## Energy, Mines and Petroleum Resources
## Mines and Mineral Resources Division

# Regional Mine Reclamation Bond Calculation Policy

VERSION 1.0 April 2018

| | |
|---|---|
| **Approved:** | *Original Signed by: Julie Chace, Executive Regional Director, Mines and Mineral Resources Division.* |
| **Effective Date:** | April 1, 2018 |
| **Relationship to Previous Policy:** | This policy replaces all previous policy regarding regional mine reclamation bond calculations. |

Ministry of Energy,
Mines and Petroleum Resources

# Name of Policy: Regional Mine Reclamation Bond Calculation Policy

## Business Area:

Health Safety and Permitting Branch; Regional Mine Permitting and Reclamation

## Purpose:

The purpose of this policy is to provide guidance to Inspector of Mines responsible for permitting Regional Mines and to provide a tool for determining the appropriate reclamation bond amount.

The purpose of the guidance is:

- To provide Regional Inspector of Mines- Permitting with a defensible and consistent means of assessing reclamation liability for regional mines
- To avoid financial risk and liability to the public/government by ensuring the assessed security represents the cost of mine reclamation to the Province
- To encourage dialogue between proponent and Inspector, with the aim of limiting unnecessary disturbance and prompting progressive reclamation
- To promote transparency in bonding levels and methodology to First Nations and the public.

## Scope:

This policy applies to all associated regulatory processes and administration required to determine the appropriate bond amounts in relation reclamation of regional mines, which in this context is defined as: mineral and coal exploration sites, placer mines, pits or quarries that are below an environmental assessment threshold.

This policy impacts the following procedural steps

- review of a NOW application for a new or amended Mines Act Permit;
- First Nations consultation, stakeholder engagement and agency referrals
- Setting permit conditions
- determining the appropriate reclamation security,
- compliance verification inspections
- permit closure and bond return

## Definitions:

**"Regional Mines"** means placer mines, pits or quarries as well as mineral and coal exploration sites.

**"Reclamation"** means actions taken to mitigate or reverse the impacts of mining activities on the land base on the premise that mining should be a temporary use of the land It encompasses a range of concepts and activities including ecological restoration, revegetation and rehabilitation. It is guided by the standards within Part 10.7 of the HSRC. Parts 9.10.1 and 9.13.1 specify requirements for reclamation of mineral and coal exploration. These

requirements can be refined and clarified based on the site specific requirements as detailed in the permit application and any necessary permit conditions.

**"Inspector"** means a person appointed by the chief inspector as an inspector of mines with required delegations under Section 10 of the Mines Act.

## Policy:

When making a determination of the appropriate level of reclamation bond for activities being authorized by a regional mine Mines Act Permit, an Inspector should be guided by the most up to date version of the "Regional Bond Calculator" and associated "Regional Mine Reclamation Bond Calculator Guidance Document". Both these documents are available on the Ministry website and internal filing system.

The Regional Reclamation Bond Calculator was developed to assist Inspectors of Mines in the determination of the appropriate bond amount. It is not to fetter the decision of the Inspectors as the bond calculation may be modified by the Inspector to account for the site specific circumstances.

## Related Guidance/Considerations:

The Regional Bond Calculator and Guidance document will be updated periodically to reflect updated cost information and reclamation methodologies. It will also be reviewed for consistency with the Provincial Reclamation Policy when it is developed.

# MEMPR Regional Mine Reclamation Bond Calculator
# Version 8.2

**30-Jul-18**

| | | |
|---|---|---|
| **Project Name:** | Nicola Valley Aggregates Ltd | **Project Summary Notes** |
| **Proponent:** | Nicola Valley Aggregates Ltd | |
| **Permit #:** | | |
| **NoW #:** | 1621718 | |
| **NoW Activity:** | Sand and Gravel | |
| **Mine Inspector:** | Brendan Scorrar | |
| **Date:** | 7-Jan-19 | |

