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<b>Date:</b>	April 23, 2013	<b>Made by:</b>	Jason Obermeyer, P.E.
<b>Project No.:</b>	083-81505	<b>Checked by:</b>	Craig Schuettpelz, P.E.
<b>Subject:</b>	Financial Assurance Cost Estimate	<b>Reviewed by:</b>	Brent Bronson, P.E.

**Project Short Title: Cliffs Natural Resources**

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### 1.0 OBJECTIVE

This calculation brief describes the methodology Golder Associates Inc. (Golder) has used to develop a financial assurance cost estimate on behalf of Northshore Mining Company (Northshore) for closure and post-closure care of the proposed Type II Virginia Formation stockpile at Northshore Mine, near Babbitt, Minnesota. The objective of the financial assurance cost estimate is to provide the cost basis for a financial assurance mechanism to help ensure that Northshore will be financially capable of fulfilling its closure and post-closure responsibilities as outlined in the *Type II Virginia Formation Stockpile Plan* and Minnesota Administrative Rules, Chapter 6130.

### 2.0 METHODOLOGY

Golder developed the financial assurance cost estimate primarily using a unit-cost estimating approach. Estimated costs were developed based on the premise that closure and post-closure activities would be performed by a third-party contractor. Quantities for earthworks and other construction items were developed based primarily on cover system design concepts presented in the *Type II Virginia Formation Stockpile Plan*. Unit costs for earthwork and other construction items were developed primarily using crew analyses for equipment and labor. The financial assurance cost estimate is applicable only to closure and post-closure care within the footprint of the proposed Type II Virginia Formation stockpile; financial assurance mechanisms that may apply to other portions of the site, if any, are not included. Estimated costs are presented in 2013 United States dollars.

### 3.0 ASSUMPTIONS

Golder employed a set of assumptions to develop the quantities and unit costs used in the financial assurance cost estimate. The assumptions are described in the following sections.

#### 3.1 Quantities

- Closure Area
  - Progressive closure will be employed in accordance with the *Type II Virginia Formation Stockpile Plan*). Specifically, stockpiled rock will be covered within 30 months of being placed. Therefore, the area to be closed in the event that the financial assurance mechanism is activated is based on the maximum amount of rock

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**Golder Associates Inc.**  
44 Union Boulevard, Suite 300  
Lakewood, CO 80228 USA  
Tel: (303) 980-0540 Fax: (303) 985-2080 www.golder.com



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estimated to be stockpiled over a 30-month span (50 percent of Year 3 production, plus production in Years 4 and 5), as computed from estimated tonnages for Virginia Formation blasts in the *Type II Virginia Formation Stockpile Plan*. The amount of material to be placed during this time span is estimated as 9,561,614 long tons.

- The average stockpile height is 100 feet.
- The loose (haul) unit weight of Type II Virginia Formation rock is 1.493 long tons per cubic yard (approximately 124 pounds per cubic foot), as provided by Northshore. The unit weight of stockpiled Type II Virginia Formation rock is 1.717 long tons per cubic yard (approximately 142 pounds per cubic foot), or 15 percent higher than the loose (haul) unit weight. These unit weights are also applied to drainage material and buttress fill.
- The loose (haul) unit weight of earthen cover components other than drainage material and buttress fill is 1.310 long tons per cubic yard (approximately 109 pounds per cubic foot). The unit weight of in-place earthen cover components is 1.506 long tons per cubic yard (approximately 125 pounds per cubic foot), or 15 percent higher than the loose (haul) unit weight.
- The cover system extends 20 feet beyond the limits of stockpiled Type II Virginia Formation rock on all sides.
- Stockpiled material has an angle of repose of 1.4 horizontal to 1 vertical.
- The average stockpile width (north-south direction) is 680 feet.
- Surface Grading
  - The average depth of minor grading across the stockpile surface is 0.5 feet.
- Cover System
  - The cover system consists of the following layers, from bottom to top:
    - 1-foot-thick lower bedding layer
    - Geomembrane-backed geosynthetic clay liner (GCL)
    - 1-foot-thick upper bedding layer
    - 2-foot-thick drainage material layer
    - 3-foot-thick glacial till layer
- Buttress Fill
  - The face of the buttress fill cross-section includes three benches, each having a width of 30 feet, with no more than 30 vertical feet between benches.
  - Buttress fill must be constructed against one north-south stockpile face and one east-west stockpile face in the event that the financial assurance mechanism is activated.
- Glacial Till Borrow Area
  - Glacial till will be removed from a borrow area with an average removal thickness of 10 feet.
- Post-Closure Care
  - A period of 30 years is used for post-closure care.

