



# MORRISON COPPER/GOLD PROJECT PROJECT DESCRIPTION

Prepared by:

Pacific Booker Minerals Inc.  
#1702 – 1166 Alberni St.  
Vancouver, B.C.  
V6E 3Z3

Submitted to:

B.C. Environmental Assessment Office  
PO Box 9426 Stn Prov Govt  
Victoria, B.C.  
V8W 9V1

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**Table of Contents**

|           |   |           |
|-----------|---|-----------|
| <b>1.</b> | <b>EXECUTIVE SUMMARY</b> .....                                | <b>1</b>  |
| <b>2.</b> | <b>PROONENT</b> .....   | <b>3</b>  |
| <b>3.</b> | <b>CLAIMS</b> .....   | <b>4</b>  |
| <b>4.</b> | <b>MORRISON PROPERTY</b> .....                                | <b>6</b>  |
| 4.1       | LOCATION.....   | 6         |
| 4.2       | HISTORY.....  | 6         |
| 4.3       | RECENT EXPLORATION WORK.....                                  | 7         |
| 4.3.1     | <i>Regional Geology</i> .....                                 | 8         |
| 4.3.2     | <i>Geology of the Morrison Deposit</i> .....                  | 9         |
| 4.3.3     | <i>Mineralization</i> .....                                   | 9         |
| 4.4       | MINERAL RESOURCE .....  | 10        |
| <b>5.</b> | <b>MORRISON PROJECT</b> .....                                 | <b>11</b> |
| 5.1       | MINE PLAN.....  | 12        |
| 5.1.1     | <i>Open Pit</i> .....   | 12        |
| 5.1.2     | <i>Mining Methods</i> .....                                   | 13        |
| 5.2       | METALLURGY/PROCESSING .....                                   | 13        |
| 5.3       | PROJECT FOOTPRINT.....  | 16        |
| 5.4       | ON-SITE COMPONENTS.....                                       | 17        |
| 5.4.1     | <i>Property Access</i> .....                                  | 18        |
| 5.4.2     | <i>Plant</i> .....  | 18        |
| 5.4.3     | <i>Overburden and organic bearing material storage;</i> ..... | 18        |
| 5.4.4     | <i>Borrow Pits</i> .....                                      | 18        |
| 5.4.5     | <i>Waste Rock Disposal</i> .....                              | 19        |
| 5.4.6     | <i>Low Grade Ore Storage</i> .....                            | 19        |
| 5.4.7     | <i>Tailing Storage Facility</i> .....                         | 19        |
| 5.4.8     | <i>Roads and Interconnecting Corridors</i> .....              | 21        |
| 5.5       | OFF-SITE INFRASTRUCTURE .....                                 | 21        |
| 5.5.1     | <i>Telecommunications</i> .....                               | 21        |
| 5.5.2     | <i>Electrical Power</i> .....                                 | 21        |
| 5.5.3     | <i>Roads and Highways</i> .....                               | 24        |
| 5.5.4     | <i>Concentrate Transportation</i> .....                       | 24        |
| 5.5.5     | <i>Accommodations</i> .....                                   | 26        |
| 5.5.5.1   | Pre-Production (Construction) Phase Camp.....                 | 26        |
| 5.5.5.2   | Production (Operating) Phase Camp.....                        | 26        |
| 5.6       | WATER MANAGEMENT PLAN .....                                   | 26        |
| 5.7       | PROJECT PHASES.....   | 29        |
| 5.7.1     | <i>Pre-Production</i> .....                                   | 29        |
| 5.7.2     | <i>Production</i> .....                                       | 29        |
| 5.7.3     | <i>Closure and Reclamation</i> .....                          | 29        |
| 5.8       | WORK FORCE .....  | 29        |
| <b>6.</b> | <b>ENVIRONMENTAL ASSESSMENT PROGRAM</b> .....                 | <b>31</b> |
| 6.1       | INTRODUCTION.....   | 31        |
| 6.2       | ENVIRONMENTAL ASSESSMENT (EA) PROCESS.....                    | 31        |
| 6.2.1     | <i>Regulatory Framework</i> .....                             | 33        |
| 6.2.1.1   | Provincial.....   | 33        |
| 6.2.1.1   | Federal.....  | 34        |
| 6.3       | PUBLIC CONSULTATION .....                                     | 34        |



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|        |  |    |
|--------|--|----|
| 6.3.1  | <i>First Nations Consultation and Participation</i> .....                | 34 |
| 6.4    | LAND USE.....  | 35 |
| 6.5    | ENVIRONMENTAL SETTING AND EFFECTS ASSESSMENT .....                       | 35 |
| 6.6    | ENVIRONMENTAL ISSUES .....   | 36 |
| 6.6.1  | <i>Surface Water Hydrology and Quality</i> .....                         | 36 |
| 6.6.2  | <i>Ground Water Hydrogeology and Quality</i> .....                       | 37 |
| 6.6.3  | <i>Acid Rock Drainage / Metal Leaching (ARD/ML)</i> .....                | 37 |
| 6.6.4  | <i>Fisheries and Aquatic Species</i> .....                               | 38 |
| 6.6.5  | <i>Lake and Stream Sediments</i> .....                                   | 38 |
| 6.6.6  | <i>Flora and Fauna Studies &amp; Terrestrial Ecosystem Mapping</i> ..... | 38 |
| 6.6.7  | <i>Surficial Geology &amp; Soils</i> .....                               | 39 |
| 6.6.8  | <i>Seismicity &amp; Terrain Stability</i> .....                          | 39 |
| 6.6.9  | <i>Climate and Air Quality</i> .....                                     | 40 |
| 6.6.10 | <i>Noise</i> .....   | 40 |
| 6.6.11 | <i>Archaeology, Traditional Knowledge and Use</i> .....                  | 40 |
| 6.6.12 | <i>Socio-Economic Assessment</i> .....                                   | 41 |
| 6.6.13 | <i>Public Health &amp; Safety</i> .....                                  | 41 |
| 7.     | PROJECT SCHEDULE .....   | 42 |

**ABBREVIATIONS**

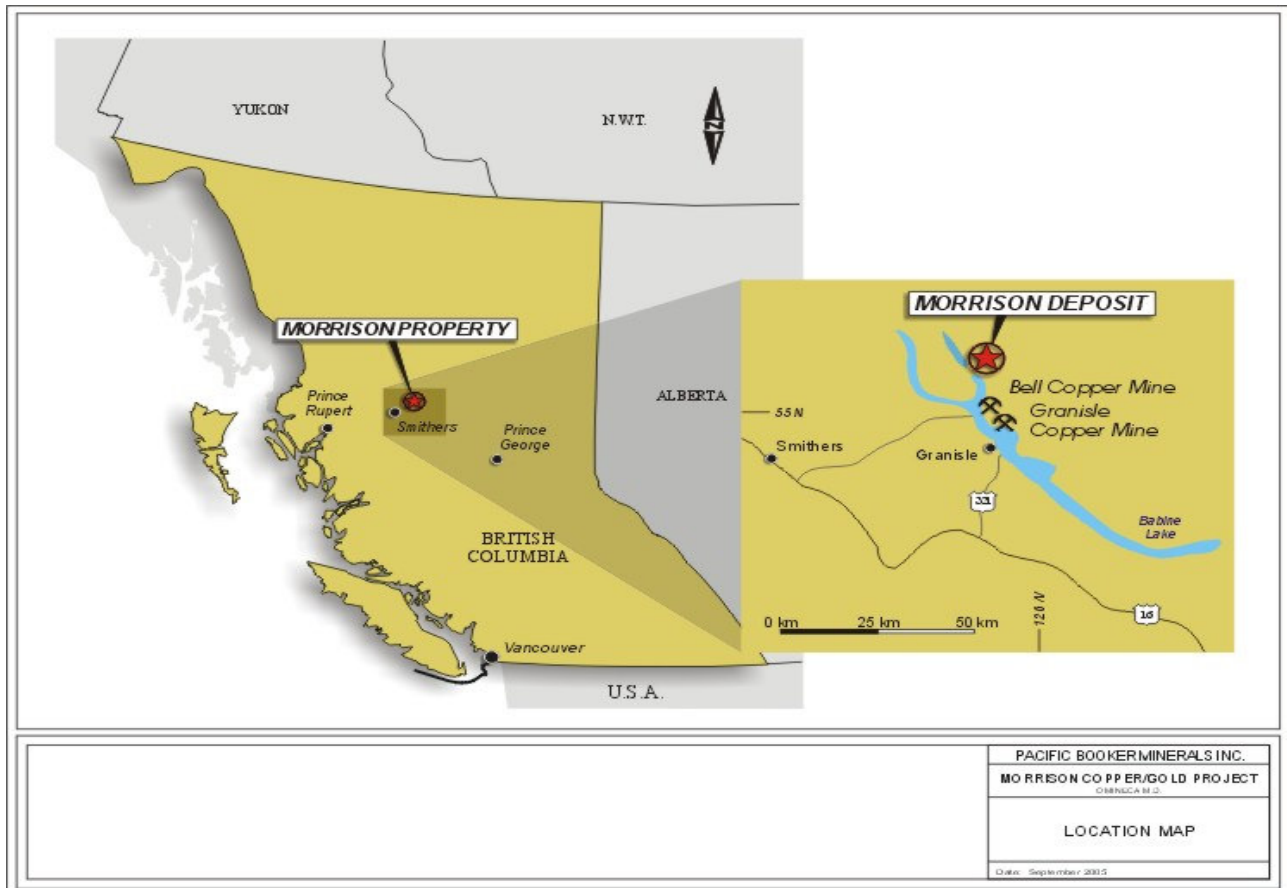
|        |   |
|--------|---|
| ABA    | Acid – Base Accounting  |
| ARD    | Acid Rock Drainage  |
| Au     | Gold  |
| BC     | British Columbia  |
| BCEAA  | BC Environmental Assessment Act   |
| BCEAO  | BC Environmental Assessment Office  |
| BCEMPR | BC Ministry of Energy, Mines and Petroleum Resources  |
| BCMAL  | BC Ministry of Agriculture and Lands (formerly Ministry of Sustainable Resource Management*)                                      |
| BCMOE  | BC Ministry of Environment (formerly Ministry of Water, Land and Air Protection*)   |
| BFP    | Biotite Feldspar Porphyry   |
| CEAA   | Canadian Environmental Assessment Agency  |
| Cu     | Copper  |
| CST    | Cleaner Scavenger Tailings  |
| EC     | Environment Canada  |
| EA     | Environmental Assessment  |
| FISS   | Fisheries Information Summary System  |
| FOC    | Fisheries and Oceans Canada   |
| HADD   | Section 35 of the <i>Fisheries Act</i> , which prohibits the harmful alteration, disruption or destruction (HADD) of fish habitat |
| HPGR   | High Pressure Grinding Roll   |
| HDPE   | High Density Polyethylene   |
| ICP    | Inductively Coupled Plasma elemental analysis methodology   |
| KP     | Knight Piésold Ltd  |
| LBN    | Lake Babine Nation  |



|        |   |
|--------|---|
| LRMP   | Land and Resource Management Plan   |
| MEM    | BC Ministry of Energy and Mines (now BC Ministry of Energy, Mines and Petroleum Resources*) |
| ML/ARD | Metal Leaching / Acid Rock Drainage   |
| MLRMP  | Morice Land and Resource Management Plan  |
| Mo     | Molybdenum  |
| NAG    | Non-Acid Generating Rock  |
| NTS    | National Topographic System   |
| PAG    | Potentially Acid Generating Rock  |
| PBM    | Pacific Booker Minerals Inc.  |
| PEM    | Predictive Ecosystem Mapping  |
| PLT    | Point Load Tests  |
| RMR    | Rock Mass Rating  |
| RST    | Rougher Scavenger Tailings  |
| SAG    | Semi-Autogenous Grinding  |
| TOR    | Terms of Reference  |
| TSF    | Tailings Storage Facility   |
| UCS    | Unconfined Compressive Strength   |
| WEI    | Wardrop Engineering Inc.  |
| WMF    | Waste Management Facility   |
| XRF    | X-Ray Fluorescence Spectroscopy elemental analysis methodology                              |

## 1. EXECUTIVE SUMMARY

**Pacific Booker Minerals Inc. (PBM)**, a publicly traded company, owns the mineral rights to the Morrison property located in Central British Columbia, Canada. The property is approximately 65km Northeast of Smithers within 30 km of two former copper/gold/silver producing mines, Bell and Granisle. Figure 1 shows the location of Morrison Property.



**Figure 1 – Morrison Project Location Map 1**

The Morrison Property has the advantage of existing regional infrastructure including a deep-sea shipping terminal at the port of Stewart, a high speed forestry road network, hard surface highways, nearby electrical high voltage power and full service communities within daily commuting distance from the Project site and a regional airport at Smithers.

The Morrison property has a porphyry copper/gold/molybdenum deposit for which a 43-101 compliant mineral Resource Estimate was completed May 4, 2007. The measured/indicated mineral resource at a 0.30 CuEq cut-off is 206,869,000 tonnes grading 0.46% Cu equivalent consisting of 0.39% Cu, 0.20gAu/t and 0.005% Mo. The contained metal is 1,787,780,000 lbs Cu, 1,306,300 oz Au and 20,676,000 lbs Mo.