| Reclamation Cost Estimate | | | | | | | | | Notes/Assumptions |
|---|---|---|---|---|---|---|---|---|---|
| **1** | **Equipment Mob/Demob** | **Quantity** | **Unit** | **Rate ($/unit)** | | | | **Subtotal** | |
| a | Lowbed (45,000 kg) | | Hour | s.13 | Include total round trip hours | | | $0 | |
| b | Pilot Car for Oversize Loads | | Hour | | Include total round trip hours for Hwy travel | | | $0 | |
| c | Walking - Excavator | | km | | Include total round trip kms | | | $0 | |
| d | Walking - Dozer | | km | | Include total round trip kms | | | $0 | |
| e | Specialized Equipment/Transport | | - | - | Requires project specific cost estimate | | | $0 | |
| | | | | | | | | | |
| **2** | **Asset/Debris Removal** | **Quantity** | **Unit** | **Rate ($/unit)** | **Loading** | | | **Subtotal** | |
| a | Equipment/Wash Plant Removal | | Hour | s.13 | Include total round trip hours for lowbed | | | $0 | |
| b | Shipping Containers (Sea Cans) | | Hour | | Include round trip hours for trucking | | | $0 | |
| c | Scrap/Garbage | | Hour | | Include round trip hours for trucking | | | $0 | |
| d | Camp (Tent/Camper Trailer) | | Hour | | Include round trip hours for trucking | | | $0 | |
| e | Removal Crew | | Hour | | | | | $0 | |
| f | Explosives Disposal | | - | - | Requires project specific cost estimate | | | $0 | |
| | ***Camp (Modular Trailer/Bunk House)*** | | | | | | | | |
| g | Trailer Prep for Transport | | # of Trailers | s.13 | | | | $0 | |
| h | Trucking | | Hour | | Include total round trip hours for trucking | | | $0 | |
| i | Pilot Car | | Hour | | Include total round trip hours for Hwy travel | | | $0 | |
| | ***Equipment for Cleanup Activities*** | | | | | | | | |
| j | Excavator | | Hour | s.13 | | | | $0 | |
| k | Dozer | | Hour | | | | | $0 | |
| | ***Disposal*** | | | | | | | | |
| l | Waste disposal tipping fee | | Tonne | s.13 | | | | $0 | |
| m | Camper Trailer Disposal | | # of Trailers | | | | | $0 | |
| n | Modular Trailer Disposal | | # of Trailers | | | | | $0 | |
| | | | | | | | | | |
| **3** | **Fuel/Hydrocarbon Removal** | **Quantity** | **Unit** | **Rate ($/unit)** | | | | **Subtotal** | |
| a | Fuel Drum/Tidy Tank/Lubricant Storage | | Hour | s.13 | Include round trip hours for trucking | | | $0 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | b | Large Fuel Tank Storage | | Hour | s.13 | Include round trip hours for transport truck | | | $0 |
| | c | Soil Remediation | | m3 | | | | | $0 |
| | | | | | | | | | |
| **4** | **Ground Based Exploration Activities** | | **Quantity** | **Unit** | **Rate ($/unit)** | **Length (m)** | **Width (m)** | **Depth (m)** | **Subtotal** |
| | a | Drill Site (Small) | | # of Sites | s.13 | | | | $0 |
| | b | Drill Site (Large) | | ha | | | | | $0 |
| | c | Large Gravel Pads | 0 | m3 | | | | | $0 |
| | d | Trench | 0 | m3 | | | | | $0 |
| | e | Sealing Exploration Drill Holes | | # Holes | | | | | $0 |
| | f | Sealing Drill Holes based on meter | | m | | | | | $0 |
| | g | Sealing openings/adits | | Site specific conditions requiring additional details and budgeting | | | | | $0 |
| | h | Development Waste Dumps | | Site specific conditions requiring additional details and budgeting | | | | | $0 |
| | i | Sealing Coal Exploration Drill Holes for blow-out prevention | | # Holes | s.13 | | | | $0 |
| | | | | | | | | | |
| **5** | **Helicopter Based Exploration Activities** | | **Quantity** | **Unit** | **Rate ($/unit)** | | | | **Subtotal** |
| | | ***Helicopter Staging*** | | | | | | | |
| | a | Distance to staging area | | km | s.13 | s.13 | | | $0 |
| | b | Distance from staging area to site | | km | | Distance used in select calculations below | | | |
| | | ***Crew Staging*** | | | | | | | |
| | c | Vehicle mileage to staging area | | km | | | | | $0 |
| | d | Hotel/Atco Trailer (Meals & Accom) | | Day/Person | | | | | $0 |
| | e | Tent Camp (Meals &Accom) | | Day/Person | | | | | $0 |
| | | ***Heli pads*** | | | | | | | |
| | f | Disassembly of heli pads | | Sites | | | | | $0 |
| | g | Caching/Burning of timbers | | Sites | | | | | $0 |
| | h | Burning small debris | | Sites | | | | | $0 |
| | | ***Drill pads*** | | | | | | | |
| | i | Disassembly (small structure) | | Sites | | | | | $0 |
| | j | Disassembly (large structure) | | Sites | | | | | $0 |
| | k | Sealing Exploration Drill Holes | | # Holes | | Formula includes distance from staging area to site | | | $0 |
| | l | Caching/Burning of timbers (small structure) | | Sites | | | | | $0 |
| | m | Caching/Burning of timbers (large structure) | | Sites | | | | | $0 |
| | n | Burning small debris | | Sites | | | | | $0 |
| | o | Removal of non-wooden debris | | Sites | | Formula includes distance from staging area to site | | | $0 |
| | | ***Fuel barrels*** | | | | | | | |
| | p | Removal of full barrels off-site | | Barrels | | Formula includes distance from staging area to site | | | $0 |
| | q | Removal of empty barrels off-site | | Barrels | | Formula includes distance from staging area to site | | | $0 |
| | | ***Camp Removal*** | | | | | | | |
| | r | Burning tent pads | | Pads | | | | | $0 |
| | s | Disassembly of buildings | | Buildings | | | | | $0 |
| | t | Removal of metal (e.g. tin roofs) | | Buildings | | Formula includes distance from staging area to site | | | $0 |
| | u | Burning derelict buildings | | Buildings | | | | | $0 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **6** | **Placer Activities** | | **Quantity** | **Unit** | **Rate ($/unit)** | **Length (m)** | **Width (m)** | **Depth (m)** | **Subtotal** | |
| | a | Surface recontouring | | ha | s.13 | | | | $0 | |
| | b | Overburden placement - without travel | | ha | | | | | $0 | |
| | c | Overburden placement - with travel | | ha | | | | | $0 | |
| | d | Topsoil placement - without travel | | ha | | | | | $0 | |
| | e | Topsoil placement - with travel | | ha | | | | | $0 | |
| | f | Test Pit | 0 | m3 | | | | | $0 | |
| | g | Sed Ponds - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | h | Sed Ponds - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | i | Pit - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | j | Pit - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | k | Water Management Deactivation | 0 | m3 | | | | | $0 | |
| | l | Water Management Installation | 0 | m3 | | | | | $0 | |
| | | | | | | | | | | |
| **7** | **Sand and Gravel Activities** | | **Quantity** | **Unit** | **Rate ($/unit)** | **Length (m)** | **Width (m)** | **Depth (m)** | **Subtotal** | |
| | a | Surface recontouring | s.13 | ha | s.13 | | | | s.13 | |
| | b | Overburden placement - without travel | | ha | | | | | $0 | |
| | c | Overburden placement - with travel | | ha | | | | | $0 | |
| | d | Topsoil placement - without travel | | ha | | | | | $0 | |
| | e | Topsoil placement - with travel | | ha | | | | | $0 | |
| | f | Test Pit | 0 | m3 | | | | | $0 | |
| | g | Sed Ponds - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | h | Sed Ponds - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | i | Pit - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | j | Pit - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | k | Water Management Deactivation | 0 | m3 | | | | | $0 | |
