ECHO BAY MINES

Lupin Operation
9818 International Airport
Edmonton, AB T5J 2T2

May 11, 2001

Nunavut Water Board
P.O. Box 119
Gjoa Haven, N.T.
X0B 1J0

Attention: Mr. Philippe di Pizzo
Executive Director

RE: Echo Bay Mines Ltd., Lupin Mine Licence NWB1LUP0008
Cost Estimate for Lupin Mine Sire Reclamation

Dear Sir:

In their decision concerning the issuance of the Lupin water licence, the Nunavut Water Board stated that the reclamation liability of the Lupin mine was to be reviewed annually. To this end, Echo Bay Mines Ltd. contracted Nuna Logistics Ltd., Clark Builders, and EBA Engineering Consultants to jointly prepare a cost estimate for the reclamation of the Lupin site. In their report submitted January 19, 2001, the cost to reclaim the Lupin site was estimated to be $24,598,000.

Enclosed are three copies of their report. Additional copies are available upon request. Please do not hesitate to contact the undersigned or Dave Hohnstein should you have any questions.

Sincerely,

H. Ducasse

Hugh Ducasse,
Manager, Loss Control and Environmental Affairs

cc: Bill Danyluk
General Manager, Lupin Operation

PROPOSAL AND COST ESTIMATE FOR ECHO BAY MINES LTD. LUPIN MINE SITE RECLAMATION

Prepared For:

BILL BURTON, Director, Mining
ECHO BAY MINES LTD.
1210 Manulife Place
10180 - 101 Street
Edmonton, Alberta

Respectfully Submitted By:

NUNA LOGISTICS LIMITED
Executive Offices
340 Park Place, 666 Burrard Street
Vancouver, British Columbia
V6C 2X8

Operations Offices
9839 – 31 Avenue
Edmonton, Alberta
T6N 1C5

Human Resources
Suite 104, 5107 – 48 Street
Yellowknife, Northwest Territories
X1A 1N5

CLARK BUILDERS
8429 - 24 Street
Edmonton, Alberta
T6P 1L3

EBA ENGINEERING CONSULTANTS

14535 - 118 Avenue
Edmonton, Alberta
T5L 2M7

PO Box 2244
#201, 4916 - 49 Street
Yellowknife, Northwest Territories
X1A 2P7

January 19, 2001

NUNA LOGISTICS

NUNA LOGISTICS

Executive Office
340 Park Place, 666 Burrard Street
Vancouver, BC V6C 2X8

Tel 604 682 4667 Tel 1 888 734 5773
Fax 604 682 4473 Fax 1 888 734 5771
Email psl_nuna@telus.net

January 19, 2001

Bill Burton, Director, Mining
Echo Bay Mines Ltd.
1210 Manulife Place
10180 - 101 Street
Edmonton, AB

Dear Sir:

RE: COST ESTIMATE – ECHO BAY MINES LTD. – LUPIN MINE RECLAMATION

Nuna Logistics Limited in conjunction with Clark Builders and EBA Engineering Consultants Ltd., is pleased to submit a proposal and cost estimate for the reclamation of Echo Bay Mines' Lupin mine site.

The proposal and cost estimate is based on information gathered during three visits to the mine site:

> **SEPTEMBER 1999 -** John Zigarlick and Court Smith (Nuna Logistics) for the purpose of reviewing the tailings management and restoration plan.
>
> **AUGUST 2000 -** Court Smith (Nuna Logistics), Andrew Clark and Roger Geisinger (Clark Builders) for the purpose of determining a demolition plan for the site facilities, equipment and structures.
>
> **SEPTEMBER 2000 -** Court Smith (Nuna Logistics) and Brent Murphy (EBA Engineering) for the purpose of reviewing environmental and geotechnical issues relating to the abandonment and restoration of the Lupin mine site.

The Executive Summary section describes the partnership of Nuna Logistics, Clark Builders, and EBA Engineering and presents a pro-active plan to minimize overall reclamation costs.

Thank you for the opportunity to present our proposal and cost estimate. Please contact me at 604-682-4667 if you have any questions.

Respectfully submitted,

NUNA LOGISTICS LIMITED

Courtland Smith, P.Eng.
Vice President
CS/jm

PROPOSAL AND
COST ESTIMATE FOR
ECHO BAY MINES LTD.
LUPIN MINE SITE RECLAMATION

INDEX

NUNA LOGISTICS

EXECUTIVE SUMMARY

OUR TEAM

Nuna Logistics, Clark Builders and EBA Engineering intend to jointly pursue reclamation work related to mine site development and restoration throughout Nunavut and the Northwest Territories. Our concept is to provide a total solution to mine site reclamation by providing a cradle-to-grave monitoring, planning, and restoration service. Our companies have specific expertise that, when combined, cover the full range of requirements for the reclamation of mine developments.

