will be installed from the discharge of the pump to the AsWTP.
- During the winter months, the water level in the Whale Tail Attenuation Pond will be kept more or less constant. Thus, it is not expected that winter pump station will need to be moved.
- At the end of the winter pumping season, the winter pump stations and associated hoses and pipeline will be moved up the pond access ramp. Once the snow melts, the water level in the Whale Tail Attenuation Pond is expected to rise.
- The pump will provide a maximum pumping capacity of 125 m^3/h. The operating speed of the pump will be manually adjusted by the Operator based on the desired treatment flow.
- Flow and cumulative volume pumped will be measured using a portable magnetic flowmeter installed at the discharge of the pump and using the flowmeter located on the raw water inlet heater of the AsWTP.
- The local control panel and communication wireless hardware are installed in the winter pump station. The control panel will allow remote start/stop of the pump and remote adjustment of the pump operating speed based on a flow control set-point.

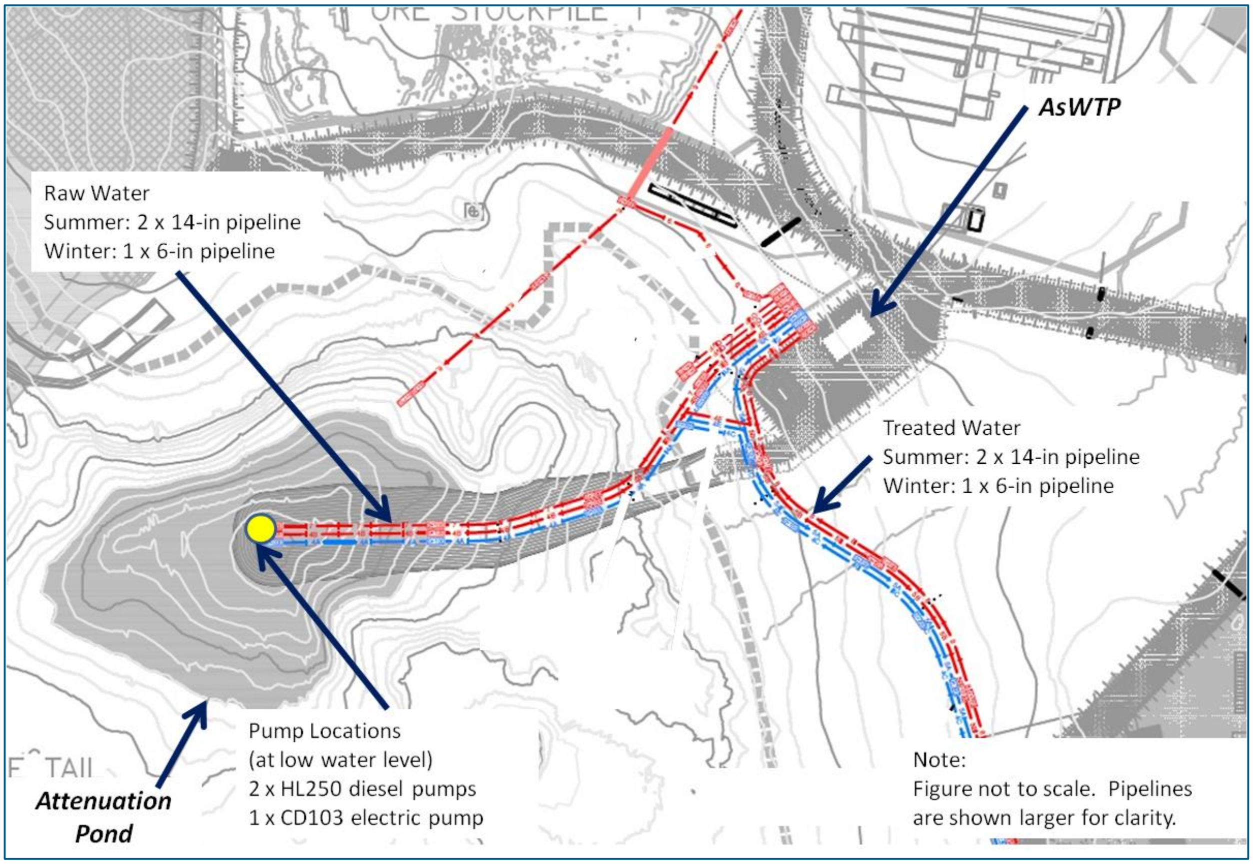


Figure 6: Location of the Whale Tail Attenuation Pond Pump Stations and Pipelines to the AsWTP

Table 3 provides a summary description of the raw water pumping station and pipelines required to pump raw water from the Whale Tail Attenuation Pond to the AsWTP in the summer and winter months.

Table 3: Summary Description of Raw Water Pump Station and Pipelines

Parameter	Units	Summer	Winter
Pump Model		Godwin HL250 12x10	Godwin CD103 4x4
Description		Diesel pump installed in a container	Electric powered pump, installed in a heated container
Quantity		2	1
Pump Tag No.		61PWA69501 / 69502	61PWA69503
Flow Capacity Available[1]	m^3/h	up to 800 m3/h (total 1600 m^3/h)	84 to 105
Estimated Total Dynamic Head (TDH) required at design flow[1]	m	31 to 42	33 to 39
Suction hose diameter	in	14	4
Discharge pipeline diameter	in	14	6
Discharge pipeline material		HDPE DR17	HDPE DR17
Insulated and Heat-Traced		un-insulated	insulated and heat traced
Flow Control		Manually adjusted by the Operator	Manually adjusted by the Operator using the variable frequency drive (VFD) located inside the container

Notes:

1) The flow capacity available and estimated head reflects the maximum pumping capacity the existing pump can provide based on the expected system curve (i.e. pipeline length, routing and profile and water elevation)

The summer and winter pump stations generally consist of a pump installed inside a container to facilitate its movement and placement during the pumping season.

Only the HDPE pipeline required for winter operations are heat-traced and insulated.

At the inlet of the AsWTP, the two (2) 14-in pipeline from the Whale Tail Attenuation Pond will connect to a common 20-in HDPE DR17 un-insulated header, as shown in Figure 7. A 20-in HDPE line will then connect the common header to the inlet of the AsWTP. The 6-in insulated and heat-traced pipeline used in the winter months will be connected directly to the 20-in HDPE pipeline located inside the AsWTP.

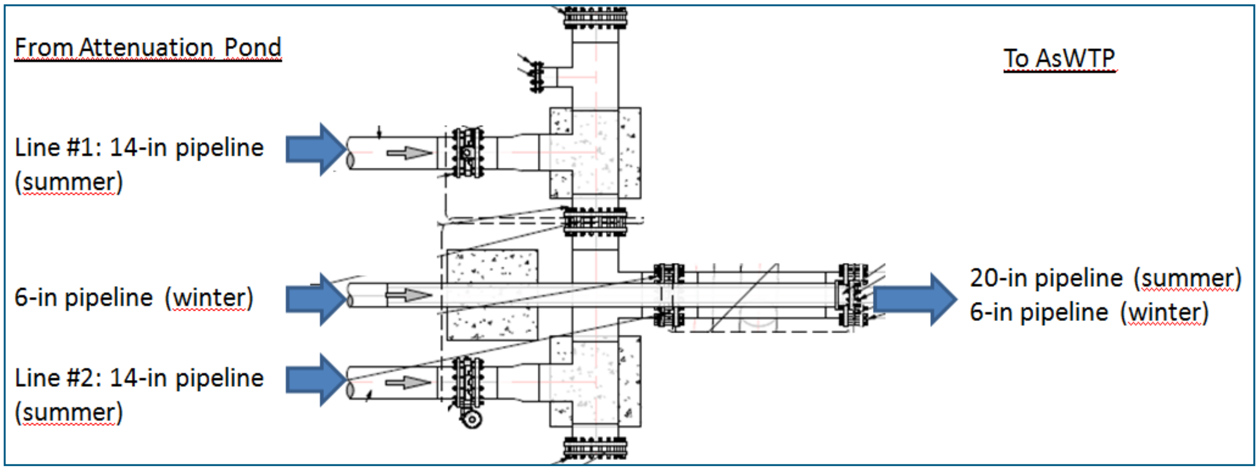


Figure 7: Inlet Header at the AsWTP

6.2.2 Treated Water

The raw water collected in the Whale Tail Attenuation Pond in the summer and winter months will be pumped to the AsWTP where it will be treated. The treated water is collected in two (2) pump boxes (61TNK69301/69302) and then pumped to Mammoth Lake for final discharge.

In the summer months:

- Two (2) Warman FAH 12x10 electric pumps will be used to transfer the treated water from the AsWTP to Mammoth Lake.
- Each pump will be installed inside the AsWTP building, connected to a pump box. The discharge of each pump will be connected to a 3600 to 3700 m long 14-in HDPE DR17 non-insulated pipeline that will be used to transfer the treated water to Mammoth Lake. A total of two (2) 14-in treated water pipelines will be used to discharge the treated water to the receiving environment (Mammoth Lake).
- Each pump can provide a maximum pumping capacity of 800 m^3/h, for a total of 1600 m^3/h.
- The operating speed of the pump will be automatically adjusted in order to maintain a constant level in the pump box.
- Flow and cumulative volume pumped to Mammoth Lake will be measured using a magnetic flowmeter installed at the discharge of each pump.
- The treated water is discharged into Mammoth Lake using a diffuser. Each line will be equipped with a diffuser that will be installed in the lake (refer to design report 651298-8200-40ER-0001 for more details).

In the winter months:

- One (1) CD103 electric pump will be used to transfer the treated water from the AsWTP to Mammoth Lake.
- The pump will be installed inside the AsWTP building and its suction will be connected to both pump boxes. The Operator will be able to select which pump boxes to use during the winter months.

- A 3300 m long 6-in HDPE DR17 insulated and heat-traced pipeline will be used to discharge the treated water to Mammoth Lake.
- The pump can provide a maximum pumping capacity of 125 m^3/h.
- The operating speed of the pump will be automatically adjusted in order to maintain a constant level in the pump box.
- Flow and cumulative volume pumped to Mammoth Lake will be measured using a magnetic flowmeter installed at the discharge of each pump.

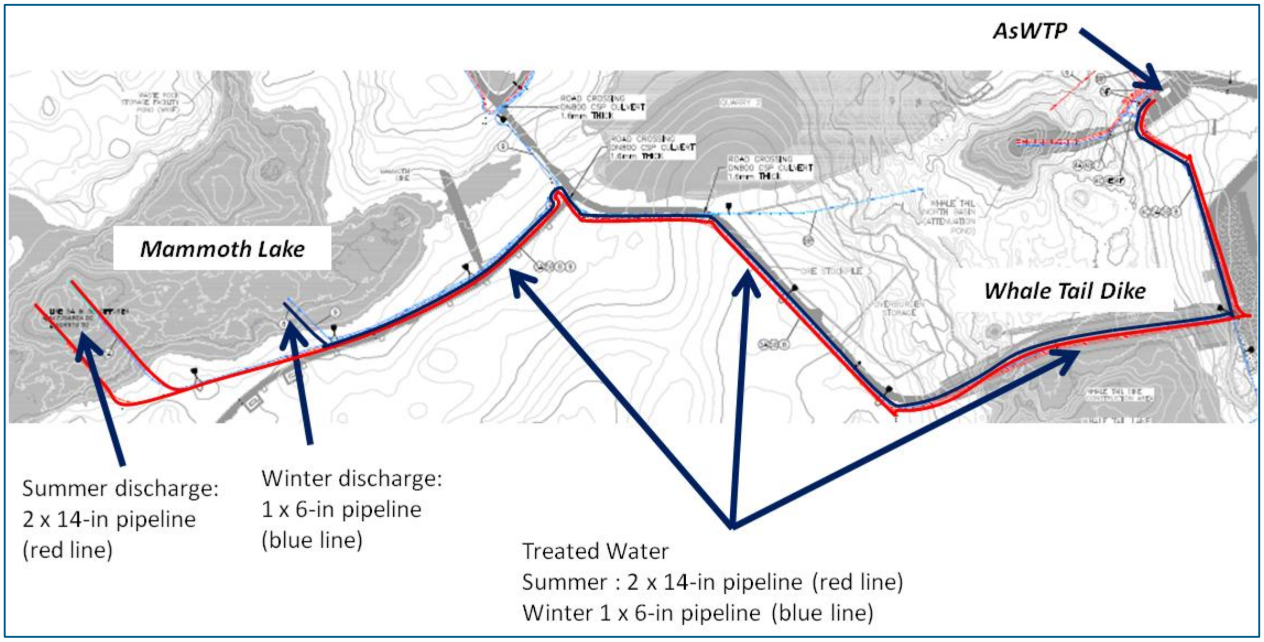


Figure 8: Location of the Treated Water Pipelines from AsWTP to Mammoth Lake

Table 4 provides a summary description of the treated water pumping station and pipelines required to pump the treated water from the AsWTP to Mammoth Lake in the summer and winter months.

