CONSTRUCTION SUMMARY (AS-BUILT) REPORT EFFLUENT WATER TREATMENT PLANT, PUMPING STATIONS, PIPELINES, AND DIFFUSER

Meliadine Gold Project, NU

PRESENTED TO

Agnico Eagle Mines Ltd.

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EXECUTIVE SUMMARY

Tetra Tech was retained by Agnico Eagle Mines Limited (Agnico Eagle) to conduct a detailed design of the water management infrastructures at the Meliadine Gold Project, Nunavut. As a part of this mandate, Tetra Tech designed the pumping stations CP1 and CP5, related pipelines, as well as the effluent water outfall system (including the diffuser) into Meliadine Lake. Tetra Tech previously prepared the design report for these water management infrastructures (Agnico Eagle N° 6515-E-132-005-132-REP-009). The design report also covered the effluent water treatment plant design that was done by Agnico Eagle.

Agnico Eagle requested Tetra Tech to complete on their behalf the following as-built construction record report. It should be noted that Tetra Tech was not involved, nor was on site, during the construction activities for these water management infrastructures. Accordingly, all the construction, quality assurance, and commissioning activities associated with the aforementioned infrastructure was managed by Agnico Eagle and their subcontractors. As such, Tetra Tech has presented the construction data as supplied by Agnico Eagle and therefore Tetra Tech cannot accept any responsibility for the accuracy of any of the data supplied.

The construction for the pumping stations CP1 and CP5, pipelines, and effluent water outfall system were conducted between July and September 2017. The construction for the effluent water treatment plant started in September 2017 and commissioning was completed in June 2018.

This report summarizes the construction as-built information for the effluent water treatment plant, pumping stations, pipelines, as well as the effluent water outfall system into Meliadine Lake.

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

Agnico Eagle Mines Limited (Agnico Eagle) retained the services of Tetra Tech to carry out the planning and design work associated with the Water and Environment and the Civil Works components of the Meliadine Project, a gold mine located approximately 25 km north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut.

Tetra Tech previously prepared the design report for the effluent water treatment plant (EWTP), pumping stations, pipelines, as well as effluent water outfall system (including the diffuser) into Meliadine Lake. As part of the scope of work, Agnico Eagle asked Tetra Tech to:

- Conduct a detailed design for the pumping stations CP1 and CP5, pipelines, and effluent water outfall system to Meliadine Lake while Agnico Eagle was in charge of the effluent water treatment plant design, as part of the 2017 civil work construction schedule
- Produce construction drawings and specifications for the pumping stations CP1 and CP5, pipelines, and effluent water outfall system to Meliadine Lake while Agnico Eagle was in charge of those for the effluent water treatment plant
- Prepare design and construction summary reports of the effluent water treatment plant, pumping stations CP1 and CP5, pipelines, and effluent water outfall system to Meliadine Lake

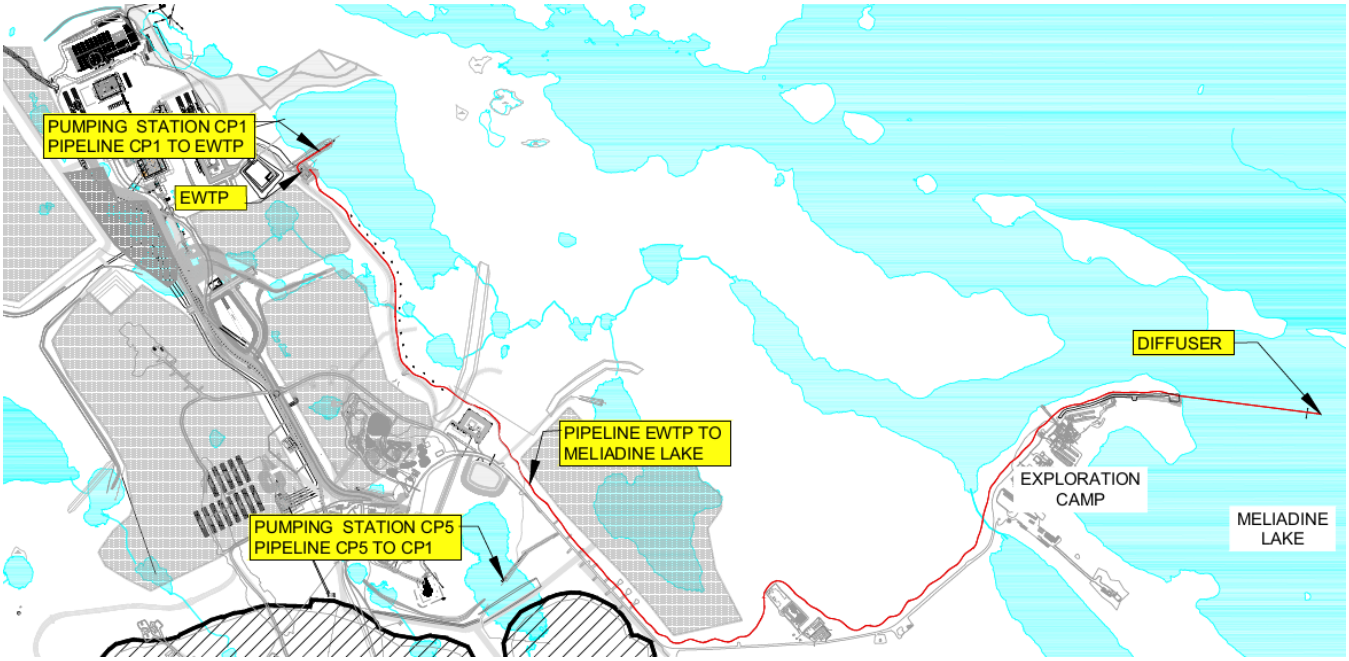
As required by the Water Licence A (No. 2AM-MEL1631), this report summarizes the construction work of those water management infrastructures. Included in this report is:

- A summary of the characteristics of the effluent water treatment plant, pumping stations CP1 and CP5, pipelines, and effluent water outfall system to Meliadine Lake
- Documentation on field decisions that deviate from original plans
- Specifications of equipment
- As-built drawings
- Photographs

2.0 SITE LOCATION PLAN

The figure below presents a site location plan for the effluent water treatment plant (EWTP), pumping stations CP1 and CP5, pipelines, and effluent water outfall (diffuser) in Meliadine Lake.

Figure 2.1: Site Location Plan



3.0 SURFACE CONTACT WATER MANAGEMENT STRATEGY

As presented in the Design Report related to the EWTP, pumping stations, and diffuser (6515-E-132-005-132-REP-009), contact water originating from affected areas on surface are intercepted, diverted, and collected within the existing collection ponds CP1 and CP5. The collected water at the mine site is pumped and stored in CP1, where the contact water is treated by the EWTP prior to discharge to the receiving environment, or will be used as make-up water at the mill.

As part of the Water Management Program, pipelines transfer water during the operation months, from spring freshet to October. Contact water of CP5 is pumped to CP1. Waters directed to CP1 are treated in the EWTP to an approved quality level prior to being discharged in the Meliadine Lake sub-basin through the diffuser system.

CP1 and CP5 are emptied every fall in order to collect all water during the following spring melt.

4.0 CONSTRUCTION SUMMARY

4.1 Construction Schedule

The construction for the pumping stations CP1 and CP5, pipelines, and effluent water outfall system were conducted between July and September 2017. The construction for the effluent water treatment plant started in September 2017 and commissioning was completed in June 2018. Construction was completed according to the milestone dates shown in Table 4.1.

Table 4.1: Construction Milestone Dates

Item	Date of completion
Site Preparation	July 2017
Pumping Stations CP1 and CP5	September 2017
Pipeline from CP1 to EWTP	September 2017
Pipeline from EWTP to Meliadine Lake	September 2017
Pipeline from CP5 to CP1	August 2017
Diffuser installation	August 8th, 2017
Effluent Water Treatment Plant (EWTP) - Installation	October 2017
Effluent Water Treatment Plant (EWTP) – Commissioning	June 2018
Effluent Water Treatment Plant (EWTP) – Operation (start-up)	July 1st 2018

4.2 Effluent Water Outfall System Components

The effluent water outfall system consists of the following five (5) components which are part of this construction summary:

- Pumping station in CP1 collecting pond
- Pumping station in CP5 collecting pond
- Effluent Water Treatment Plant (EWTP)
- Pipelines linking CP5 to CP1 and CP1 to Meliadine Lake
- Diffuser

As-built drawings and final locations of the effluent water outfall system components are available in Appendix A (as-built drawings) and B (survey drawings), respectively. Photographs illustrating the system and its compliance with the construction/permitting design and drawings can be found in Appendix C.