Nuna Logistics is a northern company with extensive earthworks experience in the region. We have a demonstrated commitment to hiring northerners, and providing subcontract and supply opportunities to northern firms. Nuna Logistics has direct operating experience at the Lupin mine site in tailings dam construction and site services.

Clark Builders originated in the north and have extensive experience in building and facilities construction in Canada and aboard. Clark Builders was involved in the original construction of the Lupin plant and facilities.

EBA Engineering Consultants is one of Western Canada's premier geotechnical and environmental consulting firms. EBA Engineering is a recognized leader in northern engineering.

CONCEPT

The proposal and cost estimate is based on the following:

- Completion of some of the earthwork prior to mine closure. This approach will result in substantial completion of the restoration within one year of mine closure, thereby significantly reducing overhead costs after mine closure.

- Using Caterpillar 776 tractor-trailer arrangements for esker and rock haulage. These units are capable of hauling 120 tonnes per load of esker (136 tonnes per load of rock).

- No demolition or removal of floor level concrete. We have assumed that, upon building demolition, equipment pedestals can be leveled and made safe and no further concrete removal will be required.

COST ESTIMATE

The total cost estimate excluding contingency is as follows:

DIRECT COSTS

Main Complex	$ 3,818,900
Residence Complex	200,600
Site Buildings and Infrastructure	1,660,200
Site Earthworks Reclamation	827,800
Tailings	10,050,800
Underground	272,100
Subtotal	**$16,830,400**

INDIRECT COSTS

General Indirects	$ 1,475,000
Project Administration	1,362,900
Supplies and Services	60,000
Support Equipment	1,436,000
Support Labour	1,233,200
Utilities and Support	299,700
Transportation and Camp	1,901,600
Subtotal	**$ 7,768,400**

TOTAL PROJECT	**$24,598,800**

PROPOSAL

Nuna Logistics', Clark Builder's, and EBA Engineering's proposal is based on a time and materials basis. Labour and equipment rates include all consumables (except for those specified as Owner supplied items) and include overheads and profit.

Nuna Logistics' proposed work relates to the site earthworks, materials handling, and site services. Clark Builders' proposed work relates to the demolition of the site facilities, equipment and structures. EBA Engineering's proposed work relates to technical assistance planning, site management, quality assurance, surveying, and environmental monitoring.

LABOUR RATES

Labour rates are based on a two-week on-site and two-week off-site schedule for Nuna Logistics' employees and a three week on-site and one week off-site for Clark Builders using non-union labour. The rates consist of our current labour pay rates, scheduled overtime, employee benefits (CPP, EI, WCB), statutory holiday pay, vacation pay, overheads and profit. Air transport to site and camp catering are not included in the labour rates, but will be charged separately under materials supplies and services. The rates are based on our Year 2000 base rate schedule and do not include escalation. The rates are as follows:

NUNA LOGISTICS LIMITED

Project Manager	$ 67.00
Project Foreman	$ 53.00
Administrator	$ 39.00
Equipment Operator	$ 47.00
Truck Driver	$ 44.00
Serviceman	$ 45.00
Labourer	$ 39.00

CLARK BUILDERS

Superintendent - Level 1	$ 70.37
Superintendent - Level 2	$ 65.22
Foreman - Level 1	$ 61.79
Foreman - Level 2	$ 60.08
Equipment Operator - Journeyman	$ 61.79
Millwright - Journeyman	$ 61.79
Iron Worker - Journeyman	$ 60.08
Iron Worker - Level 2	$ 56.65
Welder - Journeyman	$ 61.79
Machinest - Journeyman	$ 61.79
Carpenter - Journeyman	$ 60.08
Carpenter - 4th Year	$ 55.96

CLARK BUILDERS CONTINUED...

