TRUE NORTH

PROJECT RECLAMATION PLAN

Submitted to:

Alaska Department of Natural Resources
Division of Mining, Land and Water
3700 Airport Way
Fairbanks, Alaska 99709

and

U.S. Army Corps of Engineers
Alaska District - Regulatory Branch
P.O. Box 898
Anchorage, Alaska 99506-0898

Submitted by:

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A Subsidiary of Kinross Gold Corporation
P.O. Box 73726
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December 2001

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1.0 INTRODUCTION

1.1 Purpose

This True North Project Reclamation Plan document updates the reclamation plan prepared by Fairbanks Gold Mining, Inc. (FGMI) in December 2000. This current reclamation plan incorporates changes made by FGMI as a result of its ongoing design and analysis process, as well as those changes made in response to agency and public review and comments received during the initial permitting.

The True North Project is operator by Fairbanks Gold Mining, Inc. (FGMI), a wholly owned subsidiary of Kinross Gold Corporation (KGC). FGMI owns 100% of the True North and has lease agreements with the underlying claim owners; the agreements include the area of the Millsite Lease and additional claims within the overall exploration area listed in Section 2.0.

Fairbanks Gold Mining, Inc. (FGMI), has prepared this updated plan to address interim, concurrent, final reclamation and post-mining land use of the True North Project. This plan is submitted to the Alaska Department of Natural Resources, Division of Mining, Land and Water (ADNR) in accordance with AS 27.19.010 et. seq. and 11 AAC 97.100 et. seq. Concurrently, the plan is being submitted to the U.S. Army Corps of Engineers (COE) as required by the Clean Water Act Section 404 Permit No. M-940742, N-940742, O-940742, P-940742, and Q-940742 Murray Creek 2.

The True North Project and all operating and ancillary facilities are located on legally filed and held State mining claims. The State mining claims are on land administered by ADNR (*Appendix B – True North Project Millsite Lease Location Description*).

FGMI will reclaim exploration, development, and mining-related disturbances at the True North Project in a manner compatible with the land use selected and discussed herein. Reclamation practices will utilize best practicable established and accepted technologies and methodologies suitable to the interior forest or Taiga environment of the True North Project area. Where pertinent, documented successful practices from other interior forest region reclamation projects (i.e. Trans Alaska Pipeline, Fort Knox Mine, and placer mining) will be implemented at the True North Project.

As generally discussed in the September 2000 True North Project Description, reclamation practices are under constant scrutiny by government, industry, and the public. Although there are no process facilities, the True North Project is subject to the Alaska Reclamation Act. Therefore, reclamation plans must be, within the context of existing regulations, dynamic and capable of changing with the input of new information, ideas, and techniques (11 AAC 97.330 Amendment of Reclamation Plan).

Final reclamation (final contouring of development dumps, facility sites, and seed bed

preparation) will be initiated immediately and completed within two years of cessation of mining operations where affected land cannot practicably be reclaimed concurrently. Notification, in writing, of final closure will be given to the ADNR and COE within **90** days after cessation of mining operations.

Access by Federal and State regulatory personnel to the True North Project mine facilities for the purpose of inspecting for reclamation or other appropriate compliance areas are statutory/regulatory mandates and will be honored by FGMI, with the request that agents contact mine management to gain access. The health and safety of FGMI employees and that of regulatory personnel is the rational for this request. Mining is regulated under the Mine Safety and Health Administration (MSHA). Their regulations require minimum training for employees and visitors for Hazard Recognition and Safety. Visitors as well as employees must wear safety equipment, approved by MSHA.

FGMI requests consideration by the regulatory agencies to conduct routine inspections during weekdays when administration and mine managers are available to answer questions and, if necessary, accompany agents to different areas of the site.

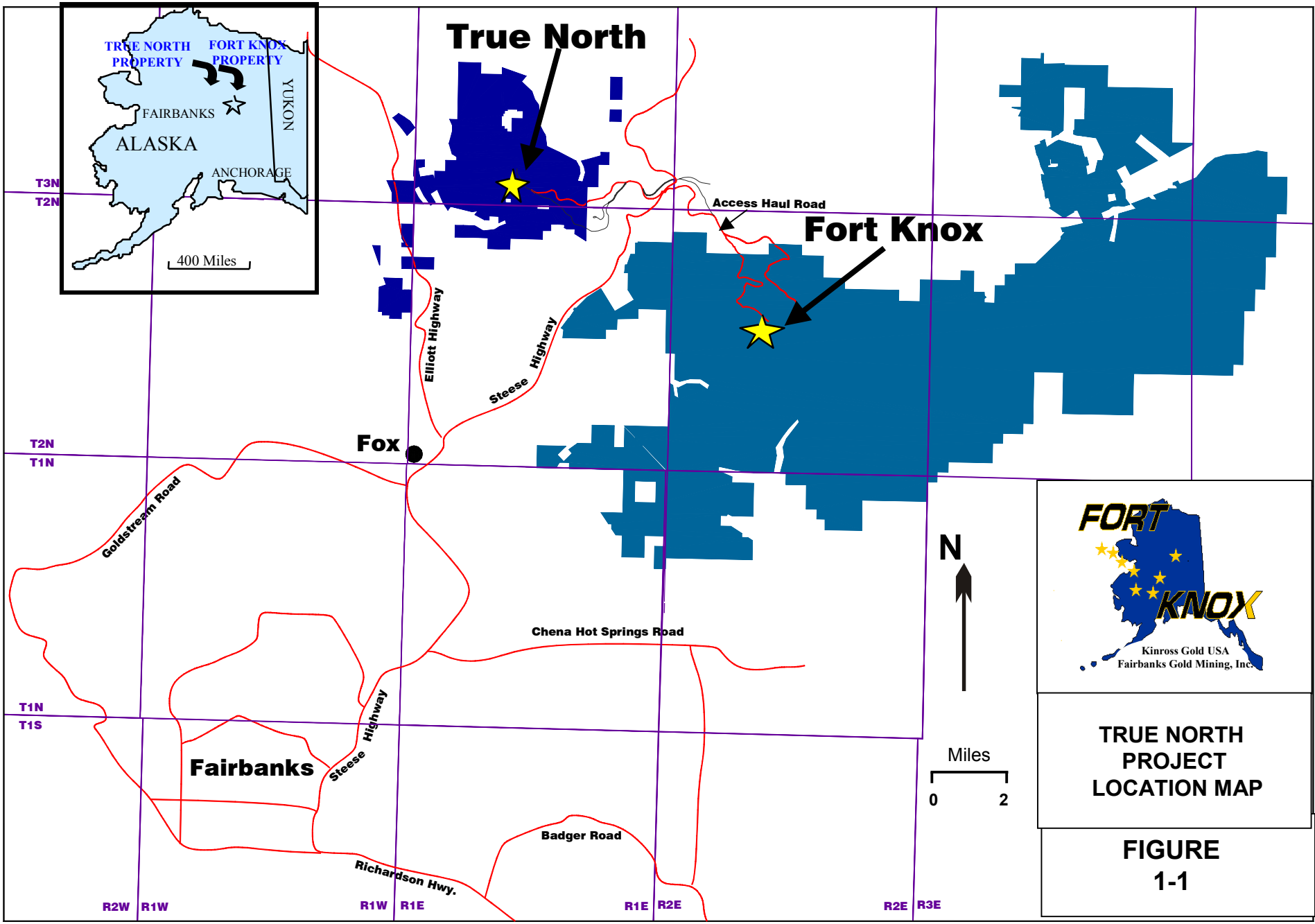
1.2. Project Summary

1.2.1 Location and Land Status

The True North Project is within the Chatanika River watershed located on the northwest flank of Pedro Dome approximately 25 miles northeast of Fairbanks (Figure 1-1 and 1-2). The ridgelines drain into Murray Creek, a tributary of Dome Creek to the south; and Louis Creek, Whiskey Gulch, and Spruce Creek, tributaries of Little Eldorado Creek to the north. More specifically, the Millsite Lease boundary is located in portions of Sections 21, 27, 28, 29, 32, & 33, Township 3N, Range 1E, Fairbanks meridian (Figure 2-1) and is located entirely on State and University of Alaska land. The True North ore body and ancillary facilities have been placed within the Millsite Lease

There is no federal land involved within the project boundaries and the closest residence is approximately one mile from the project boundary.

The center of the ore body is located on the northwest flank of Pedro Dome on the ridge between Dome Creek and Eldorado Creeks. Calcareous and carbonate-altered schist hosts the True North deposit. The ore body is elongated northeast gently dipping to the southwest. True North's topographic features are shown in Figure 3-1.


TRUE NORTH PROPERTY
FORT KNOX PROPERTY
YUKON
FAIRBANKS
ALASKA
ANCHORAGE
400 Miles
True North
Fort Knox
Access Haul Road
Elliott Highway
Steese Highway
Fox
Goldstream Road
Chena Hot Springs Road
Fairbanks
Steese Highway
Badger Road
Richardson Hwy.
T3N
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R3E
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FORT KNOX
Kinross Gold USA
Fairbanks Gold Mining, Inc.
TRUE NORTH PROJECT LOCATION MAP
FIGURE 1-1

1.2.2 General Environmental Information

The True North Project area is in the Yukon-Tanana Uplands, characterized by rounded, even topped ridges with gentle slopes. The deposit is located on the northwest flank of Pedro Dome at elevations ranging between 1,760 to 1,200 feet.

The climate is continental sub-arctic with mean annual precipitation of less than 12 inches. The area is predominantly forested. Well-drained soils of the uplands and alluvial plains are covered mainly with white spruce (*Picea glauca*) and a mixture of broadleaf trees such as paper birch (*Betula paprifera*) and quaking aspen *(Populus tremuloides*). The climax forest on well-drained soils in the area is white spruce. The moderately well drained and imperfectly drained soils may support forests similar to those on the well-drained soils, but more commonly black spruce (*Picea mariana*) and willow (*Salix spp*.) are found. Mosses (*Sphagnum* spp.), along with horsetail (*Equisetum* spp.) and grass, typically cover the ground. Shrubs such as willow, however, are also prevalent.

The poorly drained soils with a high permafrost table generally support communities of black spruce, willow, and alder (*Alnus* spp.). A thick moss mat, principally *Sphagnum* spp., covers the ground. Lichens such as *Cladonia* spp. and *Peltigera* spp. are common in the moss mat also. This mat supports a dense cover of shrubs; primarily bog birch (*Betula glandulosa*), spirea (*Spirea beauverdiana*), Labrador tea (*Ledum decumbens*), cranberry (*Vaccinium vitis-idaea*), and blueberry (*Vaccinium uliginosum*). Tussocks of cotton grass (*Eriophorum* spp.) are also common, especially along the toe slopes. Poorly drained soils with a high permafrost table may be found on the northern exposures of the mountain slopes, especially those areas that are concave or broken. Spindly black spruce and a thick moss mat are typical on these sites. Permafrost is discontinuous throughout the project area, and does not exist on some north-facing mountain slopes where it normally would be expected. South-facing slopes receive much more radiation from the sun, and generally support white spruce, paper birch, and quaking aspen.

ABR, Inc. performed three wetland delineations for True North. No high value wetlands, such as open water or emergent wetlands are located within the Millsite Lease area. The impacted wetlands are associated with permafrost and have vegetative cover of black spruce and a moss mat. Similar type wetlands are abundant in the True North Project area and surrounding region (ABR, Inc., 1997, 2000). Approximately 396 acres of wetlands will be disturbed due to roads and pit development. The office, shop, explosive storage area, development rock dumps, growth medium stockpile and ore stockpile will all be located on uplands which accounts for an additional disturbance of approximately 618 acres.

The True North Project area does not currently support any threatened or endangered species, but does support populations of three species of concern: Northern Goshawk, Olive-sided Flycatcher, and lynx. Populations of these species appear to be present in numbers similar to

other locations in interior Alaska. Suitable habitats for these species are abundant in the True North Project area and surrounding region (ABR, Inc., 1998).

2.0. APPLICANT INFORMATION

2.1 Corporation Officer Completing Application

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Title: General Manager
Telephone: (907) 488-4653 ext. 2202

2.2 Designated Contact Person

Name: William R. Jeffress
Title: Manager - Environmental Services
Telephone: (907) 490-2206

2.3 Corporate Information

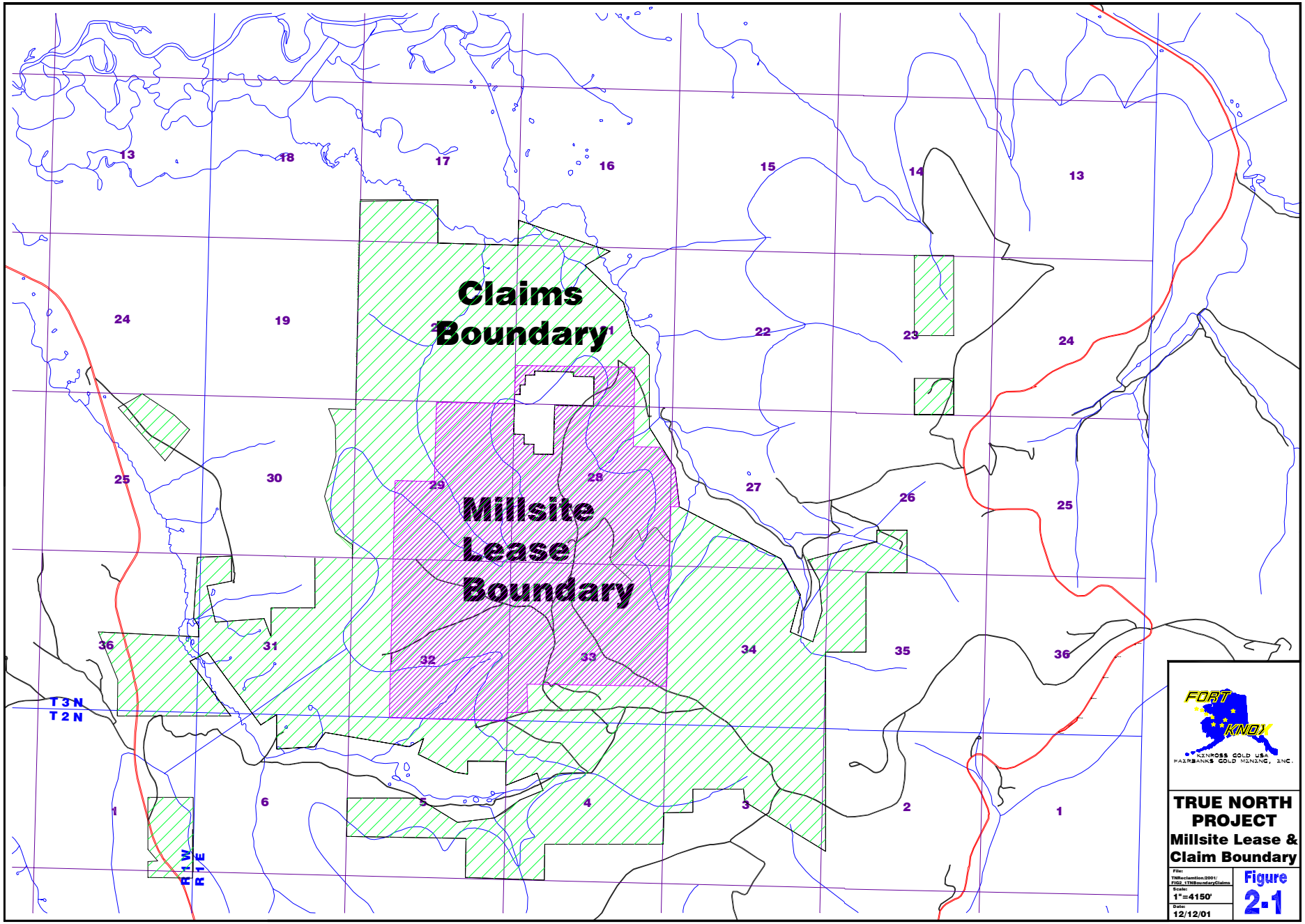
Business Name: Fairbanks Gold Mining, Inc.
Address: P.O. Box 73726
Fairbanks, Alaska 99707-3726
Telephone: (907) 488-4653

President: Arthur H. Ditto
Vice President: Robert W. Schafer
Vice President: Thomas E. Irwin
Treasurer Brian W. Penny
Secretary Shelley M. Riley

Fairbanks Gold Mining, Inc. is a wholly owned subsidiary of Kinross Gold U.S.A., Inc., a Nevada corporation that in turn is a wholly owned subsidiary of Kinross Gold Corporation a precious metals corporation with the principal operating office at Scotia Plaza, 57th Floor; 40 King Street West; Toronto, Ontario M5H 3Y2; CANADA.

2.5 Alaska Registered Agent

Name: Fairbanks Gold Mining, Inc.
Address: c/o C. T. Corporation System (Agent)
240 Main Street, Suite 800
Juneau, Alaska 99801


Claims Boundary
Millsite Lease Boundary
13
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R1E
FORT KNOX
KINROSS GOLD USA
FAIRBANKS GOLD MINING, INC.
TRUE NORTH PROJECT
Millsite Lease & Claim Boundary
File: T:\Reclamation\2001\FIG2_1TNBoundaryClaims
Scale: 1"=4150'
Date: 12/12/01
Figure 2-1

2.5 Corporate Guaranty and Reclamation Bonding

Kinross Gold Corporation shall maintain a Corporate Guaranty in addition to the reclamation bond that shall cover the total closure costs for closure and reclamation of the True North Project.

3.0. PROJECT DESCRIPTION

3.1. General

The True North Project is located 25 miles northeast of Fairbanks, on the northwest flank of Pedro Dome. Historic access to the True North Project is via the Steese Highway to Cleary Summit, then 6.5 miles via a gravel road skirting the south side of Pedro Dome. The new access/haul road begins approximately 0.5 miles south of the Cleary Summit and follows a new road alignment along the north side of Pedro Dome.

The True North Project operation involves an open-pit mine and related facilities for personnel and equipment. Operational designs are based on estimated gold reserves for the True North "Hindenburg" and "East" pits of 7.2 million tons, averaging 0.063 oz/t and approximately 5.9 million tons, averaging 0.055 oz/t for the Central, Shepard and Zeppelin pits. FGMI exploration crews continue drilling to further define mineralization in the area. Kinross is optimistic that additional development will proceed as exploration drilling confirms additional reserves. The mine will operate year-around with conventional open pit mining averaging 30,000 tons per day, at a strip ratio from 2:1 in the Hindenburg and East pits. Mining in the Central, Shepard, and Zeppelin pits will average 50,000 tons per day at a strip ratio of 4:1. Approximately 10,000 tons of ore per day will be trucked to the Fort Knox mill for processing. Mining of the Hindenburg and East pits is projected to be complete in the third quarter of 2001 and mining of the Central, Shepard, and Zeppelin pits will continue into 2004. The mine will employ approximately 129 workers in two shifts, 24 hours per day, 365 days per year. There are no living accommodations at the project site. Grid power follows an alignment close to the access/haul road (approximately 3-miles) Golden Valley Electric Association provides 480-volt, 3-phase electrical power.

3.2. Surface Disturbances

3.2.1. Placer and Other Mining Disturbances as of July 1999

Prior to construction of the proposed True North Project mine facilities, placer, exploration, and other mining activities have disturbed approximately 68 acres within the True North Project area. This acreage (68 acres) does not include areas encompassed by trails, historic ditches, cabin sites, and small-localized disturbances. Some of these previously disturbed areas are located where the Hindenburg pit, East pit, and development rock dumps are planned.

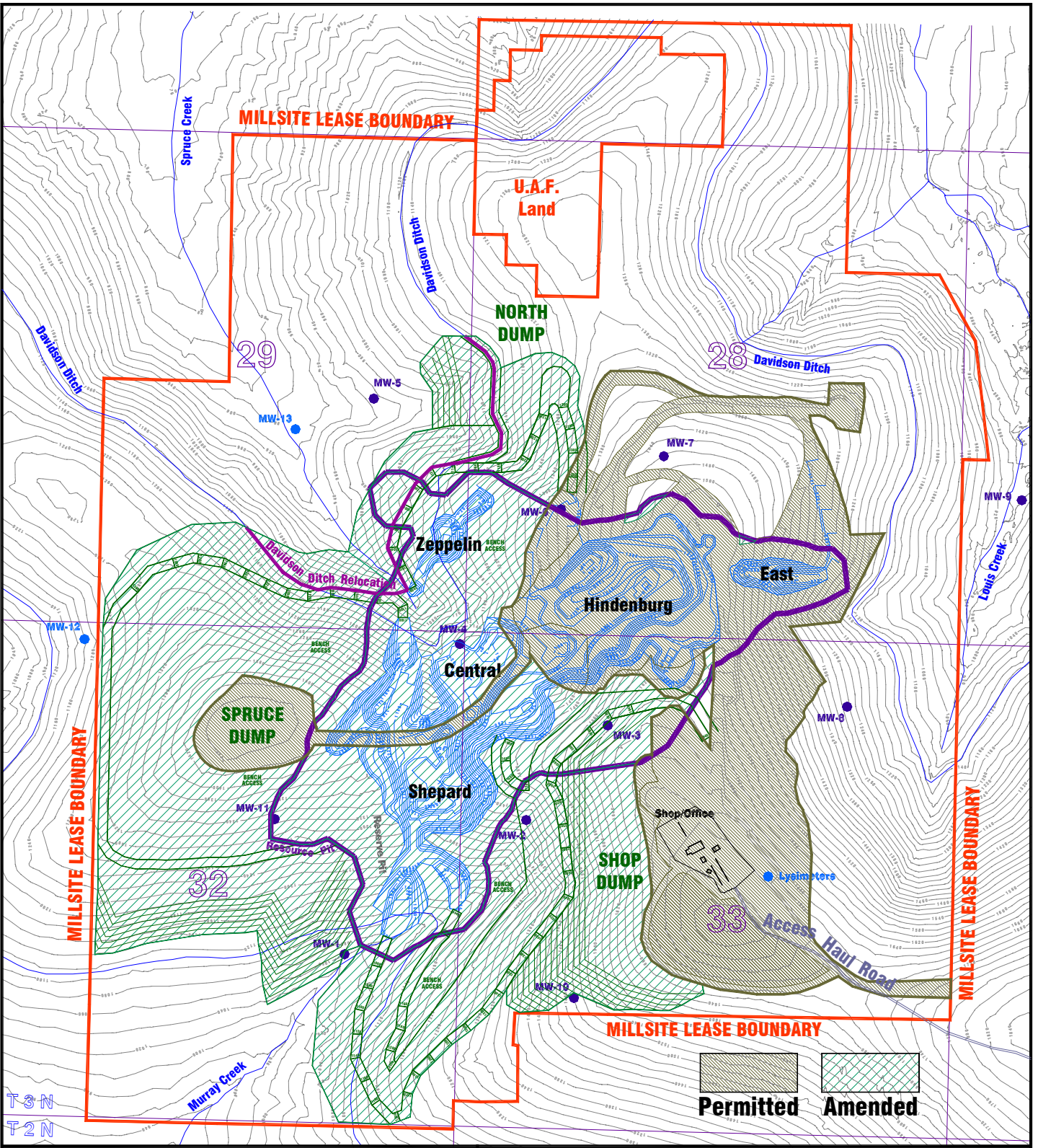
3.2.2 Areas and Acreage of Disturbance

Table 1 lists the proposed disturbance on state land within the Millsite Lease area that currently includes the Hindenburg, East, Central, Shepard, and Zeppelin pits, and ancillary facilities. The general areas of potential disturbance are identified in Figure 3-1.