Table 4: Summary Description of Raw Water Pump Station and Pipelines

Parameter	Units	Summer	Winter
Pump Model		Warman FAH 12x10	Godwin CD103 4x4
Description		Electrical powered pump equipped with a variable frequency drive	Electrical powered pump equipped with a variable frequency drive
Quantity		2	1
Pump Tag No.		61PWA69301 / 69302	61PWA69303
Flow Capacity Available[1]	m3/h	up to 725 m3/h (total 1600 1450 m3/h)[2]	84 to 100
Estimated Total Dynamic Head (TDH) required at design flow[1]	m	49 to 51	40
Suction hose diameter	in	10	4
Discharge pipeline diameter	in	14	6
Discharge pipeline material		HDPE DR17	HDPE DR17
Insulated and Heat-Traced		un-insulated	insulated and heat traced
Flow Control		Automatically adjusted based on the water level in the pump box or By flow control based on an Operator set-point.	Automatically adjusted based on the water level in the pump box or By flow control based on an Operator set-point.

Notes:

1) The flow capacity available and estimated head reflects the maximum pumping capacity the existing pump can provide based on the expected system curve (i.e. pipeline length, routing and profile and water elevation).
2) The existing Warman FAH 12x10 pump, equipped with a 250 HP motor, is used to transfer the treated water from the WTP to Mammoth Lake. Based on the system curve, including the aboveground pipeline length of 3.2 km, a submerged pipeline length of about 400 m and 10 discharge port of 3-in diffusers, the maximum flow that can be pumped is estimated at 725 m^3/h. The pump capacity is limited by the motor size installed on the pump. However, to manage a design flood event, the required total treatment flow rate is 950 m^3/h). Thus, with a maximum pumping capacity of 725 m^3/h/pump, it will be possible to treat a total flow rate of 1450 m^3/h which is greater than the capacity required to manage a design flood event.

6.3 Controls

6.3.1 Raw Water

It will be possible to control the raw water pumps locally and remote during the winter season. The winter pump station (i.e. CD103 containerized pump station) will be equipped with a new local control panel that will communicate with the AsWTP via a wireless link. The local control panel will allow the remote operation of the raw water pumps from the AsWTP, specifically:

- Start or stop the winter electric pump (CD103) based on an Operator input and when an alarm is triggered.
- Adjust the operating speed of the winter pump CD103 using the new variable frequency drive (VFD) installed in the container; and Stop the diesel pumps HL250 based on the Operator input and when an alarm is triggered. It will also be possible to start the pump remotely.

To implement the remote shutdown of the diesel pump, the winter pump station will have to be installed next to the diesel pumps. A control cable will be installed between the local control panel and the diesel pump's control panels.

In the summer months, the Operator can either remotely or manually start the diesel pump. He will have to locally adjust the operating speed of the pump until the desired flow rate is obtained. If an alarm is triggered at the AsWTP that causes a plant shutdown, the AsWTP control panel will send a shutdown signal to the winter pump station control panel which will transfer the command to the summer diesel pumps.

In the winter months, from the AsWTP, the Operator will manually start the electric pump and adjust the operating speed until the desired flow rate is obtained. If an alarm is triggered at the AsWTP that causes a plant shutdown, the AsWTP control panel will send a shutdown signal to the winter pump station control panel.

Magnetic flowmeters installed at the discharge of the pumps will be used to measure the instantaneous flow rate and cumulative volume pumped from the Whale Tail Attenuation Pond to the AsWTP:

- 61FIT695001: Discharge of pump 61PWA69501 (summer operation);
- 61FIT695002: Discharge of pump 61PWA69502 (summer operation);
- 61FIT695003: Discharge of pump 61PWA69503 (winter operation).

6.3.2 Treated Water

The treated water pumps are controlled by the AsWTP control panel.

During the summer months, only pumps 61PWA69301 and 61PWA69302 (i.e. Warman FAH 12x1) will be in operation. Each pump's operating speed will be automatically adjusted to maintain a constant level (control loop 61LIC695001 and 695003) in their respective pump boxes (61TNK69301 and 69302).

During the winter months, pump 61PWA69303 will be in service (i.e. CD103). The Operator will select the pump box that will be in service. Based on this selection, the appropriate level control loop will be used to control the speed of the pump.

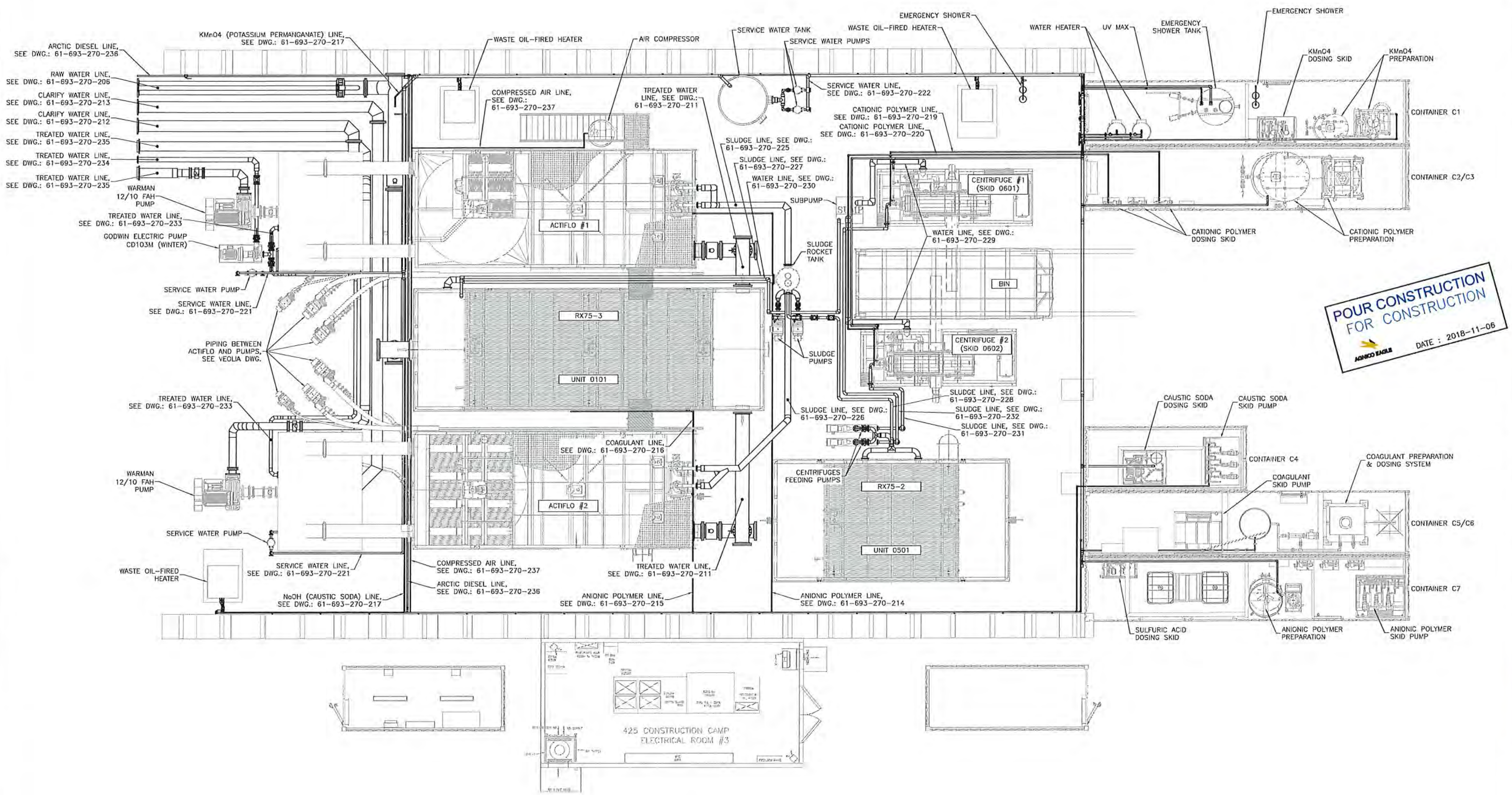
Magnetic flowmeters installed at the discharge of the pumps will be used to measure the instantaneous flow rate and cumulative volume pumped to Mammoth Lake:

- 61FIT695002: Discharge of 61PWA301 (summer operation)
- 61FIT695004: Discharge of 61PWA69302 (summer operation)
- 61FIT695005: Discharge of 61PWA69303 (summer operation)

Appendix A

Construction drawings

NO. DESSIN DRAWING NO. 61-693-270-200



PLAN VIEW
SCALE : 1:75

PLAN CLÉ / KEY PLAN — THIS DRAWING

NOTES GÉNÉRALES / GENERAL NOTES

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
WTP – MECHANICAL EQP. LAYOUT	61-693-210-201
WTP – PIPING DETAILS	61-693-270-201@237

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-11-06	FOR CONSTRUCTION	B.L.	LGAG	D.LAF
A	2018-07-20	FOR COMMENTS	P.COTE	LGAG	D.LAF

REVISIONS

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018-11-06
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
270 – PIPING
PLAN VIEW
GENERAL ARRANGEMENT
WTP DISTRIBUTION SYSTEM

DESSINÉ PAR / DRAWN BY	PIERRE-OLIVIER CÔTÉ	DATE 2018-06-08
VÉRIFIÉ PAR / CHECKED BY	ISRAËL GAGNON, P. ENG.	2018-MM-JJ
APPROUVÉ PAR / APPROVED BY	ISRAËL GAGNON, P. ENG.	2018-MM-JJ
ÉCHELLE / SCALE	1 : 75	DATE 2018-06-08

NO. DESSIN / DRAWING NO. 61-693-270-200

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

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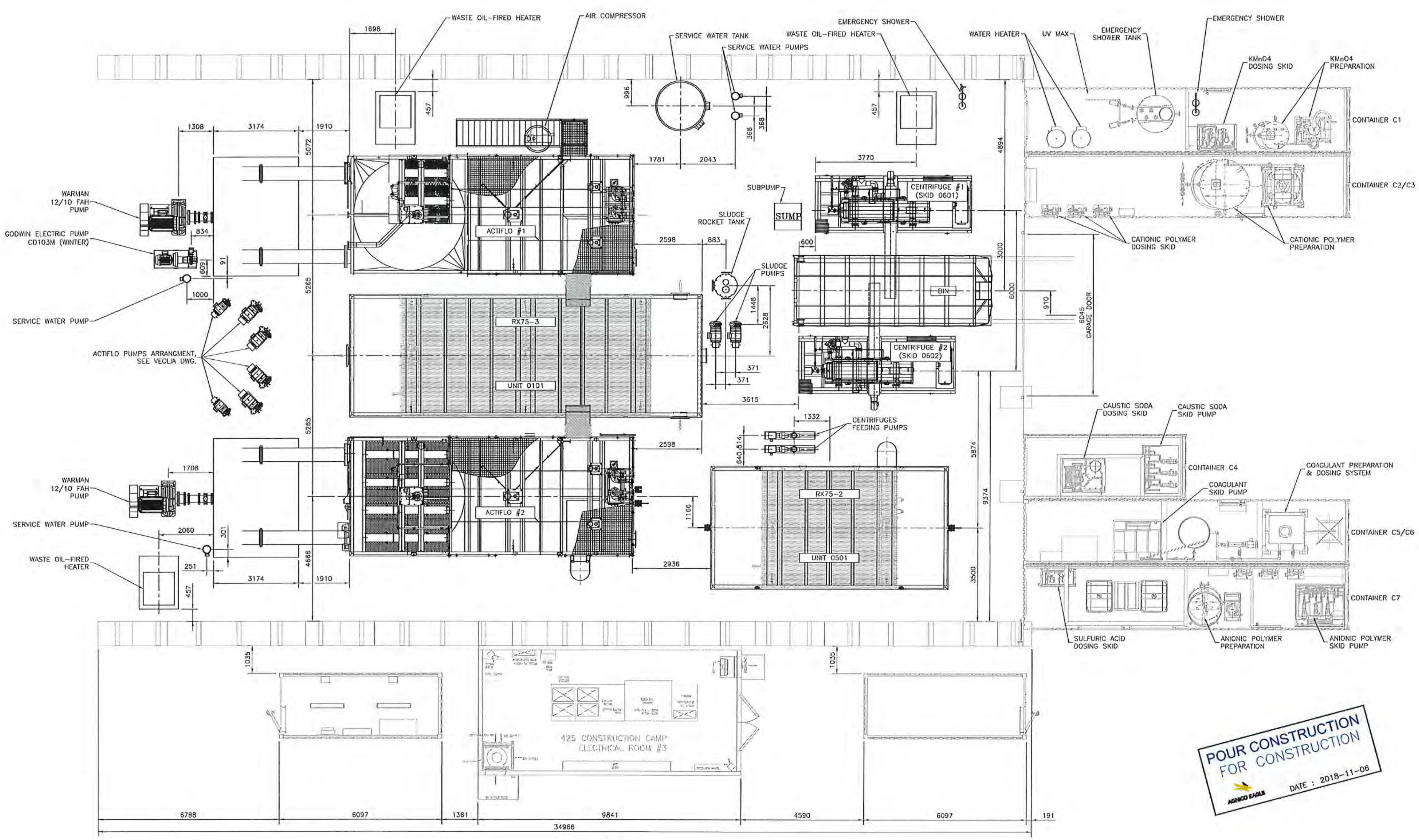
AE-CART-ARCH D
FILE NO. 61-693-270-200-R0.dwg

NO. DESSIN DRAWING NO. 61-693-210-201

FORMAT ARCHD



PLAN VIEW
SCALE : 1:75

POUR CONSTRUCTION
FOR CONSTRUCTION
DATE : 2018-11-06

PLAN CLÉ
KEY PLAN
THIS DRAWING

NOTES GÉNÉRALES / GENERAL NOTES

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018-11-06
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

2018-11-06

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-11-06	FOR CONSTRUCTION	B.L.	I.G.	D.L.

