Title of document: MULTIPLE ACCOUNTS ANALYSIS FOR THE TAILINGS FACILITY EXTENSION PROJECT

Client: AGNICO EAGLE MINES LTD, MEADOWBANK DIVISION

Project: TRADE-OFF STUDY FOR THE TAILINGS FACILITY EXTENSION PROJECT

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1.0 INTRODUCTION

The Meadowbank Mine is an approved mining operation and Agnico Eagle is looking to extend the life of the mine by constructing and operating Whale Tail Pit, a satellite deposit on the Amaruq property, as a continuation of mine operations and milling at the Meadowbank Mine.

Following the development of the Whale Tail Pit Project, a first phase of the Tailings Facility Extension Project (TSFE) was conducted in 2015. The objective was to evaluate the expansion potential of the actual Meadowbank TSF by the construction of internal structures to increase the total storage capacity associated to the mining of the Amaruq ore deposit. The second phase is to evaluate different options for the storage of additional tailings on site.

A preliminary scoping of options for the storage of additional tailings on site was performed with SNC-Lavalin (SLI) and Agnico-Eagle (AEM) key personnel. The brainstorming session (refer to the Memorandum document 637215-0000-30MC-0001-00) was held on site, but some experts from SNC-Lavalin joined the session by conference call. In the request for proposal, Agnico-Eagle identified the following preliminary options to be developed during the trade-off study:

- Internal Structures;
- In-pit deposition;
- Dry stacking (Filtered Tailings);
- A combination of the above options;
- Other options (to be defined during brainstorming preparation and reports review).

During the brainstorming session, other tailings management options were investigated. After the brainstorming session, three (3) options were selected to be developed in the trade-off study and processed through the multiple account analysis (MAA):

- In-Pit deposition;
- Internal structures;
- Filtered tailings.

The MAA session was held on August 30, 2016 in order to evaluate and discuss the options to be considered for the extension project. The trade-off study's main objective was to develop a preliminary tailings storage concept with optimized capital and operational cost, reducing negative impacts of operational and environmental risk, and social acceptability. This study identifies the most promising option for long term tailings management at Meadowbank to be further developed in the next project phases.

The objective of this document is to present the results of the MAA session, the options developed for the tailings facility extension and the rationale behind the selected options according to four (4) pillars: economy, society, environment and viability.

2.0 DEFINITION OF OPTIONS

The objective is to allow storage of 23M tonnes of additional tailings. Potential mill feed in the following years (beyond Q3 2018) is estimated to be 28M tonnes of tailings and shall be stored in the following years. This tonnage was estimated considering planned production from Whale Tail deposit [20MT (17 o/p + 3 u/g)] and a 2 years production contingency to accommodate potential discovery [8 MT (11,000 TPD x 2 years)]. From Q3 2018, the current South Cell capacity to elevation 150m (current approved license) will be approximately 5M tonnes. The new tailings storage facility capacity to be design is then 23 M tonnes.

2.1 Option 1 – In-Pit Tailings Deposition

The In-Pit Tailings Deposition is divided into the following distinct periods:

- Period 1: End of Portage/Vault Operation and Start of Whale Tail Deposition in South Cell
- Period 2: Whale Tail deposition in Portage Pit E then in Pit A.
- Period 3: After Operations, Pit water filling
- Period 4: After Pit Filling, Before dike breaching

The water/mass balance model shows that Portage Pit A and Pit E has sufficient capacity to store 23 M tonnes of Whale Tail tailings. The tailings filling rate in Portage Pit E and Pit A is high, especially during the first year of deposition. Based on experience at other mine sites, when the tailings deposition is higher than 5 m/year, the tailings will not have sufficient time to consolidate and release its trapped water, resulting in lower in-situ tailings densities. However, this applies only to the short operational period and the long term dry density should be comparable to that of sub-aerial deposition under similar boundary conditions.

The water elevation in Portage Pit E and Pit A also increases rapidly. To maintain the water level higher in Goose Pit during the period of In-Pit Tailings Deposition, it will be necessary to transfer some water from Third Portage Lake into Goose Pit.

Portage Pit E and Pit A are separated by the Portage Central Dump, which is permeable. Furthermore, the Second Portage Fault passes under the Portage Central Dump. Thus, there is a potential risk of reclaim water and contamination migration in groundwater if the hydraulic head in Portage Pit is higher than the surrounding area via the Second Portage Fault. To mitigate this risk, water treatment may be required during in-pit deposition and after closure to abate the metal concentrations in the reclaim water in Portage pit to meet closure criteria. Once the water is of sufficient good quality, dikes will be breached to discharged water directly to Third Portage Lake.

Appendix 1 presents a fact sheet of this option. Refer to technical note 637215-1000-40EC-0001_A00 Memo In-Pit Disposal.

2.2 Option 2 – Internal Structures Tailings Deposition

The objective of this option is to design internal structures at elevation that will provide 23M tonnes of additional storage capacity in the North and the South Cells. The proposed structures were based on the design parameters developed by OKC for the Internal Structures in North Cell (OKC, 2016).

The maximum elevation of the internal structures was determined by the deposition plan developed by AEM to store the required tonnage and manage the reclaim water volume. This plan was driven by the volume of reclaim water without having water ponding against the internal structures, as these are not designed to be impervious structures. It is planned to perform the deposition as currently done in Meadowbank: end of pipe deposition following a month-by month planning outlined by the deposition plan. The results show that the internal structures have to be raised by three steps (since the height of the structure is limited to a maximum of 4 m) to achieve a maximum elevation of 160.0 masl. Furthermore, as the reclaim water is expected to pond against Saddle Dam 3 for the deposition period and for a period of time after closure, this impervious structure has to be raised and extended to the Saddle Dam 2/Stormwater Dike junction for the northern part and to the closest deposition point in the southern part (beyond the maximum water contact limit of the reclaim pond) to make sure that no water will flow to the environment. The internal structures must connect with SD3 without compromising the flow barrier in the sector of the reclaim pond. Both upstream geomembrane and adjacent material must tie-in perfectly with one another and the upstream geomembrane must be maintained under the internal structures.

The reclaim barge used to recirculate slurry water back to the mill will be placed in the active tailings storage facility. Due to the nature of arctic deposition entrapping ice and pore water, the reclaim pond will gradually decrease in total water volume during operations while staying over the reclaim pump operational limit. After operations, the remainder of the pond will be transferred via a water treatment plant to the Portage pit as part of the reflooding process and this will allow rockfill capping of the TSF for closure.

The closure cover design is based on the concept developed for the North Cell Reclamation. The surface runoff from precipitation and spring freshet shall be shed off the TSF surface through the reclaim pond located close to the SD3. Two runoff drains report to reclaim pond against SD3 in order to take advantage of the gravitational flow already imposed by the tailings deposition. It is assumed that at closure, SD3 will be breached and water accumulated in a retention pond downstream of SD3. Water from this pond will be pumped to the pit until the water quality criteria will be met and the water will freely goes towards the environment.

The internal structures are built using NPAG material. A filter layer is placed on the upstream side of the rockfill berm, and consists of 0-6" crushed rock against the NPAG rockfill with 0-¾" crushed rock on either side of a non-woven geotextile. Filters and geotextile are required to prevent migration of the tailings into the coarse rockfill (OKC, 2016). This 5,600 m length structure is pervious and its permeability is reduced while it is protected with tailings beaches at its upstream face.

Appendix 1 presents a fact sheet of this option. Refer to technical note 637215-2000-4GEC-0001_A00 Memo Internal Structures.

2.3 Option 3 – Filtered Tailings Deposition

Filtered tailings emerge from the process facility within a prescribed range of moisture contents. The tailings are then transported by conveyor or truck and then placed, spread and compacted to form an unsaturated, dense and stable tailings "stack" (often termed a "dry stack") requiring no dam for retention with no associated tailings pond.

The objective of this option is to design a filtered tailings stack that will provide 23M tonnes of additional storage capacity in the North Cell. The concept proposed for the scoping study of the filtered tailings stack is developed mainly on the deposition plan and the water management. The filtered tailings shall be deposited over frozen tailings deposited using end-of pipe deposition.

Three (3) stacks are designed allowing flexibility considering the life of mine of the Whale Tail project (open pit, underground and possible extension) and for the tailings deposition and water management ease. These three cells will also allow for “zones” placement (seasonal placement, optimal tailings management in case of tailings specification variation, etc.) and progressive closure of the TSF.

One of the main advantages of dry stack tailings over other tailings management options is the ease of progressive reclamation and closure of the facility. The facility can often be developed to start reclamation very early in the project life cycle. This can have many advantages in the control of fugitive dust, in the use of reclamation materials as they become available, and in the short and long terms environmental impacts of the project (Davies, 2011).

Otherwise, the filtration plant will be installed close to North and South Cells Tailings Storage Facility (TSF). The tailings slurry of 54% w/w will be pumped to the filtration plant where filtered tailings with 85% w/w solid concentration (or 15% w/w moisture content) will be produced. The filtered tailings will then be transported by truck to the North Cell TSF. The filtrate will be pumped back to the process plant.

Surface runoff from the North Cell will be transferred to the South Cell. The runoff will be stored in the South Cell and pumped to Portage Pit. Prior to transferring the surface runoff from the South Cell to Portage Pit, the surface runoff water quality must be exempt of any dissolved metals, cyanide and be low in total suspended solids. To ensure this is the case, a portable Water Treatment Plant (WTP) is planned to treat the accumulated water in-situ.

The closure cover design is based on the concept developed for the North Cell Reclamation. A runoff drains shall be planned from North Cell reclaim pond toward Stormwater Dike and report to South Cell reclaim pond against SD3 in order to take advantage of the gravitational flow already imposed by the tailings deposition. It is assumed that at closure, SD3 will be breached (or ditch excavated in the southern abutment of SD3) and water will accumulate in a retention pond downstream of SD3. Water from this pond will then be pumped to the Portage Pit until the water quality criteria required for closure is met. Once this occurs, the water will be allowed to freely flow towards Third Portage Lake.

Appendix 1 presents a fact sheet of this option. Refer to technical note 637215-3000-4GEC-0001_A00 Memo Filtered Tailings.

3.0 METHODOLOGY

A MAA session with key members from Agnico Eagle and SLI was held on August 30th, 2016, with the objective of choosing one option which will be brought to the conceptual design.

The MAA session held online was conducted with the following participants:

Agnico Eagle
M. Beauséjour (phone)
J. Bélanger
M. Groleau
M. Julien
P-É. Mcdonald
F. Petrucci
J. Quesnel
R. Vanengen

SNC-Lavalin
A. Arbaiza
Y. Jalbert
A.-L. Nguyen
M.-H. Picard
D. Tremblay

During the meeting, and built on previous discussions with stakeholders, the advantages and disadvantages of each option were presented. The analysed options were:

- Option 1 : In-Pit Tailings Deposition
- Option 2: Internal Structures Tailings Deposition
- Option 3: Filtered Tailings Deposition

The session was then conducted using the Sustainability+ option selection tool developed by SLI. In the Sustainability+ tool, criteria are developed in the three (3) sustainable development pillars (Society, Environment and Economy) and a fourth engineering pillar (Viability).