Table 1.
Approximate Areas and Acreage of Disturbance by Project Component

Project Components	Total Acres
Open Pits	352.3
Development Rock Dumps	363.2
Growth Medium Stockpiles	9.0
Ore Stockpile	1.8
Maintenance Complex	10.8
Blasting Supplies Storage	4.0
Mine Site Roads	274.8
Total	**1,014.1**

The True North Millsite Lease area covers approximately 2, 096.0 acres of which 1, 014.1 acres have been or are projected to be disturbed under the authorization of the previous exploration permits, the Millsite Lease issued January 20, 2001, and the current amendment. Approximately 1,082 acres within the Millsite Lease area remain targeted for further exploration or condemnation drilling.



LEGEND: Contour Line | Dump/Road Contour | Dump/Road Toe | Pit Design Limit | Pit Resource Area

NOTES: Pit outlines based upon most current drilling information and economics, and are updated periodically.

SCALE (ft): 0 1000 2000

Date: December 19, 2001

Filename: tn2_mineplan_i.dwg

Figure 3-1

TRUE NORTH PROJECT
General Arrangement

4.0. RECLAMATION PLAN

4.1 General

FGMI's long-term goals of reclamation during and after mining operations are to shape, stabilize, revegetate or otherwise treat the land in order to return it to a safe and stable condition consistent with the Tanana Basin Area Plan (TBAP) and the Kinross Gold Corporation Environmental Policy (Appendix A). The current designated post-mining uses for the True North Project area are for wildlife habitat and recreation as prescribed by AS 27.19.020. FGMI is incorporating practices that include contouring and stabilizing disturbed areas using best engineering p ractices to create seed beds that invite and promote early seral colonization, using commercially available native plant species, when available, and soil amendments with proven track records.

FGMI will adhere to the above general philosophy in developing and implementing this reclamation plan for the True North Project. Therefore the objectives of the plan are:

1. Stabilization and protection of surficial soil materials from wind and water erosion;

2. Stabilization of steep slopes through contouring and leveling to provide rounded landforms and suitable seedbeds;

3. Establishment of long-term, self-sustaining vegetation communities through reseeding and/or promotion of natural invasion and succession.

FGMI will continue working with ADNR, and Alaska Department of Fish & Game (ADF&G) with the implementation and evaluation of both concurrent and long-term reclamation activities. This consultation is consistent with the preliminary revegetation proposal of Fort Knox as described in Appendix C -*U.S. Fish & Wildlife Service-Estimating Wildlife Habitat Variables*.

FGMI considers reclamation to be a progressive process tied directly to the design, construction, operation, and closure of the mining operation. Reclamation will occur in the following phases, with some overlap:

1. Interim reclamation to stabilize and maintain viability of topsoil and growth medium stockpiles will be completed during and directly after construction (Figure 3-1);

2. Previously disturbed areas including historic exploration trenches, abandoned roads, and exploration drill pads that will not be affected by current mining operations will be concurrently reclaimed;

3. Final reclamation (Phase I) will occur upon cessation of mining operations. Phase I reclamation (final contouring of development rock/growth medium dumps, facility sites,

and seed bed preparation), where affected land cannot practicably be reclaimed concurrently, will be initiated immediately upon cessation of mining operations, and re-contouring will be completed within 2 to 5 years; and

4. Passive reclamation (Phase II) will consist of water quality monitoring until closure and all reclamation performance standards are achieved.

The physical reclamation of the True North Project site will utilize best practicable proven and documented technology. The specifics of this technology are discussed in Section 4.1.7. The details and procedures for area specific reclamation such as the pit, and development rock dumps are discussed in Section 4.2.

4.1.1 Changes to Scope of Reclamation Activities

FGMI will submit revisions to the approved True North Project Reclamation Plan for review and approval by the Alaska Department of Natural Resources when revised mining plans would result in the following:

1. A significant increase in the size (i.e., 25% increase in perimeter) of the pit;

2. A significant increase in the size (i.e., 25% increase in footprint) of the growth medium stockpiles or development rock dumps;

3. Any significant change in the geochemical characterization of the ore or development rock; and

4. Any other change that significantly alters the footprint of the project or the type of activity as described in the approved Plan of Operations.

4.1.2 Land Use

4.1.2.1 Land Use Prior to the True North Project

The True North Project area is located within the Tanana Basin Area Plan in Subregion 1-Fairbanks North Star Borough, Management Unit 1J2-Cleary Summit-Pedro. The primary management objective is subsurface development and the secondary objective is forestry. Other objectives are to protect fish and wildlife habitat and recreation opportunities.

Mineral extraction activities, both placer and lode mining, have been continuous throughout the Fairbanks Region. Mineral exploration and mining activities have produced the greatest visible impact to surface features. Recreational activities in this region include hiking, biking, berry picking, cross country skiing, snowmobiling, mushing, horseback riding, trapping and small/large game hunting.

The site supports those wildlife species typically inhabiting taiga. Avian species include numerous migratory birds and raptors. Mammals range from small shrews, voles, mice, lemmings, Red squirrels and Snowshoe hares to larger species including, but not limited to foxes, wolves, Black bears, Brown bears, and moose.

4.1.2.2 Land Use During True North Project Operations

State surface land use authorizations (Millsite Lease) allow limited access to the general public. Restricted access is due to the inherent hazards associated with the operation of large mine equipment. Compliance with requirements of Mine Safety and Health Administration (MSHA) regulations will limit access to personnel trained to recognize hazards and observe safety rules to insure the health and safety of employees and visitors.

Wildlife habitation by certain species will be temporarily altered during the active portion of the mine life. Larger mammals will typically seek isolation from human disturbance; however, with concurrent reclamation the resident population of moose and wolves will increase. In order to ensure the safety of mine employees and the public, all hunting, fishing, and trapping within the Millsite Lease area are prohibited.

4.1.2.3 Refuse

All wooden pallets and cardboard remnants from operations will be disposed of in the proposed on-site burn pit. Burning will be conducted once a week. A burn permit will be maintained for burning from the Alaska Division of Forestry during the months of May through September.

Putresible waste from sack lunches will be disposed of in animal proof dumpsters to prevent attracting wildlife.

FGMI's waste minimization strategy is to recycle all materials where possible and promote innovative approaches to waste management. Refuse that cannot be recycled will be stored in dumpsters to be disposed of in the FNSB solid waste landfill.

4.1.2.4 Proposed Productive Post-Mining Land Uses

The True North Project operation will alter the landscape of the site for the long-term. FGMI will reclaim both wetland and upland sites to a more productive post-mining land use as wildlife habitat. ADNR, ADF&G, and FGMI will work as a team to formulate a successful post-mining land use consistent with the TBAP designations of multiple use including forestry and recreation.

4.1.3 Reclamation of Pre-Mining Disturbances

Prior to discovery and development of True North Project, more than 90 years of placer mining activities and mineral exploration have substantially affected both the Dome Creek and Little Eldorado Creek. Approximately 68 acres have been previously disturbed within the Millsite Lease from exploration activities and historic lode mining. .

4.1.4 Schedule of Reclamation Activities

4.1.4.1 Reclamation During and Directly After Construction

Clearing methods shall be based on site specific conditions, including vegetation type, size, soils, slope, and proximity to water bodies. Timber salvage shall be in accordance with the Department of Natural Resources, Division of Forestry regulations. The following clearing methods may be used at the True North Project area:

1. Clearing methods for woody vegetation that minimize disturbance to the ground surface shall be used in areas where ground cover is desired to minimize permafrost degradation; or for areas where ground cover and topsoil will not be removed immediately after clearing to minimize erosion of surface material.

2. Preferred clearing methods that minimize surface disturbance and provide reclamation materials that may be handled and redistributed easily include hydro axing or other forms of tree mulching. Mechanical clearing of small trees (<6" DBH) and ground cover (muskeg) with dozers will allow small piles to be constructed prior to moving to interim stockpiles.

3. Cleared vegetation shall be stockpiled in areas providing the most advantageous locations suitable for use in later reclamation (Shop, Louis Creek, East Pit, Spruce Creek, and North Development Rock Dumps).

4. Burning of cleared and stockpiled vegetation is not a preferred option for widespread disposal of surface material; however it may be considered in limited areas.

Growth medium salvage will continue as the ore body, development rock dumps, and other mine facilities are fully developed, and suitable growth medium will continue to be stockpiled throughout the mine life. Growth medium stockpiles will be located near their sites of origin (mine origin) as well as at the Shop Growth Medium Stockpile (Figure 3-1). Interim reclamation of the growth medium stockpiles will proceed after placement to stabilize and maintain viability of all stockpiled material for final reclamation if the material is needed.
Areas disturbed during construction and exploration that will not be re-disturbed during operations will be reclaimed. These areas will be identified during at the annual meetings. Areas to be identified for final reclamation during or immediately after construction should

include material borrow sites, construction access roads, abandoned exploration roads, and exploration drill pads.

4.1.4.2 Concurrent Reclamation

Development rock dumps including Spruce Creek, East Pit, Louis Creek, Shop, and North will be constructed as hilltop and head of valley dumps in steps or terraced lifts to achieve the desired overall slope (Figure 3-1). Inactive portions of these dumps will be recontoured and reclaimed as contemporaneously as practicable during the mine life.

4.1.4.3 Temporary Closure

Temporary closure means the cessation of the mining operations for a period of not more than one-year. If conditions require temporary closure to extend beyond one-year, final reclamation will begin with a final closure notice submitted to the ADNR, unless an extension accompanied by full justification is requested by the company and approved by ADNR. Temporary closure scenarios, which require modifications to the plan of operation, reclamation plan, or 404 Permit, will be coordinated with and submitted to the appropriate Federal and State agencies for approval.

Temporary closure may include planned and unplanned cessation of the mining processes. Planned temporary closures that have specific conditions defining their beginning and end include, but are not limited to the following:

1. Interruptions in the active beneficiation processes at the Fort Knox Mill to provide planned periods of quiescence for metallurgical or operating reasons.

2. Any other planned condition, which will interrupt the active beneficiation process at the Fort Knox Mill including modification to process components or suppressed metal market conditions.

3. Change in ownership requiring the temporary cessation of operations while operating permits are transferred to the new owner/operator.

Unplanned temporary closures may include, but are not limited to the following:

1. Closure because of unforeseen weather events.

2. The cessation of operations because of litigation.

Temporary Closure will comply with the following four reclamation practices:

1. Maintain the site;

2. Maintain all site monitoring, reporting and all reclamation work already completed;

3. Increase bond amounts for any additional disturbed acreage; and

4. Identify areas of reclamation affected by closure and how they will be influenced.

4.1.4.4 Final Reclamation

Initial site development and construction of the fuel storage and shop building was completed in November of 2001. Under the current permitting, engineering, economic scenario, and mine plan, production will continue for approximately 3 years. Final reclamation will be initiated as activity on the Hindenburg, East, Central, Shepard, and Zeppelin pits are completed (Figure 3-1). Reclamation will be as concurrent as mining activities allow. Final reclamation (final contouring of the Spruce Creek, East Pit, Louis Creek, Shop, and North development rock dumps, facility sites, and seed bed preparation) will be initiated immediately and completed within 2 to 5-years of cessation of mining operations where affected land cannot practicably be reclaimed concurrently. Notification, in writing to initiate final closure will be given to the ADNR and COE within **90** days after cessation of mining operations. The notice will provide the date on which final reclamation activities will begin.

Once mining ceases, reclamation will begin on the Hindenburg, East, Central, Shepard, and Zeppelin pits (remaining portions not concurrently reclaimed), the Spruce Creek, East Pit, Louis Creek, Shop, and North development rock dumps, and portions of the mine roads. The four trailers serving as office buildings and lineout facilities for mine crews fuel storage facility, and the 80-foot x 120-foot prefabricated maintenance complex will be decommissioned and those sites reclaimed.

4.1.5 Public Safety

Public safety is a goal in closure and reclamation of mining operations.
The True North Project pit high wall interceptor ditches and safety berms will remain in place to restrict access to the Hindenburg pit area. Four (4) to six (6) foot vegetated berms will be utilized to restrict access to the steeper highwall sections of the Hindenburg, Central, and Shepard pit and other potentially hazardous areas to be identified in the Closure Notification. Signs will also be posted to provide additional warning of potentially hazardous areas. Final signage and placement will be coordinated with the ADNR.

4.1.6 Post-Mining Topography

Post-reclamation topography on the True North Project site will consist of a rolling, diversified landform that blends with the hills and surrounding landscape.

4.1.6.1 Drainage

The ridgelines drain into Murray Creek, a tributary of Dome Creek to the south; and Louis Creek, Whiskey Gulch, and Spruce Creek, tributaries of Little Eldorado Creek drain to the north.

Post-mining drainage patterns will be similar in overall gradient and direction. Diversion ditches around the Hindenburg, Central, and northern portion of the Shepard pit will channel spring breakup and storm runoff into Spruce Creek. Diversion structures above the southern portion of the Shepard pit will divert surface flows to the Murray Creek drainage. The East pit will have been backfilled and a rock dump placed over the pit location with runoff directed toward Louis Creek.

4.1.6.2 Pit Slope Stability

The goal is to maximize backfilling of pit(s); however, it is understood that the amount of backfilling done at a given site will be determined using the following three-step approach:

1. Preferred option is to complete backfilling to a surface configuration that will achieve the designated post-mining land use and to the extent possible conform to the surrounding landscape;

2. Mine plans and sequence of mining activities will be conducted in such a manner that potential backfill options are maximized; and

3. The actual amount of backfill that occurs at a site will be based on post-mining land use, the potential to adversely impact water quality, wildlife habitat and economics.

Engineering analysis, geologic interpretation which will be ongoing, and mine planning has determined that an adequate catch bench width of 25-feet will be to provide effective protection against rock fall and maintain access to the benches (Figure 4-1). The effectiveness of narrower benches is frequently lost due to a combination of incomplete excavation of bench toes, back break, and local bench scale failures. The increase in overall slope angle that results from decreasing catch bench widths below 25-feet is not usually worth increasing the overall slope angle.

Additional stabilization of the final pit may be enhanced by FGMI's mine planning to accommodate sequential backfilling of portions of the Hindenburg pit. FGMI will provide justification to the agencies if this cannot be implemented.

4.1.6.3 Development Rock Dump Slope Stability

The goal of construction and reclamation of the development rock dumps is to achieve stable,

naturally revegetated land forms that meet the objectives of the designated post-mining land use consistent with the Tanana Basin Area Plan and do not adversely affect down-gradient surface or ground water quality. To accomplish this goal, the following approach will be used:

1. Growth medium will be stripped prior to establishing the development rock dumps unless removal would decrease the stability of the dump;

2. Stripped growth medium will be placed along the lateral parameter of the development rock dumps to facilitate reuse of material for placement on the dump where required to achieve revegetation;

3. Diversification of wildlife habitats within development rock dumps will be considered;

4. Natural revegetation is preferred;

5. Development rock dumps will be covered with at approximately 12- inches of growth medium, if needed to facilitate revegetation and minimize infiltration; and

6. Water (runoff and seepage) from development rock dumps will be sampled (as required by the Storm Water Pollution Prevention Plan) to ensure protection of downstream waters.

An engineering and geotechnical contractor, Golder Associates, Inc., has recommended that the dumps be constructed in a series of benches (Figure 4-2). This will maximize the capacity of the dumps within the constraints of the space available and the requirement to limit base shear stresses. Reduction of the amount of recontouring for reclamation in the future will also occur.

Development rock dumps and those portions of growth medium stockpiles not utilized during concurrent or final reclamation will have a 2.5H:1V – 3.0H:1V overall slope. These slopes will be reclaimed at this angle or flatter to ensure stability, as described in Section 4.2.3. Multiple benching will occur in order to achieve this overall slope angle.

4.1.6.4 Permafrost Conditions

Golder Associates, Inc., assessed permafrost conditions at the project site during site investigation work. Their studies concluded that permafrost occupies the upper part of the site and is associated with the black spruce forest. Areas free of permafrost, or with a lowered permafrost table, are associated with the birch forest that occupies the lower slope area. No massive ice was encountered while drilling the site. No development rock dumps, growth medium stockpiles or facilities will be constructed in these areas.

4.1.7 General Reclamation Procedures

General procedures for physical stabilization and revegetation of mined land disturbances are well documented and proven. These proven techniques are incorporated throughout this True North Reclamation Plan and, in coordination with ADF&G and ADNR, will continue to be used during the implementation phase of final reclamation.

4.1.7.1 Earthwork

Reclamation of the True North Project will require extensive earthwork. Development rock dumps, and those portions of the Hindenburg pit designed to allow recreational access will require grading, recontouring, and possible growth medium application. Generally, slopes will be constructed to 2.5H:1V – 3.0H:1V or shallower where feasible.
Earthwork will utilize industry standard heavy equipment. The equipment list will include (or equivalents thereof): D10N Cat., D9N Cat., D8L Cat., rubber-tired scraper, RT dozer, 10,000 gallon water truck, motor graders, hydro seeder, broadcast seeder, straw blower, and disk harrow. Other equipment such as (but not limited to) front-end loaders, track and tire mounted backhoes, and haul trucks may be substituted for or included with this general equipment list. As specific conditions require during implementation of the plan, equipment needs and use must and will remain dynamic. However, a minimum of a D10N (or equivalent), a rubber-tired scraper and a RT dozer will remain available to accomplish reclamation at any given time.

Runoff and erosion control are handled by the Storm Water Pollution Prevention Plan as required by the National Pollutant Discharge Elimination System (NPDES) Storm Water Multi-Sector General Permit for Industrial Activities. Long-term Best Management Practices (BMP) for runoff and erosion control emphasizing site contouring and other low maintenance features are preferred over more maintenance intensive measures. Establishment of native species, as mentioned in the Revegetation Section 4.1.7.3, will be emphasized components of erosion control; non-native species (e.g. annual grasses) may be used in areas where erosion potential may be significant.

4.1.7.2 Revegetation

4.1.7.2.1 Growth Medium

Growth medium is defined herein as all native soil (in-place) material with the physical and chemical properties capable of germinating and sustaining vegetation growth with or without amendments. At the True North Project site, the term "growth medium" is interchangeable with the terms "topsoil" and "overburden". Overburden material, suitable for use as growth medium, is the unconsolidated material, which lies between the topsoil horizon (where present), and bedrock.

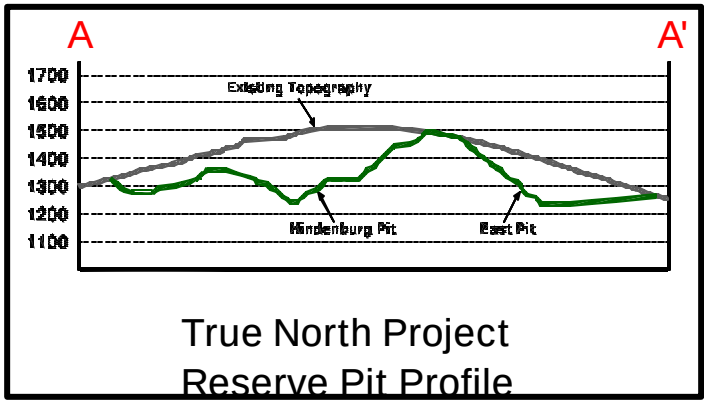
Growth medium (topsoil and overburden) and organic materials (muskeg and woody species)

where feasible will be separated and stockpiled at the True North Project in anticipation of future reclamation. From initial development up to anticipated cessation of mining in 2004, an estimated 796,684 cubic yards of possible growth medium will be available for use in reclamation. This stockpiled amount exceeds the total that would provide a 12-inch cover (783,468 cubic yards) if needed for the total True North Project disturbed areas including the bottom of the pits. Figure 3-1 shows the locations of these stockpiles. Table 2 provides specific volumes available.

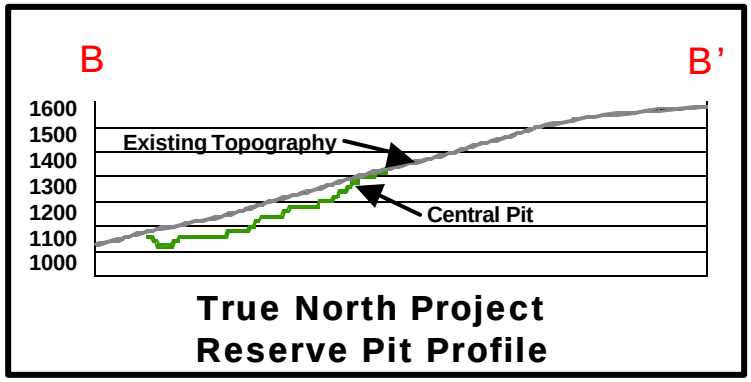
Table 2
Estimated Growth Medium Volumes

Location Name	Volume (cy)
East Pit & Dump Site	70,355
Louis Creek Site	104,925
Spruce Creek Site	386,342
Shop Dump A & B	87,039
North Rock Dump	10,890
Hindenburg, Central, Shepard Zeppelin Pits	137, 133
Total	796,684 cubic yards

Approximately 12 inches of growth medium may be applied generally to those sites requiring additional growth medium to be revegetated or to promote natural re-invasion by native plant species. However, application depth will vary depending upon the facility. If not required to minimize infiltration, development rock dumps that contain mixed overburden and high levels of fines will require less growth medium than rockier dumps to be identified at the first annual meeting. Roads and building sites will require little, if any, growth medium, but each site will be individually evaluated on a site-specific base. Growth medium will be applied by scraper or dump truck and spread by a D10N (or equivalent) Cat.