## 3.2 Unit Costs

- Equipment Spreads
  - Earthwork labor and equipment spreads were developed for construction of earthen components used in the cover system. *Rental Rate Blue Book for Construction Equipment, Volume 1* (EquipmentWatch 2011) was used to supply ownership costs, operating costs, rate adjustments, and regional adjustments for each specific piece of equipment. Equipment spreads and information used to develop hourly rates for each piece of equipment are provided in Table 1. Rate adjustments are based on model year 2005 equipment.
  - Equipment operates 173 hours per month.
- Labor Crews
  - Labor crews consist of one superintendent, one laborer, and one operator per piece of equipment. The hourly rate for the superintendent is \$85.00 per hour, based on Golder's experience in the north-central United States. Hourly rates for laborers and operators correspond to the prevailing labor wages for highway and heavy construction published by the Minnesota Department of Labor and Industry (2012) for St. Louis County, Minnesota:
    - Laborer – \$41.47 per hour
    - Dozer operator – \$47.82 per hour
    - Truck operator – \$47.82 per hour
    - Loader operator – \$48.12 per hour
    - Grader operator – \$48.67 per hour
  - Labor costs for maintenance of equipment are included in the equipment hourly rates (EquipmentWatch 2011).
- Bedding Material Production
  - Bedding material is to consist of waste rock from an on-site stockpile that has been crushed on site.
  - Crushing costs are based on a quotation from a third-party contractor. The equipment mobilization cost was estimated as \$18,000, and the crusher operating cost was estimated as \$5.71 per long ton.
- Production Rates
  - Production rates were developed by Golder based on these factors, as applicable:
    - estimated haul distances provided by Northshore
    - assigned equipment spreads
    - estimated haul truck capacity (adjusted for waste and bulking)
    - estimated haul speeds
    - estimated load and dump times per cycle (also accounting for job efficiency associated with 50-minute work hours)
  - A production rate of approximately 322 cubic yards (bank volume) per hour is used for surface grading, based on the use of a Caterpillar D8T dozer with a universal blade, a bulking factor of 15 percent, an estimated (uncorrected) dozing production of 675 loose cubic yards per hour for an average dozing distance of 150 feet, a material

factor of 0.80 (rock), a soil density correction factor of 0.69 (3,345 pounds per loose cubic yard), a job efficiency correction factor of 0.83 (50 minutes per hour), and a slot dozing factor of 1.20 (Caterpillar 2007).