REVISIONS

SNC·LAVALIN
SNC-Lavalin Stavibel Inc.
532, 7e Rue Ouest, Bureau 101
Amos (Québec) J9T 3W7
Tél. : 819 732-8355 Téléc. : 819 732-0259
www.snclavalin.com

Projet No. : 653281-0000

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
210 – GENERAL ARRANGEMENT
PLAN VIEW
MECHANICAL EQUIPMENTS LAYOUT

DESSINÉ PAR DRAWN BY	BRUNO LEMIEUX, TECH.	DATE 2018/10/24
VÉRIFIÉ PAR CHECKED BY	ISRAËL GAGNON, P. ENG.	2018/10/24
APPROUVÉ PAR APPROVED BY	ISRAËL GAGNON, P. ENG.	2018/10/24
ÉCHELLE SCALE 1 : 75	DATE 2018-06-08	
NO. DESSIN DRAWING NO.	61-693-210-201	
NO. PROJET PROJECT NO. 6115	REVISION 0	FEUILLE / SHT 1/1

AE-CART-ARCH D

FILE NO. 61-693-210-201-R0.dwg

NO DESSIN DRAWING NO. 61-695-270-203

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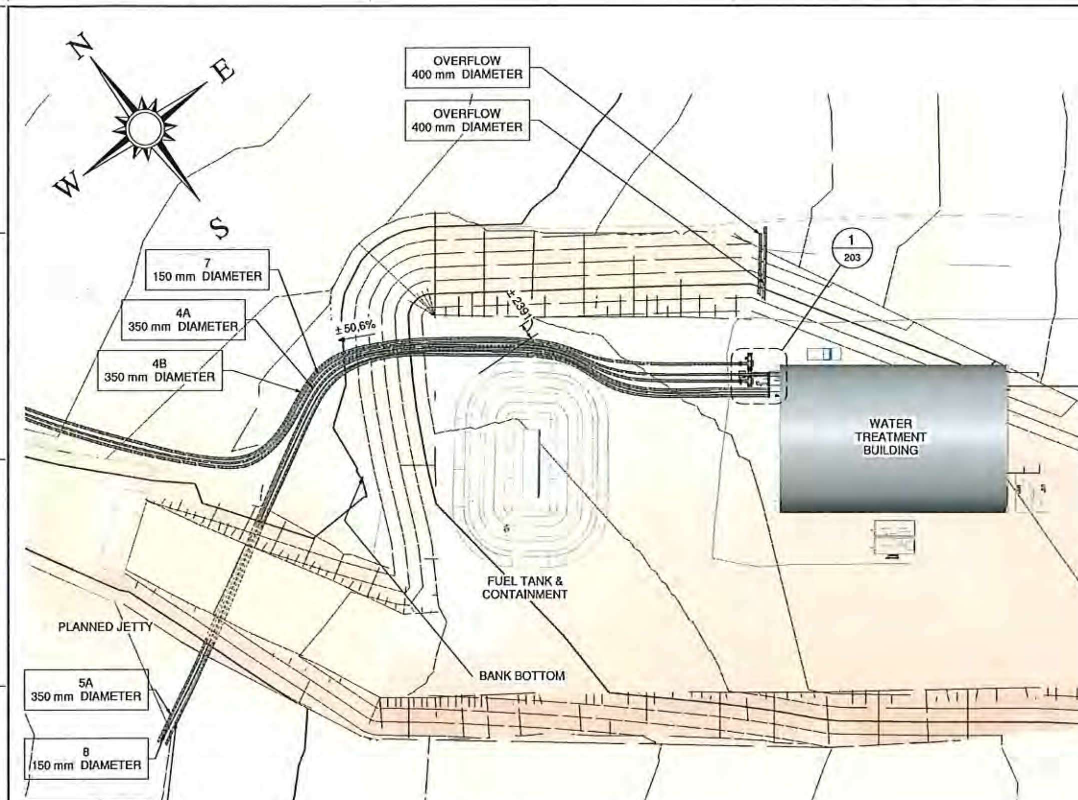
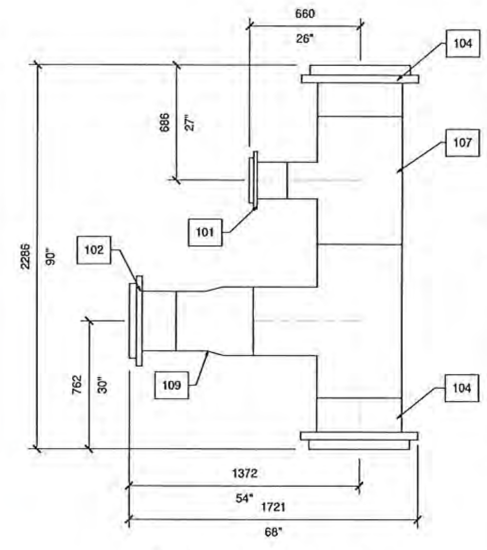
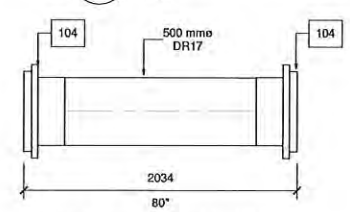


PLAN VIEW WATER TREATMENT PLANT AREA
1 : 500



TOTAL WEIGHT OF SECTION = 329 kG

2 / 203 HEADER SECTION DETAIL
1 : 20



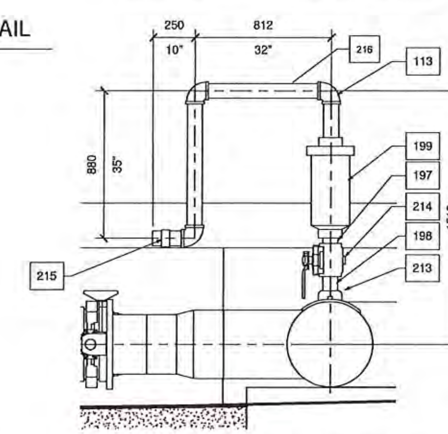
TOTAL WEIGHT OF SECTION = 188 kG

4 / 203 HEADER SECTION DETAIL
1 : 25

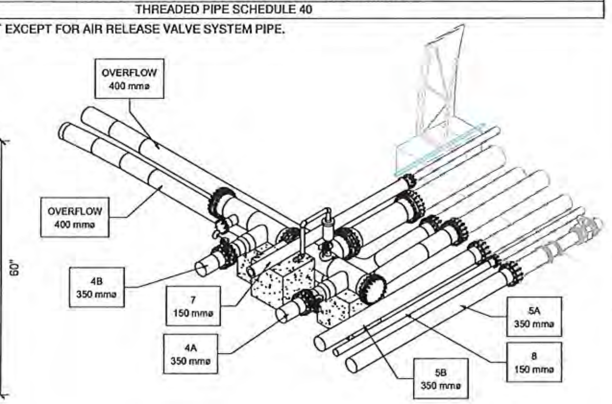
PIPE FITING LIST			
MARK	COUNT	SIZE	DESCRIPTION
100	2	150 mmø-150 mmø	DR17 - BACK-UP RING (DI) - STUB END (HDPE)
101	1	200 mmø-200 mmø	DR17 - BACK-UP RING (DI) - STUB END (HDPE)
102	6	350 mmø-350 mmø	DR17 - BACK-UP RING (DI) - STUB END (HDPE)
103	2	400 mmø-400 mmø	DR17 - BACK-UP RING (DI) - STUB END (HDPE)
104	7	500 mmø-500 mmø	DR17 - BACK-UP RING (DI) - STUB END (HDPE)
105	1	200 mmø	DR17 - BLIND FLANGE STEEL ISCO
106	2	500 mmø	DR17 - BLIND FLANGE STEEL ISCO
107	1	500 mmø-500 mmø-200 mmø	DR17 - BRANCH SADDLE - REDUCING TEE - HDPE
108	2	500 mmø-500 mmø-400 mmø	DR17 - BRANCH SADDLE - REDUCING TEE - HDPE
109	2	400 mmø-350 mmø	DR17 - CONCENTRIC REDUCER HDPE
110	2	400 mmø-400 mmø	DR17 - ELBOW 45° HDPE
111	2	400 mmø-400 mmø	DR17 - ELBOW 90° HDPE
112	1	500 mmø-500 mmø-500 mmø	DR17 - TEE FABRICATED HDPE
113	3	80 mmø-80 mmø	SCHEDULE 40 PIPE TREADED ELBOW Dia 80

PIPE ACCESSORIES LIST			
MARK	COUNT	SIZE	DESCRIPTION
197	1		NPT MALE BRANCH Dia 80
198	1		NPT MALE BRANCH Dia 80
199	1		APCO COMBINATION AIR VALVE, MODEL 447, dia 80
200	8		THREADED ROD 3/4" X 10 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 142 L.
201	16		THREADED ROD 3/4" X 10 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 160 L.
202	40		THREADED ROD 1-1/8" X 7 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 246 L.
203	24		THREADED ROD 1" X 8 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 274 L.
204	32		THREADED ROD 1" X 8 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 284 L.
205	60		THREADED ROD 1-1/8" X 7 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 325 L.
206	24		THREADED ROD 1" X 8 UNC C/W 2 NUTS AND 2 LOCK WASHERS AND 2 WASHERS (ASTM 307 GR.B/ASTM A563 GR.A) 350 L.
207	3	500 mmø-500 mmø	GASKET 1/8" THICK
208	2	400 mmø-400 mmø	GASKET 1/8" THICK
209	2	350 mmø-350 mmø	GASKET 1/8" THICK
210	2	150 mmø-150 mmø	GASKET 1/8" THICK
211	2	350 mmø-350 mmø	BUTTERFLY VALVE HANDWHEEL CL-150
213	1		SADDLE ELECTROFUSION 20" IPS DR17 x 3" NPT MALE SS 304
214	1		DEZURICK ECCENTRIC PLUG VALVE, MODEL PEC,3,T1,C1,NBR WITH LEVER, Dia 80
215	1		STRAP 80 Dia 50mm X 6mm WITH MECHANICAL ANCHORS
216	5	80 mmØ	THREADED PIPE SCHEDULE 40

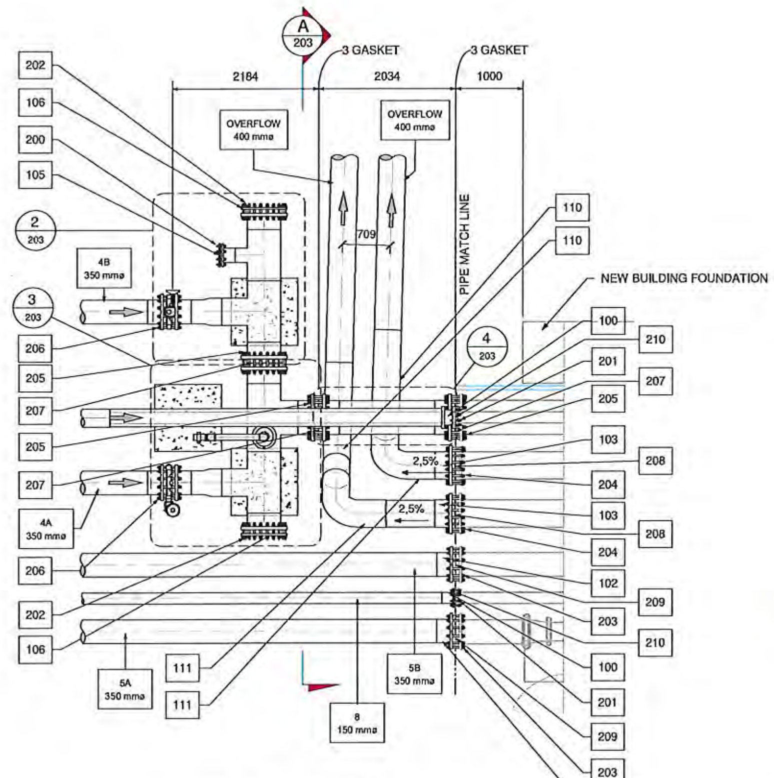
NOTES: PIPES SEGMENTS ARE NOT INCLUDED IN THE LIST EXCEPT FOR AIR RELEASE VALVE SYSTEM PIPE.



