



ABORIGINAL AFFAIRS AND NORTHERN  
DEVELOPMENT CANADA

October 24, 2011

Mark Cliffe-Phillips  
Executive Director  
Wek'eezhii Land and Water Board  
#1-4905 48th Street  
Yellowknife, NT X1A 3S3

Dear Mr. Cliffe-Phillips,

Re: **AANDC RECLAIM Cost Estimate (October 2011) - Diavik Diamond  
Mines Incorporated MV2007L2-0003 – Diavik Mine Site**

Thank you for your letter dated October 13, 2011. In that correspondence you direct Aboriginal Affairs and Northern Development Canada (AANDC) to:

*“submit a reclamation liability estimate by October 24th, 2011, along with supporting rationale and any evidence for any line items that are different from the Diavik estimate.”*

AANDC is pleased to provide the attached RECLAIM cost estimate and associated rationale to the Wek'eezhii Land and Water Board for their consideration at their upcoming November 2011 meeting. AANDC retained Brodie Consulting Limited in the development of this estimate and associated rationale.

I trust this information will be useful to the Board. Should you have any questions feel free to contact Mr. Nathen Richea at (867) 669-2657 [Nathen.Richea@aandc.gc.ca](mailto:Nathen.Richea@aandc.gc.ca) or the undersigned at (867) 669-2574 or [Robert.Jenkins@aandc.gc.ca](mailto:Robert.Jenkins@aandc.gc.ca)

Sincerely,

Robert Jenkins  
Manager – Water Resources Division  
Aboriginal Affairs and Northern Development Canada

**ABORIGINAL AFFAIRS AND NORTHERN DEVELOPMENT CANADA**  
**RECLAIM COST ESTIMATE FOR THE DIAVIK DIAMOND MINE**  
**(OCTOBER 2011)**  
**MV2007L2-0003**

## **INTRODUCTION**

AANDC and the WLWB have a defined relationship within the *Mackenzie Valley Resource Management Act* in regards to the setting and holding of reclamation security. In simple terms, the WLWB is responsible for setting the amount of financial security held against a project and AANDC is responsible to approve the form of security and hold it on behalf of the Crown.

The onus is on the Board to ensure that an appropriate security amount is established within water licence and land use permit authorizations, so that the cost of reclamation, including shutdown, closure and post-closure, is born by the operator of the mine rather than the Crown.

Through this submission, AANDC is acting as a technical advisor to the WLWB. The amount provided herein represents AANDC's estimate of the total land and water-related liability at the Diavik diamond mine at the end of operations. It is respectfully submitted that this amount be used by the Board in the establishment of land and water reclamation security.

## **BACKGROUND**

AANDC participated in the review process for Diavik Diamond Mines Incorporated's (DDMI) revised Interim Closure and Reclamation Plan (ICRP). At that time, AANDC also reviewed DDMI's associated reclamation cost estimate (December 2010).

On February 22, 2011, the Wek'eezhii Land and Water Board (WLWB) requested that Aboriginal Affairs and Northern Development Canada (AANDC) prepare and submit a RECLAIM cost estimate for the total liability associated with the Diavik mine site

Following review of DDMI's cost estimate, AANDC as per advice from its technical expert forwarded two information requests to DDMI relevant to preparation of a RECLAIM estimate on March 3<sup>rd</sup> and April 8, 2011. DDMI responded on March 9, 2011 and April 8, 2011, respectively.

Using the information contained within the December 2010 version of the ICRP as well as the responses from information requests, AANDC generated a reclamation cost estimate using the RECLAIM model, version 6.1., and provided that estimate to the WLWB on April 18, 2011. An end-of-mine liability (year 2022) of \$166,619,696.00 was presented to the WLWB.

Since the provision of that estimate, additional meetings were held during June and September 2011 to discuss the respective estimates. Ultimately, the Board rendered a decision in regard to the submitted Interim Closure and Reclamation Plan. Presently, the Board has approved version 3.2 of the Plan.

This document provides the current AANDC estimate with respect to the total land and water-related reclamation liability at the Diavik diamond mine at the end of operations. Any changes to the AANDC RECLAIM cost estimate which occurred between April 18, 2011 and October 24, 2011 will be described, as well as any major differences between the respective estimates. AANDC rationale for these differences will be presented. This approach should meet the requirements of the WLWB directive issued on October 13, 2011.

## **GUIDING PRINCIPLES – AANDC RECLAIM COST ESTIMATE**

The estimate, as presented, is developed in accordance with the “Mine Site Reclamation Policy for the Northwest Territories” (AANDC, 2002). This Policy outlines Departmental principles with respect to sustainable resource development in the north, including:

1. Adequate security should be provided to ensure the cost of reclamation, including shutdown, closure and post-closure, is born by the operator of the mine rather than the Crown;
2. Following mine closure, mining companies or their future owners should continue to be responsible for the site, including the remediation of any additional environmental complications which develop;
3. Every mine should, at all times, have a mine closure and reclamation plan, which includes measures to be taken in the event of a temporary closure.
4. Estimates of reclamation costs, for the purposes of financial security should be based on the cost of having the necessary reclamation work done by a third party contractor if the operator defaults. The estimates should also include contingency factors appropriate to the particular work to be undertaken.

## **ASSUMPTIONS – AANDC RECLAIM COST ESTIMATE**

This estimate was based on the following assumptions:

- The company goes bankrupt or abandons the property,
- No allowance for progressive reclamation,
- All work is based on independent contractor rates,
- All costs are 2011 Canadian dollars, respectively,
- The cost estimate does not include revenue from recovery of assets,
- The mine is developed substantially as planned,
- The estimate does not include costs for catastrophic events such as failure of dams, dikes or dump slope,
- If discrepancies in provided information are identified, they must be verified and validated by a qualified individual,
- A21 kimberlite pipe is not developed as originally planned and permitted,
- Cover designs for the NCRP and PKC remain as approved in the 2001 ICRP,
- A quarry to acquire NPAG rock for cover of the North Country Rock Pile (NCRP) and Processed Kimberlite Containment (PKC) facility is required until detailed information regarding the specific locations, volumes, and accessibility of Type I rock necessary to meet closure design criteria is provided by DDML.

## **2011 AANDC RECLAIM ESTIMATE - METHODOLOGY:**

The RECLAIM model, version 6.1, was used in the preparation of this estimate. This incorporated the most current unit cost information available to the Department. Unit costs are regularly updated, based upon third party cost information experienced at AANDC - Contaminants and Remediation Directorate sites, where possible.

It is important to note that the RECLAIM model is not a statistical model. It relies solely upon user entry values and does not manipulate those entry values other than to multiply or add the values for the user. Accordingly, a sound understanding and comprehension of the reclamation approach required at a site is required when preparing an estimate.

The RECLAIM model is broken down into a series of mine components (e.g. Open Pit), and then into a series of activities (i.e. "line items"). A unit value is entered within each line item, and then the user must decide the unit cost code which applies to that activity. The model will then multiply the unit value by the unit code for the user. The sum of the mine components is added to generate a subtotal, and as a final step, the user must decide values for project management, engineering, and contingency. These values are calculated as a percentage of the subtotal and then added to the subtotal.

The final calculation provides an estimate of the total reclamation security. This total reclamation security amount is the sum of the water related reclamation security and land related reclamation security. AANDC maintains that only the water related reclamation security be posted within the Type A water licence. Land related reclamation security is to be posted appropriately within land use authorizations or other appropriate instruments.

AANDC would like to note that where possible information provided by the proponent was utilized, in an effort to minimize the need to make assumptions within the cost estimate. An example of this was the utilization of updated building areas provided by the proponent. However, it must be clear that should insufficient information exist or the level of detail be lacking, AANDC must follow a "precautionary approach" as described within the 2002 Mine Site Reclamation Policy. Should additional detailed information become available to the Department at a later date the estimate can be revisited.

## **OCTOBER 24, 2011 AANDC COST ESTIMATE - RESULTS**

Full details of the October 24, 2011 AANDC RECLAIM cost estimate are provided as Appendix A. Following submission of the AANDC cost estimate on April 18, 2011, meetings were held between the parties in June and September 2011. Following the discussions at these meetings, AANDC modified its April 18<sup>th</sup> estimate where it deemed appropriate (Appendix B).

The current AANDC estimate of total land and water-related liability (end-of-mine) associated with the Diavik Diamond Mine is \$156,890,022.00. This is approximately a 10 million dollar decrease from the previous cost estimate submitted by AANDC in April 2011 (\$166,619,696.00). Prior to a comparison of this estimate with the DDMI cost estimate, AANDC feels that it would be beneficial to the Board if the differences in our cost estimate were explained. Table 1 provides a breakdown by mine component of the April 18, 2011 AANDC estimate to the October 24, 2011 AANDC cost estimate.

<b>Mine Component</b>	<b>April 2011</b>	<b>October 2011</b>
Open Pit	\$1,760,097.76	\$1,760,097.76
Underground Mine	\$1,381,493.06	\$1,381,493.06
Tailings	\$53,806,469.58	\$47,502,894.06
Rock Pile	\$30,993,905.96	\$29,813,116.96
Buildings and Equipment	\$16,078,169.98	\$16,078,169.98
Chemicals and Soils Management	\$2,123,417.00	\$2,123,417.00
Water Management	\$1,119,553.99	\$1,119,553.99
Mobilization / Demobilization	\$10,332,540.00	\$10,332,540
Monitoring and Maintenance	\$16,845,117.00	\$16,845,117
Project Management (5%)	\$5,363,155.00	\$4,988,937
Engineering (5%)	\$5,363,155.00	\$4,988,937
Contingency (20%)	\$21,452,621.00	\$19,955,749
<b>Total</b>	<b>\$166,619,696.00</b>	<b>\$156,890,022.00</b>

It can be seen from Table 1 that costs associated with the Tailings and Rock Pile mine components were reduced by approximately 7 million. This in turn reduced percentage values calculated on the subtotal amount by approximately 3 million.

### Tailings

The Tailings mine component is reduced by \$6,303,575.52. This is associated with a reduction in the amount of Type I rock required for the PKC cover to be generated through development of a quarry. The original cost estimate included an allocation for a shortfall of 6,122,000 m<sup>3</sup> of Type I material for covering the PKC. Amounts were held for the quarrying of this material. Through its discussions with DDMI, AANDC has refined this number to include the use of Type III material under the till layer in the PKC. This reduces the Type I shortfall to 4,322,000 m<sup>3</sup>.

### Rock Pile

The Rock Pile mine component is reduced by \$1,180,789.00. During the June 2011 meeting of the parties, DDMI identified several line items within the Rock Pile mine component which were not consistent with the assumption that the A21 mine development will not be built and not consistent with the 2001 ICRP. Accordingly, AANDC removed several line items from its estimate with respect to stabilizing slopes and covering dumps (items related to A21).

**COMPARISON OF DIFFERENCES - OCTOBER 24, 2011 AANDC COST ESTIMATE AND 2011 DDMI ESTIMATE**

Table 2 provides a comparison of the current AANDC RECLAIM cost estimate (October 24, 2011) versus the 2011 DDMI estimate.

<b>Mine Component</b>	<b>AANDC</b>	<b>DDMI</b>
Open Pit	\$1,760,097.76	\$1,751,823
Underground Mine	\$1,381,493.06	\$1,182,098
Tailings	\$47,502,894.06	\$31,827,045
Rock Pile	\$29,813,116.96	\$23,066,005
Buildings and Equipment	\$16,078,169.98	\$14,984,746
Chemicals and Soils Management	\$2,123,417.00	\$1,492,549
Water Management	\$1,119,553.99	\$1,352,910
Mobilization / Demobilization	\$10,332,540	\$277,196
Monitoring and Maintenance	\$16,845,117	\$16,741,292
Project Management (5%)	\$4,988,937	\$3,782,859
Engineering (5%)	\$4,988,937	\$3,782,859
Contingency (20%)	\$19,955,749	\$15,131,435
<b>Total</b>	<b>\$156,890,022.00</b>	<b>\$115,372,817</b>

Overall, the AANDC estimate was approximately 41 million dollars higher than the DDMI estimate. It became apparent throughout this process that there were three main areas of difference between the AANDC and DDMI estimates. This included the rock pile, tailings, and mobilization/demobilization mine components. For these components, the AANDC estimate was substantially higher than that of the DDMI estimate and accounted for approximately 33 million dollars in observed difference. The remaining 8 million dollars is largely tied to the percentages held for project management, engineering, and contingency. AANDC notes that the percentages used in both estimates were the same (Project Management – 5%; Engineering – 5%; and Contingency – 20%), however, the AANDC line item subtotal upon which these percentages were

calculated was approximately 25 million higher than that of DDMI. This in turn resulted in higher values.

### Key areas of Difference

To meet the request of the Board as provided on October 13, 2011:

*“submit a reclamation liability estimate by October 24th, 2011, along with supporting rationale and any evidence for any line items that are different from the Diavik estimate.”*

AANDC provides below a description of the three mine components which comprise the major overall differences between the AANDC and DDMI estimates, along with a rationale for the AANDC estimated amounts.

### Tailings and Rock Pile

The Tailings and Rock Pile mine components within the model include costs associated with the reclamation of the processed kimberlite containment area (PKC) and North Country Rock Pile (NCRP).

The AANDC estimate for the Tailings mine component is \$47,502,894.06 and the DDMI estimate is \$31,827,045.00. This is an overall difference of \$15,675,849.06. This difference is attributed mainly to a single line item within the AANDC estimate. Specifically, the AANDC estimate includes an allocation of \$15,135,585.00 to construct a quarry to make up the shortfall of 4,322,000 m<sup>3</sup> of Type I (Non-Potentially Acid Generating) rock to be used in the PKC cover.

The AANDC estimate for the Rock Pile mine component is \$29,813,116.96 and the DDMI estimate is \$23,066,005.00. This is an overall difference of \$6,747,111.96. This difference is attributed mainly to a single line item within the AANDC estimate. Specifically, the AANDC estimate includes an allocation of \$6,706,304.00 to make up the shortfall of 1,915,000 m<sup>3</sup> of Type I (Non-Potentially Acid Generating) rock to be used in the NCRP cover.

The rationale associated with the AANDC cost estimates for these two mine components are discussed together as they are both associated with the need to quarry Type I rock for placement as covers. AANDC has included within its cost estimate closure of the NCRP and PKC as approved within the 2001 ICRP. The closure design for these facilities includes a cover comprised of till and coarse Type I rock.

### Concerns with Potential Short-Fall of Type I Rock for Cover Purposes

AANDC discussed its concerns regarding a potential shortfall of Type I rock for use as cover material for the PKC and NCRP within its April 18, 2011 RECLAIM cost estimate submitted to the Board. AANDC will not reiterate that information within this document as it is already on the public record. AANDC requests that the Board review that information as it is pertinent to this discussion.

Since April, meetings of the parties have been held in June and September 2011. The main focus of these meetings was to discuss this issue. Additional information provided by DDMI on this topic is attached as Appendices C and D.

As identified previously, AANDC continues to include an allocation within its RECLAIM cost estimate for operation of a quarry to generate a total of 6,237,000 m<sup>3</sup> of Type I rock for use in covering the PKC and NCRP. The information provided to date by DDMI, including the most recent information provided on October 13, 2011, is not at the level to which the Crown would consider adequate to substantiate a 40 million dollar reduction in security.

The information provided on October 13, 2011 did include powerpoint schematics, summary tables, conceptual re-mining approaches, and statements based on internal reviews of information. The detailed information upon which statements within this letter are based, and upon which schematics and summary tables have been generated, has not been provided. No engineered drawings have been provided to date nor has any information been signed off by a professional engineer, professional geologist, or other individual with an appropriate designation.

Based upon a schematic provided to the Department by DDMI in December of 2010, AANDC had made an assumption that the entire NCRP is a blend of Type II and III rock. In its October 13, 2011 letter, DDMI apologized for any confusion and provided a schematic upon which it requested the Department utilize moving forward. Such confusion only raises the Department's concern that this new information be appropriately validated and verified, prior to the Department removing the allocation for quarrying Type I rock within its current estimate.

Moving forward, AANDC strongly believes that this issue can be resolved. Since its meeting with DDMI on September 16, 2011, AANDC and its consultant, Brodie Consulting Limited, have been contemplating the level of detail necessary to alleviate concerns raised on this issue (Appendix E – Note values in Table I will be lower than provided due to further reductions made on October 20, 2011).

Due to the significant implication of this issue on reclamation cost and security provisions (~\$30 M for quarrying and associated project management, engineering, and contingency), AANDC recommends that an adequate level of

validation to this issue would be a study (pre-feasibility level or higher), signed off by a registered professional (P.Eng/P.Geo).

The study should address concerns that:

- a. There is a specified quantity of Type I resource
- b. There is a practical mining method for its recovery
- c. The residual NCRP is reclaimable consistent with ICRP (till and waste rock cover over Type II and III material)

Components of this study would include:

- i. Plan view drawings at each year end since the start of operations.
- ii. Spot records of waste dump truck management
- iii. Spot geochemical sampling
- iv. Mining plan which addresses slope angles, access ramps, and appropriate mining equipment for:
  1. the geometries involved
  2. range of rock size,
  3. cohesion (ice) and,
  4. mining rate.
- v. QA/QC plan.

AANDC feels that such a study is warranted in this situation and would provide AANDC with the level of confidence required that sufficient Type I rock is available, practically recoverable, and meets the design criteria for covering the PKC and NCRP. Once provided and verified, AANDC would be willing to modify its RECLAIM cost estimate accordingly.