| | l | Water Management Installation | 0 | m3 | | | | | $0 | |
| | | | | | | | | | | |
| **8** | **Quarry Site Activities** | | **Quantity** | **Unit** | **Rate ($/unit)** | **Length (m)** | **Width (m)** | **Depth (m)** | **Subtotal** | |
| | a | Surface recontouring | | ha | s.13 | | | | $0 | |
| | b | Overburden placement - without travel | | ha | | | | | $0 | |
| | c | Overburden placement - with travel | | ha | | | | | $0 | |
| | d | Topsoil placement - without travel | | ha | | | | | $0 | |
| | e | Topsoil placement - with travel | | ha | | | | | $0 | |
| | f | Test Pit | 0 | m3 | | | | | $0 | |
| | g | Sed Ponds - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | h | Sed Ponds - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | i | Pit - Backfilling without travel | 0 | m3 | | | | | $0 | |
| | j | Pit - Backfilling with travel | 0 | m3 | | | | | $0 | |
| | k | Water Management Deactivation | 0 | m3 | | | | | $0 | |
| | l | Water Management Installation | 0 | m3 | | | | | $0 | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 9 | Site Preparation | Quantity | Unit | Rate ($/Unit) | Length (m) | Width (m) | | Subtotal | |
| | a Decompaction (Ripping - Dozer) | 0 | ha | s.13 | | | | $0 | |
| | b Harrowing | 0 | ha | | | | | $0 | |
| | c Rough and Loose Surface Prep | 0 | ha | | | | | $0 | |
| 10 | Supplemental Topsoil | Quantity | Unit | Rate ($/unit) | | | | Subtotal | |
| | a Topsoil (m3) | | m3 | s.13 | | | | $0 | |
| | b Topsoil (ha) | | ha | | | | | $0 | |
| | c Dump Truck (8 m3) | | hr | | | | | $0 | |
| 11 | Access Trail/Road | Area (ha) | Width (m) | Length (km) | Unit Cost/ha | | | Subtotal | |
| | *Permanent Deactivation* | | | | | | | | |
| | a Exploration Trail | 0 | | | s.13 | | | $0 | |
| | b Excavated Trail (side slope <30%) | 0 | | | | | | $0 | |
| | c Excavated Trail (side slope >30%) | 0 | | | | | | $0 | |
| | **Interior Roads** | | | | | | | | |
| | d Access Road (side slope <30%) | 0 | | | | | | $0 | |
| | e Access Road (side slope >30%) | 0 | | | | | | $0 | |
| | **Coastal Roads** | | | | | | | | |
| | f Access Road (side slope <30%) | 0 | | | | | | $0 | |
| | g Access Road (side slope >30%) | 0 | | | | | | $0 | |
| | *Reclamation as per Part 9.10.1(7) of HSRC* | | | | | | | | |
| | **Interior Roads** | | | | | | | | |
| | h Access Road (side slope <30%) | s.13 | | | s.13 | | | s.13 | |
| | i Access Road (side slope >30%) | 0 | | | | | | $0 | |
| | **Coastal Roads** | | | | | | | | |
| | j Access Road (side slope <30%) | 0 | | | | | | $0 | |
| | *Reclamation (w slope recontouring)* | | | | | | | | |
| | k Exploration Trail | 0 | | | | | | $0 | |
| | l Excavated Trail (side slope <30%) | 0 | | | | | | $0 | |
| | m Excavated Trail (side slope >30%) | 0 | | | | | | $0 | |
| | **Interior Roads** | | | | | | | | |
| | n Access Road (side slope <30%) | 0 | | | | | | $0 | |
| | o Access Road (side slope >30%) | 0 | | | | | | $0 | |
| | **Coastal Roads** | | | | | | | | |
| | p Access Road (side slope <30%) | 0 | | | | | | $0 | |
| | q Access Road (side slope >30%) | 0 | | | | | | $0 | |
| 12 | Stream Crossing/Restoration | Quantity | Unit | Rate ($/unit) | | | | Subtotal | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | ***Bridges (removal & transport)*** | | | s.13 | | | | |
| | | 6-9m | | # of Bridges | | | | | $0 |
| | | >9m-12m | | # of Bridges | | | | | $0 |
| | | >12m-15m | | # of Bridges | | | | | $0 |
| | | >15m-18m | | # of Bridges | | | | | $0 |
| | | >18m-21m | | # of Bridges | | | | | $0 |
| | | >21m-24m | | # of Bridges | | | | | $0 |
| | b | ***Stream Culvert Removal*** | | | | | | | |
| | | Fish Stream | | # of Culverts | | | | | $0 |
| | | Non Fish Stream | | # of Culverts | | | | | $0 |
| | | | | | | | | | |
| | c | ***Stream Restoration*** | | m | | | | | $0 |
| | | | | | | | | | |
| **13** | **Revegetation - Seeding** | | **Area (ha)** | **Application Rate (kg/ha)** | **No. of Kg.** | **Material Cost ($/kg)** | **Material Cost ($/ha)** | **Appl. Cost ($/ha)** | **Subtotal** |
| | a | **Hand Broadcast** | | | | | | | |
| | | Seed | | s.13 | 0.00 | s.13 | $0 | $0 | $0 |
| | | Fertilizer | | | 0.00 | | $0 | $0 | $0 |
| | | | | | | | | | |
| | b | **ATV Broadcast** | | | | | | | |
| | | Seed | | | 0.00 | | $0 | $0 | $0 |
| | | Fertilizer | | | 0.00 | | $0 | $0 | $0 |
| | | | | | | | | | |
| | c | **Aerial Broadcast** | | | | | | | |
| | | Seed | | | 0.00 | | $0 | $0 | $0 |
| | | Fertilizer | | | 0.00 | | $0 | $0 | $0 |
| | | | | | | | | | |
| **14** | **Revegetation - Planting** | | **Area (ha)** | **Application Rate (Stems/ha)** | **No. of Trees** | **Seedling Cost ($)** | **Planting Cost ($)** | | **Subtotal** |
| | a | Seedlings | | 1500 | 0 | $0 | $0 | | $0 |
| | b | Fertilizer | | 1500 | 0 | $0 | $0 | | $0 |
| | | | | | | | | | |
| **15** | **Additional Revegetation Activities** | | **Quantity** | **Unit** | **Rate ($/Unit)** | **Length (m)** | **Width (m)** | | **Subtotal** |
| | a | Hydroseed | | ha | s.13 | | | | $0 |
| | b | Bioengineering (live planting) | | m2 | | | | | $0 |
| | | | | | | | | | |
| **16** | **Reclamation Monitoring** | | **Quantity** | **Number of Expected Visits** | **Unit** | **Rate ($/unit/visit)** | **Sample Cost** | **Day Rate** | **Subtotal** |
| | a | Vegetation Monitoring | | | ha | s.13 | | | $0 |
| | b | Geotechnical Monitoring | | | Site | | | | $0 |
| | c | Surface Water Quality/ARD Monitoring | | | Samples | | s.13 | s.13 | $0 |
| | d | Foliar Metals Uptake Monitoring | | | Samples | | | | $0 |
| | | | | | | | | | |
| **17** | **Planning and Assessment** | | **Quantity** | **Unit** | **Rate ($/unit)** | | | | **Subtotal** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | a | Reclamation Plan | | Report | s.13 | | | | $0 | |
| | b | Geotechnical Assessment | | Report | | | | | $0 | |
| | c | Soil Remediation Investigation | | Report | | | | | $0 | |
| | d | Ground Water Investigation | | Report | | | | | $0 | |
| | e | Hazardous Materials Assessment | | Report | | | | | $0 | |
| | | | | | | | | | | |
| **18** | **Miscellaneous** | | **Quantity** | **Unit** | **Rate ($/unit)** | | | | **Subtotal** | |
| | a | Accommodation and Meals | | Day | s.13 | | | | $0 | |
| | b | Vehicle Mileage | | km | | | | | $0 | |
| | c | Helicopter Access/Support | | hr | | | | | $0 | |
| | d | Airplane | | km | | | | | $0 | |
| | e | Certified Trades (mechanical/electrical) | | hr | | | | | $0 | |
| | | | | | | | | | | |
| **19** | **Project Management (enter '1' if applicable)** | | | | | | | | **Subtotal** | |
| | a | Project Management of Activities | | % | s.13 | | | | $0 | |
| | | | | | | | | | | |
| **20** | **Uncertainty Factor (enter '1' if applicable)** | | | **Unit** | **Rate (%)** | | | | **Subtotal** | |
| | a | Uncertainty Estimate | | % | s.13 | | | | $0 | |
| | | | | | | | | | | |
| **21** | **Inflation** | | **Quantity** | **Unit** | **Rate (%)** | | | | **Subtotal** | |
| | a | Annual inflation on goods and services | | **Years** | s.13 | | | | $0 | |
| | | | | | | | | **Total Estimated Reclamation Cost:** | s.13 | |