4.2.1 Pumping Stations CP1 and CP5

4.2.1.1 General

The permanent pumping stations CP5 and CP1 were installed respectively on the Jetty CP5 and CP1[1] respectively. The water from CP5 will be pumped to CP1 and the water from CP1 will be pumped through the EWTP to Meliadine Lake.

[1] For information on CP1 and CP5 Jetties, refer to Construction Summary 6515-E-132-005-132-REP-012

As planned in the Design Report[2], the pumping stations were installed over underground sumps located within the pond jetties. The pumping stations were designed to control the water level in the collection ponds and to empty them at the end of the season. The water level in the ponds is regulated with an ultrasonic level transmitter located in the pumping station's sump. When the water reaches the set high level, the pumps start pumping the water until a set low level is reached. The submersible pumps were installed below the lakebed elevation, on the bottom of the sumps, in order to collect the maximum amount of water.

4.2.1.2 Pump Narrative

The amount of water to pump will increase over the years and additional pumps will be needed to meet the pumping requirement. The following tables present the expected pumping stations configuration until the end of the project:

Table 4.2: CP5 pumping station configuration (CP5 to CP1)

	Years -3 to -1 (2017 to 2019)	Years 1 (2020)	Years 2 to 3 (2021 to 2022)	Years 4 (2023)	Years 5 to 6 (2024 to 2025)	Years 7 (2026)	Years 8 (2027)
Maximum flowrate (m³/day)	19,205	19,205	30,935	30,935	32,775	32,775	32,775
Number of pumps	1	1	2	2	2	2	2

Table 4.3: CP1 pumping station configuration (CP1 to EWTP)

	Years -3 to -1 (2017 to 2019)	Years 1 (2020)	Years 2 to 3 (2021 to 2022)	Years 4 (2023)	Years 5 to 6 (2024 to 2025)	Years 7 (2026)	Years 8 (2027)
Maximum flowrate (m³/day)	14,880	14,880	14,880	20,640	20,640	35,040	35,040
Number of pumps	1	1	1	1	1	2	2

[2] Effluent System Design Report: 6515-E-132-005-132-REP-009

4.2.1.3 Pumping Station Enclosure

All mechanical and electrical pumping station equipment are housed in a heated and insulated enclosure. Electrical equipment (e.g. control panel, junction boxes, VFD/soft starters, etc.) are separated from the mechanical equipment (e.g. pumps, isolation valves, piping, piping accessories, etc.) by a wall and each room will have its own access door.

The enclosure has been built following the site information and design coefficients (temperature, wind load, snow load, etc.) from the Agnico Eagle general guidelines to resist to the Nunavut climatic conditions. The enclosure is installed on a leveled coarse compacted gravel surface. All surfaces are painted in accordance with Agnico Eagle requirements to ensure good corrosion resistance over the years of operation.

4.2.1.4 Sumps and Suction Lines

Each pumping station was installed over a sump which is connected to the pond with two environmental hazard free high density polyethylene (HDPE) pipes. As the water level in the collection pond rises, the HDPE pipes fill the sumps with water. Both sumps are equipped with two suction lines at different elevations. Every year, at the beginning of the freshet, the top water layer flows through the upper suction line until the bottom line water is thawed. The bottom line diameter is larger than the top one which will reduce water velocity at the bottom sump inlet.

The sumps are made from fusion welded HDPE and were pneumatically tested after fabrication to insure tightness. Before winter season, the two knife gate valves installed on the suction lines used to fill the sump with water, are closed to isolate the sump. Once isolated, the sump is drained and the submersible pumps is pulled out from the sumps and stored during the winter season.

4.2.1.5 Submersible Pumps

Each pumping station is equipped with two (2) identical Flygt submersible pumps used to pump the water from the sump to an HDPE pipeline connected to the pumping station manifold.

The selected pumps are high flow low head type, each one is capable of pumping approximately 20,000 m^3/day. Shut-off pressure is 65 psig for CP1 and 30 psig for CP5.

4.2.1.6 Pipelines

Piping manifold inside the pumping station is made of steel with Victaulic connections for easy dismantlement during maintenance operations. All piping was hydrostatically tested at the manufacturing facility to ensure tightness.

4.2.1.7 Controls

The pumping stations were designed and built to provide easy operation and maintenance. The equipment is locally controlled at the pumping station and remotely controlled from a control room. The complete functional description for the pumping stations is provided in Appendix D. When the pumps are shut-down, the electrically operated valve, installed on the four inch (4'') drain line, opens to allow the water between the manifold and the first high point on the HDPE pipelines to flow back into the sump.

4.2.2 Effluent Water Treatment Plant (EWTP)

The purpose of the EWTP (ACP-700R) is to reduce Total Suspended Solids (TSS) to a maximum concentration of 15 mg/L from the influent water pumped from CP1 prior to its discharge through the diffuser into Meliadine Lake.

The equipment has an operational range of 6,250 to 28,000 m^3/d. It is expected that the EWTP will be in use only during the open water season, approximately four (4) months in the year (June to October).

4.2.2.1 Actiflo® and Multiflo

The first treatment component consists of one Actiflo® clarifier with two (2) recirculation lines and two (2) hydrocyclones. The Actiflo® can be operated with one (1) or two (2) lines, depending on the influent flow rate and TSS content. The Actiflo® overflow is designed to meet the Type A License final effluent discharge criteria for TSS concentrations. The final effluent is monitored for pH, turbidity, and flow rate which are monitored continuously. The end-of-pipe effluent concentration for various conventional constituents will not exceed the values provided by the Metal Mining Effluent Regulation (MMER). Appendix E presents results of water quality testing during commissioning and start-up.

The hydrocyclone overflow is sent to the Multiflo for sludge thickening which overflows by gravity into a break tank and then pumped into the raw water Actiflo® inlet pipe for recirculation. The principal purpose of the Multiflo is to decrease the amount of water sent to the mill, since the total water content volume within the sludge cannot be managed at the mill. This unit does not contribute to the efficiency of the system to reduce dissolved chemical parameters within the water effluent.

The Multiflo will be in operation following the start-up of the mill in early 2019.

The Meliadine EWTP Overall Process Flow Diagram is illustrated attached in Appendix F.

4.2.2.2 Service Water System

The service water system consists of two (2) multimedia filters, two (2) heaters, one (1) filtered water tank and four (4) service water pumps. Service water is used in the preparation of dry chemicals and for polymer makeup systems. Coagulant and polymer require filtered heated water.

4.2.2.3 Reagents

Two (2) types of polymers as well as a coagulant are used to treat the water that flows through the Actiflo® and each are supplied by a dosing system that is adjusted according to the influent flow rate. One (1) cationic and one (1) anionic polymers are used. Treated water from the Actiflo® is used for the mixing of the reagents.

4.2.2.4 Controls

The Actiflo® Feed Pump is equipped with a variable frequency drive (VFD) that allows the flow to be modulated. A controller uses the raw water flow meter's (65FIT6930001) signal and adjusts the frequency of the pump to obtain the flow specified by the Operator in order to maintain a constant flow rate to the system.

The raw water TSS analyzer is used to monitor the raw water quality. An alarm is triggered when a high-high turbidity is reached and if only one (1) recirculation pump is running.

The effluent water TSS concentration and pH values are monitored continuously with in-line instrumentation. If effluent concentrations reach a set point indicating that final effluent discharge criteria may be exceeded, an alarm is sent to the Operator, who manages the system to meet effluent criteria. A second alarm is sent to the operator if effluent concentrations reach a second set point that is just below the final effluent discharge criteria. This triggers the two (2) outflow valves to automatically divert the final effluent to CP1, preventing discharge to the environment.

Addition of the two (2) required reagents is proportional to the influent water flow. Since this flow is maintained constantly by a control loop, no manual adjustment is required. If the operator has to modify the influent water flow, adjustment of the reagent dosing system is required to maintain the target dosage rate. The reagent dosing systems are equipped with pumps that maintain a constant flow rate when running at a constant frequency. The flow can be modified by changing the electric motor frequency.