- A production rate of approximately 534 cubic yards (in-place volume) per hour is used for hauling of waste rock from a stockpile to the crusher for processing to be used as bedding material, based on the use of five 40-ton haul trucks with a one-way haul distance of 500 feet, a haul truck capacity of 22.9 loose cubic yards, an average haul speed of 10 miles per hour, and a load and dump time of 10 minutes per cycle. One Caterpillar 992G loader having a rated bucket capacity of 15.0 cubic yards is required to load haul trucks, based on a cycle time of 0.65 minutes and a job efficiency correction factor of 0.83 (50 minutes per hour) (Caterpillar 2007).
- A production rate of approximately 510 cubic yards (in-place volume) per hour is used for placement of bedding material, based on the use of seven 40-ton haul trucks with a one-way haul distance of 4,000 feet, a haul truck capacity of 22.9 loose cubic yards, an average haul speed of 15 miles per hour, and a load and dump time of 10 minutes per cycle. One Caterpillar 992G loader having a rated bucket capacity of 15.0 cubic yards is required to load haul trucks, based on a cycle time of 0.65 minutes and a job efficiency correction factor of 0.83 (50 minutes per hour) (Caterpillar 2007). One Caterpillar D8T dozer with a universal blade is required to feed bedding material to smaller dozers, based on a bulking factor of 15 percent and an estimated (uncorrected) dozing production of 925 loose cubic yards per hour for an average dozing distance of 100 feet, a soil density correction factor of 0.78 (2,933 pounds per loose cubic yard), a material correction factor of 1.20 (loose stockpile), a job efficiency correction factor of 0.83 (50 minutes per hour), and a grade correction factor of 1.06 (3-percent downhill push) (Caterpillar 2007). Two Caterpillar D6T dozers with semi-universal blades are required based on a bulking factor of 15 percent and an estimated (uncorrected) dozing production of 400 loose cubic yards per hour for an average dozing distance of 150 feet, a soil density correction factor of 0.78 (2,933 pounds per loose cubic yard), a material correction factor of 1.20 (loose stockpile), a job efficiency correction factor of 0.83 (50 minutes per hour), and a grade correction factor of 1.06 (3-percent downhill push) (Caterpillar 2007).
- A production rate of approximately 656 cubic yards (in-place volume) per hour is used for placement of drainage material and buttress fill, based on the use of 11 40-ton haul trucks with a one-way haul distance of 5,000 feet, a haul truck capacity of 20.1 cubic yards, an average haul speed of 15 miles per hour, and a load and dump time of 10 minutes per cycle. One Caterpillar 992G loader having a rated bucket capacity of 15.0 cubic yards is required to load haul trucks, based on a cycle time of 0.65 minutes and a job efficiency correction factor of 0.83 (50 minutes per hour) (Caterpillar 2007). One Caterpillar D11R dozer with a universal blade is required based on a bulking factor of 15 percent and an estimated (uncorrected) dozing production of 2,000 loose cubic yards per hour for an average dozing distance of 150 feet, a soil density correction factor of 0.69 (3,345 pounds per loose cubic yard), a material correction factor of 1.20 (loose stockpile), a job efficiency correction factor of 0.83 (50 minutes per hour), and a grade correction factor of 1.06 (3-percent downhill push) (Caterpillar 2007).
- A production rate of approximately 751 cubic yards (in-place volume) per hour is used for placement of glacial till, based on the use of 12 40-ton haul trucks with a one-way haul distance of 8,000 feet, a haul truck capacity of 22.9 cubic yards, an average haul speed of 20 miles per hour, and a load and dump time of 10 minutes per cycle. One Caterpillar 992G loader having a rated bucket capacity of 15.0 cubic yards is required to load haul trucks, based on a cycle time of 0.65 minutes and a job

efficiency correction factor of 0.83 (50 minutes per hour) (Caterpillar 2007). One Caterpillar D11R dozer with a universal blade is required based on a bulking factor of 15 percent and an estimated (uncorrected) dozing production of 2,000 loose cubic yards per hour for an average dozing distance of 150 feet, a soil density correction factor of 0.78 (2,933 pounds per loose cubic yard), a material correction factor of 1.20 (loose stockpile), a job efficiency correction factor of 0.83 (50 minutes per hour), and a grade correction factor of 1.06 (3-percent downhill push) (Caterpillar 2007).

- Materials required for closure will be available on site and not subject to ownership by others, as confirmed by Northshore.
- Materials required for closure will not require processing, except crushing of waste rock to produce bedding material.
- Cover Surface and Borrow Area Vegetation
  - A unit cost of \$2,500 per acre is used for establishment of vegetation on the cover surface and glacial till borrow area, based on a contractor quotation previously obtained by Northshore for ongoing reclamation. This unit cost is consistent with Golder's experience on recent projects.
- GCL
  - A unit cost of \$0.85 per installed square foot is used for GCL, based on Golder's experience and contractor quotations on recent projects.
- Lump Sum Costs
  - The lump sum cost for mobilization and demobilization is computed as 5 percent of the total cost for earthwork construction items and GCL installation.
  - The lump sum cost for contractor's overhead and profit is computed as 15 percent of the total cost for earthwork construction items.
  - The lump sum cost for survey is computed as \$10,000 per week for 25 percent of the construction duration associated with surface grading and placement of bedding material and GCL, drainage material, and glacial till, plus \$10,000 for office time and \$40,000 for maintenance of equipment-mounted survey instruments.
  - The lump sum cost for construction quality assurance is computed as \$6,000 per week for the construction duration associated with placement of bedding material and GCL, drainage material, and glacial till, plus \$15,000 for a construction report.
  - The lump sum cost for administration is computed as 10 percent of the total closure and post-closure care cost.
  - The lump sum cost for contingency is computed as 10 percent of the total closure and post-closure care cost.
  - The annual cost of \$30,000 for post-closure monitoring and inspections described in the *Type II Virginia Formation Stockpile Plan* includes \$20,000 per year for monitoring and reporting based on recent Northshore cost information for ongoing monitoring and \$10,000 per year for inspections and reporting based on Golder's experience.
  - The annual cost of \$15,000 for post-closure repairs such as routine management of woody vegetation, minor regrading to maintain positive drainage and mitigate damage due to erosion, and reseeding of areas exhibiting insufficient vegetative coverage is based on Golder's experience.