**Notes:**

s.13 Mine is on provate land, very close to services in Merritt.

**Spreadsheet cell colour code:**

| | |
|---|---|
| | Cell to enter value |
| | Calculated value |

Version 8.0 April 13, 2018

| | |
|---|---|
| ***Project Name:*** | |
| ***Permit #:*** | |
| ***NoW #:*** | |

| | | Reclamation Activity | Assumptions/Description/Additional Information | Calculations and Rate Sources |
|---|---|---|---|---|
| **1** | | **Equipment Mob/Demob** | | |
| | a | 6 Axle Lowbed (45,000 kg) | Transport cost is based on an hourly trucking rate quotes by service providers. Blue Book values were not consistent with industry standards for transportation costs. | When considering length of time for lowbed to/from site, factor lower rate of speed for off hwy travel. Assume 90 km/hr for hwy travel, 60 km/hr for FSR, 40 km/hr for access roads. Can adjust based on known road conditions. Include time to load/unload equipment (suggest adding 2hrs). Based on service provider quote of s.13 |
| | b | Pilot Car for Oversize Loads | Include total round trip hours for Hwy travel | Based on service provider quote of s.13 |
| | c | Walking - Excavator | Based on a walking speed of 10km/hr. Included round trip | Hourly rate from Blue Book Rate Sheet |
| | d | Walking - Dozer | Based on a walking speed of 10km/hr. Included round trip | Hourly rate from Blue Book Rate Sheet |
| | e | Specialized Equipment/Transport | Requires project specific cost estimate | If specialize equipment or methods of transport are required (e.g. barge), a project specific cost estimate will be needed based on a quote or known local pricing. Enter the cost into the bond calculator. |
| | | | | |
| **2** | | **Asset/Debris Removal** | | |
| | a | Equipment/Wash Plant Removal | Equipment such as excavators, crawler tractors, drill rigs will be low bedded from the site to the nearest storage area.<br>Same method of estimating time as in Equipment Mob/Demob section (1a); cost is based upon one machine (double for 2, triple for 3, etc.). | When considering length of time for lowbed to/from site, factor lower rate of speed for off hwy travel. Assume 90 km/hr for hwy travel, 60 km/hr for FSR, 40 km/hr for access roads. Can adjust based on known road conditions. Include time to load/unload equipment (suggest adding 2hrs). Based on service provider quote of s.13 |
| | b | Shipping Containers (Sea Cans) | Specialized trailer beds available or flatbed trailer. Factor in one round trip/shipping container. | When considering length of time for trucking to/from site, factor lower rate of speed for off hwy travel. Assume 90 km/hr for hwy travel, 60 km/hr for FSR, 40 km/hr for access roads. Can adjust based on known road conditions. Include time to load/unload (suggest adding 2hrs). Based on service provider quote of s.13 |
| | b | Garbage/Scrap | This line item is based on the use of dump truck (8 m3). The user will need to estimate the number of loads, as well as the travel time to and from site, including loading time. | s.13 |
| | c | Camp (Tent/Camper Trailer) | Camp removal cost will be very specific and depend on the type and size. Wall tent/camper trailer style camps associated with small operations. Estimate round trip travel time (hours) | s.13 |
| | e | Removal Crew | Crew needed to remove debris from site. May be difficult to estimate the number of hours needed to clean up a site. It may be easier to consider in terms of full workdays (e.g. 10 hours). The estimate should include travel time to and from the site. | s.13 |
| | f | Explosives Disposal | Handling and disposal of explosives should only be done by trained qualified professionals. Requires project specific cost estimate. | Site specific conditions requiring additional details and budgeting |

| | | | | |
|---|---|---|---|---|
| | | **Camp (Modular Trailer)** | | |
| | g | Trailer Prep for Transport | Assumes two person dismantle crew. Task include disconnecting electrical, sewer, prepping trailer for transport (e.g. blocking if required). | Based on 8 hr day s.13 |
| | h | Trucking | Trucking requires special deck, trailer is loaded either by winch if on sides, or requires jacking and blocking of trailer. | When considering length of time for trucking to/from site, factor lower rate of speed for off hwy travel. Assume 90 km/hr for hwy travel, 60 km/hr for FSR, 40 km/hr for access roads. Can adjust based on known road conditions. Include time to load/unload (suggest adding 2hrs). Based on service provider quote of s.13 |
| | i | Pilot Car | A pilot car will required for the transport of trailers on public highways. | Include total round trip hours for Hwy travel. Based on service provider quote of s.13 |
| | | **Equipment for Cleanup Activities** | | |
| | j | Excavator | If required for debris removal | Hourly rate from Blue Book Rate Sheet |
| | k | Dozer | If required for debris removal | Hourly rate from Blue Book Rate Sheet |
| | | **Disposal** | | |
| | l | Waste disposal tipping fee | Landfill/disposal facilities charge a tipping fee based on the weight of the disposal material. Tipping fee will vary by landfill and location. | Calculation uses a mid-range value of s.13 based on Kamloops Landfill rates |
| | m | Camper Trailer Disposal | Assumes aver camper trailer weight of 2.3 tonne, with tipping fee of s.13 | Calculation uses a mid-range value of s.13 , based on Kamloops Landfill rates |
| | n | Modular Trailer Disposal | Assumes 24 tonne trailer with tipping fee of s.13 | Calculation uses a mid-range value of s.13 based on Kamloops Landfill rates |
| | | | | |
| **3** | **Fuel/Hydrocarbon Removal** | | | |
| | a | Fuel Drum/Tidy Tank/Lubricant Storage | Estimate time to travel to site, load materials, and dispose of goods | Based on 5 ton truck Blue Book rate s.13 |
| | b | Large Fuel Tank Storage | Large steel tanks over 900 L. Estimate time to travel to site, load tank(s), and deliver to disposal or storage area. | When considering length of time for trucking to/from site, factor lower rate of speed for off hwy travel. Assume 90 km/hr for hwy travel, 60 km/hr for FSR, 40 km/hr for access roads. Can adjust based on known road conditions. Include time to load/unload (suggest adding 2hrs). Based on service provider quote of s.13 |
| | c | Soil Remediation | Soil remediation for contaminated soils, primarily for hydrocarbon spills or salt contamination. Rough cost estimate to test, excavate, and transport soil to an authorized facility. For contaminated soil removal only, does not include ground water testing for contaminates. Costs can vary greatly depending on the quantity and nature of contaminated material and soil. For large or completed sites, or for sites requiring specialized remediation techniques the cost is expected to be greatly higher. The cost does not capture the cost of disposal for hazardous chemicals used for processing. If hazardous chemicals are expected onsite, more information from the proponent is required. | Rough cost estimate to test, excavate, and transport soil to an authorized facility. Price based on L 10 m x W 5 m x D 5m excavation (250 m3). Assumed 16 soil sample s.13 analytical report, s.13 dumping fee at authorized facility, 10 hrs for excavation s.13 17 end dump trucks (15m3 load capacity) for 10 hrs at s.13 |
| | | | | |
| **4** | **Ground Based Exploration Activities** | | | |

| | | | | |
|---|---|---|---|---|
| | a | Drill Site (Small) | Bury sump, remove debris, recontouring, replacing topsoil, revegetation (materials and application) - Modified from MEM 2003<br>Based on 10m x 10 m drill pad, consider adjusting cost for larger drill sites (e.g. >0.25 ha). | Rate based on source information (MEM 2003) |
| | b | Drill Site (Large) | Bury sump, remove debris, recontouring, replacing topsoil, revegetation (materials and application) - Modified from MEM 2003 . Cost is intended for larger drill sites (e.g. >0.25 ha). | Rate modifies from source information (MEM 2003) |
| | b | Large Gravel Pads | For the removal of large gravel pads located in areas with soft ground (e.g. wetlands). Based on one medium sized excavator s.13 with a production capacity of 150 m3/hr, loading dump truck. Assuming two loads/hr for off road dump truck (capacity 17 m3), rate s.13 Min one hr charge of s.13 | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for gravel removal |
| | c | Trench | Trench reclamation based on volume. Excavator rate ($)/Productivity (m3/h) + Compaction finishing and revegetation s.13 Actual cost will vary depending on machine productivity and swell factor of material. | Excavator rate ($)/Productivity (m3/h) + Compaction finishing s.13 |
| | d | Sealing Exploration Drill Holes | Cost of sealing drill holes can be highly variable and depends on multiple factors (e.g. depth, diameter, etc.). | Rate based on info from service providers |
| | e | Sealing Drill Holes based on meter | Ballpark cost per meter to decommission is estimated at s.13 per meter (this includes cement and grout materials, all required equipment, crew, crew subsistence, vehicle, drill, etc.). There are a lot of assumptions with this value, and actual cost can vary considerably. | Rate based on info from service providers |
| | f | Sealing openings/adits | Cost to close adits or shafts can be highly variable and is site specific. s.13 for machine accessible sites, but could be significantly more. Engineering maybe required. Request additional detail from proponent. Recommend requirement for precast concrete collar on opening. | Site specific conditions requiring additional details and budgeting |
| | g | Stockpiles/Waste Dumps | Due to site specific conditions and technical consideration, this line item requires additional details and third party costing by a qualified professional. | Site specific conditions requiring additional details and budgeting |
| | | | | |
| **5** | **Heli Based Exploration Activities** | | | |
| | | **Helicopter Staging** | | |
| | a | Distance to staging area | Assumes that at min one hour of helicopter time is needed for travel to and from staging area. Calculation is based on the average cruising speed of an A-Star helicopter is 212 km/h. Every km over 212 km will be an extra s.13 | s.13 based on service provider quote and includes fuel. |
| | b | Distance from staging area to site | Distance from staging area is used for other calculations. Calculations will double value for round trip. Distance converted to time based on estimated long-lining speed of 120 km/h | |
| | | **Crew Staging** | | |
| | c | Mileage to staging area | This is to be used if there will be vehicle support or if crew and helicopter mobilized from separate areas. | Mileage rate of s.13 Enter total estimated kms for project. |
| | d | Hotel/Atco Trailer (Meals & Accom) | Accommodation for crew in a hotel or in logging/mining/exploration camp. | Estimated meal and accommodation rate of s.13 Actual cost will vary depending on location and circumstance. |
| | e | Tent Camp (Meals &Accom) | Small tent based camp meant for short duration. | MEM 2017 estimate |

