Report to:

CROWFLIGHT MINERALS INC.

Bucko Lake Nickel Project: Environment Act Proposal Notice of Alteration Interim Tailings Storage Plan

Project No. 0651790101-REP-R0001-00

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BUCKO LAKE NICKEL PROJECT:

Environment Act Proposal
Notice of Alteration
Interim Tailings Storage Plan

DECEMBER 2007

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REVISION HISTORY

REV. NO	ISSUE DATE	PREPARED BY AND DATE	REVIEWED BY AND DATE	APPROVED BY AND DATE	DESCRIPTION OF REVISION

EXECUTIVE SUMMARY

Crowflight Minerals Inc. (Crowflight) is in the process of obtaining provincial and federal environmental approvals and permits for their planned Bucko Lake Nickel Project near Wabowden, Manitoba. The project is a Class 2 Development, and Crowflight submitted an Environment Act License Proposal for the project to Manitoba Conservation in April, 2006.

That proposal included a plan for disposal of tailings in the adjacent Bucko Lake. This tailings disposal approach was identified as the most environmentally acceptable approach for the secure long term disposal of the potentially acid-generating tailings that will be produced from milling of the Bucko ore.

Given the extended and unpredictable schedule for completion of the federal process, Crowflight has been forced to consider interim means of bringing the project into production and, with the submission of this Notice of Alteration (NOA) to their project proposal originally submitted in April 2006, is proposing to include the provision for interim land-based tailings storage in order to allow the project to go into production, and take advantage of current and continuing underground exploration activities and the current strong market prices for nickel while the federal review process is completed. Once the final approval for the in-lake disposal of tailings is obtained, Crowflight plans to transfer the stored tailings to the Bucko lake tailings impoundment area and then decommission and reclaim the interim tailings storage facility (ITSF).

This Notice of Alteration to the Environment Act License Proposal for the Project details the planned ITSF and the expected environmental impacts the facility. Based on the ITSF design, its operation as a zero discharge facility, the temporary and short-term (12 month) period of use, and planned prompt decommissioning, this change to the project is being proposed as a minor change, not significantly increasing the overall environmental impact of the Bucko Lake Nickel Project.

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1.0 INTRODUCTION

Crowflight Minerals Inc. (Crowflight) is in the process of obtaining provincial and federal environmental approvals and permits for their planned Bucko Lake Nickel Project near Wabowden, Manitoba. The project is a Class 2 Development, and Crowflight submitted an Environment Act License Proposal for the project to Manitoba Conservation in April 2006.

The April 2006 proposal included a plan for disposal of tailings in the adjacent Bucko Lake. This tailings disposal approach was identified as the most environmentally acceptable approach for the secure long-term disposal of the potentially acid-generating tailings that will be produced from milling of the Bucko ore (Wardrop 2006 and 2007).

The environmental review and approval process for lake-based tailings disposal takes a long and unpredictable length of time. To date, three federal departments have indicated that each has to sign off on a screening environmental assessment under the *Canadian Environmental Assessment Act* (CEAA), and two Order-in-Council approvals from the Federal Cabinet are necessary to address requirements under the *Metal Mining Effluent Regulations* (MMER) of the *Fisheries Act* and Section 23(1) of the *Navigable Waters Protection Act*. Thus far, the federal review has taken some 16 months, and current estimates of the time remaining to obtain the necessary federal approvals extend to the end of 2008, at the earliest, and possibly into 2009.

Given the extended and unpredictable schedule for completion of the federal process, Crowflight has been forced to consider interim means of bringing the project into production. With the submission of this Notice of Alteration (NOA) to their April 2006 project proposal, Crowflight is proposing to include the provision for interim land-based tailings storage in order to allow the project to go into production, take advantage of current and continuing underground exploration activities and the current strong market prices for nickel, while the federal review process is completed.

The proposed alteration to the project and the expected environmental impacts of this alteration are detailed and discussed in the following sections.

2.0 PROPOSED PROJECT ALTERATION

Crowflight has requested that Wardrop Engineering Inc. (Wardrop) design an interim tailings storage facility (ITSF) with sufficient capacity to handle up to the first 12 months of tailings production. The location, design, and changes to water management necessary to develop, operate and close out the ITSF are detailed below.

2.1 FACILITY LOCATION

Crowflight is proposing to construct the ITSF at the location shown in Figure 1, approximately 500 m NW of the Bucko mine site. The storage facility will be located on the west side of the existing mine access road and approximately 150 m from the SW shore of Bucko Lake. This location was selected for the following reasons. It is:

- as close as possible to the mine site but outside the boundaries and buffer zones for all known summer and winter woodland caribou habitat in the area;
- adjacent to the existing mine access road, thereby eliminating a need for significant additional new access road construction;
- as close as possible to Bucko Lake to facilitate the subsequent transfer of tailings to the lake once federal approval has been obtained.

2.2 FACILITY CAPACITY

Crowflight has developed detailed estimates, by month, of ore and waste production through the first 12 months of mine operation (Table 1).

Table 1. Bucko Mine production schedule through year 1.

	2008					2009							
Month	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Total**
Ore Tonnes Milled	15,573	22,930	24,000	24,518	29,881	29,532	29,532	29,532	28,626	28,626	28,626	28,626	320,001

The interim tailings storage facility needs to be able to contain 50% of the tailings production. The balance of tailings production will be returned to the underground as hydraulic backfill.