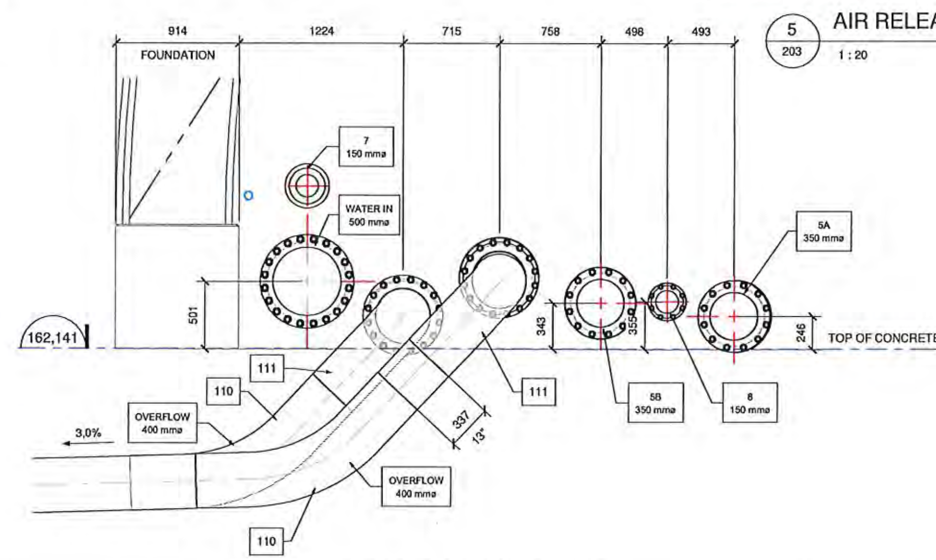
5 / 203 AIR RELEASE DETAIL
1 : 20



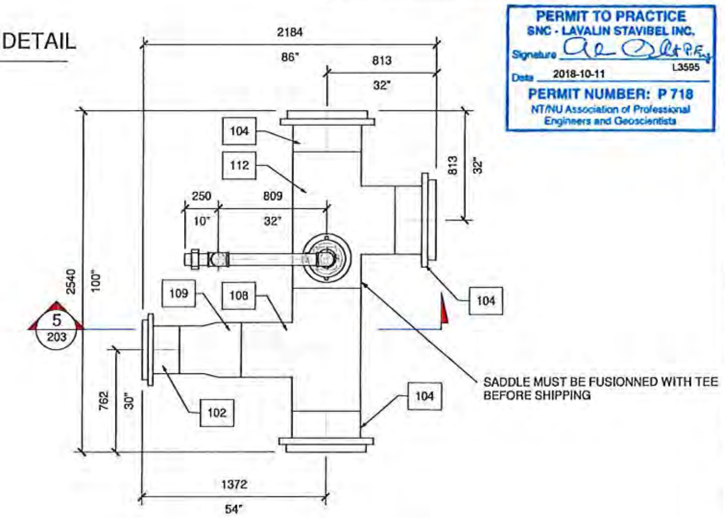
3D VIEW TIE-IN AREA



1 / 203 TIE IN DETAIL
1 : 50



A / 203 SECTION TIE IN
1 : 25



TOTAL WEIGHT OF SECTION = 389 kG

3 / 203 HEADER SECTION DETAIL
1 : 25

PLAN CLÉ
KEY PLAN

Mining & Metallurgy
5500, des Galeries Blvd., bur. 200, Quebec (Quebec), Canada G2K 2E2
Telephone: (418) 621-5500, Fax: (418) 621-6887

PROJET No	SUBDIVISION	SUJET	SÉRIE	RÉV.
651298	8200	41,D6	0004	01

NOTES GÉNÉRALES / GENERAL NOTES

FOR CONSTRUCTION
POUR CONSTRUCTION
AGNICO EAGLE
DATE 2018-10-11 15:03:54

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	N DWG

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
L3595
Date 2018-10-11
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR	APP.	CLIENT
1	2018-10-10	FOR CONSTRUCTION	F.P.	É.L.	
0	2018-08-28	FOR CONSTRUCTION	F.P.	É.L.	
RB	2018-07-18	CLIENT COMMENTS	F.P.	É.L.	
RA	2018-07-18	INTERNAL COMMENTS	F.P.	É.L.	

REVISIONS

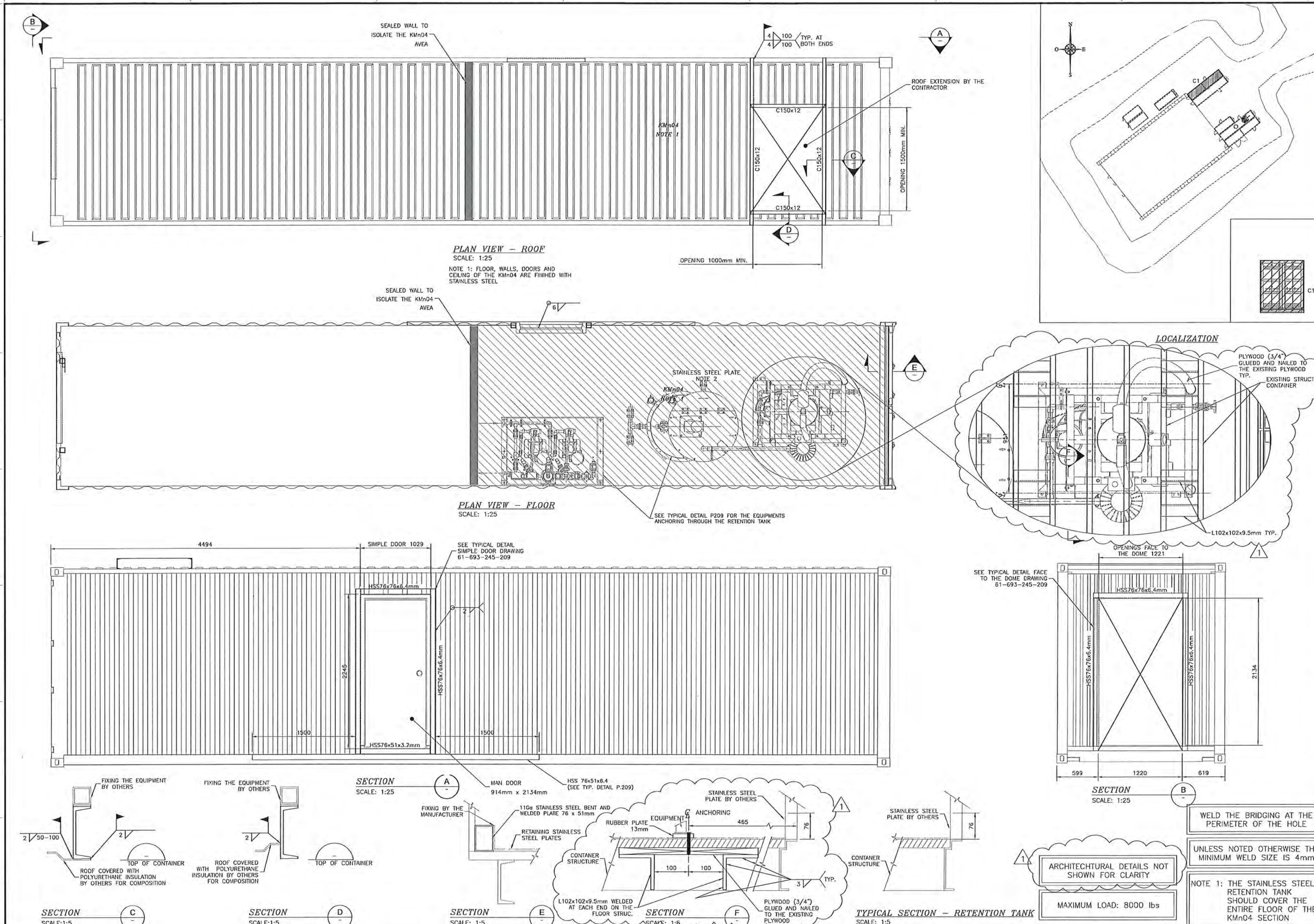
TITRE / TITLE

AGNICO EAGLE - AMARUQ DIVISION
695 - WATER MANAGEMENT
270 - PIPING
PLAN VIEW AND DETAILS
WTP TIE-INS FOR DEWATERING PHASE AND PHASE 1 OPERATION AND INLET HEADER DETAILS

DESSINÉ PAR / DRAWN BY	F.POTVIN	DATE 2018-07-18
VÉRIFIÉ PAR / CHECKED BY	É.LEBEL	2018-07-18
APPROUVÉ PAR / APPROVED BY	A.L. NGUYEN	2018-07-18
ÉCHELLE / SCALE	As indicated	DATE 2018-07-18
NO. DESSIN / DRAWING NO.	61-695-270- 203	
NO. PROJET / PROJECT NO. 6118	RÉVISION 1	FEUILLE / SHT /

C:\Users\potvf2\Documents\651298_CENTRAL_potvf2.rvt
2018-10-11 15:03:54

NO. DESSIN / DRAWING NO. 61-693-245-201_R1



ARCHITECHTURAL DETAILS NOT SHOWN FOR CLARITY

MAXIMUM LOAD: 8000 lbs

WELD THE BRIDGING AT THE PERIMETER OF THE HOLE

UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm

NOTE 1: THE STAINLESS STEEL RETENTION TANK SHOULD COVER THE ENTIRE FLOOR OF THE KMn04 SECTION

PLAN CLÉ / KEY PLAN

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Date 2018-08-22 L3595
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

NOTES GÉNÉRALES / GENERAL NOTES

LIFTING WITH FORK ONLY (BY OTHERS)

LIFTING PROCEDURE BY AEM

POUR CONSTRUCTION
FOR CONSTRUCTION
DATE : 2018-08-22

SNC·LAVALIN

Project # : 653281-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
TYPICAL DETAIL CONTAINER	61-693-245-209
–	–
–	–
–	–
KMn04 SERVICE AREA	AMP18-19-003

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2018-08-22	EQUIPMENT ANCHORAGES	JBD	D.L.	
0	2018-07-27	FOR CONSTRUCTION	JBD	D.L.	

REVISIONS

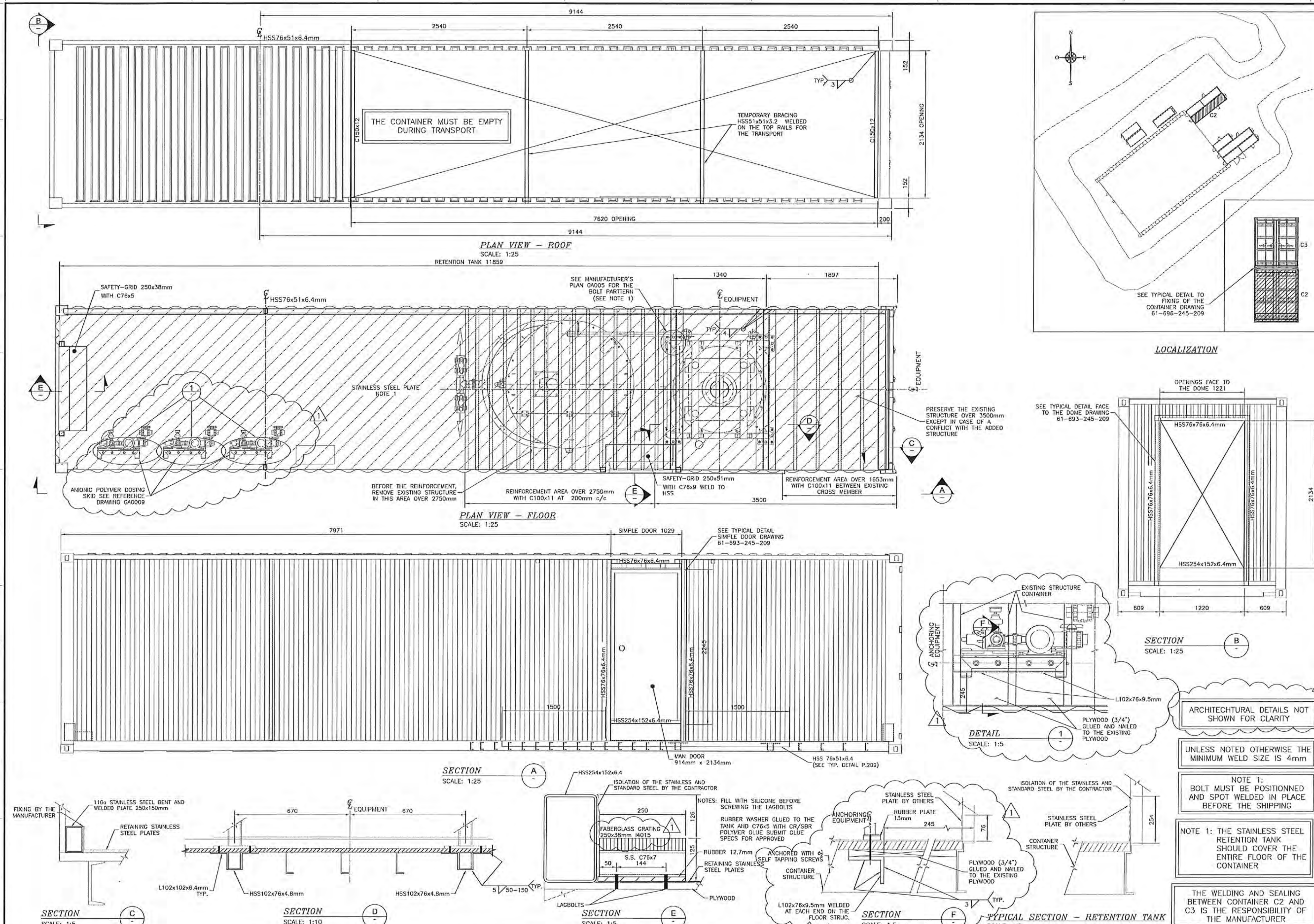
2018-08-22

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURE
CONTAINER 40 ft HIGH CUBE KMn04 AND SERVICE WATER SYSTEMS
PLAN VIEW, ELEVATION & PROFIL