In addition to the above, the inferred resource is 56,534,000 tonnes grading 0.47% Cu equivalent. This consists of 0.40% Cu, 0.21gAu/t and 0.005% Mo. The contained inferred metals are 494,720,000 lbs Cu, 374,400 oz Au and 6,231,000 lbs Mo.

PBM is in the advanced stage of a feasibility study to evaluate the Morrison property. PBM is proposing an open-pit mining and milling operation for the production of copper/gold/molybdenum concentrate from the Morrison deposit.

The proposed mine is an open pit mine utilizing conventional truck and shovel equipment. The ore production rate will be 30,000 tonnes per day or approximately 11 million tonnes of ore per year. The proposed treatment process is a conventional crushing, grinding and flotation system resulting in the production of approximately 155,000 tonnes of concentrate per year containing copper and gold. A separate molybdenum concentrate will be produced. Construction is expected to commence in 2009 with production in 2011.



## 2. PROPONENT

**PBM** is a public traded company listed on the TSX Venture Exchange (Trading Symbol: BKM) and the American Stock Exchange (Trading Symbol: PBM). PBM owns the Morrison property located in Central British Columbia. In 1997 PBM entered into an agreement with Noranda Inc. to obtain a 50% interest in the Morrison property. PBM subsequently purchased the Morrison property from Falconbridge Limited (formerly Noranda Inc.) in April 2004, with no net smelter return or concentrate commitments to Falconbridge Limited.

The Company maintains its head office in Vancouver as follows:

**Pacific Booker Minerals Inc.**  
#1702-1166 Alberni Street  
Vancouver, BC, Canada  
V6E 3Z3  
Phone: 604 681-8556  
Fax: 604 687-5995  
Toll Free: 1-800-747-9911  
E-mail: [info@pacificbooker.com](mailto:info@pacificbooker.com)  
Website: [www.pacificbooker.com](http://www.pacificbooker.com)

The Company is managed under the direction of its President, Chief Executive Officer and Chief Financial Officer as follows:

**Mr. GREGORY R. ANDERSON, President & CEO**  
**Mr. JOHN PLOURDE, Investor Relations**  
**Mr. ERIK TORNQUIST, Executive VP & COO**  
**Ms. RUTH SWAN, CFO**

The Company management in turn operates under the direction of a seven member Board of Directors as follows:

**Mr. WILLIAM DEEKS, Chairman of the Board**  
**Mr. GREGORY R. ANDERSON, President & CEO**  
**Mr. JOHN PLOURDE, Executive Director**  
**Mr. ERIK TORNQUIST, Executive Director, Executive VP & COO**  
**Mr. MARK GULBRANDSON, Executive Director**  
**Mr. WILLIAM F. WEBSTER, Executive Director**  
**Mr. DENNIS SIMMONS, Executive Director**

The Company through the Board reports regularly to its shareholders, the owners of the Company, as required under the Securities Commissions Regulations in regards to public disclosure requirements.



### 3. CLAIMS

PBM's land position consists of 45 contiguous claims totaling 12,027 hectares. All claims are located within the Omineca Mining Division in Central British Columbia, Canada. PBM is currently pursuing development of claims herein referred to as the Morrison Property. The following Figure 2 shows the Mineral Claims near Morrison Project.

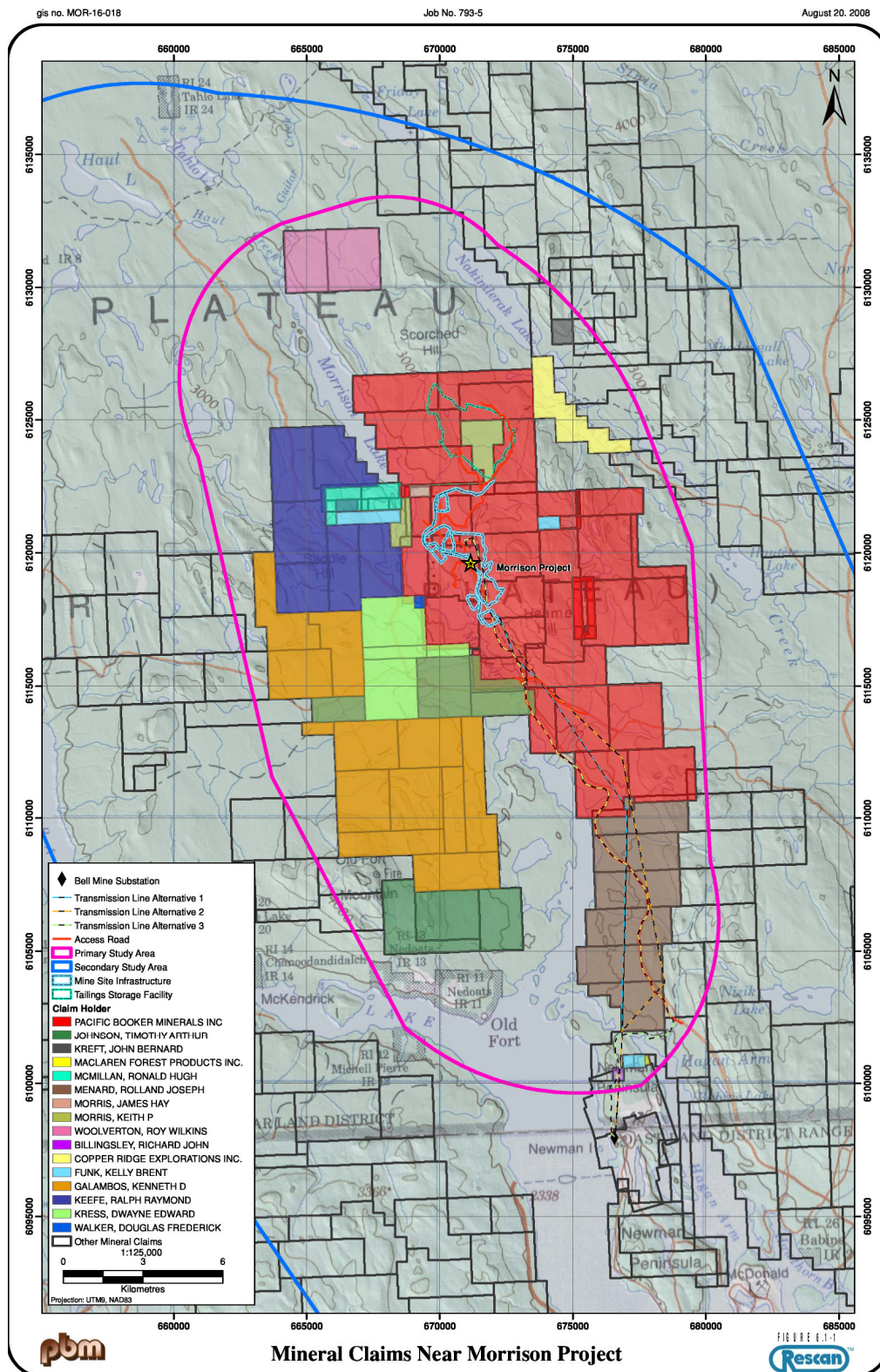
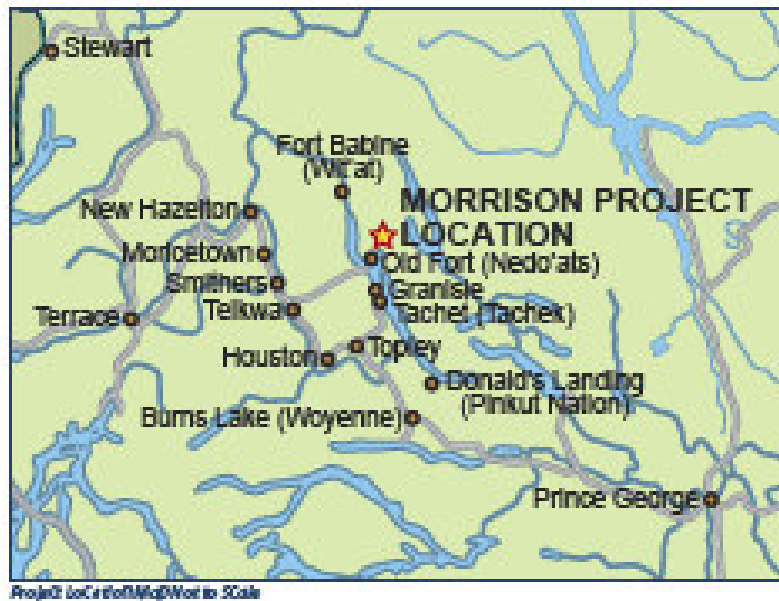


Figure 2 – Mineral Claims near Morrison Project

## 4. MORRISON PROPERTY

### 4.1 LOCATION

**Pacific Booker Minerals Inc. (PBM)** owns the mineral rights to the Morrison property located in Central British Columbia, Canada. Coordinates of the Morrison property are 55° 11' N Latitude and 126° 16' W Longitude and the property is approximately 65km Northeast of Smithers and 35 km north of the Village of Granisle (Figure 3 below). It is within 30 km of two former copper/gold/silver producing mines, Bell and Granisle.



**Figure 3 - Morrison Project Location Map 2**

The Morrison Property has the advantage of existing regional infrastructure. The regional infrastructure includes a deep-sea shipping terminal at the Port of Stewart, a high speed forestry road network, hard surface highways, nearby electrical high voltage power (approximately 25 km from project site) and full service communities (Village of Granisle, Communities of Topley, Houston and Smithers) within daily commuting distance from the Project site and a regional airport at Smithers.

### 4.2 HISTORY

The Morrison property was discovered and initially explored in the early 1960s during the initial rush of porphyry copper exploration in the Babine Lake region. Regional stream sediment sampling in 1962 by the Norex Group of Noranda led to the discovery of the Morrison deposit in 1963. Critical early work on the discovery was carried out by L. Saunders, R. Woolverton and D.A. Lowrie (Woolverton, 1964).

Noranda reports that in 1963, while following up on anomalous copper stream sediment results collected in 1962, copper-bearing biotite feldspar porphyry (“BFP”) as float and outcrop were found in a stream that flows over the copper zone of the Morrison deposit. Trenching of the thin overburden uncovered large areas of relatively unweathered chalcopyrite-bearing bedrock on both sides of the stream (650m by 250m on the west side and 250m by 250m on the east side), where a copper soil geochemical anomaly had been defined.

Further delineation of the deposit took place during the period 1963 to 1973 and included soil geochemical, electromagnetic (“EM”), magnetic and IP surveys together with trenching, geological mapping, alteration studies and 13,890 metres of diamond drilling. The drilling, which utilized the magnetic surveys as a guide in early programs, consisted of ninety-five diamond drill holes, most inclined at  $-45^{\circ}$  and oriented east or west. The first 65 holes were AEX (27mm) diameter. The remaining 30 were BQ (36.5 mm) diameter. By 1968 diamond drilling had defined two zones immediately northwest and southeast of a small central pond. The position of these zones corresponds closely to the strong copper geochemical and magnetic anomalies previously outlined during Noranda’s earlier surface exploration.

Geological mapping in 1963 and 1967 indicated the possibility that the two zones might be offset segments of a single faulted deposit. Hydrothermal alteration studies initiated in 1967 showed that the deposit had well-defined biotite-chlorite zoning and that biotitization was very closely related to copper grades. Although data were sparse, biotitization in the large, poorly tested area between the two known zones appeared to be widespread and strong, indicating that this area had the potential to be mineralized. Drilling in 1970 to test this central area was successful in defining mineralization and better establishing the limits of the fault offset portions of the copper zone. This increased the known lateral extent of the deposit significantly.

Following the 1973 drill program, Noranda did no further field work at Morrison. In 1988 the company investigated the gold content of the deposit by assaying 477 composite samples. Noranda completed preliminary pit design and operating studies in 1988 and 1990. The purpose of the studies was to establish whether Morrison could supply feed to the Bell Mine; however, Noranda concluded that at that time, such an operation would not be economic.

No further drilling was done until PBM optioned the property in October, 1997. PBM conducted a National Instrument 43-101 compliant, three-phase drilling program, which commenced in January 1998 in order to:

- Establish grade and continuity of copper values;
- Establish gold grades; and
- Explore the depth potential of the copper/gold bearing system.

### **4.3 RECENT EXPLORATION WORK**

PBM’s work on the Morrison property has consisted of surface backhoe trenching, test-pitting and drilling for resource estimation, metallurgical testing, geotechnical engineering, hydrogeology and overburden estimation.

- Between 1998 and 2003 PBM completed surface backhoe trenching and 82 diamond drill holes totaling 25,245 metres within the limits of the Morrison deposit previously drilled by Noranda;
- In 2005, four additional exploration holes (957 m) were completed and four large PQ holes (700 m) were drilled for metallurgical samples twinning older holes;
- In 2006, seven geotechnical holes (1464 m) were drilled but not assayed and 18 condemnation holes (643 m) were drilled in outlying areas that were regarded as potential plant, waste and tailings sites. These holes were logged but not assayed as no visible mineralization was encountered. Several of these holes were subsequently used for water monitoring; and
- In 2007, fifteen additional geotechnical and 16 ground water monitoring holes (1008 m) were drilled in the proposed tailings storage facility impoundment area, the open pit and plant site. Prior to the drilling a resistivity survey was completed.
- In 2008, three geotechnical and six groundwater drill holes were drilled in the proposed plant site; waste rock storage and low-grade ore stockpile areas.