Carpenter - 3rd Year	$ 51.84
Carpenter - 2nd Year	$ 47.73
Labourer - Level 1	$ 49.79
Labourer - Level 2	$ 46.36
Labourer - Level 3	$ 42.92
Labourer - Level 3	$ 39.49

EBA ENGINEERING CONSULTANTS

Engineer/Scientist – Level 5	$134.00
Engineer/Scientist – Level 4	$113.00
Engineer/Scientist – Level 3	$ 93.00
Engineer/Scientist – Level 2	$ 78.00
Technical Services – Level 3	$ 68.00
Technical Services – Level 2	$ 58.00
Technical Services – Level 1	$ 48.00

EQUIPMENT RATES

Equipment rates are based, for each piece of equipment, on a monthly ownership rate plus an hourly operating rate. The ownership rate includes carrying costs, depreciation, and equipment specific insurance. The operating rate includes fuel at $0.55 per liter, lubricants, tires, repair parts, wear parts, maintenance labour (with the same inclusions and exclusions as operating labour), overheads and profit. The monthly ownership rate applies for all months in which the equipment is on site. The hourly operating rate additional to the monthly rate, applies for hours operated doing the work. The rates do not include variances in fuel pricing. The rates are as follows:

NUNA LOGISTICS LIMITED	MONTHLY RATE	PLUS HOURLY RATE
Cat 776 Tractors/Trailers	$2,700	$209.00
Cat 992 Loaders	$3,200	$264.00
Cat D8 Dozers	$2,800	$142.00
Cat 773 trucks	$6,600	$202.00
John Deere 992E Excavator	$4,500	$190.00
Cat 16G Graders	$5,000	$122.00
Cat 966 Loaders	$1,900	$123.00
Cat IT28 Tool carriers	$1,000	$ 41.00
Conventional tractor/Trailers	$1,800	$ 88.00
Buses	$ 500	$ 33.00
Pickups	$ 500	$ 7.00

CLARK BUILDERS	HOURLY RATE (MINIMUM 200 HOURS PER MONTH)
120 Ton Conventional Crane	$ 90.00
50 Ton RT Crane	$ 75.00
25 Ton RT Crane	$ 50.00
120' Manlift	$ 55.00
80' Manlift	$ 45.00
60' Manlift	$ 17.50
10,000 Lb Zoom Boom Forklift	$ 17.50
235 Excavator	$125.00
Metal Shears	$ 42.50
Loader	$ 50.00

MOBILIZATION AND DEMOBILIZATION

Off-site mobilization and demobilization will be invoiced at cost. Off-site costs are expected to consist of transport charges and road-use fees. On-site mobilization and demobilization will be charged according to the above labour and equipment rates. On-site costs are expected to consist of minor equipment erection.

MATERIALS, SUPPLIES, AND SERVICES

Materials, supplies, and services, which are not included in the labour or equipment rates, will be invoiced at cost.

BASIS OF THE ESTIMATE

The cost estimate was prepared using the rates and parameters presented in the proposal. All rates are based on year 2000 numbers and do not include escalation.

The cost estimate includes items which may be either Owner-supplied or independently supplied as follows:

1) on-site accommodations ($40.00 per day per person);
2) air transport of personnel and supplies between Edmonton/Yellowknife or northern communities and Lupin ($750.00 per average round trip per person);
3) road use fees ($0.10 per ton-km).

The estimate does not include Owner-supplied items prior to the closure of Lupin operations as follows:

1) first-aid and safety orientation;
2) emergency facilities and staff; and
3) Owner's project management.

The estimate includes the items and quantities specifically listed in the estimate.

We have had the benefit of viewing a report entitled "Closure Cost Estimate and Scoping of Mine Closure Issues, Lupin Mine, NWT" prepared by Golder Associates in December, 1997. Although our approach to the reclamation is different, comparison of the costs generally confirm our estimates.

ASSUMPTIONS

In developing the cost estimate, we have made the following assumptions.

1) The cost estimate is based on constant Year 2000 Canadian dollars.

2) The estimate includes the provision of office, camp, catering services and shop facilities during the final stages of main facilities demolition. Nuna Logistics assumes that the existing on-site facilities will be available for use by Nuna Logistics, Clark Builders, and EBA Engineering prior to the final stages of demolition. Camp catering is included in the estimate at a price of $40.00 per manday.

3) The quantities (tonnes, cubic meters) and resulting haulage hours are assumed to be approximate only and the numbers may change based on equipment, quantity, variances, and scheduling.

4) The haul cycle profiles used are assumed to be representative of the average haul for each type of material based on current road locations and conditions.

5) Specific gravities, swell factors and density of the materials are assumed to be:

Esker	Specific Gravity	1.85
	Swell	30%
	LCM Density	1.42
	ECM Density	1.61
Quarry or Waste Rock	Specific Gravity	2.65
	Swell	40%
	LCM Density	1.89
	ECM Density	2.21

6) Whiteout days have not been included in the costs or the schedule. This should not be an issue because most of the work is scheduled to occur during the summer season.