## 4.0 CALCULATIONS

The quantities and unit costs developed by Golder for this financial assurance cost estimate are summarized in Table 2, and additional detail is provided in Attachment 1. The financial assurance cost estimate grand total is \$28,966,000.

## 5.0 LIMITATIONS

This financial assurance cost estimate is not intended to be used for budgetary purposes, to solicit competitive bids, or as a basis for final reclamation plans. Golder has made a good-faith effort to estimate the cost of closure and post-closure care associated with the subject facilities, if performed as described herein, to a level that is consistent with customary practice for financial assurance cost estimating. However, this financial assurance cost estimate reflects a conceptual level of accuracy that requires generalized assumptions to be made in the absence of detailed engineering.

## 6.0 REFERENCES

Caterpillar Inc. (Caterpillar) (2007). *Caterpillar Performance Handbook, Edition 37*.

EquipmentWatch (2011). *Rental Rate Blue Book for Construction Equipment, Volume 1*. San Jose, CA. 2nd Half 2011.

Minnesota Department of Labor and Industry (2012). *Prevailing Wages for State Funded Construction Projects (Construction Type: Highway and Heavy, Region Number: 01)*. Effective October 29, 2012. Available online: [http://workplace.doli.state.mn.us/prevwage/highway\\_data.php?region=01](http://workplace.doli.state.mn.us/prevwage/highway_data.php?region=01) (accessed October 31, 2012).

**Table 1: Assumed Equipment Spreads and Costs**

Equipment	Monthly Ownership Cost	Hourly Operating Cost	Rate Adjustment	Regional Adjustment	Hourly Rate	Number of Pieces			
						Surface Grading	Bedding Material	Drainage Material, Buttress Fill	Glacial Till
Conventional 1-Ton 4x4 Pickup Truck	\$1,030.00	\$21.00	0.943	1.098	\$27.16	1	2	1	1
Caterpillar D6T Dozer	\$9,380.00	\$59.30	0.953	1.112	\$116.76	0	2	0	0
Caterpillar D8T Dozer	\$18,375.00	\$99.95	0.953	1.112	\$212.51	2	2	0	0
Caterpillar D11R Dozer	\$42,910.00	\$256.95	0.976	1.112	\$526.15	0	0	1	1
Caterpillar 14M Grader	\$10,970.00	\$64.35	0.946	1.112	\$131.05	1	1	1	1
7,000-Gallon Off-Road Water Tanker	\$8,600.00	\$89.50	0.915	1.098	\$139.44	1	1	1	1
Caterpillar 740 Articulated Truck	\$13,530.00	\$73.30	0.908	1.098	\$151.27	2	12	11	12
Caterpillar 988H Loader	\$19,330.00	\$115.70	0.943	1.112	\$232.87	1	0	0	0
Caterpillar 992G Loader	\$33,700.00	\$199.30	0.964	1.112	\$408.12	0	2	1	1