Snowden Mining Industry Consultants completed a report entitled “Morrison Copper/Gold Project Resource Estimation and Pit Optimization Study” in March 2003. This study indicated that under favourable economic conditions, an open pit mine at Morrison should generate an economic return.

In 2004 a Preliminary Assessment of the property was conducted by Beacon Hill Consultants (1988) Ltd. and Knight Piésold Ltd. The result of this study indicated that the project had the potential to be viable and that the property should be further developed and, subject to further study, be placed into production.

#### **4.3.1 Regional Geology**

The Morrison deposit is on the northern edge of the Skeena Arch in a region underlain by volcanic, clastic and epiclastic rocks ranging in age from the Lower Jurassic to Lower Cretaceous. These rocks are correlative with the Takla Group, Hazelton Group, Bowser Lake Group, Skeena Group and Sustut Group. They have been block-faulted by a series of post-Eocene, northwesterly-trending series of faults that have created a long linear sequence of horsts and grabens. Some of these structures have been traced over a distance of 100 km. The younger Middle Jurassic to Cretaceous rock is often preserved in the down-dropped blocks, with the older Lower and Middle Jurassic rocks exposed in the Highlands.

Intrusive rocks in the area include the Early Jurassic diorite and granodiorite Topley intrusions, Eocene rhyolite and rhyodacite intrusions, and, most importantly from an economic viewpoint, the Eocene Babine igneous suite which consists of quartz, hornblende, biotite and plagioclase pyritic intrusions.

### 4.3.2 Geology of the Morrison Deposit

The Morrison deposit is a zoned annular porphyry copper-gold deposit largely within a multi-phased Eocene 'Babine type' biotite feldspar porphyry (BFP) body which intrudes Middle to Upper Jurassic Ashman Formation siltstone and greywackes. The lower part of this sequence is mostly marine pebble conglomerate, interbedded with maroon to greenish grey sandstone and siltstone, which change upwards to deeper water well-bedded shaley argillaceous siltstone and greywacke.

The lower marine sequence has abundant bivalves, ammonites, belemnites and fossil wood debris of Middle to Upper Jurassic age.

The intrusive BFP at Morrison is very similar to that at other Babine copper deposits. A complete description of the lithology including chemical and microprobe analysis is presented by Carson and Jambor (1975). The BFP intrusive at Morrison is a faulted plug with nearly vertical contacts, which occupies a northwesterly-oriented elliptical area of 900 by 500 metres width. Before block faulting, the plug was roughly circular in plan with a diameter of about 500 metres. Numerous offshoots of the plug, many of which are 1 to 500 m-wide northerly-trending dykes or sills, occur abundantly in the Ashman sedimentary rocks.

The unaltered BFP is speckled with abundant 0.25 to 5 mm phenocrysts of plagioclase, biotite and hornblende in a fine-grained matrix of the same materials as well as quartz and K-feldspar. Apatite and magnetite are common accessory minerals.

### 4.3.3 Mineralization

The copper zone forms the central core of the Morrison deposit. The zone is predominantly hosted in a potassic altered BFP plug with intercalations of older siltstone. All copper sulphides are primary. Chalcopyrite is the main copper-bearing mineral. The copper mineralization occurs in three principal types; (a) fine-grained disseminated chalcopyrite mineralization probably related to microfractures; (b) chalcopyrite-bearing fractures commonly 1-3 mm wide containing coarser chalcopyrite, and (c) late-stage fracture-filling and disseminated sulphides. Within this lithologic and structural framework, the copper zone is defined by the limits of well-developed copper mineralization with associated gold that consistently grades greater than 0.20% Cu. The peripheral limits of the copper zone are generally abrupt as the copper content declines outward to less than 0.10% Cu within a 40 m-wide margin around the copper zone. The degree of structural development and hydrothermal alteration within the internal core of the copper zone are locally more intense, and these favourable elements contribute to the development of higher-grade zones of copper and gold mineralization. Although the copper to gold ratios may vary within these high grade zones, the copper grades locally are greater than 0.50% Cu, and gold grades frequently range from 0.40 to 0.60gAu/t and up to 1.00gAu/t over short intervals. Minor amounts of bornite occur in the higher grade copper zones as disseminations. Spotty occurrences of galena and sphalerite occur within carbonate-cemented veins within and near the East and West Faults.

#### 4.4 MINERAL RESOURCE

The Morrison property has a porphyry copper/gold/molybdenum deposit for which a 43-101 compliant mineral Resource Estimate was completed by GeoSim Services Inc. in May 4, 2007. Based on the classification categories measured, indicated and inferred the following Table 1 lists the resources estimated:

**Table 1 – Resource Estimate**

| Cutoff<br>% Eq<br>Cu | Measured + Indicated |                 |           |             |           | Inferred           |               |           |             |           |
|----------------------|----------------------|-----------------|-----------|-------------|-----------|--------------------|---------------|-----------|-------------|-----------|
|                      | Tonnes ><br>Cutoff   | Average Grade   |           |             |           | Tonnes ><br>Cutoff | Average Grade |           |             |           |
|                      |                      | Cu<br>EQ<br>(%) | Cu<br>(%) | Au<br>(g/t) | Mo<br>(%) |                    | Cu EQ<br>(%)  | Cu<br>(%) | Au<br>(g/t) | Mo<br>(%) |
| 0.15                 | 281,652,590          | 0.40            | 0.34      | 0.17        | 0.005     | 87,806,392         | 0.38          | 0.33      | 0.16        | 0.004     |
| 0.20                 | 265,954,503          | 0.41            | 0.35      | 0.17        | 0.005     | 81,798,181         | 0.40          | 0.34      | 0.17        | 0.005     |
| 0.25                 | 238,475,426          | 0.44            | 0.37      | 0.18        | 0.005     | 61,661,854         | 0.45          | 0.38      | 0.19        | 0.004     |
| 0.30                 | 206,869,448          | 0.46            | 0.39      | 0.20        | 0.005     | 56,524,341         | 0.47          | 0.40      | 0.21        | 0.005     |
| 0.35                 | 170,772,241          | 0.49            | 0.42      | 0.21        | 0.005     | 47,875,646         | 0.50          | 0.42      | 0.22        | 0.005     |
| 0.40                 | 133,351,540          | 0.52            | 0.44      | 0.22        | 0.005     | 38,587,285         | 0.53          | 0.45      | 0.23        | 0.005     |

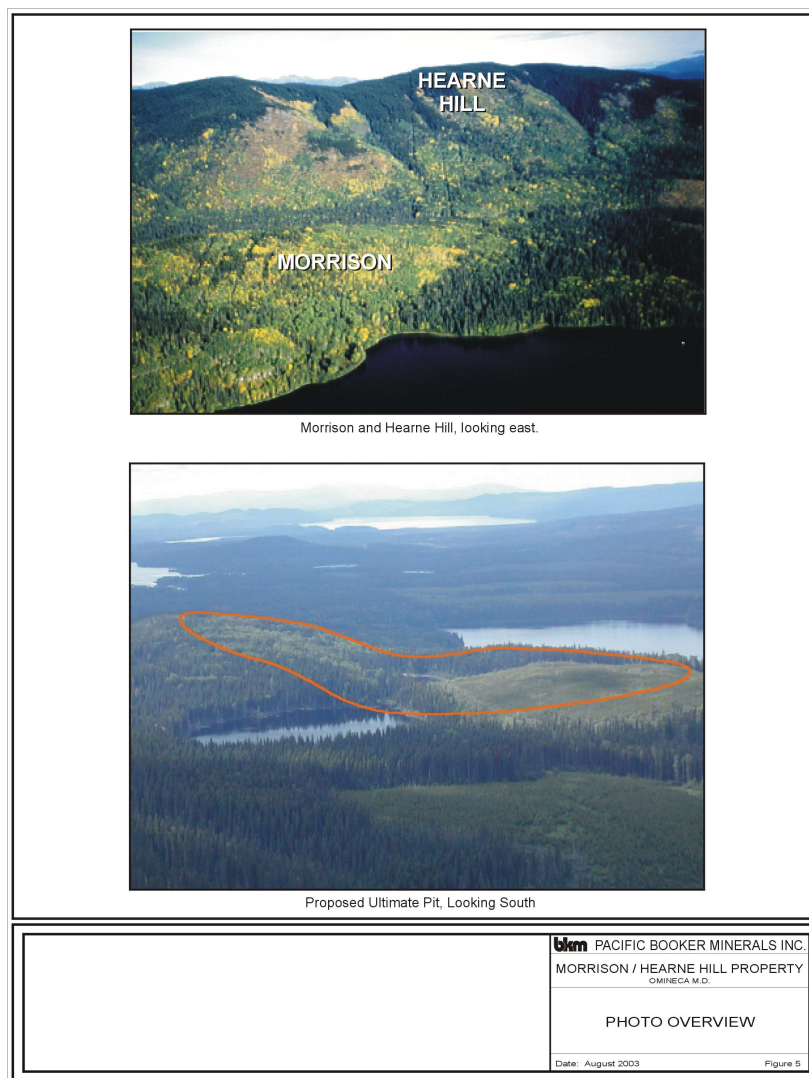
The measured/indicated mineral resource at a 0.30 CuEq cut-off is 206,869,000 tonnes grading 0.46% Cu equivalent consisting of 0.39% Cu, 0.20gAu/t and 0.005% Mo. The contained metal is 1,787,780,000 lbs Cu, 1,306,300 oz Au and 20,676,000 lbs Mo. In addition to the above, the inferred resource at a 0.30 CuEq cut-off is 56,534,000 tonnes grading 0.47% Cu equivalent. This consists of 0.40% Cu, 0.21gAu/t and 0.005% Mo. The contained metal is 494,720 lbs Cu, 374,400 oz Au and 6,231,000 lbs Mo.

The majority of the resources contained within the Morrison deposit can be categorized as measured and indicated.

## 5. MORRISON PROJECT

The study work to date indicates that the Morrison deposit has the potential to be mined and that high copper recovery and acceptable concentrates can be achieved. The deposit is considered to have potential for development utilizing surface extraction methods and conventional flotation processing to produce a copper/gold/molybdenum concentrate. Metallurgical test-work indicates that the metallurgy of the Morrison deposit is relatively straightforward.

PBM proposes to develop the Morrison deposit as an open-pit mining and milling operation for the production of copper/gold/molybdenum concentrate (Figure 4 below). Construction is expected to commence in 2009 with production in 2011.



**Figure 4 – Morrison Deposit Overview**



## 5.1 MINE PLAN

The Morrison Project is proposed to be an open pit mine utilizing conventional truck and shovel equipment. The ore production rate will be 30,000 tonnes per day or approximately 11 million tonnes of ore per year. The proposed treatment process is a conventional crushing, grinding and flotation system resulting in the production of approximately 155,000 tonnes of concentrate per year containing copper and gold. A separate molybdenum concentrate will be produced.

### 5.1.1 Open Pit

An open pit mine is planned as a four-phase mining operation as shown in the figure 5 below:

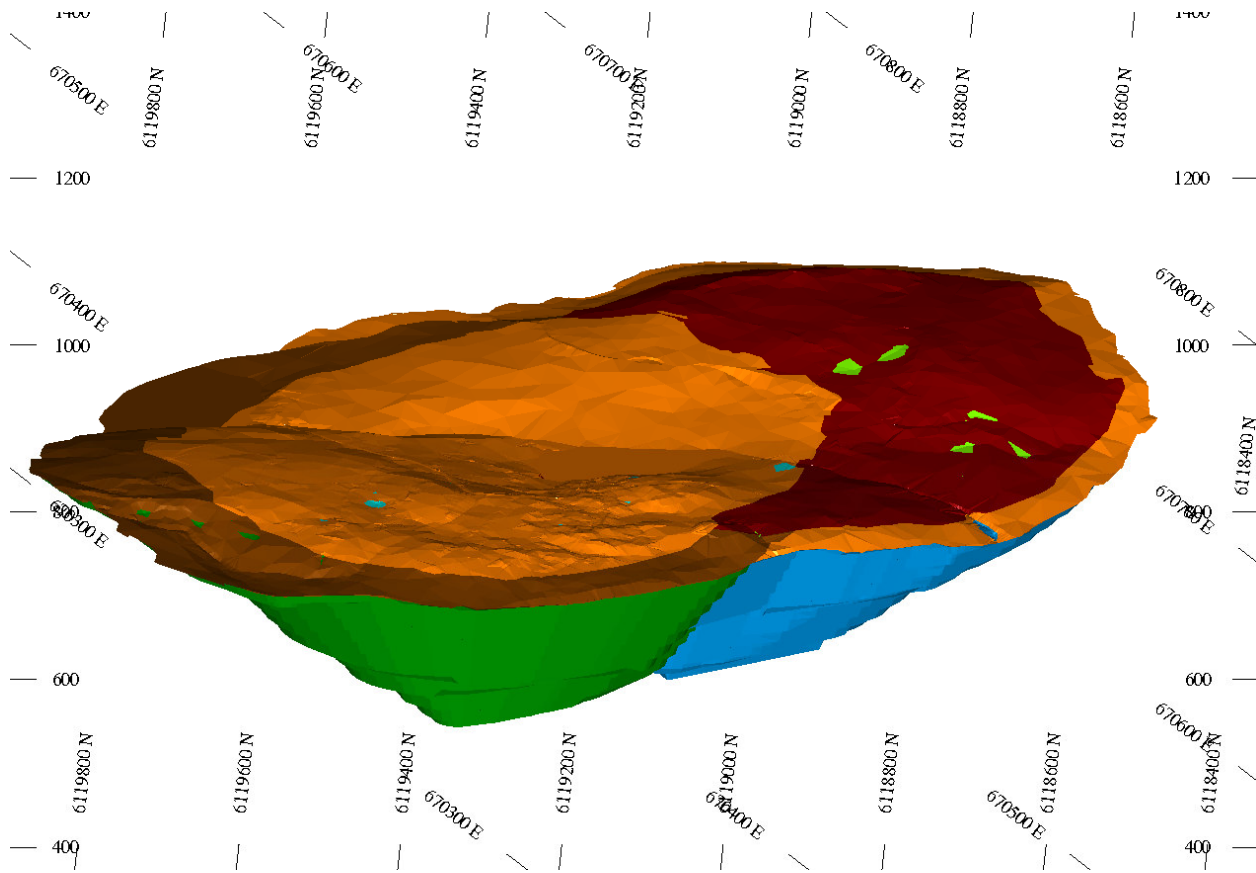


Figure 5 – Open Pit

The first Phase will be developed in the northwest end of the deposit, encompassing some of the higher-grade ore. Phase 2 will consist of a second cone the south in conjunction with a deeper pit. Phase 3 and 4 will be push backs to the North then finally to the South with the pit depth reaching approximately 396 metres below the surface. The planned production rate is 30,000 t/d ore and an average of 30,000 t/d waste over the life of the pit.