Within these four (4) pillars, there are several categories that require evaluation. Each of these categories represents an essential aspect as part of an environment mining project.

The following table summarizes those categories.

Table 3-1: Sustainability+ categories

	Society	Environment	Economy	Viability
Categories	Health and Safety Quality of life Employment Social Acceptability	Materials Water Energy Air Biodiversity	Construction Capital Operating costs Maintenance costs after reclamation Reclamation capitals cost	Technology Natural risks Flexibility Permits

One to six indictors are rated in each of these categories. The indicators have been chosen to be as unique as possible to each category to reduce bias in the analysis. Furthermore, the Environment Canada MAA document “Guidelines for the Assessment of Alternatives for Mine Waste Disposal” guided the establishment of some indicators.

A rating of -2, -1, 0, 1 or 2 can be assigned to each indicator. The following table shows the rating system for the indicators, which can be quantitative, qualitative or comparative. In this analysis, options have been compared relative to each other, rather than against a ‘base case’ option.

Table 3-2: Indicator Rating

Rate	Description
-2	Very bad performance
-1	Bad performance
0	Average performance
1	Good performance
2	Very good performance

Table 3-3 shows how the results are calculated.

Table 3-3: Calculation Methodology without Weighting

Pillar	Category	Indicator[1]	Calculation	Result
Society	Health and Safety	C1 C2 C3	X1 = average C1 to C3	Y1 = average X1 to X4
	Quality of live	C4 C5 C6	X2 = average C4 to C6	
	Employment	C7 C8 C9	X3 = average C7 to C9	
	Social Acceptability	C10 C11 C12	X4 = average C10 to C12	
Environment	Materials	C13 C14 C15	X5 = average C13 to C15	Y2 = average X5 to X9
	Water	C16 C17 C18	X6 = average C16 to C18	
	Energy	C19 C20 C21	X7 = average C19 to C21	
	Air	C22 C23	X8 = average C22 to C23	
	Biodiversity	C24 C25	X9 = average C24 to C25	
Economy	Construction capital	C26 C27	X10 = average C26 to C27	Y3 = average X10 to X13
	Operating costs	C28 C29	X11 = average C28 to C29	
	Maintenance cost after reclamation	C30 C31	X12 = average C30 to C31	
	Reclamation capital cost	C32 C33	X13 = average C32 to C33	
Viability	Technology	C34 C35	X14= average C34 to C35	Y4 = average X14 to X17
	Natural Hazards	C36 C37	X15 = average C36 to C37	
	Flexibility	C38 C39	X16 = average C38 to C39	
	Permits	C40	X17 = average C40	
			Results by category [2]: Average of X1 to X17	Results by sustainable development pillar [2]: Average of Y1 to Y4

Notes: 1: The number of indicators by category can vary (normally from 1 to 6 questions per category).
2: There are two ways to show the results: by category or by sustainable development pillar.

A sensitivity analysis is then carried on by applying weighting on some categories (where required). Weighting is decided according to the client's priority. The following table shows the weighting possibilities.

Table 3-4: Weighting

Weighting	Value
Low priority for the project	0,5
Required for the project	1
High priority for the project	2

As an example, if the category "water" is weighted as "high priority", the ratings of all the indicators in this category will be multiplied by 2. If the indicator's ratings are in the positive zone (from average to very good), the global result will be raised with a greater value, which will give an advantage to the option with good ratings in the "water" category.

Conversely, if the indicator's ratings are in the negative zone (average to very bad), the global result will be lowered with a greater value, which will penalize the option with bad ratings in the "water" category.

The maximal global grade of an option analyzed without weighting is 2, and the maximal global grade of an option analyzed with weighting is 4.

In order to have a neutral case at all times, the "required" weight must be 1 and the neutral answer 0. For instance, a weight category of High = 3; Required = 2; Low = 1, would not allow for a neutral answer to be calculated since when multiplying the indicators with the answers, the neutral case will always be multiplied by a factor of 2. Therefore, the choice of the weights are based on a mathematical approach to have a neutral case (x1), which is the same as if no weight was applied.

4.0 RESULTS

The weighting of each category has been decided during the MAA according to Agnico Eagle's priorities. However, in order to increase the speed of the exercise, SLI had identified indicators in each category prior to the MAA. During the session, each indicator was revised (refer to Figure 4-2 for the indicators that were used). The rating of each indicator was identified and revised for the 3 options in parallel.

At a first glance, the weighting was selected identical to the one chosen for the Amaruq Water Management project (627215: Whale pit project geotechnical and water management infrastructure) except for the following categories described in Table 4-1.

Table 4-1: Weighting comparison

Pillar	Category	Weight TSFE	Weight Amaruq Water Management
Environment	Air	High priority	Low priority
Viability	Technology	High priority	Low priority
	Natural Hazards	Required	High priority

It was decided during the MAA session that the water and air category should have equal weight. Therefore, a high priority was attributed to the air category. The viability of the technologies was considered of high importance since all the options implied different expertise. The natural hazards category was attributed a neutral priority since the options are not highly vulnerable to weather conditions or seismic risks.

At the end of the exercise, an additional sensitivity analysis was performed using the same weight criteria as the Amaruq Water Management project.

A summary of results is provided in the following pages.

FIGURE 4-1: WEIGHTING SELECTED IN CLOSE COLLABORATION WITH AGNICO EAGLE

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Step 1: Please provide information about the project and its options

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

Step 2 : Select a weight criteria for each category (green cells)

Weight criteria, the category is:

High Priority for the project, weight factor of 2
Required for the project, weight factor of 1
Low Priority for the project, weight factor of 0.5

	Category	Weight criteria	Weight factor
	SOCIETY		
A	Health and safety	High Priority	2
B	Quality of life	Required	1
C	Employment	Required	1
D	Social acceptability	High Priority	2
	ENVIRONMENT		
E	Materials	Required	1
F	Water	High Priority	2
G	Energy	Required	1
H	Air	High Priority	2
I	Biodiversity	High Priority	2
	ECONOMY		
J	Capital cost	High Priority	2
K	Operating cost	High Priority	2
L	Maintenance cost after reclamation	Required	1
M	Reclamation capital costs	Required	1
	VIABILITY		
N	Technology	High Priority	2
O	Natural hazards	Required	1
P	Adaptability	High Priority	2
Q	Permits	High Priority	2

Figure 4-2: DETAILED RESULTS

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
PARTICULARLY INFORMATION :	
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

See non weighted graph

See weighted graph

			INDICATOR	In-Pit disposal						Internal structures						Filtered tailings						COMMENTS
SOCIETY				GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	
A	Health and safety	High Priority	Heavy equipment / mobile equipment required/moving parts	1			1.0		2	-1		-1.0			-2	-2	-2.0				-4	More equipment required for the filtered tailings option due to the filtration plant and the amount of trucks. Construction of the internal structures require more trucks.
			Level of danger for the population	0					0	0					0	0					0	Population far from the site.
			Long-term safety for the population	0					0	0					0	0					0	Population far from the site.
			Contact with toxic and hazardous materials for the workers	0					0	1			1.0		2	-1		-1.0			-2	Filtered tailings option implies more toxic materials for the workers. In-pit disposal require water treatment plant.
			Level of danger for the workers	0					0	0					0	-1		-1.0			-2	For the in-pit disposal option, it is standard work and it will have mitigation. For the internal structures, it is seasonal work. For the filtered tailings option, workers will have to work in height.
B	Quality of life	Required	Availability of infrastructure to accommodate workers (rooms, recreation, etc.)	0					0	0					0	0					0	All infrastructures required to accommodate workers are already at the mine site. Same availability for all the options.
			Distance from traditional land use (trails, snowmobile, etc.)	0					0	0					0	0					0	Same distance from traditional land use for all the options.
			Distance from population	0					0	0					0	0					0	Population far from the site.
			Site revaluation and accessibility after closure	0					0	0					0	0					0	Same accessibility for all the options.
			Noise level	1			1.0		1	-1		-1.0			-1	-1		-1.0			-1	In pit disposal will not produce much noise compared to the other options.
			Circulation in residential areas	1			1.0		1	1			1.0		1	0					0	The energy consumption impacts the circulation between Baker Lake and Meadowbank. It is anticipated that there will be more circulation with the filtered tailings option since more equipments are required.
			Visibility of the site outside the mine property	1			1.0		1	0					0	0					0	Related to the height of the TSF.
C	Employment	Required	Inuit employment	0					0	1			1.0		1	2				2.0	2	More work available for the locals for the filtered tailings due to the amount of trucks needed. In pit lower since only few pumpman are required.
			Availability of skilled labour (specialized contractor and professionals required)	2				2.0	2	1			1.0		1	0					0	In pit disposal requires less specialized contractor or professionals. Internal structures requires some, followed by filtered tailings that require more.
			Local economic growth	-1		-1.0			-1	-1		-1.0			-1	1			1.0		1	Filtered tailings option would promote local economic growth due to the amount of workers needed, as well as material will be transported from Baker Lake.
D	Social acceptability	High Priority	Effect on traditional land use - archeological area (**)	2				2.0	4	2				2.0	4	2				2.0	4	No archeological area on the site.
			Effect on traditional land use - fishing area (**)	0					0	1			1.0		2	1			1.0		2	Pit flooding will most likely require more fish habitat compensation.
			Effect on traditional land use - hunting area (**)	2				2.0	4	2				2.0	4	2				2.0	4	No hunting area on the site.
			Relocation of population and/or infrastructure	na					na	na					na	na					na	Not applicable for all the options.
			Social acceptability (perception) of the project (**)	-1		-1.0			-2	0					0	2				2.0	4	In-pit disposal will be considered as "new technology". Internal structures option is almost the same as the existing option. Filtered tailings are already approved in Meliadine therefore this option is considered to be the robust option.