| | | | |
|---|---|---|---|
| | **Heli pads** | | |
| f | Disassembly of heli pads | Each pad takes a 2-man crew 1/2 a day. | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| g | Caching/Burning of timbers | 2 loads per pad - Cache at One or Two centralized locations. Assumes that cost of labour for burning timbers and monitoring would be similar to the cost of caching. | Estimated heli time s.13 Caches are usually close; estimated average 2km. Two min round-trip plus time for picking up/dropping off loads (total 5 min). Modified from MEM 2017 estimate. |
| h | Burning small debris | Each debris pile takes a 2-man crew 1 hour | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| | **Drill pads** | | |
| i | Disassembly (small structure) | Each pad takes a 2-man crew 1/2 a day | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| j | Disassembly (large structure) | Each pad takes a 2-man crew 1 days | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| k | Caching/Burning of timbers (small structure) | 2 loads per pad - Cache at One or Two centralized locations. Assumes that cost of labour for burning timbers and monitoring would be similar to the cost of caching. | Estimated heli time s.13 Modified from MEM 2017 estimate |
| l | Caching/Burning of timbers (large structure) | 5 loads per pad - Cache at One or Two centralized locations. Assumes that cost of labour for burning timbers and monitoring would be similar to the cost of caching. | Estimated heli time s.13 Modified from MEM 2017 estimate |
| m | Burning small debris | Each debris pile takes a 2-man crew 2 hour | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| n | Removal of non-wooden debris | Not assumed to have debris at every site. | Estimated 1/3 of sites to have debris. Formula includes heli staging distance provided. s.13 s.13 MEM 2017 estimate. |
| | **Fuel barrels** | | |
| o | Removal of full barrels off-site | 2 full barrels per load | Formula includes heli staging distance provided. Round trip. Assume 1 trip of 2 full barrels for most programs. s.13 Modified from MEM 2017 estimate. |
| p | Removal of empty barrels off-site | 10 empty barrels per load | Round trip. Assume 1 trip of 10 empty barrels (for fewer, it is still 1 trip). s.13 Modified from MEM 2017 estimate |
| | **Camp Removal** | | |
| q | Burning tent pads | Assumed 1 day for a 2-man crew to burn 4 pads, including monitoring fires | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| r | Disassembly of buildings | 1/2 day for a 2-man crew to remove non-wooden parts | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| s | Removal of metal (e.g. tin roofs) | 1 load per building | Round trip, 1 load per building. s.13 Modified from MEM 2017 estimate |
| t | Burning derelict buildings | Assumed 1 day for a 2-man crew to burn 2 buildings, including monitoring fires | Based on MEM 2017 estimate. Assumes labour rate of s.13 for 10hr work day |
| | | | |
| **6** | **Placer Activities** | | |

| | | | | |
|---|---|---|---|---|
| | a | Surface recontouring | Recontouring and sloping of disturbance area. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 33 hr moving an ave depth of material 1.0 m. s.13 Price for recontouring does not include blasting. | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |
| | b | Topsoil placement - with travel | Topsoil placement involves distribution of stockpiled topsoil across the site. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 3.3 hr s.13 Average topsoil depth of 0.10 m . If topsoil requires trucks to move material, assume 59 trucks (17 m3/truck) at 0.5 hr trip time to move topsoil from stock pile areas s.13 Excavator needed to load dump truck s.13 Total increases to s.13 | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |
| | c | Topsoil placement - without travel | Assuming medium sized dozer (CAT D8) productivity of 300 m3/hr = 1 ha in 3.3 hr moving an ave depth of material 0.10 m s.13 | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |
| | d | Test Pit | Backfilling test pits. Based on productivity of medium size excavator (150 m3/r) at a rate of s.13 There is a 1 hr min charge s.13 to account for small sites. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | e | Sed Pond - Backfilling with travel | In this scenario, the material required to backfill the workings area must be hauled by truck from another location. Based on two medium sized excavator s.13 ) with a production capacity of 150 m3/hr, one backfilling and one loading dump truck. Assuming two loads/hr for off road dump truck (capacity 17 m3), rate s.13 Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |
| | f | Sed Pond - Backfilling without travel | In this scenario, the material to backfill the workings area is located adjacent to the backfill area. Cost assumes backfilling using medium sized excavator s.13 with a production capacity of 150 m3/hr. Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | g | Water Management Deactivation | Water management deactivation (e.g. backfilling of ditches). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | h | Water Management Installation | Post closure water management (e.g. ditching to direct and manage water movement through site). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | | | **Note:** Activities does not include the cost of revegetation. See Sections 13-15 for additional costing. | |
| **7** | **Sand and Gravel Activities** | | | |
| | a | Surface recontouring | Recontouring and sloping of disturbance area. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 33 hr moving an ave depth of material 1.0 m. s.13 Price for recontouring does not include blasting. | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |

| | | | | |
|---|---|---|---|---|
| | b | Topsoil placement - with travel | Topsoil placement involves distribution of stockpiled topsoil across the site. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 3.3 hr s. 13 Average topsoil depth of 0.10 m . If topsoil requires trucks to move material, assume 59 trucks (17 m3/truck) at 0.5 hr trip time to move topsoil from stock pile areas (30 hrs s.13 Excavator needed to load dump truck s. 13 Total increases to s.13 | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |
| | c | Topsoil placement - without travel | Assuming medium sized dozer (CAT D8) productivity of 300 m3/hr = 1 ha in 3.3 hr moving an ave depth of material 0.10 m s.13 | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |
| | d | Test Pit | Backfilling test pits. Based on productivity of medium size excavator (150 m3/r) at a rate of s.13 There is a 1 hr min charge s.13 to account for small sites. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | e | Sed Pond - Backfilling with travel | In this scenario, the material required to backfill the workings area must be hauled by truck from another location. Based on two medium sized excavator s.13 with a production capacity of 150 m3/hr, one backfilling and one loading dump truck. Assuming two loads/hr for off road dump truck (capacity 17 m3), rate s.13 Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |
| | f | Sed Pond - Backfilling without travel | In this scenario, the material to backfill the workings area is located adjacent to the backfill area. Cost assumes backfilling using medium sized excavator s.13 with a production capacity of 150 m3/hr. Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | g | Water Management Deactivation | Water management deactivation (e.g. backfilling of ditches). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | h | Water Management Installation | Post closure water management (e.g. ditching to direct and manage water movement through site). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | | | **Note:** Activities does not include the cost of revegetation. See Sections 13-15 for additional costing. | |
| **8** | **Quarry Site Activities** | | | |
| | a | Surface recontouring | Recontouring and sloping of disturbance area. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 33 hr moving an ave depth of material 1.0 m. Rate of s.13 Price for recontouring does not include blasting. | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |
| | b | Topsoil placement - with travel | Topsoil placement involves distribution of stockpiled topsoil across the site. Bond value based on medium sized dozer (CAT D8) with a productivity of 300 m3/hr, capable of completing 1 ha in 3.3 hr s.13 Average topsoil depth of 0.10 m . If topsoil requires trucks to move material, assume 59 trucks (17 m3/truck) at 0.5 hr trip time to move topsoil from stock pile areas (30 hrs s.13 Excavator needed to load dump truck s.13 * 30 hrs). Total increases to s.13 | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |

| | | | | |
|---|---|---|---|---|
| | c | Topsoil placement - without travel | Assuming medium sized dozer (CAT D8) productivity of 300 m3/hr = 1 ha in 3.3 hr moving an ave depth of material 0.10 m s. 13 | Cat productivity (m3/h) / average material depth (m) = area (m2) completed in 1 hr. 10,000 m2 /area in 1 hr = time to complete 1 ha. Time (hrs)/ha x equipment rate = cost/ha |
| | d | Wash plant tailings pond - Backfilling with travel | In this scenario, the material required to backfill the workings area must be hauled by truck from another location. Based on two medium sized excavators s.13 with a production capacity of 150 m3/hr, one backfilling and one loading dump truck. Assuming two loads/hr for off road dump truck (capacity 17 m3), rate s.13 Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. (# of machines x $/m3) + (truck rate ($/hr)/estimated truck Vol (m3/hr)) = $/m3 for backfilling |
| | e | Wash plant tailings pond - Backfilling without travel | In this scenario, the material to backfill the workings area is located adjacent to the backfill area. Cost assumes backfilling using medium sized excavator s.13 with a production capacity of 150 m3/hr. Difficult to anticipate volume of fines at NoW stage. It is assumed that the cost of spreading fines from pond can be captured between surface recontouring, topsoil placement and pond back filling phases. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | h | Water Management Deactivation | Water management deactivation (e.g. backfilling of ditches). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | g | Water Management Installation | Post closure water management (e.g. ditching to direct and manage water movement through site). Cost assumes medium sized excavator s.13 with a production capacity of 150 m3/hr. | Equipment rate ($/hr)/Productivity (m3/hr) = $/m3. |
| | | | **Note:** Activities does not include the cost of revegetation. See Sections 13-15 for additional costing. | |
| **9** | **Site Preparation** | | | |
| | a | Decompaction (Ripping - Dozer) | Based on ripping production rate of 1.5 ac/hr (0.607 ha/hr)(Northwestern University 1992). Dozer rate of s.13 Note: ripping production will vary on ground compaction, number of ripper teeth, and depth of penetration. | Assuming ripping rate of 0.607 ha/hr. Cost/ha = Equipment rate ($/hr) * 1.6 hr |
| | b | Harrowing | Harrowing used to roughen soil surface in preparation for seeding. Modified from MEM 2003. | Rate based on source information (MEM 2010) |
| | c | Rough and Loose Surface Prep | Rough and loose surface treatments provide an effective way to control erosion and create conditions that promote the revegetation of the site. The rough and loose surface method provides increased diversity of habitats, improving ecological resilience. Work is completed with an excavator. Assumed average productivity of .25 ha/hr. Equipment productivity 0.15 to 0.35 ha/hr (Source: MOF Silviculture Manual 1999). Assumed medium size excavator at s.13 | (1ha/productivity 0.25 ha/hr) x Excavator Rate ($/hr) = cost/ha |
| | | | | |
| **10** | **Supplemental Topsoil** | | | |
| | a | Topsoil (m3) | Commercial rate for 1 m3 of topsoil. Does not include transportation costs. Caution when sourcing of topsoil to avoid the spread of invasive species. | Rate based on info from goods provider |
| | b | Topsoil (ha) | Based on the volume of topsoil to cover one to a depth of 30 cm. | 100 m x 100 m x topsoil depth m = m3 of soil for 1 ha. Vol of soil/ ha x $/m3 of topsoil = $/ha |
| | c | Dump Truck (8 m3) | Based on distance from anticipated source to and from site. Truck volumes and rates are variable. | Will need to calc number of loads required to haul volume of topsoil. # of loads x travel time (hrs) to site x 2 for return trip. Total hrs x truck rate = cost |
| | | | | |

| 11 | Access Trail/Road | | | |
|---|---|---|---|---|
| | | **Permanent Deactivation** | **Permanent deactivation includes installing water bars and cross ditches, removal of cross drain culverts, and limited pull back of unstable areas. Include some seeding of areas of higher erosion potential. Seeding of entire road would be additional cost. Cost does not include tree planting, this must be calculated under the Revegetation Section.** | |
| | a | Exploration Trail | Deactivation of trail may be considered under certain circumstances related to access along existing historic trail. Assumes that an excavator can deactivate 1 km of trail (3.5 m wide) in 2.5 hrs. Area is converted to hectares and calculation is based on an excavator rate of s.13 | ((width x length)/10,000)) x $/ha |
| | b | Excavated Trail (side slope <30%) | Deactivation of excavated trail may be considered under certain circumstances related to access along existing historic trail. Based on Excavated Trail - running width 3.5 m wide, >30cm into mineral soil | Value modified from estimate for full trail reclamation. Converted per km rate to ha based on trail width of 3.5 m (running surface). |
| | c | Excavated Trail (side slope >30%) | Deactivation of excavated trail may be considered under certain circumstances related to access along existing historic trail. Based on Excavated Trail - running width 3.5 m wide, >30cm into mineral soil | Value modified from estimate for full trail reclamation. Converted per km rate to ha based on trail width of 3.5 m (running surface). |
| | | **Interior Roads** | | |
| | d | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 8 m. Assumed running surface of 6 m. |
| | e | Access Road (side slope >30%) | Values based on estimates from FLNRO Road Engineers. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 10 m. Assumed running surface of 6 m. |
| | | **Coastal Roads** | | |
| | f | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 8 m. Assumed running surface of 6 m. |
| | g | Access Road (side slope >30%) | Values based on estimates from FLNRO Road Engineers. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 10 m. Assumed running surface of 6 m. |
| | | **Reclamation as per Part 9.10.1(7) of HSRC** | **Part 9.10.1(7) Reclamation includes installing water bars and cross ditches, removal of cross drain culverts, limited pull back of unstable areas and revegetating the road and right of way. . Establishment of self sustaining vegetation would be an additional cost (as per sections below).** | |
| | | **Interior Roads** | More applicable for NE Central, South Central, and SE Region. | Intermediate cost between deactivation and full reclamation |
| | h | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. Lower costs in non-coastal areas. | Intermediate cost between deactivation and full reclamation |
| | i | Access Road (side slope >30%) | Values based on estimates from FLNRO Road Engineers. Lower costs in non-coastal areas. Costs increase with slope, as there is more material to handle and more issues associated with terrain. Revegetation costs are included. | Intermediate cost between deactivation and full reclamation |
| | | **Coastal Roads** | More applicable for NW and SW Region. | |
| | j | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. | Intermediate cost between deactivation and full reclamation |