### **5.1.2 Mining Methods**

The open pit mine has been designed for four phases of pit development by conventional truck – shovel methods. The overall life of mine strip ratio is relatively low at 0.82:1.0 waste to ore. However the production will typically average 29.2 million tpa or approximately 80,000 tpd for the first two years declining to 65,000 tpd and then 60,000tpd. The mine has been designed for operations with shovels in the 18 m<sup>3</sup> to 32 m<sup>3</sup> range and trucks in 150 t to 220 t capacity range with the typical support equipment associated with this type of primary mining equipment.

Conventional open pit mining methods will be used incorporating drilling, blasting, loading and haulage. Ore and waste will be drilled and blasted using 270 mm diameter holes drilled on an 8.0m x 8.5m pattern. A 70%/30% emulsion/ANFO mix will be used for blasting, resulting in an estimated powder factor of about 0.26kg/t of material. A combination of shovels and trucks will be used for loading and hauling the ore and waste from the pit to a primary crusher located near the top of the ramp. Waste-material will be transported by truck to the main disposal area located east of the open pit within the pit catchment. Low grade ore will be placed in a stockpile north of the pit.

In addition to the primary mining equipment several pieces of auxiliary and service equipment will be required to maintain haul roads, waste dumps and general pit operations.

Mining and milling activities will be conducted 24 hours per day, 365 days per year.

## **5.2 METALLURGY/PROCESSING**

Metallurgical test-works carried out indicates that the metallurgy of the Morrison deposit is relatively straightforward and that good copper recoveries and acceptable concentrates can be achieved.

Ore will be processed through a conventional milling circuit consisting of a primary crusher, secondary cone crusher followed by High Pressure Grinding Rolls (HPGR), primary ball mills and flotation circuit including regrinding tower mills as shown in Figure 6-2. Copper will be concentrated by flotation in large tank cells then cleaned and filtered to achieve acceptable shipping moistures without thermal drying. A molybdenum concentrate will be achieved from the ore zones containing significant amount of molybdenite.

The mill flow sheet is shown in the Figure 6 and described below:

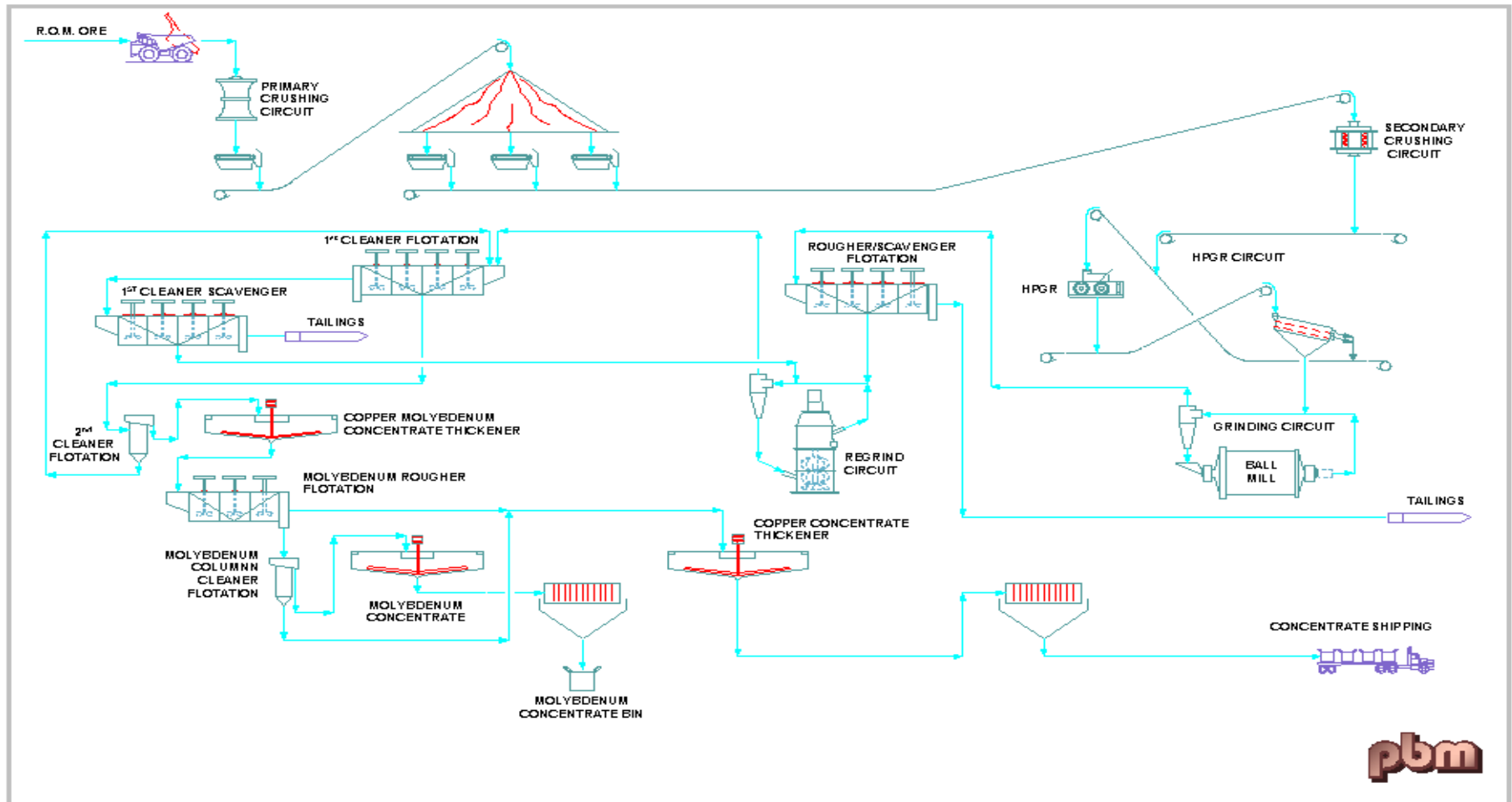


Figure 6 – Mill Flow Sheet

- The ore will be processed through a 1370 mm x 1900 mm primary gyratory crusher located approximately 500 meters from the pit rim, and then the crushed material will be conveyed to the coarse ore stockpile near the mill;
- The ore will be reclaimed from the coarse ore stockpile by apron feeders, and fed by conveyor to a cone crusher (MP 1000 with 750 kW motor) followed by HPGR (2.4 x 1.7 with 5000 kW motor). The grinding circuit will contain two ball mills (6m x 10.2m with 6700 kW motor);
- The flotation feed will be the cyclone overflow, 80% passing 150 microns. The concentrate will be floated in a bank of eight 200m<sup>3</sup> tank flotation cells. Rougher concentrate will be reground using tower mills. Column flotation with conventional cells will be used for cleaning rougher concentrate;
- The final copper-molybdenum concentrate will be thickened and thickener underflow will be fed to molybdenum flotation. The tailings from the molybdenum circuit and the thickener overflow will be fed to a copper thickener. The thickened copper concentrate in the underflow will be fed to a stock tank that in turn will be fed to a pressure filter; and
- The final molybdenum concentrate will be fed to a thickener with overflow water recycled and underflow fed to a stock tank, which in turn will be fed to a pressure filter. The final molybdenum concentrate will have moisture of approximately 20% and will require a further thermal treatment in concentrate dryer.

Ancillary requirements in the plant will be various types of air instruments, plant and flotation blowers, cranes and reagent systems.

### 5.3 PROJECT FOOTPRINT

The project on-site components and off-site infrastructure with associated activities will be within the area shown in the Figure 7 below:

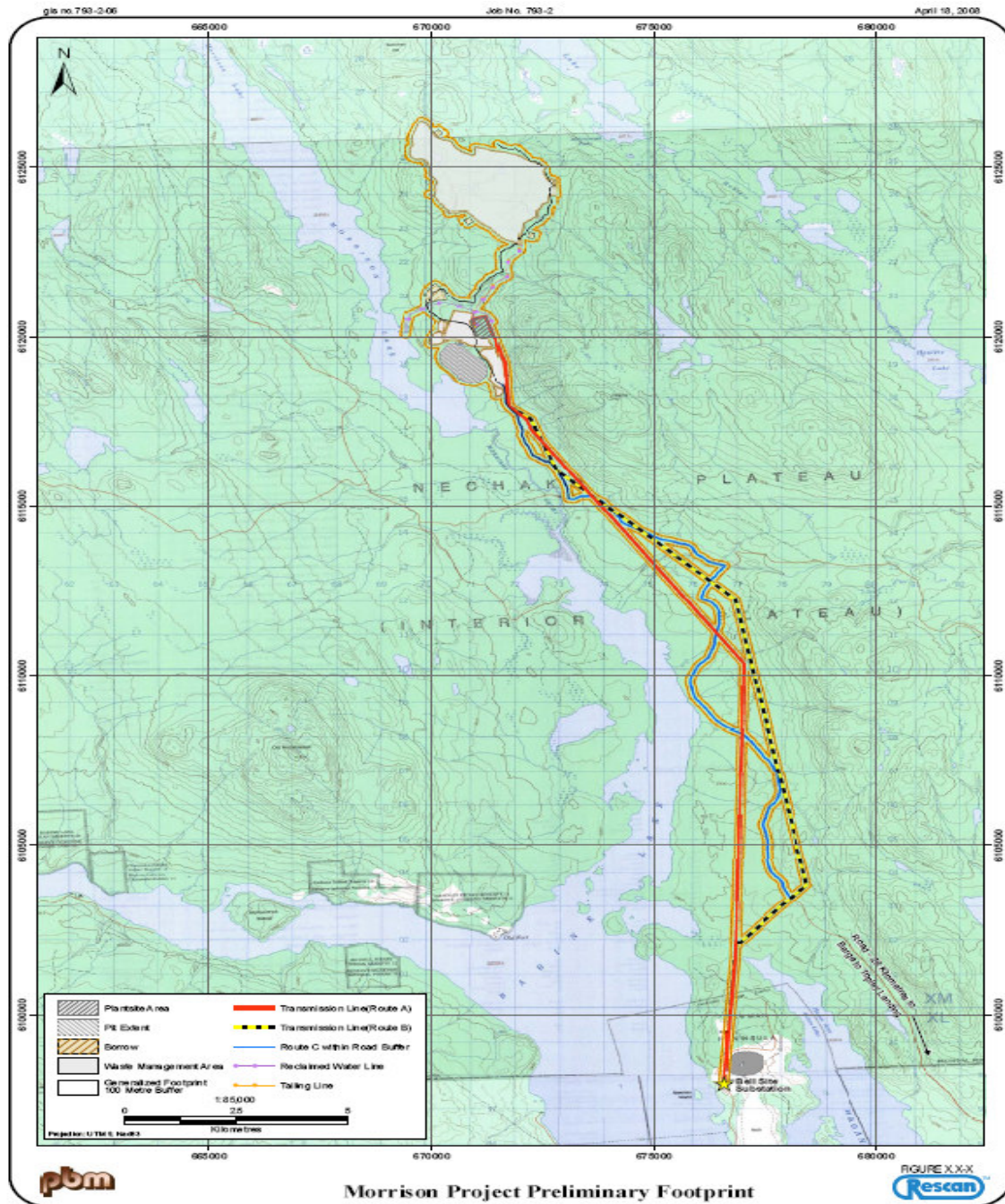


Figure 7 – Morrison Project Preliminary Footprint

### 5.4 ON-SITE COMPONENTS

Within the project footprint on site components of the Morrison Project are shown in Figure 8 below:

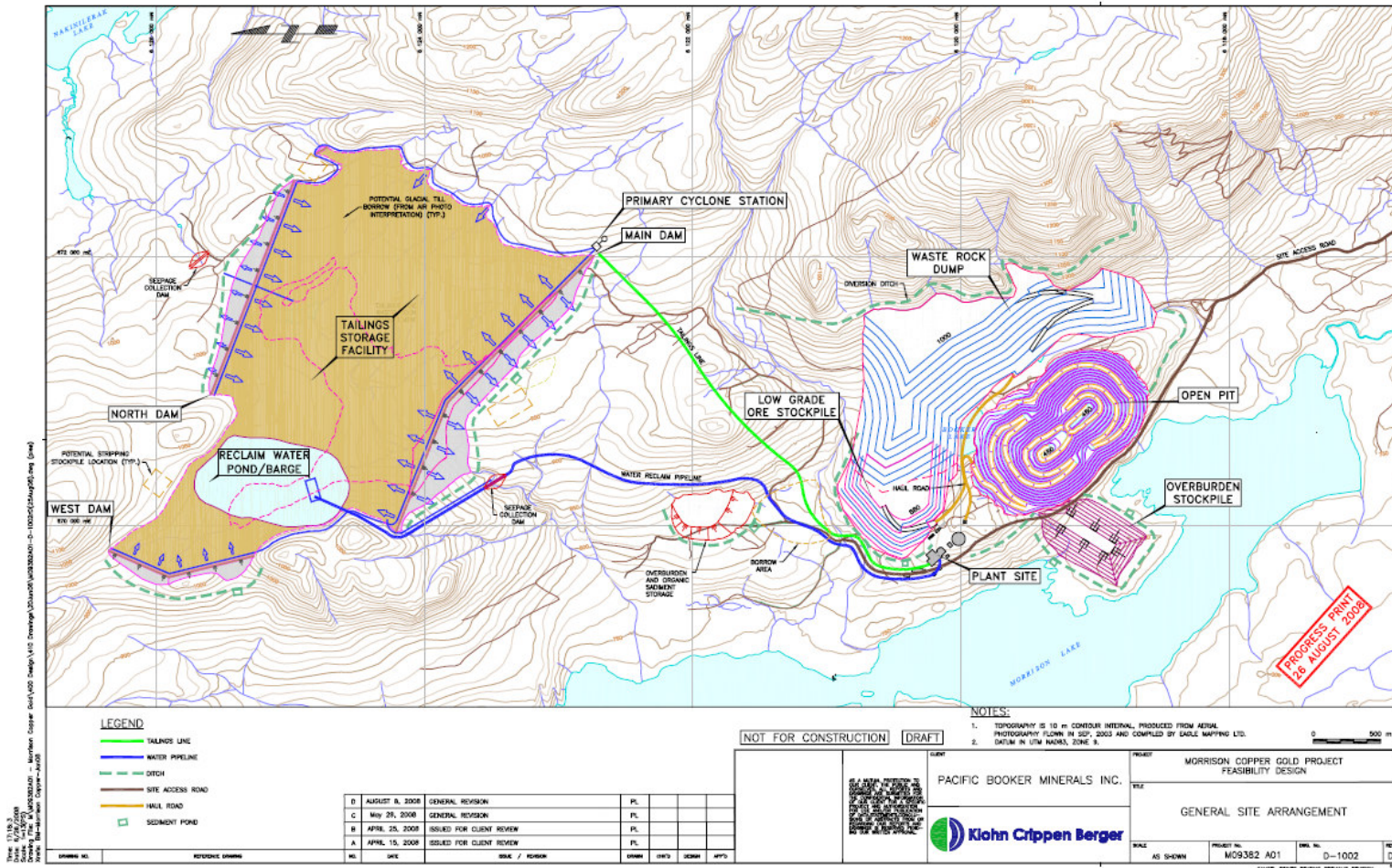


Figure 8 – Morrison Project On-site

In addition to the Open Pit the primary on-site components are

#### **5.4.1 Property Access**

The property location is on the east side of the southern end of Morrison Lake. The forest service road network extends to the south east end of the Morrison deposit. The forest service road will be extended on-site approximately 3km along the west side of the Open Pit to the Plant Site.

#### **5.4.2 Plant**

The plant site will include the following components:

- A 30,000 tonne/day processing plant (mill) for production of copper/gold/molybdenum concentrate;
- Associated mine facilities including:
  - Lab / Assay building;
  - Concentrate load out facilities;
  - Mobile Equipment Shops, Wash and Tire Change;
  - Plant Maintenance Shops;
  - Warehouse;
  - Equipment lay down areas;
  - Mine dry – Adequate for shift changes the facility will be designed for both men and women; and
  - Administration and security buildings - providing adequate space for the project offices of management, administration, and engineering personnel;
- Sewage and waste water management facilities;
- Explosives storage and mixing plant - Explosives will be stored at the site and the supply of explosives will be contracted out to an explosives' supplier. Bulk explosives will be mixed on the site; and
- Fuel Storage - Fuel storage will be sufficient for one month's supply of operations. Access to the site is available at all times, thus the storage facilities will be minimized.

#### **5.4.3 Overburden and organic bearing material storage;**

An estimated 15 million tonnes of overburden will be removed during mining. Overburden comprised of glacial till will be used in dam and road construction. Excess overburden and organic bearing materials will be stored for use in reclamation or permanent disposal.

#### **5.4.4 Borrow Pits**

Where haul distances are excessive borrow pits will provide supplemental gravel and till for dam and road construction. Borrow pits will also be used to provide gravel for concrete.

### **5.4.5 Waste Rock Disposal**

A total of 169 million tonnes of waste will be generated by mining activity over the mine life. The selected management strategy is that PAG waste rock will be disposed of immediately to the north and east of the open pit. Several locations were investigated to determine a favorable location where waste rock can be disposed. The selected location has the following features:

- Waste rock disposal is as close as is feasibly possible to the open pit. This approach reduces diesel fuel use and cost for moving waste rock;
- Sufficient space exists for all the waste rock with a minimum of site disturbance and preparation;
- Contoured against the surrounding mountain side the disposal area surface water will drain into the open pit;
- Has the advantage of facilitating the collection and treatment of runoff water; and
- A location that can be reclaimed in such a manner that the remaining structures can be re-incorporated into the surrounding environment, with as little impact as possible.

Separation of the NAG and PAG is planned with the NAG potentially being used as a base layer for both the waste disposal area and the low grade ore stockpile. A NAG base layer will ensure that groundwater flows through the NAG rather than the PAG thus reducing the chance of flushing stored contaminants from the PAG.

At the end of the mine life, the waste disposal area will contain approximately 169 million tonnes of waste rock. On closure, all potential contaminated drainage will be directed to the open pit while uncontaminated runoff from a vegetated soil cover cap may be directed away from the open pit.

### **5.4.6 Low Grade Ore Storage**

To optimize mill operations low grade ore will be stored in a stockpile for use during the mine life when sufficient newly mined ore is not available and for milling after mine closure. A maximum of 37 million tonnes of low-grade ore will be stored.

### **5.4.7 Tailing Storage Facility**

Tailings will be stored in a tailings storage facility behind secure and fully engineered dams. Locations were investigated to determine the best location where tailings could be stored. The following criteria were used to locate and compare locations:

- Location as close as is feasibly possible to the open pit. This approach results in the low cost for the movement of tailings piped from the process plant;
- A suitable area, sufficient to house all the tailings contained with the minimal of artificial dams or structures;
- A location that has minimal effect on the environment; and



- A location that can be reclaimed in such a manner that the environment is protected and the system is self-sustaining.

The tailings from the proposed open pit at Morrison consist of the following materials:

- Coarse tailings that are considered to be non-acid generating or have a low propensity to be acid generating; and
- Fine tailings that are considered to be acid generating or have a high propensity to be acid generating.

The tailings storage facility will be constructed using cyclone sand and a glacial till core for dam construction. The excess coarse tailings and fine tailings will be deposited in the centre of the waste disposal facility below the surface water pond. A surface water pond would be maintained within the central part of the tailings storage facility to prevent oxidation of the tailings.

The 520 hectares impoundment is in a flat elevated valley at the head of the watershed draining into a creek system, which ultimately drains to Morrison Lake.

The evaluation of the selected location indicated the following:

- No fish habitat was found;
- Creek diversion is straightforward and any make-up of water flows appear to be easy to implement;
- The site is sufficiently far from Morrison lake that there will be little effect, if any on the lake;
- Relatively easy to reclaim;
- The scheduled requirement for dam building material can be accommodated by material from the open pit operations and tailings cycloning, eliminating any need for additional quarrying of rock; and
- The dam heights are low; thus, the aesthetics will be more pleasing to the eye.

The storage of all tailings can be accomplished in a safe, secure and environmentally acceptable manner for the long-term.

The Tailings Storage Facility (TSF) north of the main mine site will include the following:

- Containment dams;
- Borrow pits, overburden and topsoil storage;
- Tailings Pipelines;
- Cyclone Sand;
- Cyclone Sand Distribution Pipeline; and
- Reclaim water barge.

#### **5.4.8 Roads and Interconnecting Corridors**

Mine haul roads will be required for the movement of ore and waste. Also, interconnecting corridors between the mill site and tailings storage facility will be used for tailings transport, process reclaim water, vehicle access road and power line.

### **5.5 OFF-SITE INFRASTRUCTURE**

The Morrison project offsite infrastructure will integrate with the existing regional infrastructure as described below.

#### **5.5.1 Telecommunications**

PBM will use multiple methods of communications to achieve redundancy for both operational effectiveness and emergency preparedness:

- Satellite Internet for Data and VoIP;
- Satellite Telephone;
- Radio and radio telephone (Towertel) services as are available from local suppliers; and
- Cellular telephone (ie if available from the Village of Granisle)

PBM will also consider the use of new technology such as WiMax if and when it is available as a viable option.

#### **5.5.2 Electrical Power**

Electrical power will be supplied by BC Hydro from the Babine Substation located on the west side of Babine Lake in the vicinity of the Village of Granisle. BC Hydro has completed a System Survey Study (SNC Lavelin) to investigate load interconnection options and identify facilities required. A transformer upgrade will be required at the Babine Substation in order to provide 30-35 MW power at 138 kV as shown in Figure 9 below.

Power from BC Hydro will be delivered to the Morrison Mine Site via existing and new transmission lines. PBM will extend the line from the Bell Mine site, located on Newman Peninsula. The 138 kV service, which was extended to the Bell Mine in 1971, is now energized at 25 kV but has been tested to confirm that it can be re-energized to its design voltage. Appropriate arrangements will be negotiated with Xstrata (formerly Falconbridge) and BC Hydro.

BC Hydro has indicated that 2 MW of power at 25 kV is available immediately without any upgrades to their facilities. PBM intends to construct the new power transmission line and a temporary substation early in the Pre-Production period to make this power available during construction. The power will be converted from 25 kV to 138 kV to provide sufficient power for Production.

In addition to the power supplied by BC Hydro, diesel fuel fired electrical generator sets will also be considered to provide:

- Some construction power during the Pre-Production period; and
- Emergency/Backup power during Production.

An opportunity will also be considered to generate as much as 500 kW of power using a turbine on the reclaim water pipeline. This opportunity exists as the tailings storage facility is in excess of 150m above the plant site.