In the meantime, AANDC continues to apply a precautionary approach with respect to this issue. A worst-case scenario would have been to assume that the entire volume of material is unavailable for closure, as it may be too difficult to delineate and/or access, as compared to accessing this material elsewhere (i.e. quarry). However, such a worst-case scenario has not been assumed. Based on the information provided, AANDC has assumed that 3,146,000 m<sup>3</sup> of the required 9,383,000 m<sup>3</sup> is readily available. This leaves a shortfall of material in the amount of 6,237,000 m<sup>3</sup>.

### Mobilization/Demobilization

The mobilization/demobilization component of the RECLAIM model includes costs associated with the mobilization of equipment and fuel for use in reclamation activities, as well as the mobilization and accommodation of workers who conduct reclamation activities.

The AANDC estimate for this component is \$10,332,540.00 and the DDMI estimate is \$277,196.00. This is an overall difference of \$10,055,344.00. This difference is attributed to several line items, including:

1. Mobilization of fuel and supplies (approximately \$6.5 M);
2. Mobilizing heavy equipment (approximately \$1.5 M) and;
3. Differences in costs associated with the accommodation and mobilization of a camp and workers (approximately \$2.0 M).

With respect to 1 and 2, the Crown cannot assume that equipment or fuel would be left onsite, nor can it be assumed that if it is left onsite that it would be suitable for use. It is assumed that a mine nearing receivership will take cost reduction/recovery steps to alleviate losses. As such, a precautionary approach must be used by the Crown as it is the only way through which collection of an appropriate security amount, adequate to protect the Crown against potential liability, can be determined.

With respect to #3, differences with the DDMI estimate are tied to differences in opinion on the amount of time required to mobilize and accommodate workers. AANDC estimates are based upon its experiences conducting reclamation activities at contaminated sites throughout the Territory.

## **SUMMARY TABLE – OCTOBER 2011 RECLAIM COST ESTIMATE**

AANDC has estimated the end of mine (2022) liability for the Diavik Mine Site at approximately \$156 M. A summary of the costs estimated and the land/water split calculated is identified within the following table. Full details of the October 2011 AANDC estimate are provided in Appendix A.

<b>SUMMARY OF COSTS</b>				
<b>COMPONENT TYPE</b>	<b>COMPONENT NAME</b>	<b>TOTAL COST</b>	<b>YEAR</b>	
			<b>Land Liability</b>	<b>Water Liability</b>
OPEN PIT	A514,A418	\$1,760,097.76	\$60,658	\$1,699,440
UNDERGROUND MINE	0	\$1,381,493.06	\$1,192,073	\$189,421
TAILINGS	0	\$47,502,894.06	\$42,862	\$47,460,032
ROCK PILE	0	\$29,813,116.96	\$615,961	\$29,197,156
BUILDINGS AND EQUIPMENT	0	\$16,078,169.98	\$14,659,457	\$1,418,713
CHEMICALS AND SOIL MANAGEMENT	0	\$2,123,417.00	\$1,036,709	\$1,086,709
WATER MANAGEMENT	0	\$1,119,553.99	\$0	\$1,119,554
POST-CLOSURE SITE MAINTENANCE		\$0.00	\$0	\$0
	<b>SUBTOTAL</b>	<b>\$99,778,743</b>	<b>\$17,607,718</b>	<b>\$82,171,024</b>
		<b>Percentages</b>	<b>17.6</b>	<b>82.4</b>
MOBILIZATION/DEMOBILIZATION	0	\$10,332,540	\$1,823,359	\$8,509,181
MONITORING AND MAINTENANCE	0	\$16,845,117	\$2,972,618	\$13,872,499
Market Factor Price Adjustment	0 %	\$0	\$0	\$0
PROJECT MANAGEMENT	5 %	\$4,988,937	\$880,386	\$4,108,551
ENGINEERING	5 %	\$4,988,937	\$880,386	\$4,108,551
CONTINGENCY	20 %	\$19,955,749	\$3,521,544	\$16,434,205
<b>GRAND TOTAL - CAPITAL COSTS</b>		<b>\$156,890,022</b>	<b>\$27,686,011</b>	<b>\$129,204,011</b>

## **CONCLUDING REMARKS**

AANDC hopes that the WLWB find the information contained within this RECLAIM cost estimate useful in their decision-making process for establishing an appropriate reclamation security amount for the Diavik mine site. While reviewing this document, AANDC urges the Board to keep in mind the principles contained within the AANDC Mine Site Reclamation Policy (2002). It is with these principles in mind that this cost estimate was prepared.

AANDC and the WLWB have a defined relationship within the *Mackenzie Valley Resource Management Act* in regards to the setting and holding of reclamation security. In simple terms, the WLWB is responsible for setting the amount of financial security held against a project and AANDC is responsible to approve the form of security and hold it on behalf of the Crown.

The onus is on the Board to ensure that an appropriate security amount is established within water licence and land use permit authorizations, so that the cost of reclamation, including shutdown, closure and post-closure, is born by the operator of the mine rather than the Crown.

It will be apparent to the Board that the major difference between the 2011 DDMI and AANDC cost estimates is associated with uncertainties in the availability and accessibility of suitable NPAG rock for closure of the PKC and NCRP.

AANDC hopes this outstanding issue can be resolved through the provision of additional information by DDMI. Should additional information be provided on this or any other issue, AANDC is willing to revisit its October 2011 RECLAIM cost estimate and modify as appropriate.

**APPENDIX A – OCTOBER 24, 2011 AANDC RECLAIM COST ESTIMATE**

**SUMMARY OF COSTS**

<b>COMPONENT TYPE</b>	<b>COMPONENT NAME</b>	<b>TOTAL COST</b>	<b>YEAR</b>	<b>End of Mine</b>
			<b>Land Liability</b>	<b>Water Liability</b>
OPEN PIT	A514,A418	\$1,760,097.76	\$60,658	\$1,699,440
UNDERGROUND MINE	0	\$1,381,493.06	\$1,192,073	\$189,421
TAILINGS	0	\$47,502,894.06	\$42,862	\$47,460,032
ROCK PILE	0	\$29,813,116.96	\$615,961	\$29,197,156
BUILDINGS AND EQUIPMENT	0	\$16,078,169.98	\$14,659,457	\$1,418,713
CHEMICALS AND SOIL MANAGEMENT	0	\$2,123,417.00	\$1,036,709	\$1,086,709
WATER MANAGEMENT	0	\$1,119,553.99	\$0	\$1,119,554
POST-CLOSURE SITE MAINTENANCE		\$0.00	\$0	\$0
	<b>SUBTOTAL</b>	<b>\$99,778,743</b>	<b>\$17,607,718</b>	<b>\$82,171,024</b>
		<b>Percentages</b>	<b>17.6</b>	<b>82.4</b>
MOBILIZATION/DEMOBILIZATION	0	\$10,332,540	\$1,823,359	\$8,509,181
MONITORING AND MAINTENANCE	0	\$16,845,117	\$2,972,618	\$13,872,499
Market Factor Price Adjustment	0 %	\$0	\$0	\$0
PROJECT MANAGEMENT	5 %	\$4,988,937	\$880,386	\$4,108,551
ENGINEERING	5 %	\$4,988,937	\$880,386	\$4,108,551
CONTINGENCY	20 %	\$19,955,749	\$3,521,544	\$16,434,205
<b>GRAND TOTAL - CAPITAL COSTS</b>		<b>\$156,890,022</b>	<b>\$27,686,011</b>	<b>\$129,204,011</b>

1		Open Pit Name: <u>A514,A418</u>		Pit # <u>1</u>				
ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost %	Land Cost	Water Cost	
A OBJECTIVE: CONTROL ACCESS								
Fence	m	300 fh		187.27	\$56,182	100%	\$56,182	\$0
. Signs	each	3 sh		37.08	\$111	100%	\$111	\$0
. Ditch, mat'l A	m3		#N/A	0	\$0		\$0	\$0
. , mat'l B	m3		#N/A	0	\$0		\$0	\$0
. Berm	m3		#N/A		\$0		\$0	\$0
B Block roads	m3	900 sb1h		4.85	\$4,365	100%	\$4,365	\$0
. Other			#N/A	0	\$0		\$0	\$0
.			#N/A	0	\$0		\$0	\$0
. OBJECTIVE: STABILIZE SLOPES								
excavate 4 breaches in dike	m3	48114 sc1h		8.5958	\$413,578		\$0	\$413,578
break concrete guides & wall	m3	1288 sc1h		8.5958	\$11,071		\$0	\$11,071
. construct fish habitat	m3		#N/A	0	\$0		\$0	\$0
. A 418	m3		#N/A	0	\$0		\$0	\$0
C excavate 3 breaches in dike	m3	36086 sc1h		8.5958	\$310,187		\$0	\$310,187
break concrete guides & wall	m3	1288 sc1h		8.5958	\$11,071		\$0	\$11,071
. construct fish habitat	m3		#N/A	0	\$0		\$0	\$0
A21	m		#N/A	0	\$0		\$0	\$0
. excavate 2 breaches in dike	m3		#N/A	0	\$0		\$0	\$0
break concrete guides & wall	m3		#N/A	0	\$0		\$0	\$0
. construct fish habitat	m3		#N/A	0	\$0		\$0	\$0
	kWh		#N/A	0	\$0		\$0	\$0
. Other			#N/A	0	\$0		\$0	\$0
.								
. OBJECTIVE: COVER/CONTOUR SLOPES								
. Fill, mat'l A	m3		#N/A	0	\$0		\$0	\$0
. , mat'l B	m3		#N/A	0	\$0		\$0	\$0
. Rip rap	m3		#N/A	0	\$0		\$0	\$0
. Vegetate	ha		#N/A	0	\$0		\$0	\$0
E Other			#N/A					
.			#N/A	0	\$0		\$0	\$0
. OBJECTIVE: SPILLWAY								
. Excavate channel, mat'l A	m3		#N/A	0	\$0		\$0	\$0
. , mat'l B	m3		#N/A				\$0	\$0
. Concrete	m3		#N/A	0	\$0		\$0	\$0
. Rip rap	m3		#N/A	0	\$0		\$0	\$0
. Other			#N/A	0	\$0		\$0	\$0
F			#N/A					
. OBJECTIVE: FLOOD PIT								
. Ditch, mat'l A	m3		#N/A	0	\$0		\$0	\$0
. , mat'l B	m3		#N/A	0	\$0		\$0	\$0
. Embankment, mat'l A	m3		#N/A	0	\$0		\$0	\$0
H , mat'l B	m3		#N/A	0	\$0		\$0	\$0
siphon installation/operation	each	6	#N/A	119925	\$719,550		\$0	\$719,550
silt curtains	each	6	#N/A	11731	\$70,386		\$0	\$70,386
remove pumps	each	4 pill		5618.2	\$22,473		\$0	\$22,473



**1 Underground Mine Name \_\_\_\_\_ UG Mine # \_\_\_\_\_ 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost		Cost %	Land Cost	Water Cost	
			Code	Unit Cost				
<b>A OBJECTIVE: CONTROL ACCESS</b>								
Fence	m	100	fh	187.272	\$18,727	100%	\$18,727 \$0	
Signs	each	4	sh	37.079856	\$148	100%	\$148 \$0	
Ditch, mat'l A	m3		#N/A	0	\$0		\$0 \$0	
, mat'l B	m3		#N/A	0	\$0		\$0 \$0	
Berm	m3	300	sb1h	5.238	\$1,571	100%	\$1,571 \$0	
Block adits	m3	320	clfh	460.68912	\$147,421		\$0 \$147,421	
Cap shaft	m3		#N/A	0	\$0		\$0 \$0	
Cap raises at A154/A418	m3	72	SRL	595.52496	\$42,878	100%	\$42,878 \$0	
soil cover on raise cap	m3	708	SB1L	3.1212	\$2,210	100%	\$2,210 \$0	
Cap raises at A 21	m3	0	SRL	595.52496	\$0	100%	\$0 \$0	
soil cover on raise cap	m3	0	SB1L	3.1212	\$0	100%	\$0 \$0	
Backfill adit A154	m3	100	SCSS	17.3502	\$1,735	100%	\$1,735 \$0	
Contour portal area, A154	m3	2500	SB1L	3.1212	\$7,803	100%	\$7,803 \$0	
Backfill adit, A21	m3	0	SCSS	17.3502	\$0	100%	\$0 \$0	
Contour portal area, A21	m3	0	SB1L	3.1212	\$0	100%	\$0 \$0	
concrete bulkhead, pit portal, A154	allow	1	#N/A	75000	\$75,000	100%	\$75,000 \$0	
concrete bulkhead, pit portal, A21	allow	0	#N/A	75000	\$0	100%	\$0 \$0	
Backfill open stopes	m3		#N/A	0	\$0		\$0 \$0	
remove decline surface infrastructure	allow	1	#N/A	1000000	\$1,000,000	100%	\$1,000,000 \$0	
<b>B OBJECTIVE: STABILIZE GROUND SURFACE</b>								
Backfill mine	m3		#N/A	0	\$0		\$0 \$0	
Collapse crown pillar	m3		#N/A	0	\$0		\$0 \$0	
Contour, mat'l A	m3		#N/A	0	\$0		\$0 \$0	
, mat'l B	m3		#N/A	0	\$0		\$0 \$0	
Maintain dewatering (see "MONITORING/MAINTENANCE" c			#N/A	0	\$0		\$0 \$0	
Other			#N/A	0	\$0		\$0 \$0	
<b>C OBJECTIVE: FLOOD MINE</b>								
Plug adits	m3		#N/A	0	\$0		\$0 \$0	
Plug drillholes to surface	each		#N/A	0	\$0		\$0 \$0	
Grouting	m3		#N/A	0	\$0		\$0 \$0	
Lime addition, kg/m3 of water	tonne		#N/A	0	\$0		\$0 \$0	
Lime, purchase and shipping	tonne		#N/A	0	\$0		\$0 \$0	
<b>D OBJECTIVE: HAZARDOUS MATERIALS</b>								
remove hazardous materials, LABOUR	each	1440	lab-usl	50	\$72,000	50%	\$36,000 \$36,000	
remove/decontam. Equipment, electrical	each	240	lab-usl	50	\$12,000	50%	\$6,000 \$6,000	
Other			#N/A	0	\$0		\$0 \$0	
<b>E SPECIALIZED ITEMS</b>								
.			#N/A	0	\$0	0%	\$0 \$0	
Subtotal					\$1,381,493	86%	\$1,192,073	\$189,421
					Total U/G	Percent Land	Total Land	Total Water

**1 Tailings Impoundment Name: \_\_\_\_\_ Impoundment # 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	% Cost		
					Land	Land	Water
<b>A OBJECTIVE: CONTROL ACCESS</b>							
Fence	m	160 fh		187.27	\$29,964	100%	\$29,964 \$0
Signs	each	8 sh		37.08	\$297	100%	\$297 \$0
Ditch, mat'l A	m3		#N/A	0	\$0		\$0 \$0
, mat'l B	m3		#N/A	0	\$0		\$0 \$0
Berm	m3		#N/A	0	\$0		\$0 \$0
Block roads	m3	1440 sb1h		4.85	\$6,984	100%	\$6,984 \$0
Other			#N/A	0	\$0		\$0 \$0
<b>B OBJECTIVE: STABILIZE EMBANKMENT</b>							
breach east dam	m3		#N/A	0	\$0		\$0 \$0
, fill mat'l A	m3		#N/A	0	\$0		\$0 \$0
, fill mat'l B	m3		#N/A	0	\$0		\$0 \$0
Rip rap	m3		#N/A	0	\$0		\$0 \$0
Vegetate	ha		#N/A	0	\$0		\$0 \$0
Raise crest	m3		#N/A	0	\$0		\$0 \$0
Flatten slopes	m3		#N/A	0	\$0		\$0 \$0
<b>C Other</b>							
			#N/A	0	\$0		\$0 \$0
			#N/A	0	\$0		\$0 \$0
<b>OBJECTIVE: COVER TAILINGS</b>							
coarse PK, doze to slurry sump	m3	2625000 DSL		0.8764	\$2,300,637		\$0 \$2,300,637
coarse PK - slurry pumping	m3	2625000		0.5	\$1,312,500		\$0 \$1,312,500
Rock for expelled water from N or S durr	m3	1875000	#N/A	3.6	\$6,750,000		\$0 \$6,750,000
<b>D Rock for expelled water from roads</b>							
Rock for expelled water from new quarry	m3		#N/A	8.25	\$0		\$0 \$0
Soil cover, till	m3	1416000	#N/A	4.46	\$6,315,360		\$0 \$6,315,360
Cover rock from N or S dump	m3	4247000	#N/A	3.6	\$15,289,200		\$0 \$15,289,200
Cover rock from roads	m3		#N/A		\$0		\$0 \$0
<b>E Cover rock from new quarry</b>							
Remove & treat supernatant	m3	270000 otpl		0.25	\$67,500		\$0 \$67,500
<b>OBJECTIVE: FLOOD TAILINGS</b>							
Ditch, mat'l A	m3		#N/A	0	\$0		\$0 \$0
, mat'l B	m3		#N/A	0	\$0		\$0 \$0
<b>F Raise crest</b>							
Other	m3		#N/A	0	\$0		\$0 \$0
			#N/A	0	\$0		\$0 \$0
			#N/A	0	\$0		\$0 \$0
<b>OBJECTIVE: DEVELOP WETLAND</b>							
Earthworks, mat'l A	m3		#N/A	0	\$0		\$0 \$0
Vegetate	ha		#N/A	0	\$0		\$0 \$0
<b>G Other</b>							
			#N/A	0	\$0		\$0 \$0
			#N/A	0	\$0		\$0 \$0
<b>OBJECTIVE: UPGRADE SPILLWAY</b>							
Excavate channel, mat'l A	m3	18000 sc3h		10.6	\$190,800		\$0 \$190,800
<b>H , mat'l B</b>							
Concrete	m3		#N/A	0	\$0		\$0 \$0
Rip rap	m3	13000	#N/A	5.65	\$73,450		\$0 \$73,450
geotextile over ice rich soil	m2	2500	#N/A	10	\$25,000		\$0 \$25,000
<b>I</b>							
			#N/A	0	\$0		\$0 \$0