True North Project
Reserve Pit Profile



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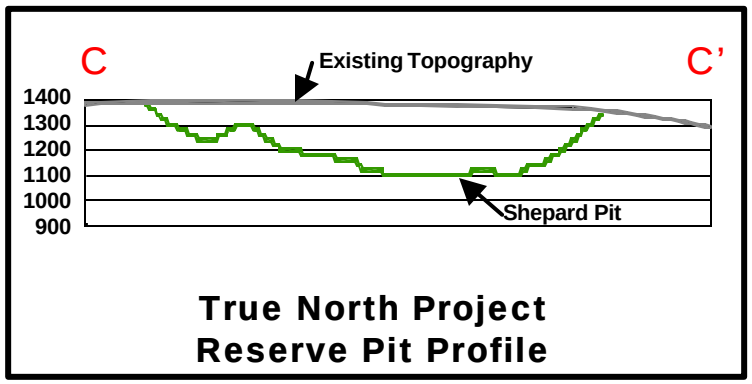

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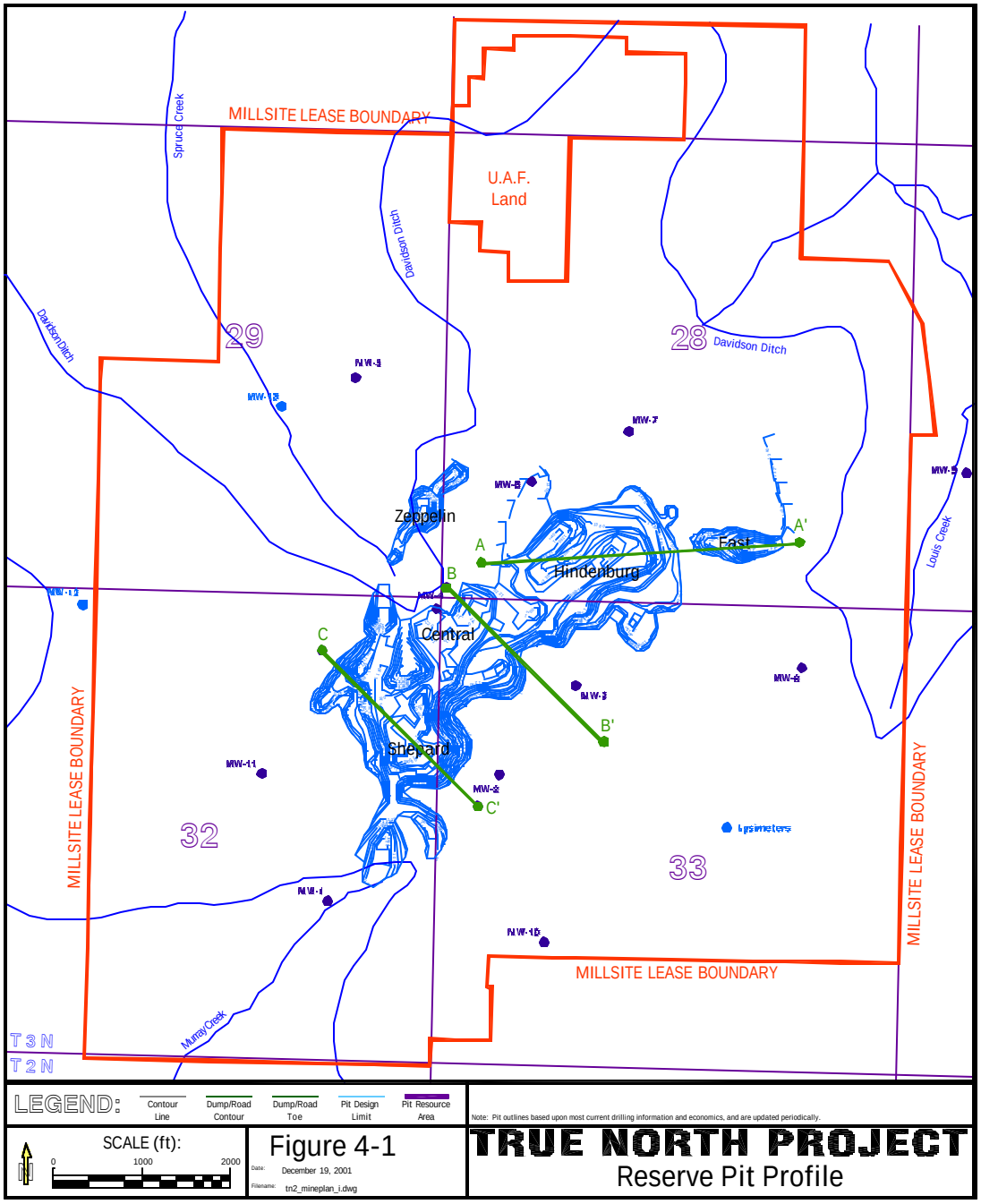
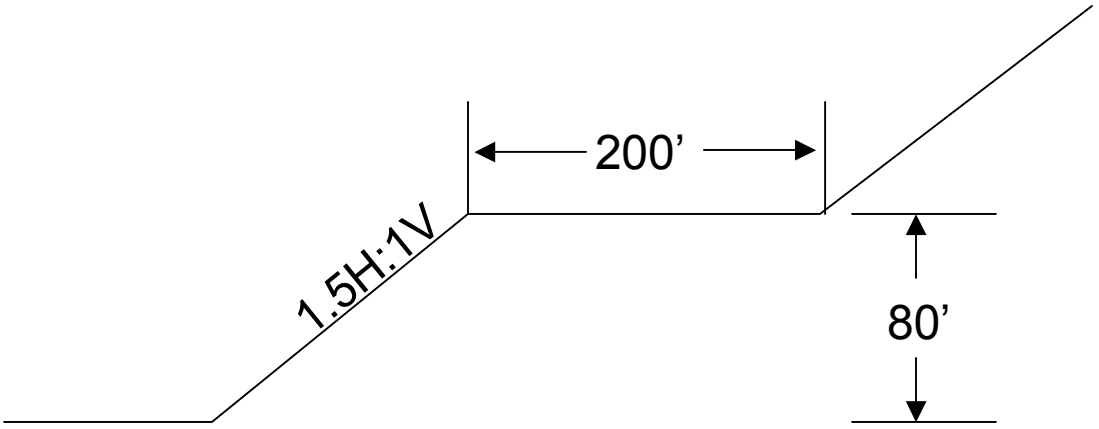
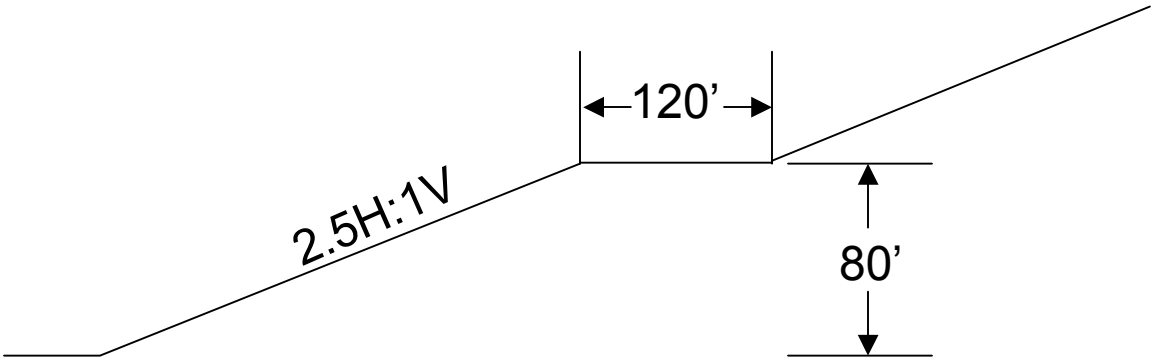
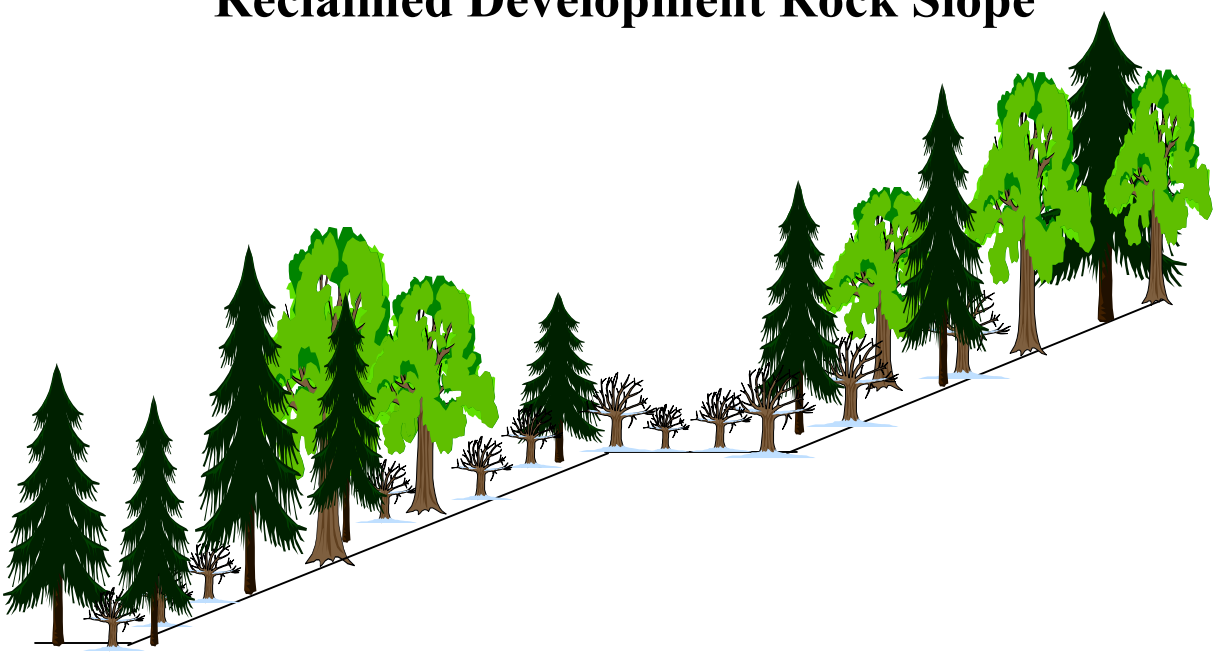




Active Development Rock Slope



Reclaimed Development Rock Slope



Revegetated Development Rock Slope

FAIRBANKS GOLD MINING, INC.	PROJECT TRUE NORTH	TITLE Cross Sectional View of Conceptual Reclaimed Development Rock Dump DATE 12/20/01 FIGURE 4-2

4.1.7.2.2 Seedbed Preparation

Mine and mine related disturbances would result in compacted surfaces unsuitable for revegetation. Thus, preparation of a seedbed suitable for plant germination and growth may be the most critical reclamation task. Growth medium (whether applied or insitu) and the underlying subsurface will be prepared in a manner as to retain moisture and allow adequate root development and penetration.

Using a D10N (or equivalent) Cat with a 2 or 3 shank ripper, the method of primary seedbed preparation at the True North Project will be ripping or scarifying. If necessary, ripping will occur along contours of sloped areas. Highly compacted areas including the equipment lot and mine roads will be ripped in a linear fashion. Following the application of growth medium, areas including the equipment lot and mine roads will be prepared to roughen the surface just prior to seeding. The purpose of roughing the surface is to trap moisture, reduce wind shear, minimize surface erosion by increasing infiltration, and create micro-habitats conducive to seed germination and development.

4.1.7.2.3 Fertilizer and Fertilization

Prepared seedbeds will be fertilized prior to, after, or during (when a hydroseeder is used) the seeding operation. Specific fertilization requirements will be determined in the field if necessary and will be dependent on the quality of growth medium applied. If necessary, growth medium will be tested for standard soil agricultural constituents including nitrogen (N), phosphorus (P), and potassium (K) to determine appropriate application of fertilizer.

The True North Project can produce mixed results. Fertilizer may, indeed, enhance the initial establishment of desirable species. However, because of the low nutrient retention capacity of the waste rock, N and K may be leached from the materials or be tied up in the biomass within several years. Fertilizer may also increase the establishment and growth of undesirable colonizing species and species existing as dormant ruderals in the growth medium. Therefore, application of fertilizer will be managed carefully by FGMI.

Based on results at other locations within Interior Alaska and concurrent reclamation at Fort Knox, the general recommended rate of fertilizer application is 50 to 100 pounds per acre of 20N-20P-10K or comparable blend. Final fertilizer and application rates will be determined from information acquired from concurrent reclamation at the True North Project and from experience gained from concurrent reclamation at Fort Knox. Mine revegetation research and monitoring will be conducted in cooperation with ADNR and ADF&G. Proper documentation of Fort Knox fertilization practices, annual site visits, and annual meetings will be included in assessing the fertilization rates.

4.1.7.2.4 Seed and Seeding

The general grass seed mix that will be used at the True North Project site is listed in Table 3. This mix has been approved by ADNR Plant Materials Center and is the preferred seed mix, but this may vary depending on availability of specific seeds.

Table 3
Seed Mix

ARCTARED RED FESCUE	***Festuca Rubra***	50%
GRUENING ALPINE BLUEGRASS	***Poa Alpina***	20%
TUNDRA GLAUCOUS BLUEGRASS	***Poa Glauca***	20%
NORTRAN TUFTED HAIRGRASS	***Deschampia Caespitosa***	10%

As with any seed mix, a degree of flexibility is necessary. The mix will change over time to include forbs and woody species depending upon such factors as internal and external research results, changes in technology, changes in land management philosophy, and commercial availability. Native species will be the preferred mix, unless information developed by the ADNR-Plant Materials Center and on-site test plots indicate other more desirable species will better meet the post-mining land use criteria. Seeding will be done via drill seeding, broadcast seeding, and limited hydroseeding. The preferred method for the concurrent reclamation at the True North Project will be broadcast seeding. Broadcast seeding will continue to be used on terrain considered too steep or rocky for seed-drill equipment. Hydroseeding may be employed around the edge of the pit and on steep slopes where safety is a primary consideration. The application rate for seeding using the presently proposed grass seed mix will be 11 pounds of pure live seed (PLS) per acre.

4.1.7.2.5 Mulch

Mulches may be necessary to protect the seed and help retain soil moisture during the critical germination process. Numerous types of materials have been used successfully as mulch in revegetation efforts. However, experience has proven that straw or grass hay at a rate of 1-2 tons per acre is cost-effective. Slopes too steep for equipment generally require an application of hydromulch via a hydroseeder at an approximate rate of 1 ton per acre. Commercial hydromulch generally consists of wood fiber byproducts or other forms of cellulose. To date successful concurrent reclamation activities at the Fort Knox Mine have not required the use of mulch. True North Project mulch activities will directly correlate to the Fort Knox results. Therefore, mulching will occur where standard reclamation activities are unsuccessful.

Prior to initial topsoil and overburden stripping for construction of facilities, timber (≥6-inches DBH) will be cut and decked or chipped where feasible and taken to the Shop

Growth Medium Stock Pile. All other woody plant material will be hydro-axed or broken up and incorporated as a soil amendment. Organic material will be windrowed near the areas of disturbance or place at or near the Shop Growth Medium Stock Pile for later use as mulch (Figure 3-1).

If additional organic material such as mulch is necessary, it will be applied following seeding and fertilization with a standard straw (or hay) blower mounted behind a truck or tractor. If necessary the mulch will then be crimped into the seedbed using a cultipacker or shallow-set disk harrow to prevent wind-blow and increase microhabitat for seed germination.

Around the pits and steeper slopes where a hydroseeder may be used, hydromulch will be incorporated into the seed and fertilizer mix for one-time application. The hydromulch will contain a tackifier to help hold the mulch mix in place. Application and location will be discussed with ADNR in the field.

4.1.7.2.6 Revegetation Timing

Seeding will be conducted as soon as possible following seedbed preparation (Section 4.1.7.2.2). Mine revegetation test plot research and experience with concurrent reclamation will be used to determine the most productive planting time. Otherwise seeding will be implemented after spring break-up until mid-July. Such seeding will allow the seed to take advantage of the summer moisture period. However, actual experience has shown that all seedbed preparation on large-scale mine reclamation projects cannot and does not occur at one point in time. Thus, while every effort will be made to conduct the majority of seeding in between spring break-up and mid-July, seeding actually may occur at any time during the year.

4.1.7.2.7 Revegetation Cover Criteria

A vegetative cover criterion of at least 70 percent will be achieved prior to requesting bond release and/or final abandonment of the project site for those areas not specifically exempted from the criterion (i.e. pit walls and special wildlife habitat areas). ADNR may determine that specific landforms, such as cut banks along roads, are stable, have minimal potential for erosion, and the specific area is consistent with the post mining land use for the mine site. Reclaimed areas will meet the aforementioned criteria prior to FGMI requesting bond release.

As an interim action level criteria to insure a viable approach to the establishment of a vegetative cover FGMI will, upon completion of seedbed preparation, revegetate areas by seeding and/or by natural recolonization. After three years at least 30 percent vegetative cover should be established as an indicator that the insitu growth media is viable. Percent live foliar cover can be determined by several methods described in the U.S. Fish & Wildlife publications *Estimating Wildlife Habitat Variables* (see Appendix C). Other more suitable methods to determine percent cover may become available and will be used upon approval from ADNR.

The reclamation standard of at least 30 percent vegetative cover over a three-year period is an action level criterion, which will indicate to FGMI that additional reclamation action must be taken to assure a viable vegetative cover is established and natural succession of plant species will continue. Additional action will include reseeding the area, fertilization, and/or incorporation of additional growth medium on the site. FGMI will be responsible for determining the cause and solution to the substandard revegetation cover. Further specifics for the control of sedimentation, determining vegetative cover and remedial action are discussed in Sections 4.2.6.

4.1.7.2.8 Public Access

Public access to the True North Project site will be restricted within the Millsite Lease area until final closure and bond release. As with any similar mining operation, pits have potentially unstable crests and steep walls, which will place limits on safe foot accessibility. Therefore, the partially reclaimed mine road entry points are proposed as the primary access points to the Hindenburg pit even though all pit walls are to be left in a stable condition.

4.2 Area Specific Reclamation

Successful reclamation of the True North Project will require specific reclamation of seven (7) elements and the implementation of the True North Project Reclamation Plan. These elements include roads of various types and uses, the open pit, development rock dumps, ore stockpile, building and equipment sites, miscellaneous, and well closure.

Discussion of specific reclamation procedures and techniques in the following sections are correlated to Section 4.1.6 General Reclamation Procedures. To minimize redundancy, the reviewer should refer to that section regarding procedural specifics.

4.2.1 Action Plan for Reclamation of Mining Roads within Millsite Lease

Four types of mine-related roads will be found at True North: haul roads, utility roads, access roads, and exploration roads. Although these roads differ somewhat in width and construction, reclamation essentially will be the same for all. At the end of the proposed mine life, approximately 275 acres of roads will be present. These roads will require specific evaluation by FGMI and the State to determine which roads should be reclaimed and which roads should be maintained for long-term monitoring and public access to the site.

These roads will be individually analyzed by the State and FGMI to determine which will be reclaimed dependent on post mining land use and site access requirements. Reclamation procedures will be similar for all types of roads that are to be reclaimed. Culverts will be removed; natural drainage areas restored or stabilized and roadbeds will be graded where necessary to provide adequate drainage. Following grading, roadbeds will be

scarified/ripped depending upon the degree of compaction and seeded and mulched if needed. Water bars to divert run-on and run-off and control erosion and berms to restrict human access will be incorporated where necessary and as approved by ADNR.

4.2.2 Action Plan for Reclamation of Pits

During active mining, reclamation activity in and around the open pit will be limited to controlling erosion on the mine roads. Upon final mine closure, mine roads in and around the pit will be smoothed of all berms except those necessary for erosion control and safety. Road cuts and fills will be recontoured as much as feasible, and the roadbeds will be ripped and scarified where necessary.

The East pit will be backfilled with a 2 million ton development rock dump placed directly over the pit site.

The Hindenburg, Central, Shepard, and Zeppelin pits will encompass approximately 352 acres in final configuration. The preferred option is backfilling the pit to allow free drainage to prevent formation of a lake. If a pit lake were to occur, FGMI will provide predictions and supporting data concerning long-term pit water quality, and potential outflow from the pit lake.

Maximization of pit backfilling is the goal; however the amount of backfilling done at a given site will be determined using the following three-step approach:

1. Completing backfilling to a surface configuration that will achieve the designated post-mining land use and to the extent possible conform to the surrounding landscape is the preferred option.

2. Sequence of mining activities and mine plans will be conducted in such a manner that potential backfill options are maximized.

3. The actual amount of backfill that occurs at a site will be based on the potential to adversely impact water quality, post-mining land use, and economics.

Within the pit, seedbeds will be prepared on selected benches and flat areas. Necessity, logistics, and safety will dictate growth medium placement and seeding. All pit highwalls will be stabilized where practicable based on FGMI engineering recommendations. Stable highwalls, which are suitable for raptor nesting will be left in place. However, the main goal is to maximize reduction of pit highwall to stable slopes that may provide for greater options for long term designated post-mining land use and enhance safety at the site following mining. The amount of highwall reduction at a given site will be determined using the following four-step approach:

1. Reduce highwalls through placement of development rock along the face or through

blasting of the face to produce angle of repose slopes that will achieve the designated post-mining land use and to the extent possible conform to the surrounding landscape.

2. Sequence of mining activities and mine plans will be conducted in such a manner that potential highwall reduction options are maximized (e.g. backfilling).

3. Options for restricting access to remaining pit highwall areas include berms and fencing; the preferred option for limiting human access and limiting safety concerns will be one that minimizes long-term maintenance.