| | | | | |
|---|---|---|---|---|
| | | **Full Reclamation** | **Full Reclamation includes decompaction, pull back, recontouring, restoring natural drainage patterns, and revegetating road and right-of-way. Establishment of self sustaining vegetation would be an additional cost (as per sections below).** | |
| | k | Exploration Trail | Rate is based on the estimate that an excavator can reclaim 1 km of trail (3.5 m wide) in 5 hrs. Area is converted to hectares and calculation is based on an excavator rate of s.13 | ((width x length)/10,000)) x $/ha |
| | l | Excavated Trail (side slope <30%) | Trail up to 3.5 m wide, >30cm into mineral soil. Revegetation costs are not included. | Value based on NE Central Bond Calc., within input from FLNRO Road Engineers. Converted per km rate to ha based on trail width of 3.5 m (running surface). |
| | m | Excavated Trail (side slope >30%) | Trail up to 3.5 m wide, >30cm into mineral soil. Revegetation costs are not included. | Value based on NE Central Bond Calc., within input from FLNRO Road Engineers. Converted per km rate to ha based on trail width of 3.5 m (running surface). |
| | | **Interior Roads** | More applicable for NE Central, South Central, and SE Region. | |
| | n | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. Lower costs in non-coastal areas. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill and ditches) of 8 m. |
| | o | Access Road (side slope >30%) | Values based on estimates from FLNRO Road Engineers. Lower costs in non-coastal areas. Costs increase with slope, as there is more material to handle and more issues associated with terrain. Revegetation costs are included. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 10 m. Assumed running surface of 6 m. |
| | | **Coastal Roads** | More applicable for NW and SW Region. | |
| | p | Access Road (side slope <30%) | Values based on estimates from FLNRO Road Engineers. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill and ditches) of 8 m. |
| | q | Access Road (side slope >30%) | Values based on estimates from FLNRO Road Engineers. Price can vary greatly, and may be much more. Costs increase with slope, as there is more material to handle and more issues associated with terrain. Revegetation costs are included. | Rate based on estimate from FLNRO Road Engineers. Converted per km rate to ha based on ave road way width (surface + cut/fill) of 10 m. Assumed running surface of 6 m. |
| | | | **Note:** Any access system that is located on >50% slopes should be referred to engineering for reclamation projects and costs. FLNRO engineering is willing and available to help with these sites. It is recommended that all trails/roads that are recontoured in areas with slopes 30-50% be considered for tree planting to ensure the stabilization of surface material. | |
| **12** | **Stream Crossings** | | | |
| | a | ***Bridges (removal & transport)*** | | |
| | | 6-9m | Costs are from the NIFR Detailed Engineered Cost Estimate Procedures (2006).<br>Cost include both the removal of the structure and transportation to a storage area (reasonably close).<br>If the bridge is to be transported >20km, add the mob/demob costs on top of the identified bridge cost. | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | >9m-12m | | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | >12m-15m | | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | >15m-18m | | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | >18m-21m | | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | >21m-24m | | Bridge removal costs still referred to in 2016 Interior Appraisal Manual . |
| | | | | |
| | b | ***Stream Culvert Removal*** | | |

| | | | | |
|---|---|---|---|---|
| | | Fish Stream | Environmental Permitting/EMP/Fish salvage/Professional Fees. Site isolation, excavation of road surface, reconstruction of streambed (requires clean gravel/cobble material, erosion control). | Rate based on estimate from FLNRO Road Engineers and service providers |
| | | Non Fish Stream | Site isolation, excavation of road surface, reconstruction of streambed (requires clean gravel/cobble material, erosion control). | Rate based on estimate from FLNRO Road Engineers and service providers |
| | | | | |
| | c | ***Stream Restoration*** | All inclusive cost for stream channel restoration. Includes permitting, equipment, site isolation, environmental monitoring, riparian planting, and erosion and sediment control. Based on cost for linear m of small stream (channel width < 6 m) | The price was based on an average of known costs for past restoration projects. |
| | | | | |
| **13** | **Revegetation - Seeding** | | | |
| | a | **Hand Broadcast** | | |
| | | Seed | For erosion control 15-30 kg/ha, for seeding to allow for tree growth light seeding 4-6 kg/ha (NEIPC 2010). Seed price based on average native seed cost. Price can range widely depending on provider and seed mix. Rate based on assumption one person can seed 1 ha/day. s. 13 | Productivity: One person = 1 ha/day. Wage/hr for 10 hr = cost/ha |
| | | Fertilizer | One person = 1 ha/day. Application cost based on s.13 for 10 hr | Productivity: One person = 1 ha/day. Wage/hr for 10 hr = cost/ha |
| | | | | |
| | b | **ATV Broadcast** | | |
| | | Seed | Productivity: 5 ha/day. Application cost based s.13 for 10 hr + s.1 for ATV | Productivity: 5 ha/day. Wage/hr for 10 hr + s.13 for ATV = cost/ha |
| | | Fertilizer | Productivity: 5 ha/day. Application cost based s.13 for 10 hr + s.1 for ATV | Productivity: 5 ha/day. Wage/hr for 10 hr + s.13 for ATV = cost/ha |
| | | | | |
| | c | **Aerial Broadcast** | | |
| | | Seed | Aerial broadcast seeding is good for large area, or numerous difficult to reach areas. Possible to seed 100 ha/hr. Mid range value from NEICP 2010. | Rate based on source information (NEIPC 2010) |
| | | Fertilizer | Possible to fertilize 100 ha/hr. Mid range value from NEICP 2010 | Rate based on source information (NEIPC 2010) |
| | | | **Note:** Disturbance sites and trails/roads should be seeded with native grass species, unless the areas are expected to recover through natural regeneration or the areas will be planted with trees. Native seed mixes should include the use of a short lived cover crop species to provided early erosion and sediment control. | |
| **14** | **Revegetation - Planting** | | | |
| | a | Seedlings | s.13 Tree prices vary greatly depending on plug size and grower. | Rate based on info from goods and service providers |
| | b | Fertilizer | s.13 | Rate based on info from goods and service providers |

| | | | | |
|---|---|---|---|---|
| | | | **Note:** When a project disturbs areas >1ha, it is recommended that the area be planted with trees. Use native pioneering species where appropriate. Consider seed providence when selecting seedling stock.<br>Areas <1 ha have commonly re-stocked themselves with natural regeneration; thus, planting is not required.<br>It is recommended that all trails/roads that are recontoured in areas with slopes 30-50% be considered for tree planting to ensure the stabilization of surface material.<br>Cost is based on interior averages from forest industry; accounts for small openings (and therefore smaller economies of scale). Stocking density may vary with BEC Zone and site series (see BEC Worksheet). Price based on density of 1500 stems/ha. Density can be modified according to desired conditions. | |
| | | | | |
| **15** | **Additional Revegetation Activities** | | | |
| | a | Hydroseed | Greater seed application rate for hydroseeding (NEIPC 2010). | Rate based on info from service providers |
| | b | Bioengineering (live staking) | **Note:** Staking with deciduous species (willow, cottonwood) is effective at stabilizing surfaces and slopes, however it is only effective in very moist environments and is not widely prescribed in the interior.<br>Bioengineering has site specific uses, such as live staking drainage/riparian area. Costs are variable depending on site location, as well as material and labour availability. Price based on US Army Corps of Engineers (1999) person hour production rates. Assumes 66 cuttings/person hour and planting 100 stems/hr.s.13 Assumed 1 m live stake spacing (10,000 stems/ha). | (10000 m2 / # of cutting/hr) + (10000 m2 / # of plantings/hr) x Wage/hr = $/10000m2 (ha).<br>Cost/10000m2 / Stems/10000m2 = cost/m2 |
| | | | | |
| **16** | **Reclamation Monitoring** | | | |
| | a | Monitoring | Monitoring costs can be variable depending on factors such as speed of recovery, and number of site visits. Minimum of one site visit, but recommend three (Year 1, Year 3, Year 5). Price is based on qualified professional assessing vegetation. | Rate based on info from service providers |
| | b | Geotechnical Monitoring | Cost for geotechnical monitoring can be highly variable depending on location and complexity of site. s.13 for 10 hr site visit, plus 10 hrs of data management/report time as well as disbursements (e.g.. vehicle and survey equipment). Price does not include instrumentation install, if required. | Rate based on info from service providers |
| | c | Water Quality/ARD Monitoring | Water quality monitoring/ARD Assumes s. 1 for lab costs, plus rough cost for time to and from site for person to collect samples, and shipping. Actual price will vary depending on program, project location, and efficiencies with additional samples. Depending on program and site concerns, sampling parameters may differ. For ARD monitoring considerations, parameters could include: buffering capacity (acidity, alkalinity), physical properties (total dissolved solids, total suspended sediments), major ions, nutrients, metals. In the calculator, add the number of samples required. Should consider collecting samples from both control and impact sites. | Rate based on info from service providers and estimate of time and expenses |