**1 Tailings Impoundment Name: \_\_\_\_\_ Impoundment # 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	% Cost			
					Land	Land	Water	
OBJECTIVE: STABILIZE DECANT SYSTEM			#N/A	0	\$0		\$0	\$0
Remove	m3		#N/A	0	\$0		\$0	\$0
Plug/backfill	m3		#N/A	0	\$0		\$0	\$0
Other			#N/A	0	\$0		\$0	\$0
			#N/A	0	\$0		\$0	\$0
OBJECTIVE: REMOVE TAILINGS DISCHARGE			#N/A	0	\$0		\$0	\$0
Cyclones	m3		#N/A	0	\$0		\$0	\$0
Pipe	m	5000	PPLL	1.1236	\$5,618	100%	\$5,618	\$0
Other			#N/A	0	\$0		\$0	\$0
			#N/A	0	\$0		\$0	\$0
quarry shortfall of rock for cover	m3	4322000	rb11	3.502	\$15,135,585		\$0	\$15,135,585
			#N/A	0	\$0		\$0	\$0
Subtotal					\$47,502,894	0.0	\$42,862	\$47,460,032
					Total Tailings	Percent Land	Total Land	Total Water

1 **Rock Pile Name:** \_\_\_\_\_ **Rock Pile #:** 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	Land		Water Cost
						Cost %	Land Cost	
<b>A OBJECTIVE: STABILIZE SLOPES</b>								
Flatten slopes with dozer, rock pile, north	m3	1501500	dsl	0.71	\$1,066,065.00	50%	\$533,033	\$533,033
. Flatten slopes with dozer, till pile	m3	0	dsl	0.71	\$0.00	100%	\$0	\$0
. Flatten slopes with dozer, till pile, south	m3	0	dsl	0.71	\$0.00	100%	\$0	\$0
. Toe buttress, drain mat'l	m3		#N/A	0	\$0.00		\$0	\$0
. , fill mat'l A	m3		#N/A	0	\$0.00		\$0	\$0
. , fill mat'l B	m3		#N/A	0	\$0.00		\$0	\$0
. Other			#N/A	0	\$0.00		\$0	\$0
<b>B</b>								
. OBJECTIVE: COVER DUMP					\$0.00		\$0	\$0
. till on biotite schist	m3	1031000	#N/A	4.82	\$4,969,420.00		\$0	\$4,969,420
. rock on mixed rock & biotite schist	m3	4290000	#N/A	3.96	\$16,988,400.00		\$0	\$16,988,400
. till on caribou ramps	m3	6400	#N/A	4.82	\$30,848.00	100%	\$30,848	\$0
. rock cover from roads, etc.	m3	0	#N/A	5.65	\$0.00		\$0	\$0
<b>C</b>								
rock cover from new quarry	m3	0						
. rock cover on 2.5:1 slopes, incr. cost	m3		#N/A	0.15	\$0.00		\$0	\$0
. till islands for reveg.	m3	0	#N/A	4.82	\$0.00	100%	\$0	\$0
. till islands for reveg., south dump	m3	0	#N/A	4.82	\$0.00	100%	\$0	\$0
. OBJECTIVE: UNDERWATER DISPOSAL			#N/A		\$0.00		\$0	\$0
<b>D</b>								
Move material	m3		#N/A	0				
. Add lime	m3		#N/A	0	\$0.00		\$0	\$0
<b>E</b>								
Add crushed limestone	m3		#N/A	0				
. Other			#N/A	0	\$0.00		\$0	\$0
.			#N/A	0	\$0.00		\$0	\$0
.			#N/A	0	\$0.00		\$0	\$0
. OBJECTIVE: COLLECT AND TREAT			#N/A	0	\$0.00		\$0	\$0
. See "ONGOING TREATMENT" costing component			#N/A		\$0.00		\$0	\$0
<b>F</b>								
.			#N/A		\$0.00		\$0	\$0
OBJECTIVE: DEVELOP WETLAND			#N/A	0	\$0.00		\$0	\$0
Earthworks, mat'l A	m3		#N/A	0	\$0.00		\$0	\$0
. , mat'l B	m3		#N/A	0	\$0.00		\$0	\$0
Vegetate, till pile	ha	31	vhs1	1680	\$52,080.00	100%	\$52,080	\$0
Other			#N/A	0	\$0.00		\$0	\$0
.			#N/A	0	\$0.00		\$0	\$0
quarry shortfall of rock for cover	m3	1915000	rb11	3.502	\$6,706,304		\$0	\$6,706,304
.					\$0.00		\$0	\$0
.			#N/A	0	\$0.00		\$0	\$0
Subtotal					\$29,813,117	2.1%	\$615,961	\$29,197,156
					Total for Rock Pile	Percent Total Land	Total Land	Total Water

**1 Building / Equip Name: \_\_\_\_\_ Bldg / Equip #: 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
<b>A OBJECTIVE: DISPOSE MOBILE EQUIPMENT</b>								
Decontaminate and ship off-site	km		#N/A	0	\$0	50%	\$0	\$0
Decontaminate, dispose on-site	each	5000	lab-sl	55	\$275,000		\$0	\$275,000
Other	each		#N/A	0	\$0		\$0	\$0
<b>B OBJECTIVE: DISPOSE STATIONARY EQUIPMENT</b>								
Decontaminate and ship off-site	km		#N/A	0	\$0	50%	\$0	\$0
Decontaminate, dispose on-site	each	5000	lab-sl	55	\$275,000		\$0	\$275,000
Other	each		#N/A	0	\$0		\$0	\$0
<b>C OBJECTIVE: DISPOSE ORE CONCENTRATION EQUIPMENT</b>								
Decontaminate crushing plant	each		#N/A	0	\$0		\$0	\$0
Decontaminate tanks & plumb.	each		#N/A	0	\$0		\$0	\$0
Remove tanks & plumbing	each		#N/A	0	\$0		\$0	\$0
Other			#N/A	0	\$0		\$0	\$0
<b>D OBJECTIVE: DISPOSE WATER TREATMENT EQUIPMENT</b>								
Decontaminate tanks & plumb.	each		#N/A	0	\$0		\$0	\$0
Remove tanks & plumbing	each		#N/A	0	\$0		\$0	\$0
Other			#N/A	0	\$0		\$0	\$0
<b>E OBJECTIVE: DECONTAMINATE BUILDINGS &amp; TANKS</b>								
site wide allowance	each	1	#N/A	75000	\$75,000	50%	\$37,500	\$37,500
clean explosives facility	each	1	#N/A	50000	\$50,000	50%	\$25,000	\$25,000
	each		#N/A	0	\$0		\$0	\$0
	each		#N/A	0	\$0		\$0	\$0
	each		#N/A	0	\$0		\$0	\$0
	each		#N/A	0	\$0		\$0	\$0
	each		#N/A	0	\$0		\$0	\$0
<b>F OBJECTIVE: MOTHBALL BUILDINGS</b>								
Building 1	m2		#N/A	0	\$0		\$0	\$0
Building 2	m2		#N/A	0	\$0		\$0	\$0
Building 3	m2		#N/A	0	\$0		\$0	\$0
Building 4	m2		#N/A	0	\$0		\$0	\$0
Building 5	m2		#N/A	0	\$0		\$0	\$0
Other	m2		#N/A	0	\$0		\$0	\$0
<b>G OBJECTIVE: REMOVE BUILDINGS - areas are increased to account for height of buildings</b>								
1 Process plant	m2	61381	brs1h	59.328	\$3,641,598	100%	\$3,641,598	\$0
2 Maintenance plant	m2	27282	brs1h	59.328	\$1,618,580	100%	\$1,618,580	\$0
3 Camp	m3	15359	brs1h	59.328	\$911,215	100%	\$911,215	\$0
5 Power /boiler house(s)	m3	17810	brs1h	59.328	\$1,056,628	100%	\$1,056,628	\$0
6 Ammonium nitrate fuel storage	m2	9259	brs1h	59.328	\$549,316	100%	\$549,316	\$0
7 Explosives/cap storage & mixing	m3	600	brs1h	59.328	\$35,597	100%	\$35,597	\$0
8 Remove boneyard waste	each	1		125000	\$125,000	100%	\$125,000	\$0
9 Crusher building	m2	4633	brs1h	59.328	\$274,866	100%	\$274,866	\$0
# conveyors	m2	2500	brs1h	59.328	\$148,319	100%	\$148,319	\$0
# south tank farm	m2	0	brs1h	59.328	\$0	100%	\$0	\$0
# mixc small buildings	m2	0	brs1h	59.328	\$0	100%	\$0	\$0
Paste Plant (new)	m2	20735	brs1h	59.328	\$1,230,161	100%	\$1,230,161	\$0
Mine Dry (new)	m2	3259	brs1h	59.328	\$193,349	100%	\$193,349	\$0
Lube Oil Storage	m2	2914	brs1h	59.328	\$172,881	100%	\$172,881	\$0
NIWTP Acid Storage	m2	3705	brs1h	59.328	\$219,809	100%	\$219,809	\$0

1 **Building / Equip Name:** \_\_\_\_\_ **Bldg / Equip #:** 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost %	Land	Land Cost	Water
								Cost
MAC E Wing	m2	1283	brs1h	59.328	\$76,118	100%	\$76,118	\$0
NIWTP	m2	3150	brs1h	59.328	\$186,882	100%	\$186,882	\$0
NIWTP Expansion	m2	2796	brs1h	59.328	\$165,880	100%	\$165,880	\$0
LDG Office	m2	993	brs1h	59.328	\$58,912	100%	\$58,912	\$0
Sewage Treatment Plant	m2	1471	brs1h	59.328	\$87,271	100%	\$87,271	\$0
UG Mine Dry	m2	954	brs1h	59.328	\$56,599	100%	\$56,599	\$0
Emulsion Plant	m2	1413	brs1h	59.328	\$83,830	100%	\$83,830	\$0
Surface Welding Shop	m2	1098	brs1h	59.328	\$65,142	100%	\$65,142	\$0
Surface Operations Building	m2	1076	brs1h	59.328	\$63,837	100%	\$63,837	\$0
Dorm 1 & 2	m2	2691	brs1h	59.328	\$159,651	100%	\$159,651	\$0
North Construction Offices	m2	547	brs1h	59.328	\$32,452	100%	\$32,452	\$0
Pit Muster	m2	485	brs1h	59.328	\$28,774	100%	\$28,774	\$0
Mine Rescue Fire Hall	m2	449	brs1h	59.328	\$26,638	100%	\$26,638	\$0
LDG Muster	m2	328	brs1h	59.328	\$19,460	100%	\$19,460	\$0
LDG Offices	m2	273	brs1h	59.328	\$16,196	100%	\$16,196	\$0
A21 Offices	m2	238	brs1h	59.328	\$14,120	100%	\$14,120	\$0
Fuel Tanks 1-6	m2	27918	brs1h	59.328	\$1,656,313	100%	\$1,656,313	\$0
Arctic corridors	m2	6372	brs1h	59.328	\$378,038	100%	\$378,038	\$0
Incinerator	m2	1000	brs1h	59.328	\$59,328	100%	\$59,328	\$0
<b>H OBJECTIVE: BREAK BASEMENT SLABS</b>								
. Buildings - all	m2	4500	brcl	37.08	\$166,859		\$0	\$166,859
. Building 2	m2		#N/A	0	\$0		\$0	\$0
. Building 3	m2		#N/A	0	\$0		\$0	\$0
. Building 4	m2		#N/A	0	\$0		\$0	\$0
. Building 5	m2		#N/A	0	\$0		\$0	\$0
. Other			#N/A	0	\$0		\$0	\$0
<b>I OBJECTIVE: REMOVE BURIED TANKS</b>								
. Tank 1, decontaminate	m3		#N/A	0	\$0		\$0	\$0
. , excavate & dispose	m3		#N/A	0	\$0		\$0	\$0
. Tank 2, decontaminate	m3		#N/A	0	\$0		\$0	\$0
. , excavate & dispose	m3		#N/A	0	\$0		\$0	\$0
. Other			#N/A	0	\$0		\$0	\$0
<b>J OBJECTIVE: LANDFILL FOR DEMOLITION WASTE</b>								
. Place rock cover	m3	187500	#N/A	5.65	\$1,059,375	50%	\$529,688	\$529,688
. Vegetate	ha		#N/A	0	\$0		\$0	\$0
. Landfill disposal fee	tonne		#N/A	0	\$0		\$0	\$0
<b>K OBJECTIVE: GRADE AND CONTOUR</b>								
. Grade mill area	m2	30750	dsl	0.8764	\$26,950	50%	\$13,475	\$13,475
. Place rock cover	m3	34050	#N/A	5.65	\$192,383	50%	\$96,191	\$96,191
. Rip rap on ditches	m3		#N/A	0	\$0		\$0	\$0
. Vegetate	ha		#N/A	0	\$0		\$0	\$0
. Other			#N/A	0	\$0		\$0	\$0
<b>L OBJECTIVE: RECLAIM ROADS</b>								
Haul roads, A 154 & A418 lease	ha	3.71	scfyl	3960.8	\$14,695	100%	\$14,695	\$0
Service roads, A154 & A418 lease	ha	1.6	scfyl	3960.8	\$6,337	100%	\$6,337	\$0
Haul roads, A21 lease	ha	0	scfyl	3960.8	\$0	100%	\$0	\$0

1 Building / Equip Name: \_\_\_\_\_ Bldg / Equip #: 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost %	Land	Land Cost	Water Cost
Service roads, A21 lease	ha	1.65	scfyl	3960.8	\$6,535	100%	\$6,535	\$0
Haul roads, PKC & dumps lease	ha	10.13	scfyl	3960.8	\$40,123	100%	\$40,123	\$0
Service roads, PKC & dumps lease	ha	23.2	scfyl	3960.8	\$91,891	100%	\$91,891	\$0
Haul roads, infrastructure lease	ha	14.85	scfyl	3960.8	\$58,818	100%	\$58,818	\$0
Service roads, infrastructure lease	ha	5.4	scfyl	3960.8	\$21,388	100%	\$21,388	\$0
Haul roads, airstrip lease	ha	0	scfyl	3960.8	\$0	100%	\$0	\$0
Service roads, airstrip lease	ha	2.9	scfyl	3960.8	\$11,486	100%	\$11,486	\$0
			#N/A	0	\$0	100%	\$0	\$0
K SPECIALIZED ITEMS								
RECLAIM AIRSTRIP	ha	11	SCFYI	3960.8	\$43,569	100%	\$43,569	\$0
YELLOWKNIFE LANDFILL DISPOSAL FEE		1		250000	\$250,000	100%	\$250,000	\$0
			#N/A	0	\$0		\$0	\$0
Subtotal					\$16,078,170	91.2%	\$14,659,457	\$1,418,713
				Total Buildings		Percent Land	Total Land	Total Water

**Chemicals and Soil**

1

**Contamination:**

1

ACTIVITY/MATERIAL	Units	Quantity	Code	Unit Cost	Cost	%	Land Cost	Water Cost
<b>Note:</b> The procedures, equipment and packaging for clean up and removal of chemicals or contaminated soils are highly dependent on the nature of the chemicals and their existing state of containment. Government guidelines should be consulted on an individual chemical basis. Any estimate made here should be considered very rough unless specific evaluations have been conducted.								
Hazardous Materials Inventory								
. Contaminated soil investigation ESA		1	#N/A	68393	\$68,393	50%	\$34,197	\$34,197
. Contaminated Soil drilling and sampling		1	#N/A	277143	\$277,143	50%	\$138,572	\$138,572
A LABORATORY CHEMICALS	km						\$0	
. load, manifest, ship & disposal fee	pallet	500	#N/A	1000	\$500,000	50%	\$250,000	\$250,000
B PCB, hauling	litre		#N/A	0	\$0		\$0	\$0
. PCB, disposal	litre		#N/A	0	\$0		\$0	\$0
C FUEL					\$0		\$0	\$0
. Tank decontamination	ls	1	#N/A	223737	\$223,737	50%	\$111,869	\$111,869
. Type 2	kg		#N/A	0	\$0		\$0	\$0
. Type 3	kg		#N/A	0	\$0		\$0	\$0
D WASTE OIL								
. Oils/lubricants - burn on-site	litre		#N/A	0	\$0		\$0	\$0
. Oils/lubricants - ship off-site	litre	650000	#N/A	0.027	\$17,550	50%	\$8,775	\$8,775
. removal glycol	litre	20,000		1.25	\$25,000	50%	\$12,500	\$12,500
E remove batteries	kg	25,000		0.5	\$12,500	50%	\$6,250	\$6,250
. remove paints	litre	1500		0.27	\$405	50%	\$203	\$203
. remove solvents	litre	7500		0.75	\$5,625	50%	\$2,813	\$2,813
. Oils/lubricants - disposal fee	litre		#N/A	0	\$0		\$0	\$0
. PROCESS OR TREATMENT CHEMICALS								
F Sulfuric Acid Transfer to tanker	litres	80000	pcrl	0.38	\$30,400	50%	\$15,200	\$15,200
Haul to disposal facility	loads	2	#N/A	12000	\$24,000	50%	\$12,000	\$12,000
Disposal fee	litres	80000	#N/A	1	\$80,000	50%	\$40,000	\$40,000
Type 4	kg		#N/A	0	\$0		\$0	\$0
EXPLOSIVES	kg							
	allow	1	#N/A	10000	\$10,000		\$0	\$10,000
CONTAMINATED SOILS								
. Type 1, light fuel	m3	5000	csrh	134.84	\$674,200	50%	\$337,100	\$337,100
G Type 2, heavy fuel and oil	m3	2500	#N/A	100	\$250,000	50%	\$125,000	\$125,000
. Type 3, metals	m3	250	#N/A	100	\$25,000	50%	\$12,500	\$12,500
. Haz. Mat. testing & assessment						50%		
. Technician and analyses	each	1	#N/A	110000	\$110,000	50%	\$55,000	\$55,000
H Drilling	each	1	#N/A	75000	\$75,000	50%	\$37,500	\$37,500
. Reporting		1		20000	\$20,000	50%	\$10,000	\$10,000
. Other			#N/A	0	\$0		\$0	\$0
. OTHER								
. remove nuclear densometers from mill	each	10	#N/A	4000	\$40,000		\$0	\$40,000
Subtotal					\$2,123,417	48.8%	\$1,036,709	\$1,086,709