4. Mechanisms shall be established to provide for long-term maintenance of pit wall safety structures.

Specific Criteria:

1) The pit slopes will be left in a stable condition by the completion of active reclamation work (Phase I).

2) Upon cessation of mining, safety berms will be constructed and warning signs posted along steep or developing stable slopes and areas with limited access in and about the pit.

3) Flat benches will be overlaid with topsoil or suitable growth medium and revegetated to the best extent practicable.

4) Design of mine roads to the pit for recreational use and safe access areas (entry and egress) for terrestrial wildlife will be coordinated with the ADNR and ADF&G.

4.2.3 Action Plan for Reclamation of Development Rock Dumps

Upon cessation of mining at the True North Project development rock dumps containing approximately 8 million tons of overburden and development rock will require reclamation. Since termination of mining will likewise eliminate the need for these facilities, final reclamation will be initiated immediately after mining ceases. Alternative habitat options will be considered throughout concurrent and final reclamation but shall require the approval of ADNR and ADF&G.

Reclamation of the development rock dumps will require a large amount of grading and contouring. Dumps will be constructed by end dumping. Thus, slopes generally will be at angle-of-repose. Those dumps that initially are overburden stockpiles will have one or more lifts. Where lifts are terraced, lift slopes will be angle-of-repose but overall dump slopes generally will be shallower.

Grading and sloping of the dumps will entail rounding of the crests and pushing material outward to establish a slope of approximately 2.5H:1V – 3.0H:1V. Since most dump side slopes will be constructed with multiple lifts, each lift will be sloped individually to partially fill the next lower bench. Aesthetically, multiple-lift dumps will have an overall "rolling" appearance (Figure 4-2). The tops of the dumps will be rounded to minimize impoundment of storm waters and snowmelt. Large boulders that are uncovered during grading will be left on the surface to provide topographic diversity and microhabitats for wildlife and vegetation and to break the linear appearance of the final slope.

Following grading and contouring, 12-inches of growth medium will be applied to promote establishment of a vegetative cover and minimize infiltration if required. The development rock dumps at the True North Project will contain variable amounts of finer grained material and/or overburden material, which may require less growth medium than other facilities (see Section 4.1.7.2.1). The fine fraction of dump material will be evaluated for growth medium characteristics. When final grading, contouring, and application of growth medium have been completed, dumps may require ripping along contours. Intervals between contour rips will be based upon best engineering judgment and length of slope. Contour ripping will reduce erosion potential by reducing smooth slope length, increase infiltration, provide micro-habitats for increased moisture retention and seed germination, and help break linear aspects relative to aesthetics. On multiple-lift dumps, the contours around the toe area of each lift will be ripped, if necessary, for the stated reasons as well as to reduce the potential for ponding on the bench areas. Brush berms and/or sedimentation berms, constructed at the toe of each dump, will remain until a vegetative cover is established and the potential for erosion is minimized.

Dumps will be seeded and mulched, (if needed), following physical preparation. Due to the rocky, irregular nature of the final slopes broadcast-seeding methods will be utilized.

The final reclamation goal is to achieve stable and naturally revegetated development rock dumps that do not adversely affect downstream water quality. To accomplish this goal the following approach will be used:

1. Growth medium and organic cover material will be stripped prior to development of rock dumps unless removal of these materials would decrease the stability of the development rock dump.

2. Stripped growth medium materials will be placed along the lateral perimeter of the development rock dump to facilitate reuse of material for placement on the development rock dump where required to achieve revegetation.

3. Diversification of habitats within development rock dumps will be considered.

4. Natural revegetation is preferred.

5. Development Rock Dumps will be covered with approximately 12- inches of topsoil or suitable growth medium, if needed to facilitate revegetation and minimize infiltration.

6. Water (runoff) from development rock dumps and infiltration will be sampled to ensure protection of down gradient surface and ground waters.

7. Concurrent reclamation on rock dumps is difficult to anticipate due to changes in mine plans and the inherent danger of reclamation crews working below active dumpsites. FGMI will concurrently reclaim inactive dumps that will not be re-disturbed and pose no threats to the health and safety of personnel performing the reclamation.

4.2.3.1 Development Rock Potential For Acid Rock Drainage (ARD)

FGMI has evaluated overburden, ore and development rock as to their potential to generate ARD. The Acid/Base Accounting (ABA) analysis for the Hindenburg, East, Central, Shepard, and Zeppelin pits during baseline studies indicated minimal potential for acid generation. 20% of the exploration holes drilled in 1999, 2000, and 2001, plus reviews of geologic logs from past exploration drilling programs since 1992 were used to make this determination. The ABA testing was used to characterize the potential of both ore and waste material to adversely impact either surface or ground water.

Water quality will continue to be monitored quarterly and quarterly ABA characterization of development rock and ore will continue over the life of the operation and at final reclamation. Annual characterization of development rock and disturbed areas shall be evaluated for mine leachate at neutral pH using the Meteoric Water Mobility Procedure (MWMP). Predictions of potential metals available in leachate shall be developed. Assessments of the neutralization potential of surrounding rock will be ongoing. If FGMI becomes aware of acid formation occurring or the potential thereof, this issue will be managed according to Best Management Practices (BMP) specific to ARD. If routine characterization of material indicates a potential for acid rock drainage, then a specific management plan for material handling will be immediately developed by FGMI. This plan will be submitted to ADNR and ADEC for approval, and the reclamation plan modified according to 11 AAC 97.240. The plan will detail the method or methods for segregating sulfides for encapsulation or mixing oxide and sulfides to neutralize acid generating potential. The plan will list specific BMP's to manage storm water run-on and runoff during and after final reclamation.

4.2.4 Action Plan for Reclamation of Building and Equipment Sites

Four main reclamation components for the True North Project buildings and equipment sites are as follows:

1. As facility components of the site are decommissioned, materials, equipment, and buildings will be removed from the True North Project.

2. Non-hazardous and nontoxic solid waste such as lumber and non-salvageable metal scrap will be burned on-site and/or disposed in satellite dumpsters

3. Hazardous and toxic materials such as petroleum products, acids, and solvents will be moved off-site by licensed transporters and either returned to the vendor or disposed at licensed facilities.

4. Equipment and piping not needed for the reclamation and monitoring process will be utilized at another mining site, sold or salvaged, or disposed in a manner approved by ADNR and other appropriate agencies. Past experience indicates that most equipment will be either utilized at other facilities or sold. Disposition of fencing and power facilities are discussed in Section 4.2.5.

Buildings remaining at the True North Project when the mine ceases production will be portable office buildings, and the maintenance complex. As various site components cease operation, associated buildings will be emptied, dismantled, and removed from the True North Project site for utilization at other operations, sold, or salvaged. If sold or salvaged, it is likely that the purchaser or salvager will do removal. FGMI will continue to be responsible for the facilities until the buildings are removed. Remaining structures (Table 4) on the site and foundations will be reduced to rubble and disposed in a manner approved by the ADNR and ADEC. Disposal alternatives include insitu burial or disposal. FGMI proposes insitu burial of the foundations.

Reclamation of building and equipment sites will follow procedures outlined previously. Sites will be graded lightly for proper drainage, ripped and scarified, seeded, and if necessary mulched. Although it is not likely that growth medium will be needed, each site will be so evaluated following final grading. If growth medium is needed it will be applied at approximately a 6-inch cover layer.

Table 4
List of Buildings at Completion of Mining

Building or Site ID	Foundation Area (sq. ft)	Site Acres
Maintenance Bays 1-3	4,320	0.10
Electrical Building	1,440	0.03
Wash/Aprons	3,000	0.07

4.2.5 Action Plan for Reclamation of Miscellaneous Sites

Aside from building and equipment sites discussed in Section 4.2.4, miscellaneous sites or issues for discussion at the True North Project include well closure and electrical power facilities. All structures will be removed unless otherwise decided with the concurrence of ADNR.

4.2.5.1 Action Plan for Reclamation of Wells and Well Closure

All wells will be plugged and surface casing removed when abandoned (after post-closure monitoring is complete). At the present time eleven-baseline monitoring wells are in place (Figure 4-3 Groundwater Monitor Wells). When mining ceases, additional wells may require abandonment. This issue will be revisited at each annual meeting as additional operating data becomes available and during development of final closure plans. Final closure and monitoring plans will require approval from ADEC and the ADNR.

Well abandonment will be conducted according to ADEC regulations (18 AAC 80.015). FGMI will follow the abandonment procedures including removal and disposal of pumps and piping, removal of the casing where possible or perforation, plugging of the well with an approved sealing material at total depth, removal of the surface casing, minor grading around the well site, and seeding and mulching.

4.2.5.2 Action Plan for Reclamation of Fence Removal

Any fencing established on the True North Project site shall be removed upon closure.

4.2.5.3 Action Plan for Reclamation of Electrical Power Facilities

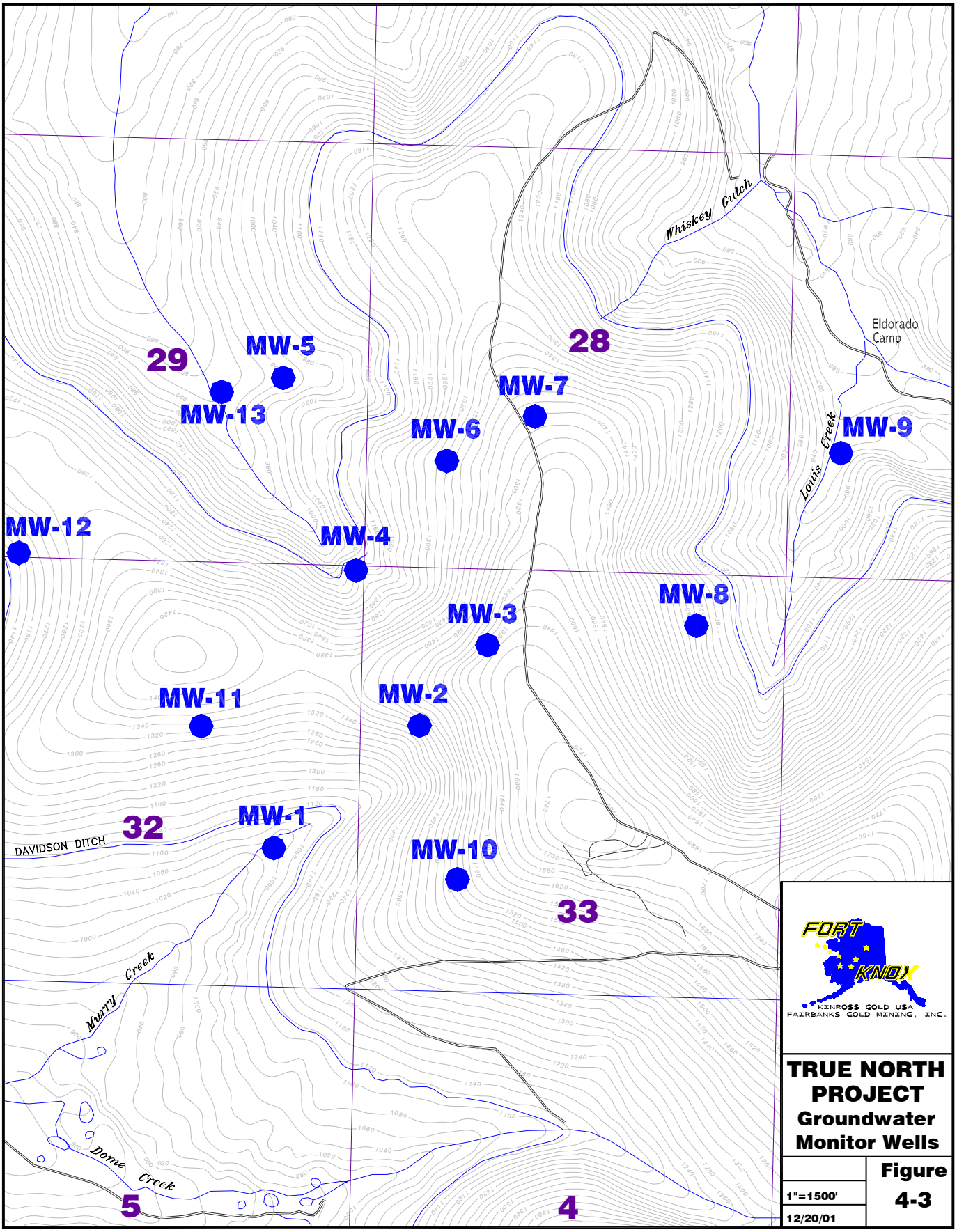
One primary electrical power substation will service the True North Project. When electrical power requirements are no longer necessary, substations and associated facilities will be removed from the site, unless approved otherwise by the ADNR.

4.2.6 Surface Water and Groundwater Protection Plans

Implementation of Best Management Practices (BMP) to control erosion during active mining will be designed to minimize re-disturbance during reclamation and active reclamation. The BMPs will be consistent with those measures and practices identified in EPA's *Storm Water Pollution Prevention for Industrial Activities* and the approved True North Project Storm Water Pollution Prevention Plan. Temporary control devices will be removed when the site-specific threat of erosion has been minimized through earthwork or revegetation.

5.0 APPLICANT STATEMENT OF RESPONSIBILITY

FGMI recognizes its responsibility in the use of public (State) lands and accepts that responsibility in agreeing to reclaim the True North Project site. FGMI will meet the requirements of its reclamation plan and return the site to a safe and stable condition, consistent with the approved post-mining land use. FGMI will meet required local, State, and Federal regulations regarding reclamation of any surface area affected by the mining operation. Reclamation activities and post-reclamation maintenance of remaining structures are FGMI's responsibility. In the event a new operator/land owner assumes control of the True North Project, the new operator or land owner will agree to assume responsibility for the reclamation and maintenance of any affected land and structures that are the subject of this plan or existing permits. The new operator/land owner will request transfer of all applicable State and Federal permits. The new operator/land owner will provide surety acceptable to the U.S. Army Corps of Engineers and with ADNR as allowed by **11 AAC 97.420 (c)** that will cover reclamation of disturbed land.



FORT KNOX
KINROSS GOLD USA
FAIRBANKS GOLD MINING, INC.

TRUE NORTH PROJECT
Groundwater Monitor Wells

1"=1500'

12/20/01

Figure 4-3

6.0 ESTIMATE OF RECLAMATION COSTS AND LONG-TERM POST RECLAMATION MAINTENANCE OBLIGATIONS THROUGH 2003

6.1 Reclamation Cost Estimates and Bond Adjustment

The total estimated costs to reclaim the True North Project site are **$2,238,419.00**. True North end of mine life reclaimed cost estimates, map, and volume of material information are contained in Appendix D. FGMI will reclaim affected land as contemporaneously as practicable.

Under the provisions of 11 AAC 97.320. (a), FGMI will file an annual report that includes the volume of material mined in that year, the total acreage reclaimed in that year, and a statement as to whether the reclamation plan is on schedule.

General assumptions used in constructing the cost estimates are as follows:

- Wage rates are based on the Davis Bacon Wages determination for Alaska. Wage rates include; base salary, fringe, Alaska Workmen's Compensation, FICA, and unemployment.

- Equipment and productivity rates are based upon 29th Edition of the Caterpillar Performance Handbook.

- Estimates for material costs (seed, fertilizer, mulch, and cement) are based on vendor quotes, contractor estimates, and actual experience with concurrent reclamation at Fort Knox and other operations within interior Alaska.

- Fencing and replacement of growth medium costs are all inclusive of labor, equipment, and materials and are based on actual experience and contractor estimates.

- Well abandonment costs are premised on actual cost of cement and all-inclusive cost for labor and equipment based on extensive experience at the Fort Knox Mine, Sleeper Mine, Ryan Lode Mine, and well drilling contractor estimates.

Cost estimates for surety determination assume work being completed by a qualified Alaska contractor.

Since the various facilities such as the pit and development rock dumps, have different reclamation requirements, successful reclamation will be achieved much more rapidly for some facilities than others. Therefore, FGMI will seek incremental surety release on each facility or affected acreage as successful reclamation is completed as required in 11 AAC 97.435.

6.2 Reclamation Plan and Performance Bond Evaluation

This reclamation plan and a performance evaluation will be conducted at the end of the first year of operation during the first annual meeting. Further evaluations will be conducted at each annual meeting during operation and final closure phases of the project.

7.0 ACKNOWLEDGEMENTS

A. It is understood that should the nature of the operation change, a modified or supplemental plan of operations and reclamation may be required.

B. It is understood that approval of this reclamation plan does not constitute:
(1) Certification of ownership to any person named herein; and
(2) Recognition of the validity of any mining claim herein.

C. It is understood that a bond equivalent to the estimated cost of performing the agreed upon reclamation measures will be required before this plan can be approved. Bonding and any bond reduction amounts will be set on a site-specific basis by ADNR in coordination with the cooperating agencies.

D. It is understood that any information provided with this plan or provided in the future, that is marked “Confidential” will be treated by the agency in accordance with that agency's laws, rules, and regulations.

E. FGMI will conduct an Environmental Closure Audit to determine if any previously unknown environmental liabilities exist as a direct or indirect result of the proposed True North Project.

Fairbanks Gold Mining, Inc. has reviewed and agrees to comply with all conditions in the reclamation plan. Fairbanks Gold Mining, Inc. understands that the bond will not be released until ADNR gives written approval of the reclamation work.

FAIRBANKS GOLD MINING, INC.

By: _____

Title: _____

Signature: _____

Date: _____

REFERENCES

ABR, Inc.-Environmental Research & Services (1998). Reconnaissance Evaluation of threatened and Endangered Species in the True North Joint Venture Project Area, 1998. Fairbanks, AK.

ABR, Inc.-Environmental Research & Services (1997). Wetlands Survey of the True North Joint Venture Project Area, 1997. Fairbanks, AK.

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Golder Association Inc. (2000). True North project Waste Dump Site Investigation and Stability Evaluations. Anchorage, AK.

Hill, J.M. (1933). Lode Deposits of the Fairbanks District, Alaska. USGS Bulletin 849-B. U.S. Government Printing Office, Washington, D.C., 163 pp.

Joesting, H.R. (1942). Antimony and Tungsten Deposits in Fairbanks and Adjacent Areas, MR-194-11.

Parker, G.A. (1929). The evolution of Placer Mining Methods in Alaska. B.S. Thesis, Geology and Mining, Alaska Agricultural College and School of Mines, College, Alaska, 64 pp.

APPENDIX A

KINROSS GOLD CORPORATION
ENVIRONMENTAL POLICY

KINROSS GOLD CORPORATION
ENVIRONMENTAL POLICY

OBJECTIVE

Kinross Gold Corporation recognizes that maintenance of environmental quality is vital to the Company's existence**,** progress, and continued development. The Company will maintain high environmental standards limited only by technical and economic feasibility. The Company will take positive action to protect the safety of its workers, conserve natural resources, and minimize the impact of its activities on the environment through diligent application of appropriate technology and responsible conduct at all stages of exploration, mine development, mining, mineral processing, decommissioning, and reclamation.

The purpose of Kinross Gold Corporation's Environmental Policy is to provide a measurable framework for the performance of the Company's activities in an environmentally responsible manner, ensuring compliance by the Company and its employees with all applicable environmental regulations and commitments.

IMPLEMENTATION

Kinross Gold Corporation will:

Evaluate, plan, construct, and operate all projects and facilities to reduce adverse environmental impacts and to meet or exceed applicable environmental laws, regulations, and standards. In the absence of applicable regulations, the Company will apply cost effective best management practices to protect the environment.

Require managers of all projects and operations to adhere to the Company Environmental Policy and to identify, evaluate, and minimize risks to the environment.

Continuously review environmental achievements and technology to seek and implement methods for further improvement.

Require all operations to have site-specific emergency response plans, which meet or exceed all applicable regulations.

Conduct regular audits of environmental performance and emergency response plans to verify compliance with the Company's policy and applicable regulations. Identify revisions or improvements to current practices in order to minimize environmental impacts. Report findings quarterly to the Board of Directors.

Educate employees in environmental matters and responsibilities relating to performance of their assigned tasks. Entrust all employees to maintain necessary environmental performance for their activities.

Foster communication with shareholders, the public, employees, and government to enhance understanding of environmental issues affecting the Company's activities.

Work pro-actively with government and the public to define environmental priorities. Participate in the development of responsible laws for the protection of the environment.

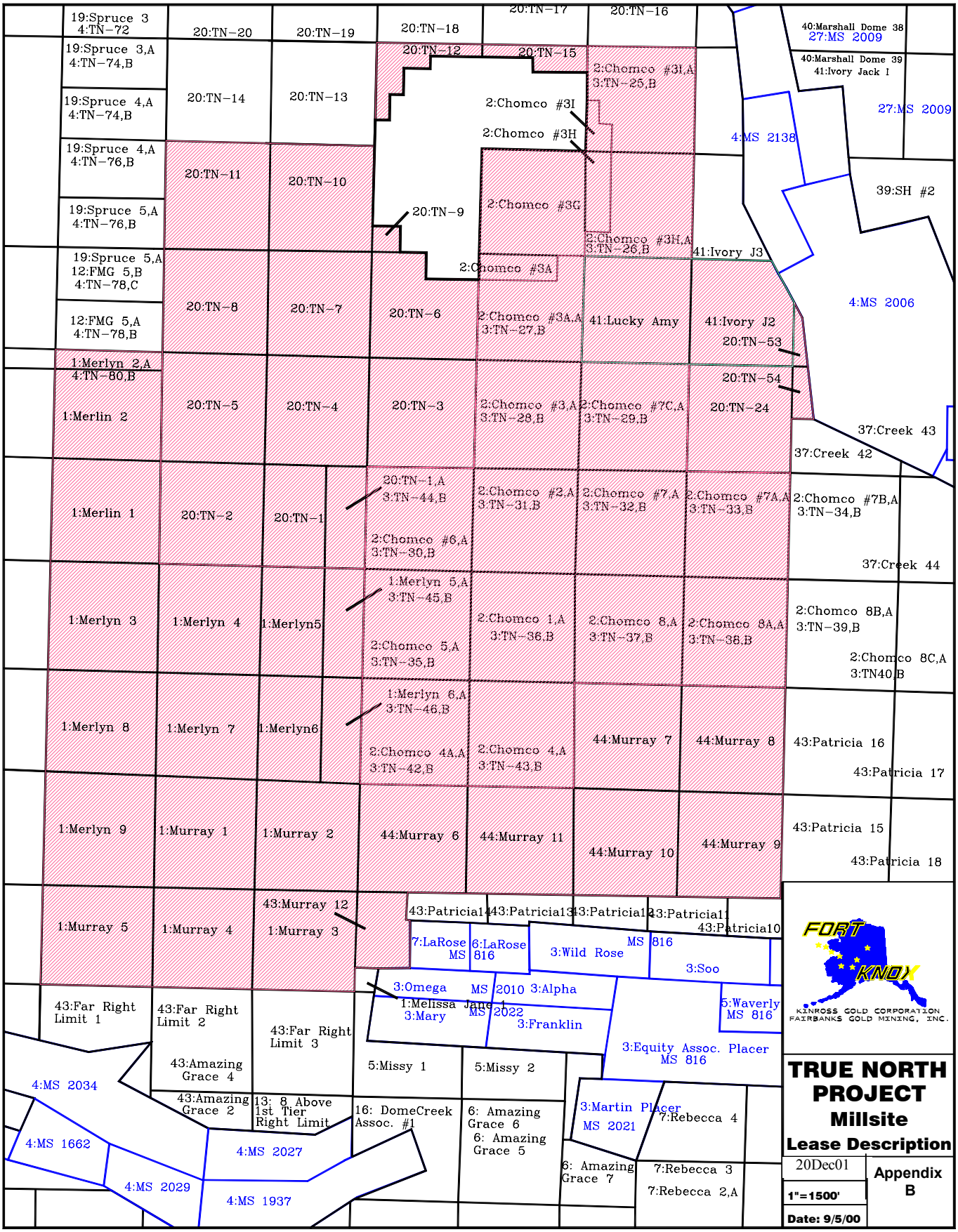
Allocate sufficient resources to meet the Company's environmental goals. Annually assess the projected costs of decommissioning and reclamation while funding "off balance sheet" an appropriate amount to ensure that there are sufficient cash reserves to pay for these costs upon closure.