**Table 2: Cost Estimate Summary**

Item	Units	Quantity (see note)	Unit Cost	Extension (see note)
Mobilization and Demobilization	LS	1	\$950,000.00	\$950,000.00
Contractor's Overhead and Profit	LS	1	\$2,617,000.00	\$2,617,000.00
Survey	LS	1	\$103,000.00	\$103,000.00
Construction Quality Assurance	LS	1	\$126,000.00	\$126,000.00
Grade Stockpile Surface	CY	34,000	\$5.35	\$182,000.00
Load, Haul, and Place Lower Bedding Material	CY	68,000	\$18.03	\$1,227,000.00
Install Geosynthetic Clay Liner	SF	1,818,000	\$0.85	\$1,546,000.00
Load, Haul, and Place Upper Bedding Material	CY	68,000	\$18.03	\$1,227,000.00
Load, Haul, and Place Drainage Material	CY	135,000	\$5.70	\$770,000.00
Load, Haul, and Place Glacial Till	CY	202,000	\$5.24	\$1,059,000.00
Load, Haul, and Place Buttress Fill	CY	2,253,000	\$5.70	\$12,843,000.00
Vegetate Cover Surface	AC	42	\$2,500.00	\$105,000.00
Reclaim Glacial Till Borrow Area	AC	13	\$2,500.00	\$33,000.00
Monitoring and Inspections	YR	30	\$30,000.00	\$900,000.00
Annual Repairs	YR	30	\$15,000.00	\$450,000.00
Administrative Cost	LS	1	\$2,385,000.00	\$2,414,000.00
Contingency	LS	1	\$2,385,000.00	\$2,414,000.00
<b>GRAND TOTAL</b>				<b>\$28,966,000.00</b>

Note: Quantities in units of CY and SF are rounded up to the nearest 1,000, quantities in units of AC are rounded up to the nearest whole number, and extension amounts are rounded up to the nearest \$1,000.00.



**ATTACHMENT 1**

By: JEO 1/11/13  
Checked: CCS 1/14/13

Tonnage	16,297,270 t	
Maximum 30-Month Tonnage	9,561,614 t	
Average Stockpile Height	100 ft	
Angle of Repose	1.4 H:1V	
Width of Stockpile	680 ft	
Length of Stockpile	3,769 ft	
Loose (Haul) Rock Unit Weight	124 pcf	
Stockpile Rock Unit Weight	142 pcf	
Loose (Haul) Cover Unit Weight	109 pcf	
Cover Unit Weight	125 pcf	
Average Regrade Thickness	0.5 ft	
Lower Bedding Material Thickness	1 ft	
Upper Bedding Material Thickness	1 ft	
Drainage Material Thickness	2 ft	
Glacial Till Thickness	3 ft	
Average Depth of Glacial Till Borrow	10 ft	
Glacial Till Borrow Area	545,350 sf	
Buttress Cross-Sectional Area	19,600 sf	
Buttress Length	5,909 ft	
Maximum 30-Month Stockpile Length	2,211 ft	
Stockpile Mid-Height to Buttress Fill Centroid	106 ft	
Maximum 30-Month Buttress Length	3,103 ft	
Total Stockpile Footprint	4,408,625 sf	Including buttress fill area
Maximum 30-Month Stockpile Area	1,503,517 sf	Mid-slope, not including buttress fill area
Maximum 30-Month Cover Area	1,817,833 sf	Including 20' cover length outside stockpile top
30-Month Surface Grading Volume	33,664 cy	
30-Month Lower Bedding Material Volume	67,327 cy	
30-Month Upper Bedding Material Volume	67,327 cy	
30-Month Drainage Material Volume	134,654 cy	
30-Month Glacial Till Volume	201,981 cy	
30-Month Buttress Fill Volume	2,252,587 cy	
Total 30-Month Earthwork Volume	2,757,541 cy	

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - SURFACE GRADING**

By: JEO 11/1/12  
Checked: BTM 11/1/12

<b>Labor</b>	<b>No.</b>	<b>Hr. Rate</b>	<b>Hr. Total</b>
Superintendent	1	\$85.00	\$85.00
Laborer	1	\$41.47	\$41.47