Figure 4-2: DETAILED RESULTS

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
PARTICULARLY INFORMATION :	
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

See non weighted graph

See weighted graph

INDICATOR				In-Pit disposal						Internal structures						Filtered tailings						COMMENTS
ENVIRONMENT				GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	
E	Materials	Required	Need to import materials	1			1.0		1	1			1.0		1	-2	-2.0				-2	Filtered tailings option requires more logistics to obtain materials (buildings, filter press ,etc.).
			Reuse of construction paths materials	na					na	na					na	na					na	Not applicable for all the options.
			Disposal of excavated material with no reuse	2				2.0	2	1			1.0		1	2				2.0	2	Some disposal of excavated materials can be expected for the internal structures (foundation excavation for SD3 raises).
			Waste generation	0					0	1			1.0		1	-1		-1.0			-1	Directly linked to the amount of material imported (bags, boxes, etc).
			Use of recycled or re-used materials for the cover	0					0	0					0	0					0	Same amount of recycled or re-used materials for all the options.
			Thickness of cover required	0					0	0					0	1			1.0		1	Low thickness of cover required for filtered tailings (in terms of cost estimation).
			Distance from source of granular material	2				2.0	2	2				2.0	2	2				2.0	2	Short distance for all the options.
			Availability of borrow pits	2				2.0	2	0					0	2				2.0	2	For the internal structure option, till material is required for the raise of SD3 and its quantity is limited on site.
F	Water	High Priority	Spill risk (Fuel, tailings, etc.)	2				2.0	4	-1		-1.0			-2	0					0	Higher risk for internal structures option as the internal structures are not impervious and the connection between SD3 and the internal structures is more complex.
			Water and snow management (ditches, sumps, etc.) (**)	-1		-1.0			-2	-1		-1.0			-2	-2	-2.0				-4	Snow management for the filtered tailings option seems to be more important, especially during the operation.
			Reclaim water treatment required	-2	-2.0				-4	0					0	-1		-1.0			-2	An important reclaim water treatment will be required for in-pit disposal. There are also uncertainties related to the consolidation of the tailings after the deposition. Water treatment may be required for internal structure option and the reclaim pound minimal volume will be hard to maintain.
			Impact on the natural water flow (lake area impacted)	-1		-1.0			-2	2				2.0	4	2				2.0	4	In case in pit disposal do not allow dike breaking at the end of the closure process.
			Possible management of the TSS	2				2.0	4	2				2.0	4	1			1.0		2	TSS management might be required during the operation, as some erosion will be observed into the slopes of the stacks.
			Lack or excess of water due to process	2				2.0	4	-1		-1.0			-2	-1		-1.0			-2	There is more flexibility with the water balance for in-pit disposal.
			Impact on the existing drainage network	2				2.0	4	2				2.0	4	2				2.0	4	No impact on the existing drainage network for all the options.
			Effects on groundwater quality (**)	-2	-2.0				-4	0					0	0					0	In pit disposal will always have some uncertainties due to the 2nd Portage Fault. Impacts will have to be evaluated.
			Use of fresh water during operation	1			1.0		2	-1		-1.0			-2	-1		-1.0			-2	The reclaim pond management is more complex for the internal structures and the filtered tailings.
G	Energy	Required	Energy consumption for the selected process	2				2.0	2	2				2.0	2	-2	-2.0				-2	Energy consumption is higher for the filtered tailings due to the filtration plant, as well as hauling the tailings instead of pumping the tailings.
H	Air	High Priority	Greenhouse gas emissions	1			1.0		2	0					0	-2	-2.0				-4	Emissions higher for the filtered tailings due to the filtration plant and more haul trucks require.
			Generation of dust	2				2.0	4	0					0	-2	-2.0				-4	Higher for the filtered tailings.
I	Biodiversity	High Priority	Wildlife access to the tailings disposal facility	0					0	-1		-1.0			-2	-1		-1.0			-2	Moderate for in-pit disposal.
			Increase of water discharge to the environment (effluent)	0					0	0					0	0					0	No increase nor decrease for all the options.
			Impact on Caribou migration	0					0	-1		-1.0			-2	-1		-1.0			-2	Moderate for in-pit disposal.
			Fish habitat compensation required (or impact on fish and fish habitat) (**)	-1		-1.0			-2	0					0	0					0	Pit flooding will most likely require more fish habitat compensation.
			Number of ecological services (*) impacted	-1		-1.0			-2	0					0	0					0	One lake (pit) impacted.
			Incentives to establish the wildlife after reclamation	2				2.0	4	2				2.0	4	2				2.0	4	Incentives for various types of wildlife for all the options.
			Types of proposed revegetation	na					na	na					na	na					na	Not applicable for all the options.
ECONOMY				GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	GRADE					TOTAL SCORE	
J	Capital cost	High Priority	Life of mine cost - Capital cost (**)	1			1.0		2	0					0	-2	-2.0				-4	In pit disposal: 25M$; Internal structures: 75 M$; Filtered tailings: over 210 M$.
K	Operating cost	High Priority	Life of mine cost - Operational cost (**)	1			1.0		2	2				2.0	4	-2	-2.0				-4	In pit disposal: 0.8$/tonne; Internal structures: 0.49$/tonne; Filtered tailings: 5.81$/tonne.
L	Maintenance cost after reclamation	Required	na	na					na	na					na	na					na	Not applicable for all the options.
M	Reclamation capital costs	Required	Life of mine cost - Closure cost (**)	0					0	0					0	1			1.0		1	The closure considered is the cover only. Thinner cover expected for Option 3.

Figure 4-2: DETAILED RESULTS

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
PARTICULARLY INFORMATION :	
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

See non weighted graph | See weighted graph

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INDICATOR				In-Pit disposal			Internal structures			Filtered tailings			COMMENTS
VIABILITY				GRADE		TOTAL SCORE	GRADE		TOTAL SCORE	GRADE		TOTAL SCORE	
N	Technology	High Priority	State of the art technology (Disposal system has a precedent in arctic environment)	1	1.0	2	0		0	1	1.0	2	The upstream raise suggested for the internal structures is not developed in Northern region.
			Flexibility (expansion)	2	2.0	4	-2	-2.0	-4	1	1.0	2	Assumption for this indicator: the footprint is no increase. In-pit disposal could be expanded into Vault and Goose Pits. Filtered tailings could be expanded in South Cell.
			Availability of energy on site	2	2.0	4	2	2.0	4	-1	-1.0	-2	More energy needed for filtered tailings, therefore a possible shortage could arise.
			Complexity of the expected work (constructability)	1	1.0	2	0		0	0		0	In-pit disposal option easier than the other options since the pit is already constructed.
			Completeness and reliability of the data used for this concept	-2	-2.0	-4	-1	-1.0	-2	-1	-1.0	-2	Data less complete/reliable for in-pit disposal.
			Are the technologies used for this project well understood, tested and reliable?	2	2.0	4	2	2.0	4	1	1.0	2	All the technologies are tested and reliable for in-pit disposal and internal structures.
O	Natural hazards	Required	Vulnerability to climate threat (permafrost)?	1	1.0	1	-2	-2.0	-2	-2	-2.0	-2	In-pit disposal is less vulnerable to climate threat, compared to the other options.
			Vulnerability to weather conditions (flooding, dryness, wind)?	0		0	-1	-1.0	-1	-1	-1.0	-1	Filtered tailings are vulnerable to wind, dryness and rain (erosion). Internal structures are vulnerable to flooding (reclaim pond).
			Vulnerability to seismic risks (infrastructure and foundation)?	2	2.0	2	0		0	1	1.0	1	Internal structures more vulnerable to seismic risks that the other options.
P	Adaptability	High Priority	Tailings closure concept need to be reviewed	-2	-2.0	-4	1	1.0	2	1	1.0	2	Tailings closure concept needs to be reviewed for the in-pit disposal option. The other options might be reviewed but not entirely.
			Adaptability to gradual reclamation	2	2.0	4	0		0	1	1.0	2	Internal structures is less adaptable for gradual reclamation.
			Adaptability to materials shortage	2	2.0	4	-2	-2.0	-4	1	1.0	2	Internal structures is less adaptable for materials shortage.
			Adaptability to economic constraints	2	2.0	4	1	1.0	2	-2	-2.0	-4	Filtered tailings are not adaptable to economic constraints since its CAPEX is over 210M$. Permanent water cover for in-pit disposal, so the closure expenditure required follows the deposition.
			Adaptability to sudden changes (ore type; granulometry, mineralogy; mill throughput).	2	2.0	4	2	2.0	4	-2	-2.0	-4	Filtered tailings less adaptable to sudden changes.
			Integration with the client's current operations	1	1.0	2	2	2.0	4	-1	-1.0	-2	Internal structures integrates better with the client's current operations.
Q	Permits	High Priority	Impact of permitting on operation schedule	-1	-1.0	-2	2	2.0	4	0		0	No delay for the internal structures, as this is the same as the current tailings deposition.
			Complexity of the environment /technical studies	-1	-1.0	-2	0		0	-1	-1.0	-2	Less complex for internal structures, compared to the other options.
			TSF Footprint increase	-1	-1.0	-2	0		0	0		0	Same footprint for internal structures and filtered tailings. In pit disposal may imply an increase in footprint.
			Level of difficulty to obtain permits from government authorities	-2	-2.0	-4	-1	-1.0	-2	0		0	More difficult to obtain permits for the in-pit disposal option.

(*) Ecological services :
1) Support service that allows other services to initiate
- Soil formation
- Nutrient cycle recovery
- Primary biomass production
2) Supply service
- Food
- Drinking water
- wood/fiber
- Genetic diversity (return to the wild of the land plot)
3) Regulation service
- Climate regulation
- Limits the spread of diseases
- Water cycle and quality
4) Cultural service
- Recreation and tourism
- Aesthetic
- Cultural heritage

(**) Environment Canada's guidance

See non weighted graph | See weighted graph

FIGURE 4-3: NON-WEIGHTED RESULTS

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

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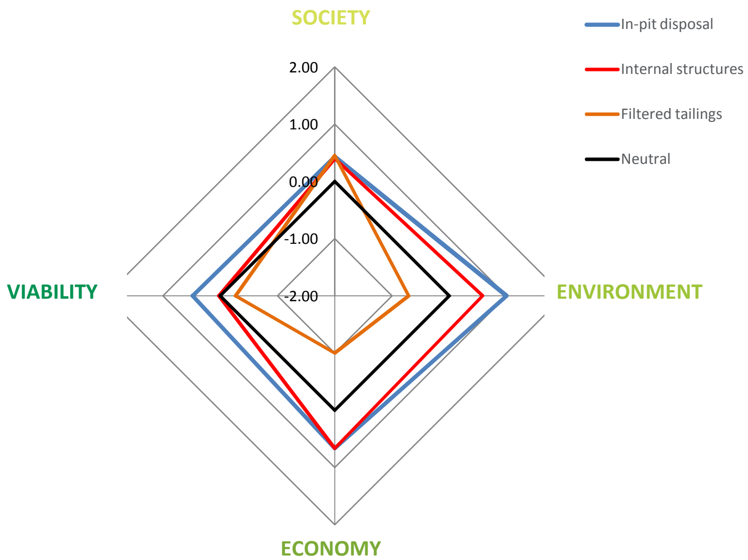
Non-weighted results by theme