Robert M. Buchan
Chairman and CEO

Ned Goodman
Chairman, Environmental Committee
Kinross Board of Directors

APPENDIX B

TRUE NORTH PROJECT
MILLSITE LEASE MAP
&
MILLSITE LEASE LOCATION DESCRIPTION


19:Spruce 3
4:TN-72
20:TN-20
20:TN-19
20:TN-18
20:TN-17
20:TN-16
40:Marshall Dome 38
27:MS 2009
19:Spruce 3,A
4:TN-74,B
20:TN-12
20:TN-15
2:Chomco #3I,A
3:TN-25,B
40:Marshall Dome 39
41:Ivory Jack 1
19:Spruce 4,A
4:TN-74,B
20:TN-14
20:TN-13
2:Chomco #3I
2:Chomco #3H
27:MS 2009
4:MS 2138
19:Spruce 4,A
4:TN-76,B
20:TN-11
20:TN-10
39:SH #2
19:Spruce 5,A
4:TN-76,B
20:TN-9
2:Chomco #3G
2:Chomco #3H,A
3:TN-26,B
41:Ivory J3
19:Spruce 5,A
12:FMG 5,B
4:TN-78,C
2:Chomco #3A
20:TN-8
20:TN-7
20:TN-6
4:MS 2006
12:FMG 5,A
4:TN-78,B
2:Chomco #3A,A
3:TN-27,B
41:Lucky Amy
41:Ivory J2
20:TN-53
1:Merlyn 2,A
4:TN-80,B
20:TN-54
1:Merlin 2
20:TN-5
20:TN-4
20:TN-3
2:Chomco #3,A
3:TN-28,B
2:Chomco #7C,A
3:TN-29,B
20:TN-24
37:Creek 43
37:Creek 42
1:Merlin 1
20:TN-2
20:TN-1
20:TN-1,A
3:TN-44,B
2:Chomco #2,A
3:TN-31,B
2:Chomco #7,A
3:TN-32,B
2:Chomco #7A,A
3:TN-33,B
2:Chomco #7B,A
3:TN-34,B
2:Chomco #6,A
3:TN-30,B
37:Creek 44
1:Merlyn 3
1:Merlyn 4
1:Merlyn5
1:Merlyn 5,A
3:TN-45,B
2:Chomco 1,A
3:TN-36,B
2:Chomco 8,A
3:TN-37,B
2:Chomco 8A,A
3:TN-38,B
2:Chomco 8B,A
3:TN-39,B
2:Chomco 5,A
3:TN-35,B
2:Chomco 8C,A
3:TN40,B
1:Merlyn 8
1:Merlyn 7
1:Merlyn6
1:Merlyn 6,A
3:TN-46,B
44:Murray 7
44:Murray 8
43:Patricia 16
2:Chomco 4A,A
3:TN-42,B
2:Chomco 4,A
3:TN-43,B
43:Patricia 17
1:Merlyn 9
1:Murray 1
1:Murray 2
44:Murray 6
44:Murray 11
44:Murray 10
44:Murray 9
43:Patricia 15
43:Patricia 18
1:Murray 5
1:Murray 4
43:Murray 12
1:Murray 3
43:Patricia14
43:Patricia13
43:Patricia12
43:Patricia11
43:Patricia10
7:LaRose
MS
6:LaRose
816
3:Wild Rose
MS
816
3:Soo
3:Omega
MS
2010
3:Alpha
1:Melissa Jane 1
3:Mary
MS
2022
3:Franklin
5:Waverly
MS 816
3:Equity Assoc. Placer
MS 816
43:Far Right
Limit 1
43:Far Right
Limit 2
43:Far Right
Limit 3
43:Amazing
Grace 4
5:Missy 1
5:Missy 2
4:MS 2034
43:Amazing
Grace 2
13: 8 Above
1st Tier
Right Limit
16: DomeCreek
Assoc. #1
6: Amazing
Grace 6
6: Amazing
Grace 5
3:Martin Placer
MS 2021
7:Rebecca 4
4:MS 1662
4:MS 2027
6: Amazing
Grace 7
7:Rebecca 3
4:MS 2029
7:Rebecca 2,A
4:MS 1937
FORT KNOX
KINROSS GOLD CORPORATION
FAIRBANKS GOLD MINING, INC.
TRUE NORTH
PROJECT
Millsite
Lease Description
20Dec01
1"=1500'
Date: 9/5/00
Appendix
B

TRUE NORTH PROJECT LOCATION AND MILLSITE LEASE DESCRIPTIONS

The True North Project is within the Chatanika River watershed located on the northwest flank of Pedro Dome, approximately 25-miles northeast of Fairbanks. The ridgelines drain into Murray Creek, a tributary of Dome Creek to the south; and Louis Creek, Whiskey Gulch, and Spruce Creek, tributaries of Little Eldorado Creek drain to the north. More specifically, the Millsite Lease is located in portions of Section 21, 27, 28, 29, 32 & 33, Township 3N, Range 1E, Fairbanks Meridian.

APPENDIX C

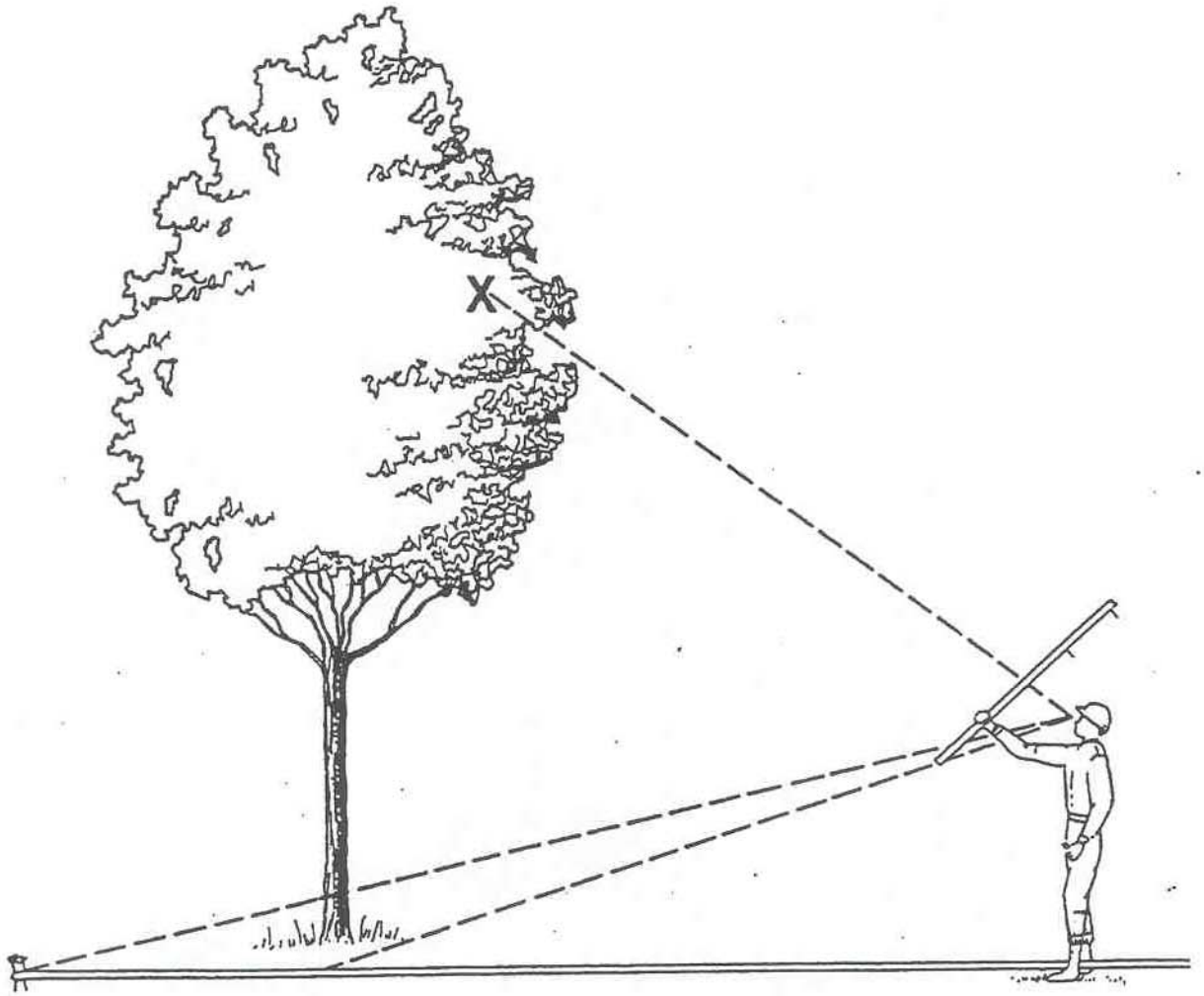
U.S. FISH & WILDLIFE SERVICE

ESTIMATING WILDLIFE HABITAT VARIABLES

Biological Services Program

FWS/OBS-81/47
September 1981

ESTIMATING WILDLIFE HABITAT VARIABLES



Fish and Wildlife Service

U.S. Department of the Interior

FWS/OBS-81/47
September 1981

ESTIMATING WILDLIFE HABITAT VARIABLES

by

Robert L. Hays
Western Energy and Land Use Team
U.S. Fish and Wildlife Service
Fort Collins, Colorado 80526

and

Cliff Summers and William Seitz
Colorado Cooperative Wildlife Research Unit
Colorado State University
Fort Collins, Colorado 80523

Western Energy and Land Use Team
Office of Biological Services
Fish and Wildlife Service
U.S. Department of the Interior
Washington, D.C. 20240

Use: In forestry to calculate total volume of harvestable wood on the site.

Suggested techniques: Line Intercept (p. 40); Bitterlich Method (p. 43); Calculated Cover (p. 50); Point Intercept - Step Point (p. 50); Point Intercept - Pin Frame (p. 52). See Table 3 for a comparison of these techniques' suitability under various study conditions.

2.3.3 Canopy Cover (and Brushpile Cover and Bare Ground)

The projection used in the definition of cover (section 2.3.1, above), is the general outline of plants, ignoring minor gaps between branches and holes in the center of the plant. This is typically used for single strata (layers) in the vegetation. It is hard to define the general outlines when plants have overlapping branches. Hence, it is used most when plants do not overlap much. It is also called "crown closure." Brushpiles can be treated with this concept. Bare ground is sometimes calculated by subtracting absolute cover values for all the plants in the community from 100%. Under this approach, litter is often treated as "bare ground", and patches of bare soil underneath trees and shrubs are not counted as "bare ground" (see also Foliar Cover, section 2.3.4). Canopy cover is used in forestry to calculate total volume of wood on a site from aerial photos, and in wildlife management as an indication of the amount of vegetation in various strata (and, hence, to indicate the availability of food and cover).

Suggested techniques: Line Intercept (p. 40); Bitterlich Method (p. 43); Calculated Cover (p. 50); Point Intercept - Step Point (p. 50); Point Intercept - Pin Frame (p. 52); Point Intercept - Spherical Densiometer (p.)55; Point Intercept - Canopy Camera (p. 56); Ocular Estimation of Cover (p. 58); and RS: Crown Density Scale; Bitterlich Method; Ocular Estimation of cover. See Table 4 for a comparison of these techniques' suitability under various study conditions.

2.3.4 Foliar Cover (and Litter Cover and Bare Ground)

The projection used in the definition of cover (section 2.3.1, above) is for each separate plant part. Thus, gaps between leaves or branches do not contribute to the measured cover. As usually applied, "foliar" also includes stems, flowers, and all other plant parts. Litter on the ground, e.g., dead leaves and branches, is usually treated with this concept. What constitutes "litter" must be clearly defined, because there is a continuum between freshly fallen plant parts and highly decomposed material whose source can no longer be recognized. Bare ground is sometimes measured directly in terms of this concept. However, bare ground is also sometimes measured wherever there are no plant parts or litter close to (above) the surface, even though taller plant parts (e.g., a tree's branches are present above the point) (see also Canopy Cover, section 2.3.3). Foliar and litter cover are used in forestry and range management to predict erosion rates; foliar cover is used in ecology to predict primary production.

Suggested techniques: Point Intercept - Step Point (p. 50); Point Intercept - Pin Frame (p. 52); Point Intercept - Spherical Densiometer (p. 55); Point Intercept - Canopy Camera (p. 56); Ocular Estimation of Cover (p. 58).

3.14 CALCULATED COVER

3.14.1 Variable Estimated

Canopy or Basal Cover of trees or shrubs(pp. 5, 7).

3.14.2 Description

In summary, the results of a measurement of density and of mean canopy area or basal area for the same site are used to calculate cover.

If data are available on density (Techniques 3.20 or 3.21) and mean canopy or basal area for plants (Techniques 3.1 and 3.23) on the same site, these estimates can be combined to estimate cover. The following formula applies:

$$C = 100\ AD$$

where C = cover (%)
A = mean area per plant (area)
D = density of plants (number per unit area, where the area units are the same as area for A, above)

3.14.3 Accuracy

The accuracy of the calculated cover is a function of the accuracies of the constituent measurements of density and mean area . For basal area of trees, it is usually medium to low in accuracy. For canopy cover, it tends to have low accuracy, due to deviations of canopy shape from circular.

3.14.4 Application Notes

This technique is most appropriate where the separate measures of density and canopy or basal area are required for other purposes. A convenient sampling approach is to combine T-square Nearest Neighbor Sampling (p. 62) for density with Crown Diameter (p. 15) or Diameter Tape (p. 18) and Averaging (p. 69). Each plant measured for the T-square sampling can also be used for area measurement. If the average area per plant is not required, it is usually preferable to measure cover with the Line Intercept (p. 40), Bitterlich Method (p. 43), Point Intercept-Spherical Densiometer (p. 55), or RS: Crown Density Scale at the same time density is being measured. One convenient way to do this is by combining a Line Intercept (p. 40) for measuring cover with a belt Quadrat (p. 65) for measuring density. The line transect forms one side of the belt quadrat.

3.15 POINT INTERCEPT-STEP POINT

3.15.1 Variables Estimated

Canopy cover of herbs, shrubs or trees, basal cover of herbs, foliar cover of low herbs, litter cover, or bare ground (pp. 5, 7).

3.15.2 Description

In summary, data are collected by recording what is present at (or directly above) the toe of a boot as one walks a line transect.

A V-shaped notch is cut in the sole at the toe of one boot of the person that makes the measurements (see Equipment section, below). Within the site, one or more line transects are laid out (see Appendix A). The observer walks along the transect and records a sample point each time the notched boot is placed on the ground. It is essential to walk straight and maintain a constant step length irrespective of barriers, briar patches, change in slope, and other factors. For each sample point, the observer records the item which occupies the line of sight for the majority of the notch. The observer must take care to exclude litter and vegetation which is pushed out of its undisturbed position. It is often desirable to record separately for each point the data for herbs, shrubs less than eye height, and taller trees and shrubs. The taller plants can be sampled by visual estimation of the location of a vertical line above the notch, or using the Vertical Rod (p. 39), which is more accurate.

General calculations are as follows for each category (X) recorded (e.g., plant species):

$$\% \text{ ground cover} = \frac{\text{no. hits on X}}{\text{total no. sample points}} \times 100$$

This method has been modified by the addition of a pointed pin or rod (R. Francis, pers. comm.). The toe of the boot is lifted upward, and the pin or rod can be slid through the notch and used to select the sample point.

3.15.3 Accuracy

This technique is rather crude. Errors in pacing the transect invariably occur, usually resulting in underestimation of shrubs and other obstacles. In addition, it is often hard to eliminate errors caused by moving vegetation out of its original position. The pointed rod may alleviate some of this bias (R. Francis, pers. comm.). Estimation of taller vegetation (e.g., trees) by line of sight is even less accurate than the results for low grasses and forbs, but using the Vertical Rod (p. 39) will give results whose accuracy is comparable to those for herbs. Error can also result from the uniform spacing of points. This can be minimized by using several short transects, rather than one or two long ones.

3.15.4 Application Notes

This technique permits collection of many data points quickly. This is an advantage if the site is relatively heterogeneous. One person can easily apply this alone. It is best in grasslands, savannas, and open forests on even terrain. If conditions make it difficult to walk in a straight line, or if accuracy is needed, an alternative technique should be used such as: Line Intercept (p. 40); Bitterlich Method (p. 43); Point Intercept-Pin Frame (p. 52), Spherical Densiometer (p. 55), or Canopy Camera (p. 56); or RS: Crown Density Scale.

3.15.5 Training

This technique can be learned in less than 1 hr. A 1/2 hr practice session in the field is usually adequate (J. Hagihara, pers. comm.). Complex communities may require 4 hr of practice (R. Francis, pers. comm.).

3.15.6 Equipment

Pointed rod (option). One notched boot (The notch should be in the tip of the toe, 0.3 cm (1/8 in) wide and 0.15 cm (1/16 in) deep.

3.15.7 Cost

One-half to 1 hr per 200 m transect.

3.15.8 References

USDA Forest Service 1970.

3.16 POINT INTERCEPT-PIN FRAME

3.16.1 Variables Estimated

Basal, canopy, or foliar cover of low shrubs and herbs (pp. 5, 7).

3.16.2 Description

In summary, a frame is repeatedly set up in the site. The frame is used to identify specific points on the ground. Each point is scored for what is present.

A random point is selected within the site (see Appendix A). This point locates one end of the frame. Next, a random direction is selected (see Appendix A) to determine the location of the other end of the frame. The frame is erected by pushing the points into the ground or by using the support rod (see equipment section below).

A sample point is determined either by sighting through the frame's crosshairs, or by lowering a pin until its tip first contacts a plant or the ground (Fig. 14). What is contacted is recorded for each point. For basal cover, it may be necessary to look beneath the first contact (or extend the pin) until it is clear what is contacted at the specified height for measurement. For canopy cover, it must be decided whether or not the point lies within a plant canopy's projection. After reading all the points in the frame, a new location is selected and the process is repeated.

Cover is calculated by:

$$\text{Cover of X (\%)} = \frac{\text{Number of hits on X}}{\text{Total number of points}} \quad (100)$$

APPENDIX D

RECLAMATION COST ESTIMATE & DRAWING

True North End of Mine Life Estimated Reclamation Cost

		Manpower ($)	Equipment ($)	Materials ($)
1	**Roads**	$43,021	$99,208	$32,009
2	**Open Pit**	$6,707	$14,414	$5,684
3	**Rock Dumps**	$202,618	$789,999	$46,084
4	**Ore/Growth Medium Stockpile**	$4,097	$9,342	$2,297
5	**Buildings***	$6,933	$19,863	$34
6	**Groundwater Wells ($3.49 /foot))**	$7,382	$3,575	$1,656
7	**Maintenace Complex/Blasting Supplies Area**	$4,058	$909	$1,596
8	**Pit Backfill**	$26,594	$104,048	$1,413
9	**Monitoring^**			
10	**Supervisor Supervision**	$44,677	$0	$0
	SUBTOTAL			

Mobilization/Demobilization **5% of contract cost**

Profit **10% of contract cost**

Sub Total

Contract Administration **5% of contract cost**
Contingency **5% of contract cost**

$ Cost/Acre by Area							
ROADS	OPEN PIT**	ROCK DUMPS***	ORE/GROWTH MEDIUM STOCKPILE	BLDGS	MAINT/BLASTING	PIT BACKFILL	MONITORING (lump su
$587	$509	$2,121	$739	$161,969	$1,291	$10,081	$266,284
Total Acres per Area							
296.80	52.70	427.30	21.30	0.32	14.80	13.1	

* Building total cost includes extra $25,000 for building demolition in case buiding salvage isn't possible.
** Acreage total reflects reclaimed area along pit(s) perimeter not entire pit(s) disturbance area.
*** Average cost per/acre for all rock dumps.
^ Monitoring rates reflect 1.5 % annual increase for inflation.