<b>Equipment</b>	<b>No.</b>	<b>Ownership</b>	<b>Operating</b>	<b>Rate Adj.</b>	<b>Region Adj.</b>	<b>Operator</b>	<b>Hr. Total</b>
Conventional 1-Ton 4x4 Pickup Truck	1	\$1,030.00	\$21.00	0.943	1.098	\$0.00	\$27.16
Caterpillar D6T Dozer	0	\$9,380.00	\$59.30	0.953	1.112	\$47.82	\$0.00
Caterpillar D8T Dozer	2	\$18,375.00	\$99.95	0.953	1.112	\$47.82	\$520.66
Caterpillar D11R Dozer	0	\$42,910.00	\$256.95	0.976	1.112	\$47.82	\$0.00
Caterpillar 14M Grader	1	\$10,970.00	\$64.35	0.946	1.112	\$48.67	\$179.72
7,000-Gallon Off-Road Water Truck	1	\$8,600.00	\$89.50	0.915	1.098	\$47.82	\$187.26
Caterpillar 740 Articulated Truck	2	\$13,530.00	\$73.30	0.908	1.098	\$47.82	\$398.18
Caterpillar 988H Loader	1	\$19,330.00	\$115.70	0.943	1.112	\$48.12	\$280.99
Caterpillar 992G Loader	0	\$33,700.00	\$199.30	0.964	1.112	\$48.12	\$0.00

**Total Hourly Cost** **\$1,720.45**

Hourly production 322 cy

**Total Unit Cost** **\$5.35 /cy**

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - BEDDING MATERIAL (LOAD, HAUL, CRUSH)**

By: JEO            1/4/13  
Checked: CCS        1/9/13

<b>Labor</b>	<b>No.</b>	<b>Hr. Rate</b>	<b>Hr. Total</b>
Superintendent	1	\$85.00	\$85.00
Laborer	1	\$41.47	\$41.47

<b>Equipment</b>	<b>No.</b>	<b>Ownership</b>	<b>Operating</b>	<b>Rate Adj.</b>	<b>Region Adj.</b>	<b>Operator</b>	<b>Hr. Total</b>
Conventional 1-Ton 4x4 Pickup Truck	1	\$1,030.00	\$21.00	0.943	1.098	\$0.00	\$27.16
Caterpillar D6T Dozer	0	\$9,380.00	\$59.30	0.953	1.112	\$47.82	\$0.00
Caterpillar D8T Dozer	1	\$18,375.00	\$99.95	0.953	1.112	\$47.82	\$260.33
Caterpillar D11R Dozer	0	\$42,910.00	\$256.95	0.976	1.112	\$47.82	\$0.00
Caterpillar 14M Grader	0	\$10,970.00	\$64.35	0.946	1.112	\$48.67	\$0.00
7,000-Gallon Off-Road Water Truck	0	\$8,600.00	\$89.50	0.915	1.098	\$47.82	\$0.00
Caterpillar 740 Articulated Truck	5	\$13,530.00	\$73.30	0.908	1.098	\$47.82	\$995.46
Caterpillar 988H Loader	0	\$19,330.00	\$115.70	0.943	1.112	\$48.12	\$0.00
Caterpillar 992G Loader	1	\$33,700.00	\$199.30	0.964	1.112	\$48.12	\$456.24

**Total Hourly Cost** **\$1,865.66**

Crushing equipment mobilization	\$18,000	\$18,000
Crushing operational cost	\$5.71 /t	\$8.60 /cy
<b>Total Crushing Cost</b>	<b>\$5.80 /t</b>	<b>\$8.74 /cy</b>

Load and dump time per cycle	10 min	10 min
Average haul speed	10 mph	10 mph
One-way haul distance	0.1 mi	0.1 mi
Trips per truck per hour	5.4	5.4
Truck capacity adjusted for waste/shrink	30.0 t	22.9 cy
Number of trucks	5	5
Hourly production (loose)	804 t	614 cy
Hourly production (cover)		534 cy
<b>Total Unit Cost</b>	<b>\$8.12 /t</b>	<b>\$12.23 /cy</b>

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - BEDDING MATERIAL (LOAD, HAUL, PLACE)**

By: JEO 1/4/13  
Checked: CCS 1/9/13

<b>Labor</b>	<b>No.</b>	<b>Hr. Rate</b>	<b>Hr. Total</b>
Superintendent	1	\$85.00	\$85.00
Laborer	1	\$41.47	\$41.47