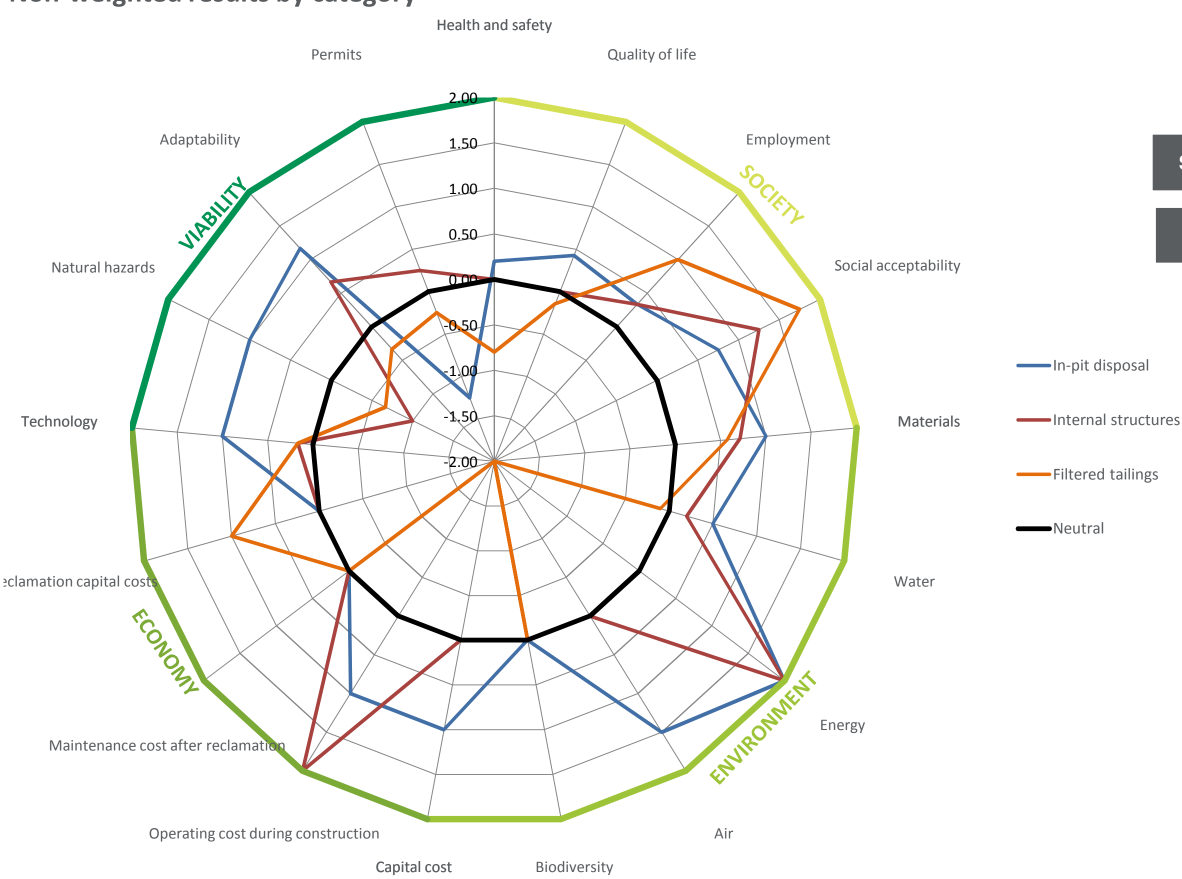
Non-weighted results by theme

	In-Pit disposal	Internal structures	Filtered tailings
COMMUNITY	0.43	0.40	0.45
ENVIRONMENT	1.00	0.58	-0.71
ECONOMY	0.67	0.67	-1.00
VIABILITY	0.48	0.02	-0.27
Average:	0.64	0.42	-0.38
Average (%):	32%	21%	-19%

Non-weighted results by category

	In-Pit disposal	Internal structures	Filtered tailings
Health and safety	0.20	0.00	-0.80
Quality of life	0.43	0.00	-0.14
Employment	0.33	0.33	1.00
Social acceptability	0.75	1.25	1.75
Materials	1.00	0.71	0.57
Water	0.50	0.20	-0.10
Energy	2.00	2.00	-2.00
Air	1.50	0.00	-2.00
Biodiversity	0.00	0.00	0.00
Capital cost	1.00	0.00	-2.00
Operating cost during construction	1.00	2.00	-2.00
Maintenance cost after reclamation			
Reclamation capital costs	0.00	0.00	1.00
Technology	1.00	0.17	0.17
Natural hazards	1.00	-1.00	-0.67
Adaptability	1.17	0.67	-0.33
Permits	-1.25	0.25	-0.25
Average:	0.66	0.41	-0.36
Average (%):	33%	21%	-18%

Non-weighted results by category



See detailed summary

See weighted graph

FIGURE 4-4: WEIGHTED RESULTS

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

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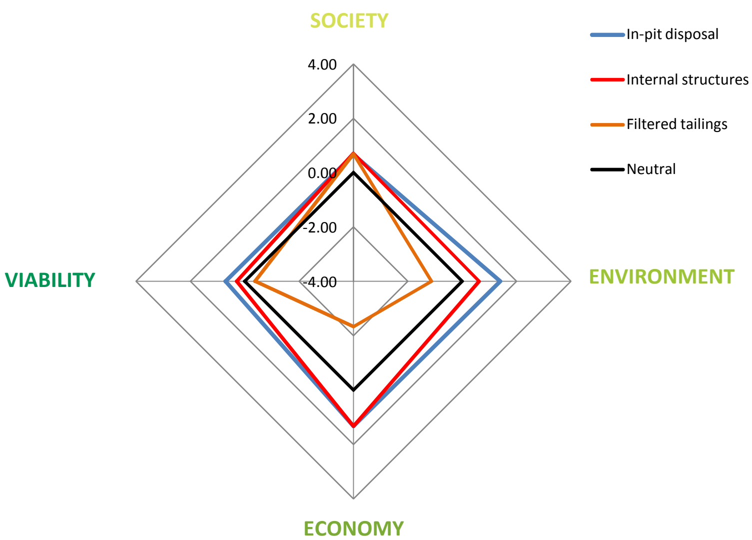
Weighted results by theme



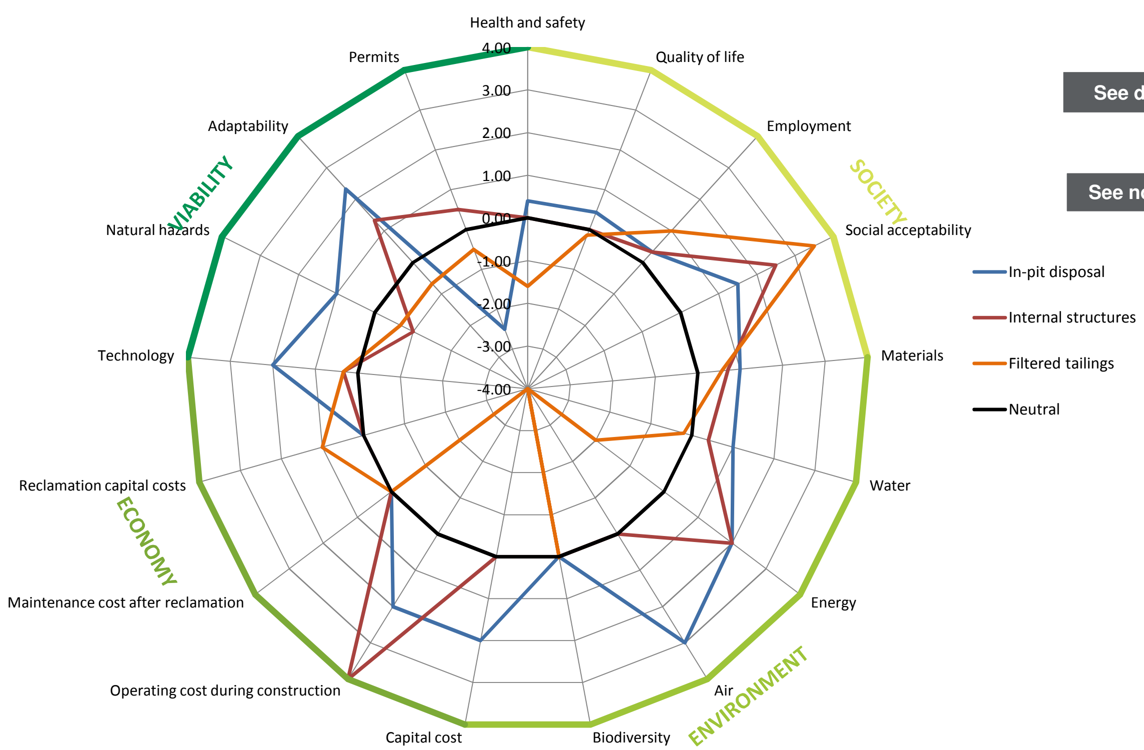
Weighted results by theme

	In-Pit disposal	Internal structures	Filtered tailings
COMMUNITY	0.67	0.71	0.69
ENVIRONMENT	1.40	0.62	-1.13
ECONOMY	1.33	1.33	-2.33
VIABILITY	0.71	0.29	-0.38
Average:	1.03	0.74	-0.79
Average (%):	26%	18%	-20%

Weighted results by category

	In-Pit disposal	Internal structures	Filtered tailings	Weight indicator
Health and safety	0.40	0.00	-1.60	High Priority
Quality of life	0.43	0.00	-0.14	Required
Employment	0.33	0.33	1.00	Required
Social acceptability	1.50	2.50	3.50	High Priority
Materials	1.00	0.71	0.57	Required
Water	1.00	0.40	-0.20	High Priority
Energy	2.00	2.00	-2.00	Required
Air	3.00	0.00	-4.00	High Priority
Biodiversity	0.00	0.00	0.00	High Priority
Capital cost	2.00	0.00	-4.00	High Priority
Operating cost during construction	2.00	4.00	-4.00	High Priority
Maintenance cost after reclamation				Required
Reclamation capital costs	0.00	0.00	1.00	Required
Technology	2.00	0.33	0.33	High Priority
Natural hazards	1.00	-1.00	-0.67	Required
Adaptability	2.33	1.33	-0.67	High Priority
Permits	-2.50	0.50	-0.50	High Priority
Average:	1.03	0.69	-0.71	
Average (%):	26%	17%	-18%	

Weighted results by category



See detailed summary

See non weighted graph

FIGURE 4-5: WEIGHTED RESULTS (AMARUQ WEIGHT)

PROJECT NO :	637215
DESCRIPTION :	TSF extension project
OPTION 1 DESCRIPTION :	In-Pit disposal
OPTION 2 DESCRIPTION :	Internal structures
OPTION 3 DESCRIPTION :	Filtered tailings