**Chemicals and Soil**

1

**Contamination:**

1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost %	Land		Water
						Land Cost	Percent Total Land	Total Water
						Total Chemical	Percent Land	Total Land

**1 /ater Management Project: \_\_\_\_\_ Project # 1 \_\_\_\_\_**

<b>ACTIVITY/MATERIAL</b>	<b>Units</b>	<b>Quantity</b>	<b>Cost Code</b>	<b>Unit Cost</b>	<b>Cost %</b>	<b>Land Cost</b>	<b>Water Cost</b>
<b>A OBJECTIVE: STABILIZE EMBANKMENT</b>							
Toe buttress, drain mat'l	m3		#N/A	0	\$0	\$0	\$0
, fill mat'l A	m3		#N/A	0	\$0	\$0	\$0
, fill mat'l B	m3		#N/A	0	\$0	\$0	\$0
Rip rap	m3		#N/A	0	\$0	\$0	\$0
Vegetate	ha		#N/A	0	\$0	\$0	\$0
Raise crest	m3		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>B OBJECTIVE: UPGRADE SPILLWAY</b>							
Excavate channel	m3	680 dsh		2.83	\$1,924	\$0	\$1,924
Place rip rap	m3	190	#N/A	5.65	\$1,074	\$0	\$1,074
Excavate channel	m3	14400 dsh		2.83	\$40,752	\$0	\$40,752
Place rip rap	m3	10400	#N/A	5.65	\$58,760	\$0	\$58,760
Other			#N/A	0	\$0	\$0	\$0
<b>C OBJECTIVE: STABILIZE SEDIMENT CONTAINMENT PONDS</b>							
Place soil cover	m3		#N/A	0	\$0	\$0	\$0
Place geotextile	m2		#N/A	0	\$0	\$0	\$0
Vegetate	m3		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>D OBJECTIVE: BREACH EMBANKMENT</b>							
Remove Fill	m3		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>E OBJECTIVE: COLLECTION PONDS</b>							
Breach 4 dams	m3	2200 dsh		2.83	\$6,226	\$0	\$6,226
place geotextile, 4 by 15,000 m2	m2	60000	#N/A	10	\$600,000	\$0	\$600,000
place rock over geotextile	m3	60000	#N/A	5.65	\$339,000	\$0	\$339,000
Other			#N/A	0	\$0	\$0	\$0
<b>F OBJECTIVE: BREACH DITCHES</b>							
Excavate	m3	7875 dsh		3.4945	\$27,519	\$0	\$27,519
Backfill/recontour	m3	2625 sc1h		8.5958	\$22,564	\$0	\$22,564
Vegetate	ha		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>G OBJECTIVE: REMOVE PIPELINES</b>							
Remove pipes	m		#N/A	0	\$0	\$0	\$0
Concrete plug deep pipes	m3		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>H OBJECTIVE: NORTH INLET EAST DIKE</b>							
Excavate/construct spillway	m3	4500 sb3h		4.83	\$21,735	\$0	\$21,735
Excavate & backfill	m3		#N/A	0	\$0	\$0	\$0
Other			#N/A	0	\$0	\$0	\$0
<b>I OBJECTIVE: COLLECT DRAINAGE FOR TREATMENT</b>							
Excavate collection ditches	m3		#N/A	0	\$0	\$0	\$0
Rip rap ditches	m3		#N/A	0	\$0	\$0	\$0
Pipes	m		#N/A	0	\$0	\$0	\$0
Pumps	each		#N/A	0	\$0	\$0	\$0
Collect'n pond, exc. mat'l A	m3		#N/A	0	\$0	\$0	\$0
, exc. mat'l B	m3		#N/A	0	\$0	\$0	\$0
Collect'n pond, fill mat'l A	m3		#N/A	0	\$0	\$0	\$0

**Water Management Project: \_\_\_\_\_ Project # 1 \_\_\_\_\_**

ACTIVITY/MATERIAL	Units	Quantity	Cost	Unit	Cost %	Land		Water
			Code	Cost		Land Cost	Cost	
, fill mat'l B	m3		#N/A	0	\$0		\$0	\$0
Collect'n pond, liner	m2		#N/A	0	\$0		\$0	\$0
J OBJECTIVE: TREAT DRAINAGE (see "ONGOING TREATMENT" for operating costs)								
Build treatment plant	lump sum		#N/A	0	\$0		\$0	\$0
			#N/A	0	\$0		\$0	\$0
<b>Subtotal</b>					\$1,119,554	0.0%	\$0	\$1,119,554
					Total	Percent Total	Total	Total
					Water	Land Land	Water	

1 Mobilization Name: \_\_\_\_\_ Mob # 1 \_\_\_\_\_

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
<b>A MOBILIZE HEAVY EQUIPMENT</b>					
Equipment to regional centre					
. Excavators	km		#N/A	0	\$0
. Dump trucks	km		#N/A	0	\$0
. Dozers	km		#N/A	0	\$0
. Demolition shears	km		#N/A	0	\$0
Equipment, regional centre to site					
. Excavators - 2	km	4800	MHERH	8.42	\$40,416
. Dump trucks - 15	km	120000	MHERH	8.42	\$1,010,400
. Dozers - 4	km	16000	MHERH	8.42	\$134,720
. Demolition shears - 2		9600	MHERH	8.42	\$80,832
. Front end loader 2 cranes - 2		4800	MHERH	8.42	\$40,416
		1600	MHERH	8.42	\$13,472
. service vehicles -10		16000	MHERH	8.42	\$134,720
. km					
<b>B MOBILIZE CAMP</b>					
. allowance		1	#N/A		\$150,000
<b>C MOBILIZE WORKERS</b>					
. rotations over reclamatio period	m-hrs	26000	#N/A	45	\$1,170,000
<b>D MOBILIZE MISC. SUPPLIES</b>					
. Fuel	litre	7000000	#N/A	0.78	\$5,460,000
. Minor tools and equipment	owance	1	#N/A	0	\$500,000
. Truck tires	owance	1	#N/A	0	\$500,000
<b>E MOBILIZE &amp; HOUSE WORKERS person days</b>					
. 20800 man-days	month	740	accml	1483.2	\$1,097,564
<b>WINTER ROAD</b>					
. Full winter use	km		#N/A	0	\$0
. Limited winter use	km		#N/A	0	\$0
. km			#N/A	0	\$0
<b>F BONDING lump sum</b>					
. lump sum			#N/A		\$0
<b>G TAXES lump sum</b>					
. lump sum			#N/A		\$0
<b>H INSURANCE lump sum</b>					
. lump sum			#N/A		\$0
<b>Subtotal</b>					\$10,332,540
					Total Mob.

	# of machines	loads/machine km	total round trip mileage
Equipment Mobilization			
excavator	2	3	800 4800
dump trucks	15	10	800 120000
dozers	4	5	800 16000
demolition shears	2	6	800 9600
front end loader	2	3	800 4800
cranes	2	1	800 1600
service vehicles	10	2	800 16000

**1 Monitoring & Maintenance Mon / Mtce # 1**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
<b>A OBJECTIVE: POST-CLOSURE INSPECTIONS</b>					
Annual geotechnical insp.	each	7	rpth	\$12,360	\$86,520
Survey inspection	each	7	#N/A	\$50,000	\$350,000
Water sampling (surface and groundwater)	ys	10	#N/A	\$250,000	\$2,500,000
Reporting	ys	10	#N/A	\$100,000	\$1,000,000
person, labour, equipment, logistics, etc. allowance		1	#N/A	\$6,237,680	\$6,237,680
<b>B OBJECTIVE: INTERIM CARE &amp; MAINTENANCE</b>					
annual C&M	ys	3	#N/A	\$2,223,639	\$6,670,917
	month		accml		\$0
	month		#N/A	\$0	\$0
	each		#N/A	\$0	\$0
	allowance		#N/A		\$0
Subtotal					\$16,845,117
					Total Mon./Maint.

**ANNUAL INTERIM CARE & MAINTENANCE**

	No.	hrs/year	Rate	Annual Cost
Site supervisor	1	3650	\$61.20	\$223,380
laborers	3	3650	\$38.76	\$141,474
equipment operators	2	3650	\$56.10	\$204,765
mechanic	1	3650	\$61.20	\$223,380
electrician	1	3650	\$70.00	\$255,500
envir. coordinator	1	3650	\$61.20	\$223,380
				\$1,271,879 total staff
Fuel, power & heat	L/hr	mon/yr	fuel	
	50	3	108000	
	40	7	201600	
	25	2	36000	
Fuel, mobile equipment	15	12	129600	
			475200 total fuel	
air charter	flights/yr		cost/flight	
	52		4500	234000
camp costs	108 m-months		1320	142560
misc. supplies, allowance				50000
reagents				50000
			Total annual C&M	\$2,223,639

**1 Post-Closure Site Maintenance**

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost	% Land	Land Cost	Water Cost
<b>A WATER TREATMENT</b>								
Total annual cost, unit cost from Ongoing Water Treatment				0	\$0		\$0	\$0
<b>B Cover Maintenance</b>								
Repair erosion, remove trees	ha		#N/A	0	\$0		\$0	\$0
<b>C Spillway Maintenance</b>								
Repair erosion		m3	#N/A	0	\$0		\$0	\$0
Clear spillway		each	#N/A	0	\$0		\$0	\$0
Other			#N/A	0	\$0		\$0	\$0
<b>D Other</b>								
							\$0	\$0
							\$0	\$0
Subtotal, Annual post-closure costs					\$0		\$0	\$0
Discount rate for calculation of net present value of post-closure			3.00%				\$0	
Number of years of post-closure activity			0 years				\$0	
Present Value of payment stream					\$0	#DIV/0!	\$0	\$0
					Total Post closure	Percent Land	Total Land	Total Water

**WATER TREATMENT COSTS**

**ANNUAL VOLUME OF WATER (m3)**

**Reagent addition rates**

Reagent	kg reagent/m3 water	cost in \$/kg, FOB site	Annual reagent cost
H2O2	0.1 kg/m3	1.5	\$0
lime	kg/m3	0.45	\$0
ferric sulphate	kg/m3		\$0
ferrous sulphate	kg/m3		\$0
flocculents	kg/m3		\$0
TOTAL			\$0

**Supplies and Labour**

power, kW-hr	0 rate, \$/kW-h	0.08	\$0
misc. supplies, hoses, tools			\$0
sampling equip.			\$0
equip. maintenance and parts			\$0
water analysis			\$0
reporting			\$0
truck rental			\$0
annual mileage			\$0
road maintenace & snow plowing			\$0
electrician/mechanic for treatment plant & power supply			\$0
Annual cost			\$0
labor, hourly rate	35		
men per day for water treatment work			1
on site, days per year			0
spring/fall maintenance, extra work			0
hours worked per year			0
annual labor cost			\$0
Total, labour and suppli			\$0
TOTAL ANNUAL COSTS, reagents plus labour and supplies			\$0
Average treatment cost, \$/m3			\$0.00

Water analyses	
samples per month	10
analysis cost/sample	100
shipping	200
Total Water Sampling	1200

Site Access	
annual site access cost	
road	\$0
air	\$0
winter road	\$0

## Unit Cost Table

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	COMMENTS
<b>1 excavate Rock, Bulk</b>							
	drill, blast, load						
	short haul (<500m) Dump	RB1	m3	10.51	15.73	#N/A	quarry operations for bulk fill
	RB1 + long haul, up to 1500 m	RB2	m3	11.12	16.41	#N/A	
	RB1 + spread and compact	RB3	m3	11.12	16.41	#N/A	
	RB1 + long haul + spread and compact	RB4	m3	11.74	28.37	#N/A	
	RB1 + Specified activity	RBS	m3	#N/A	#N/A	#N/A	
<b>2 excavate Rock, Controlled</b>							
	drill, blast, load						
	short haul (<500m) Dump	RC1	m3	26.01	37.08	#N/A	spillway excavation
	RC1 + long haul, up to 1500 m	RC2	m3	11.74	16.97	#N/A	
	RC1 + spread and compact	RC3	m3	11.12	16.41	#N/A	
	RC1 + long haul + spread and compact	RC4	m3	12.47	17.67	#N/A	
	RC1 + Specified activity	RCS	m3	#N/A	#N/A	145	\$145/M3-drift excavation
<b>3 excavate Soil, Bulk</b>							
	excavate, load						
	short haul (<500m) dump	SB1	m3	3.12	0.00	#N/A	LOW cost: excavation of loose soil, high volume
	SB1 + long haul, up to 1500 m	SB2	m3	3.60	5.45	#N/A	LOW cost: excavation of loose soil, 1.5 km haul, high volume
	SB1 + spread and compact	SB3	m3	4.47	6.71	#N/A	
	SB1 + long haul + spread and compact	SB4	m3	4.16 5.06	5.97 10.06	#N/A	LOW cost: excavation of loose soil, 1.5 km haul, high volume, const. of simple soil cover
	SB1 + Specified activity	SBS	m3			12.06	LOW cost: rehandle waste rock dump into pit, >500,000 m3, 2 km haul SPECIFIED cost: rehandle waste rock, haul 3 km, place & compact on dam
				2.60 0.00	7.17 0.00		
	Soil, tailings	SBT	m3	1.25	3.40	14.28	LOW cost: doze tailings, HIGH cost: excavate & short haul
<b>4 excavate Soil, Controlled</b>							
	excavate, load						
	short haul (<500 m), dump	SC1	m3	6.30	8.60	#N/A	
	SC1 + long haul, up to 1500 m	SC2	m3	7.81	10.83	#N/A	
	SC1 + spread and compact	SC3	m3	6.30	13.10	#N/A	HIGH cost: for simple soil covers
	SC1 + long haul + spread and compact	SC4	m3	7.08	21.41	#N/A	HIGH cost: for complex covers & dam construction, spillway repair, LOW volume
	SC1 + Specified activity	SCS	m3	#N/A	22.89	17.35	SPECIFIED cost: backfill adit with waste rock
<b>Geo-synthetics</b>							
	geotextile, filter cloth	GST	M2	1.11	3.12	#N/A	FOB Edmonton, add shipping & installation
	geogrid	GSG	M2	5.31	0.00	#N/A	

**Unit Cost Table**

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	
	liner, HDPE	GSHDPE	M2	6.62	0.00	#N/A	
	liner, ES3	GSES3	m2	18.62	0.00		
	liner, PVC	GSPVC	M2	0.00	0.00	#N/A	
	geosynthetic installation	GSI	m2	0.93	13.01	#N/A	
	bentonite soil ammendment	GSBA	tonne	284.28	321.36	#N/A	FOB Edmonton, add shipping & mixing
<b>Shaft, Raise &amp; Portal Closures</b>							
	Shaft & Raises	SR	m2	595.52	1966.36		LOW cost: pre-cast concrete slabs, little site prep. HIGH cost: for hand construction, remote site
	Portals	POR	m3	0.00	230.34	1101.60	HIGH cost: for excavate & backfill collapsed portal SPECIFIED cost: installed pressure plug
<b>5 Concrete work</b>							
	Small pour, no forms	CS	m3	333.72	668.56	#N/A	
	Large pour, no forms	CL	m3	264.05	393.27	#N/A	
	Small pour, Formed	CSF	m3	393.27	1966.36	#N/A	
	Large pour, Formed	CLF	m3	325.85	460.69	#N/A	
<b>6 Vegetation</b>							
	Hydroseed, Flat	VHF	ha	1792.19	5561.98	#N/A	
	Hydroseed, Sloped	VHS	ha	2076.47	6241.78	#N/A	
	veg. Blanket/erosion mat	VB	ha	12359.95	14831.94	#N/A	
	Tree planting	VT	ha	12359.95	14831.94	#N/A	
	Wetland species	VW	ha	61799.76	92699.64	#N/A	
<b>7 Pumps</b>							
	Small, <	PS	each	3370.90	6741.79	#N/A	
	Large, >	PL	each	5618.16	#####	#N/A	large - 250 hp Gould w/diesel motor
<b>8 PiPes</b>							
	Small, < 6 inch diameter	PPS	m	0.56	5.62	#N/A	LOW cost: pipe removal, HIGH cost: supply new pipe SPECIFIED: small, heat traced & insulated pipe
	Large, > 6 inch diameter	PPL	m	1.12	202.25	#N/A	LOW cost: pipe removal, HIGH cost: supply 24" 100 psi HDPE pipe, FOB Edm.