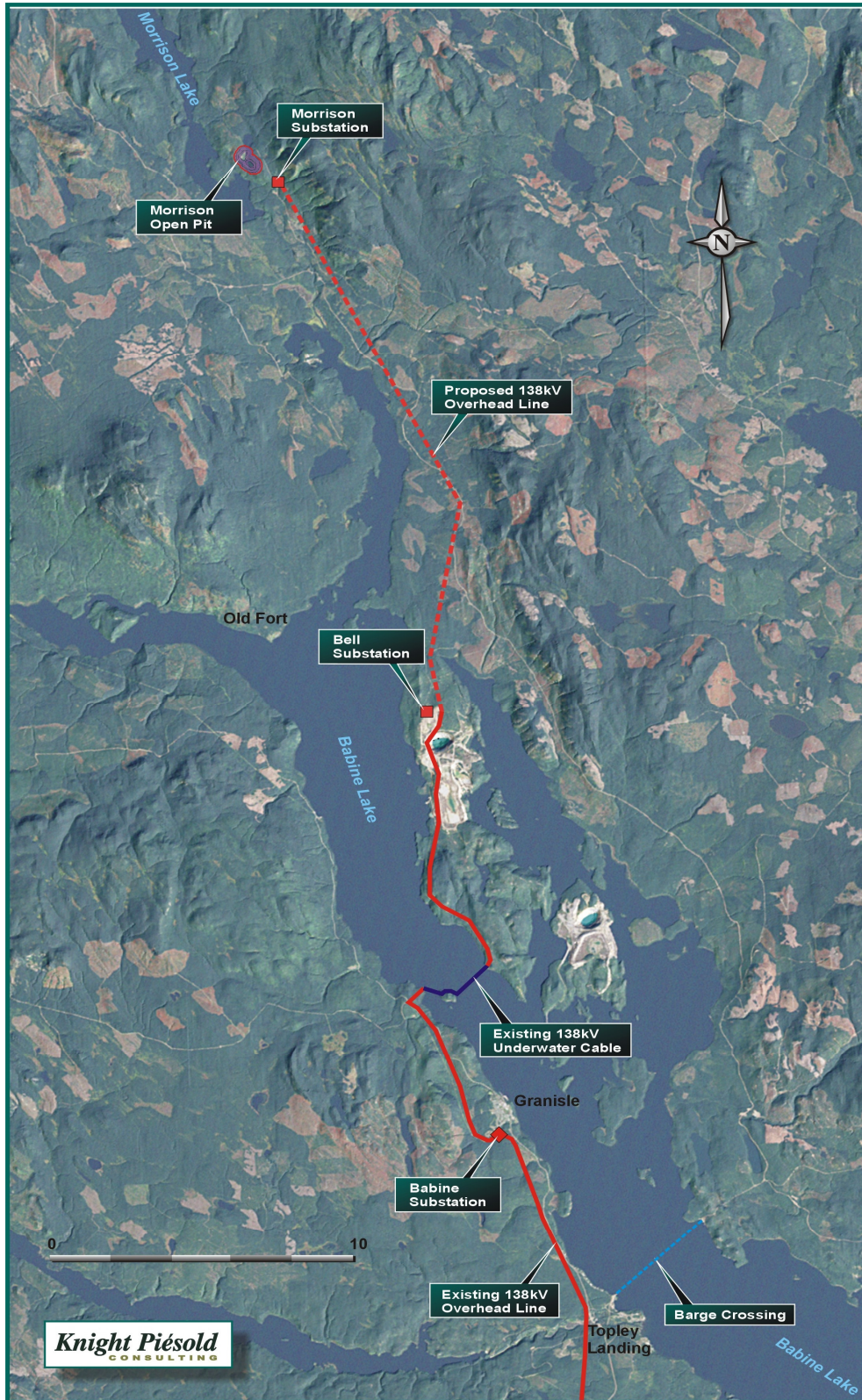


Figure 9 – Morrison Project Transmission Line

### **5.5.3 Roads and Highways**

The Morrison Property has the advantage of existing regional infrastructure. The regional infrastructure includes a high speed forestry road network, an all-season barge and hard surface highways.

The forest service road network was established by Forestry companies operating in the area. The selected road route for mine Pre-production and Production use, including transportation of concentrate, will be via these forest service roads between Nose Bay and the mine site. PBM will enter into an agreement for shared use of the forest service road between Nose bay and the Morrison Mine Site. Additionally, for some over-weight or oversize loads a forest service road may be utilized on a periodic basis; either:

- Between Michelle Bay and Houston to connect to the CNR Railhead at Houston; and
- Between the mine site and CNR Railhead at Leo Creek.

Crossing of Babine Lake will be via an all-season barge, Nose Bay to Michelle Bay. PBM will enter into an agreement to use the existing Babine Lake barge and barge facilities to cross Babine Lake between Nose Bay and Michelle Bay.

During Pre-Production and Production traffic beyond Michelle Bay will normally be via public highways; south from Michelle Bay to Highway 16 at Topley via South Granisle Highway then east or west on Highway 16.

### **5.5.4 Concentrate Transportation**

Concentrate will be hauled via tandem trucks west to the Port of Stewart B.C., where it will be loaded onto ocean going vessels for shipment to smelters in China, Korea, India or Japan. For efficient use of manpower and equipment the selected transportation route is broken into 3 legs:

- Leg 1 - from the Morrison mine site south along the Morrison, Hagan, Jinx and Nose Bay forest service roads (east side of Babine Lake) to Nose Bay, then by barge across to Michelle Bay on the west side of the lake;
- Leg 2 – from Michelle Bay to Topley via South Granisle Highway and north to Smithers via Highway 16; and
- Leg 3 – from Smithers to the Port of Stewart via Highway 16.

This route is shared with other routine mine traffic on forest service roads, the barge across Babine Lake and existing public highways as shown in Figure 10 below.

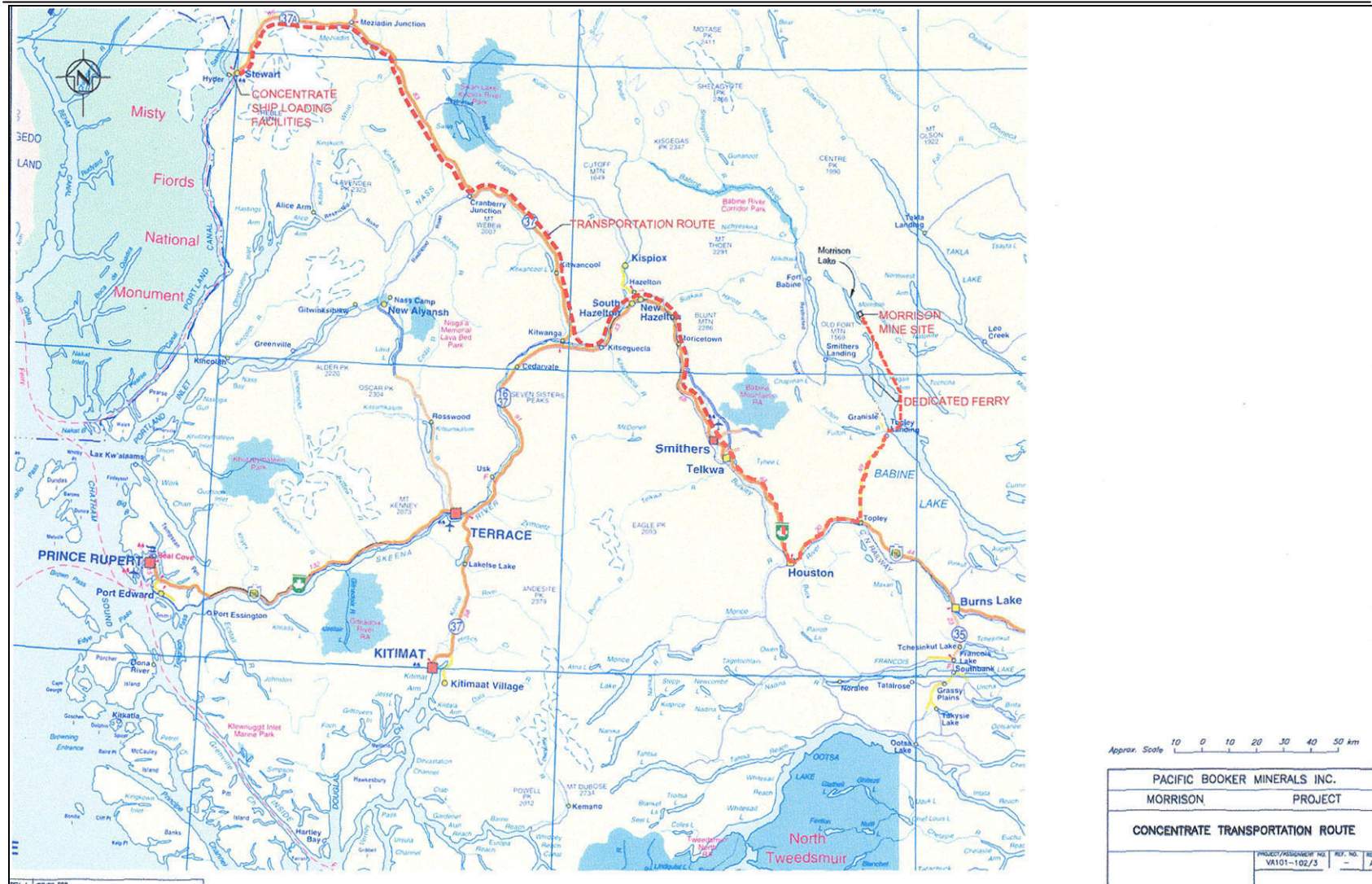


Figure 10 – Concentrate Transportation Route

### **5.5.5 Accommodations**

PBM will not provide a camp or accommodations on the Morrison Project Site. Therefore personnel will use off-site infrastructure such as existing forest service camps, apartments and hotels mainly in the Village of Granisle.

#### **5.5.5.1 Pre-Production (Construction) Phase Camp**

During the construction phase contractors will be responsible for their own local transportation, meals and accommodation arrangements. PBM will identify the options (construction workers may stay in the Village of Granisle, another nearby community or one of the two existing logging camps) and the contractors can determine their own best arrangements.

#### **5.5.5.2 Production (Operating) Phase Camp**

Personnel will be responsible for their own meals and accommodation off site. Personnel may stay in the Village of Granisle, another nearby community or one of the two existing logging camps. PBM will offer a bus/van service from the Village of Granisle side of Babine Lake. Personnel hired locally will commute to the bus / van pickup and parking will be provided.

## **5.6 WATER MANAGEMENT PLAN**

The Tailings Storage Facility (TSF) is located at an elevation between 950 m and 1020 m. The mill processing and TSF will be operated as a zero discharge system, with no releases to the outside environment under normal operating conditions. All free tailings transport water will be recycled back to the process plant by a reclaim pump from the tailings pond. Seepage water and construction water will be collected on the downstream side of the tailings dams and returned to the TSF. For flood management, the TSF will be designed to store the surface runoff from 2 week duration – 200 years return period precipitation event. Floods exceeding this return period may be discharged through an emergency spillway to maintain dam safety.

Current project water balance calculations indicate that the TSF will operate with a net water deficit. Therefore, in addition to all available water recycled from the TSF and drainages collected in the open pit, the mill processes will obtain make-up water from Morrison Lake. Upon mine closure, surface runoff from the TSF will be routed through a closure spillway and water collected in the open pit will form a lake and drain to Morrison Lake. If these drainages from the reclaimed site do not meet British Columbia water quality guidelines, surface water will be treated before release.

Hydrologic water balance inputs for the Morrison Project are based on data from nearby regional stations operated by Environment Canada, calibrated with approximately 1 year of data collected on the project site. The following hydrologic parameters have been estimated for the project site:

Precipitation: 50 mm/annum

Lake evaporation: 420 mm/annum

Undisturbed catchment runoff coefficient: 50%

In future phases of project development, the hydrologic inputs will be reassessed using the most up to date site data.

Geotechnical behaviour of the tailings is based on laboratory testing of samples produced in lock cycle testing. Although the tailings' physical properties will vary as the ore extracted during mining varies, the current samples are believed to represent "average" process plant output.

Inflows into the open pit have been estimated based on typical values for similarly sized pits, and will be updated with a hydrogeologic model.

Using the inputs described above, monthly water balance models have been prepared for the TSF during several stages of operations and closure, and summarized in Table 2 below:



**Table -2 Water Balance Summary**

| Parameters                                      | Average Annual Flows (m <sup>3</sup> /hr) |              |              |            |
|---|---|--------------|--------------|------------|
|   | Starter                                   | Operations   | Pre-Closure  | Closure    |
| <b>Water Inputs</b>                             |   |              |              |            |
| Cyclone overflow water                          | 1,209                                     | 1,209        | 1,209        | -          |
| Cyclone sand recycled water                     | 75  | 75           | 75           | -          |
| Contaminated pit/dump water                     | -   | 75           | 90           | -          |
| Fresh Water Well Extraction                     | 466                                       | 342          | 334          | -          |
| Precipitation on pond                           | 127                                       | 280          | 306          | 363        |
| Runoff from catchment                           | 248                                       | 172          | 159          | 130        |
| Runoff from waste dumps, mine area and open pit | 95  | 95           | 95           | -          |
| Seepage reclaim                                 | 100                                       | 100          | 100          | 79         |
| <b>Subtotal</b>                                 | <b>2,320</b>                              | <b>2,348</b> | <b>2,368</b> | <b>573</b> |
| <b>Water Outputs</b>                            |   |              |              |            |
| Pond evaporation                                | 97  | 214          | 233          | 277        |
| Tailing voids                                   | 322                                       | 233          | 233          | -          |
| Seepage   | 200                                       | 200          | 200          | 200        |
| Water reclaim to process plant                  | 1,701                                     | 1,701        | 1,701        | -          |
| <b>Subtotal</b>                                 | <b>2,320</b>                              | <b>2,348</b> | <b>2,368</b> | <b>477</b> |
| <b>Net Balance</b>                              | <b>0</b>                                  | <b>0</b>     | <b>0</b>     | <b>96</b>  |

The water balance has been calculated using the following assumed conditions:

- No diversions are in place and all catchment water reports to the TSF;
- Tailings discharged into the impoundment settle to an effective dry density of 1.4 t/m<sup>3</sup> (75% solids) for the starter dam to 1.5 t/m<sup>3</sup> (80% solids) for the final dam;
- 30% of the tailings reports as cyclone underflow at 72% solids by weight, which consolidates to 85% solids. The difference in water is returned to the TSF;
- Direct precipitation and evaporation is calculated on the basis of the wet tailings surface and water pond. Winter precipitation is assumed to be water on the pond;
- The average runoff coefficient for uphill drainage is 0.5;
- Reclaim of mill process water will be equivalent to the total tailings transport rate at 41% solids by weight;
- Seepage water and cyclone consolidation water will be returned to the TSF; and
- Contaminated mine water is assumed to report to the TSF.

The fresh water makeup requirement has been adjusted to produce a zero discharge impoundment.

## **5.7 PROJECT PHASES**

### **5.2.1 Pre-Production**

Project implementation will occur during a 24 month pre-production phase during which the on-site components and off site-infrastructure are constructed. An additional pre-production activity is stripping of the open pit overburden.