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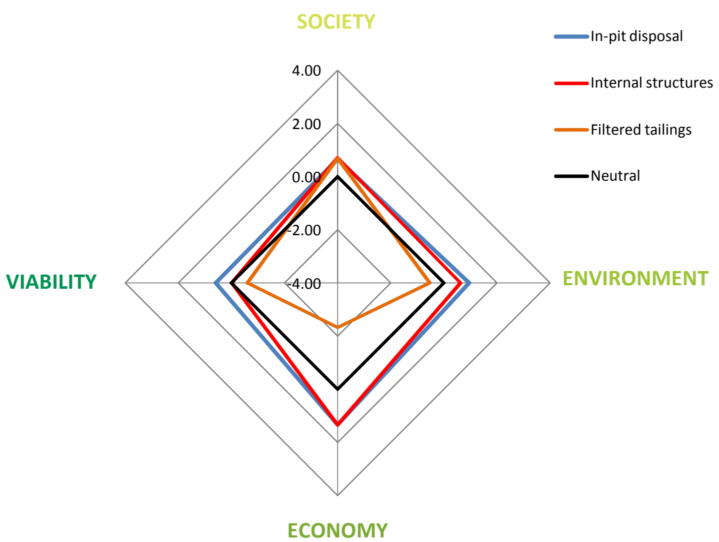
Weighted results by theme



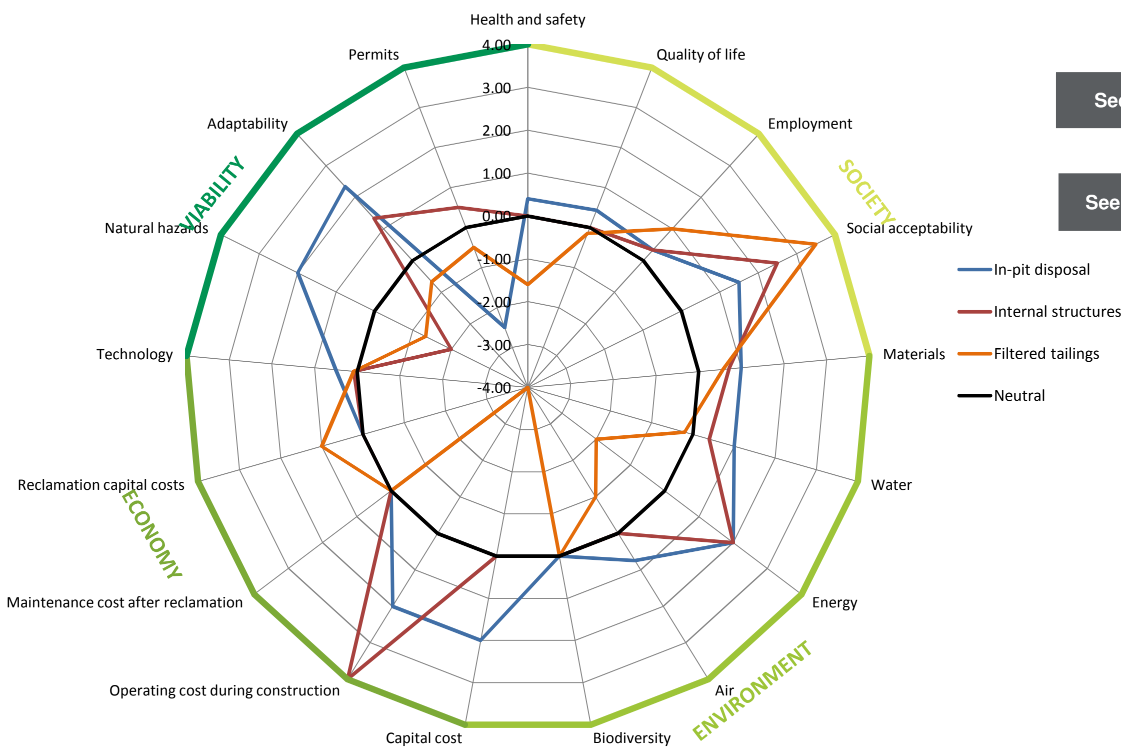
Weighted results by theme

	In-Pit disposal	Internal structures	Filtered tailings
COMMUNITY	0.67	0.71	0.69
ENVIRONMENT	0.95	0.62	-0.53
ECONOMY	1.33	1.33	-2.33
VIABILITY	0.58	-0.02	-0.60
Average:	0.88	0.66	-0.69
Average:	22%	17%	-17%

Weighted results by category

	In-Pit disposal	Internal structures	Filtered tailings	Weight indicator
Health and safety	0.40	0.00	-1.60	High Priority
Quality of life	0.43	0.00	-0.14	Required
Employment	0.33	0.33	1.00	Required
Social acceptability	1.50	2.50	3.50	High Priority
Materials	1.00	0.71	0.57	Required
Water	1.00	0.40	-0.20	High Priority
Energy	2.00	2.00	-2.00	Required
Air	0.75	0.00	-1.00	Low Priority
Biodiversity	0.00	0.00	0.00	High Priority
Capital cost	2.00	0.00	-4.00	High Priority
Operating cost during construction	2.00	4.00	-4.00	High Priority
Maintenance cost after reclamation				Required
Reclamation capital costs	0.00	0.00	1.00	Required
Technology	0.50	0.08	0.08	Low Priority
Natural hazards	2.00	-2.00	-1.33	High Priority
Adaptability	2.33	1.33	-0.67	High Priority
Permits	-2.50	0.50	-0.50	High Priority
Average:	0.86	0.62	-0.58	
Average:	21%	15%	-15%	

Weighted results by category



See detailed summary

See non weighted graph

5.0 DISCUSSION

The In-Pit Tailings Deposition option (Option 1) obtained the best score. The internal structures design (Option 2) obtained the second best score, followed by the filtered tailings stack design option (Option 3). Table 5-1 summarizes the results for each option. Note that option 1 remains the best in the non-weighted and weighted results.

Table 5-1: Summary of the MAA Results

	Option 1 In-pit deposition	Option 2 Internal structures	Option 3 Filtered tailings
Non-weighted results	**33%**	**21%**	**-18%**
Weighted results (TSFE weight)	**26%**	**17%**	**-18%**
Weighted results (Amaruq Water Management weight)	**21%**	**15%**	**-15%**

The best option has been assigned this score mainly for its superior performance in the following categories: health and safety, quality of life, water, air, capital cost, technology, natural hazards, and adaptability. In the society pillar, the In-Pit Tailings Deposition option implies less heavy equipment compared to the other options, which contributes to a good health and safety practice. Furthermore, it offers a good quality of life since it implies reduced noise levels and less visibility of the site outside the mine property (lowest height of the TSF), compared to the other options. In the environment pillar, the In-Pit Tailings Deposition option also gets the highest score in the water category since this option implies a greater flexibility with its water balance. In addition, there is a reduced use of fresh water due to its simple reclaim pond water management, compared to the other options. This option also resulted in the highest score for air quality since it would generate less greenhouse gases and dust compared to the internal structures and filtered tailings options. In the economy pillar, the estimated capital cost of this option is less than the other options. Finally, in the viability pillar, the In-Pit Tailings Deposition is the most flexible technology since it could be expanded into Vault and Goose pits. Since the pit is already excavated for this option, its constructability is easier than the other options. In the natural hazards category, the in-pit deposition is less vulnerable to climate threat and seismic risks. Finally, this option showed to be more adaptable to gradual reclamation, material shortage, and economic constraints.

The main disadvantage of the In-Pit Tailings Deposition is in the water category due to the uncertainties in groundwater quality due to the 2nd Portage Fault. In the viability pillar, there are some disadvantages in the adaptability category since the tailings closure concept needs to be reviewed. Furthermore, the level of difficulty to obtain permits from government authorities is higher for the In-Pit Tailings Deposition and therefore this option is less advantageous in the permit category.

The Internal Structures Tailings Deposition option (Option 2) is the second best option according to the MAA performed. The main advantage of this option compared to the In-Pit Tailings Deposition is in the social acceptability category, since this option will require less fish habitat compensation. Also, the project would be more accepted than the In-Pit Tailings Deposition due to its resemblance to the existing option. The In-Pit Tailings Deposition can be considered as a new technology and therefore could be negatively perceived compared to the internal structures option. Another advantage of this option is in the permits category; since the permitting on operation schedule is the same as the current tailings deposition, there would be no delay on permitting for the Internal Structures Tailings Deposition. Furthermore, the level of difficulty to obtain permits from government authorities is lower than the In-Pit Tailings Deposition. The main disadvantage of the Internal Structures Tailings Deposition option is its non flexibility for expansion (technology category), its high vulnerability to climate threat (natural hazards category), and its non adaptability for materials shortage (adaptability category).

Lastly, the Filtered Tailings Deposition option (Option 3) was negatively scored in the majority of the categories of this MAA exercise. The main advantage of this option compared to the In-Pit Tailings Deposition and Internal Structures Tailings Deposition is in the employment and social acceptability categories (society pillar), since this option would generate more work for the Inuit population due to the amount of trucks needed for the Filtered Tailings Deposition. Furthermore, the filtered tailings technology is already approved in Meliadine, therefore this project is better perceived and more acceptable. The main disadvantages of the Filtered Tailings Deposition are due to its filtration plant since it will require a high amount of trucks (health and safety category), and its energy consumption would be much higher than the other options. Furthermore, the filtration plant and the truck hauling would produce more greenhouse gases and dust than the other options. Finally, the capital cost of the Filtered Tailings Deposition is estimated to be over 210M$, not to mention the operating cost of 5.81$/tonne, which are both higher than the other two options.

In summary, the results of the MAA indicate that Option 1 (In-Pit Tailings Deposition) gets the best results for all the pillars (society, environment, economy and viability). Overall this option has proved to be the preferred option to be further developed in a prefeasibility study.

APPENDIX 1: Fact sheets of the three options

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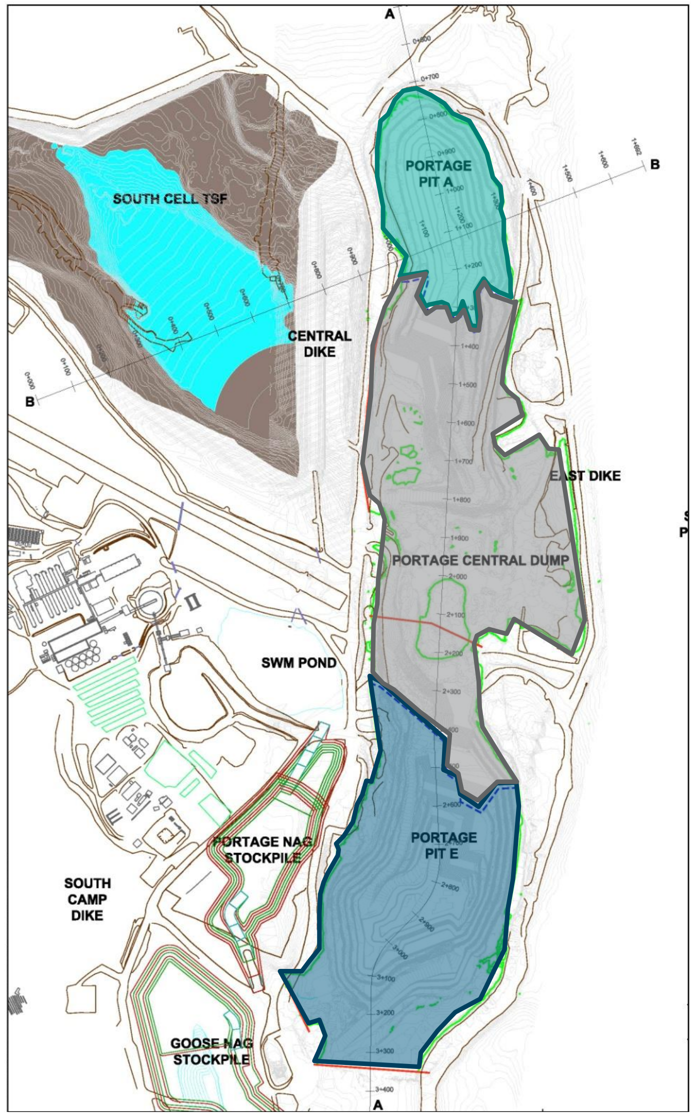
TSFE – In-Pit Tailings Deposition Concept

In-Pit Deposition

In-Pit Deposition Concept consists of the deposition of the Whale Tail tailings into Portage Pit A and Pit E.