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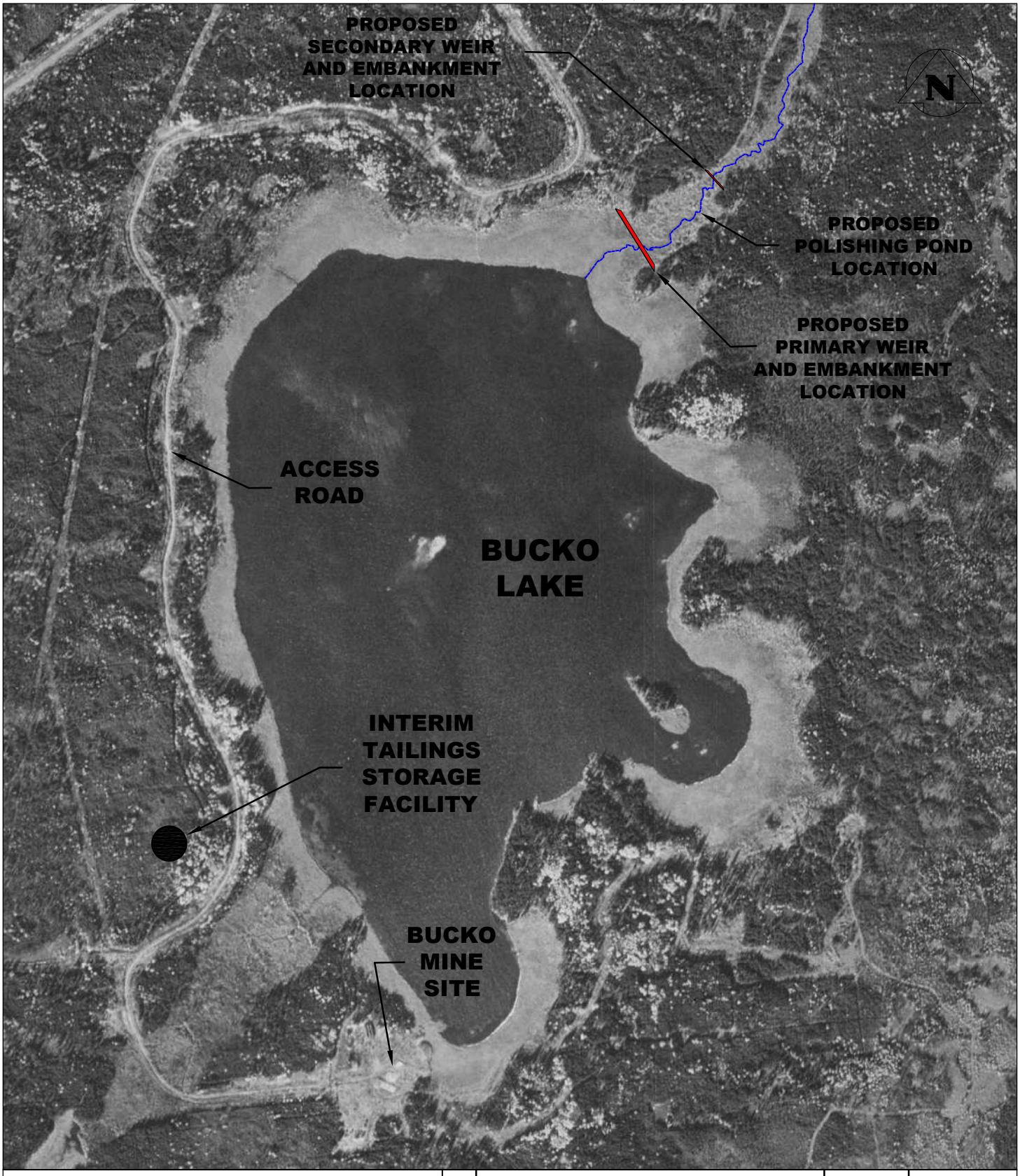


NO.	DESCRIPTION	DATE	ISSUED BY

REVISIONS/ISSUE

WARDROP | Engineering Inc.

CLIENT: Crowflight Minerals Ltd.

DRAWING DESCRIPTION

FIGURE 1: LOCATION OF INTERIM TAILINGS STORAGE FACILITY IN RELATION TO MINE SITE BUCKO LAKE NICKEL PROJECT, WABOWDEN, MB

DESIGNED BY:	DR	DRAWN BY:	ET	DRAWING NO.	REV.
CHECKED BY:		DATE:	07.12.18	0651790100-SKT-R0030	A1

A (8.5" x 11")

2.3 IMPOUNDMENT DESIGN

The basic design criteria relevant for the geotechnical design of the ITSF are listed in Table 2

Table 2. Nominal ITSF Design Criteria.

Parameter	Specification
Tailings Throughput	1,000 tonnes/day (365,000 million tonnes/year)
Tailings to Underground	500 tonnes/day (182,500 tonnes/year)
Tailings to ITSF	500 tonnes/day (182,500 tonnes/year)
Tailings Specific Gravity	2.6
Initial Void Ratio	1.0
Initial tailings Density	1.3 tonnes per cubic metre (m^3)
Average Final Tailings Density	1.5 tonnes per cubic metre (m^3)
Tailings Pulp Density	45%
Water in Tailings Voids	21%
Volume of Tailings	333 m^3/day (122,000 m^3/year)
Required Storage	
• 1-year ITSF	122,000 m^3
• 6-year	732,000 m^3

Additional design criteria include the following:

- Mine life is estimated at 6 years. The construction of the ITSF facility to contain 1-year tailings production is required to be completed by July 2008. In year 2, tailings disposal will be changed to subaqueous storage in Bucko Lake. However, the ITSF design must account for a possibility of conversion into an ultimate tailings storage facility capable of storing 6-year tailings production in case the subaqueous disposal does not get regulatory approval.
- The tailings solids are expected to be acid generating. Long term control of acid generation will require the maintenance of saturated conditions during operations.
- Tailings impoundment effluent is assumed to require treatment for reduction of suspended solids to meet discharge quality criteria. On the basis of laboratory analyses of bench scale tailings wastewater, metal concentrations are expected meet the MMER discharge quality regulations and be close to the Manitoba WQSOG for protection of aquatic life without treatment (Wardrop 2007).
- ITSF must provide full containment of tailings and supernatant water.
- The tailings deposition should create a pond, sized for not less than five days of retention time. The pond can be operated at zero discharge under average precipitation and 100 year wet precipitation conditions. Water reclaim rates will be managed in order to keep the tailings saturated. Any discharge by pumping from a barge will be limited to handling of extreme event precipitation.