**Unit Cost Table**

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	
				0.00	0.00		add shipping & installation
9	<b>pump sand BackFill</b>	BF	m3	6.18	18.54	#N/A	
10	<b>Fence</b>	F	m	12.48	187.27	#N/A	
11	<b>Signs</b>	S	each	12.36	37.08	#N/A	
12	<b>rock, Drill and Blast only</b>	DB	m3	12.36	24.72	#N/A	
	<b>(flatten slope, collapse drift)</b>						
13	<b>excavate Rip Rap</b>						
	drill, blast, load short haul (<500 m) dump and spread	RR1	m3	12.30	18.37	#N/A	
	RR1 + long haul	RR2	m3	12.47	19.05	#N/A	HIGH cost: quarry & place rip rap in channel
	excavate rock from waste dump, short haul, spread	RR3	m3	4.72	6.49	#N/A	LOW cost: removal of 18 in minus from dump, long haul and spread HIGH cost: removal of coarse rock from dump, long haul, armour spillway
	RR3 + long haul	RR4	m3	5.26	7.02	#N/A	
	specified rip rap source	RR5	m3	#N/A	#N/A	#N/A	
14	<b>Import LimeStone</b>	ILS	tonne	9.89	14.83	#N/A	
15	<b>Import LiMe</b>	ILM	tonne	187.27	556.61	#N/A	LOW cost: bulk shipping, high volume, FOB Vancouver/Edmonton HIGH cost: bags delivered to central Yukon, small volume
16	<b>Grouting</b>	G	m3	222.48	269.67	#N/A	HIGH cost: cement, FOB Yellowknife
17	<b>Dozing</b>						
	doze Rock piles	DR	m3	0.96	2.19	#N/A	LOW cost: doze crest off dump
	doze overburden/Soil piles	DS	m3	0.88	3.49	#N/A	HIGH cost: push up to 300 m
18						#N/A	
						#N/A	
19						#N/A	
						#N/A	
20			each	0	0	#N/A	
			each			#N/A	

## Unit Cost Table

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	
<b>21 Buildings - Decontaminate</b>							
	Chemicals	BDC	m3	#N/A	#N/A	#N/A	
	Asbestos	BDA	m2	23.60	47.19	#N/A	LOW cost: removal of asbestos siding & flooring HIGH cost: removal of insulated pipes, friable asbestos
<b>22 Buildings - Remove</b>	areas are per floor on 3 m average height						LOW cost: removal and on-site disposal - small wooden structures
	Wood - teardown	BRW1	m2	24.16	37.08	#N/A	
	Wood - burn	BRW2	m2	6.18	11.24	#N/A	
	Masonry	BRM	m2	26.57	37.08	#N/A	
	Concrete	BRC	m	37.08	55.62	6	LOW cost: removal of building perimeter walls, HIGH cost: per m3 for bulk concrete
	Steel - teardown	BRS1	m2	39.55	59.33	240	SPECIFIED cost: \$/m2 to break floor slab
	Steel - salvage	BRS2	m2	61.80	92.70	#N/A	SPECIFIED cost: demolition shear \$/hour operating
<b>23 Power &amp; Pipe Lines</b>							
	Power lines, remove	POWR	each	23.48	5191.18	#N/A	
	Small, < 6 inch diameter	PPS	m			#N/A	LOW cost: pipe removal, HIGH cost: supply new pipe
	Large, > 6 inch diameter	PPL	m			#N/A	LOW cost: pipe removal, HIGH cost: supply 24" 100 psi HDPE pipe, FOB. Add shipping
<b>24 Laboratory Chemicals</b>				1966.36	2606.83	#N/A	
	Remove from site	LCR	pallet	#N/A	#N/A	#N/A	
	Dispose on site	LCD	each	37.08	43.26	#N/A	
<b>25 PCB - Remove from site</b>		PCBR	litre				LOW cost: shipping, handling & disposal from Yellowknife
<b>26 Fuel</b>				1.23	1.77	#N/A	
	Remove from site	FR	kg	#N/A	#N/A	#N/A	
	Burn on site	FB	kg				
<b>27 Oil</b>				0.39	1.15	#N/A	
	Remove from site	OR	litre	0.39	0.62	#N/A	
	Burn on site	OB	litre				
<b>28 Process Chemicals</b>				0.39	2.30	#N/A	
	Remove from site	PCR	kg	#N/A	#N/A	#N/A	
	Dispose on site	PCD	kg				
<b>29 Explosives</b>				0.00	2.47	#N/A	

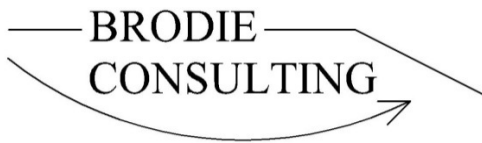
**Unit Cost Table**

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$		
	Remove from site	ER	kg	#N/A	#N/A	#N/A		
	Dispose on site	ED	kg					
<b>30 Contaminated Soils</b>				43.26	134.84	#N/A		
	Remediate on site	CSR	m3	2080.80			LOW cost: bio-remediate on-site. HIGH cost: ship off-site to landfill as haz. waste	
	consolidate & cover	Use cost code items 1 - 4						
	cover in place	Use cost code items 1 - 4						
<b>31 Mobilize Heavy Equipment</b>								
	Road access	MHER	\$/km	2.81	8.42	2.05	SPECIFIED cost: \$/tonne/km in cargo plane	
	Air access	MHEA	each	#N/A	#N/A	1375	SPECIFIED cost: helicopter cost, \$/hr of operation	
<b>32 Mobilize Camp</b>				#N/A	#N/A	#N/A		
	<20 persons Road access	MC<R	each	#N/A	#N/A	#N/A		
	<20 persons Air access	MC<A	each	1560.60				
<b>33 Mobilize Workers</b>				3121.20	6138.36	#N/A		
	mobilize	MM<	person	3121.20	6138.36	#N/A	LOW cost: road access. HIGH cost: transport by Twin Otter aircraft	
	>20 persons	MM>	person	39.33	42.66	#N/A		
<b>34 ACCoModation</b>		ACCM	month	1483.19	2224.79	#N/A	LOW cost, accom in existing camp, per man, HIGH cost: - supply new camp	
<b>35 Mobilize Misc. Supplies</b>		MMS	each	1320	2620	#N/A	LOW cost: winter road - limited use, LOW snowfall	
<b>36 Winter Road</b>		WR	km	1483.19	2943.92	10000		
<b>37 Visual site Inspection</b>		VI	each	3955.18	7977.79	#N/A		
<b>38 Survey site Inspection</b>		SI	each	#N/A	#N/A	#N/A		
<b>39 Water Sampling</b>		WS	each	6179.98	10112.69	#N/A		
<b>40 site inspection RePorT</b>		RPT	each	#N/A	12359.95	#N/A		
<b>41 Security Guard</b>		SG	pers/mc	6179.98	8651.97	#N/A		
<b>42 Maintain Pumping</b>		MP	month	3707.99	#N/A	#N/A		
<b>43 Clear SpillWay</b>		CSW	each	2101.19	5932.78			
<b>44 Build Treatment Plant</b>						#N/A		
	Small (< 1000 m3/d)	BTPS	lump su	#####	#####	#N/A		
	Large (> 1000 m3/d)	BTPL	lump su	#####	#####	#N/A		
<b>45 Operate Treatment Plant</b>		OTP	m3	0.33	1.85	#N/A		
<b>46 SCariFY road and</b>		SCFY	km	3960.80	5561.98			

### Unit Cost Table

ITEM	Detail	COST CODE	UNITS	LOW \$	HIGH \$	SPECIFIED \$	
<b>install water breaks</b>				0.00	0.00	0.00	
<b>water treatment chemicals</b>							
ferric sulphate		ferric	kg	0.68	0.00	0.00	
ferrous sulphate		ferrous	kg	0.45	0.00	0.00	
lime		lime	kg	0.31		0.00	
hydrogen peroxide, 50%		hperox	kg	1.46	0.00	0.00	
Sodium Metabisulfate		Nametab	kg	1.01	0.00	0.00	
Caustic soda, 50%		caustic	kg	0.63	0.00	0.00	
Sulfuric acid, 93%		sulfuric	kg	0.27	0.00	0.00	
flocculant		flocc	kg	5.50	0.00	0.00	
copper sulphate		copper	kg				
typical shipping, to Whitehorse or Yellowknife			kg	0.07	0.00	0.00	
<b>Typical Labour &amp; Equipment Rates</b>			\$/hr	70	80		updated July 2010
Site manager		Sman	\$/hr	75.60	86.40	0.00	
Mine superintendent		super	\$/hr	56.00	64.80	0.00	
Environmental coordinator		env-co	\$/hr	56.00	64.80	0.00	
Journeyman (mech, elec, weld)		trade	\$/hr	54.00	64.80	0.00	
surveyor/mech			\$/hr	62.50			
Equipment operator		oper	\$/hr	57.50	59.40	0.00	
labour - skilled		lab-s	\$/hr	55.00	41.04	46.05	specified - water treatment plant operator
labour - unskilled		lab-us	\$/hr	50.00	37.80	0.00	
Security / first aid		safety	\$/hr	37.90	51.84	0.00	
Admin.		admin	\$/hr	45.36	52.92	0.00	
				0.00	0.00	0.00	
Front end loader, ?, Cat992		loader	\$/hr	277.00	356.40	0.00	low - 988 loader, high - 992 loader
excavator, Cat325		excav	\$/hr	190.00	189.00	0.00	fuel and operator
dump truck - tandem		dumpt	\$/hr	0.00	0.00	0.00	
dump truck off road, Cat 777		dumppo	\$/hr	286.20	0.00	0.00	
dozer, D8, D10		dozer	\$/hr	225.00	324.00	0.00	fuel & oper. Incl.
CS563		comp	\$/hr	95.00			fuel & oper. Incl.
scooptram, 6 yd3 bucket		scoop	\$/hr	148.00			
flat bed truck with hiab		hiab		131.00			fuel & oper NOT included
certified mech with truck			\$/hr	200.00			

**APPENDIX B – BCL TECHNICAL MEMO – OCTOBER 20, 2011**



## MEMORANDUM

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DATE: October 20, 2011

TO: Robert Jenkins, Nathan Richea, AANDC Water Resources  
CC:

FROM: John Brodie, P. Eng., Cassandra Hall, P.Geo, EIT

SUBJECT: DDMI Revised Security Estimate – October 2011

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The purpose of this memo is to provide a summation of the information provided to date from DDMI and an updated cost estimate where appropriate using that information. The main difference between the companies cost estimate has been the availability of Type I rock.

BCL completed an updated cost estimate in April 2011 and details are in Diavik Mine – Commentary on ICRP & Closure Cost Implications.

### Part 1

DDMI presented a schematic of the North Country Rock Pile in December 2010 outlining the planned reclamation strategy for resloping and covering. The schematic indicated that the majority of the North Country Rock Pile was Type III material.

DDMI provided a table of options in March 2011 where Type I material could be excavated around the site to make up the shortfall in available material. This included removing Type I from roads, laydown areas and small stockpiles. BCL revised the table to account for impurities and impracticality of removing the material.

DDMI provided a re-mining plan with the closure cost information in June 2011. BCL had 3 main concerns regarding the re-mining of the North Country Rock Pile for Type I as presented.

1. Mining Plan which includes access roads, equipment and stable slopes

2. Boundary affects between Type I and III rock
3. Reclamation plan of North Country Rock Pile after Type I material has been excavated.

This information was conveyed to DDMI in August 2011. Following that there have been email exchanges and meetings regarding the re-mining plan of Type I from the North Country Rock Pile.

Due to the uncertainties in the re-mining plan of the North Country Rock Pile BCL has maintained the cost of quarrying sufficient Type I material in the cost estimate. The original cost estimate for Type I material that needed to be quarried was 8,037,000 m<sup>3</sup>. BCL has refined this number to include the use of Type III material under the till layer in the PKC. This reduces the Type I short fall to 6,237,000 m<sup>3</sup>.

Further reductions in the cost estimate using information that DDMI has provided includes:

*DDMI 1. Consistency with No A21 Assumption*

We agree with the removal of the costs for flattening the till slopes. The cost for the till island revegetation can be removed but in our opinion this is deficient on future land use.

*DDMI 2. Consistency with ICRP 2001 Approval*

The cost for the till island revegetation can be removed but in our opinion this is deficient on future land use.

*DDMI 3. Reasonable Assumptions*

The mobilization of fuel to the site for reclamation activities is consistent with the reclamation security at other sites. We believe this to be an appropriate component of the cost estimate.

## **Part 2**

Table 1 provides a summary of the cost estimate including the refinements as described above. The cost of the Type I rock quarrying is \$21,841,889 + 30% for project management, engineering and contingency which totals \$28,394,455.

Table 1

SUMMARY OF COSTS				
			YEAR	End of Mine
COMPONENT TYPE	COMPONENT NAME	TOTAL COST	Land Liability	Water Liability
OPEN PIT	A514,A418	\$1,760,097.76	\$60,658	\$1,699,440
UNDERGROUND MINE	0	\$1,381,493.06	\$1,192,073	\$189,421
TAILINGS	0	\$47,502,894.06	\$42,862	\$47,460,032
ROCK PILE	0	\$29,813,116.96	\$615,961	\$29,197,156
BUILDINGS AND EQUIPMENT	0	\$16,078,169.98	\$14,659,457	\$1,418,713
CHEMICALS AND SOIL MANAGEMENT	0	\$2,123,417.00	\$1,036,709	\$1,086,709
WATER MANAGEMENT	0	\$1,119,553.99	\$0	\$1,119,554
POST-CLOSURE SITE MAINTENANCE		\$0.00	\$0	\$0
	<b>SUBTOTAL</b>	<b>\$99,778,743</b>	<b>\$17,607,718</b>	<b>\$82,171,024</b>
		<b>Percentages</b>	17.6	82.4
MOBILIZATION/DEMOBILIZATION	0	\$10,332,540	\$1,823,359	\$8,509,181
MONITORING AND MAINTENANCE	0	\$16,845,117	\$2,972,618	\$13,872,499
Market Factor Price Adjustment	0 %	\$0	\$0	\$0
PROJECT MANAGEMENT	5 %	\$4,988,937	\$880,386	\$4,108,551
ENGINEERING	5 %	\$4,988,937	\$880,386	\$4,108,551
CONTINGENCY	20 %	\$19,955,749	\$3,521,544	\$16,434,205
<b>GRAND TOTAL - CAPITAL COSTS</b>		<b>\$156,890,022</b>	<b>\$27,686,011</b>	<b>\$129,204,011</b>

**APPENDIX C – DDMI POWERPOINT PRESENTATION – JUNE 29, 2011 MTG**

**RioTinto**

## Closure Cost Estimate Information



AANDC-WLWB-DDMI June 29, 2011

## INAC 2011

Identified 4 areas where more detail was necessary regarding closure cover material accessibility and appropriateness:

- Full delineation of locations and volumes of Type I rock
- Size of the material at each location
- Methods and specific equipment to access material
- Details regarding any size modification

1. Full delineation of the locations and volumes of Type I rock. Identifying that X amount of material is located in an area is not sufficient. INAC must be confident that the material is readily available at or near the surface and that significant time and resources will not be required to delineate and/or separate the Type I material.