Design parameters considered for this option:

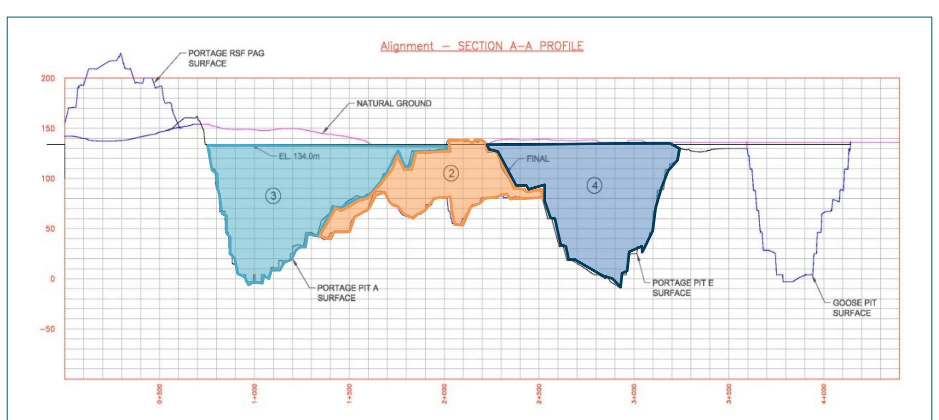
- Thickened tailings at 54% solid;
- In-Situ Tailings Dry Density 1 t/m^3;
- Tailings Water Entrapment: 67% w/w;
- Reclaim water flow: Adjusted to maintain a 3 m water cover
- Maximum tailings elevation: 125.6 m (8 m below Third Portage Lake Level (133.6 m) to prevent tailings re-suspension;
- Volume available in Portage Pit A at elevation 134 m: 14,196,123 m^3 approx.;
- Volume available in Portage Pit E at elevation 134 m: 19,168,283 m^3 approx.;
- For water/mass balance modelling, assume 100% conservation of water/mass;
- North/South Cell TSF runoff water are directed to Portage Pit A or Pit E;
- East Dike Seepage directed to Portage Pit A or Pit E
- Transfer of Goose Pit water to Portage Pit A to maintain higher water elevation than in Portage Pit and prevent overtopping.

In-Pit Deposition Methodology:

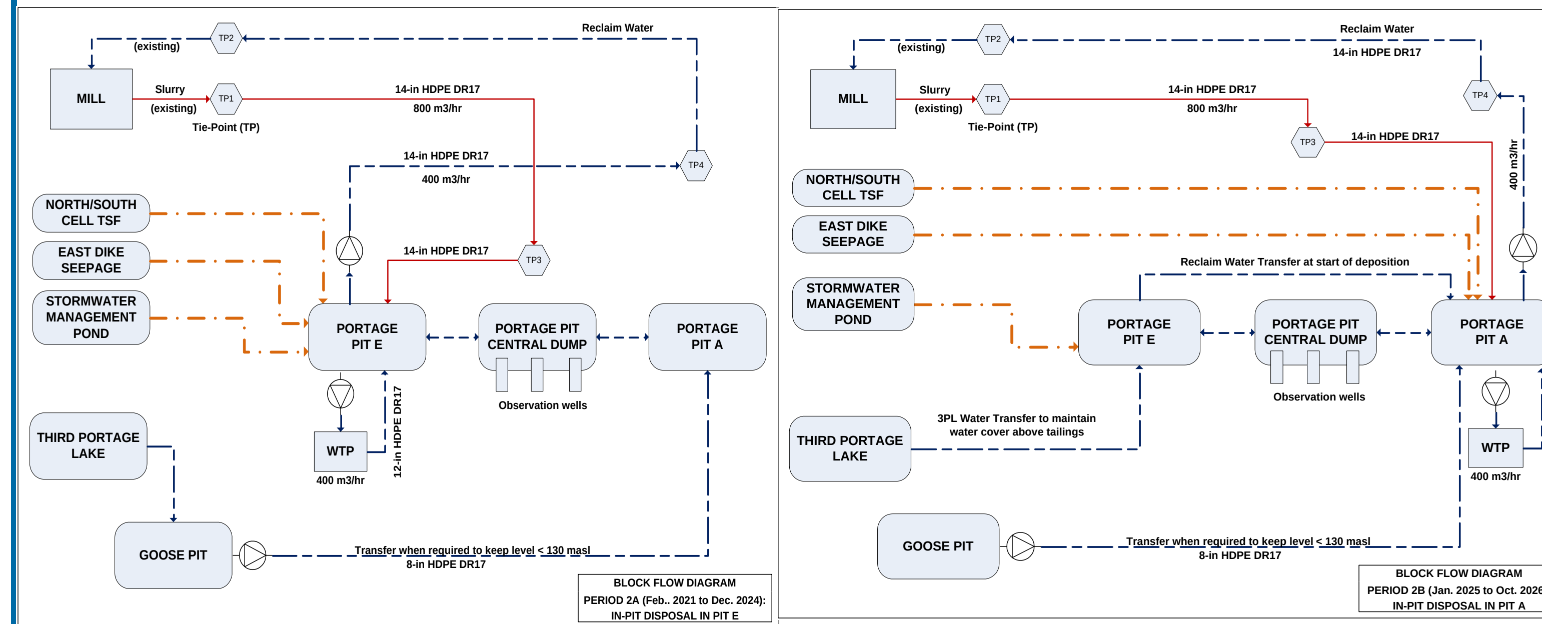
- Period 1: End of Portage/Vault Operation and Start of Whale Tail Deposition in South Cell;
- Period 2: Whale Tail deposition in Portage Pit E then in Pit A;
- Period 3: After Operations, Pit water filling;
- Period 4: After Pit Filling, Before dike breaching.

Main Findings:

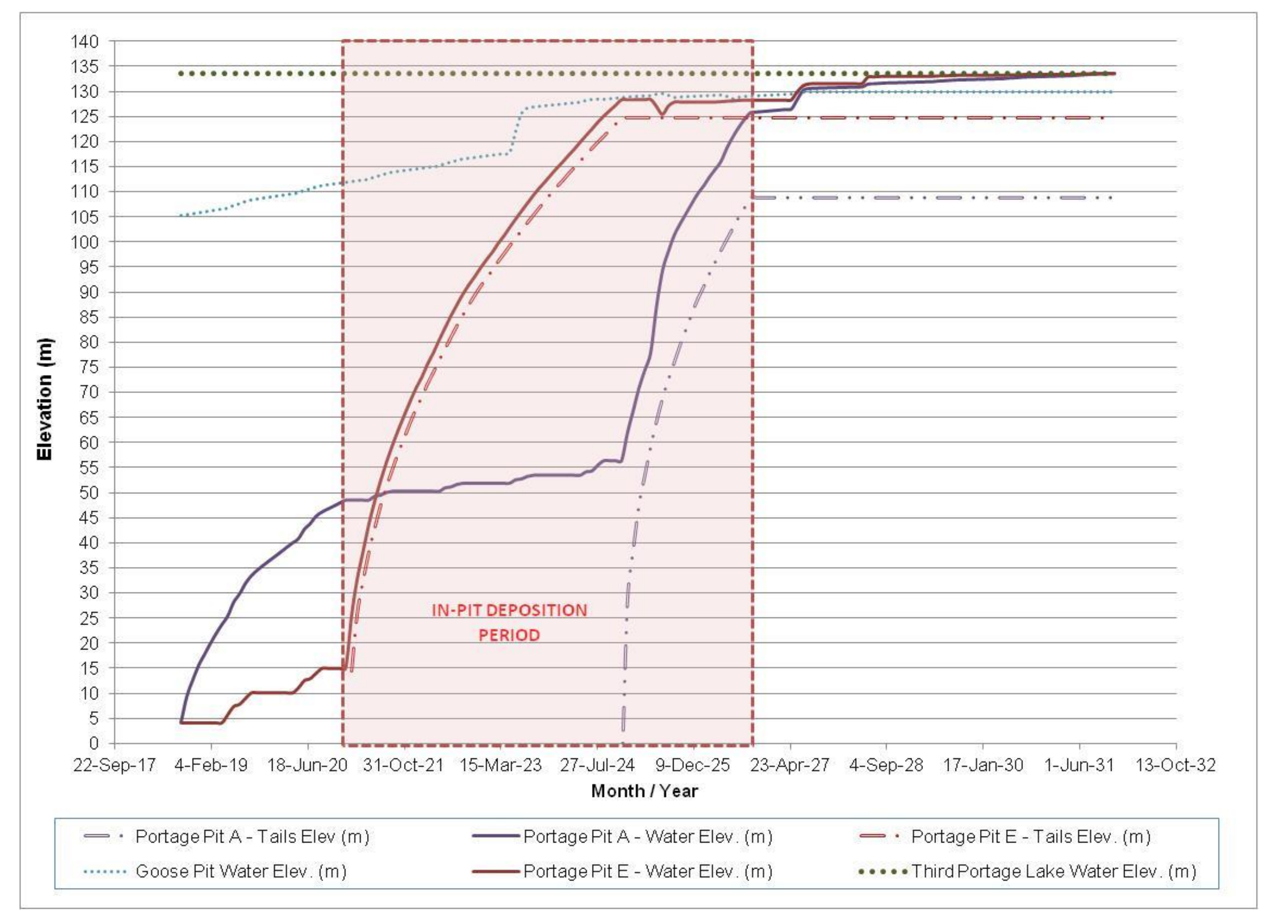
- Portage Pit A and Pit E can store the volume of 23 MT of Whale Tail tailings assuming an in-situ dry tailing density of 1.0 t/m^3;
- Potential of reclaim water and contamination migration in groundwater if the hydraulic head in Portage Pit is higher than surrounding area;
- Potential of reclaim water and contamination migration via Second Portage Fault at closure (via Central Dump);
- Water treatment required during in-pit deposition and after closure to abate the metal concentrations in the reclaim water in Portage pit to meet closure criteria;
- Chloride and sulfate concentrations will likely be more elevated than 3PL background level.