- The assumed subsurface conditions:
  - 1 m of peat, over
  - 10 m glaciolacustrine clay-silt containing 1-2 m sand stringers of limited extent, over
  - Granite - granodiorite bedrock
- Assumed peat compression under the tailings: ~ 50 %.
- Glaciolacustrine clay-silt is assumed to have low permeability. Both peat and clay are assumed to have sorption potential for any contaminant constituents from the tailings effluent.
- Non-Acid Rock Drainage (ARD) (gneissic) waste rock will be available for the ITSF construction and should be factored in the designs.
- The proposed tailings embankment design should also maximize the use of locally available mineral soil for filter zones. If there is a lack of locally available materials for the filter zones these will need to be processed by crushing and blending rock materials.
- Tailings impoundment closure alternatives:
  - Transfer of tailings into Bucko Lake following regulatory approval
  - Transfer of tailings to the mine underground in the event that subaqueous disposal is not approved and the project is closed.
  - Capping of the tailings to limit infiltration of precipitation on the impoundment surface (assuming subaqueous disposal has been approved and the ultimate tailings storage facility has been constructed).
- The Bucko Lake site is not situated in a seismically active area. The proposed ITSF and the likelihood of seismic hazard is very remote.
- The geotechnical designs presented herein are conceptual. Detailed engineering design criteria including geotechnical slope stability, seepage and contaminant transport and hydrotechnical aspects will be developed in the next design stage.

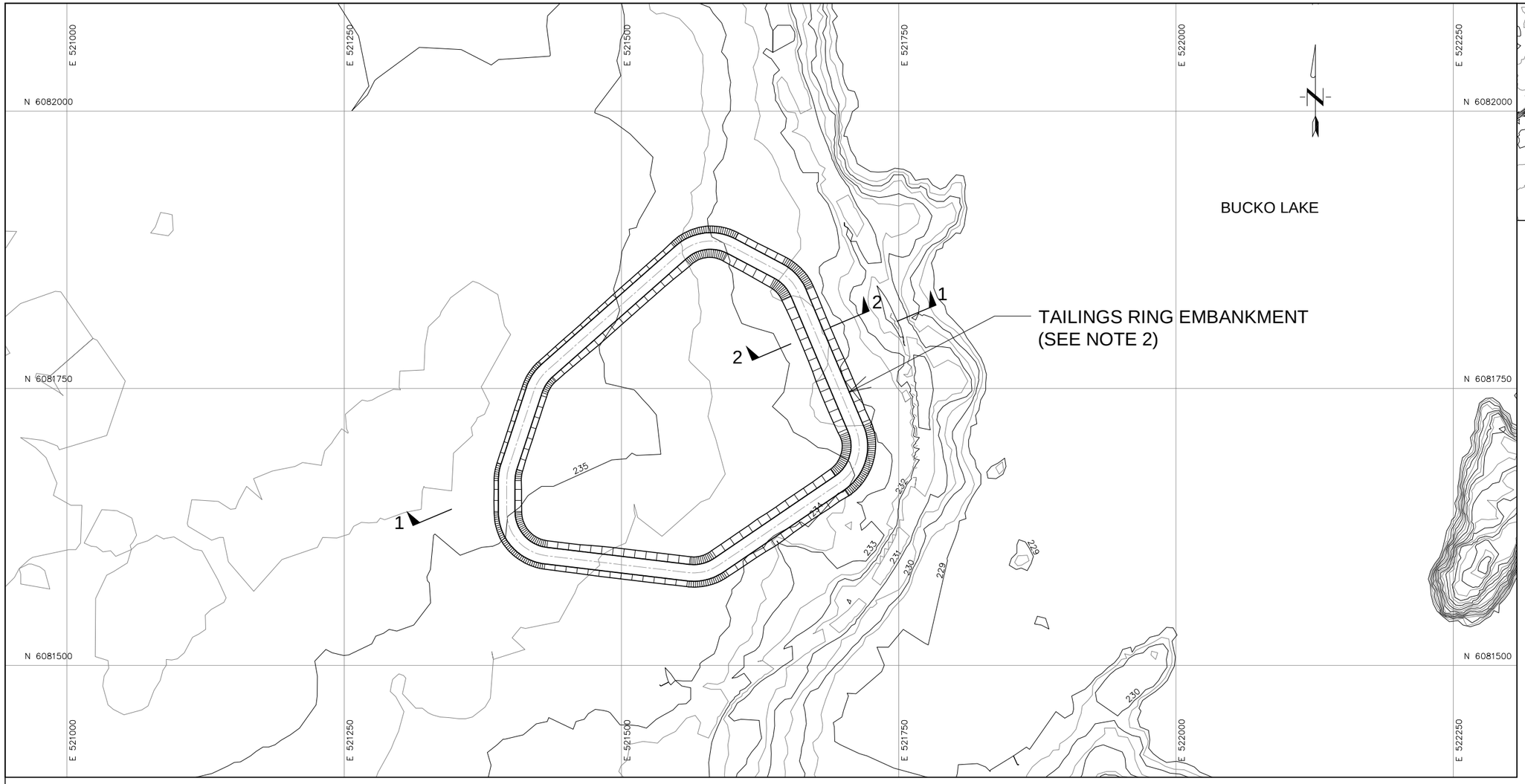
Local topographic conditions in the proposed ITSF lend themselves to containing the conventional wet tailings by a ring embankment. The ITSF site is suitable for storage of the current 182,500 tonnes (122,000 m^3) of tailings. The embankment design is depicted in Figures 2 and 3 and briefly described as follows:

- Essentially the ring embankment is earth/rockfill structure varying in height from 4.0 to 6.5 m. The embankment will be raised before August 2008 to sore initial 1-year tailings production designated for the on-land disposal.
- Upstream and downstream embankment slopes will be 2H:1V and 1.5H:1V, respectively.
- The main rockfill zone supports a sloping impervious core and attendant fine and coarse filters.
- The fine base filter is provided in order to prevent migration of fines from the fine foundation soils into the rockfill.