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: BASE CASE ASSUMPTIONS (numerical)

Items	Deliver $$/lb.	Applied lb./Acre	Unit Cost/ft.	Operator Wages	Equip. Cost/Hour
Fertilizer	$0.38	100	(fertilizer = 10*20*10 local vender)		
Seed	$6.35	11	(seed mix 50% Arcta Red,20% Tundra Bluegrass,20% Alpine Bluegrass, 10% Hairgrass)		
3/8" Hole Plug(bentonite)	$10.15	per 50 lbs			
Benseal(bentonite)	$11.35	per 50 lbs			
EZ-MUD	$84.50	per 5 gallons			

	Base Rate	Fringes	FICA 7.65%	SIIS 9.31%	Unemployment 1.3%	Wage Rate	
Laborer	$21.55	$7.08	$2.19	$2.67	$0.37	$33.86	(Davis-Bacon Wage Rate
Truck Driver	$25.91	$8.06	$2.60	$3.16	$0.44	$40.17	(Davis-Bacon Wage Rate
Heavy Equipment Operator	$25.91	$8.06	$2.60	$3.16	$0.44	$40.17	(Davis-Bacon Wage Rate
Dozer Operator	$25.91	$8.06	$2.60	$3.16	$0.44	$40.17	(Davis-Bacon Wage Rate
Foreman	$27.45	$8.06	$2.72	$3.31	$0.46	$41.99	(Davis-Bacon Wage Rate

Monitoring Equipment	Rate $/day
Dissolved oxygen meter	$35.00
Ph meter	$30.00
Conductivity meter	$35.00
4WD pickup	$60.00
Water sounder meter	$45.00

	NC Lease Rate	FGMI Operation Rate	Equip. Rate (rounded to nearest $)	
777D Dump Truck*	$116.25	$62.74	179.00	
992G*	$142.00	$105.65	248.00	
D10R Cat *	105	$60.90	166.00	
Motor Grader 163H*	37.5	$40.49	78.00	Major equipment rates based on
Broad Spreader-Challenger 35 Tractor*	13.13	$40.49	54.00	NC lease rates and FGMI operation rates.
Water Truck 20,000 Gal 651E*	37.5	$22.60	60.00	
Scraper 657E*	131.25	$105.65	237.00	
375 Excavator*	84.37	$85.30	170.00	
Hydraulic Hammer Model H180 (cost per month 8,000 @ 200hrs)			$40.00	

* All CAT equipment rates are based on monthly lease rates with avg 400 hrs per month operation.
_Foreman rates approx. 1.06 x base operator rates.

Foreman Wage Rates	Hours	Foreman** Labor Cost
$41.99	1064	$44,677.36

** Note: foreman labor cost for the entire project was assumed to equal to the total hours for support equipment in each task area.
A total of 1064 hours was calculated for support equipment.

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: ROADS

ACRES

Type	Road Length	Road Width	Road Surface Acres	Road Fill/toe Acres	
Mine Site Roads*	46,082	100	105.8	0	
Fill/toe areas			0.0	191	Total Acres
			105.8	191.0	296.8

*Mine site road totals are approximate at the end of mine life.
Total footage includes all rock dump and mine access roads outside the open pit.

LABOR HOURS AND COST ROAD SURFACE

Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
D10R Spread Topsoil	1.02	108	$40.17	$4,338
D10R Scarify	0.75	79	$40.17	$3,173
Seed/Fert.	1	106	$40.17	$4,258
Grader 163H	1.77	187	$40.17	$7,512
20,000 Water/651E	1.77	187	$40.17	$7,512
375 Excavator	0.65	69	$40.17	$2,772
Total Hrs	6.95	735	**Total**	**$29,565**

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST ROAD SURFACE

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	Equip. $$/Hour 375		**Equip. Costs**
D10R Spread Topsoil**	1.02	108	$166						$17,928
D10R Scarify	0.75	79	$166						$13,114
Seed/Fert.	1	106		$54					$5,724
Grader 163H	1.77	187			$78				$14,586
20,000 Water/651E	1.77	187				$60			$11,220
375 Excavator	0.65	69					$170		$11,730
Total Hrs	6.96	736						**Total**	**$74,302**

** Dozer time is for pushing road side crests down @ 0.6 yd3/LF or 296 yd3/Ac use production rate for pushing 12" topsoil.

LABOR HOURS AND COST FILL/TOE AREAS

Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
D10R Scarify	0.25	48	$40.17	$1,928
Seed/Fert.	1	191	$40.17	$7,672
Grader 163H	0.25	48	$40.17	$1,928
20,000 Water/651E	0.25	48	$40.17	$1,928
Total Hrs	1.75	335	**Total**	**$13,456**

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST FILL/TOE AREAS

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E		**Equip. Costs**
D10R Scarify	0.25	48	$166					$7,968
Seed/Fert.	1	191		$54				$10,314
Grader 163H	0.25	48			$78			$3,744
20,000 Water/651E	0.25	48				$60		$2,880
Total Hrs	1.75	335					**Total**	**$24,906**

MATERIAL COST

Materials	Delivered $$/Pound	Pounds/ Acre	**Cost of Materials**
Fertilizer	$0.38	100	$11,278
Seed	$6.35	11	$20,731
		Total	**$32,009**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$43,021	$99,208	$32,009	$174,238
Cost per Acre:	$145	$334	$108	**$587**

Assumptions:
Road acreages are broken down into hard driving surfaces and fill areas.
Road widths (hard driving surfaces only) are approximately 100 feet.
Scarified road surfaces will provide suitable growth medium.
D10R dozer time (spreading topsoil) is attributed to recontouring any bermed material along access roads and side road crowns.
Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: OPEN PIT (Final Configuration)

ACRES

Type	Surface* Acres	Perimeter Feet	Perimeter Acres	
Phase II Pit	170.50	22953	52.7	(22,953*100)/43,560=52.7
Totals	170.50	22953	52.7	
		Total =	52.7	

*Phase II pit acres includes current $300 pit configuration

LABOR HOURS AND COST

Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
D10R Spread	0.48	25	$40.17	$1,004
D10R Berm Const.	0.25	13	$40.17	$522
Seed/Fert.	1	53	$40.17	$2,129
Scraper 657E	0	0	$40.17	$0
Grader 163H	0.72	38	$40.17	$1,526
20,000 Water/651E	0.72	38	$40.17	$1,526
Total Hrs	3.17	167		**$6,707**

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread	0.48	25	$166						$4,150
D10R Berm Const	0.25	13		$166					$2,158
Seed/Fert.	1	53			$54				$2,862
Scraper 657E	0	0				$237			$0
Grader 163H	0.72	38					$78		$2,964
20,000 Water/651E	0.72	38						$60	$2,280
Total Hrs	3.17	167							**$14,414**

MATERIAL COST

Materials	Delivered $$/Pound	Pounds/ Acre		**Materials Cost**
Fertilizer	$0.38	100		$2,003
Seed	$6.35	11		$3,681
			Total	**$5,684**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$6,707	$14,414	$5,684	$26,805
Cost per Acre:	$127	$274	$108	**$509**

Assumptions:
East Pit will be backfilled during active mining therefore no berming will be required.
Pit perimeter will be reclaimed 100 feet back from the pit rim and bermed (6 ft).
Bermed soil will be taken from 100 foot reclaimed area along pit perimeter.
Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Upper Spruce Rock Dump

ACRES

Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump*		**59.45**	**71.3**	**59.5**	**130.8**
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		6.60	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

*Assumed 50% of Upper Spruce Rock dump is sloped and 50% of Upper Spruce Rock dump is flat.

Upper Spruce Rock Dump

Total Man Hours	Wage Rates	**Labor Costs**
1621	$40.17	$65,116
		$65,116

Upper Spruce Rock Dump

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,00(Water/651E	**Equip. Costs**
D10R Reslope & Spread Topsc	1.75	125	$166						$20,750
D10R Scarify	0.25	18		$166					$2,988
Seed/Fert.	1	71			$54				$3,834
Scraper 657E	6.38	455				$237			$107,835
Grader 163H	2.00	143					$78		$11,154
20,000 Water/651E	2.00	143						$60	$8,580
Total Hrs	13.38	**955**							**$155,141**

Upper Spruce Rock Dump

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,00(Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	61	$166						$10,126
D10R Scarify	0.25	15		$166					$2,490
Seed/Fert.	1	59			$54				$3,186
Scraper 657E	6.38	379				$237			$89,823
Grader 163H	1.28	76					$78		$5,928
20,000 Water/651E	1.28	76						$60	$4,560
Total Hrs	11.21	**666**							**$116,113**

MATERIAL COSTS

Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$4,970
Seed	$6.35	11		$9,136
			Total	**$14,106**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$65,116	$271,254	$14,106	$350,476
Cost per Acre:	$498	$2,074	$108	**$2,679**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Lower Spruce Rock Dump

ACRES

Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		**38.30**	**46.0**	**25.6**	**71.6**
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		6.60	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

Lower Spruce Rock Dump

Total Man Hours	Wage Rates	**Labor Costs**
841	$40.17	$33,783
		$33,783

Lower Spruce Rock Dump

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topso	1.75	80	$166						$13,280
D10R Scarify	0.25	11		$166					$1,826
Seed/Fert.	1	46			$54				$2,484
Scraper 657E	5.59	257				$237			$60,909
Grader 163H	1.98	91					$78		$7,098
20,000 Water/651E	1.98	91						$60	$5,460
Total Hrs	12.55	**576**							**$91,057**

Lower Spruce Rock Dump

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	26	$166						$4,316
D10R Scarify	0.25	6		$166					$996
Seed/Fert.	1	26			$54				$1,404
Scraper 657E	5.59	143				$237			$33,891
Grader 163H	1.25	32					$78		$2,496
20,000 Water/651E	1.25	32						$60	$1,920
Total Hrs	10.36	**265**							**$45,023**

MATERIAL COSTS

Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$2,721
Seed	$6.35	11		$5,001
			Total	**$7,722**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$33,783	$136,080	$7,722	$177,585
Cost per Acre:	$472	$1,901	$108	**$2,480**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Louis Rock Dump

ACRES

Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		**37.90**	**45.5**	**7.9**	**53.4**
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.0	0.0	21.3	21.3
North Rock Dump		6.6	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

Louis Rock Dump

Total Man Hours	Wage Rates	**Labor Costs**
568	$40.17	$22,817
		$22,817

Louis Rock Dump

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topsoi	1.75	80	$166						$13,280
D10R Scarify	0.25	11		$166					$1,826
Seed/Fert.	1	45			$54				$2,430
Scraper 657E	3.98	181				$237			$42,897
Grader 163H	2.00	91					$78		$7,098
20,000 Water/651E	2.00	91						$60	$5,460
Total Hrs	10.98	**499**							**$72,991**

Louis Rock Dump

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	8	$166						$1,328
D10R Scarify	0.25	2		$166					$332
Seed/Fert.	1	8			$54				$432
Scraper 657E	3.98	31				$237			$7,347
Grader 163H	1.27	10					$78		$780
20,000 Water/651E	1.27	10						$60	$600
Total Hrs	8.79	**69**							**$10,819**

MATERIAL COSTS

Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$2,029
Seed	$6.35	11		$3,730
			Total	**$5,759**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$22,817	$83,810	$5,759	$112,386
Cost per Acre:	$427	$1,569	$108	**$2,105**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: East Pit Rock Dump

ACRES					
Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Pit Rock Dump		**25.80**	**31.0**	**4.9**	**35.9**
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		6.60	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

East Pit Rock Dump		
Total Man Hours	Wage Rates	**Labor Costs**
444	$40.17	$17,835
		$17,835

East Pit Rock Dump

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topsc	1.75	54	$166						$8,964
D10R Scarify	0.25	8		$166					$1,328
Seed/Fert.	1	31			$54				$1,674
Scraper 657E	5.69	176				$237			$41,712
Grader 163H	2.00	62					$78		$4,836
20,000 Water/651E	2.00	62						$60	$3,720
Total Hrs	12.69	**393**							**$62,234**

East Pit Rock Dump

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	5	$166						$830
D10R Scarify	0.25	1		$166					$166
Seed/Fert.	1	5			$54				$270
Scraper 657E	5.69	28				$237			$6,636
Grader 163H	1.22	6					$78		$468
20,000 Water/651E	1.22	6						$60	$360
Total Hrs	10.4	**51**							**$8,730**

MATERIAL COSTS				
Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$1,364
Seed	$6.35	11		$2,508
			Total	**$3,872**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$17,835	$70,964	$3,872	$92,671
Cost per Acre:	$497	$1,977	$108	**$2,581**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: North Rock Dump

ACRES

Slope Correction	1.2	(1.2xPlan View Acres)			Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		**6.60**	**7.9**	**6.9**	**14.8**
	Totals	232.7	279.2	169.4	448.6

North Rock Dump

Total Man Hours	Wage Rates	**Labor Costs**
129	$40.17	$5,182
		$5,182

North Rock Dump

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topso	1.75	14	$166						$2,324
D10R Scarify	0.25	2		$166					$332
Seed/Fert.	1	8			$54				$432
Scraper 657E	2.66	21				$237			$4,977
Grader 163H	2.02	16					$78		$1,248
20,000 Water/651E	2.02	16						$60	$960
Total Hrs	9.7	**77**							**$10,273**

North Rock Dump

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	7	$166						$1,162
D10R Scarify	0.25	2		$166					$332
Seed/Fert.	1	7			$54				$378
Scraper 657E	2.66	18				$237			$4,266
Grader 163H	1.30	9					$78		$702
20,000 Water/651E	1.30	9						$60	$540
Total Hrs	7.53	**52**							**$7,380**

MATERIAL COSTS

Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$562
Seed	$6.35	11		$1,034
			Total	**$1,596**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$5,182	$17,653	$1,596	$24,431
Cost per Acre:	$120	$409	$37	**$1,651**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: Shop Rock Dump A

ACRES

Slope Correction 1.2	(1.2xPlan View Acres)			Actual
	Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID	Acres	Acres	Acres	Acres
Louis Rock Dump	37.90	45.5	7.9	53.4
East Rock Dump	25.80	31.0	4.9	35.9
Upper Spruce Rock Dump	59.45	71.3	59.5	130.8
Lower Spruce Rock Dump	38.30	46.0	25.6	71.6
Shop Rock Dump A	**30.90**	**37.1**	**40.5**	**77.6**
Shop Rock Dump B	33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpil	0.00	0.0	21.3	21.3
North Rock Dump	6.60	7.9	6.9	14.8
Totals	232.7	279.2	169.4	448.6

Shop Rock Dump A

Total Man Hours	Wage Rates	**Labor Costs**
495	$40.17	$19,884
		$19,884

Shop Rock Dump A
Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/65	**Equip. Costs**
D10R Reslope & Sprea	1.75	71	$166						$11,786
D10R Scarify	0.25	10		$166					$1,660
Seed/Fert.	1	40			$54				$2,160
Scraper 657E	4.55	184				$237			$43,608
Grader 163H	0.88	81					$78		$6,318
20,000 Water/651E	0.88	81						$60	$4,860
Total Hrs	9.31	467							**$70,392**

Shop Rock Dump A
Flat Areas:

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/65	**Equip. Costs**
D10R Spread Topsoil	1.02	3	$166						$498
D10R Scarify	0.25	1		$166					$166
Seed/Fert.	1	3			$54				$162
Scraper 657E	4.55	13				$237			$3,081
Grader 163H	0.88	4					$78		$312
20,000 Water/651E	0.88	4						$60	$240
Total Hrs	9	28							**$4,459**

MATERIAL COSTS

Materials	$$/Pound	Pounds/Acre		**Cost of Materials**
Fertilizer	$0.38	100		$2,949
Seed	$6.35	11		$5,420
			Total	**$8,369**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$19,884	$74,851	$8,369	$103,104
Cost per Acre:	$256	$965	$108	**$1,329**

Assumptions:
Topsoil cover will be 12" thick.
Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Shop Rock Dump B

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		**33.70**	**40.4**	**2.8**	**43.2**
Low Grade/Growth Medium Stockpile		0.00	0.0	21.3	21.3
North Rock Dump		6.60	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

Shop Rock Dump B		
Total Man Hours	Wage Rates	**Labor Costs**
451	$40.17	$18,117
		$18,117

Shop Rock Dump B

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topsc	1.75	71	$166						$11,786
D10R Scarify	0.25	10		$166					$1,660
Seed/Fert.	1	40			$54				$2,160
Scraper 657E	3.54	143				$237			$33,891
Grader 163H	2.00	81					$78		$6,318
20,000 Water/651E	2.00	81						$60	$4,860
Total Hrs	10.54	**426**							**$60,675**

Shop Rock Dump B

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	3	$166						$498
D10R Scarify	0.25	1		$166					$166
Seed/Fert.	1	3			$54				$162
Scraper 657E	3.54	10				$237			$2,370
Grader 163H	1.43	4					$78		$312
20,000 Water/651E	1.43	4						$60	$240
Total Hrs	9	**25**							**$3,748**

MATERIAL COSTS			
Materials	$$/Pound	Pounds/Acre	**Cost of Materials**
Fertilizer	$0.38	100	$1,642
Seed	$6.35	11	$3,018
		Total	**$4,660**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$18,117	$64,423	$4,660	$87,200
Cost per Acre:	$419	$1,491	$108	**$2,019**

Assumptions:

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: North/Central Shepard Pit Backfill

ACRES

Type	Surface Acres	
North/Central Shepard Pit	13.10	(approx. plan view of backfill area)

LABOR HOURS AND COST

Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
992G Loader	5.67	74	$40.17	$2,973
D10R Spread Rock	9.49	124	$40.17	$4,981
D10R scarify	0.25	3	$40.17	$121
Seed/Fert.	1	13	$40.17	$522
777D Dump Truck	22.87	300	$40.17	$12,051
Grader 163H	5.65	74	$40.17	$2,973
20,000 Water/651E	5.65	74	$40.17	$2,973
Total Hrs	44.91	662		**$26,594**

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour 992G	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 777D	Equip. $$/Hour Grader 163H	Equip. $/Hour 20,00 Water/651E	**Equip. Costs**
992G Loader	5.67	74	$248						$18,352
D10R Spread Rock	9.49	124		$166					$20,584
D10R scarify	0.25	3		$166					$498
Seed/Fert.	1	13			$54				$702
777D Dump Truck	22.87	300				$179			$53,700
Grader 163H	5.65	74					$78		$5,772
20,000 Water/651E	5.65	74						$60	$4,440
Total Hrs	44.91	662							**$104,048**

MATERIAL COST

Materials	Delivered $$/Pound	Pounds/ Acre		**Materials Cost**
Fertilizer	$0.38	100		$498
Seed	$6.35	11		$915
			Total	**$1,413**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$26,594	$104,048	$1,413	$132,055
Cost per Acre:	$2,030	$7,943	$108	**$10,081**

Assumptions:

Pit will be backfilled to provide minimum 1% slope for drainage.

All fill material is provided from Lower Spruce Creek Rock Dump

Topsoil cover will be 12" thick.

Grader and water truck hours were equal to total 992G time and will serve as support equipment

Number 777D and D10's to be sized to keep 992G hourly time as the maximun in this task.

TRUE NORTH RECLAMATION PLAN

Cost Estimation Worksheet: Orestockpile/Growth Medium Area

ACRES				
Slope Correction	1.2	(1.2xPlan View Acres)		Actual
		Reclaimed Sloped	Actual Sloped	Reclaimed Flat	Reclaimed Dump
Dump ID		Acres	Acres	Acres	Acres
Louis Rock Dump		37.90	45.5	7.9	53.4
East Rock Dump		25.80	31.0	4.9	35.9
Upper Spruce Rock Dump		59.45	71.3	59.5	130.8
Lower Spruce Rock Dump		38.30	46.0	25.6	71.6
Shop Rock Dump A		30.90	37.1	40.5	77.6
Shop Rock Dump B		33.70	40.4	2.8	43.2
Low Grade/Growth Medium Stockpile		**0.00**	**0.0**	**21.3**	**21.3**
North Rock Dump		6.60	7.9	6.9	14.8
	Totals	232.7	279.2	169.4	448.6

Ore Stockpile/Growth Medium Area		
Total Man Hours	Wage Rates	**Labor Costs**
102	$40.17	$4,097
		$4,097

Ore Stockpile/Growth Medium Area

Sloped Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope & Spread Topso	1.99	0	$166						$0
D10R Scarify	0.25	0		$166					$0
Seed/Fert.	1	0			$54				$0
Scraper 657E	0	0				$237			$0
Grader 163H	1	0					$78		$0
20,000 Water/651E	1	0						$60	$0
Total Hrs	5.24	**0**							**$0**

Ore Stockpile/Growth Medium Area

Flat Areas:

Equipment Activity	Equip. Hours/ Acre	**Total Equip. Hours**	Equip. $$/Hour D10R	Equip. $$/Hour D10R	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour 657E	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Spread Topsoil	1.02	22	$166						$3,652
D10R Scarify	0.25	5		$166					$830
Seed/Fert.	1	21			$54				$1,134
Scraper 657E	0	0				$237			$0
Grader 163H	1.27	27					$78		$2,106
20,000 Water/651E	1.27	27						$60	$1,620
Total Hrs	4.81	**102**							**$9,342**

MATERIAL COSTS			
Materials	$$/Pound	Pounds/Acre	**Cost of Materials**
Fertilizer	$0.38	100	$809
Seed	$6.35	11	$1,488
		Total	**$2,297**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$4,097	$9,342	$2,297	$15,736
Cost per Acre:	$192	$439	$108	**$739**

Assumptions:

Grader and water truck hours were equal to total D10R time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: Maintenace Complex Buildings

ACRES

Building or Site ID	Foundation Area (sq.')	Site Acres
Maint. Bay 1-3	9,600	0.22
Electrical Bldg.	1,440	0.03
Wash/Aprons	3,000	0.07
	Total =	0.32

LABOR HOURS AND COST

Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
375 Excavator*	178.8	57	$40.17	$2,290
D10R Reslope	1.02	0.33	$40.17	$13
D10R Scarify	0.25	0.08	$40.17	$3
Seed/Fert.	1	0.32	$40.17	$13
Scraper 657E	2.66	0.85	$40.17	$34
Grader 163H	89.4	57	$40.17	$2,290
20,000 Water/651E	89.4	57	$40.17	$2,290
Total Hrs	362.53	172.58	**Total**	**$6,933**

*375 excavator mounted with hydraulic hammer

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST

Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour 375	Equip. $$/Hour D10R	Equip. $$/Hour 657E	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
375 Excavator*	178.8	57.22	$170						$9,727
Hydraulic Hammer**	244.2	48.84	$40						$1,954
D10R Reslope	1.02	0.33		$166					$55
D10R Scarify	0.25	0.08		$166					$13
Seed/Fert.	1	0.32				$54			$17
Scraper 657E	2.66	0.85			$237				$201
Grader 163H	89.40	57					$78		$4,463
20,000 Water/651E	89.40	57						$60	$3,433
Total Hrs	606.73	222.08						**Total**	**$19,863**

*375 excavator mounted with hydraulic hammer
** Hydraulic hammer $ 8,000 per month @ 200 hrs use.