# How much Type I Rock do we need?

## Closure:

NCRP Cover	8.8 Mt
PKC Cover	12.5 Mt
total	21.3 Mt (INAC 2011)

Say 24 Mt to include "other"

# Where could we get Type I Rock from?

(all units Mt)

North Country Rock Pile	37.00
Main Till Pile	0.00
Till Pile West of PKC Containment	0.00
Dump 12	1.04
Wet Well	0.16
ROM	2.49
Test Piles	0.39
A21 UG Portal Area	0.10
Waste Transfer Area	0.25
Airport Runway and Apron	1.85
Dump 7	1.32
N3 Laydown	0.46
Pit Access Road	0.15
Pond 14	0.48
UG Portal Area	0.67
South Haul Road	0.44
A21 Causeway	2.51
AN Storage/Emulsion Plant Road	0.38
Pond 2 Dam	1.27
<b>Total</b>	<b>50.9</b>

Excludes 0.4 Mt from Pond 14 used for operations

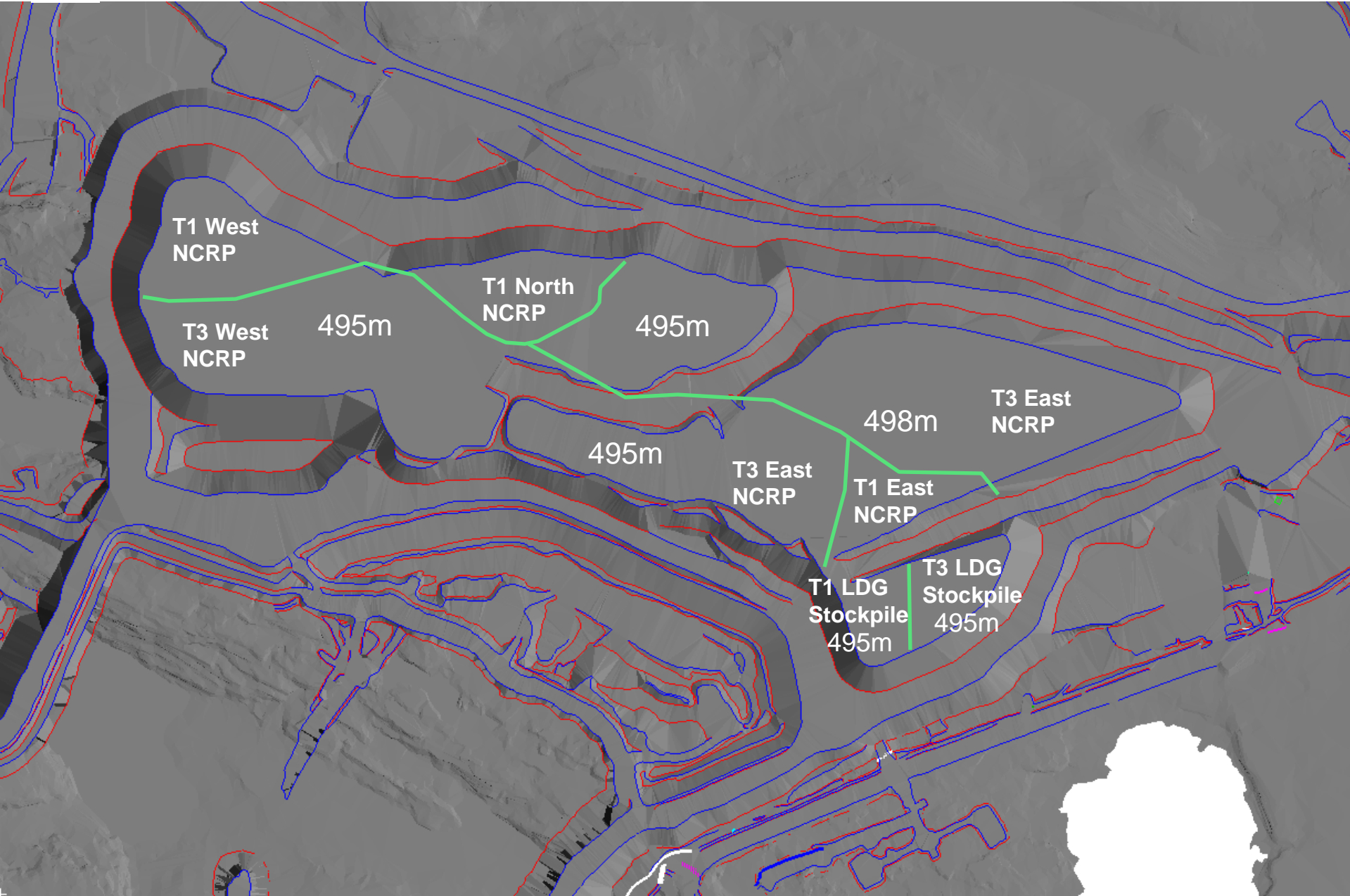
# DDMI Type I Re-mine Plan

- Life-of-mine operations requirements for Type I (Mt):

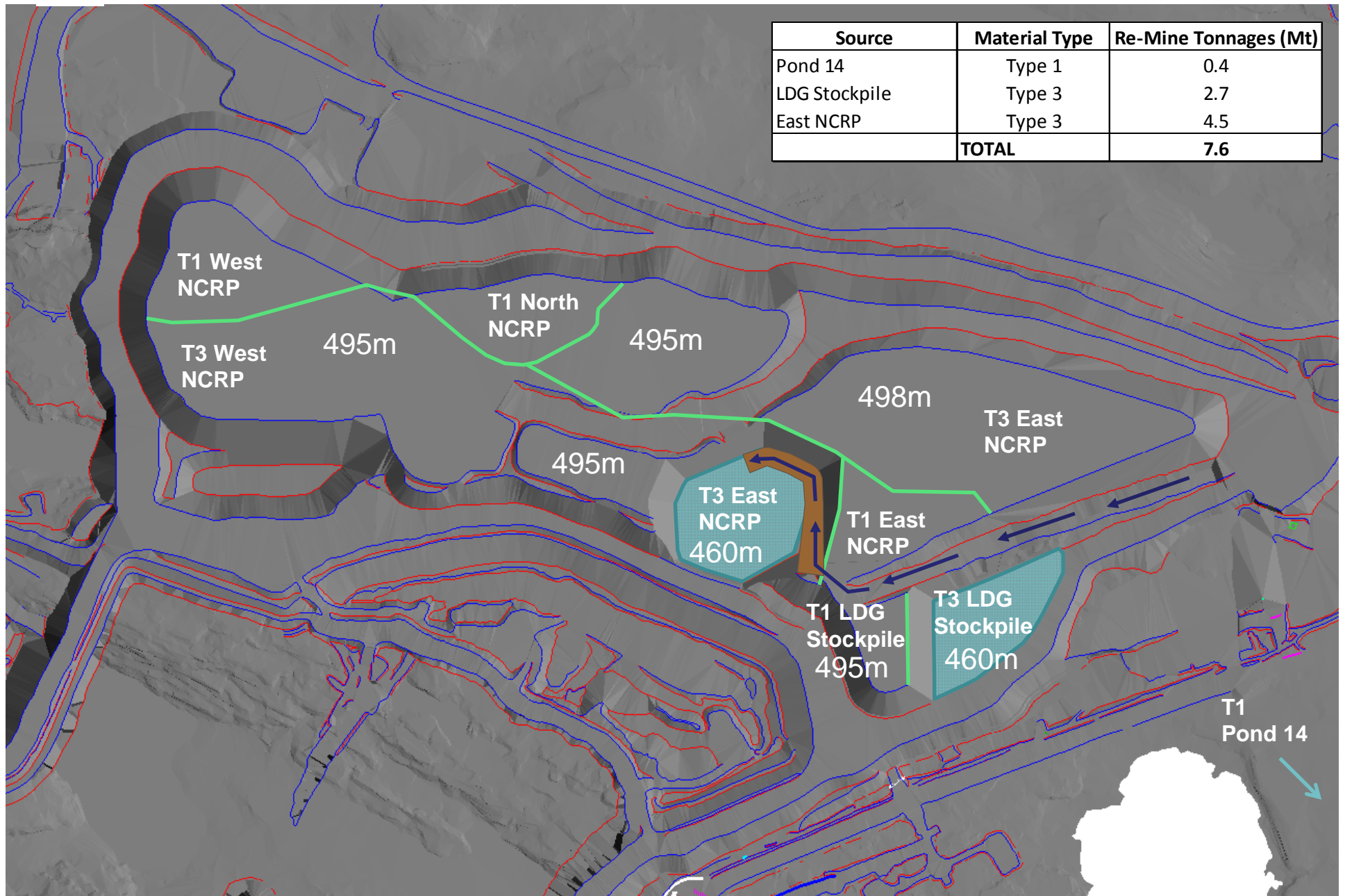
	Type I
PKC Dam Raise 9470	1.8
Crusher Feed	0.9
UG CRF	0
Total	2.7

- Operations Type I requirements supplied by UG (2.3Mt) and Pond 14 (0.4Mt)
- **Underground fill will be Type III CFR**
- Type I Re-mining commences July 2012 with completion of open-pit mining
- Three Phases of Closure Re-Mining – 8 Mt in each phase

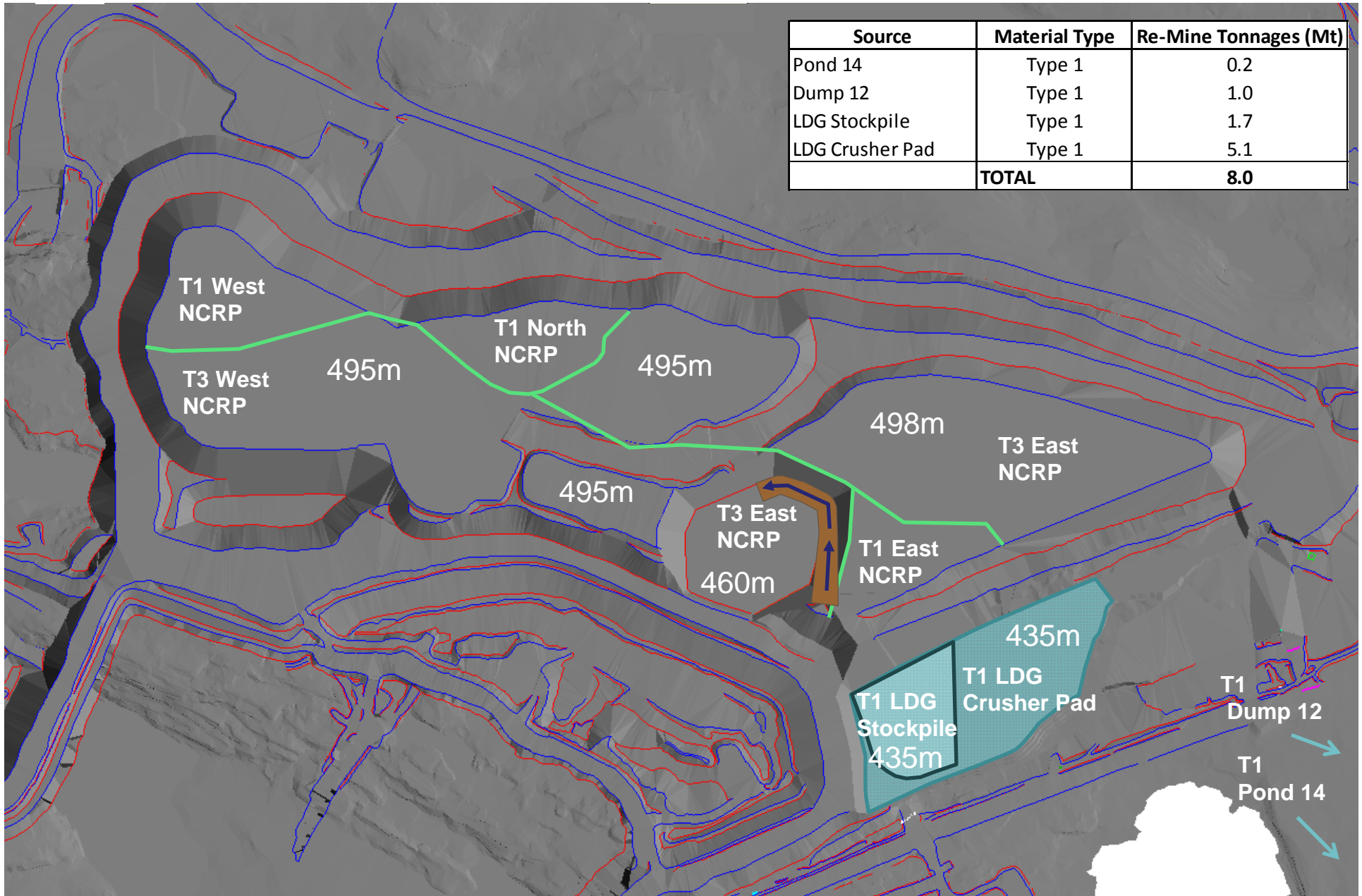
North Country Rock Pile (NCRP) – July 31, 2012 before Re-mining Commences