| | | | | |
|---|---|---|---|---|
| | d | Foliar Metals Uptake Monitoring | Assumes s.13 for lab costs (e.g. . Full metals suite), plus day rate for technician to collect samples, and travel to and from site. Actual price will vary depending on program, project location, and efficiencies with additional samples. In the calculator, add the number of samples required. Need a minimum of 2g of foliage/sample. | Rate based on info from service providers and estimate of time and expenses |
| | | | | |
| **17** | **Planning and Assessment** | | | |
| | a | Reclamation Plan | Cost for a qualified professional to conduct a site visit, assess existing site conditions, and prepare a reclamation plan. For complex or remote sites, the cost for a plan will be higher s.13 | Rate based on info from service providers |
| | b | Geotechnical Assessment | Cost for a qualified professional to conduct a site visit, assess existing site conditions, and prepare a geotechnical report with proposed mitigation measures. For complex or remote sites, the cost for a plan will be higher. | Rate based on info from service providers |
| | c | Soil Remediation Investigation | Cost for a qualified professional to conduct a site visit, lab analyses, and assessment report. Price includes excavator for 10 hr day. | Rate based on info from service providers |
| | d | Ground Water Investigation | Groundwater investigation for a contaminated site. Minimum of three drill holes s.13 | Rate based on info from service providers |
| | e | Hazardous Materials Assessment | Cost for a qualified professional to conduct a site visit, assess materials left on site, identify potential areas of contamination, and prepare a report (Phase 1 report). For complex or remote sites, the cost for a plan will be higher s.13 | Rate based on info from service providers |
| | | | | |
| **18** | **Miscellaneous** | | | |
| | a | Accommodation and Meals | Rate for accommodation and meals s.13 It is expected that this price will be adequate for most hotel and camp situations throughout the province. If accommodation is required for the project, account for all personnel expected to be onsite (e.g. equipment operators, debris removal crew, etc.) | Estimate |
| | b | Vehicle Mileage | This line item is intended to cover fuel and vehicle expenses to and from site for those providing reclamation services. | Mileage rate x #km |
| | c | Helicopter Access/Support | Astar becoming industry standard (includes fuel). Rates for other helicopters in "Rate Sheet" tab. | Rate based on info from service providers |
| | d | Airplane | For remote sites with air strips or water access. Floatplane access may be more common in northern or coastal regions s.13 | Rate based on info from service providers |
| | e | Specialized Trades | The HSRC now requires certified electricians or mechanics to perform electrical work. May be needed when disconnecting/disassembling generators and performing electrical work on camp infrastructure. Mechanics may be needed when equipment (i.e. dozer, excavator, larger ATV/UTV, etc. needs to be disassembled for helicopter or other transport. | s.13 |
| **19** | **Project Management** | | Enter a '1' in the cell if applicable | |

| | | | | |
|---|---|---|---|---|
| | a | Project Management of Activities | Project management fee to cover off expenses related to contract details (e.g. procurement, supervision, and budgeting). | 10% Project Management Fee |
| **20** | **Uncertainty Factor** | | Enter a '1' in the cell if applicable | |
| | a | Uncertainty Estimate | Used to reflect uncertainty in the estimate, provides contingency to accommodate unforeseen costs or differences in rates, based on factors such as remote access challenges or northern allowance. Enter '1' in the cell if applicable | 15% uncertainty factor |
| **21** | **Inflation** | | | |
| | a | Annual inflation on goods and services | Inflation rate to be applied for projects with longer term end dates. | Inflation=sum of project x inflation rate x number of years. Annual inflation was calculated based on change in 2010 Blue Book equipment rates. |

## Heavy Equipment Rates

| Equipment Type | Equipment Rates/Hr | Productive/Capacity | Comments |
|---|---|---|---|
| **Dozers - Uses include ripping, contouring, spreading material** | | | |
| Class 4 (130-189.9 FWHP) | s.13 | Move 120 m3/hr* | Small to medium sized machine (e.g. Cat D6) |
| Class 5 (190-259.9 FWHP) | | Move 150 m3/hr* | Medium sized machine (e.g. Cat D7) |
| Class 6 (260-359.9 FWHP) | | Move 200 m3/hr* | Medium sized machine (e.g. Cat D8) |
| Class 7 (360-519.9 FWHP) | | Move 270 m3/hr* | Large sized machine (e.g. Cat D9) |
| | | | |
| **Excavators - Uses include site prep, infilling ponds/pits/trenches, road deactivation, road pullback, stream crossing removal** | | | |
| Class 1 (Under 32,000 Lbs) | s.13 | - | Mini-small sized machine |
| Class 2 (32,000-41,999 Lbs) | | - | Small sized machine |
| Class 3 (42,000-44,999 Lbs) | | - | Small sized machine |
| Class 4 (45,000-50,999 Lbs) | | Move 150 m3/hr* | Medium sized machine |
| Class 5 (51,000-58,999 Lbs) | | Move 170 m3/hr* | Medium sized machine |
| Class 6 (59,000-67,999 Lbs) | | Move 170 m3/hr* | Medium sized machine |
| Class 7 (68,000-87,999 Lbs) | | Move 210 m3/hr* | Medium sized machine |
| Class 8 (88,000-95,999 Lbs) | | Move 210 m3/hr* | Large sized machine |
| | | | |
| **Grader (Uses include ripping work)** | | | |
| Class 6 (220-249 FWHP) | s.13 | Rip 1500 m of access road/day (5-8 m wide)* | |
| | | | |
| **Dump Trucks** | | | |
| Standard Hwy Truck | s.13 | 8 m3/load | Typical hwy rated dump truck |
| Trailer with End Dump | | 15 m3/load | Hwy rated truck |
| Off Hwy Truck | | 17 m3/load | Off Hwy articulated rock/dump truck |
| | | | |

**Notes:**

Equipment rates based on 2016-2017 Blue Book values

Equipment classes based on Blue Book system

Classes shown in table represent common sized machines

Actual contractor rates may be up to 30% more

Rates include operator

FWHP = Fly Wheel Horsepower

*Productivity values based on MEM 2003. Note: Production can vary greatly depending on site conditions

## Helicopter Rates

| Helicopter | Rate/hr | Fuel $/hr | Total $/hr |
|---|---|---|---|
| Bell 206 Jet Ranger | s.13 | | |
| Bell 206 Long Ranger | | | |
| A-Star B4 | | | |