- The low permeability core will be extended approximately 1 m into the native clay-silt. The clay core and attendant filters sizing will allow for further embankment raising, if required. Dependent on the water balance within the tailings impoundment (tailings decant water, precipitation and snow melt water within TMA, and water removal for reuse in the mill) the actual extent of the clay core may potentially be reduced.
- A 0.3 m thick driving surface composed of fine rockfill (Zone 4) will be provided over the granular downstream embankment shell.
- The embankment will be constructed using non-ARD gneissic waste rock. Material for the low permeability core is assumed to be available locally within glaciolacustrine deposit. In case of insufficient quantities of sand and gravel for attending filters within the glaciolacustrine deposit, these will have to be processed by crushing and blending non-ARD gneissic waste rock.

Preliminary material quantity takeoffs for the ultimate dam can be summarized as follows:

- Peat Excavation 32,000 m^2
- Clay Excavation 16,000 m^3
- Zone 1 (compacted low permeability core) 27,000 m^3
- Zone 2 (filter transition – fine) 20,000 m^3
- Zone 3 (filter transition – coarse) 12,000 m^3
- Zone 4 (fine rockfill) 34,000 m^3
- Zone 5 (rockfill) 31,000 m^3



PLAN
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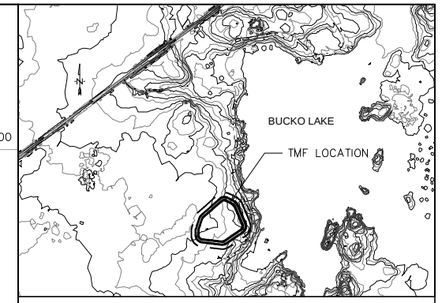

KEY PLAN
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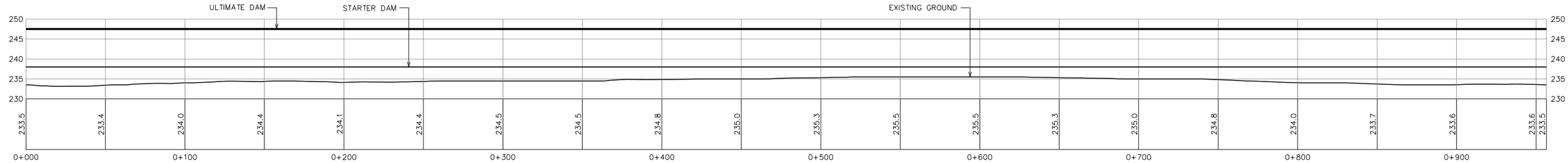
NOTES:

1. ALL DIMENSIONS, ELEVATIONS AND COORDINATES SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE INDICATED.
2. TAILINGS RING EMBANKMENT IS DESIGNED TO PROVIDE SAFE CONTAINMENT OF ONE YEAR OF TAILINGS PRODUCTION VOLUME AND AT THE SAME TIME ALLOW FOR CONVERSION INTO A PERMANENT TAILINGS RETENTION FACILITY CAPABLE OF STORING SIX YEARS OF TAILINGS VOLUME IN CASE THE BUCKO LAKE SUBAQUEOUS TAILINGS DISPOSAL DOES NOT GET A REGULATORY APPROVAL FOR MINE LIFE YEARS TWO TO SIX.



TAILINGS RING EMBANKMENT - PROFILE
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VER. 1:500

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REFERENCES		MK	DATE	REVISIONS AND ISSUES	REV. BY	APP. BY
				A. ZIVKOVIC		12/12/07
				NAME	COMPANY	DATE
				P. ENG. SEAL AND SIGNATURE		

BUCKO LAKE NICKEL PROJECT
INTERIM TAILINS STORAGE FACILITY
GENERAL ARRANGEMENT PLAN

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R.R	ASZ	ASZ	FIGURE 2	A
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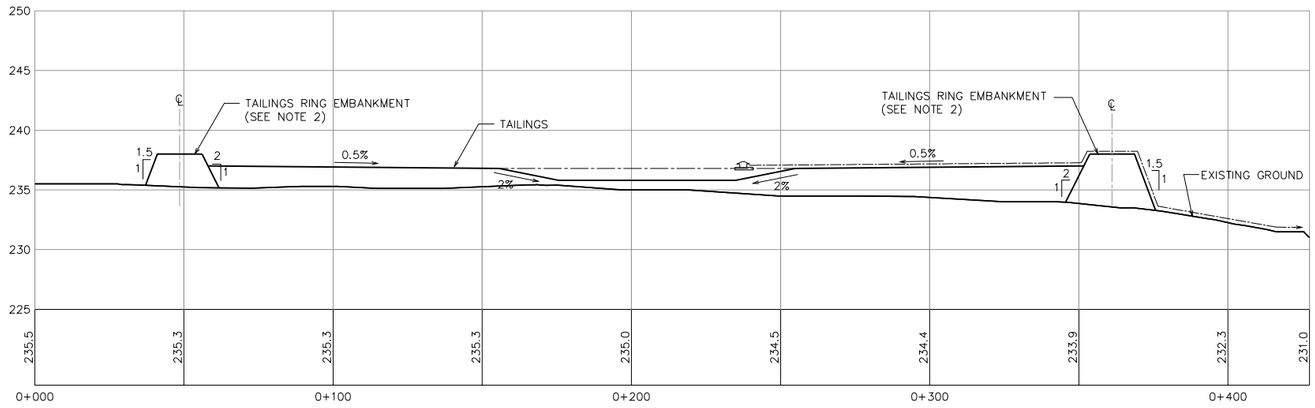

TAILINGS MANAGEMENT FACILITY - SECTION 1-1
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NOTES:

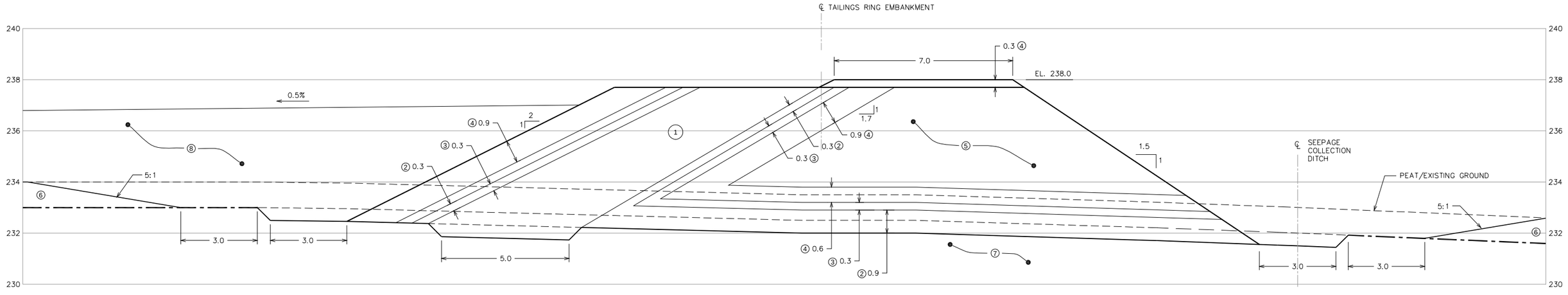
1. ALL DIMENSIONS, ELEVATIONS AND COORDINATES SHOWN ON THIS DRAWING ARE IN METRES UNLESS OTHERWISE INDICATED.

2. TAILINGS RING EMBANKMENT IS DESIGNED TO PROVIDE SAFE CONTAINMENT OF ONE YEAR OF TAILINGS PRODUCTION VOLUME AND AT THE SAME TIME ALLOW FOR CONVERSION INTO A PERMANENT TAILINGS RETENTION FACILITY CAPABLE OF STORING SIX YEARS OF TAILINGS VOLUME IN CASE THE BUCKO LAKE SUBAQUEOUS TAILINGS DISPOSAL DOES NOT GET A REGULATORY APPROVAL FOR MINE LIFE YEARS TWO TO SIX.

LEGEND:

MATERIAL ZONES

① LOW PERMEABILITY CORE (CLAY SILT)
② FILTER TRANSITION (FINE)
③ FILTER TRANSITION (COARSE)
④ FINE ROCKFILL
⑤ ROCKFILL
⑥ PEAT
⑦ CLAY SILT
⑧ TAILINGS



TAILINGS RING EMBANKMENT - SECTION 2-2
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	REFERENCES					

REV.	NAME	COMPANY	DATE
A	A. ZIVKOVIC		12/12/07
	P. ENG. SEAL AND SIGNATURE		

BUCKO LAKE NICKEL PROJECT
INTERIM TAILINGS STORAGE FACILITY
RING EMBANKMENT SECTIONS AND DETAIL

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R.R	ASZ	ASZ	FIGURE 3	A
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2.4 TAILINGS TRANSPORT

Tailings will be pumped from the mill to the interim storage cell via an overland pipeline (nominal 4 inch PVC) routed alongside the mine access road. The tailings line will be paired with a reclaim water line (nominal 4 inch PVC) to enable the recovery and re-use of excess tailings wastewater in the mill process and minimise the reliance on fresh makeup water from Bucko Lake.

2.5 WATER BALANCE AND WATER MANAGEMENT

The water balance for the interim tailings storage cell is detailed in Table 3 for average precipitation conditions and in Table 4 for 100 year wet precipitation conditions. The system will be operated to keep all the tailings in a saturated condition, with the tailings in the centre of the basin under a water cover that also functions as a reclaim pond.

Under both precipitation regimes, tailings wastewater and precipitation inflows will be approximately balanced by evaporation, reclaim, and losses to tailings voids. Water reclaim will be operated at 85% of tailings water loading to the cell, except during the first month of operation when it is necessary to build up a reclaim pool. At that reclaim rate, it is expected that the interim tailings storage cell can be operated as a zero discharge facility. Maintaining 85% reclaim is not expected to be a problem for the mill given that it has been designed for almost 100% reclaim from the Bucko Lake Tailings Impoundment Area (TIA).

Table 3. ITSF Water Balance – Average precipitation

	2008					2009						
Month	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Precipitation (mm)	73.9	62.4	41.4	32.8	26.3	18.2	15.9	20.6	26.0	44.4	69.4	86.1
Evapaporation (mm)	90	60	20	0	0	0	0	0	0	60	100	110
Tonnes Ore Milled	15,573	22,930	24,000	24,518	29,881	29,532	29,532	29,532	28,626	28,626	28,626	28,626
Water Inflows (m3)												
Water in tailings	37411	55085	57654	58898	71783	70943	70943	70943	68767	68767	68767	68767
Precipitation	4877	4877	4118	2732	2165	1736	1201	1049	1360	1716	2930	4580
Water Losses (m3)												
Water in Tailings Voids	5244	7721	8081	8255	10061	9943	9943	9943	9638	9638	9638	9638
Evaporation	5940	3960	1320	0	0	0	0	0	0	3960	6600	7260
Reclaim to Mill (85%, see note 1)	28058	46822	49006	50063	61015	60302	60302	60302	58452	58452	58452	58452
Net Addition/Loss (m3)	3047	1459	3366	3312	2871	2434	1899	1748	2036	-1567	-2993	-2003
Accumulated Water (m3)	3047	4506	7872	11184	14055	16489	18388	20136	22172	20605	17612	15609
Makeup Water Needed (m3)	9353	8263	8648	8835	10767	10642	10642	10642	10315	10315	10315	10315

Note 1. Reclaim up to 75% in month 1, 85% thereafter.