DESSINÉ PAR / DRAWN BY	MICHEL LANTHIER, Tech.	2018-05-09
VERIFIÉ PAR / CHECKED BY	JANICK COTE, Jr Eng.	2018-07-06
APPROUVÉ PAR / APPROVED BY	DANY LAMBERT, P. Eng.	2018-07-06
ÉCHELLE / SCALE	INDICATED	DATE 2018-05-09
NO. DESSIN / DRAWING NO.	61-693-245-201	
NO. PROJET / PROJECT NO. 6115	REVISION 1	FEUILLE / SHT 1/1

FILE NO. 61-693-245-201_R1.dwg

NO. DESSIN DRAWING NO. 61-693-245-202_R1



ARCHITECHTURAL DETAILS NOT SHOWN FOR CLARITY

UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm

NOTE 1:
BOLT MUST BE POSITIONNED AND SPOT WELDED IN PLACE BEFORE THE SHIPPING

NOTE 1: THE STAINLESS STEEL RETENTION TANK SHOULD COVER THE ENTIRE FLOOR OF THE CONTAINER

THE WELDING AND SEALING BETWEEN CONTAINER C2 AND C3 IS THE RESPONSIBILITY OF THE MANUFACTURER

PLAN CLÉ KEY PLAN

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Date 2018-08-22
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

NOTES GÉNÉRALES / GENERAL NOTES

LIFTING WITH FORK ONLY (BY OTHERS)

LIFTING PROCEDURE BY AEM

THE CONTAINER MUST BE EMPTY DURING TRANSPORT

POUR CONSTRUCTION
FOR CONSTRUCTION
DATE : 2018-08-22

SNC·LAVALIN

Project # : 653281-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
TYPICAL DETAIL CONTAINER	61-693-245-209

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2018-08-22	FOR CONSTRUCTION	JBD	D.L.	
0	2018-07-27	FOR CONSTRUCTION	JBD	D.L.	

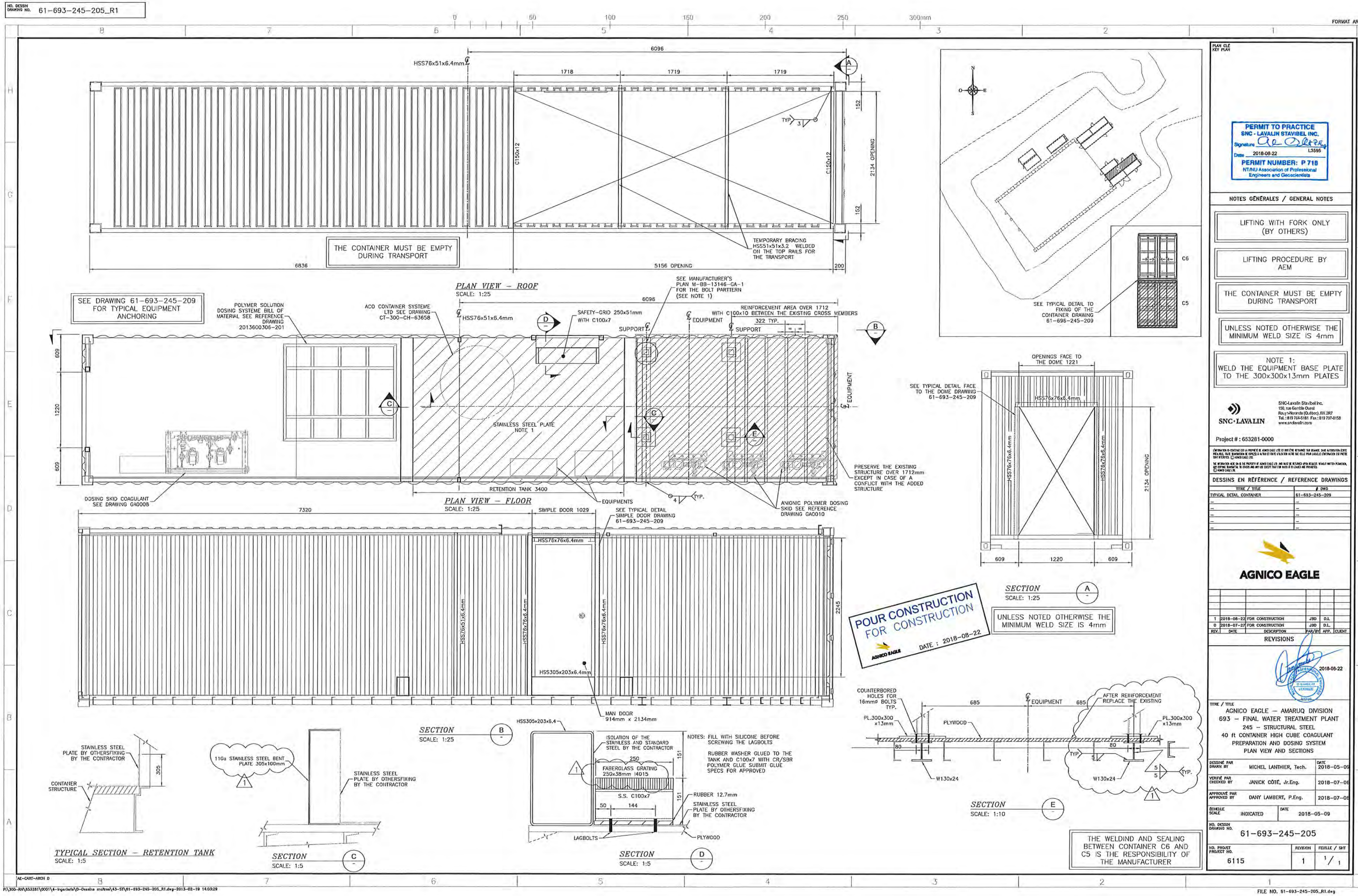
REVISIONS

2018-08-22

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURAL STEEL
40 fT CONTAINER HIGH CUBE CATIONIC POLYMER AND DOSING SYSTEMS
PLAN VIEW AND SECTION

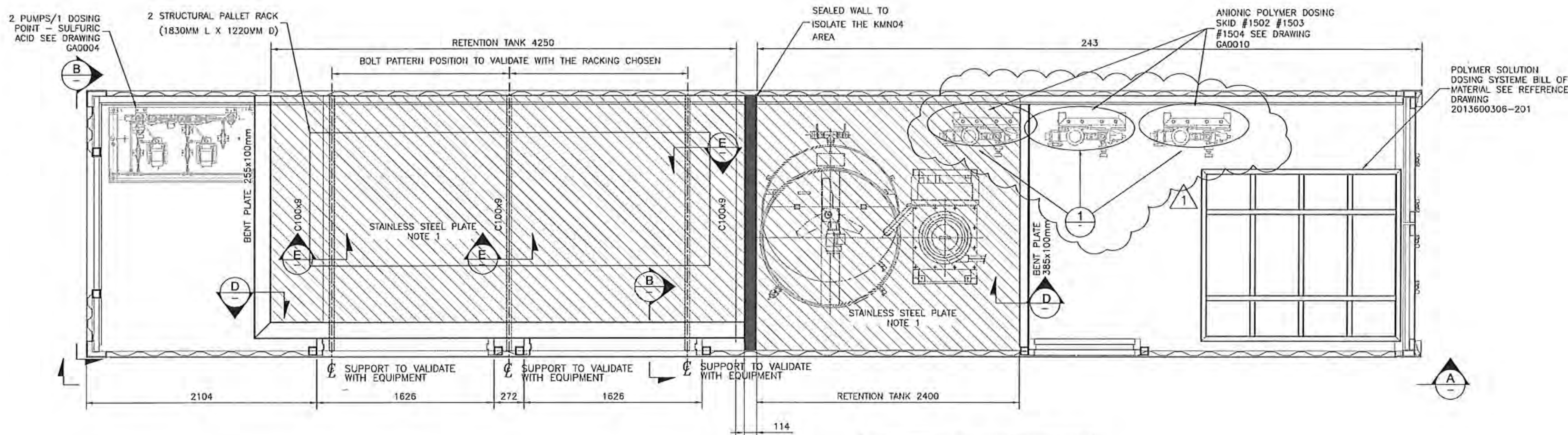
DESSINÉ PAR DRAWN BY	MICHEL LANTHIER, Tech.	2018-05-09
VERIFIÉ PAR CHECKED BY	JANICK CÔTÉ, Jr. Eng	2018-07-06
APPROUVÉ PAR APPROVED BY	DANY LAMBERT, P.Eng.	2018-05-06
ÉCHELLE SCALE	INDICATED	DATE 2018-05-09
NO. DESSIN DRAWING NO.	61-693-245-202	
NO. PROJET PROJECT NO. 6115	REVISION 1	FEUILLE / SHT 1/1

FILE NO. 61-693-245-202_R1.dwg



NO. DESSIN DRAWING NO. 61-693-245-205_R1
FORMAT ARCHD
HSS76x51x6.4mm
6096
1718
1719
1719
C150x12
2134 OPENING
152
TYP. 3
THE CONTAINER MUST BE EMPTY DURING TRANSPORT
TEMPORARY BRACING HSS51x51x3.2 WELDED ON THE TOP RAILS FOR THE TRANSPORT
6836
5156 OPENING
200
PLAN VIEW – ROOF
SCALE: 1:25
SEE DRAWING 61-693-245-209 FOR TYPICAL EQUIPMENT ANCHORING
POLYMER SOLUTION DOSING SYSTEME BILL OF MATERIAL SEE REFERENCE DRAWING 2013600306-201
ACO CONTAINER SYSTEME LTD SEE DRAWING CT-300-CH-63658
SAFETY-GRID 250x51mm WITH C100x7
SEE MANUFACTURER'S PLAN M-BB-13146-GA-1 FOR THE BOLT PARTTERN (SEE NOTE 1)
REINFORCEMENT AREA OVER 1712 WITH C100x10 BETWEEN THE EXISTING CROSS MEMBERS
322 TYP.
EQUIPMENT
SUPPORT
STAINLESS STEEL PLATE NOTE 1
RETENTION TANK 3400
EQUIPMENTS
PRESERVE THE EXISTING STRUCTURE OVER 1712mm EXCEPT IN CASE OF A CONFLICT WITH THE ADDED STRUCTURE
ANIONIC POLYMER DOSING SKID SEE REFERENCE DRAWING GA0010
DOSING SKID COAGULANT SEE DRAWING GA0008
PLAN VIEW – FLOOR
SCALE: 1:25
609
1220
609
7320
SIMPLE DOOR 1029
SEE TYPICAL DETAIL SIMPLE DOOR DRAWING 61-693-245-209
HSS76x76x6.4mm
HSS76x51x6.4mm
HSS305x203x6.4mm
2245
MAN DOOR 914mm x 2134mm
SECTION B
SCALE: 1:25
SEE TYPICAL DETAIL FACE TO THE DOME DRAWING 61-693-245-209
OPENINGS FACE TO THE DOME 1221
SECTION A
SCALE: 1:25
UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm
POUR CONSTRUCTION
FOR CONSTRUCTION
DATE : 2018-08-22
SEE TYPICAL DETAIL TO FIXING OF THE CONTAINER DRAWING 61-695-245-209
C6
C5
STAINLESS STEEL PLATE BY OTHERSFIXING BY THE CONTRACTOR
CONTAINER STRUCTURE
305
TYPICAL SECTION – RETENTION TANK
SCALE: 1:5
11Ga STAINLESS STEEL BENT PLATE 305x100mm
STAINLESS STEEL PLATE BY OTHERSFIXING BY THE CONTRACTOR
SECTION C
SCALE: 1:5
HSS305x203x6.4
ISOLATION OF THE STAINLESS AND STANDARD STEEL BY THE CONTRACTOR
250
FABERGLASS GRATING 250x38mm I4015
S.S. C100x7
50
144
151
LAGBOLTS
NOTES: FILL WITH SILICONE BEFORE SCREWING THE LAGBOLTS
RUBBER WASHER GLUED TO THE TANK AND C100x7 WITH CR/SBR POLYMER GLUE SUBMIT GLUE SPECS FOR APPROVED
RUBBER 12.7mm
STAINLESS STEEL PLATE BY OTHERSFIXING BY THE CONTRACTOR
PLYWOOD
SECTION D
SCALE: 1:5
COUNTERBORED HOLES FOR 16mmø BOLTS TYP.
PL.300x300 x13mm
PLYWOOD
685
EQUIPMENT
685
AFTER REINFORCEMENT REPLACE THE EXISTING
80
W130x24
SECTION E
SCALE: 1:10
THE WELDIND AND SEALING BETWEEN CONTAINER C6 AND C5 IS THE RESPONSIBILITY OF THE MANUFACTURER
PLAN CLÉ KEY PLAN
PERMIT TO PRACTICE SNC-LAVALIN STAVIBEL INC.
Date 2018-08-22
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists
NOTES GÉNÉRALES / GENERAL NOTES
LIFTING WITH FORK ONLY (BY OTHERS)
LIFTING PROCEDURE BY AEM
THE CONTAINER MUST BE EMPTY DURING TRANSPORT
UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm
NOTE 1: WELD THE EQUIPMENT BASE PLATE TO THE 300x300x13mm PLATES
SNC·LAVALIN
Project #: 653281-0000
DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS
TYPICAL DETAIL CONTAINER 61-693-245-209
AGNICO EAGLE
1 2018-08-22 FOR CONSTRUCTION JBD D.L.
0 2018-07-27 FOR CONSTRUCTION JBD D.L.
REVISIONS
2018-08-22
TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURAL STEEL
40 ft CONTAINER HIGH CUBE COAGULANT PREPARATION AND DOSING SYSTEM
PLAN VIEW AND SECTIONS
DESSINÉ PAR DRAWN BY MICHEL LANTHIER, Tech. 2018-05-09
VÉRIFIÉ PAR CHECKED BY JANICK CÔTÉ, Jr.Eng. 2018-07-06
APPROUVÉ PAR APPROVED BY DANY LAMBERT, P.Eng. 2018-07-06
ÉCHELLE SCALE INDICATED DATE 2018-05-09
NO. DESSIN DRAWING NO. 61-693-245-205
NO. PROJET PROJECT NO. 6115 RÉVISION 1 FEUILLE / SHT 1/1
FILE NO. 61-693-245-205_R1.dwg