Block Flow Diagram of In-Pit Deposition Concept – Period 2



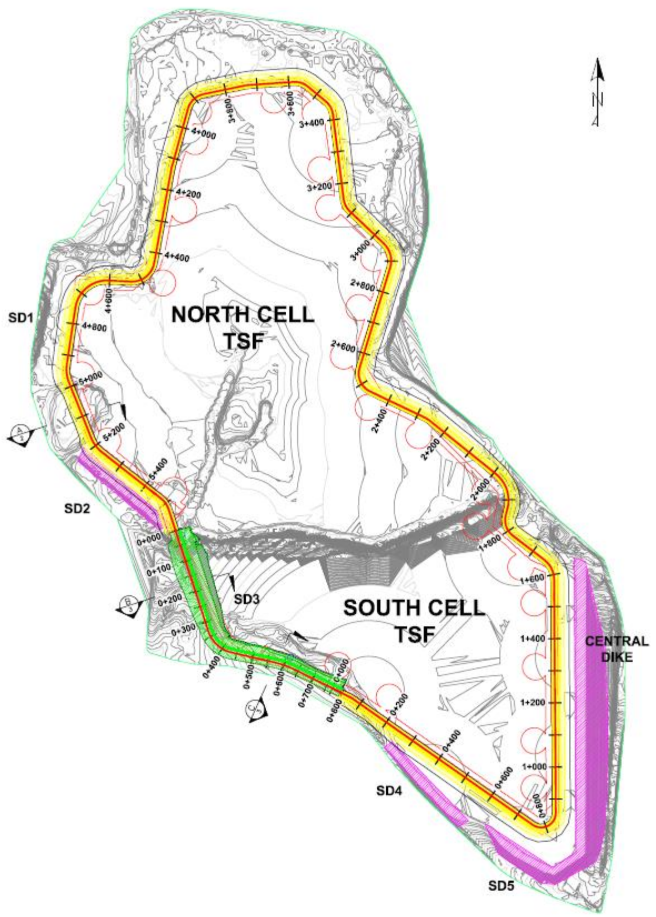
Estimated Tailings and Water Elevation in Portage Pit and Goose Pit



Internal Structures Design

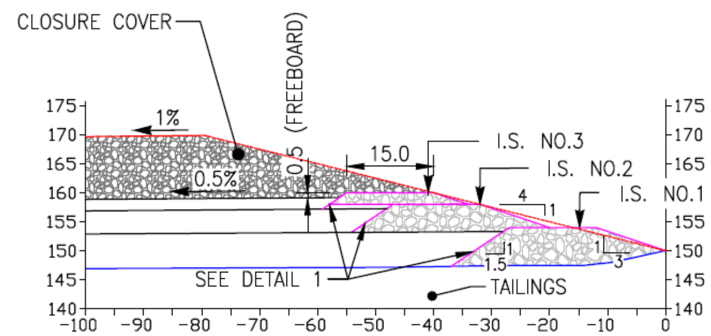
Concept proposed of the internal structures developed mainly on the deposition plan and the water management.

- Deposition of Whale Tail tailings into North & South Cells;
- Based on the Internal Structures in North Cell technical report (OKC, 2016).

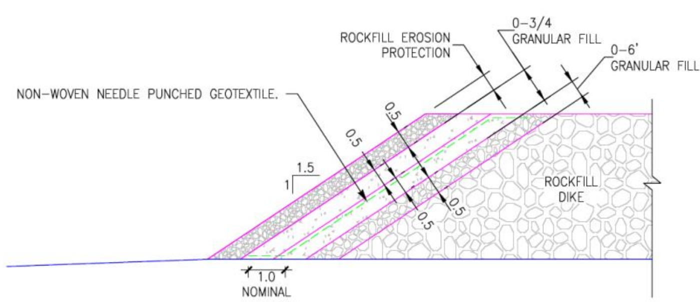


Design parameters considered while developing the internal structures option:

- The initial surface used for modeling comes from the tailings deposition in the North and South Cells up to a maximum el. of 150 masl;
- Internal Structures design conducted according to the AEM deposition plan;
- The internal structures are raised in three (3) stages with an upstream construction method;
- SD3 to be raised at el. 160 masl with a downstream construction method as per detailed design developed by Golder for Saddle Dams (Golder, 2015). It is assumed that the tailings beaches should seal the junction between both structures.



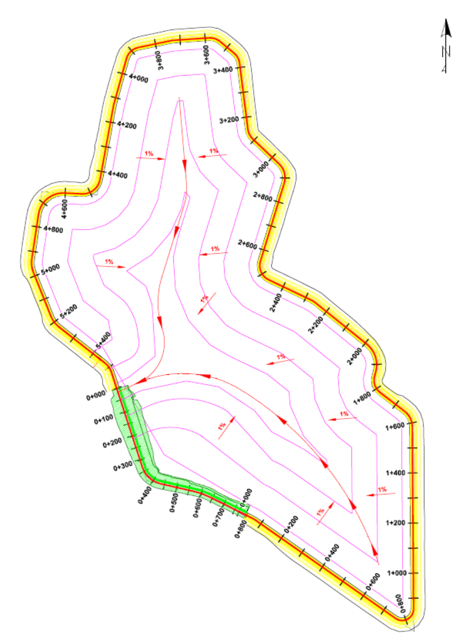
A 1 INTERNAL STRUCTURES STAGES
Scale: 1:1000



DETAIL 1 OF THE UPSTREAM SLOPE (OKC, 2016)
Scale: 1:100

Closure and Reclamation of Tailings Site:

- Minimum slope of the rockfill cover is 1% toward the runoff drains;
- Minimum slope of drainage channels are 0.5%;
- Minimum cover of 2 m of NPAG material over the tailings to keep tailings frozen over 150 years with consideration of climate changes;
- Surface runoff from precipitation and spring freshet shall be shed off the TSF surface through the reclaim pond located close to the SD3. Water from this pond will be pumped to the pit until the water quality criteria will be met and the water will freely goes towards the environment.



Closure Cover

Deposition Plan

Deposition plan developed by AEM following criteria below:

- South Cell TSF and North Cell TSF are considered as one TSF;
- Tailings volume discharge point will be distributed in order to raise tailings beaches at the same elevation all around the TSF during all the planned operation;
- Tailings deposition leads to sub-aerial beach of 0.45% and sub-aqueous of 2.56% (AEM, 2015);
- Reclaim pond must be above 250,000 m^3;
- Reclaim pond is located against SD3;
- Same deposition practice as currently done in Meadowbank which consists of end of pipe deposition and following a month-by month planning outlined by the deposition plan.

Tonnage required in time

Year	Tonnage (tonnes)	Ice Thickness (m)	Tailings Dry Density (t/m^3)	Ice entrapment (%)	Sub aerial beach (%)	Sub aqueous beach (%)
2019	1,091,505	0.8	1.45	41.7%	1.10	3.60
2020	3,285,000	0.8	1.28	65.4%	0.45	2.36
2021	3,953,000	0.8	1.28	65.4%	0.45	2.36
2022	4,015,000	0.8	1.28	65.4%	0.45	2.36
2023	4,015,000	0.8	1.28	65.4%	0.45	2.36
2024	4,026,000	0.8	1.28	65.4%	0.45	2.36
2025	4,015,000	0.8	1.28	65.4%	0.45	2.36
2026	3,344,000	0.2	1.28	65.4%	0.45	2.36
Total	**28,295,500**					

Internal Structures elevation in time

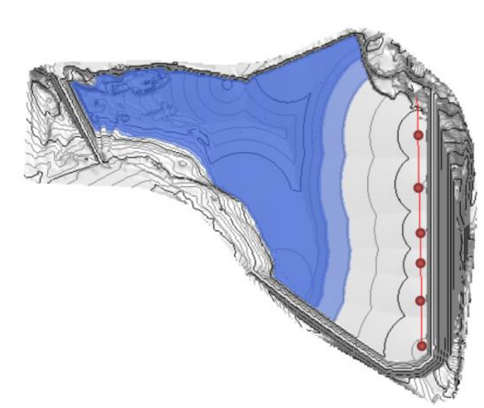
Year	Deposition driven by reclaim water		Total pond volume (Water + Ice) (m^3)	Water Volume (m^3)	Tailings dike elevation (masl)	Minimum water volume in the year (m^3)	Operational risk
	Volumes (m^3)	Elevation (m)					
2019	1,091,505		1,091,505	818,629	150	818,629	Low
2020	1,045,263		1,045,263	804,853	150	381,503	Moderate
2021		148	1,041,265	708,060	150	378,369	Moderate
2022	1,041,069		1,041,069	832,855	154	376,439	Moderate
2023		152	545,899	343,916	154	218,296	High
2024		154.5	534,178	240,380	160	113,107	High
2025		156.5	524,888	236,199	160	108,927	High
2026	276,441		276,441	124,378	160	104,746	High

Deposition Strategy: 2 phases

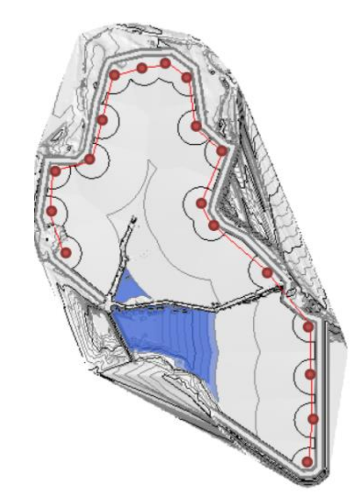
- Tailings deposition exclusively in the South Cell;
- Internal structures in both the North and South cells are erected to elevation 154masl and subsequently to elevation 160masl for 2024. The intent of raising the internal structures to such elevations is to ultimately create a single storage facility compromising of both the actual North and South cells over the elevation 150masl for the beginning of phase 2 during 2021.

Reclaim Water Management

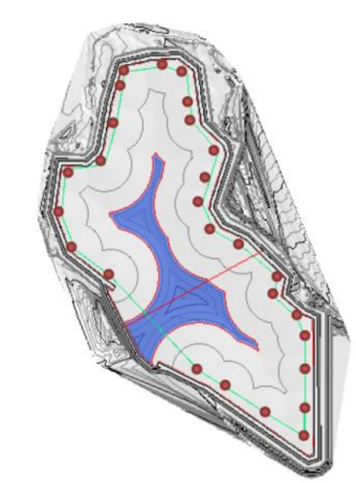
During phase 1, tailings deposition occurs such as the reclaim pond is pushed towards SD3 following the same strategy as done during Meadowbank operations, this allows the South Cell pond to connect to the actual North Cell pond during 2021 in phase 2. From that point in time, regularly spaced deposition points are used to discharge in a way to promote the creation of a single TSF containing a single reclaim pond adjacent to SD3.