# NCRP – Re-Mining Phase 1: During Open Pit and Underground Operation

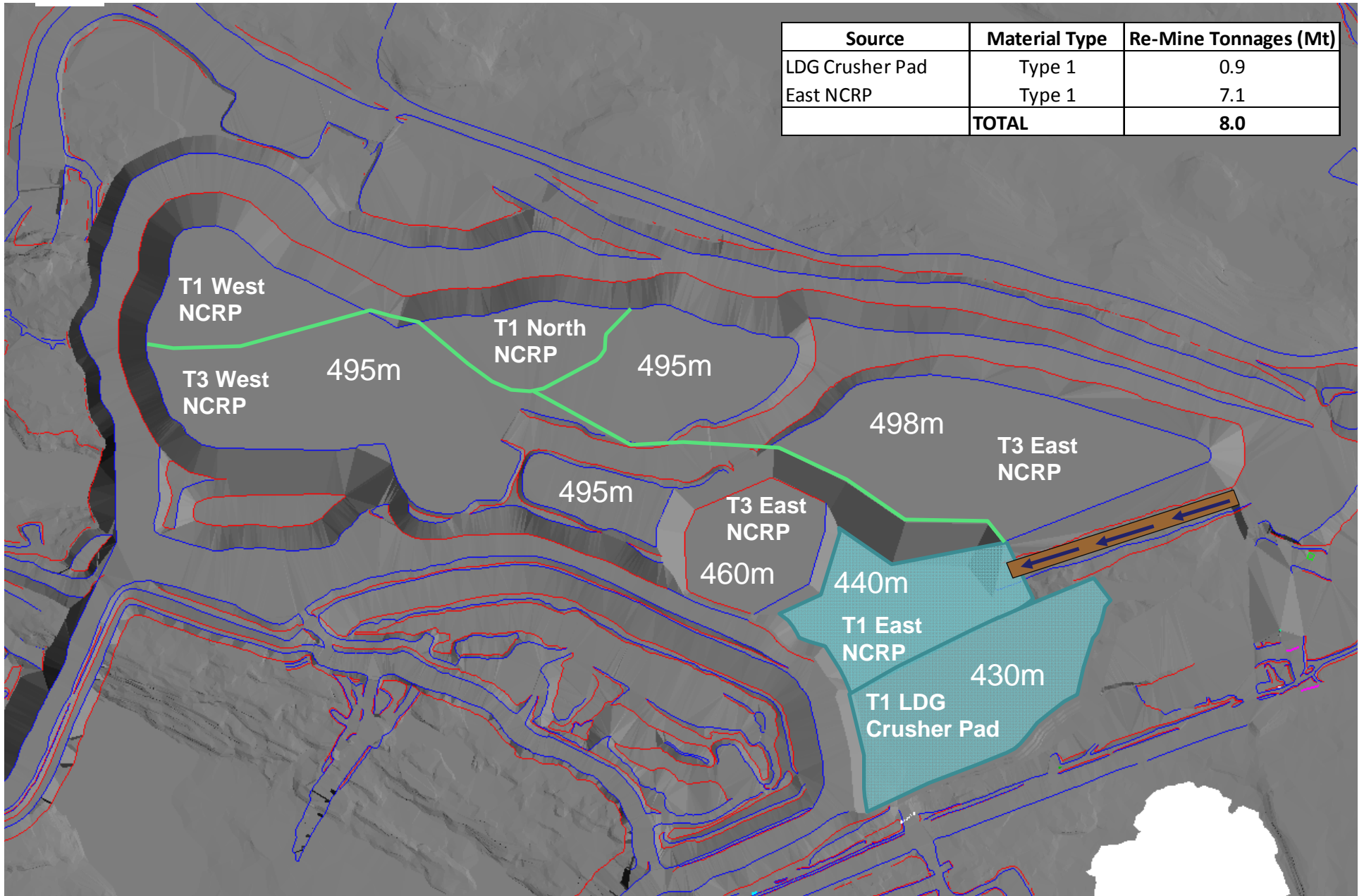


# NCRP – Re-Mining Phase 2 – For Closure

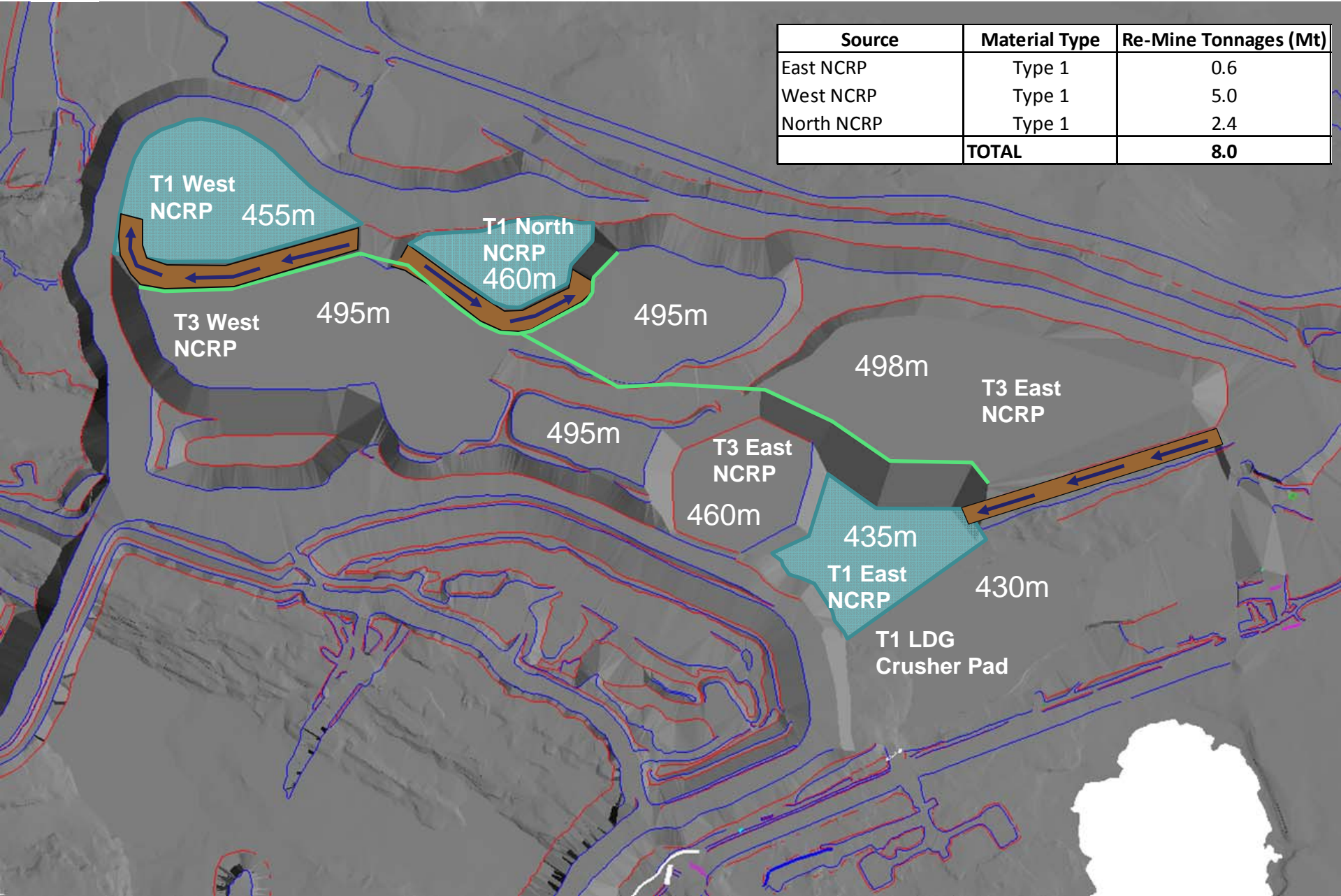


# NCRP – Re-Mining Phase 3: For Closure

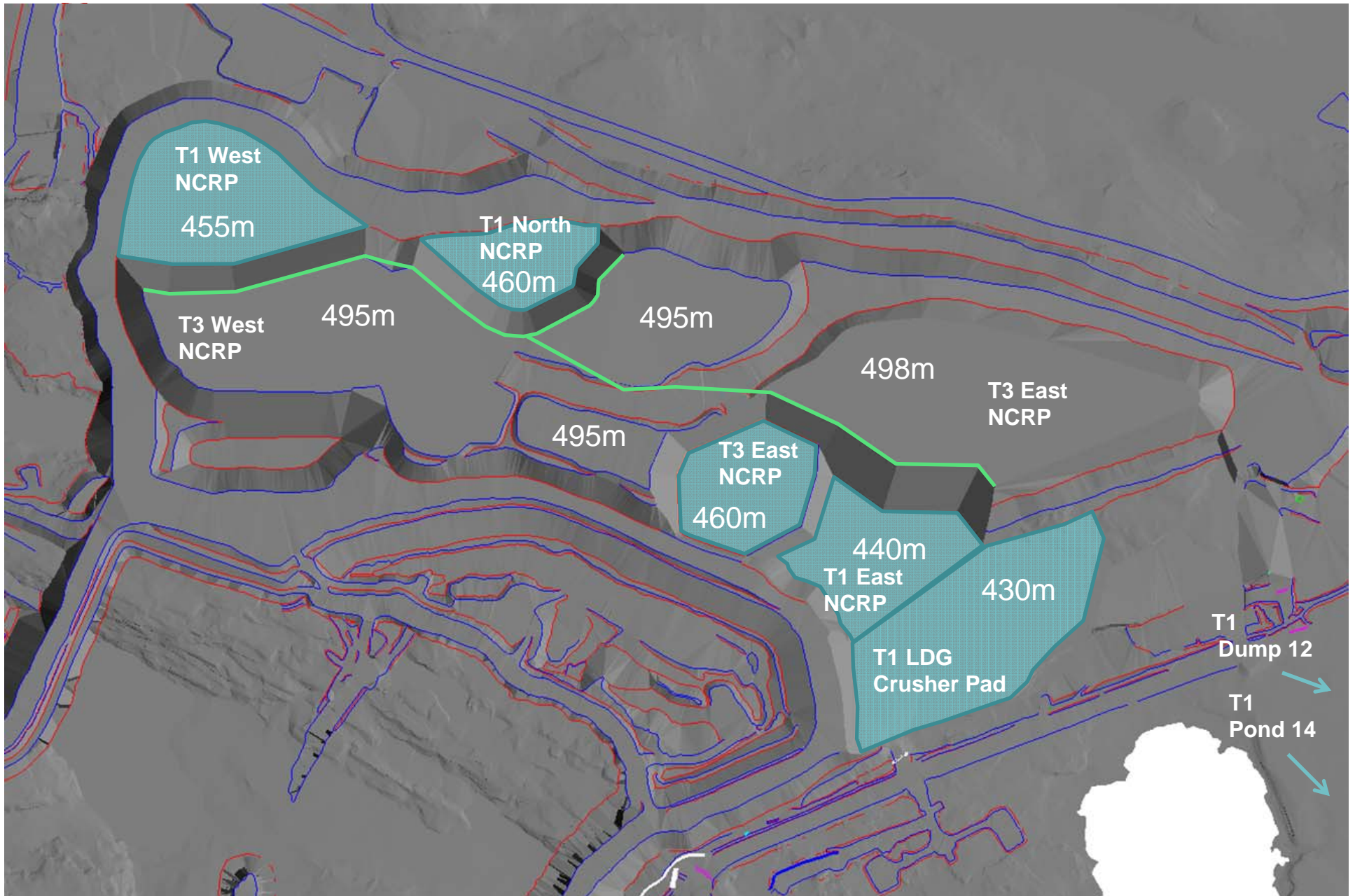
Source	Material Type	Re-Mine Tonnages (Mt)
LDG Crusher Pad	Type 1	0.9
East NCRP	Type 1	7.1
	<b>TOTAL</b>	<b>8.0</b>



# NCRP – Re-Mining Phase 4: For Closure



# NCRP – Completion of Re-Mining



# Re-Mining Summary

(all units Mt)

Re-Mining Area	Phase 2	Phase 3	Phase 4
Pond 14	0.2		
Dump 12	1.0		
LDG Stockpile - 435 m elevation	1.7		
LDG Crusher Pad - 435 m elevation	5.1		
		0.9	
East NCRP - 440 m elevation		7.1	
			0.6
West NCRP - 435 m elevation			5.0
West NCRP - 455 m elevation			2.4
North NCRP - 460 m elevation			
Total	8.0	8.0	8.0

# Type I Material Balance

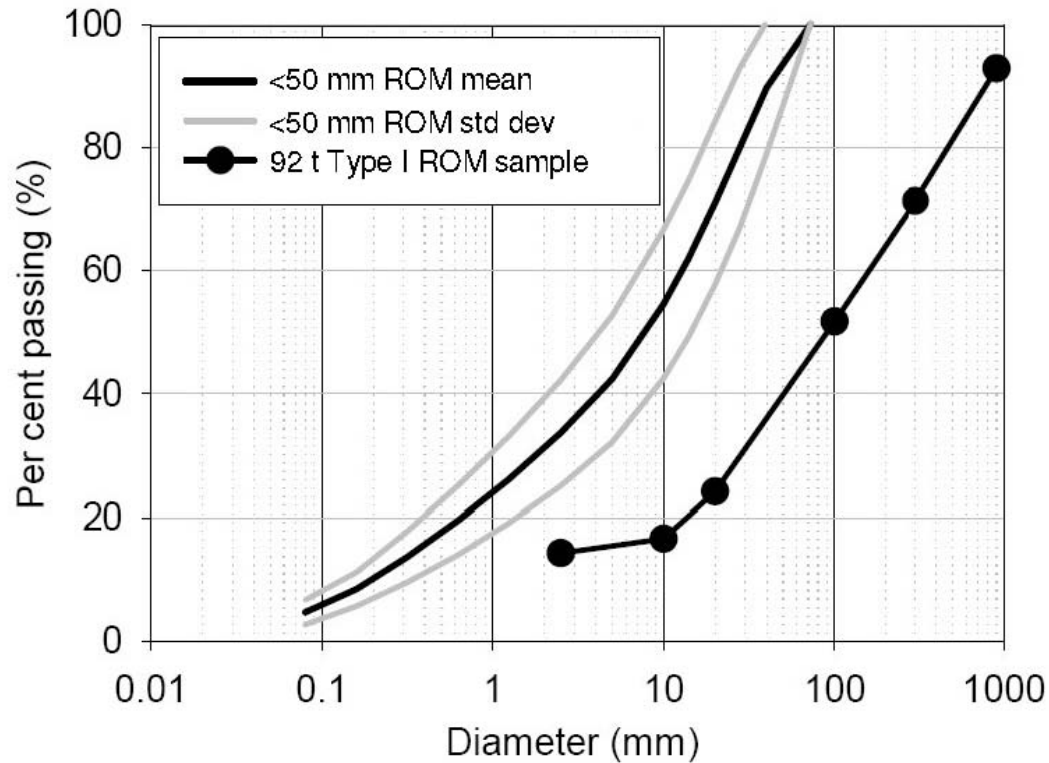
(all units Mt)

	Potential	Re-Mine	Remaining
<b>North Country Rock Pile</b>	<b>37.00</b>	<b>22.80</b>	<b>14.20</b>
Main Till Pile	0.00	0.00	0.00
Till Pile West of PKC Containment	0.00	0.00	0.00
<b>Dump 12</b>	<b>1.04</b>	<b>1.00</b>	<b>0.04</b>
Wet Well	0.16	0.00	0.16
ROM	2.49	0.00	2.49
Test Piles	0.39	0.00	0.39
A21 UG Portal Area	0.10	0.00	0.10
Waste Transfer Area	0.25	0.00	0.25
Airport Runway and Apron	1.85	0.00	1.85
Dump 7	1.32	0.00	1.32
N3 Laydown	0.46	0.00	0.46
Pit Access Road	0.15	0.00	0.15
<b>Pond 14</b>	<b>0.48</b>	<b>0.20</b>	<b>0.28</b>
UG Portal Area	0.67	0.00	0.67
South Haul Road	0.44	0.00	0.44
A21 Causeway	2.51	0.00	2.51
AN Storage/Emulsion Plant Road	0.38	0.00	0.38
Pond 2 Dam	1.27	0.00	1.27
<b>Total</b>	<b>50.9</b>	<b>24.0</b>	<b>26.9</b>

2. Identification of the size of the material (gauge) at each location. Identification of whether or not material of different size is mixed within each location.

# Material Size – Run-of-Mine

Large scale (92 t, <900mm) particle size distribution  
 Completed by SNC Lavalin/A&A Technical in 2001



NCRP, Pond 14 and Dump 12 are all ROM

3. Full details regarding the method and specific equipment required to access the material at each location. Rationale supporting the assumption that no blasting is required must be provided for each location.

# Re-mining Equipment and Method

Current DDMI plans assume:

- drill and blast may be required – keeping a 75X series drill on-site
- could require
  - re-mining benches drilled and blasted in 10 m benches
  - drill holes in equilateral pattern with 7m spacing
- L-1350 loader and EX1200 backhoe as re-mining tools – dozer to assist
- one 830E haul truck
- at the beginning of each 10 m bench, once enough material has been mined out, a dozer will build a ramp down at a 10% grade for equipment access

#### 4. Details regarding whether or not this material has been modified in size since its placement.

As described above, NCRP, Pond 14 and Dump 12 are all ROM Rock - i.e. not modified in size since placement

# Three Other Cost Areas

## 1. Consistency with No A21 Assumption

Rock Pile Name: \_\_\_\_\_ Rock Pile #: 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
OBJECTIVE: STABILIZE SLOPES					
Flatten slopes with dozer, rock pile, north	m3	1501500	dsl	0.71	\$1,066,065.00
Flatten slopes with dozer, till pile	m3	479000	dsl	0.71	\$340,090.00
Flatten slopes with dozer, till pile, south	m3	234000	dsl	0.71	\$166,140.00
Toe buttress, drain mat'l	m3		#N/A	0	\$0.00
, fill mat'l A	m3		#N/A	0	\$0.00
, fill mat'l B	m3		#N/A	0	\$0.00
Other			#N/A	0	\$0.00
OBJECTIVE: COVER DUMP					
till on biotite schist	m3	1031000	#N/A	4.82	\$4,969,420.00
rock on mixed rock & biotite schist	m3	4290000	#N/A	3.96	\$16,988,400.00
till on caribou ramps	m3	6400	#N/A	4.82	\$30,848.00
rock cover from roads, etc.	m3	0	#N/A	5.65	\$0.00
rock cover from new quarry	m3	0			
rock cover on 2.5:1 slopes, incr. cost	m3		#N/A	0.15	\$0.00
till islands for reveg.	m3	93300	#N/A	4.82	\$449,706.00
till islands for reveg., south dump	m3	46650	#N/A	4.82	\$224,853.00

## 2. Consistency with ICRP 2001 Approval

Rock Pile Name: \_\_\_\_\_ Rock Pile #: 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
OBJECTIVE: STABILIZE SLOPES					
Flatten slopes with dozer, rock pile, north	m3	1501500	dsl	0.71	\$1,066,065.00
Flatten slopes with dozer, till pile	m3	479000	dsl	0.71	\$340,090.00
Flatten slopes with dozer, till pile, south	m3	234000	dsl	0.71	\$166,140.00
Toe buttress, drain mat'l	m3		#N/A	0	\$0.00
, fill mat'l A	m3		#N/A	0	\$0.00
, fill mat'l B	m3		#N/A	0	\$0.00
Other			#N/A	0	\$0.00
OBJECTIVE: COVER DUMP					
till on biotite schist	m3	1031000	#N/A	4.82	\$4,969,420.00
rock on mixed rock & biotite schist	m3	4290000	#N/A	3.96	\$16,988,400.00
till on caribou ramps	m3	6400	#N/A	4.82	\$30,848.00
rock cover from roads, etc.	m3	0	#N/A	5.65	\$0.00
rock cover from new quarry	m3	0			
rock cover on 2.5:1 slopes, incr. cost	m3		#N/A	0.15	\$0.00
till islands for reveg.	m3	93300	#N/A	4.82	\$449,706.00
till islands for reveg., south dump	m3	46650	#N/A	4.82	\$224,853.00

### 3. Reasonable Assumptions

Mobilization Name: \_\_\_\_\_ Mob # 1

ACTIVITY/MATERIAL	Units	Quantity	Cost Code	Unit Cost	Cost
MOBILIZE HEAVY EQUIPMENT					
Equipment to regional centre					
Excavators	km		#N/A	0	\$0
Dump trucks	km		#N/A	0	\$0
Dozers	km		#N/A	0	\$0
Demolition shears	km		#N/A	0	\$0
Equipment, regional centre to site					
Excavators - 2	km	4800	MHERH	8.42	\$40,416
Dump trucks - 15	km	120000	MHERH	8.42	\$1,010,400
Dozers - 4	km	16000	MHERH	8.42	\$134,720
Demolition shears - 2		9600	MHERH	8.42	\$80,832
Front end loader 2		4800	MHERH	8.42	\$40,416
cranes - 2		1600	MHERH	8.42	\$13,472
service vehicles -10		16000	MHERH	8.42	\$134,720
	km				
MOBILIZE CAMP					
	allowance	1	#N/A		\$150,000
MOBILIZE WORKERS					
rotations over reclamation period	m-hrs	26000	#N/A	45	\$1,170,000
MOBILIZE MISC. SUPPLIES					
Fuel	litre	7000000	#N/A	0.78	\$5,460,000

# Possible Outcome

COMPONENT TYPE	COMPONENT NAME		Revised INAC 2011	Original INAC 2011	
			TOTAL COST	TOTAL COST	
OPEN PIT	A514,A418		\$1,760,097.76	\$1,760,097.76	
UNDERGROUND MINE		0	\$1,381,493.06	\$1,381,493.06	
TAILINGS		0	\$32,367,308.84	\$53,806,469.58	(\$21,439,160.74)
ROCK PILE		0	\$23,106,813.00	\$30,993,905.96	(\$7,887,092.96)
BUILDINGS AND EQUIPMENT		0	\$16,527,875.98	\$16,078,169.98	\$449,706.00
CHEMICALS AND SOIL MANAGEMENT		0	\$2,123,417.00	\$2,123,417.00	
WATER MANAGEMENT		0	\$1,119,553.99	\$1,119,553.99	
POST-CLOSURE SITE MAINTENANCE			\$0.00	\$0.00	
<b>SUBTOTAL</b>			<b>\$78,386,560</b>	<b>\$107,263,107</b>	
			<b>Percentages</b>	<b>Percentages</b>	
MOBILIZATION/DEMOBILIZATION		0	\$4,872,540	\$10,332,540	(\$5,460,000.00)
MONITORING AND MAINTENANCE		0	\$16,845,117	\$16,845,117	
Market Factor Price Adjustment		0 %	\$0	\$0	
PROJECT MANAGEMENT		5 %	\$3,919,328	\$5,363,155	(\$1,443,827.38)
ENGINEERING		5 %	\$3,919,328	\$5,363,155	(\$1,443,827.38)
CONTINGENCY		20 %	\$15,677,312	\$21,452,621	(\$5,775,309.54)
<b>GRAND TOTAL - CAPITAL COSTS</b>			<b>\$123,620,184</b>	<b>\$166,619,696</b>	(\$42,999,512.01)

Water License component goes from \$137M to \$95M versus current \$184M

## Next Steps?

**APPENDIX D – DDMI LETTER TO WLWB OCTOBER 13, 2011**

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Yellowknife, NT X1A 2P8  
Canada  
T (867) 669 6500  
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Mr. Robert Jenkins  
Manager  
Water Resources Division  
Aboriginal Affairs and Northern Development Canada  
Box 1500  
Yellowknife, NT X1A 2P8

Mr. Mark Cliffe-Philips  
Executive Director  
Wek'èezhii Land and Water Board  
Box 32  
Wekweeti, NT X0E 1W0

October 13, 2011

**Re: Clarification Information – Closure Cost Estimate**

Diavik Diamond Mines Inc. (DDMI) is responding to informal inquiries from Aboriginal Affairs and Northern Development Canada (AANDC) and their consultant Brodie Consulting Ltd. (BCL) for information that might help clarify issues raised at a September 16, 2011 meeting. This information is being provided to assist AANDC/BCL in completing an updated closure cost estimate, based on the Interim Closure and Reclamation Plan – Version 3.2, for the Wek'èezhii Land and Water Board (WLWB).