MATERIAL COST

Materials	Delivered $$/Pound	Pounds/ Acre		**Cost of Materials**
Fertilizer	$0.38	100		$12
Seed	$6.35	11		$22
			Total	**$34**

	Manpower	Equipment	Materials	Building*** Demolition	Total
GRAND TOTALS:	$6,933	$19,863	$34	$25,000	$51,830
Cost per Acre:	$21,666	$62,072	$106		**$161,969**

Assumptions:
Buildings and equipment removed for salvage; only foundations remain.
Foundations above grade and concrete floor structures to be broken up with hydraulic hammer and buried in place with dozer.
***Building demolition cost is 1/2 of SR Means cost for demolition of similar building type and size.
Topsoil cover will be 12" thick.
Grader and water truck hours were equal to total 375 excavator time and will serve as support equipment

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: Maintenace Complex/Blasting Supplies Storage

ACRES		
Building or Site ID		Site Acres
Maintenace Complex		10.80
Blasting Supplies Storage		4
	Total =	14.80

LABOR HOURS AND COST				
Equipment Activity	Man Hours/ Acre	Total Man Hours	Wage Rates	**Labor Costs**
D10R Reslope	1.02	15	$40.17	$603
D10R Scarify	0.25	4	$40.17	$161
Seed/Fert.	1	15	$40.17	$603
Scraper 657E	2.66	29	$40.17	$1,165
Grader 163H	0.51	19	$40.17	$763
20,000 Water/65´	0.51	19	$40.17	$763
Total Hrs	5.95	101	**Total**	**$4,058**

EQUIPMENT HOURS/ACRE AND EQUIPMENT COST									
Equipment Activity	Equip. Hours/ Acre	Total Equip. Hours	Equip. $$/Hour 375	Equip. $$/Hour D10R	Equip. $$/Hour 657E	Equip. $$/Hour Seed/Fert.	Equip. $$/Hour Grader 163H	Equip. $$/Hour 20,000 Water/651E	**Equip. Costs**
D10R Reslope	1.02	15		$166					$2,490
D10R Scarify	0.25	4		$166					$664
Seed/Fert.	1	15				$54			$799
Scraper 657E	2.66	29			$237				$6,873
Grader 163H	0.51	19					$78		$1,482
20,000 Water/65´	0.51	19						$60	$1,140
Total Hrs	5.95	101						**Total**	**$13,448**

MATERIAL COST			
Materials	Delivered $$/Pound	Pounds/ Acre	**Cost of Materials**
Fertilizer	$0.38	100	$562
Seed	$6.35	11	$1,034
		Total	**$1,596**

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$4,058	$13,448	$1,596	$19,102
Cost per Acre:	$274	$909	$108	**$1,291**

Assumptions:
Topsoil cover will be 12" thick.
Grader and water truck hours were equal to total D10R time and will serve as support equipment

Groundwater & Surface water

18 samples per sample event

Note: Cost analysis assumes monitoring starts from closure and state water quality is met at the end of two years.

Year	Type Surface Water (profile 1)	Type Groundwater (profile 2)	Profile 1 Cost	Profile 2 Cost	Analytical Total	Totals
1	36	48	$13,860	$18,480	$32,340	$47,275.00
2	36	48	$14,068	$18,757	$32,826	$48,191.00
3	9	12	$3,570	$4,760	$8,329	$12,199.00
4	9	12	$3,623	$4,831	$8,454	$12,398.00
5	9	12	$3,678	$4,904	$8,581	$12,600.00
6	9	12	$3,733	$4,977	$8,710	$12,807.00
7	9	12	$3,789	$5,052	$8,841	$13,017.00
8	9	12	$3,846	$5,127	$8,973	$13,230.00
9	9	12	$3,903	$5,204	$9,108	$13,447.00
10	9	12	$3,962	$5,283	$9,244	$13,668.00
15	9	12	$4,268	$5,691	$9,959	$14,834.00
20	9	12	$4,598	$6,130	$10,728	$16,106.00
25	9	12	$4,953	$6,604	$11,557	$17,495.00
30	9	12	$5,336	$7,114	$12,450	$19,017.00
		Totals	$77,186	$102,915	$180,101	**$266,284**

Year	Profile1-2 Cost/ea*	Tech. Cost/hr*	**Tech. Cost 5 days	4WD Vehicle Cost/ day*	4WD Vehicle Cost/yr*	Sample^ Equipment Cost/ year*	Total
2001	$385.00	$33.86	$10,835.20	$60.00	$1,200.00	$2,900.00	$14,935.20
2002	$390.78	$34.37	$11,160.26	$60.90	$1,218.00	$2,987.00	$15,365.26
2003	$396.64	$34.89	$2,791.20	$61.81	$309.05	$769.15	$3,869.40
2004	$402.59	$35.41	$2,832.80	$62.74	$318.32	$792.23	$3,943.35
2005	$408.63	$35.94	$2,875.20	$63.68	$327.87	$815.99	$4,019.07
2006	$414.76	$36.48	$2,918.40	$64.64	$337.71	$840.47	$4,096.58
2007	$420.98	$37.03	$2,962.40	$65.61	$347.84	$865.69	$4,175.93
2008	$427.29	$37.59	$3,007.20	$66.59	$358.27	$891.66	$4,257.13
2009	$433.70	$38.15	$3,052.00	$67.59	$369.02	$918.41	$4,339.43
2010	$440.21	$38.72	$3,097.60	$68.60	$380.09	$945.96	$4,423.65
2011	$446.81	$39.30	$3,144.00	$69.63	$391.50	$974.34	
2012	$453.51	$39.89	$3,191.20	$70.67	$403.24	$1,003.57	
2013	$460.31	$40.49	$3,239.20	$71.73	$415.34	$1,033.68	
2014	$467.21	$41.10	$3,288.00	$72.81	$427.80	$1,064.69	
2015	$474.22	$41.72	$3,337.60	$73.90	$440.63	$1,096.63	$4,875.00
2016	$481.33	$42.35	$3,388.00	$75.01	$453.85	$1,129.53	
2017	$488.55	$42.99	$3,439.20	$76.14	$467.47	$1,163.41	
2018	$495.88	$43.63	$3,490.40	$77.28	$481.49	$1,198.31	
2019	$503.32	$44.28	$3,542.40	$78.44	$495.93	$1,234.26	
2020	$510.87	$44.94	$3,595.20	$79.62	$510.81	$1,271.29	$5,377.30
2021	$518.53	$45.61	$3,648.80	$80.81	$526.14	$1,309.43	
2022	$526.31	$46.29	$3,703.20	$82.02	$541.92	$1,348.71	
2023	$534.20	$46.98	$3,758.40	$83.25	$558.18	$1,389.17	
2024	$542.21	$47.68	$3,814.40	$84.50	$574.92	$1,430.85	
2025	$550.34	$48.40	$3,872.00	$85.77	$592.17	$1,473.78	$5,937.95
2026	$558.60	$49.13	$3,930.40	$87.06	$609.94	$1,517.99	
	Profile1-2	Tech.	**Tech. Cost	4WD Vehicle	4WD Vehicle	Sample^ Equipment	

Year	Cost/ea*	Cost/hr*	5 days	Cost/ day*	Cost/yr*	Cost/ year*	Total
2027	$566.98	$49.87	$3,989.60	$88.37	$628.24	$1,563.53	
2028	$575.48	$50.62	$4,049.60	$89.70	$647.08	$1,610.43	
2029	$584.11	$51.38	$4,110.40	$91.05	$666.49	$1,658.75	
2030	$592.87	$52.15	$4,172.00	$92.42	$686.49	$1,708.51	$6,567.00
		Total	**$60,509**			**Total**	**$86,182**

* Rates increase 1.5 % per year - costs start @ year 2000.

** Assume it will take 5 days and two technicians to complete one sample event.

^ Sampling equipment includes ph,dissolved oxygen, conductivity and water sounder

TRUE NORTH RECLAMATION PLAN
Cost Estimation Worksheet: Groundwater Wells 5" well = 0.136 ft3/Lf

Groundwater Wells

Well ** ID	Depth Length (ft'	Well Dia. (in)	Required Well* Vol.(1.02 gal/ft)	Required 50# Bags Benseal (50#/30 gal	Required Gals EZ MUD Benseal (10 oz/30 gal)	Number of *** Pipe Sticks (20 ft)
TMW-1	192	5	196	7	65	10
TMW-2	330	5	337	11	112	17
TMW-3	360	5	367	12	122	18
TMW-4	220	5	224	7	75	11
TMW-6	350	5	357	12	119	18
TMW-7	460	5	469	16	156	23
TMW-8	307	5	313	10	104	15
TMW-9	60	5	61	2	20	3
TMW-10	395	5	403	13	134	20
TMW-11	435.5	5	444	15	148	22
TMW-12	100	5	102	3	34	5
TMW-13	400	5	408	14	136	20
Totals	3,610		Total	122	9.59	182

* Manufacturer's recommendation for required benseal slurry per foot (5" well). 9.59 say 10 gals of EZ MUD
** Assume all wells have dedicated pumps and are installed as close to the bottom as possible.
*** Assume 4 hours for removeal of 10 sticks

LABOR HOURS AND COST

Equipment Activity	Man Hrs	Total Man Hours	Wage Rates	**Labor Costs**
Laborer (1) -grouting hrs/100 ft	1	36	$33.86	$1,219
Laborer (2) - grouting hrs/100 ft	1	36	$33.86	$1,219
Laborer (3) -pulling pipe/pumps - hrs per 10 stick	4	73	$33.86	$2,472
Laborer (4) - pulling pipe/pump - hrs per 10 sticks	4	73	$33.86	$2,472
Total Hrs	10	218	**Total**	**$7,382**

EQUIPMENT COST

Equipment Activity	Equip. $$/Day	Equip. # Days	**Equip. Costs**
4WD Flat bed Truck	$150	3	$450
Pump/mixing Equipment	$100	3	$300
Boom/Pump Truck	$315	5	$1,575
Cutting Torch	$250	5	$1,250
		Total	**$3,575**

MATERIAL COST

Materials	Delivered $$/BAG	**Cost of Materials**	
3/8" Hole Plug(bentonite)	$10.15	$102	
Benseal(bentonite)	$11.35	$1,385	
EZ-MUD	$84.50	$169	(2-5 Gal containers)
	Total	**$1,656**	

	Manpower	Equipment	Materials	Total
GRAND TOTALS:	$7,382	$3,575	$1,656	$12,613
Cost per ft:	$2.04	$0.99	$0.46	**$3.49**

Assumptions:
Groundwater wells are to be filled by tremieing with benseal/ez-mud slurry.
Groundwater wells to be plugged with 3/8' hole plug at surface after well casing removal.
Surface casing will be severed with cutting torch below ground surface.

777D Production pg 9-4 Cat Performance Handbook Ed29(CPH)
Capacity 79.1 yd3 pg 9-4 CPH
Work:Hauling waste rock from Upper Spruce Creek Rock Dump to Central Shepard Pit for backfilling.
Assumptions: 1)maximum haul road grades are 8 %
2)correction factors apllied are listed below

	Excellent Opr.	Job Eff.
Production correction factors	1	0.83

3)haul distances are average
4)backfill waste rock supplied from Upper Spruce Creek Rock Dump

Cycle time (Cycle time estimated from Cat Handbook pg 9-30)

		Total Cycle time (one trip)	11.7			
		Trips/hr	5.13			
		777D Capacity (yd3)	79.1			
	Feet	% Grade	100 ft sections			
Lower Spruce Creek Dump	2125	8	21.25	170.00		
Lower Spruce Creek Dump Access	432	0	4.32	0.00		
Pit Access Rd	795	0	7.95	0.00		
Pit Access Rd	205	8	2.05	16.40		
Shepard Pit Ave Haul Dist.	631	0	6.31	0	Wt Ave	
	4188		41.88	186.40	**4.45**	Use - 4 %

				Central Shepard Pit Rock Total		
777D	yd3/Hr			Yd3 fill	Acres	Yd3/ac
Production =	336.80	=	(1.0*0.83*6.9*79.1)	79,782	13.1	6,090

777D Rock	**Central Shepard Pit Backfill**		
Production =	**18.08**	**Hrs/Ac**	777D Prod. = (6,090/336.80/13.1) =18.08
(Hrs/Ac)			Hrs/Ac

	Central Shepard Topsoil Total		
	Yd3 fill	Acres	Yd3/ac
Assume hauling topsoil from Lower Spruce Creek Rock Dump Perimeter	21,143	13.1	1,614

777D Topsoil	**Topsoil Cover**		
Production =	**4.79**	**Hrs/Ac**	777D Prod. = (21,143/336.80/13.1) =4.79
(Hrs/Ac)			Hrs/Ac

992G Production pg 12-35 Cat Performance Handbook Ed29(CPH)
Capacity 15 yd3 pg 12-35 CPH
Work:Loading waste rock into 777D dump trucks Central Shepard Pit.
Assumptions: 1)bucket capacity Cat handbook pg 12-47 @ 3,500 lbs/yd3 say 100% fill factor - loose material
2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Fill Factor
Production correction factors	1	0.83	1.00

3)haul distances are minimal no tramming time required.

	Cycle time (min)		
Empty (tramming time)	0.00		
Loaded (tramming time)	0.00		
Avg load, dump, & manuever time(min)	0.55	Cat handbook pg 12-39 Ed 29	Central Shepard Pit Rock Volume/ac
Total Cycle time (one trip)	0.55		6,090
Trips/hr	109.09		
992G Capacity (yd3)	15		Central Shepard Pit Topsoil Volume/ac
Fill Factor	1		1,614

Production/hr	**1358**	yd3/hr	=	(109.09*15*1.0*1.0*.83)

Central Shepard Pit Rock			
992G Production			
Production/hr			
Production/Ac	**4.48**	hrs/ac	(6,090/1358)
Central Shepard Pit Topsoil			
992G Production			
Production/hr			
Production/Ac	**1.19**	hrs/ac	(1614/1358)

GENERAL INFORMATION

Reclamation slope 2.5-3.0H:1V			6" Topsoil =	807	yd3/Ac
Active rock dump slope 1.5H:1V			12" Topsoil =	1614	yd3/Ac
Angle of repose					
Rock Density	3500	#/yd3			
Soil Density	2460	#/yd3			
Production Density	2300	#/yd3			
Slope Acre Correction		1.2			

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP Density pg1-49 (CPH)
Dozer Track Type Factor = (2300 lbs/yd3/3500 lbs/yd3) = 0.65
Work:Pushing down bench crests from 1.5:1 to 3:1 slope
Assumptions: 50 foot average push

	Excellant Opr	Rock	Job Eff.	Grade Eff.	Rehandle factor	Density Factor	D10R pg 1-57 (yd3/hr)
Production correction factors:	1	0.7	0.83	1.6	1	0.65	2800

Rock Dumps **(20 ft lifts)** Material/ac 1971 yd3/ac Slot Dozing 1.2

D10R LCY/Hr
Production = 2030.25 = (1*0.7*0.83*1.6*0.65*1*2800*1.2) = 2030.25

D10R Production = 0.97 (Hrs/Ac) D10R Prod. = (1,970yd3/ac/2030.25 LCY/Hr) = 0.97

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP Density pg1-49 (CPH)
Dozer Track Type Factor = (2300 lbs/yd3/2460 lbs/yd3) = 0.93
Work:Pushing and contouring 12" topsoil over 3:1 slope
Assumptions: 12" topsoil layer, 100 foot avg. pushes

	Excellant Opr	Topsoil	Job Eff.	Grade Eff.	Density Factor	D10R pg 1-57 (yd3/hr)	Rehandle factor
Production correction factors:	1	1.2	0.83	1.6	0.93	1400	1

12" Topsoil Material/ac 1614 yd3/ac

D10R LCY/Hr
Production = 2074.87 = (1*1.2*0.83*1.6*0.93*1400*1)

D10R Production = 0.78 Hrs/Ac (Hrs/Ac) D10R Prod. = (1614yd3/ac/2074.87 LCY/Hr) = 0.78

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP Density pg1-49 (CPH)
Dozer Track Type Factor = (2300 lbs/yd3/2460 lbs/yd3) = 0.93
Work:Pushing and contouring 12" topsoil over flat slope
Assumptions: 12" topsoil layer

	100 ft pushes	Excellant Opr	Topsoil	Job Eff.	Density Factor	D10R pg 1-57 (yd3/hr)	Rehandle factor
Production correction factors:		1	1.2	0.83	0.93	1700	1

12" Topsoil Material/ac 1614 yd3/ac

D10R LCY/Hr
Production = 1574.68 = (1*1.2*0.83*0.93*1700*1)

D10R Production = 1.02 Hrs/Ac (Hrs/Ac) D10R Prod. = (1614yd3/ac/1574.68 LCY/Hr) = 1.02

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CPH) Berm Area = (0.5*7.8*6)*2 = 46.8 sq. ft
Dozer Track Type Berm Volume = (46.8 sq.ft)(1 ft)/27 = 1.73
Work:Reclamation along pit perimeter Pit Perimeter Distance = 22953
Assumptions: 1) 100 foot width section reclaimed Pit Perimeter Volume = 39709
2) Berm to be established along pit perimeter approx. 6 feet high Pit Perimeter Acres = 52.7
3) Berm material to be obtained from reclaimed area along pit perimete Material/Acre (39,709yd3/52.7 ac) = 753
4) Dozer average run = 100 foot

	Excellant Opr	Topsoil	Job Eff.	Density Factor	D10R pg 1-57 (yd3/hr)	Rehandle factor
Production correction factors	1	1.2	0.83	0.93	1700	1

D10R LCY/Hr Density pg1-49 (CPH)
Production = 1574.68 = (1*1.2*0.83*0.93*1700*1) Factor = (2300 lbs/yd3/2460 lbs/yd3)

D10R Pit Perimeter Production = 0.48 Hrs/Ac (Hrs/Ac) D10R Prod. = (753yd3/ac/1574.68 LCY/Hr) = 0.48

Dozer Production D10R with Multishank Adjustable Parallelogram Ripper
Dozer Track Type
Work:Scarifying with rippers
Assumptions: 1)ripping in 1st gear-2.5 mph, offset ripping
2)scarifying 12" topsoil
3)scarifying/ripping road surfaces will require 3 passes to rip
Shank Gauge 8' 8"
2 Pass Ripper Width = 12.99 ft 1st gear speed 13200 ft/hr

D10R Topsoil Rippig Rate Production = 0.25 Hrs/Ac (Hrs/Ac)

D10R Road Ripping Rate Production = 0.75 Hrs/Ac (Hrs/Ac)

Dozer Production D10R with SU Blade pg 1-51 Cat Performance Handbook Ed29(CP Density pg1-49 (CPH)
Dozer Track Type Factor = (2300 lbs/yd3/3500 lbs/yd3) = 0.65
Work:Pushing Waste Rock In North/Central Shepard Pit
Assumptions: 100 foot average run

	Excellant Opr	Rock	Job Eff.	Grade Eff.	Rehandle factor	Density Factor	D10R pg 1-57 (yd3/hr)
Production correction factors:	1	0.7	0.83	1	1	0.65	1700

Rock Dumps Material/ac 6,090 yd3/ac

D10R LCY/Hr
Production = 642.01 = (1.0*0.7*0.83*1.0*0.67*1.0*1700) = 642.01

D10R Production = 9.49 (Hrs/Ac) D10R Prod. = (12,011 yd3/ac/642.01 LCY/Hr) = 18.71

GENERAL ASSUMPTIONS

Hydralic Hammer Model H180 Cat Performance Handbook Ed29(CPH) pg 18-8

Work:Breaking up concrete foundations and slab floors.

Assumptions: 1)concreete compressive strenght = 3,000 psi
2)correction factors apllied are listed below

	Ave Opr	Job Eff.
Production correction factors	1	0.83

3)assume massive formations-F (pg 18-8)
4)Model H180 mounted on excavator-production rates @3000 psi concrete, pg 18-8 = 110 yd3/8Hr
5)concrete floors and concrete foundation walls above final grade shall be broken
6)assume foundation walls are an average of 4 feet above grade
7)assume concrete floors and walls are an average of 1 foot thick

Site	Concrete Volume YD3		Hrs
Shop Complex	520	(includes concrete floors maint bays 1-3, elect. Bldg, & wash/aprons	45.56
	133	(includes foundation walls)	11.65
		Total	57.21

Hrs = (520yd3/(110yd3/8hr*1*0.83))*8 = 57.21

Acres = 0.32 Hammer Production Rate = 110 yd3/8hr

Production	**Hrs/Acre**	
Hydraulic Hammer	**178.80**	(57.21 hrs/0.32 acres)

GENERAL ASSUMPTIONS					
Reclamation slope 2.5-3H:1V			12" Topsoil =	1614	yd3/Ac
Angle of repose 1.5H:1V					
Production Density	3000	#/yd3			
Soil Density	2460	#/yd3			
Slope Acre Correction		1.2			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) — Density Factor = pg1-49 (CPH) (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Capacity 34.6 yd3 pg 8-71 CPH

Work:Scraping and hauling topsoil from growth medium pile to Shop Rock Dump A

Assumptions:
1)maximum haul road grades are 8 %
2)correction factors apllied are listed below
3)haul distances are average
4)topsoil supplied from growth medium area ajdacent to maintenance complex
5)12" topsoil layer

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

		Acres	%
Shop Rock Dump A	Flat	40.5	56.72
	Sloped	30.9	43.28
		71.4	

Growth Medium Stockpile
Ave Haul Dist.
848 feet (borrow area)

Ave Haul Dist.
0 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Shop Rock Dump A	2632	8.00
	3480	

Shop Rock Dump A **3480** **@ 8.00** pg 8-71 (CPH) Production Approx. = 350 yd3/hr

657E Production = 354.41 yd3/Hr = (1.0*0.83*1.22*350)

657E Production = (Hrs/Ac) **Shop Rock Dump A** **4.55** **Hrs/Ac**

657E Prod. = (1614yd3/ac/354.41 LCY/Hr) = 4.55

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from growth medium pile to Shop Rock Dump B

Assumptions:
1)maximum haul road grades are 8 %
2)correction factors apllied are listed below
3)haul distances are average
4)topsoil supplied from growth medium area ajdacent to maintenance complex
5)12" topsoil layer

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

		Acres	%
Shop Rock Dump B	Flat	2.8	7.67
	Sloped	33.7	92.33
		36.5	

Growth Medium Stockpile
Ave Haul Dist.
848 feet (borrow area)

Ave Haul Dist.
0 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Shop Rock Dump B	1346	8.00
	2194	

Shop Rock Dump B **2194** **@ 8.00** pg 8-71 (CPH)
Production Approx. = 450 yd3/hr

657E yd3/Hr
Production = 455.67 = (1.0*0.83*1.22*450)

657E	**Shop Rock Dump B**		
Production = (Hrs/Ac)	**3.54**	**Hrs/Ac**	657E Prod. = (1614yd3/ac/455.67 LCY/Hr) = 3.54

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from Lower Spruce Creek Rock Dump perimeter to Lower Spruce Creek Rock Dump

Assumptions: 1)maximum haul road grades are 8 %

2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

3)haul distances are average

4)topsoil will be stockpiled along the dump perimeter during intial clearing.