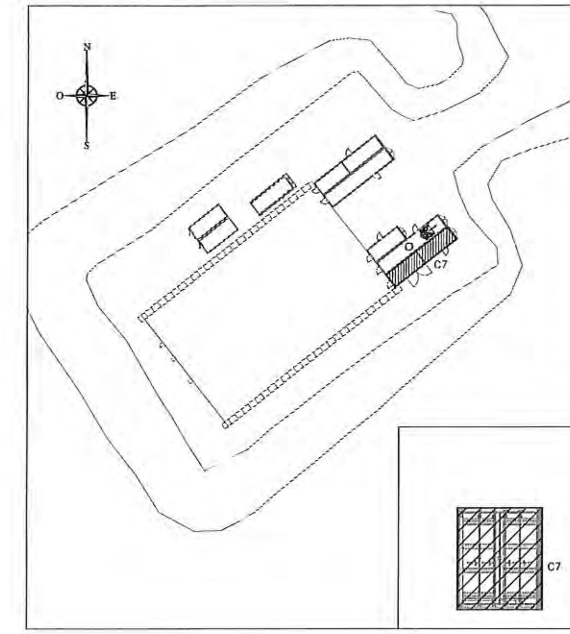
NO. DESSIN DRAWING NO. 61-693-245-207_R1

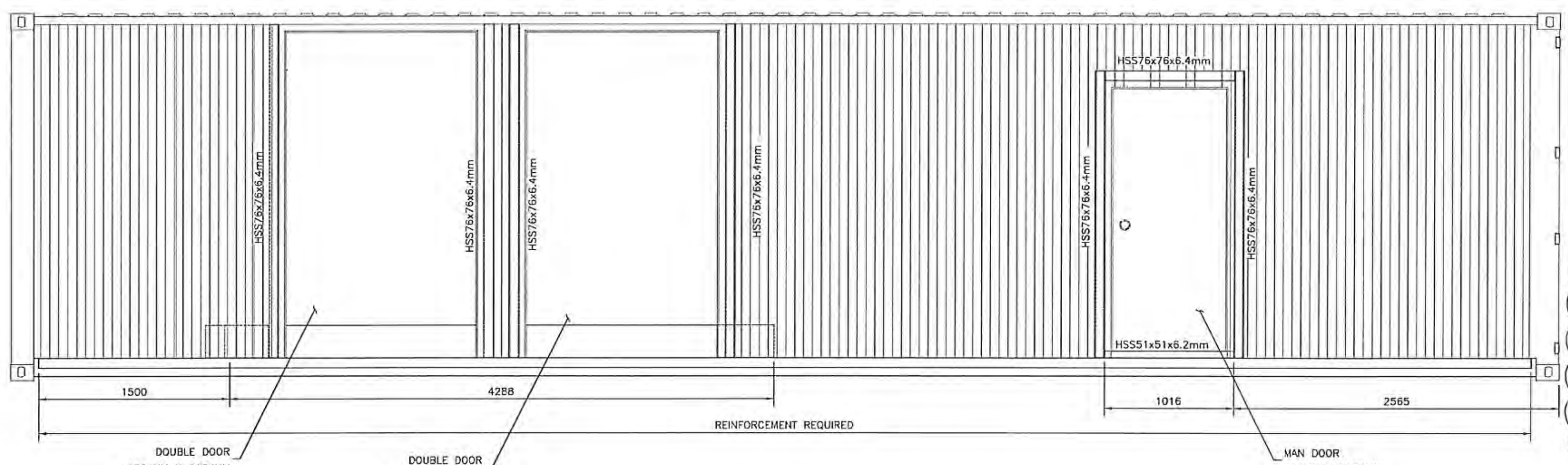


PLAN VIEW – FLOOR
SCALE: 1:25

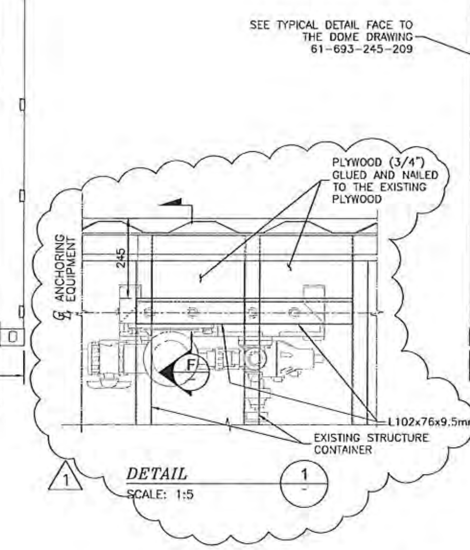
SEE DRAWING 61-693-245-209 FOR TYPICAL EQUIPMENT ANCHORING

THE CONTAINER MUST BE EMPTY DURING TRANSPORT

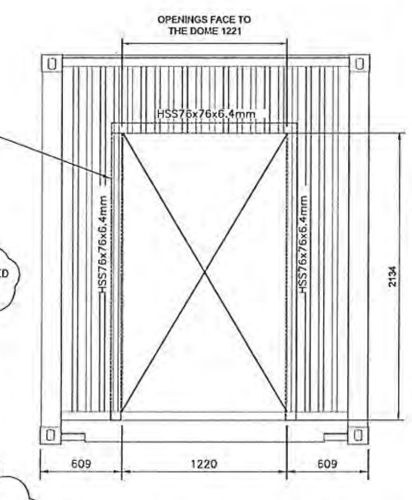




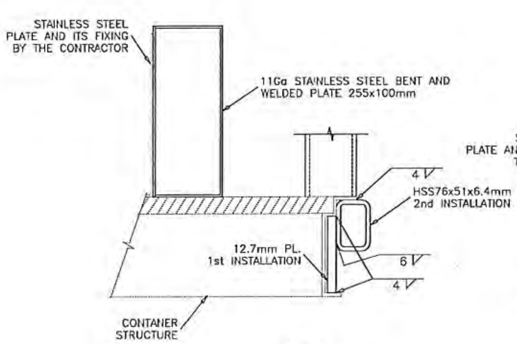
SECTION A
SCALE: 1:25



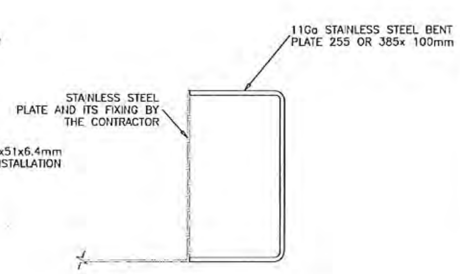
DETAIL 1
SCALE: 1:5



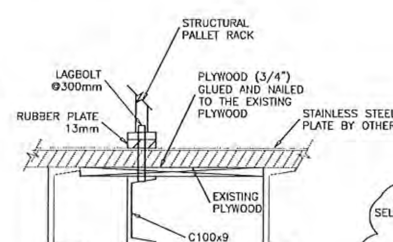
SECTION B
SCALE: 1:25



SECTION B
SCALE: 1:5



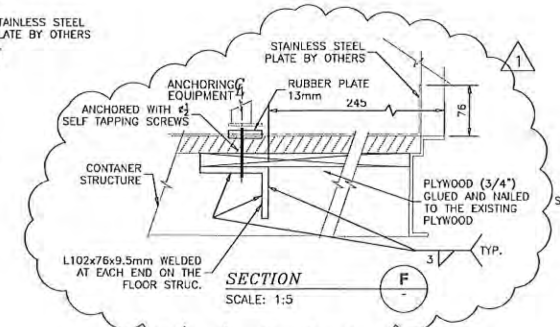
SECTION D
SCALE: 1:5



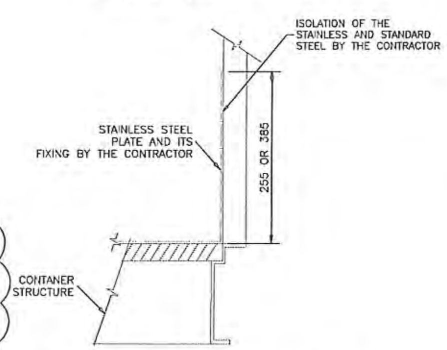
NOTES: FILL WITH SILICONE BEFORE SCREWING THE LAGBOLTS

RUBBER WASHER GLUED TO THE TANK AND C100x9 WITH CR/SBR POLYMER GLUE SUBMIT GLUE SPECS FOR APPROVED

SECTION E
SCALE: 1:5



SECTION F
SCALE: 1:5



TYPICAL SECTION – RETENTION TANK
SCALE: 1:5

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE DATE : 2018-08-22

ARCHITECHTURAL DETAILS NOT SHOWN FOR CLARITY

NOTE 1: THE STAINLESS STEEL RETENTION TANK PLATE SHOULD COVER THE ENTIRE FLOOR OF THE CONTAINER

UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm

PAINT THE VISIBLE SIDE OF THE BENT PLATE IN YELLOW SAFETY

PLAN CLÉ
KEY PLAN

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018-08-22
L3595
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

NOTES GÉNÉRALES / GENERAL NOTES

LIFTING WITH FORK ONLY (BY OTHERS)

LIFTING PROCEDURE BY AEM

THE CONTAINER MUST BE EMPTY DURING TRANSPORT

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

Project # : 653281-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
TYPICAL DETAIL CONTAINER	61-693-245-209
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–	–
–	–
–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2018-08-22	EQUIPMENT ANCHORAGES	JBD	D.L.	
0	2018-07-27	FOR CONSTRUCTION	JBD	D.L.	

REVISIONS

2018-08-22

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURAL STEEL
40 fT CONTAINER HIGH CUBE KMn04 AND SERVICE WATER SYSTEM
PLAN VIEW AND SECTIONS

DESSINÉ PAR / DRAWN BY	MICHEL LANTHIER, Tech.	DATE 2018-05-09
VÉRIFIÉ PAR / CHECKED BY	JANICK CÔTÉ, Jr.Eng.	2018-07-09
APPROUVÉ PAR / APPROVED BY	DANY LAMBERT, P.Eng.	2018-07-09
ÉCHELLE / SCALE: INDICATED	DATE 2018-05-09	
NO. DESSIN / DRAWING NO.	61-693-245-207	
NO. PROJET / PROJECT NO. 6115	RÉVISION 1	FEUILLE / SHT 1/1

FORMAT ARCHD

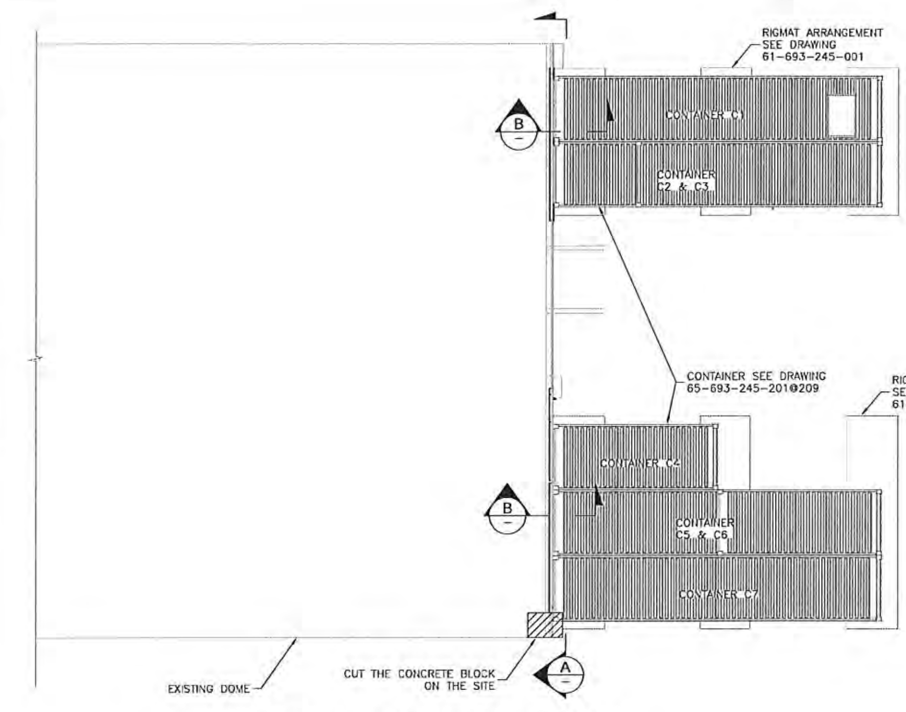
AE-CART-ARCH D

P:\300-RN\653281\0001\4-Ingénierie\D-Dessins maîtres\43-ST\61-693-245-207_R1.dwg-2018-02-19 14:03:29