Table 4. ITSF Water Balance Under 100 Year Return Wet Precipitation Conditions

	2008					2009						
Month	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
Precipitation (100 y wet year) (mm)	91.5	77.3	51.3	40.6	32.6	22.5	19.7	25.5	32.2	55.0	85.9	106.6
Evaporation (mm)	90	60	20	0	0	0	0	0	0	60	100	110
Tonnes Ore Milled	15573	22930	24000	24518	29881	29532	29532	29532	28626	28626	28626	28626
Water Inflows (m3)												
Water in tailings	37411	55085	57654	58898	71783	70943	70943	70943	68767	68767	68767	68767
Precipitation	6038	6038	5099	3383	2680	2149	1487	1299	1683	2124	3628	5671
Water Losses (m3)												
Water in Tailings Voids	5244	7721	8081	8255	10061	9943	9943	9943	9638	9638	9638	9638
Evaporation	5940	3960	1320	0	0	0	0	0	0	3960	6600	7260
Reclaim to Mill (85%, see note 1)	28058	46822	49006	50063	61015	60302	60302	60302	58452	58452	58452	58452
Net Addition/Loss (m3)	4207	2620	4346	3962	3386	2847	2185	1997	2360	-1159	-2295	-913
Accumulated Water (m3)	4207	6828	11174	15136	18522	21370	23555	25552	27912	26753	24458	23545
Makeup Water Needed (m3)	9353	8263	8648	8835	10767	10642	10642	10642	10315	10315	10315	10315

Note 1. Reclaim up to 75% in month 1, 85% thereafter.

2.5.1 SEEPAGE MANAGEMENT

The interim storage cell dykes will not fully control seepage, with some seepage through the dykes expected and collection and control measures incorporated in the design for seepage collection (Figure 3). All seepage that reports to the perimeter collection ditch will be pumped back into the cell to maintain saturated conditions in the tailings pile and ensure that sufficient water is available for reclaim to the mill process.

2.5.2 PROCESS MAKEUP WATER

Process makeup water will be drawn from Bucko Lake. Estimated makeup water requirements are approximately 380 m^3/1,000 tonnes of ore. Implementation of the interim tailings storage approach will require the use of about 15% more fresh process makeup water than will be needed once the lake-based tailings disposal system is implemented in Year 2 of the project.

The process makeup water requirement represents a small withdrawal from the lake during the open water season, requiring from 1.5% (May) to 6.8% (October) of monthly watershed runoff (Table 5). Bucko Creek flows are expected to be proportionately reduced (i.e., May flows by 1.5% and October flows by 6.8%). Lake volume is not expected to be affected during the open water season.

The withdrawal of process makeup water from Bucko Lake will have a measureable effect on the lake volume during the winter months. Under ice cover, the process makeup water withdrawals from Bucko Lake will progressively reduce the under ice water volume. Over the 6 month period (approximate) of ice cover, the mill process will withdraw approximately 61,850 m^3 of water from Bucko Lake (Table 3). Assuming the mean maximum winter ice thickness is 0.74 m, as observed on Bucko Lake in the baseline studies (Wardrop 2007; p. 70), this represents an approximately 8.5% reduction of the under-ice water volume.

Table 5. Comparison of process makeup water withdrawals from Bucko Lake and watershed runoff/Bucko Creek flows.

	2008			2009			
	Aug	**Sep**	**Oct**	**Apr**	**May**	**Jun**	**Jul**
Watershed Runoff/Bucko Creek Flow (m3)	228351	192816	127926	607700	702460	214446	266049
Makeup Water Needed (m3)	9353	8263	8648	10315	10315	10315	10315
% of Runoff/Flow	4.1	4.3	6.8	1.7	1.5	4.8	3.9

2.6 CLOSURE AND RECLAMATION

Crowflight intends to switch tailings disposal to Bucko Lake as soon as possible after the federal approval process has been completed. At that time, all tailings in the interim storage cell will be transferred to Bucko Lake and the storage cell will be decommissioned.

The tailings will be transferred to Bucko Lake by pumping water into the storage cell to re-suspend the tailings and allow pumping as a slurry into the Bucko Lake TIA. Once the cell has been emptied of tailings, the inner faces of the impoundment dykes will be hosed clean of tailings and then the dykes will be dismantled and the tailings and reclaim pipelines will be removed. The waste rock component of the dykes will be transferred to the waste rock dump (Figure 4). The clay and sand core materials will be segregated and stockpiled separately for later use in site closure and reclamation at the end of the mine life. The tailings and reclaim piping will be used in the Bucko Lake TIA tailings distribution system.

Residual tailings on the bottom of the impoundment will be bladed up and disposed of in the Bucko Lake TIA. Based on experience in the forest industry with the re-vegetation of similar habitat, vegetation establishment is expected to be most successful if the stripped organic matter is not replaced on the site. Peat can be stockpiled for approximately 1 year. After that time it becomes too dry for effective use as a germination substrate. Instead, Crowflight will contour the margins of the disturbed area and develop appropriate drainage so that precipitation does not accumulate, flooding out the germinants and impeding vegetation establishment.

The most successful method of re-vegetating the site following cell decommissioning will be by means of artificial regeneration. Depending on the amount of compaction to the soil as a result of operations, mechanical site preparation (e.g., disc-trenching) may be required prior to planting or seeding activities. Black spruce seedlings and/or seed used to regenerate the site will be obtained from the Nelson River Seed Zone (Forestry Branch 2003a), and efforts will be made to establish a forest stand(s) with a composition similar to the previous site. If artificial regeneration by means of tree planting is the preferred treatment, spruce seedlings should be treated with mycorrhizae (natural soil fungi) prior to planting. This may assist in the long-term success of vegetation establishment by adding nutrients to temporarily nutrient deficient soil.

As a best management practise, Crowflight will attempt to maintain mature vegetation (trees) around the cell in order to promote natural regeneration by seeding from the adjacent stands after decommissioning. This is especially effective when there are mature trees oriented perpendicular to the prevailing wind, as will be the case on the interim storage site.

Crowflight will monitor the site annually for re-vegetation progress to ensure seedling quantity and health and that the vegetation is self-sustaining.