The reagent dosing system is equipped with valves and graduated cylinders allowing the operator to measure the addition rate of the reagent using a stop watch. The operator determines the required flow of a specific reagent by a formula based on influent flow rate. Based on this calculation, a manual adjustment to the reagent pump is done in order to obtain the required dosage. Initially, the formula is based on laboratory testing and is adjusted accordingly to the treatment plant performance.

4.2.3 Pipelines

4.2.3.1 General

The pumping stations at CP1, CP5 and the EWTP transfer water through a total of 5.3 km of sections of 400 mm (Ø16 inch) and a section of 500 mm (Ø20 inch) HDPE pipes. The treated water from the EWTP is pumped to a diffuser located in the Meliadine Lake. Sections of the pipelines are insulated where required. The following table presents a summary of the three (3) pipelines:

Table 4.4: HDPE Pipeline Lengths

Description	Actual Length (m)	Diameter (mm)
CP5 to CP1	709	500
CP1 to EWTP	108	400
EWTP to Meliadine Lake	4 517	400

The pipelines were butt welded using a fusion welding machine and a flange connection was installed at every 76 m (250 feet) for easy manipulation during installation. The pipeline spools were transported, handled, and assembled on roads or pads using mobile equipment such as forklifts, front-end loaders, or boom trucks. The routing of the pipelines was chosen in such a way to limit the need of installation equipment to run over the tundra and to stay off a distance of 31 m from water bodies. No archeological sites were encountered in any areas along the pipeline routings.

4.2.3.2 Material

Piping

All pipelines and flanges are made of high quality Sclairpipe HDPE DR17 PE4710. Black HDPE was chosen for its high sunlight Ultraviolet resistance, supported by technical literature stating a life expectancy of 50-100 years of successful service. The complete Sclairpipe datasheet is available in Appendix G of this document. A 50 mm (2 inch) thick factory applied waterproof rigid polyurethane foam was applied over some section lengths.

Fusion of joints was done according to a procedure equivalent to ASTM F2620, Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings, see Appendix H for the complete pipe fusion manual. Service tests were conducted on the pipelines for leak detection at start-up of the EWTP.

Heating and insulation

The sections of pipelines requiring insulation are those where gravitational draining is not possible due to the pipeline's profile shape. The HDPE pipeline as-built drawing in Appendix A shows sections of the pipeline between CP1 and Meliadine Lake that are insulated and drained. This insulation reduces heat transfer and therefore reduces the possibility of water freezing and piping collapse under freezing temperature shutdown.

The section of the pipeline that is submerged and exposed to freezing in Meliadine Lake, over a distance of approximately 50 meters and 5 meters deep, is heat traced and insulated.

Flanges, valves and accessories

All pipelines flanges (stub-ends) are made of the same material as the pipelines, with a pressure rating class 150 lbs and comply with ANSI B16.5 dimensions for perfect mating and minimizing risks of leaks. Flanges and fittings for vents and drains are all made of stainless steel for good corrosion resistance. Aboveground flanges backing rings are made of ductile iron and all hardware is made of stainless steel for strength and corrosion resistance. Submerged hardware in Meliadine Lake is all stainless steel made with magnesium sacrificial anodes to enhance corrosion protection in fresh water. Valves are made of stainless steel or ductile iron with EPDM rubber or Teflon seals, depending of the design requirements.

Culvert sleeves

In locations where the pipelines cross haul or access roads, galvanized corrugated steel sleeves were used across the roads to support the weight of vehicles and backfill, and to maintain the integrity of the pipelines.

4.2.3.3 Equipment

Flowmeter

Magnetic flowmeters are installed on the two major pipelines as presented in the following table:

Table 4.5: Flowmeters Installed on Pipelines

Description	Number of flowmeters
CP5 to CP1	2
CP1 to EWTP	1
EWTP to Meliadine Lake	2

All flowmeters are connected to a PLC where data is logged. This equipment is used to monitor the quantity of water transferred between CP5 and CP1 ponds and the water discharged into the environment. The flowmeters are also intended to be used as a real-time leak detector system. An alarm is set to inform the Control room when the flow reading of a pipeline has a difference greater than 10%. The goal of this system is to mitigate and minimize risks of environmental contamination.

The flowmeters of pipeline CP5 to CP1 are located as follow: one is installed near the discharge of CP5 pumping station and connected to its PLC. The second one is located on the top of D-CP1 at approximately 760 m (2,493 ft) away from the pumping station and it will be connected to the PLC in the electrical room of the evaporators into the P-Area.

The flowmeter of pipeline EWTP to Meliadine Lake is located on the construction pad before the water outfalls to the diffuser. This flowmeter is Wi-Fi connected to the Exploration Camp nearby. A flowmeter was installed at the EWTP to complete the leak protection system.

All flowmeters are skid mounted and are rated for outdoor use in Nunavut.

Drains

Drains assemblies are provided to every pipeline lower points where it is not technically possible to drain gravitationally during shutdown operations. The water will be pumped and discharged where it is safe for the environment. The drains are shown on HDPE pipeline as-built drawing in Appendix A.

Air/Vacuum Valves

An air/vacuum valve is located at every highest points of the EWTP to Meliadine Lake pipeline. This valve is required to exhaust air when filling and admit air while draining. This is an important equipment to protect the integrity of the pipeline and prevent it from collapsing in case of water column separation at shutdown.

No air/vacuum valves are needed on the CP5 to CP1 and CP1 to EWTP as the pipelines are able to safely sustain the possible vacuum stresses and air pockets at high points will be removed with the flow velocity.

4.2.3.4 Pipeline CP5 to CP1

The pipeline centerline routing is straight but the pipeline was designed and installed to snake along its general path. This is required to give free movement of the pipelines under the Nunavut high outdoor temperature range and to limit the induced thermal expansion stress.

Except on pumping stations jetties, the pipelines lie directly on the tundra where sharp stones were removed before installation to reduce the risks of tears and premature wear. Since the pipelines are water tight, no hazards or disturbances are expected after installation. A hydrostatic test was performed to confirm it.

The routing was designed and installed to maintain a minimum distance of 31 m from any natural water body.

CP5 to CP1 pipeline discharges on the shore of CP1 and lies on rip rap to avoid shore erosion.

4.2.3.5 Pipeline EWTP to Meliadine Lakeshore

The first 180 m from the EWTP is supported on a pre-molded cement base. The second section (180 m to 900 m) of the pipeline reaching the dyke D-CP1 is exposed to flooding every year at freshet. For this reason, as defined in the Design Report3, the pipeline is anchored with concrete blocks lying underwater and chains retaining the pipeline from deriving too far from its design centerline routing. This design allows the pipeline to float on the water, minimizing stress loads on the material. Once water is pumped out of CP1, the pipeline eventually reaches its relative designed position on the ground and remains there until the next flooding. All retaining accessories are galvanized to provide protection against rust over the operation years.

Each of the submersible anchors consists of a pair of 1500 kg (3306 lbs) concrete blocks. The pipeline is maintained in place with a chain linking both blocks to the pipe attachment point. An anchor point was installed every 38 m (125 ft) to maintain the pipeline in position. The anchors are sized to resist a maximum wind load corresponding to a 1/100 year event as well as all lake waves and gravity loads.

The section of the pipeline between D-CP1 and Meliadine Lake is the same as described in Section 4.2.3.4. The pipeline routing is at least 31m away from water bodies at the exception of a section along the exploration camp where the area is too narrow and therefore runs at a distance less than 31m.

4.2.3.6 Submarine Pipeline (Between Meliadine Lakeshore and Diffuser)

The section of the pipeline between the shore of Meliadine Lake and the diffuser was designed to be submerged at all time.

In order to avoid sub-marine environment disturbances and limit sub-marine work and marine equipment, on-shore installation was conducted. A construction pad with a ramp, was built on the water outfall shore, within 31m from the edge of waterbody (without entering the limit of the high-water mark), to provide a flat area where material could be stored before being assembled and where heavy equipment could circulate, thus limiting at its minimum the disturbance of the land around the construction area.

The method adopted for the installation of the sub-marine pipeline is named Float-and-Sink. The HDPE spools were fusion jointed on the construction pad in a continuous process. The concrete ballasts were assembled on the pipeline as it went into the water while remaining empty and floated on the surface of the water. Once a ballast was attached to the pipeline, the assembly was loaded on a wheeled bogey and rails smoothly drove the pipeline in the water. The pipeline floated as it was lighter than water; the bogey is then removed and installed back on the next ballast. To maintain the pipeline on the lakebed, a ballast was installed every approximately 8 m along the pipeline for a total of 49 ballast blocks, for a ballast depth chart see Appendix I. A tug boat pulled the pipeline using a pulling head in the Meliadine Lake.