Deposition in 2019



Deposition in 2021

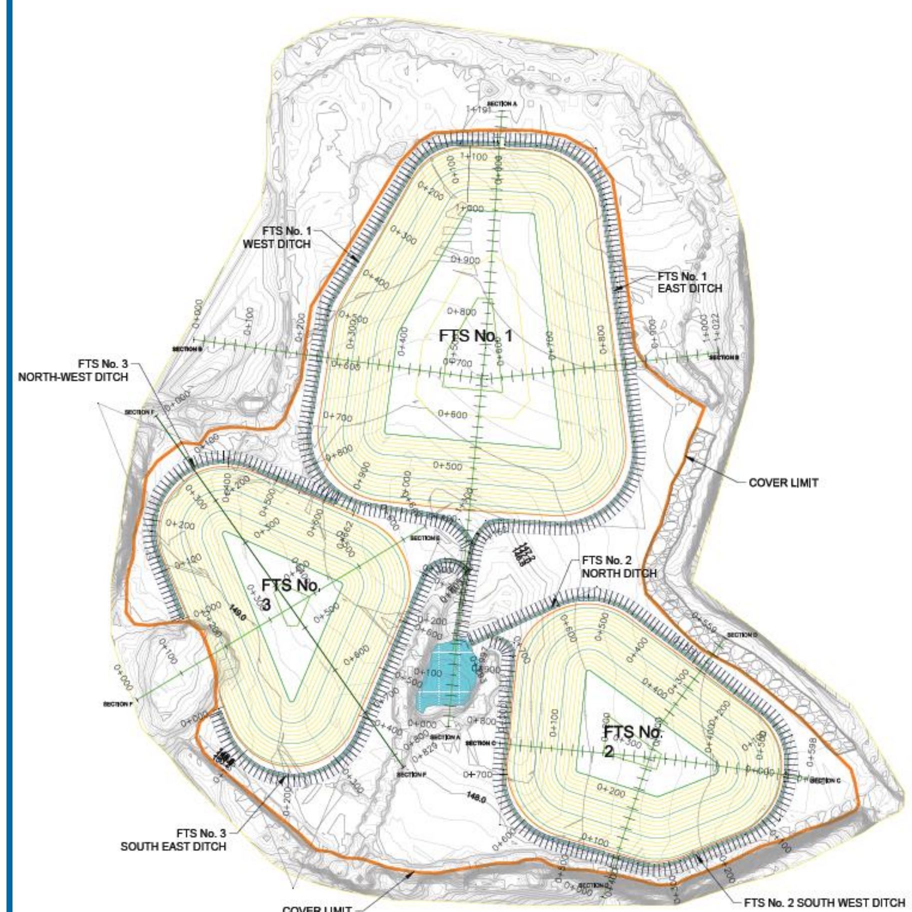


Deposition in 2026

Filtered Tailings Stack Design

Concept proposed of the filtered tailings stack developed mainly on the deposition plan and the water management.

- Deposition of Whale Tail tailings into North Cell;
- Based on feasibility study made for Meliadine and Lessons Learned from other projects and on SLI experiences.



Design parameters considered while developing the filtered tailings option:

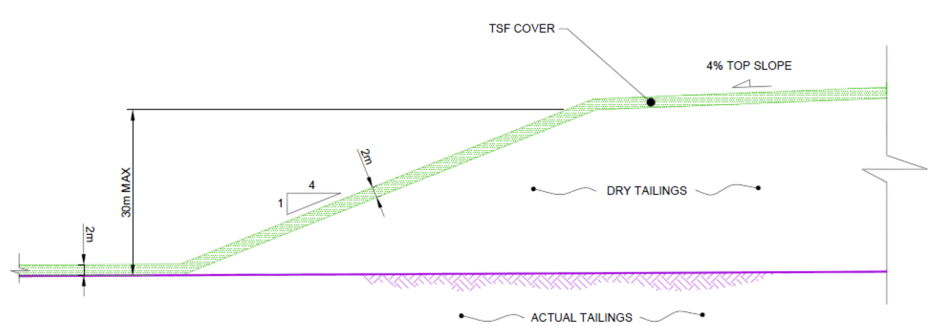
- Filtered tailings at 85% solid;
- Tailings dry density is assumed to be 1730 kg/m^3;
- Collection ditches with 0.25% slope and gravity flow;
- Final slope deposition of 4H:1V;
- Maximum height of the TSF at 30m;
- Filtered tailings to be transported by truck to the North Cell TSF. The filtrate to be pumped back to the process plant.

Three (3) stacks designed allowing flexibility for:

- LOM of Whale Tail Project (open pit, underground and possible extension);
- Tailings deposition;
- Water management ease;
- "Zones" placement (seasonal placement, optimal tailings management, etc.);
- Progressive closure.

Available Storage Capacity for Each FTS

	Volume (m^3)	Tonnage (t)
FTS No. 1	7,070,000	12,231,100
FTS No. 2	3,345,000	5,786,850
FTS No. 3	3,280,000	5,674,400
TOTAL	13,695,000	23,692,350



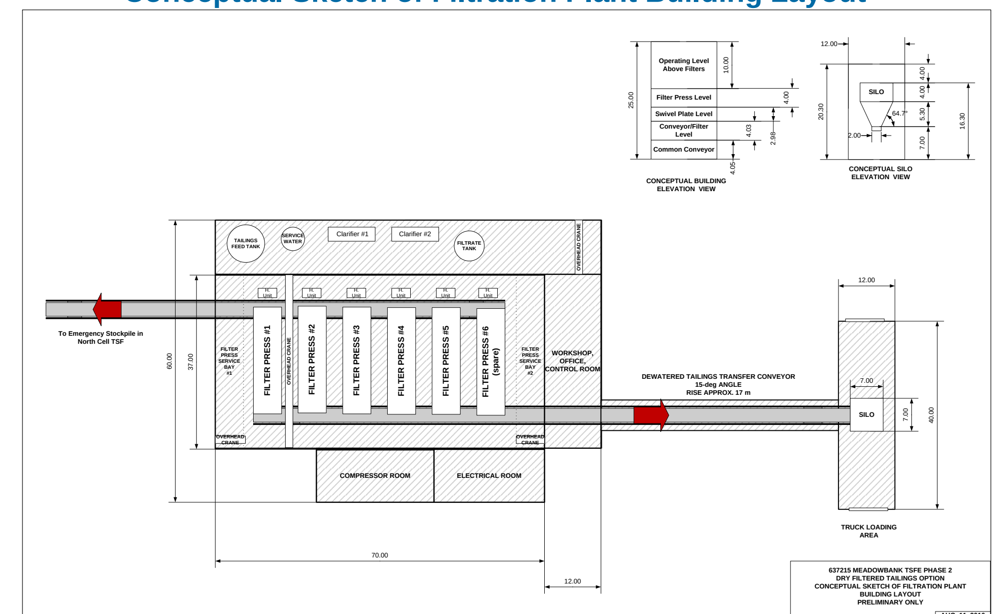
Closure and Reclamation of Tailings Site:

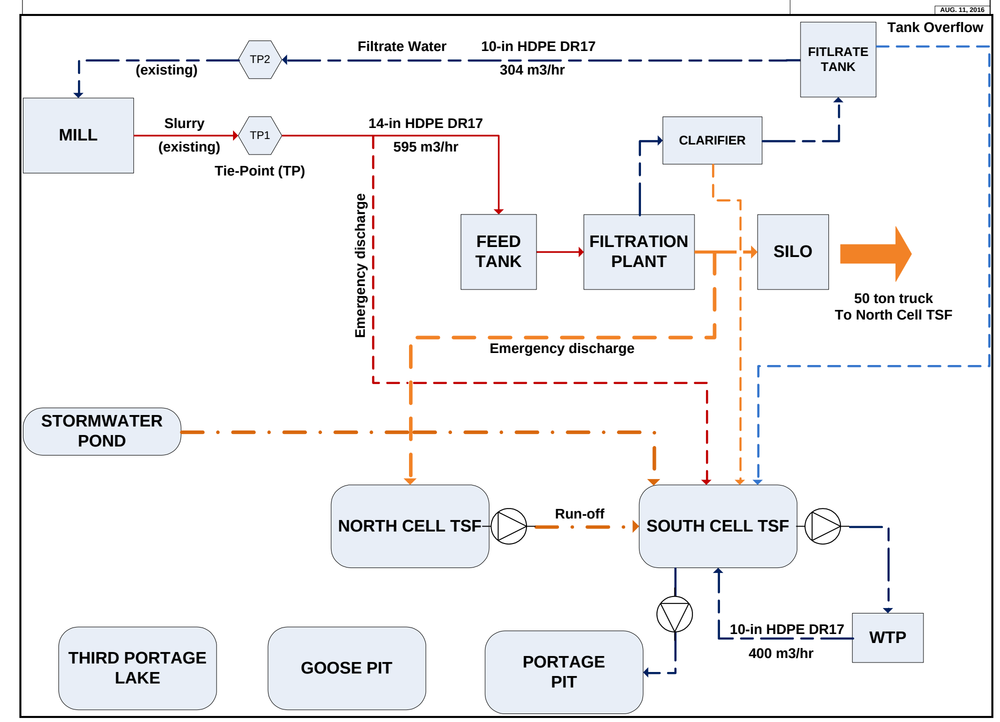
- Minimum slope of the rockfill cover is 1% toward the runoff drains;
- Minimum slope of drainage channels are 0.5%;
- Minimum cover of 2 m of NPAG material over the tailings to keep tailings frozen over 150 years with consideration of climate changes;
- Surface runoff from precipitation and spring freshet shall be shed off the TSF surface through the reclaim pond located close to the SD3. Runoff drains shall be planned from North Cell reclaim pond toward Stormwater Dike and report to South Cell reclaim pond against SD3 in order to take advantage of the gravitational flow already imposed by the tailings deposition.

Filtration Plant Design

The filtration plant will be installed close to North and South Cells TSF.

Conceptual Sketch of Filtration Plant Building Layout





Summary water/mass balance around Filtration Plant

Stream	Parameter	Units	Value
Tailings to dewater (total flow)	Solid Mass Loading	t/hr	450
	Water Mass Loading	t/hr	383
	Slurry Mass Loading	t/hr	833
	Slurry Flow	m^3/hr	595
	S.G.	t/m^3	1.4
	Solid%	%	54
Filtered Tailings (total flow)	Solid Mass Loading	t/hr	450
	Water Mass Loading	t/hr	79
	Slurry Mass Loading	t/hr	529
	Slurry Flow	m^3/hr	311
	S.G.	t/m^3	1.73
	Solid%	%	85
Filtrate Produced (total flow)	Solid Mass Loading	t/hr	0
	Water Mass Loading	t/hr	304
	Slurry Mass Loading	t/hr	304
	Slurry Flow	m^3/hr	304
	S.G.	t/m^3	1.0
	Solid%	%	0