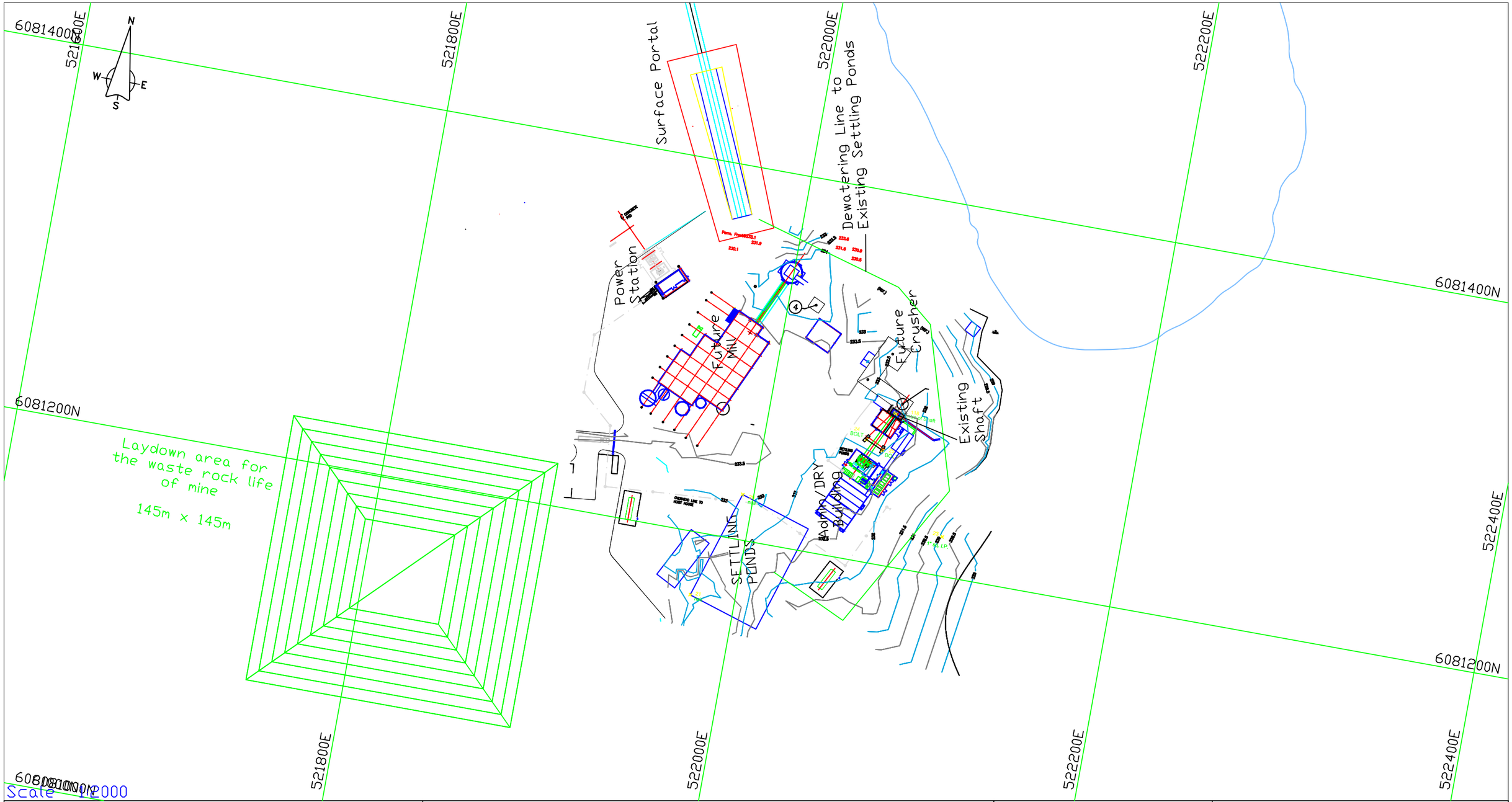

Figure 4: Site Plan with Portal

ENGINEERING – DESIGN APPROVALS							
TITLE	SIGNATURE	DATE	REQ'D BY	TITLE	SIGNATURE	DATE	REQ'D BY
DEV. SUPV.			⊕	CHIEF MINE ENG.			☐
PLANNING SUPV.			⊕	MINE PROD. SUPT.			☐
GROUND CONTROL			☐	MINE OP. MANAGER			☐
LEVEL ENG.			⊕	OTHER			☐
VENTILATION			☐				☐
GEOLOGY			☐	DRAWN BY:	Steven Black		
CAPTAIN			☐	FOR MORE INFO CALL MINE PLANNING @			

DUMAS mining + engineering + construction

crowflight minerals inc.

DEPT.	Mine Planning
	LEVEL Surface SUB
	Site Plan with Portal
	DWG. NO.:
DATE	9/21/2007
SCALE	1:1000

3.0 ENVIRONMENTAL IMPACT ASSESMENT

The environmental setting of the Bucko Lake Nickel Project was detailed in the Environment Act License Proposal for the project (Wardrop 2006) and in the Tailings Disposal Alternatives Analysis (Wardrop 2007) prepared to support the review and approval of Bucko lake for sub-aqueous tailings disposal. The following assessment is based on the information originally presented in these documents.

3.1 TERRESTRIAL RESOURCES

3.1.1 SOILS AND VEGETATION

The interim storage facility will be developed in a small (6.6 ha) area that is currently in lowland black spruce forest cover. Development and operation of the storage area will require clearing of the existing tree cover, the stripping of organic overburden along the dyke alignments, and some additional loss of surficial organic overburden in the subsequent tailings removal during closure and reclamation.

The trees on the site will be made available for harvest prior to facility development so that the current timber value will be realised. No vegetation species at risk are known or are likely to occur on the facility site.

The disturbed area will be closed out and re-vegetated promptly at the end of the interim tailings storage period. Site preparation will begin in March 2008, construction will be complete in July 2008, and decommissioning will begin in September 2009 and be complete in summer 2010 for a total elapsed time of approximately 30 months.

Given the small affected area, that no vegetation species at risk will be affected, that existing forest cover will be harvested prior to construction, and that the site will be reforested promptly, the interim tailings disposal facility is not expected to significantly increase the overall environmental impact of the Bucko Lake Nickel Project on soils or vegetation.