When the pipeline was completed and in position, it was sunk by slowly filling it up with fresh water to avoid air entrapment. As the pipeline sunk, it was carefully installed in its final location on the bed lake.

[3] Effluent System Design Report: 6515-E-132-005-132-REP-009

4.2.4 Effluent Water Outfall System (Diffuser)

Compliance of the diffuser system with the construction/permitting design and drawings has been observed:

- Diffuser connecting with the outfall through a tee connection (diffuser oriented NE-SW)
- Coordinates of the tee: 6,898,150 N / 542,756 E (UTM Zone 15 V)
- Length of diffuser: 30 m, with two arms of 15 m each
- Diameter of the diffuser: 400 mm OD / 355 mm ID
- Water depth at diffuser location: approximately 14.6 m
- Number of ports: 10 ports
- Port diameter: 51 mm
- Port spacing: 3 m
- Tideflex valve mounted on top of diffuser pipe on each port to eliminate fish access (see specifications in Appendix J)
- Vertical angle of valve: 45 degrees, pointing toward the southeast
- Port height from lake bed: 1 m, corresponding to the approximate effluent exit height from lake bed
- 3 ballast blocks on each arm of the diffuser, totalling 6 ballast blocks for the diffuser

5.0 FIELD DECISIONS THAT DEVIATE FROM ORIGINAL DESIGN

This section documents variations from original design which were approved by the designer and/or the field engineer on site for the entire effluent system. The changes listed herein do not affect the original water management strategy.

5.1 Effluent Water Treatment Plant

The construction work led to no variations from the original design in the EWTP.

5.2 Pumping Stations CP1 and CP5

The construction work led to slight variations from the original design in the pumping station CP1 and CP5, as summarized in Table 5.1 below.

Table 5.1: Pumping Station CP1 and CP5 Characteristics

Item	Proposed	Actual
Expansion joints	Expansion joints installed at every tie-in to a building.	None

- No expansion joints were deemed required.

5.3 Pipelines and Accessories

The construction work led to slight variations from the original design in the pipelines and accessories, as summarized in Table 5.2 below.

Table 5.2: Pipeline Characteristics

Item	Proposed	Actual	Difference
Flowmeter CP5 to CP1	2	2	0
Flowmeter CP1 to EWTP	0	1	+1
Flowmeter EWTP to Meliadine Lake	1	2	+1
Earthen berms along pipelines	Every 30m	none	
CP5 to CP1 – Length (m)	832.3 m	709 m	-123.3 m
CP1 to EWTP – Length (m)	154.8 m	108 m	-46.8 m
EWTP to Meliadine Lake – Length (m)	4 340.6 m	4 517 m	+176.4 m

- At the design stage, no flowmeter was deemed required on the CP1 to EWTP pipeline as the water transfer is already monitored by the EWTP to Meliadine Lake flowmeters. Nevertheless, a flowmeter was installed on this section of the pipeline.
- Originally, earthen berms were planned to be put in place at every 30 meters along the reference centerline of the pipelines. However, this was deemed unnecessary and field observations during the first weeks of pumping in 2018 by the site team proved that the set snaking loop is sufficient to ensure stability of the pipeline.
- The length of the pipeline varied as the path had been slightly modified on field to better fit with the other constructions constraints and infrastructures on-site without impacting the design intent and general path.

5.4 Effluent Water Outfall System (Diffuser)

Two (2) deviations from the design were observed and recorded during the construction of the effluent water outfall system, as summarized in Table 5.3 below and the text which follows.

Table 5.3: Effluent Water Outfall System Characteristics

Item	Proposed	Actual	Difference
Location of Tee Connector for Diffuser System	6,989,149.90N / 542,755.74E	6,989,147.41N / 542,797.91E	42 m, mainly eastward
Depth of the Diffuser System at Tee Connector	14.60 m	11.39 m	3.21 m shallower

In order to assess the impact, or not, of these two deviations, a bathymetric survey was conducted, followed by a numerical modelling study to assess conventional constituent concentrations at the edge of the mixing zone and potential concentration build-up over time, based on the as-built system, hence including the two deviations described in Table 5.4 above. A technical memo presented in Appendix K summarizes the results of the analytical work undertaken to assess these potential changes.

As confirmed with the numerical simulation described above, both deviations in the as-built diffuser (horizontal shift and system in shallower water depth) result in water quality guidelines being met for all conventional constituents as summarized in Table 5.4 below.

Table 5.4: Comparison of Diffuser System Dilution Performance

Item	Minimum Dilution at the Edge of the Mixing Zone Obtained over 14-Years Simulation	
	Proposed	Actual
Base Case Scenario	23:1	23:1
Water Quality Guidelines	Met for all conventional constituents	Met for all conventional constituents

5.5 Earthworks

The as-built material quantities for the effluent water treatment plant, pumping stations CP1 and CP5, pipelines, and effluent water outfall system (including diffuser) are presented in Table 5.5 below.

Table 5.5: As-built Material Quantities

Item	Proposed	Actual
Riprap (300-500 mm)	1 500 m^3	Volume installed not available
Non-woven geotextile	yes	no

- Riprap material was only used to build the Construction pad on the shore of Meliadine Lake.
- No geotextile was required in the lakebed underneath the pipeline entrance in the Meliadine Lake.

6.0 AS-BUILT DRAWINGS AND PHOTOGRAPHS

As-built drawings are presented in Appendix A.

Survey drawings conducted during and after the construction of the water management infrastructures can be found in Appendix B.

Photographs of the water management infrastructures during and after construction are shown in Appendix C.

7.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Agnico Eagle Mines Ltd. and their agents. Tetra Tech does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Agnico Eagle Mines Ltd., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Tetra Tech accepts no responsibility for losses, claims, expenses or damages, if any, suffered by a third party as a result of any decisions made or actions based on this report. Use of this report is subject to the terms and conditions stated in Tetra Tech's Services Agreement.

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Use of this Document acknowledges acceptance of the foregoing conditions.

8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully submitted,
Tetra Tech and Agnico Eagle team

EFFLUENT WATER TREATMENT PLANT

Prepared by:

Blandine Arseneault
Signature numérique de Blandine Arseneault
DN : cn=Blandine Arseneault
Date : 2018.09.20 16:19:57 -04'00'

Blandine Arseneault
Project Environment Lead

Reviewed by:

Pierre-Alexandre Bosse
Signature numérique de Pierre-Alexandre Bosse
DN : cn=Pierre-Alexandre Bosse
Date : 2018.09.24 19:00:52 -05'00'

Pierre-Alexandre Bossé
Project Process Lead

PUMPING STATIONS, PIPELINE AND DIFFUSER

Prepared by:

REGISTERED PROFESSIONAL ENGINEER
J.M.I.F. ALARIE
LICENSEE
NUNAVUT

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
O/A TETRA TECH
Signature
Date 2018-09-20
PERMIT NUMBER: P 1029
NWNU Association of Professional Engineers and Geoscientists

2018-09-20

Josée Alarie
Report Coordinator

Reviewed by:

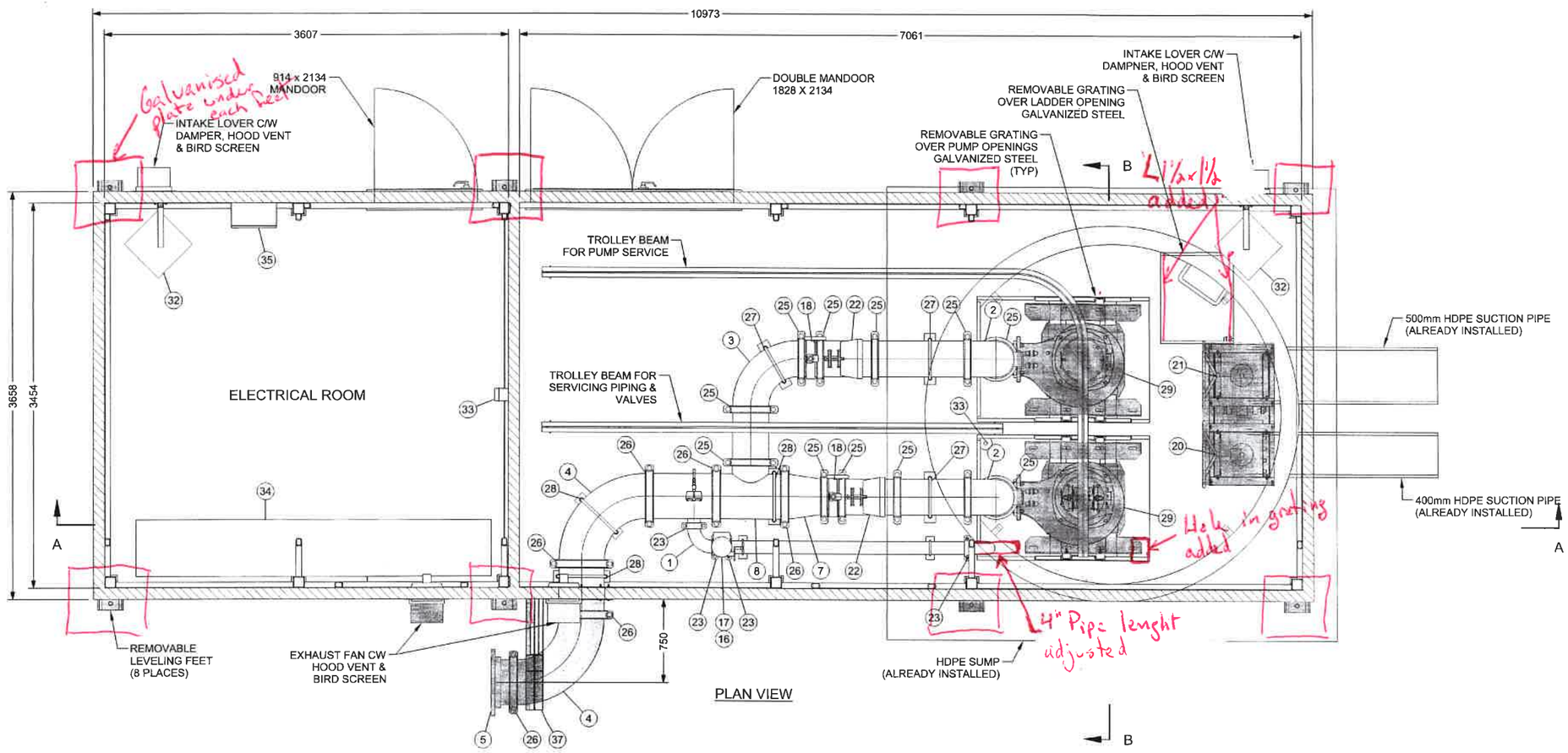
normand.menard@agnicoeagle.com
Signature numérique de normand.menard@agnicoeagle.com
DN : cn=normand.menard@agnicoeagle.com
Date : 2018.09.24 10:23:24 -05'00'

Normand Ménard
Project Mechanical Lead

APPENDIX A
As-built drawings

NO. DESSIN DRAWING NO. 65-695-265-227_2 R1

FORMAT ARCH D



PLAN VIEW

As Built

2017-10-09

FOR CONSTRUCTION
AGNICO EAGLE DATE : 2017-07-11

PLAN CLE
KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

LEGEND: SITE ASSEMBLY REQUIRED

George Fleamen
2017-07-11

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
G/A LETTER TECH
Signature
Date 2017-07-12
PERMIT NUMBER: P 1029
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2017/07/11	FOR CONSTRUCTION	G.C.	G.F.	N.M/B.A
0	2017/06/14	ISSUED FOR TENDER	S.G.	G.F.	N.M/B.A

REVISIONS

TETRA TECH

PROJECT No.: F1410330 | FICHIER No.: 65695265227

TITRE / TITLE

AGNICO EAGLE – DIVISION MELIADINE
PUMPING STATION
CP1 TO EWTP
PLAN, SECTIONS AND DETAILS

DESSINÉ PAR DRAWN BY	S.G.	DATE 2017/06/07
VÉRIFIÉ PAR CHECKED BY	G.F.	2017/06/07
APPROUVÉ PAR APPROVED BY	G.F.	2017/06/07
ÉCHELLE SCALE	N.T.S.	DATE 2017/06/07

NO. DESSIN DRAWING NO. 65-695-265-227

NO. PROJET PROJECT NO	REVISION	FEUILLE / SHT
6515-C-265-016	1	2 / 7

AC-CMET-ARCH D

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FILE NO 65-695-265-227_2-R1.dgn

NO. DESSIN DRAWING NO. 65 695 265 227 3 R1

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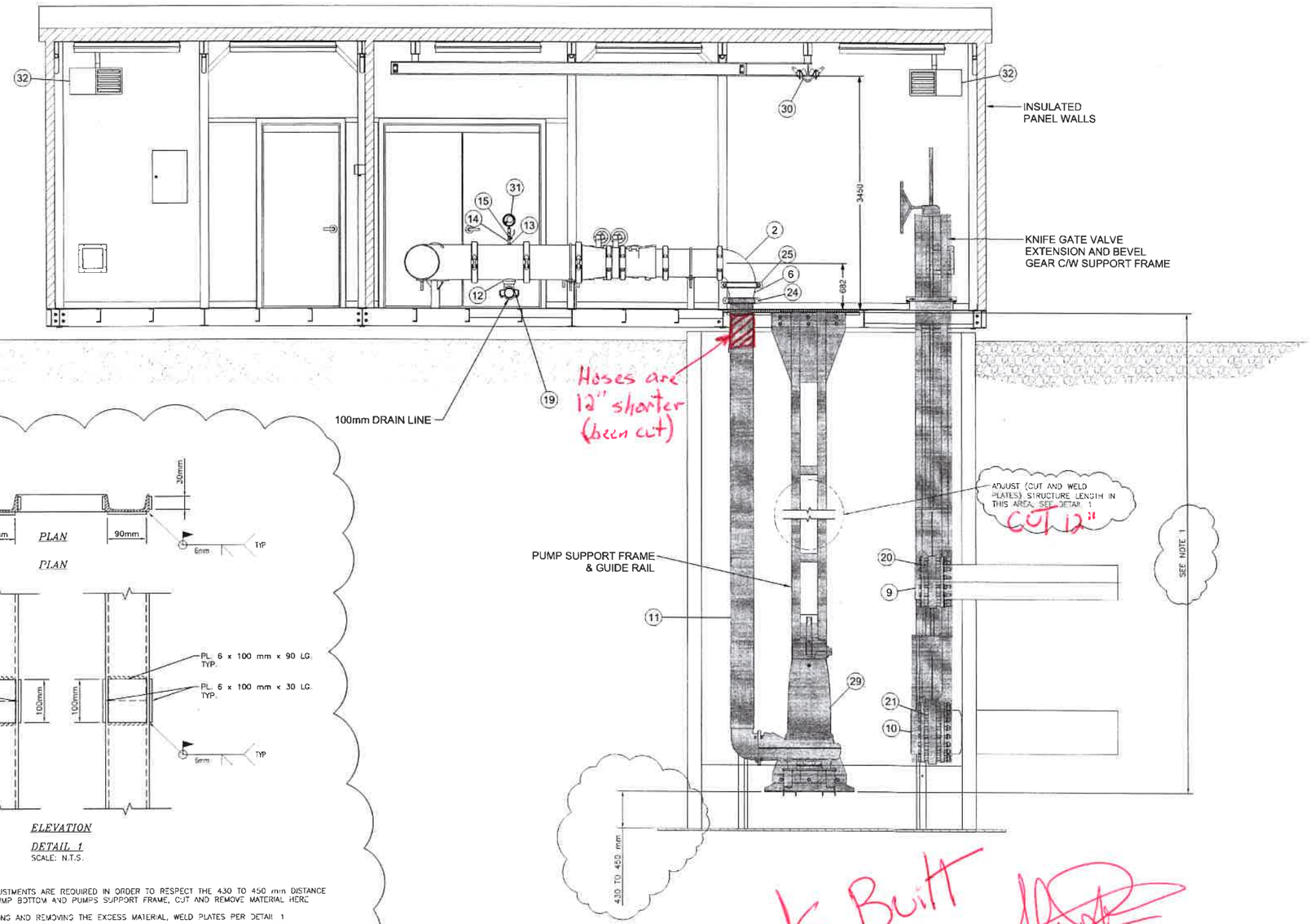

NOTES:

1. IF SITE ADJUSTMENTS ARE REQUIRED IN ORDER TO RESPECT THE 430 TO 450 mm DISTANCE BETWEEN SUMP BOTTOM AND PUMPS SUPPORT FRAME, CUT AND REMOVE MATERIAL HERE.
2. AFTER CUTTING AND REMOVING THE EXCESS MATERIAL, WELD PLATES PER DETAIL 1
3. PAINT STRUCTURE PER 6515-GGD-022, COATING SYSTEM 2 AFTER WELDING THE PLATES.