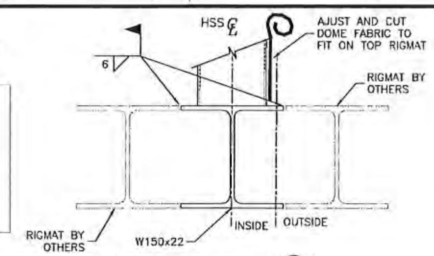
FILE NO. 61-693-245-207_R1.dwg

NO. DESSIN / DRAWING NO. 61-693-245-210_R0

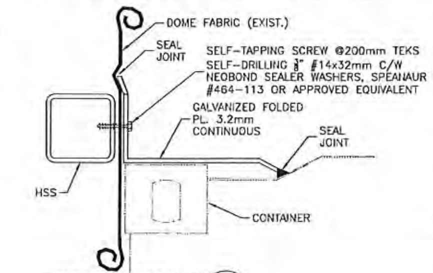
FORMAT ARCHD



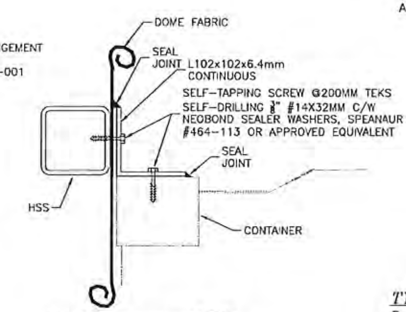
PLAN VIEW – GENERAL ARRANGEMENT
Scale: 1:125



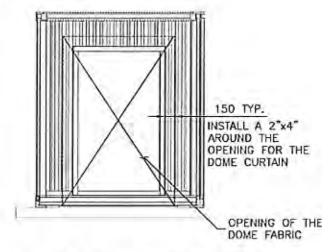
SECTION B
Scale: 1:5



TYPICAL SECTION C
Scale: 1:5
SEAL THE JUNCTION OF THE GALVANIZED PLATE AND THE CONTAINER



TYPICAL SECTION D
Scale: 1:5



TYPICAL OPENING IN THE DOME
Scale: 1:50

1. GENERAL NOTES

1.1 FOR ALL CONSTRUCTION WORKS, REFER ONLY TO DRAWINGS LABELED AS « ISSUED FOR CONSTRUCTION ».

1.2 REFER ONLY TO DIMENSIONS INDICATED ON PLANS, DO NOT THE DRAWINGS SCALE.

1.3 ALL DIMENSIONS HAVE TO BE VERIFIED AND VALIDATED ON SITE PRIOR TO CONSTRUCTION COMMENCEMENT. IN ANY CASE, NO CONTRACTOR IS PERMITTED TO INTERPRET ERRORS OR OMISSIONS BETWEEN THE PLANS AND SPECIFICATIONS OF VARIOUS PROFESSIONALS. ONLY WRITTEN QUESTIONS ON BEHALF OF THE CONTRACTOR SHALL BE CONSIDERED FOR POTENTIAL ADDENDUMS DURING THE TENDERING PERIOD. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE DRAWINGS AND SPECIFICATIONS OF ALL OTHER RELATED DISCIPLINES. ANY INTERPRETATIONS OR QUESTIONS RELATED TO PLANS DURING THE CONSTRUCTION PROCESS SHALL BE CLARIFIED BY PROFESSIONALS THROUGH WRITTEN QUESTIONS.

1.4 THE CONTRACTOR SHALL ENSURE A PRECISE CORRESPONDENCE AT THE JUNCTION OF A NEW AND EXISTING STRUCTURE. THE CONTRACTOR SHALL ENSURE A PRECISE FIT BETWEEN THE LEVEL OF A NEW FLOOR AND THAT OF AN EXISTING ONE.

1.5 THE PRESENT PLANS INDICATE IN A GENERAL MANNER, WORKS TO BE REALIZED ACCORDING TO EXISTING SITE CONDITIONS. TO ESTABLISH FINAL BID PRICE, THE CONTRACTOR SHALL MAKE SITE VISITS SO AS TO QUANTIFY ANY FACTOR OR CONSTRAINT WICH MAY AFFECT WORK REALIZATION.

1.6 FLASHING AND SEALING PART FOR THE DOME FABRIC BY OTHERS

2. STRUCTURAL STEEL

2.1 STRUCTURAL STEEL MUST RESPECT CRITERIA LISTED IN CAN/CSA-G40.20 AND CAN/CSA-G40.21, GRADE 350 W WITH EXCEPTION OF C AND L SECTION WHICH ARE TO BE OF GRADE 300 W. HSS SECTION TO BE OF ASTM 500 TYPE C GRADE 345 W.

2.3 STEEL SURFACE PREPARATION PROCESS AND PAINT COATING FOR AGNICO EAGLE. THE STEEL MUST BE FREE FROM GREASE, OIL OR ANY OTHER CONTAMINANT DETRIMENTAL TO THE GRIP.

1) MAKE SSPC-SP1
2) MAKE SSPC-SP6
3) APPLY 1 LAYER OF PRIMER OF EPOXY COR-PRO 470 (2 MILS SECS) GREY
4) APPLY 2 LAYERS OF EPOXY COATING COR-PRO 475 (5 MILS. SECS EACH) GREY

2.4 SURFACE PREPARATION BEFORE WELDING: SURFACE PREPARATION BY SANDBLAST AS PER SSPC-SP6 OR APPROVED EQUIVALENT.

2.5 REPAIRS AND TOUCH-UPS: ALL STRUCTURAL ELEMENTS (NEW AND EXISTING) WHICH HAVE BEEN DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED ONSITE.

2.6 THE CONTRACTOR OR SUB-CONTRACTOR MUST PROCEED WITH ALL WELDING WORKS IN ACCORDANCE WITH W59-03(R2008). HE MUST ALSO BE CERTIFIED AS PER W47.1-09(R2014). THE ENGINEER/OWNER RESERVES THE RIGHT TO VERIFY THESE CERTIFICATIONS BEFORE AS WELL AS AFTER THE PROJECT COMMENCEMENT.

2.7 ALL STRUCTURAL MEMBERS MUST BE CLEANED BY GRINDING PRIOR TO ALL WELDING WORKS.

2.8 BOLTS, NUTS, LOCKNUTS, AND WASHERS AS PER ASTM-A325-14. ALL BOLTS ARE M20 (U.N.O.)

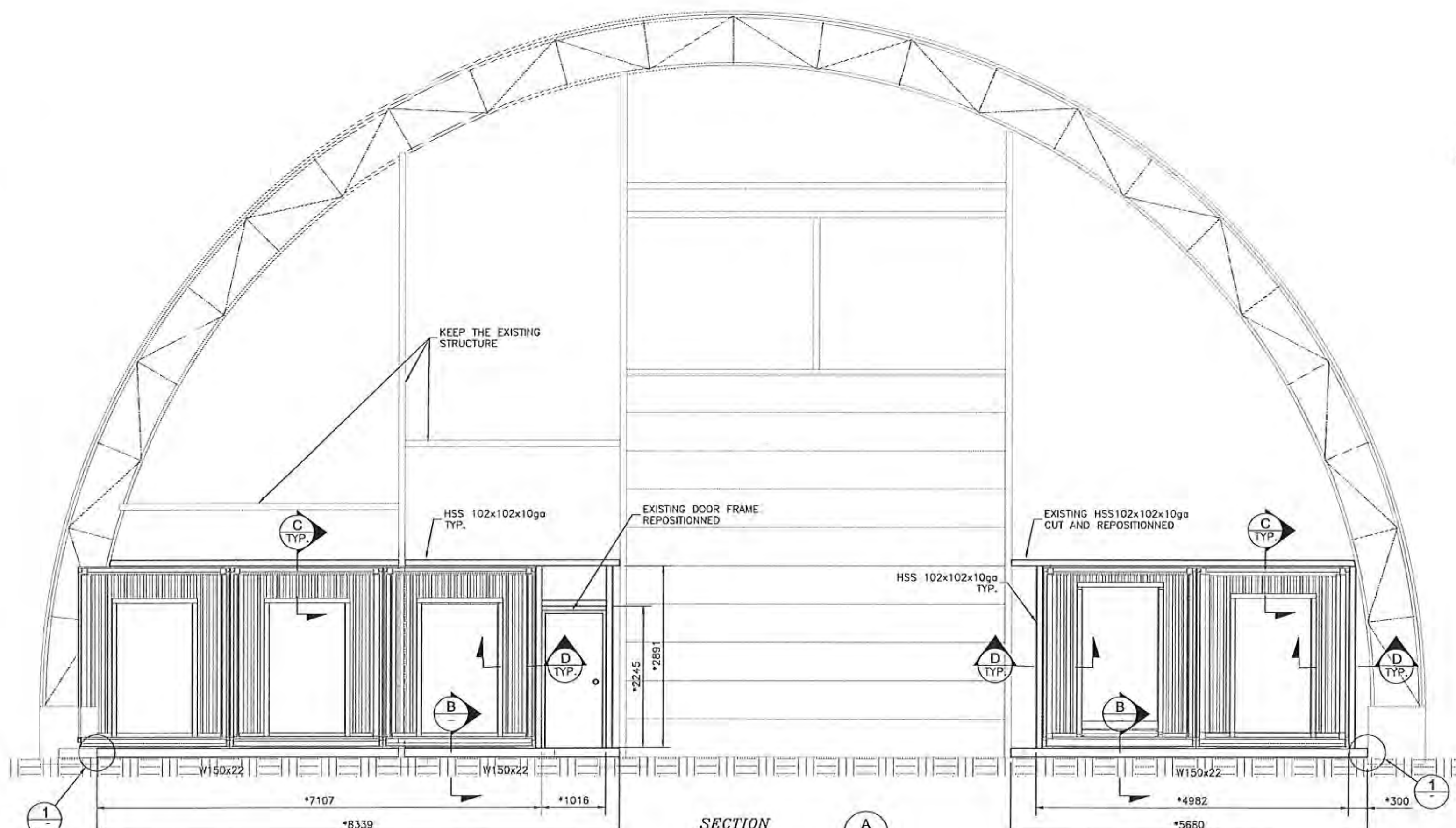
2.9 DEAD LOADS AND COLLATERAL LOADS
- STRUCTURAL STEEL (DENSITY) : 7850 kg/m3

2.10 DESIGN METHODOLOGY:

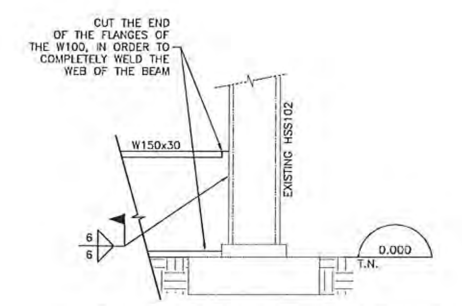
- STRUCTURAL STEEL: ULTIMATE STRENGTH DESIGN ACCORDING TO CAN/CSA-S16-14.