### **5.2.2 Production**

Production will commence when the mine components are operational and other pre-production activities are complete. Production activities include mining, milling, waste disposal and on-going construction of the tailings storage facility.

### **5.2.3 Closure and Reclamation**

The Morrison mine will be decommissioned and reclaimed, at a minimum, in accordance with the requirements of the Application Requirements for a Permit Approving the Mine Plan and Reclamation Program Pursuant to the Mines Act.

The reclamation will include:

- Removal of equipment and structures, including mill building, maintenance shops, camp, explosives storage, power lines, pump house, and other facilities;
- Reclamation of waste dump, tailings impoundment area and roads;
- Re-vegetation, and
- Return area to proposed end land use objectives within the scope of the MLRMP.

## **5.8 WORK FORCE**

During the pre-production period most activities will be completed by contractors. Approximately 450 contract personnel will be required during peak construction periods. In addition PBM will begin hiring and training its own workforce so that at handover PBM will be prepared to begin production effectively and efficiently.

At full production the total number of PBM employees at Morrison Mine site is estimated to be 251 of which 141 are to be employed in the open pit operations, 82 in mineral processing with 28 staff employed as management, professional, office and clerical duties. In addition PBM anticipates another 50 people will be employed through contract services such as concentrate haulage, road maintenance, barge operation, bus transportation and supply of consumables including fuel, lubricants, explosives and tires. The majority of the workforce will work on a 12-



hour shift based upon a four-on four-off schedule while staff will work a 5-day week 8 hours/day.

Hiring practices will be established to promote the hiring of First Nations and local personnel.

## **6. ENVIRONMENTAL ASSESSMENT PROGRAM**

### **6.1 INTRODUCTION**

The environmental assessment studies and investigations for the Morrison Copper/Gold Project are being implemented with the objective of meeting the requirements of the BC Environmental Assessment Act and the Canadian Environmental Assessment Act (if applicable). This legislation among other requirements provides for public consultation to ensure that the approval process has afforded all communities of interest a reasonable opportunity to understand the Project and to communicate their concerns in a manner that they can be satisfactorily addressed.

PBM has initiated a consultation process with regulators, First Nations and local communities to assess the Project's environmental, social and economic effect upon its regional zone of influence. This includes the Lake Babine Nation (LBN).

This process continues to be an integral component of the environmental assessment program to provide for public participation in the Project development process and to ensure that concerns are identified and appropriately addressed.

PBM is committed to the principles of sustainable development and to abiding by an environmental management system that assures that sound operating procedures, adequate resources and effective training programs are in place to meet these principles from the pre-construction period through the operations phase to final reclamation. Appropriate engineering design criteria are being applied to ensure that operations comply with all applicable government legislation. It is recognized that the mine life will be finite but with an effective process of engagement with the community and the acceptance of environmental and social responsibilities, and that a positive and enduring legacy will result from the mine development.

The PBM consultative process has been developed in a transparent manner with full consideration for environmental, social and economic factors, First Nations and Communities.

Environmental base line studies are being conducted for the Morrison Copper/Gold Project. These studies include fish and fish habitat, water quality, hydrology, hydrogeology, air quality, wetlands, wildlife, wildlife habitat, land use, aquatic biology, meteorology, terrain hazards, noise, archaeology, terrain and soils, ecosystem and vegetation, country foods and acid rock drainage.

### **6.2 ENVIRONMENTAL ASSESSMENT (EA) PROCESS**

The constitutional division of power between the Federal and Provincial governments gives British Columbia responsibility for the development of its mineral resources; however the Federal government retains an integral role in the project environmental approval process through its responsibility for fisheries, navigable waters, explosives storage and use, and environmental protection.

Through the past several years of exploration activity, PBM has maintained on-going communications with both levels of government to inform them of their activities and to develop a mutual awareness of the Project scope and the sequence of activities leading to its feasibility evaluation and environmental assessment.

In October 2002, PBM met with the Northwest Mine Development Review Committee in Smithers. Chaired by Wally Bergen of the BC Ministry of Energy, Mines and Petroleum Resources (BCEMPR), the meeting included representatives of the BC Environmental Assessment Office (BCEAO), the BC Ministry of Environmental (BCMOE), the BC Ministry of Forests, the Canadian Environmental Assessment Agency (CEAA) and Environment Canada (EC). Members of the Lake Babine Nation and councilors from the Village of Granisle also attended. At the meeting, PBM outlined its project plans and development schedule, and the agency representatives described the process for the pre-application stage of the Environmental Assessment Process.

On-going consultations have been held with various provincial and federal agencies. These included meetings with the BCEAO and the BCEMPR in Victoria in June 2003. A courtesy meeting was also held in June 2003 with the Canadian Environmental Assessment Agency, Environment Canada and Fisheries and Oceans Canada in Vancouver. In July 2003, a meeting was held with the regional managers of the BCMOE and BCEMPR. The purpose was to keep the authorities informed that PBM was actively advancing its preparatory activities to formally enter the Environmental Assessment Process.

The Project Description was first submitted to the BC Environmental Assessment Office (BCEAO) in September 2003. This document will be posted by the BCEAO on their website ([www.eao.bc.ca](http://www.eao.bc.ca)). On September 30, 2003 the BCEAO issued a Section 10 Order under the BCEA Act that declared the project to be a reviewable project pursuant to the BC Reviewable Projects Regulation. Following this on October 20, 2003, a multi-agency meeting chaired by the BCEAO (Bob Hart) was held in Smithers. Along with the BCEAO and PBM, representatives of other Provincial and Federal agencies and representatives of the First Nations also attended. A planned site visit the following day was postponed pending the resolution of procedural requirements requested by the Nedo'at (Old Fort) Band.

The visit to the Morrison property by the Provincial and Federal agencies is an essential part of the process. It allows interested agencies to determine the site-specific issues of concern under their enabling legislation that must be addressed by the environmental assessment program investigations. This visit was completed on July 6, 2004 and included representatives of the First Nations as well as the BCEAO, BCEMPR, BCMOE, BC Ministry of Agriculture and lands (BCMAL), Environment Canada (EC), and Fisheries and Oceans Canada (FOC).

The Canadian Environmental Assessment Act (CEAA) is the Federal law that requires Federal decision makers (i.e., "responsible authorities") to determine whether the anticipated environmental effects of proposed projects would trigger their involvement in the assessment process under the Fisheries Act, the Navigable Waters Protection Act and the Explosives Act. PBM is committed to on-going communications with CEAA and the other Federal authorities to

enable them to determine their decision-making responsibility and any trigger criteria that would require their participation in the assessment process.

The BCEAO takes a facilitating role to coordinate the communication of agency interest and participation. This responsibility is provided by their enabling Act and by the Canada – British Columbia Agreement on Environmental Assessment Cooperation (2004) (the “harmonization agreement”) with the Federal authorities.

With the completion of the site visit by the various Provincial and Federal agencies and PBM’s response to the agencies’ requests for additional information, on January 18, 2008 PBM was issued by the BCEAO its Section 11 Order under the BCEAA. This Order defines the environmental process and scope. It requires the preparation of draft Terms of Reference for the project environmental assessment studies and other investigations necessary to support an Application for an Environmental Assessment Certificate by the BCEAO and a Minister’s Decision.

PBM has prepared a draft Terms of Reference. The final Terms of Reference will be developed in consultation with the First Nations, interested agencies, communities, and other parties for the approval by the BCEAO. The approved Terms of Reference will be used to define the scope of work of specialty consultants to undertake issue-specific investigations. The Federal CEAA similarly requires meaningful public participation in conducting environmental assessments to give interested parties the opportunity to put forward their knowledge and views on the Project.

### **6.2.1 Regulatory Framework**

The Morrison Copper/Gold Project will be a reviewable project in accordance with the British Columbia Environmental Assessment Act (BCEAA) Reviewable Projects Regulation, Part 3- Mine Projects, Table 6, Mineral Mines as “a new mine facility that, during operation, will have a production capacity greater than 75,000 tonnes/year of mineral ore.”

In addition to obtaining the BC Environmental Assessment Certificate under the BCEAA, other permits and approvals will be required for the construction and operation of the Morrison mine. The following list is not exhaustive but identifies most of the legislation that is expected to apply:

#### **6.2.1.1 Provincial**

- *Mines Act Permit, pursuant to Section 10 of the BC Mines Act (EMPR), (including the Health, Safety and Reclamation Code and the Mineral Exploration Code)*
- *Permit pursuant to the Mining Right of Way Act (EMPR),*
- *Alteration Permit under Section 12 of the Heritage Conservation Act (TSA),*
- *Water Licenses, pursuant to the Water Act (for storage and diversion of water (MWLAP),*
- *Notifications of in-stream works, pursuant to Section 9 of the Water Act (MWLAP),*
- *Effluent Permit, Refuse Permit, Air Permit, Fuel Storage Permit and Special Waste Permit pursuant to the Environmental Management Act (MWLAP),*

- *Permit pursuant to the Wildlife,*
- *Burning Permit, pursuant to the Forest and Range Practices Act (MOF),*
- *License to Cut, pursuant to the Forest Act (MOF),*
- *Special Use Permit, pursuant to the Forest Practices Code of British Columbia Act (MOF),*
- *License of Occupation, pursuant to the Lands Act (for power line right of way, quarries, camps and staging areas) (MWLAP),*
- *Permits pursuant to the Health Act and Food Premise Regulation, Industrial Camps Health Regulation, Sanitary Regulations and Sewage Disposal Regulation (NHA), and*
- *Permits pursuant to the Drinking Water Protection Act (NHA).*

### **6.2.1.1 Federal**

Under the Canadian Environmental Assessment Act (CEAA), the responsible authorities of the Federal Government will determine their involvement with respect to the anticipated environmental effects of the Project that would trigger their involvement in the assessment process under the Fisheries Act, the Navigable Waters Protection Act and the Explosives Act.

## **6.3 PUBLIC CONSULTATION**

Both the *BC Environmental Assessment Act* and the *Canadian Environmental Assessment Act* contain provisions for public consultation as a component of the environmental assessment process. As a part of its ongoing efforts to develop and maintain open communications, PBM will direct a program of public consultation to meet the specific requirements of the two Acts. Results of public consultation efforts will be documented for presentation in the environmental assessment report.

### **6.3.1 First Nations Consultation and Participation**

The Morrison property is located on the traditional territory of the Lake Babine Nation. There are four LBN communities; Fort Babine, Nedo'ats (Old Fort), Tachet and at Burns Lake which is outside LBN traditional territory within the traditional territory of the Wet'suwet'en Nation. Indian and Northern Affairs Canada census data for 2005 gives a LBN population of 2178, of whom 1414 live on (own or other) reserve and 764 live off reserve.

PBM has been working on Morrison Property since the early 1990's. During this time, the company has actively communicated with members in all communities of the LBN and employed members of the communities on its exploration projects. The boundary between the traditional territories of Nedo'ats and Fort Babine cuts across the claim area with the boundary line just south of the proposed project area – Nedo'ats to the south and Fort Babine to the north. PBM continues to seek advice from both Nedo'ats and Fort Babine on how PBM can involve both communities and the broader LBN in a way that is culturally appropriate while following traditional protocols.

PBM believes that the development and maintenance of ongoing communications and business linkages with the LBN is essential. It is proposed that PBM and representatives of the LBN will participate in project planning from the onset to develop mutual understanding, respect, trust and a good working relationship to the benefit of both parties. This strategy is intended to:

- Provide employment that leads to self-reliance and respect. This includes training programs;
- Provide contractual opportunities;
- Involve LBN individuals, at the earliest opportunity, in baseline studies, the EA process, permitting, ongoing life-of-mine joint monitoring and other planning and communications activities; and
- Incorporate traditional knowledge into project planning activities.

The components of this strategy will enhance the capacity of the LBN to participate meaningfully in the Morrison Copper/Gold Project, and other opportunities that present themselves.

#### **6.4 LAND USE**

The Morrison Copper/Gold Project is located within the Morice Land and Resource Management Plan (LRMP) area. The Morice LRMP encompasses 1,509,203 hectares in west-central British Columbia including 36,455 hectares of private land that will be excluded from the LRMP. The Morrison property is located in the northern end of the LRMP area.

The proposed mine operation site is situated on Crown land. Current land uses in the vicinity of the Morrison property relate primarily to forestry activity with Canfor having tree farm licenses at the project site and Houston Forest Products operating nearby to the west of Morrison Creek. Much of the mine site development area has been logged and to a certain extent re-planted.

Other activities within the surrounding region include hunting, trapping, guide outfitting, backcountry wilderness tourism and recreation. Mineral exploration has been ongoing on and around the region for decades and both the Granisle and Bell Copper mines operated during the period from 1966 to 1992. The environmental assessment report will provide information on the extent of other land uses in the area and identify the potential for mine development and operations to affect other users.

#### **6.5 ENVIRONMENTAL SETTING AND EFFECTS ASSESSMENT**

The Morrison property is located 65 km north east of Smithers and it covers approximately 9,950 hectares. Located on the east side of Morrison Lake, it is in the sub-boreal spruce biogeoclimatic zone. The topography is characterized as undulating and rolling plateaus rising to the east to the ridge dominated by Hearne Hill at an elevation of 1350 metres. Drainage from the Morrison deposit area is contained within seven sub-basins.