<b>Equipment</b>	<b>No.</b>	<b>Ownership</b>	<b>Operating</b>	<b>Rate Adj.</b>	<b>Region Adj.</b>	<b>Operator</b>	<b>Hr. Total</b>
Conventional 1-Ton 4x4 Pickup Truck	1	\$1,030.00	\$21.00	0.943	1.098	\$0.00	\$27.16
Caterpillar D6T Dozer	2	\$9,380.00	\$59.30	0.953	1.112	\$47.82	\$329.16
Caterpillar D8T Dozer	1	\$18,375.00	\$99.95	0.953	1.112	\$47.82	\$260.33
Caterpillar D11R Dozer	0	\$42,910.00	\$256.95	0.976	1.112	\$47.82	\$0.00
Caterpillar 14M Grader	1	\$10,970.00	\$64.35	0.946	1.112	\$48.67	\$179.72
7,000-Gallon Off-Road Water Truck	1	\$8,600.00	\$89.50	0.915	1.098	\$47.82	\$187.26
Caterpillar 740 Articulated Truck	7	\$13,530.00	\$73.30	0.908	1.098	\$47.82	\$1,393.65
Caterpillar 988H Loader	0	\$19,330.00	\$115.70	0.943	1.112	\$48.12	\$0.00
Caterpillar 992G Loader	1	\$33,700.00	\$199.30	0.964	1.112	\$48.12	\$456.24

**Total Hourly Cost** **\$2,959.99**

Load and dump time per cycle	10 min	10 min
Average haul speed	15 mph	15 mph
One-way haul distance	0.8 mi	0.8 mi
Trips per truck per hour	3.7	3.7
Truck capacity adjusted for waste/shrink	30.0 t	22.9 cy
Number of trucks	7	7
Hourly production (loose)	768 t	587 cy
Hourly production (cover)		510 cy
<b>Total Unit Cost</b>	<b>\$3.85 /t</b>	<b>\$5.80 /cy</b>

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - DRAINAGE MATERIAL AND BUTTRESS FILL**

By: JEO 11/1/12  
Checked: BTM 11/1/12

<b>Labor</b>	<b>No.</b>	<b>Hr. Rate</b>	<b>Hr. Total</b>
Superintendent	1	\$85.00	\$85.00
Laborer	1	\$41.47	\$41.47

<b>Equipment</b>	<b>No.</b>	<b>Ownership</b>	<b>Operating</b>	<b>Rate Adj.</b>	<b>Region Adj.</b>	<b>Operator</b>	<b>Hr. Total</b>
Conventional 1-Ton 4x4 Pickup Truck	1	\$1,030.00	\$21.00	0.943	1.098	\$0.00	\$27.16
Caterpillar D6T Dozer	0	\$9,380.00	\$59.30	0.953	1.112	\$47.82	\$0.00
Caterpillar D8T Dozer	0	\$18,375.00	\$99.95	0.953	1.112	\$47.82	\$0.00
Caterpillar D11R Dozer	1	\$42,910.00	\$256.95	0.976	1.112	\$47.82	\$573.97
Caterpillar 14M Grader	1	\$10,970.00	\$64.35	0.946	1.112	\$48.67	\$179.72
7,000-Gallon Off-Road Water Truck	1	\$8,600.00	\$89.50	0.915	1.098	\$47.82	\$187.26
Caterpillar 740 Articulated Truck	11	\$13,530.00	\$73.30	0.908	1.098	\$47.82	\$2,190.01
Caterpillar 988H Loader	0	\$19,330.00	\$115.70	0.943	1.112	\$48.12	\$0.00
Caterpillar 992G Loader	1	\$33,700.00	\$199.30	0.964	1.112	\$48.12	\$456.24

**Total Hourly Cost** **\$3,740.84**

Load and dump time per cycle	10 min	10 min
Average haul speed	15 mph	15 mph
One-way haul distance	0.9 mi	0.9 mi
Trips per truck per hour	3.4	3.4
Truck capacity adjusted for waste/shrink	30.0 t	20.1 cy
Number of trucks	11	11
Hourly production (loose)	1,127 t	755 cy
Hourly production (cover)		656 cy
<b>Total Unit Cost</b>	<b>\$3.32 /t</b>	<b>\$5.70 /cy</b>

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - GLACIAL TILL**

By: JEO 10/31/12  
Checked: BTM 11/1/12

<b>Labor</b>	<b>No.</b>	<b>Hr. Rate</b>	<b>Hr. Total</b>
Superintendent	1	\$85.00	\$85.00
Laborer	1	\$41.47	\$41.47