3.1.2 WILDLIFE AND HABITAT

The interim tailings storage system will involve the removal of all trees and surficial habitat from approximately 6.6 ha of lowland black spruce forest habitat. This will result in the displacement of any resident wildlife from the site from the beginning of site development until the completion of closure and reclamation, a period of approximately 30 months. Specific considerations are detailed below.

The proposed interim tailings storage facility development area represents a very slight disturbance when compared to the disturbance of created by annual harvesting on the Nelson River Forest. The ITSF is equal in size to approximately 0.29% of the 2007-08 Tolko annual harvest area for FMU 83 (Tolko 2007) .

Forest cover on the site will be cleared in late winter (March) 2008 so that no nesting migratory birds will be disturbed by the development. However, the resumption of site use by migratory birds will likely be negligible until reclamation has been completed.

The facility and all related disturbance are located outside the woodland caribou winter and summer range (Figure 5), so the facility development is not expected to affect this species at risk.

Once the site has been closed out and reclaimed and vegetation re-growth has been initiated, wildlife will begin to re-colonise the site. The first to return to the site will be burrowing mammals and ground nesting birds, with raptors hunting on the site. Mammal and bird community diversities will progressively increase as forest cover re-establishes. Given the small area of disturbance, its location outside any woodland caribou summer or winter range, the short period of use for the project, and the proposed prompt reclamation, the interim tailings disposal facility is not expected to significantly increase the overall environmental impact of the Bucko Lake Nickel Project on wildlife or habitat.

3.2 AQUATIC RESOURCES

3.2.1 WATER QUALITY

The interim tailings storage system is not expected to produce a discharge to surface waters during the one year of operation. No change in Bucko Lake water quality is expected.

3.2.2 HYDROLOGY

The interim tailings storage approach will have a small effect on Bucko Lake outflows, and consequently on Bucko Creek flows, during the open water season, as shown in Table 5, resulting from the water withdrawals for process makeup water. Flows in Bucko Creek will be reduced by from 1.5% (May) to 6.8% (October). Given that Bucko Creek in its natural state is not passable to fish (Wardrop 2006), these small, short-term reductions in flow will not affect the quality or availability of habitat for fish.

No effect on Bucko Lake level is expected during open water periods and, therefore, no effect on the quality or accessibility of fish habitat during the open water period is expected.

0 2 4 6 8 km

SCALE APPROXIMATE

LEGEND

- MINE SITE
- CARIBOU SUMMER RANGE
- BUFFER ZONE 1000m
- MINERAL LEASE AREAS
- CARIBOU WINTER RANGE
- CARIBOU CALVING RANGE
- MINERAL CLAIMS

NO.	DESCRIPTION	DATE	ISSUED BY

REVISIONS/ISSUE

WARDROP | Engineering Inc.

CLIENT

Crowflight Minerals Inc.

DRAWING DESCRIPTION

FIGURE 5 WOODLAND CARIBOU SUMMER, WINTER AND CALVING RANGES
BUCKO LAKE NICKEL PROJECT, WABOWDEN, MB

DESIGNED BY: DR	DRAWN BY: ET	DRAWING NO.	REV.
CHECKED BY:	DATE: 07.05.22	0651790100-SKT-R0025	C

B (11" x 17")

Under ice cover, the process makeup water withdrawals from Bucko Lake will progressively reduce the under ice water volume. Over the approximately 6 month period of ice cover, the mill process will withdraw approximately 61,850 m^3 of water from Bucko Lake, which represents approximately 8.5% of the under-ice water volume based on the maximum ice thicknesses observed during the baseline study (Wardrop 2007). This water withdrawal is expected to result in an approximately 8 cm reduction in lake level. The resulting under ice water level and volume reductions will be a one-time short-term occurrence limited to the single winter (2008/2009) of interim storage facility operation.

Most studies of the effects of water withdrawals during periods of ice cover have considered much larger reductions of level and volume than will occur in Bucko Lake during the interim tailings storage period, as might occur in the level drawdown of several metres as might occur in a hydroelectric reservoir over winter (e.g., Turner et al 2005; Rosenberg et al. 1987) with the resulting exposure and desiccation of the littoral zone.

More applicable to this project is a recent study by Cott (2007), which examined the effects of water withdrawals in the range of 10% to 20% of the under ice lake volume, and found no measureable adverse effects on the fish populations as a result of these one-time withdrawals. Alaska permits the withdrawal of up to 30% of the under-ice lake volume in lakes inhabited by fish species that are tolerant of low oxygen conditions (Morris in Cott 2007), such as the brook sticklebacks and fathead minnows that occur in Bucko Lake, and up to 15% of the under-ice volume in lakes inhabited by fish species sensitive to low oxygen concentrations.

Prior to the work by Cott (2007) the Department of Fisheries and Oceans would permit no more than a 5% withdrawal of the under-ice water volume (DFO 2005), with this guideline based on the precautionary principle in the absence of any supporting research in northern Canada (Cott 2007). Given Cott's research findings and practice in Alaska, it is not expected that the one winter of withdrawal from Bucko Lake will have a significant adverse effect on fish or fish habitat in the lake. Cott (2007) recommended that the guidelines be increased to allow withdrawal of up to 10% of the under-ice volume.

The process water intake will be screened in accordance with the *Freshwater Intake End-of-Pipe Fish Screen Guideline* (DFO 1995) to prevent the entrainment of fish and the withdrawal will be taken from a depth below 2 m to minimise entrainment of the oxygenated microlayer at the underside of the ice surface.

3.2.3 FISH AND FISH HABITAT

Based on the above, no effects on fish or fish habitat, direct or indirect, are expected to occur as a result of the interim tailings storage facility.

4.0 CONCLUSIONS

The proposed interim tailings storage facility has been developed as zero discharge facility to provide interim storage of tailings produced by the proposed Bucko Lake Mine for a period of up to 1 year, beginning in August 2008. This facility can be developed, operated, and closed without significantly increasing the overall environmental impact of the project. As such, the proposed alteration to the project proposal should be considered as a minor change to the project.

5.0 REFERENCES

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