The Morrison Creek Watershed is one of the four main sub-basins of the Babine Lake system. Lakes are an important feature of the watershed and Morrison Lake is the most predominant with a surface area of 1325 ha and a maximum depth of 60 m (FISS database). Other lakes include Tahlo (152 ha) and Haul (304 ha) lakes as well as a dozen smaller lakes generally less than 70 ha in area, including several in the vicinity of the proposed mine development area (Bustard, 2004)

The Babine/ Morrison lakes system is a salmon spawning and rearing area of high value and importance. Babine Lake is the largest natural lake in BC and is one of the major sockeye salmon producers in the Province, accounting for 90 percent of the Skeena River sockeye run. (Bustard, 2004)

## **6.6 ENVIRONMENTAL ISSUES**

PBM is responsible for safeguarding the environment. Base line investigations are in process or have been completed to characterize environmental subject areas described below. The priority environmental concern is water due to the proximity of the Morrison Copper/Gold Project to the Morrison Lake. From discussions with Federal and Provincial agencies, the LBN and others, PBM has identified fisheries and fish habitat, surface and ground water, and acid rock drainage (ARD) potential as the principal Project environmental management issues. Without discounting other areas of environmental and social responsibility, water management is identified as essential for the assurance of acceptable containment, control, monitoring and reporting of effluent, seepage and surface water runoff. Engineering features will be integrated into the design to maximize the effectiveness of water management and to minimize fresh water consumption.

To characterize the seasonal effects pertaining to these issues or to coordinate assessment requirements with the Project, baseline data collection is conducted. In consultation with authorities of interest, specific field programs have been implemented with specialist consultant participation in advance of obtaining the final Terms of Reference. The information from these investigations enables the development of engineering design concepts that provide for the prevention and mitigation features to safeguard the environment.

### **6.6.1 Surface Water Hydrology and Quality**

Stream flow monitoring programs are in place with the installation of staff and crest gauges. To develop baseline data for water management pertaining to mine development and fisheries habitat protection, automated pressure recording transducers were installed and have been operating since October 2004 in the principal streams transecting the mine site and the tailings management facility.

A detailed hydrology report has been completed and is available on PBM's website [www.pacificbooker.com](http://www.pacificbooker.com).

## 6.6.2 Ground Water Hydrogeology and Quality

Information from these programs will be used to provide a detailed analysis of the groundwater regime in the vicinity of the Project area and to assess the potential effects associated with mine development, operation and closure. Initial water level measurement and falling head tests were conducted in coordination with the 2003-drilling program. Piezometer installation and exploration drill-hole measurements to determine the existing subsurface water level were completed.

To develop the baseline physical and chemical character of the ground water within the mine development area, monitoring wells are used for water level measurements, water quality sampling and response tests as approved by regulators.

## 6.6.3 Acid Rock Drainage / Metal Leaching (ARD/ML)

Chalcopyrite and pyrite are the main sulphides at the Morrison deposit with minor to moderate amounts of bornite in several places within the copper zone. Surrounding the copper core is a pyrite halo. All rock sampled at Morrison contains varying quantities of pyrite, locally in excess of 1%. Minor calcite veining and carbonate alteration are associated with the copper-gold mineralization, and the presence of these minerals will neutralize the acid generation to some extent.

The Morrison Project studies have been undertaken under the direction of qualified persons: ML-ARD by Dr. Kevin Morin, P.Geo; geological resource and block modeling by Ronald Simpson, P.Geo, GeoSim Services Inc; and mine modeling by John Nilsson, P.Eng., of Nilsson Mine Services. Collectively this work contributes to the information in this memo.

On behalf of Pacific Booker Minerals, 491 ABA (acid-base accounting) and solid-phase ICP-MS tests of rock, from 101 drill holes have been undertaken on the Morrison deposit. Sample distribution within the pit shell is shown in the accompanying figure. Mean Adj SNPR was 2.96 and median was 1.29. Thus average rock was net neutralizing whereas most samples were net acid generating. Approximately two-thirds (2/3 or 66 %) of the samples, not necessarily equivalent to mined tonnages, are predicted to become net-acid generating. About 5 % of the samples were acid at the time of analysis and the time for onset of acid conditions for the corresponding rock types is predicted to be immediate. Of the remaining, perhaps 10% of total samples are near acid paste pH conditions and could become acid within a period of several years or less. The remainder, or about 45 % of total samples tested, may have onset to ML-ARD many years in the future. In some instances this may exceed 30 years or much longer, based on ABA analysis of old drill core on site.

Fortunately carbonate-rich rock units and alteration zones are common at Morrison, and on average, Morrison samples had less S and more NP than Bell. At Morrison, a pyrite halo surrounds the copper-rich ore zone, with some rock in the pyrite zone containing up to 15 vol- % pyrite near the copper ore. This rock generally has high potential for short-term onset of ARD conditions and may need to be treated as highly reactive rock.

Separation of net acid generating (NAG) from net acid neutralizing rock (PAG) during mining was investigated by combining the ABA results with the resource block model and mining plan. This work was undertaken by GeoSim Services Inc and Nilsson Mine Services respectively. The distribution of NAG and PAG at each extracted bench by east and west pit is shown in the table below as determined by Nilsson Mine Services for the four phases of pit development. There appears to be opportunity to separate NAG and PAG volumes in many levels of the pit.

#### **6.6.4 Fisheries and Aquatic Species**

The Federal *Fisheries Act* provides for the protection of fish habitat and is very specific with respect to habitat alteration, disruption and destruction (HADD) that can be authorized by Fisheries and Oceans Canada (FOC). Thorough assessment of fishery and other aquatic resources (benthic species, periphytons) and their physical and biological habitat is essential to determining the involvement of FOC and the extent of mitigation or compensation that may be required for HADD.

A background compilation of fisheries information for the Morrison watershed was completed by David Bustard & Associates Ltd. and submitted to PBM, and Fisheries and Oceans Canada (FOC) and the BCMOE Regional Office in 2004. This background review in conjunction with a meeting with these agencies' review staff in the spring of 2004 identified a number of areas that required additional information to aid them to assess Project implications. It enabled the development of a field program to provide an assessment of fish utilization and habitat in the vicinity of the mine site, and a basis to determine the potential for mine development, operations and closure to affect fish and fish habitat.

This program was initiated in the summer of 2004 and was completed in 2007.

Should it be determined that mine development, operation and/or closure will result in an unavoidable loss of fish habitat; a fish habitat compensation plan may be required.

Field investigations have been conducted to develop baseline aquatic resource data on species, population and distribution of benthic invertebrates, periphyton, phytoplankton and zooplankton.

#### **6.6.5 Lake and Stream Sediments**

To determine baseline physical and chemical character of water body sediments around the mine development area, sediments have been collected from surface water courses and Morrison Lake in areas susceptible to sediment loading associated with mine development and operations.

#### **6.6.6 Flora and Fauna Studies & Terrestrial Ecosystem Mapping**

In consultation with BCMOE Regional Office, a program was designed by Ardea Biological Consulting to provide for the compilation and assessment of flora and fauna including rare and endangered species. Reconnaissance studies commenced in August 2004. Wildlife habitat

surveys continued in November 2004 and March 2005. A program of terrestrial mapping was completed to document the vegetation by species and location.

Predictive Ecosystem Mapping (PEM) provides information on wildlife use and habitat suitability/capability based on the Morice and Lakes Innovative Forest Practices Agreements. The mapping indicates potential high value grizzly bear, moose, amphibians, furbearers (e.g. marten, fisher), and waterfowl habitats in the area. There is also the potential for waterfowl and amphibian habitats in the proposed project area that may require evaluation. Presence and habitat use by other species such as nesting raptors (e.g. eagles, osprey, hawks etc.), small mammals, predators, etc. will be noted during the habitat assessments. Field observation at the Project site has indicated some variation from the regional PEM database but it is expected that this can be addressed to meet the BCMOE needs with species-specific (e.g., moose and grizzly bear) habitat suitability mapping.

PEM products and air-photos continue to be used to plan sampling and mapping of rare plants and ecosystems within the project area.

Baseline information has been established regarding ambient concentrations of trace elements in the upland and wetland plants utilized by ungulates and bears in the vicinity of the proposed tailing area. It will allow for future comparisons during operations and closure for assessing effects of uptake of metals in vegetation on wildlife and human health. Vegetation samples were collected for this purpose during 2004.

The results of assessments, mapping and potential mitigation measures will be used to develop mitigation measures for potential development and operational affects to wildlife and wildlife habitat and to provide for the return to productive wildlife habitat upon closure. Species at Risk, as defined in the Species at Risk Act, in the vicinity of the project have been identified.

#### **6.6.7 Surficial Geology & Soils**

In coordination with site engineering investigations, a survey was conducted to develop a detailed description of surficial geology in the vicinity of the property including glacial, colluvial, alluvial and fluvial landforms and features.

Soils mapping and sampling for soils recovery and reclamation was carried out in detail in 2007 on the proposed pit and infrastructure areas, and at a reconnaissance level within the surrounding study area. Removal and storage of surface soils will be planned for site reclamation purposes.

#### **6.6.8 Seismicity & Terrain Stability**

For Project design purposes, an analysis of regional seismicity and earthquake potential based on data generated by the Pacific Geosciences Centre was completed. Seismic data has been incorporated into designs for the tailings impoundment dams and other structures.

A terrain stability analysis for the property and infrastructure corridors has been completed including the potential for landslides and avalanches. Information generated from the terrain stability analyses have been incorporated into decisions regarding the location and design of tailings and waste rock management storage facilities, process buildings, and other structures.

### **6.6.9 Climate and Air Quality**

The development of a local climate database is essential for engineering design of tailings storage and waste rock management facility dams, process and other buildings and water management control structures. PBM installed a meteorological station in 2006. The BC Forest Service maintains a meteorological station approximately 5 km from the Project site. These stations provide regional data for correlation with site area data to enable the prediction for mine site maximum and minimum annual precipitation and storm events for various return periods. These data will be used for design purposes for the tailing and waste rock storage facilities and other structures, for water balance calculations and impact predictions through the operating and post-operating periods.

Dust fall collectors were installed on the Project site in 2006. Logging activity has occurred on an intermittent basis but otherwise the effect upon air quality is minimal and the ambient air is essentially pristine. Standard modeling techniques will be applied to predict the potential air quality impact associated with the mine development and operation, and to determine appropriate mitigation strategies for both mobile and point sources.

### **6.6.10 Noise**

Baseline noise monitoring is being conducted. The mine site is remote with limited potential for noise effects associated with anthropogenic sources. With the exception of periodic forestry activity, baseline noise levels are considered to be essentially natural. Standard modeling techniques are applied taking into account topography and weather conditions for the area, and experience from similar operations to predict the potential for noise effects on wildlife and the public associated with operations and to design appropriate mitigation measures.

### **6.6.11 Archaeology, Traditional Knowledge and Use**

The Babine Lake region is known to have a rich heritage that includes the culture of the Lake Babine Nation that preceded the arrival of European settlers. After the Europeans' arrival, their activity and development contributed further to the heritage of the region. Archaeological use assessment has been conducted in the immediate vicinity of the property. The assessment of cultural and heritage values within the area of activity of the Morrison Copper/Gold Project (for example, culturally-modified trees) have been determined by literature review and consultation with the LBN, local museums and other sources. Field investigations have been conducted to further document any evidence of artifacts or other indications of heritage and cultural significance.

### **6.6.12 Socio-Economic Assessment**

Through job creation (direct and indirect), purchasing, training programs and transferable skills, contracting opportunities and tax payments, the Morrison Copper/Gold Project has the potential to create significant positive economic benefits for the Bulkley-Nechako Region and beyond. At the same time, the mine development has the potential to affect local and regional resources through increased demand on social services such as police, health care, housing and education. Social effects at the community and family level also have the potential to occur as a result of increased disposable income, lifestyle changes and work-associated demands.

An assessment will be conducted regarding the potential economic and social effects associated with mine development based on regional demographics and community profiles. The assessment will include and be based on factors such as estimates of employment income, taxation levels, and purchased goods and services, as well as expected numbers of local versus non-resident employees, increased population resulting from in-migration of employees, shift rotation schedules, housing and accommodation.

The potential social effects upon the LBN at the local level will be given particular consideration in the context of the commitment that PBM has to engaging and providing for the participation of the LBN. The potential social impacts and benefits of the Project are being addressed with the LBN and will continue to be throughout the life of the mine.

### **6.6.13 Public Health & Safety**

The environmental assessment report will include an examination of the potential effects of all phases of the proposed Project (construction, operation, maintenance, decommissioning) on public health and safety with consideration of relevant determinants of health. Included in this assessment will be descriptions of the general public health setting and characteristics influenced by such factors as public utility services (water, waste, etc.), emergency services, noise, and air quality. The application will assess and evaluate the potential project affects upon the health and safety of employees, their families and local communities (including First Nations), and describe mitigation measures for any possible effects to human health and safety.

## **7. PROJECT SCHEDULE**

The Feasibility Study and Environmental Assessment will be completed towards the end of the fourth quarter 2008. Permitting will be applied for concurrently during the government review period. Once the project financing is obtained, it is estimated that it will take approximately 24 months to construct the facilities. A commissioning period of two months allows for the project to be fully producing in 2011.