<b>Equipment</b>	<b>No.</b>	<b>Ownership</b>	<b>Operating</b>	<b>Rate Adj.</b>	<b>Region Adj.</b>	<b>Operator</b>	<b>Hr. Total</b>
Conventional 1-Ton 4x4 Pickup Truck	1	\$1,030.00	\$21.00	0.943	1.098	\$0.00	\$27.16
Caterpillar D6T Dozer	0	\$9,380.00	\$59.30	0.953	1.112	\$47.82	\$0.00
Caterpillar D8T Dozer	0	\$18,375.00	\$99.95	0.953	1.112	\$47.82	\$0.00
Caterpillar D11R Dozer	1	\$42,910.00	\$256.95	0.976	1.112	\$47.82	\$573.97
Caterpillar 14M Grader	1	\$10,970.00	\$64.35	0.946	1.112	\$48.67	\$179.72
7,000-Gallon Off-Road Water Truck	1	\$8,600.00	\$89.50	0.915	1.098	\$47.82	\$187.26
Caterpillar 740 Articulated Truck	12	\$13,530.00	\$73.30	0.908	1.098	\$47.82	\$2,389.11
Caterpillar 988H Loader	0	\$19,330.00	\$115.70	0.943	1.112	\$48.12	\$0.00
Caterpillar 992G Loader	1	\$33,700.00	\$199.30	0.964	1.112	\$48.12	\$456.24

**Total Hourly Cost** **\$3,939.93**

Load and dump time per cycle	10 min	10 min
Average haul speed	20 mph	20 mph
One-way haul distance	1.5 mi	1.5 mi
Trips per truck per hour	3.1	3.1
Truck capacity adjusted for waste/shrink	30.0 t	22.9 cy
Number of trucks	12	12
Hourly production (loose)	1,131 t	864 cy
Hourly production (cover)		751 cy
<b>Total Unit Cost</b>	<b>\$3.48 /t</b>	<b>\$5.24 /cy</b>

**NORTHSHORE MINE - TYPE II VIRGINIA FORMATION STOCKPILE  
FINANCIAL ASSURANCE COST ESTIMATE - COST SUMMARY**

By: JEO 4/16/13  
Checked: CCS 4/16/13

<b>Item</b>	<b>Units</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Extension</b>
Mobilization/Demobilization	ls	1	\$950,000.00	\$950,000.00
Contractor's Overhead and Profit	ls	1	\$2,617,000.00	\$2,617,000.00
Survey	ls	1	\$103,000.00	\$103,000.00
Construction Quality Assurance	ls	1	\$126,000.00	\$126,000.00
Grade Stockpile Surface	cy	34,000	\$5.35	\$182,000.00
Crush, Load, Haul, and Place Lower Bedding Material	cy	68,000	\$18.03	\$1,227,000.00
Install Geosynthetic Clay Liner	sf	1,818,000	\$0.85	\$1,546,000.00
Crush, Load, Haul, and Place Upper Bedding Material	cy	68,000	\$18.03	\$1,227,000.00
Load, Haul, and Place Drainage Material	cy	135,000	\$5.70	\$770,000.00
Load, Haul, and Place Glacial Till	cy	202,000	\$5.24	\$1,059,000.00
Load, Haul, and Place Buttress Fill Material	cy	2,253,000	\$5.70	\$12,843,000.00
Vegetate Cover Surface	ac	42	\$2,500.00	\$105,000.00
Reclaim Glacial Till Borrow Area	ac	13	\$2,500.00	\$33,000.00
<b>CLOSURE TOTAL</b>				<b>\$22,788,000.00</b>
<b>POST-CLOSURE</b>				
<b>Item</b>	<b>Units</b>	<b>Quantity</b>	<b>Unit Cost</b>	<b>Extension</b>
Monitoring and Inspections	yr	30	\$30,000.00	\$900,000.00
Annual Repairs	yr	30	\$15,000.00	\$450,000.00
<b>POST-CLOSURE TOTAL</b>				<b>\$1,350,000.00</b>
Administrative Cost		10% of closure and post-closure totals		\$2,414,000.00
Contingency		10% of closure and post-closure totals		\$2,414,000.00
<b>GRAND TOTAL</b>				<b>\$28,966,000.00</b>