SECTION A-A

As Built
2017-10-09

FOR CONSTRUCTION
AGNICO EAGLE
DATE : 2017-07-11

PLAN CLE
KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

LEGEND: [redacted] SEE ASSEMBLY REQUIRED

George Fiveny, P.Eng.
July 12th 2017
Rev-2

George Fiveny
July 10th 2017
Rev-1

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
O/A TETRA TECH
Signature
Date 17.07.12
PERMIT NUMBER: P 1029
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2017/07/11	FOR CONSTRUCTION	S.G.	G.F.	M.M/B.A
0	2017/06/14	ISSUED FOR TENDER	S.G.	G.F.	M.M/B.A

REVISIONS

TETRA TECH

PROJET No.: C14103230 | FICHIER No.: 65-695-265-227

TITRE / TITLE
AGNICO EAGLE – DIVISION MELIADINE
PUMPING STATION
CP1 TO EWTP
PLAN, SECTIONS AND DETAILS

DESSINÉ PAR DRAWN BY	S.G.	DATE 2017/06/07
VERIFIÉ PAR CHECKED BY	G.F.	2017/06/07
APPROUVÉ PAR APPROVED BY	G.F.	2017/06/07
ÉCHELLE SCALE	N.T.S.	DATE 2017/06/07

NO. DESSIN DRAWING NO. 65-695-265-227

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6515-C-265-016	1	3 / 7

AE-CART-ARCH D

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FILE NO. 65-695-265-227_3-(1).ext

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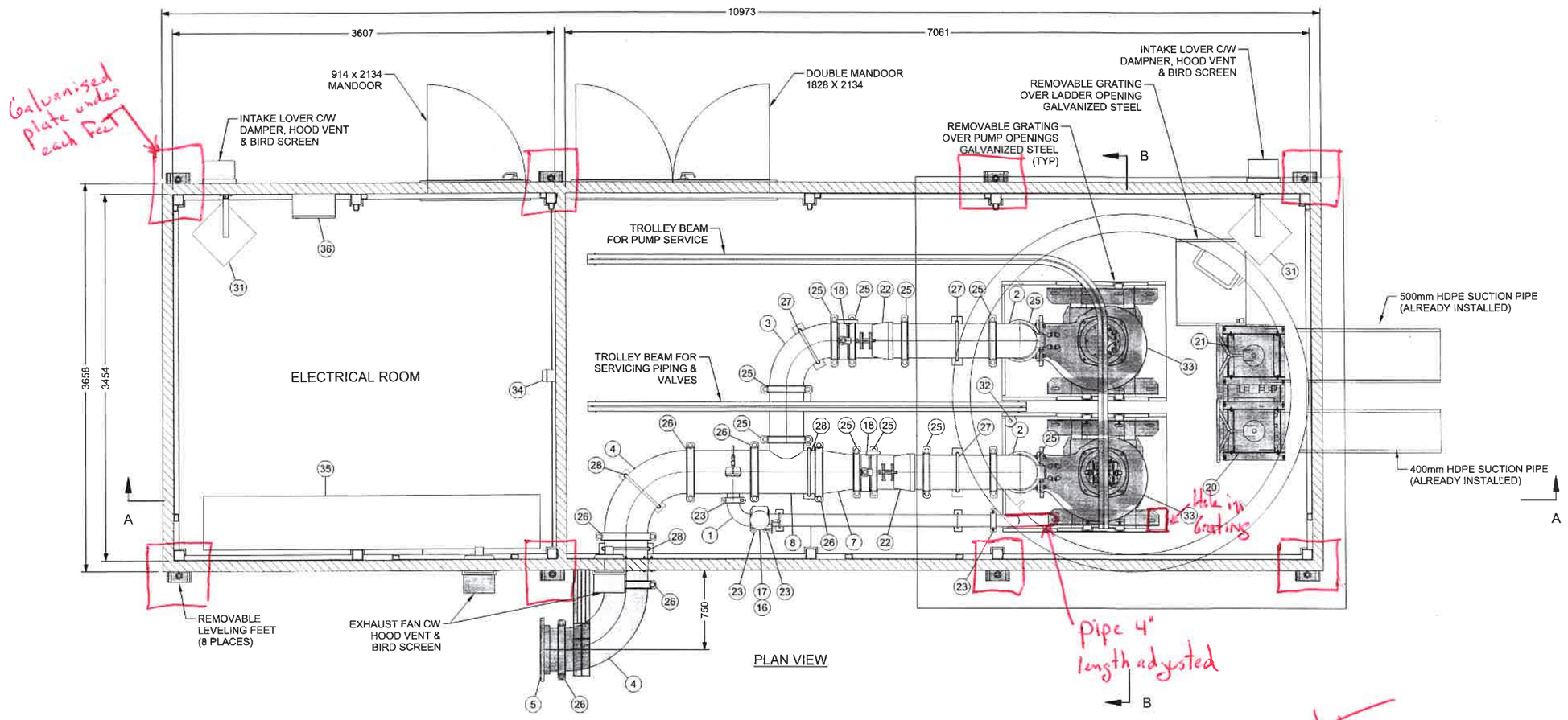

As Built

2017-10-09

FOR CONSTRUCTION
AGNICO EAGLE DATE : 2017-07-11

PLAN CLÉ
KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

LEGEND: SITE ASSEMBLY REQUIRED

George Fiamira, P.Eng.
July 12th 2017. Rev 1

George Fiamira P.Eng.
July 12th 2017, Rev. 1

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
O/A TETRA TECH
Signature
Date 2017-07-12
PERMIT NUMBER: P 1029
NTPAO Associations of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2017/07/11	FOR CONSTRUCTION	S.G.	G.F.	N.M./B.A.
0	2017/06/14	ISSUED FOR TENDER	S.G.	G.F.	N.M./B.A.

REVISIONS

TETRA TECH

PROJET No.: 2141103220 | FICHIER No.: 65-695-265-ZZZ

TITRE / TITLE
AGNICO EAGLE – DIVISION MELIADINE
PUMPING STATION
CP5 TO CP1
PLAN, SECTIONS AND DETAILS

DESSINÉ PAR DRAWN BY	S.G.	DATE 2017/06/07
VÉRIFIÉ PAR CHECKED BY	G.F.	2017/06/07
APPROUVÉ PAR APPROVED BY	G.F.	2017/06/07
ÉCHELLE SCALE	N.T.S.	DATE 2017/06/07