5)12" topsoil layer

		Acres	%
Lower Spruce Rock Dump	Flat	25.6	40.06
	Sloped	38.3	59.94
		63.9	

Growth Medium Stockpile
Ave Haul Dist.
2525 feet (borrow area)
* assume borrow area is 2,525 feet average haul.

Lower Spruce Rock Dump
Ave Haul Dist.
2125 feet

	Feet	% Grade
Lower Spruce Rock Dump	2125	8
	2525	8
	4650	

Lower Spruce Rock Dump **4650** **@ 8.00** pg 8-71 (CPH)

Production Approx. = 285 yd3/hr

657E yd3/Hr

Production = 288.59 = (1.0*0.83*1.22*285)

657E Production = (Hrs/Ac)	**Lower Spruce Rock Dump** **5.59** **Hrs/Ac**	657E Prod. =	(1614yd3/ac/288.59 LCY/Hr) = 5.59

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)
Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from Lower Spruce Creek Rock Dump perimeter to Upper Spruce Creek Rock Dump

Assumptions: 1)maximum haul road grades are 8 %
2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

3)haul distances are average
4)topsoil will be stockpiled along the dump perimeter during intial clearing.
5)12" topsoil layer

		Acres	%
Lower Spruce Rock Dump	Flat	59.45	50.00
	Sloped	59.45	50.00
		118.9	

Growth Medium Stockpile
Ave Haul Dist.
2525 feet (borrow area)
* assume borrow area is 2,525 feet average haul.
Upper Spruce Rock Dump
Ave Haul Dist.
2372 feet

	Feet	% Grade
Upper Spruce Rock Dump	2372	8
	2525	8
	4897	

Upper Spruce Rock Dump **4897** **@ 8.00** pg 8-71 (CPH)
Production Approx. = 250 yd3/hr

657E yd3/Hr
Production = 253.15 = (1.0*0.83*1.22*250)

657E Production = (Hrs/Ac)	**Upper Spruce Rock Dump** **6.38**	**Hrs/Ac**

657E Prod. = (1614yd3/ac/253.15 LCY/Hr) = 6.38

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from growth medium pile to East Pit Rock Dump

Assumptions: 1)maximum haul road grades are 8 %

2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

3)haul distances are average

4)topsoil supplied from growth medium area ajdacent to maintenance complex

5)12" topsoil layer

		Acres	%
East Pit Rock Dump	Flat	4.91	13.68
	Sloped	30.96	86.24
		35.9	

Growth Medium Stockpile
Ave Haul Dist.

848 feet (borrow area)

2360 haul from growth medium stockpile to East Pit Rock Dump

East Pit Rock Dump
Ave Haul Dist.

1160 feet

	Feet	% Grade
East Pit Rock Dump	1160	8
	848	8
	2360	8
	4368	

East Pit Rock Dump **4368** **@ 8.00** pg 8-71 (CPH)

Production Approx. = 280 yd3/hr

657E yd3/Hr

Production = 283.53 = (1.0*0.83*1.22*280)

657E	**East Pit Rock Dump**		
Production =	**5.69**	**Hrs/Ac**	657E Prod. = (1614yd3/ac/283.53 LCY/Hr) = 5.69
(Hrs/Ac)			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from adjacent growth medium pile to Louis Rock Dump

Assumptions:
1)maximum haul road grades are 8 %
2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

3)haul distances are average
4)topsoil supplied from growth medium area adjacent to Louis Rock Dump
5)12" topsoil layer

		Acres	%
Louis Rock Dump	Flat	7.9	17.25
	Sloped	37.9	82.75
		45.8	

Growth Medium Stockpile
Ave Haul Dist.
848 feet (borrow area)

Louis Rock Dump
Ave Haul Dist.
2090 feet

	Feet	% Grade
Louis Rock Dump	2090	8
	848	8
	2938	

Louis Rock Dump **2938** **@ 8.00** pg 8-71 (CPH)
Production Approx. = 400 yd3/hr

657E yd3/Hr
Production = 405.04 = (1.0*0.83*1.22*400)

657E	**Louis Rock Dump**		
Production = (Hrs/Ac)	**3.98**	**Hrs/Ac**	657E Prod. = (1614yd3/ac/405.04 LCY/Hr) = 3.98

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from growth medium area to maintenance complex

Assumptions: 1)maximum haul road grades are 8 %

2)correction factors apllied are listed below

	Excellant Opr	Job Eff.	Density Factor
Production correction factors:	1	0.83	1.22

3)haul distances are average

4)topsoil supplied from growth medium area ajdacent to maintenance complex

5)12" topsoil layer

		Acres	%
Maintenance complex	Flat	10.85	100.00
	Sloped	0	0.00
		10.85	

Growth Medium Stockpile
Ave Haul Dist.
848 feet

Maintenance complex
Ave Haul Dist.
765 feet

	Feet	% Grade
Growth Medium Stockpile	848	8.00
Maintenance complex	765	8.00
	1613	

Maintenance complex 1613 @ 8.00 pg 8-71 (CPH)

Production Approx. = 600 yd3/hr

657E yd3/Hr

Production = 607.56 = (1.0*0.83*1.22*600)

657E Production = (Hrs/Ac)	**Maintenance complex**	**Hrs/Ac**	657E Prod. =	(1614yd3/ac/607.56 LCY/Hr) = 2.66
	2.66			

Scraper Production 657E pg 8-3 Cat Performance Handbook Ed29(CPH) | Density | pg1-49 (CPH)

Capacity 34.6 yd3 pg 8-71 CPH | Factor = | (3000 lbs/yd3/2460 lbs/yd3) = 1.22

Work:Scraping and hauling topsoil from North Rock Dump perimeter to North Rock Dump

Assumptions:
1)maximum haul road grades are 8 %
2)correction factors apllied are listed below
3)haul distances are average
4)topsoil will be stockpiled along the dump perimeter during intial clearing.
5)12" topsoil layer

Production correction factors:	Excellant Opr	Job Eff.	Density Factor
	1	0.83	1.22

		Acres	%
North Rock Dump	Flat	10.85	100.00
	Sloped	0	0.00
		10.85	

Growth Medium Stockpile
Ave Haul Dist.
660 feet
* assume topsoil area is 660 feet average haul.

North Rock Dump
Ave Haul Dist.
833 feet

	Feet	% Grade
Growth Medium Stockpile	660	8.00
North Rock Dump	833	8.00
	1493	

North Rock Dump 1493 @ 8.00 pg 8-71 (CPH)
Production Approx. = 600 yd3/hr

657E yd3/Hr
Production = 607.56 = (1.0*0.83*1.22*600)

657E	**North Rock Dump**		
Production =	**2.66**	**Hrs/Ac**	657E Prod. = (1614yd3/ac/607.56 LCY/Hr) = 2.66
(Hrs/Ac)			

Seeding/Fertilizing Production

Work:Seeding and Fertilizing

Assumptions:
1)Challenger 35 Tractor CAT Performance Handbook pg 2-6 (CPH)
2)Seed and fertilizer are to be broadcasted with 12 volt mounted broadcaster
3)Spreading rates = 1st gear speed = 1.6 mi/hr = 8448 ft/hr
4)Single run spread widths: Seed = 8 ft, Fertilizer = 20 ft

Seeding Width =	8	ft	1st gear speed	8448	ft/hr
Fertilizer Width =	20	ft			

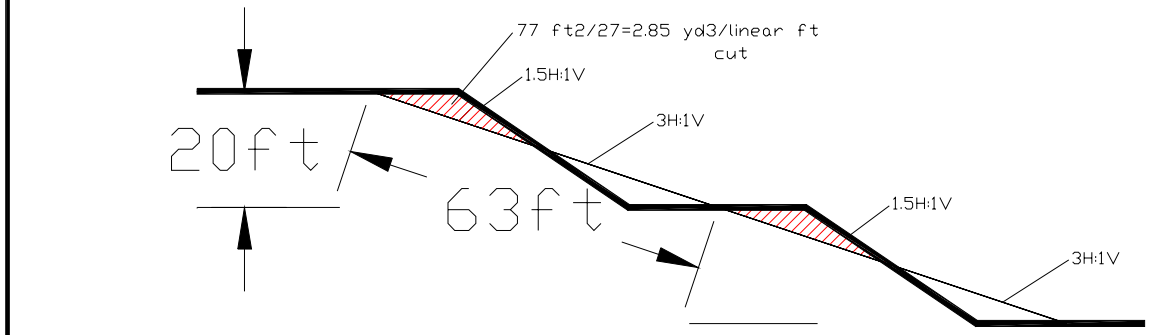
Seeding Production =	0.64	Hrs/ac	(43,560/(8x8448))
Fertilizing Production =	0.26	Hrs/ac	(43,560/(20x8448))

Challenger 35 Seeding/Fertilizer Production = (Hrs/Ac)	**1.0**	**Hrs/Ac**

Excavator Production EX350 with 2.5 yd3 bucket pg 4-148 Cat Performance Handbook Ed29(CPH)
Excavator Track Type
Work:Excavating road culverts
Assumptions: Material to be excavated for removal of 46 culverts, assume each culvert excavation 20X10X10 @ 100 long
There are approximately a total of 46,000 feet of mine access/haul roads and its assumed there is one culvert every 1,000 feet.
Cycle time = 0.30 minutes pg 4-148 Cat Performance Handbook Ed29(CPH),2.25 yd3 bucket

	Ave Opr	Job Eff.	EX350 pg 4-152 (yd3/hr)	Excavation Yd3/ac
Production correction factors:	1	0.83	450	242

EX359	CY/Hr			Excavation Per culvert (yd3)		
Production =	373.50	=	(1.0*0.83*450) = 373.50	556	((((10+20)/2)*10)*100)/27	
EX350				Excavation for 46 culverts (yd3)		
Production = (Hrs/ac)	**0.65**	**Hrs/Ac**	(242/373.50) = 0.65	25,576	(556*46)	



Volume/Acre=2.85yd3/LF=2.85yd3/63ft2
43,560ft2/63ft2=691.4ft
691.4*2.85=1,970.6= **1,971 yd3/Ac**

Fairbanks Gold Mining, Inc. a subsidiary of Kinross Gold U.S.A. Inc.	True North Mine	TRUE NORTH MINE SITE 20 FOOT BENCH VOLUME CALCULATION
	Dwg:TrueNorthBenchVolumePhaseII	Date:11/29/01 Scale: 1"=20'

Approximate Topsoil Volume Requirements

	ROADS	PIT PERIMETER DUMPS/ORE STOCKPILE		BUILDINGS	PIT BACKFILL
Acres	297	53	448.60	0.32	13
Topsoil Requirements yd3 @ 1614 yd3/ac (12" soil cover	0	0	724,040	516	21,143

Total Topsoil Requirements (yd3)
745,700

Potential Topsoil Volumes From Designated Dump Areas

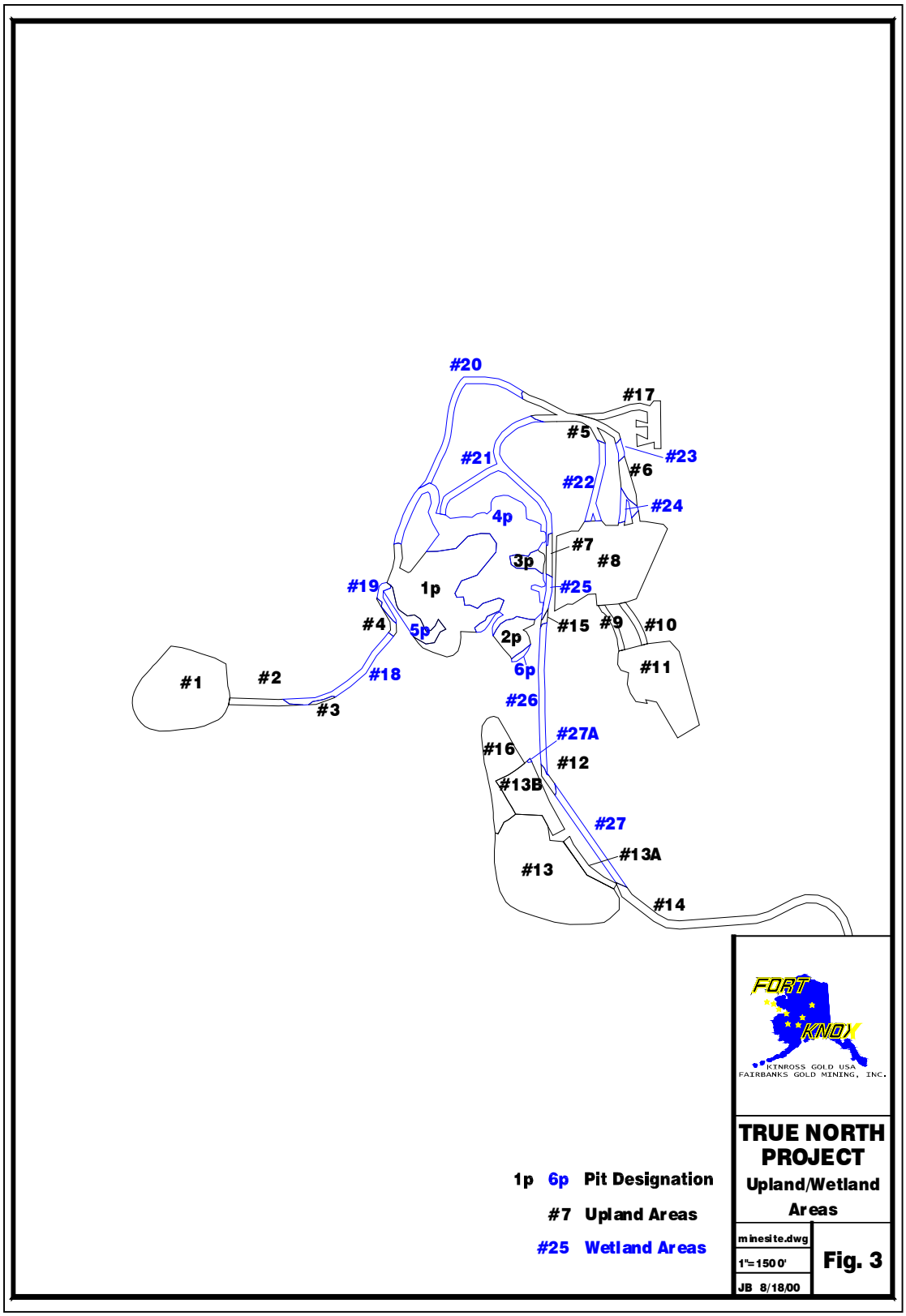
Site	Area (acres)	Soil Depth (ft)	Volume (cy)	
Louis Rock Dump (Louis Creek)*	45.8	1.42	104,925	
East Pit Rock Dump (Louis Creek)*	30.71	1.42	70,355	
Spruce Rock Dump (Spruce Creek)*	182.8	1.31	386,342	
Shop Rock Dump A & B**	107.9	0.5	87,039	
North Rock Dump**	13.5	0.5	10,890	
Zeppelin,Central,Shepard,Hindenburgh pits***	170	0.5	137,133	
		Total Potential	**796,684**	yd3

* Depth based on exploration drill borehole data by Golder Associates.
* Soil depth was calculated by averaging organic depth for all drillholes within initial proposed dump limits.
** Soil depth was conservatively estimated to be 0.5 ft thick based on field boreholes (Louis and Spruce Creeks).
***Additional topsoil should be availible from Zeppelin, Central, and Shepard pit areas assume 0.5 ft soil depth.

Calculated Topsoil/Organics Totals By Area
Stockpiles, Pit, and other Cleared Areas

Area#	Topsoil Cubic Yards	Organics Cubic Yards
1	113,050	18,842
2		
3		
4		
5		
6		
7		
8	134,117	22,353
9		
10		
11	78,625	13,104
12		
13	156,714	26,119
13A	8,813	1,469
13B	38,283	6,381
14		
15		
16	43,697	7,283
17	25,424	4,237
1p	129,590	21,598
2p	18,725	3,121
3p	9,072	1,512
18		
19		
20		
21		
22		
23		
24		
25		
26		
27		
27A	245	41
4p	151,742	25,290
5p	14,418	2,403
6p	1,745	291
Totals	**924,262**	**154,044**

Note: Topsoil and organic volumes calculated by assuming 0.5 feet of organics underlain by 3 feet of topsoil.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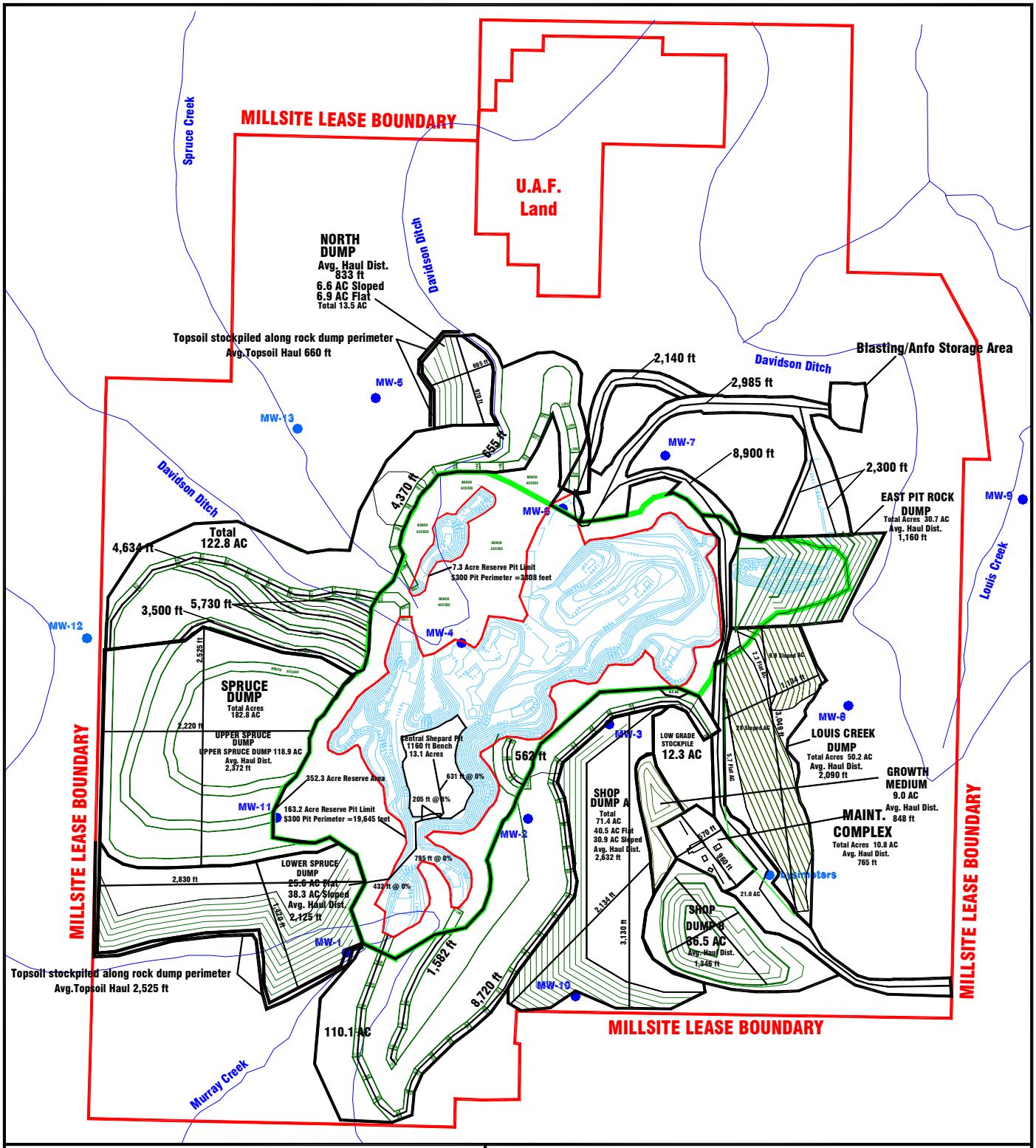
#26
#3
#27A
#16
#12
#13B
#27
#13A
#13
#14
1p 6p Pit Designation
#7 Upland Areas
#25 Wetland Areas
FORT KNOX
KINROSS GOLD USA
FAIRBANKS GOLD MINING, INC.
TRUE NORTH PROJECT
Upland/Wetland Areas
minesite.dwg
1"=1500'
JB 8/18/00
Fig. 3



LEGEND: Contour Line | Dump/Road Contour | Dump/Road Toe | Pit Design Limit | Pit Disturbance Limit

NOTES: Topographic lines based upon 2000 flyover topography, and should not be used for detailed engineering purposes. Pit outlines based upon most current drilling information and economics, and are updated periodically.

SCALE (ft): 0 1000 2000

N

Revisions:
09/21/01: minimize permit issues, per FGMI management.
10/22/01: modify road/dump footprint for MW access. Add MW-12.
11/11/01: change dump names, compute volumes. Add MW-13.
12/16/01: phase II reclamation cost estimate

Date: December 20, 2001

APPENDIX D

TRUE NORTH PROJECT
Reclamation-Admendment