Type I Material

BCL had previously taken the assumption that the North Country Rock Pile (NCRP) is a blend of Type II and Type III rock.

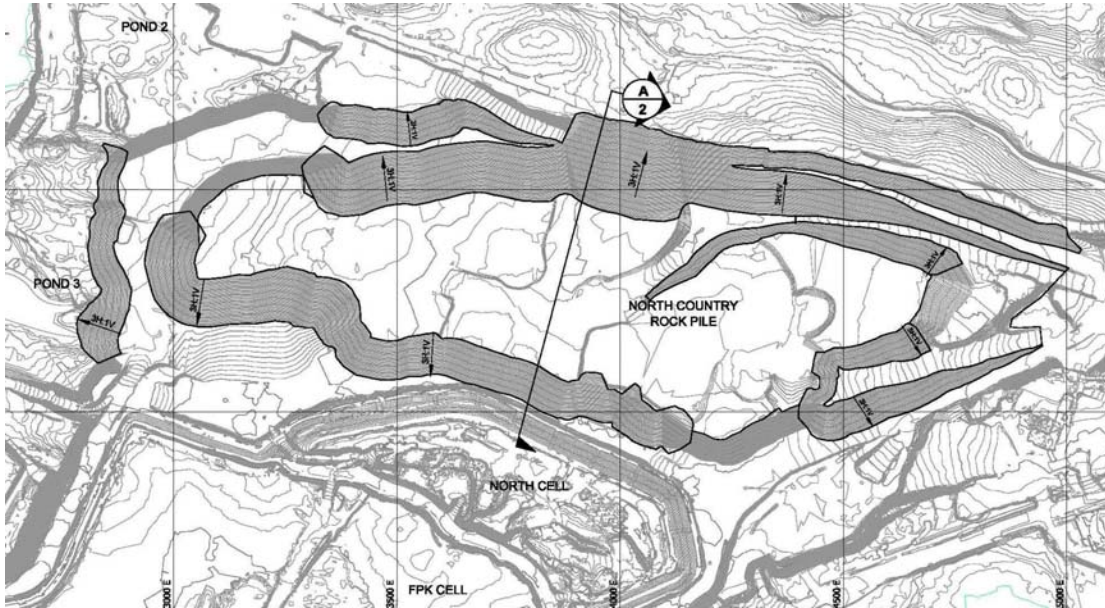
*“Based upon DDMI’s figure of the NCRP (extracted from Dec 2010 Powerpoint presentation shown below as Fig 1), essentially all of the perimeter of the pile is composed of Type 2/3 rock. Without clarification from DDMI, it must be assumed that all of the interior of the pile is the same blend of rock types.” (BCL April 15, 2011)*

Figure 1, that is referenced above, is provided below. For context the Figure was presented by DDMI as a “Conceptual Plan: Rock pile closure” in initial discussions with AANDC/BCL November 9, 2010.

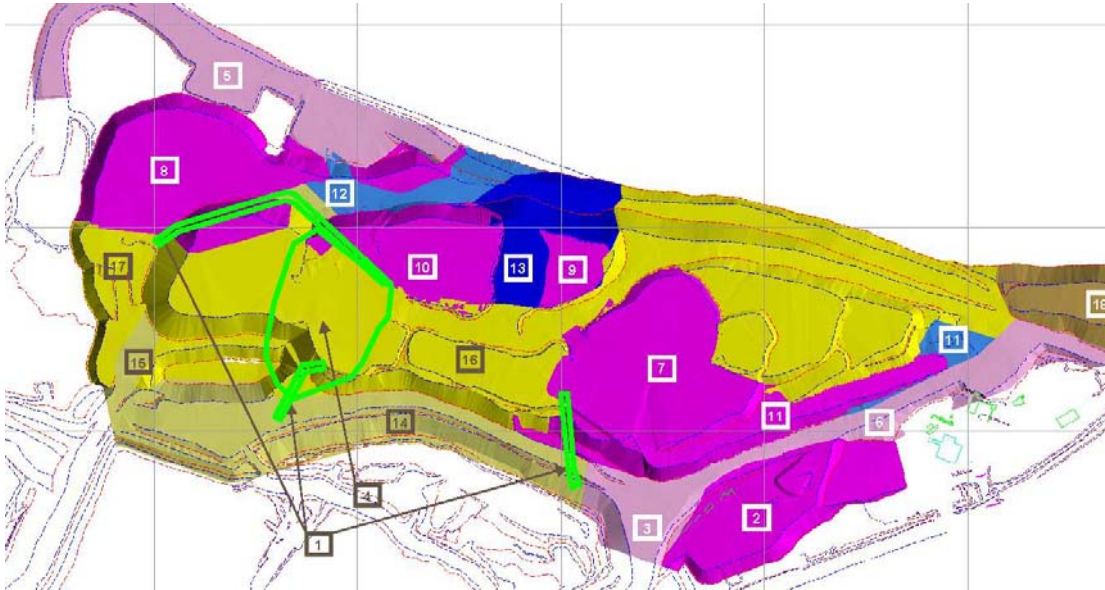
Figure 1 shows areas of the NCRP where re-sloping was proposed, based on the previous ICRP V3.0 DDMI preferred design, for “Exposed type 2 & type 3 slopes”. This design was subsequently not approved by the WLWB.

Figure 2 shows the as-built configuration for the NCRP to July 31, 2010 and delineates areas by waste rock type. The area labeled “10” in Figure 2 is Type I rock, however in Figure 1 this area is shown as being re-sloped. DDMI apologizes for this confusion and **requests that Figure 2 be used by BCL to delineate the locations of Type I within the NCRP** instead of the assumption that it is all a Type II/III blend based on Figure 1.

**Figure 1.** Conceptual Preferred Plan (ICRP V3.0): Rock pile closure – DDMI Presentation to AANDC November 9, 2010.



**Figure 2.** As-built configuration for North Country Rock Pile to July 30, 2010. Type I rock is pink, Type II rock is blue and Type III rock is yellow.



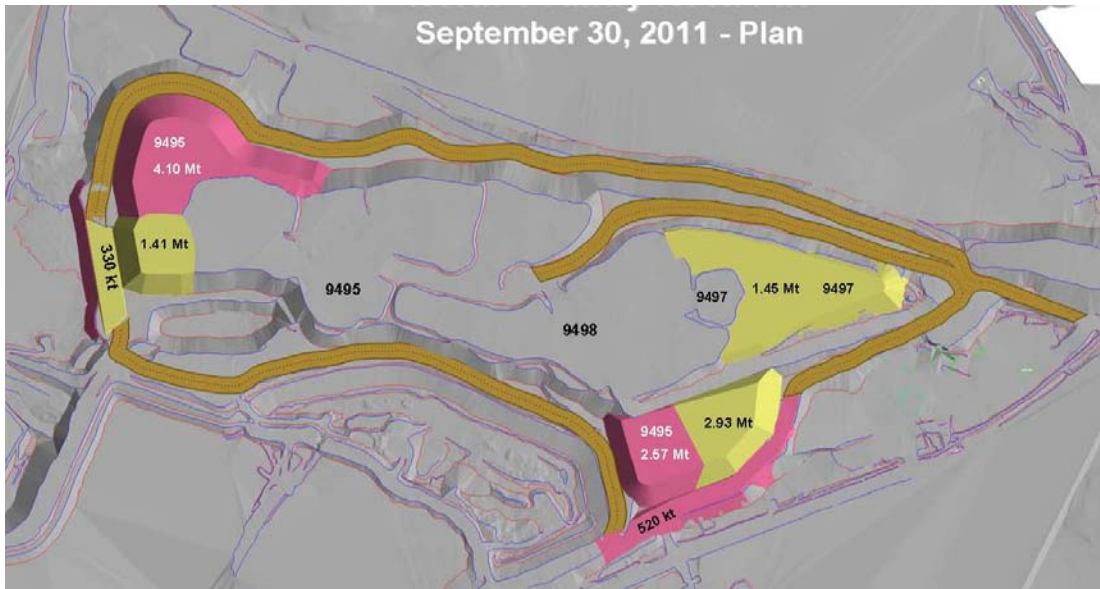
The Type I areas shown in pink in Figure 2 contain a total of 37 Mt (18 Mm<sup>3</sup>) of Type I rock to July 31, 2010. The volumes and tonnages of Type I rock by area are shown in Table 1.

**Table 1.** Volumes and tonnages of Type I rock by area for the North Country Rock Pile. Area numbers correspond to labels in Figure 2. Volumes and tonnages are to July 31, 2010 (units are cubic meters and tonnes).

			Volume	Tonnage
1	T1	EARLY_POND_DAMS	112,000	228,480
2	T1	LDG_CRUSHER_PAD	2,041,000	4,163,640
3	T1	PKC_EAST_DAM (partial)	1,164,000	2,374,560
4	T1	POND_3_T1_PAD	576,000	1,175,040
5	T1	RING_ROAD_OLD	551,000	1,124,040
6	T1	NORTH_HAUL_ROAD	2,188,000	4,463,520
7	T1	TYPE_1_DUMP	5,538,000	11,297,520
8	T1	TYPE_1_LOWER_DUMP_WEST	3,103,000	6,330,120
9	T1	TYPE_1_UPPER_DUMP_WAST_CAP	71,000	144,840
10	T1	TYPE_1_UPPER_DUMP_WEST	1,987,000	4,053,480
11	T1	TYPE_1_CRUSHER_RAMP	785,000	1,601,400
			<b>18,116,000</b>	<b>36,956,640</b>

Additional waste rock mined after July 31, 2010 was to be placed according to the plan shown in Figure 3. This shows the planned addition of 4.1 Mt of Type I rock in the northwest of the NCRP and 2.57 Mt of Type I in the southeast. An updated as-built configuration, equivalent to Figure 2 is not yet available.

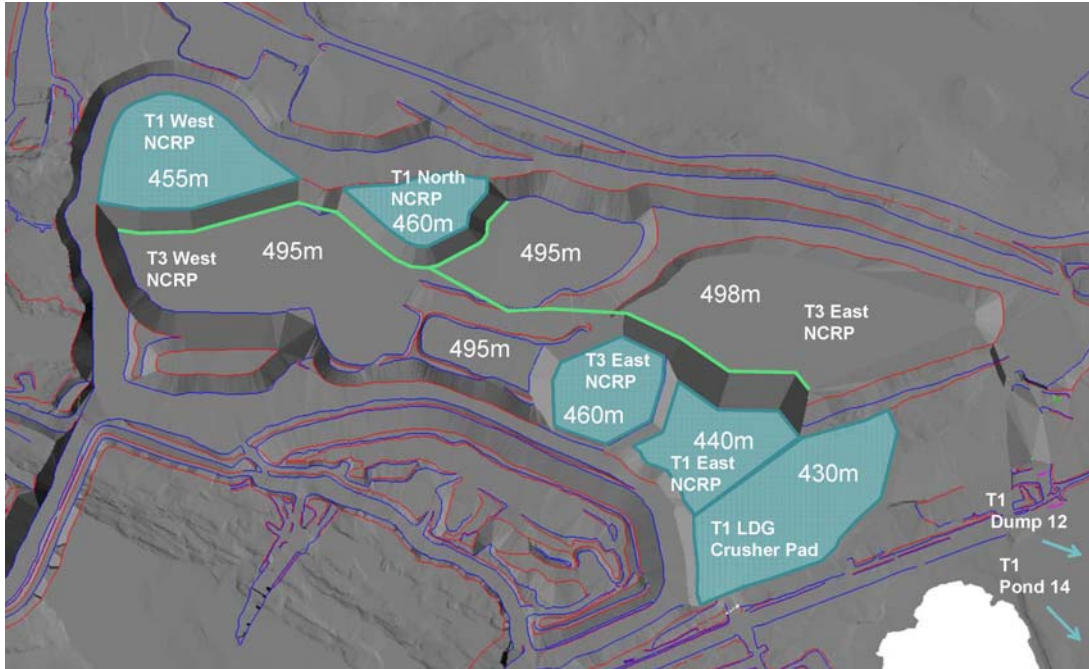
**Figure 3.** Planned locations for Type I (red) and Type III (yellow) waste rock after July 31, 2010.



This confusion around area 10 (Figure 2) was identified as an area of concern in discussions with AANDC and BCL on Sept 16, 2011. The concern was raised with regard to the presentation of a re-mining plan for the NCRP made by DDMI to WLWB, AANDC and BCL on June 29, 2011. Figure 4 shows the areas in the NCRP suggested by DDMI that could be targeted for Type I re-mining.

The specific concern raised by BCL was the rock type that exists in the area in Figure 4 titled "T1 North NCRP 460m". This is the same as the area labeled "10" in Figure 2 and is Type I rock. Table 1 shows that there were 4 Mt of rock in area "10" at July 31, 2010. The re-mine plan for the "T1 North NCRP 460m" shows extraction of 2.4 Mt of the 4 Mt available in this area. It shows mining of only the upper level to the 460m level.

**Figure 4.** Conceptual Re-Mine Plan to demonstrate how Type I rock can be extracted from the NCRP for use in mine closure. (From WLWB-AANDC-BCL Meeting June 29, 2011).



QA Type I Dumping

At the September 16, 2011 meeting with AANDC and BCL, BCL questioned the purity of the Type I rock in the NCRP. DDMI reviewed records from January 2007 to August 2011 and found an average error rate of 0.54%. This is the percentage of Type III rock that has been recorded as having been placed in a Type I area. This error could be a) Type III rock mistakenly placed in a Type I area, b) Type III rock incorrectly recorded as being placed in a Type I area, or 3) Transcription error in compiling records.

To put this average error rate in context Type I rock has a typical sulphur content of around 0.01% S and Type III has a typical sulphur content of around 0.05% S. The average sulphur content of the waste rock has been determined to be a best predictor of seepage/runoff water quality. Even if all of the 0.54% error was actually Type III rock placed in a Type I area, this would not cause a measureable change in the sulphur content and would certainly not be cause to exclude the use of this rock for closure purposes.

Re-Mining Design Parameters

Also at the September 16, 2011 meeting, BCL asked about some specific design parameters used for the re-mining. DDMI would like to provide the following information:

1. All the re-mine areas are sloped at 37 degrees which is the angle of repose for granite. These are the same slopes seen currently at the NCRP.
2. Access ramps were designed at 10% grade. This is the same grade as the permanent haul ramps in both A154 and A418 pit. The ramp widths are 37m which is the width required for double lane 830E traffic.

I trust these clarifications adequately address your questions and that this information will be fully considered in finalizing the AANDC/BCL closure cost estimate for October 24, 2011.

Regards,

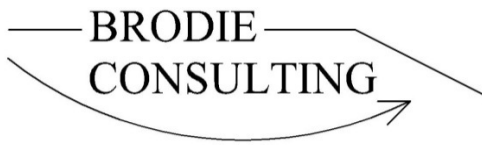
A handwritten signature in black ink, appearing to read 'G. Macdonald', with a horizontal line underneath.

Gord Macdonald

References:

BCL 2011. Brodie Consulting Ltd Memorandum to Nathan Richea and Robert Jenkins (INAC). Subject: Diavik Mine – Commentary on ICRP & Closure Cost Implications. April 15, 2011.

**APPENDIX E – BCL TECHNICAL MEMO OCTOBER 12, 2011**



## MEMORANDUM

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DATE: October 12, 2011

TO: Robert Jenkins, Nathan Richea, AANDC  
CC:

FROM: Cassandra Hall, P.Geo, EIT, John Brodie, P. Eng.

SUBJECT: DDMI information request NCRP Type I Rock

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This memo outlines the information requests for DDMI to reduce the uncertainty around the quantity and accessibility of Type I rock in the North Country Rock Pile (NCRP).

1. DDMI's presentation of December 2010 strongly suggested there was an element of doubt concerning the quantity and distribution of Type I rock in the NCRP. This included:
  - a. Plan view drawings indicating the need for slope flattening and covering of Type II/III rock on most of the perimeter of the NCRP.
  - b. Tabulated estimates of shortages of Type I rock,
  - c. Proposed plans for substantially reduced rock covers that were not consistent with the ICRP and,
  - d. Table of waste rock recoverable from roads, laydown areas and other small stockpiles.
  
2. DDMI subsequently provided several drawings which reversed the December 2010 indication of insufficient waste rock for reclamation. This newer information was not validated or substantiated with site records.
  
3. Due to the significant implication of this issue on reclamation cost and security provisions (\$36.5 M for quarrying & PM, cont), we suggest that an adequate level of validation would be a signed off study to a NI43-101 standard or equivalent (pre-feasibility level or higher) by a registered professional (P.Eng/P.Geo) that:

- a. There is a specified quantity of Type I resource
  - b. There is a practical mining method for its recovery
  - c. The residual NCRP is reclaimable consistent with ICRP (till and waste rock cover over Type II and III material)
4. We believe that the components of this study would include:
- i. Plan view drawings at each year end since the start of operations.
  - ii. Spot records of waste dump truck management.
  - iii. Spot geochemical sampling.
  - iv. Mining plan which addresses slope angles, access ramps, and appropriate mining equipment for:
    - 1. the geometries involved
    - 2. range of rock size,
    - 3. cohesion (ice) and,
    - 4. mining rate.
  - v. QA/QC plan

The above level of validation (part 3) is ideal. Any lesser level of validation will leave an element of doubt as to the proposed strategy. This uncertainty will need to be addressed in the determination of reclamation security.

Table I outlines the cost implications with increased certainty in the quantities of available Type I material in the North Country Rock Pile.

Table I

Type I in NCRP (%)	Type I to quarry (%)	Cost Implications (millions \$)
0	100	36.5
25	75	27.4
50	50	18.3
75	25	9.1
100	0	0