NO. DESSIN DRAWING NO. 65-695-265-228

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6515-S-265-094	1	2 / 7

AE-CART-ARCH D

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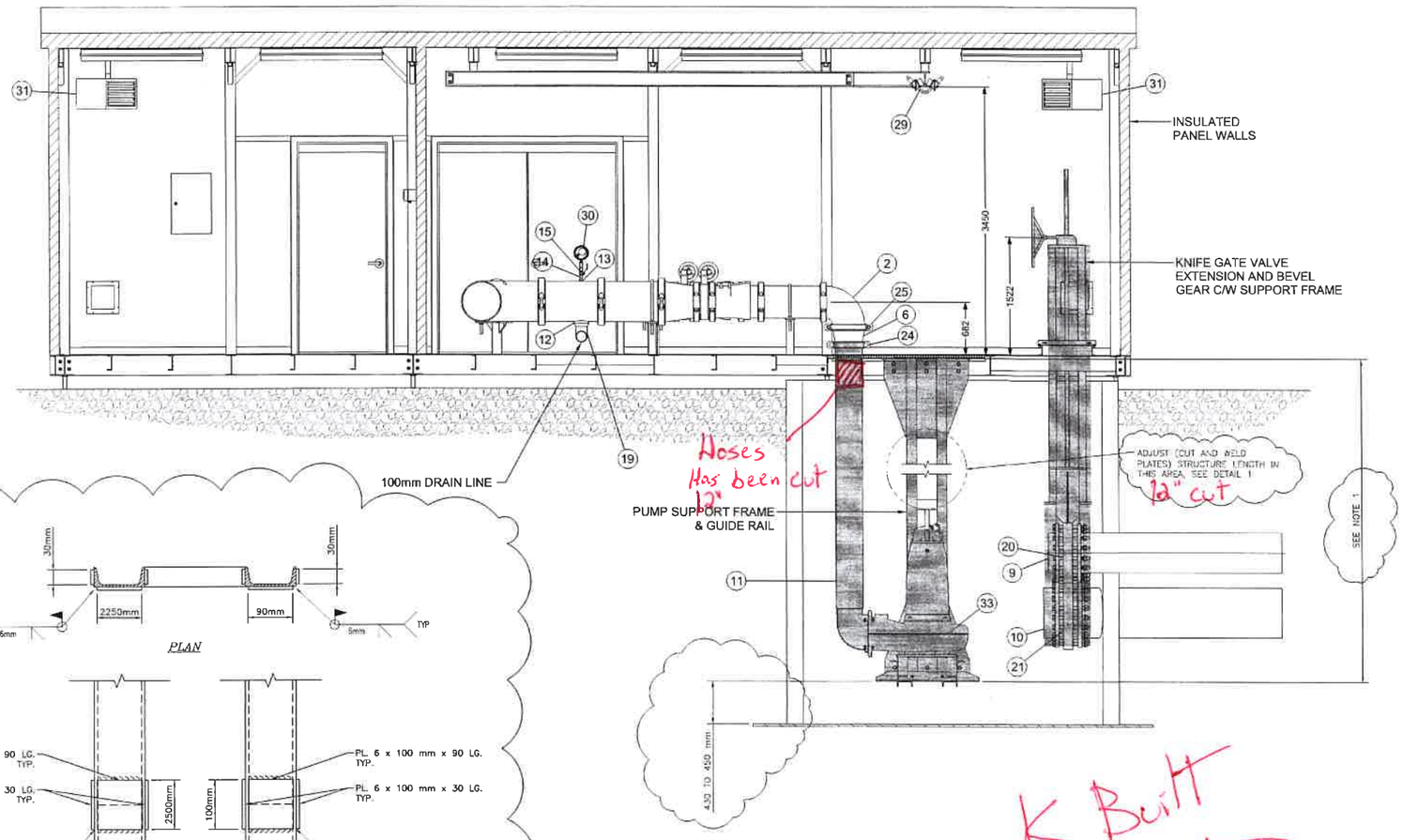

DETAIL 1
SCALE: N.T.S.

NOTES:

1. IF SITE ADJUSTMENTS ARE REQUIRED IN ORDER TO RESPECT THE 430 TO 450 mm DISTANCE BETWEEN SUMP BOTTOM AND PUMPS SUPPORT FRAME, CUT AND REMOVE MATERIAL HERE.
2. AFTER CUTTING AND REMOVING THE EXCESS MATERIAL, WELD PLATES PER DETAIL 1.
3. PAINT STRUCTURE PER 6515-GDD-022, COATING SYSTEM 2 AFTER WELDING THE PLATES.

SECTION A-A

As Built
2017-10-09

FOR CONSTRUCTION
AGNICO EAGLE DATE : 2017-07-11

PLAN ISE
KEY PLAN

NOTES GÉNÉRALES / GENERAL NOTES

LEGEND: SITE ASSEMBLY REQUIRED

George Fiorrea, P.Eng.
July 27th 2017
Rev. 1

George Fiorrea
July 27th 2017
Rev. 1

PERMIT TO PRACTICE
TETRA TECH INDUSTRIES, INC.
D/A TETRA TECH
Signature
Date Sept. 07-12
PERMIT NUMBER: P 1029
NT/NU Association of Professional Engineers and Geoscientists

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TYPE / TITLE	# DWG

AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
1	2017/07/11	FOR CONSTRUCTION	G.D.	G.F.	N.M/B.A
0	2017/06/14	ISSUED FOR TENDER	S.G.	G.F.	N.M/B.A

REVISIONS

TETRA TECH

PROJECT No.: F14102330 FICHIER No.: 65-695-265-ZZZ

TITRE / TITLE

AGNICO EAGLE – DIVISION
MELIADINE
PUMPING STATION
CPS TO CP1
PLAN, SECTIONS AND DETAILS

DESSINÉ PAR DRAWN BY	S.G.	DATE 2017/06/07
VÉRIFIÉ PAR CHECKED BY	G.F.	2017/06/07
APPROUVÉ PAR APPROVED BY	G.F.	2017/06/07
ÉCHELLE SCALE	N.T.S.	DATE 2017/06/07

NO. DESSIN DRAWING NO. 65-695-265-228

NO. PROJET PROJECT NO.	REVISION	FEUILLE / SHT
6515-S-265-094	1	3 / 7

AZ-CART-ARCH D

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NO. DESSIN / DRAWING NO 65-693-210-200_R4

PIPERACK & RELATIVE

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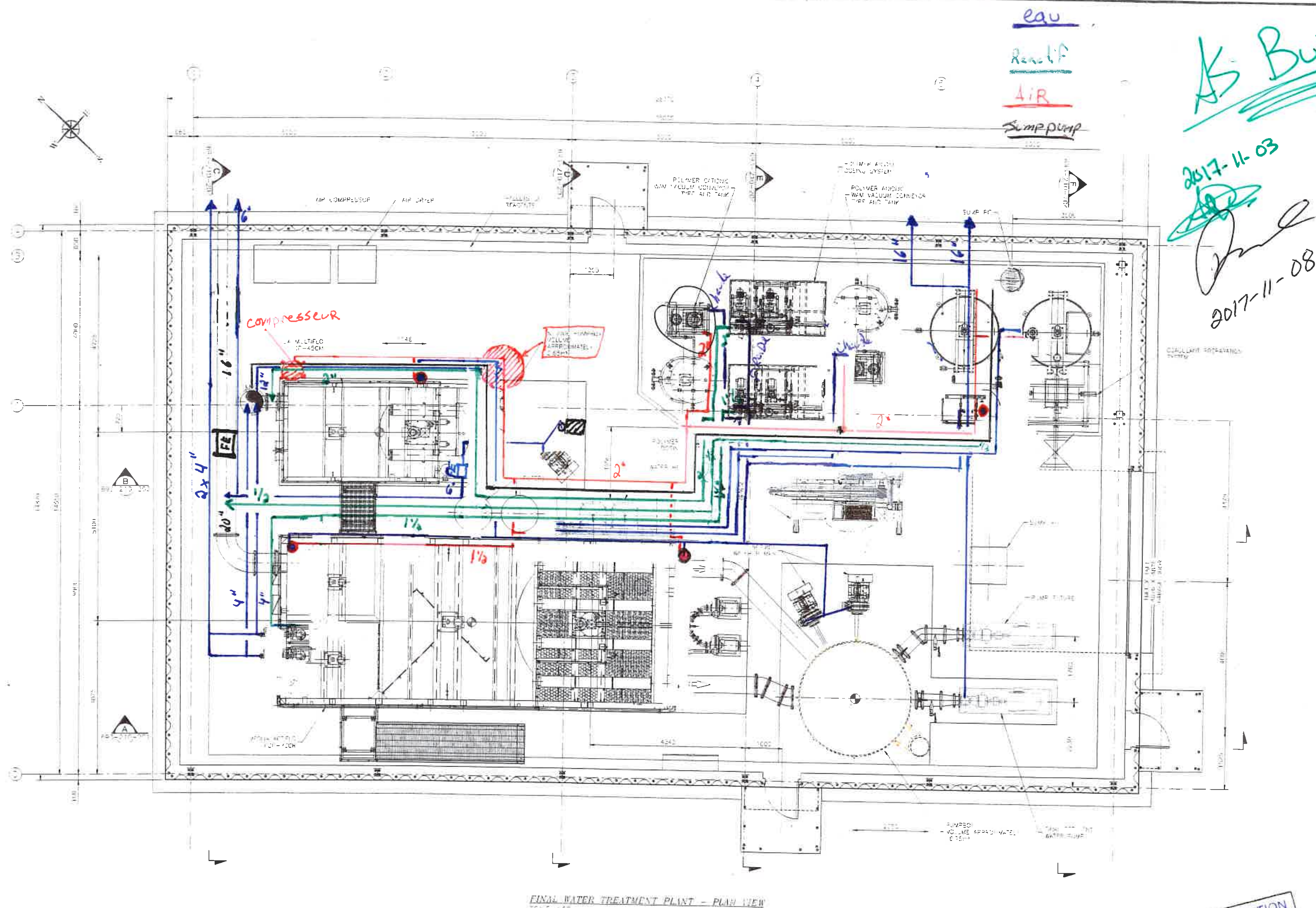

FINAL WATER TREATMENT PLANT – PLAN VIEW

As Built

2017-11-03

2017-11-08

POUR CONSTRUCTION
DATE 2017-06-21

WSP
Ref. 151-06440-10

NOTES GÉNÉRALES / GENERAL NOTES

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TITRE / TITLE	# DWG
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AGNICO EAGLE

REV.	DATE	DESCRIPTION	PAR/BY	APP.	CLIENT
4	2017-06-21	GENERAL REVISION FOR HONCE BUILDING	V.T.	B.F.	
3	2017-04-28	BUILDING REVISION	V.T.	B.F.	
2	2017-03-24	ISSUED FOR CONSTRUCTION	I.G.	B.F.	
1	2017-03-03	GENERAL REVISION, AFTER RFQ	V.T.	B.F.	
0	2016-12-13	ISSUED FOR TENDER	I.G.	B.F.	