GROUND SETTLEMENT AND GROUND HEAVE RISK ASSUMED BY AEM

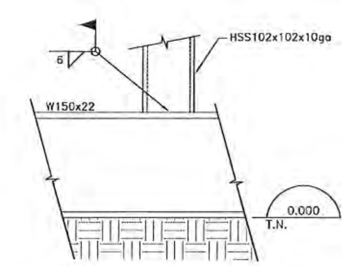
* TO BE VALIDATED



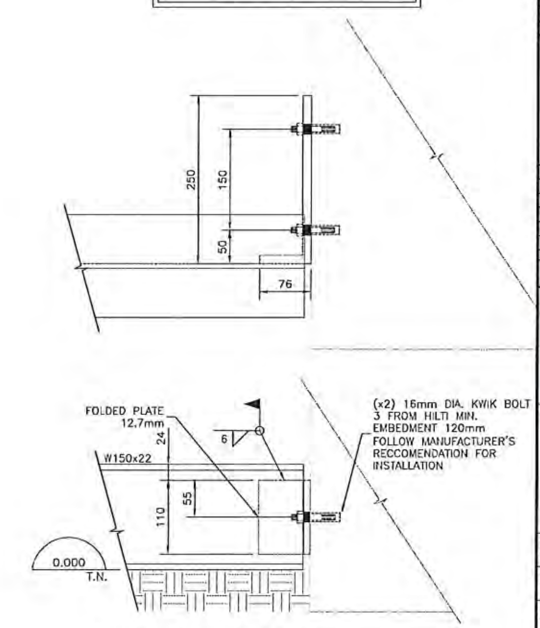
SECTION A
Scale: 1:50
* MESURE AND CUT THE STEEL BEAMS AND COLUMNS



TYPICAL DETAIL – W150 VS EXIST. HSS
SCALE: 1:5

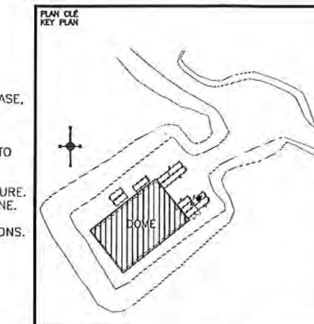


TYPICAL DETAIL – W150 VS HSS
SCALE: 1:5



TYPICAL DETAIL – ANCHORS
SCALE: 1:5

PLAN CLÉ / KEY PLAN



NOTES GÉNÉRALES / GENERAL NOTES

2018-08-17

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE
DATE : 2018-08-17

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-07-17	FOR CONSTRUCTION	JBO	D.L.	

REVISIONS

PERMIT TO PRACTICE
SNC - LAVALIN STAVIBEL INC.
Signature
Date 2018-08-17
L3595
PERMIT NUMBER: P 718
NT/NU Association of Professional Engineers and Geoscientists

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURE
MODIFICATION OF THE DOME
DETAIL PLAN

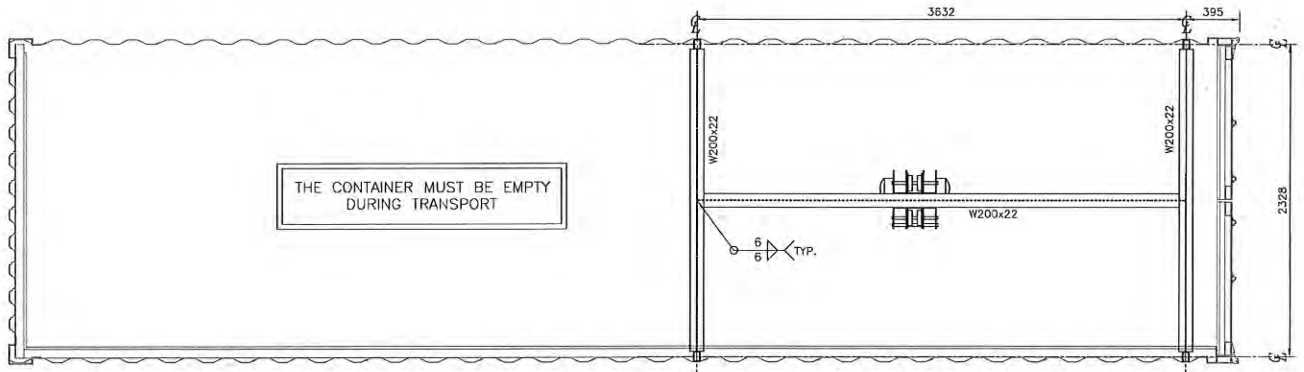
DESSINÉ PAR / DRAWN BY	JORDANE B.D., Tech.	2018-08-07
VÉRIFIÉ PAR / CHECKED BY	JANICK COTE, Jr. Eng.	2018-08-10
APPROUVÉ PAR / APPROVED BY	DANY LAMBERT, P.Eng.	2018-08-15
ÉCHELLE / SCALE	INDICATED	DATE 2018-08-07

NO. DESSIN / DRAWING NO. 61-693-245-210

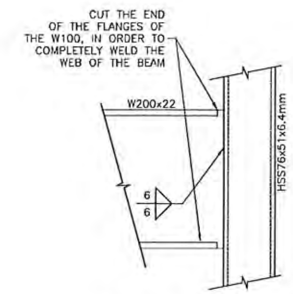
NO. PROJET / PROJECT NO.	RÉVISION	FEUILLE / SHT
6115	0	1/1

FILE NO. 61-693-245-210_R0.dwg

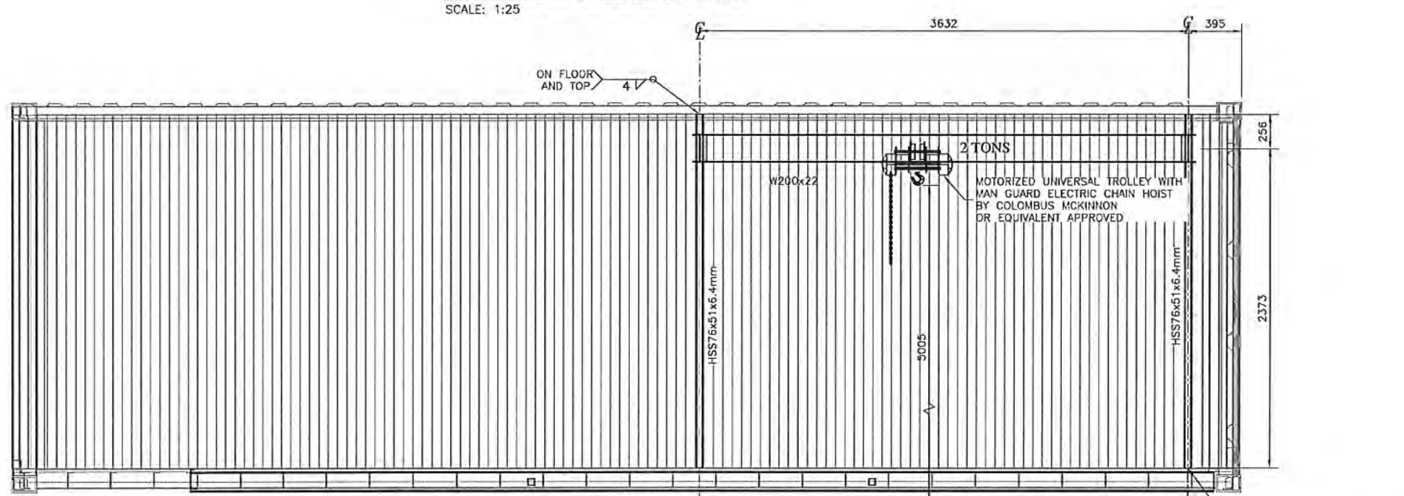
NO. DESSIN DRAWING NO. 61-693-245-203_R0



PLAN VIEW – TOP OF MONORAIL
SCALE: 1:25

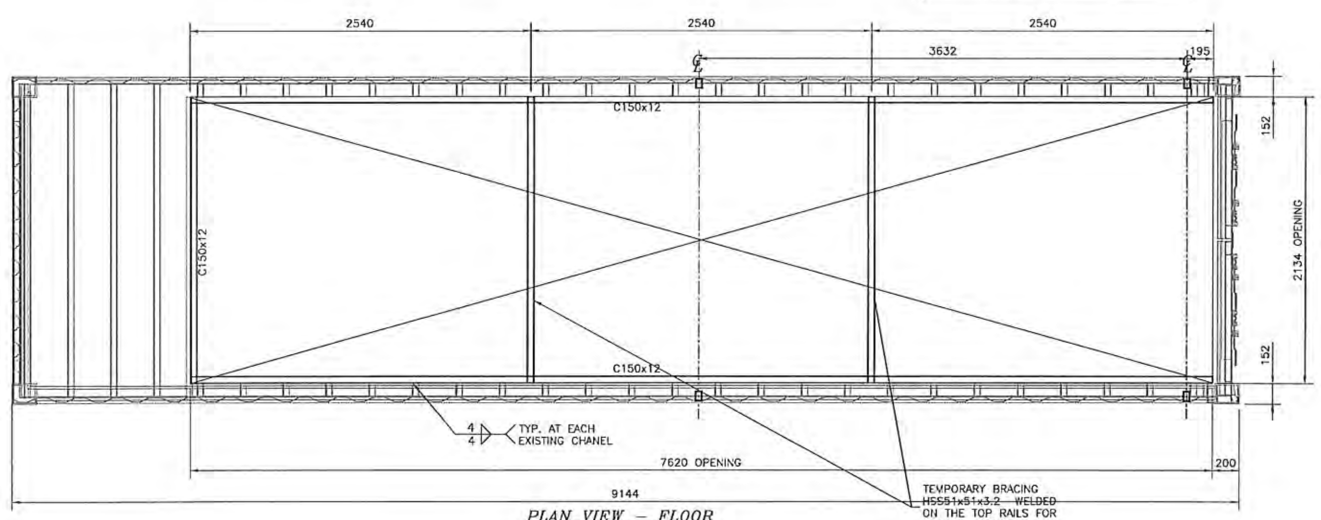


TYPICAL DETAIL – W200 VS HSS
SCALE: 1:5

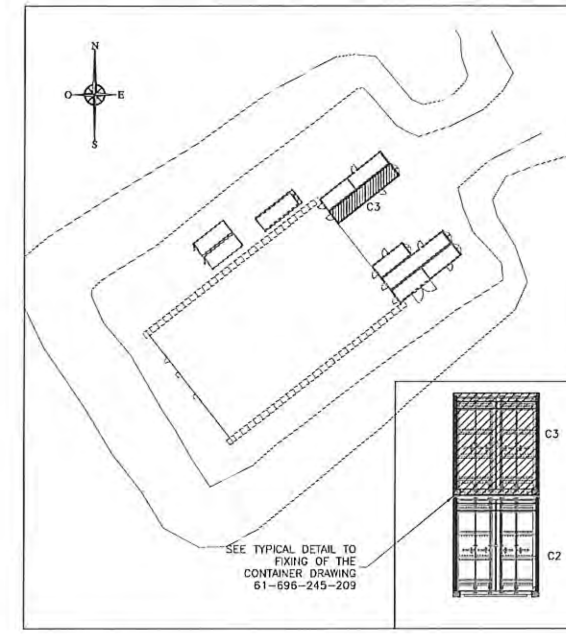


ELEVATION – MONORAIL
SCALE: 1:25

UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm



PLAN VIEW – FLOOR
SCALE: 1:25



MONORAIL NOTES

1. THE MAXIMUM RATED CAPACITY "2 TONS" SHALL BE PAINTED IN MIN. 150 MM. HIGH, BLACK LETTERS ON EACH SIDE OF THE WEB OF THE MONORAIL BEAM(S).
2. MONORAIL DESIGN CRITERIA:
SAFE WORKING LOAD: 2 TONS
MAXIMUM WHEEL LOAD: 5.1 KN
MAXIMUM TROLLEY/HOIST WEIGHT: 90 KG
VERTICAL IMPACT ALLOWANCE: 10%

PAINTING NOTES

a)"INTERSPEC" 3.12.F.2 (C5 STANDARD CURE)
EPOXY PRIME/HIGH BUILD FINISH – NEW CONSTRUCTION SYSTEM FOR SEVERE (C5-1) EXPOSURES.
b)PRIMER: "INTERGARD" 345 SINGLE COAT APPLICATION AT 3-4 MILS (75-100 MICRONS) DRY FILM THICKNESS.
c)PRIMER COLOUR: GRAY OR RED OXIDE
d)COAT FINISH : "INTERGARD" 345 APPLIED AT 3-4 MILS (75-100 MICRONS) D.F.T.
e)COLOUR FINISH: SAFETY YELLOW (YE-3)

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE DATE : 2018-07-27

THE CONTAINER MUST BE EMPTY DURING TRANSPORT

THE WELDING AND SEALING BETWEEN CONTAINER C2 AND C3 IS THE RESPONSIBILITY OF THE MANUFACTURER

PLAN CLÉ
KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

LIFTING WITH FORK ONLY (BY OTHERS)

LIFTING PROCEDURE BY AEM

UNLESS NOTED OTHERWISE THE MINIMUM WELD SIZE IS 4mm

SNC·LAVALIN
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Tel.: 819 764-5181 Fax: 819 797-0156
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Project #: 653281-0000

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
TYPICAL DETAIL CONTAINER	61-693-245-209
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–	–
–	–
–	–

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
0	2018-07-27	FOR CONSTRUCTION	JBD	D.L.	

REVISIONS

2018-07-27

TITRE / TITLE
AGNICO EAGLE – AMARUQ DIVISION
693 – FINAL WATER TREATMENT PLANT
245 – STRUCTURAL STEEL
30 fT CONTAINER HIGH CUBE CATIONIC POLYMER AND DOSING SYSTEMS
PLAN VIEW AND SECTIONS

DESSINÉ PAR DRAWN BY	MICHEL LANTHIER, Tech.	2018-05-09
VERIFIÉ PAR CHECKED BY	JANICK CÔTÉ, Jr.Eng.	2018-07-06
APPROUVÉ PAR APPROVED BY	DANY LAMBERT, P.Eng.	2018-07-06
ÉCHELLE SCALE	INDICATED	DATE 2018-05-09

NO. DESSIN DRAWING NO. 61-693-245-203

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

FILE NO. 61-693-245-203_R0.dwg