REVISIONS

TITRE / TITLE
AGNICO EAGLE – MELIADINE DIVISION
693 – FINAL WATER TREATMENT PLANT
210– GENERAL ARRANGEMENT
PLAN VIEW

DESSINÉ PAR / DRAWN BY	STEVEN PERRON	DATE 2015-11-30
VÉRIFIÉ PAR / CHECKED BY	STEVEN PERRON	2015-12-02
APPROUVÉ PAR / APPROVED BY	BERTRAND FORTIN, ing	2015-12-02
ÉCHELLE / SCALE	INDICATED	DATE 2015-11-30
NO. DESSIN / DRAWING NO	65-693-210-200	
NO. PROJET / PROJECT NO	6515	REVISION 4 / FEUILLE / SHT 1/1

FILE NO 65-693-210-200_R4.dwg

NO. DESSIN / DRAWING NO: 65-695-270-200

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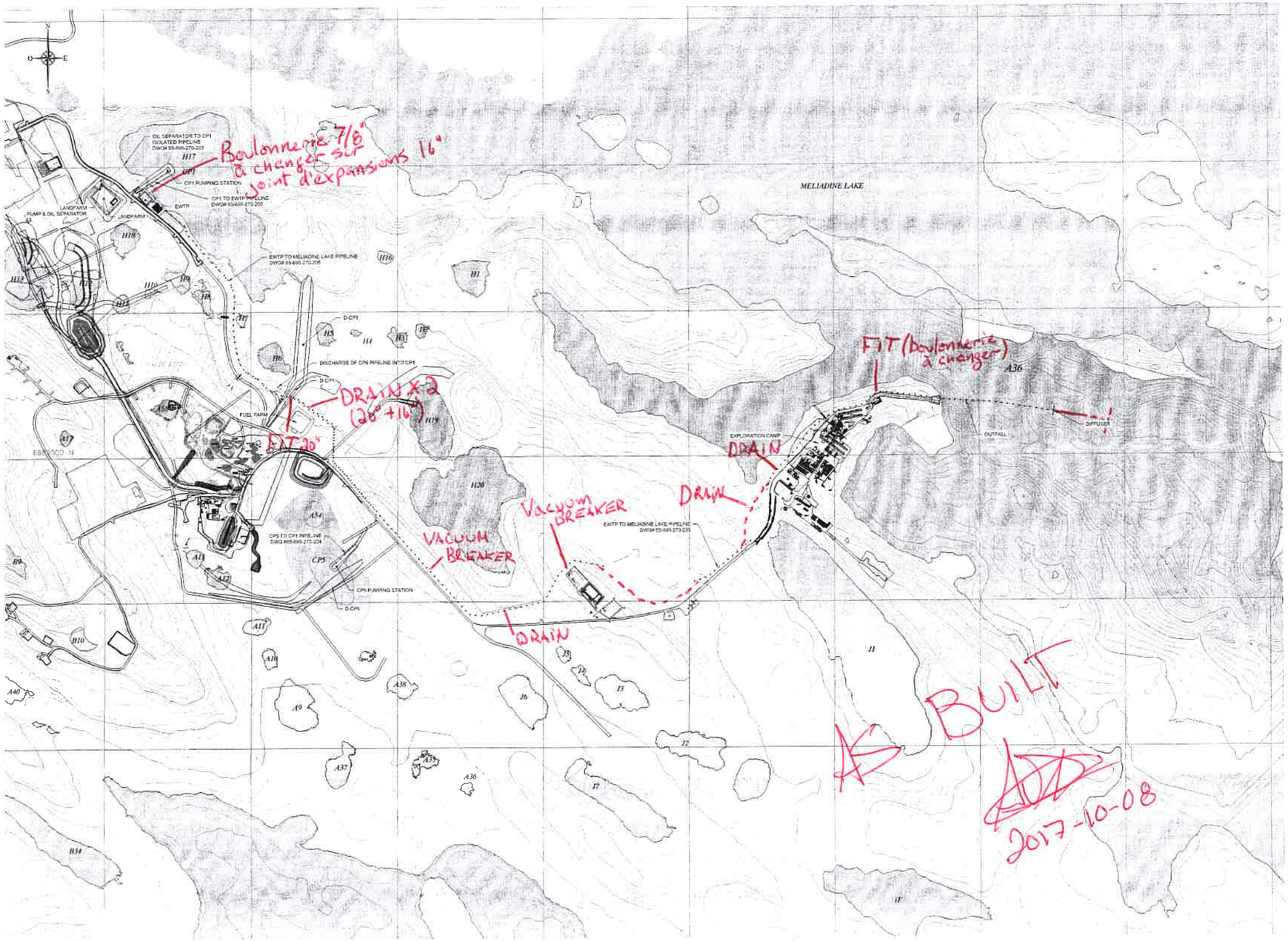

HDPE PIPELINES - GENERAL VIEW 2017
SCALE: 1:5000

PLAN CLE
KEY PLAN

NOTES GENERALES / GENERAL NOTES

1. FOR EACH PIPELINE, A 4m ZONE SHALL BE GRADED AND FREE OF BOULDERS AND SHARP ROCKS TO AVOID DAMAGES TO THE PIPE AS IT WANDERS WITH TEMPERATURE VARIATIONS
2. PIPES SHALL BE ANCHORED EVERY 30m WITH EARTHERN FILL (EXCEPT FOR OTHER SECTIONS SPECIFICALLY DETAILED) AND SHALL BE SNAKED BETWEEN EACH ANCHOR POINTS. SEE DETAIL #11 ON DWG #65-695-270-206 SH.3
3. SEE INSTALLATION SPECIFICATIONS
   #65-895-265-018-265-SPT-003
   #65-895-265-018-265-SOW-001

PERMIT TO PRACTICE
TETRA TECH CANADA INC.
PERMIT NUMBER: P 1026
Signature: ... Date: 2017 12 11

POUR CONSTRUCTION
FOR CONSTRUCTION
AGNICO EAGLE DATE 2017/07/11

DESSINS EN RÉFÉRENCE / REFERENCE DRAWINGS

TYPE / TITLE	# DWG
-	-
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-	-
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AGNICO EAGLE

REV	DATE	DESCRIPTION	PAR/BY	APP	CLIENT
2	2017/07/11	FOR CONSTRUCTION	S.C.	G.B.	N/A
1	2017/04/22	FOR TENDER (CONSTRUCTION)	S.C.	G.B.	N/A
0	2016/11/30	FOR TENDER (SUPPLY)	M.C.	M.B.	N/A

REVISIONS

TETRA TECH
PROJECT No.: E14102230 | POWER No.: 65-695-270-200

TYPE / TITLE
AGNICO EAGLE – MELIADINE
WATER MANAGEMENT
HDPE PIPELINES – GENERAL ARRANGEMENT
2017 – CONSTRUCTION PLAN

		DATE
DESSINÉ PAR / DRAWN BY:	MARIO C.	2016/11/30
VÉRIFIÉ PAR / CHECKED BY:	BENOIT T.	2017/06/22
APPROUVÉ PAR / APPROVED BY:	ORPHE B.	2017/06/22
ÉCHELLE / SCALE:	SHOWN	2017/06/22