7) An operating schedule of two weeks on-site followed by two weeks off-site is used in the cost estimate for Nuna Logistics' and EBA Engineering's employees (two 11-hour shifts per day). An operating schedule of three weeks on-site followed by one week off-site is used in the cost estimate for Clark Builders' employees (one 12-hour shift per day).

8) We have assumed that none of the esker material will require blasting and that sufficient quarry or waste rock will be available for the restoration without the need for further blasting.

9) Fuel required for mining and earthworks construction has been included in the estimate at a price of $0.55 per liter all inclusive at the site.

10) Mobilization and demobilization costs have been included in the estimate and assume that the proposed equipment will be mobilized from its present locations. On completion of the work, the estimate assumes that the equipment would be demobilized to these same locations.

11) We have assumed level road speeds of 37 kph Loaded and 40 KPH empty; and rough road speeds of 20 kph, for conventional mine trucks (15 kph for tractor/wagons). In view of our recent experience hauling esker material at Lupin, these speeds are conservative.

12) The carrying cost of the capital value of equipment is assumed to be 9%.

13) The equipment rates are based on our current experience with our current fleet. The capital cost valuation, operating costs, and performance of individual pieces of equipment at the time the work is to begin, will more accurately determine the equipment rates.

14) Air transportation has been included in the estimate at a price of $750.00 per round trip. No allowance has been made for short rotations. The price is expected to reflect an average price from various hire points to site.

15) No credits are included in this estimate for salvage value of facilities or equipment.

16) Tailings cover quantities are based on an internal Echo Bay memo from Mike Tansey to Bill Danyluk dated August 6, 2000. The timing of the placement has been modified to match equipment and esker thaw capabilities.

17) Re-vegetation has not been included in the estimate or schedule.

18) The estimate does not include post-reclamation monitoring. The estimate also does not include advance environmental work such as the preparation of the final abandonment and restroration plan or supporting studies if required. The estimate does, however, include minor on-site planning and monitoring by EBA Engineering from 2003 through 2008.

19) The estimate does not include any treatment of tailings pond supernatant liquids or special disposal of hazardous materials or soils, except for disposal to the tailings area of a minor amount of potentially acid generating rock as encountered during reclamation. Also, the tank farm soils will be relocated to the tailings area.

WORK PLAN AND SCHEDULE

The work plan and schedule are based on mine closure in early 2008 at the latest.

Nuna Logistics proposes to complete most of the tailings cover requirement while Lupin is in operation. This will ensure that the post-closure requirement will be completed in one season concurrent with the facilities reclamation. With this in mind, we also propose to delay the pre-closure tailings cover requirement as long as practical to conserve cash flow. Based on reclamation in 2008, the tailings cover work would begin in 2006.

YEARS 2006

Tailings

Tailing cover on Cells 1, 2 and part of cell 3 would be done during this summer season. The cover would require the following equipment which would be mobilized to site on the 2006 winter road.

- 4 – Caterpillar 776 Tractors
- 4 – 150-Ton Trailers
- 2 – Caterpillar 992 Loaders
- 3 – Caterpillar D8 Dozers currently (on-site)

The work would occur over a period of about 90 days (June to August).

YEAR 2007

Tailings

Tailings cover on most of the remainder of cell 3 would be done during this summer season. The work would occur over a period of about 99 days (June to early September)

Tailings cover on Cell 5, the remainder of Cell 3, and the final grading of the dikes would be completed in 2008.

The work would occur over a period of 94 days (June to early September).

Demolition

The basis of the demolition plan is to maximize the use of mechanical demolition equipment. This will result in minimal but efficient use of manpower and ensure overall worker safety.

Prior to commencing with demolition, items that have potential salvage value would be removed by a crew that would go ahead of the main dismantling crew. Items for salvage

would need to be identified ahead of time and any special handling requirements noted. Our estimate does not include credit for salvage equipment.

The following demolition equipment will be mobilized on the 2008 winter road:

2 – Backhoes
2 – Shears
3 – Cranes
1 – Caterpillar 992 Loader
2 – Caterpillar 773 Trucks
1 – Caterpillar D10 Dozer
Miscellaneous Manlifts and JLG's

The main dismantling crew will begin dismantling the main complex in mid-April, 2008.

Beginning with the roof, workers will remove exterior roof panels by cutting metal roofing into sections then hoisting these sections to the ground with a crane. Workers using manlifts and JLG's will remove exterior cladding to free the structure for demolition.

Once cladding has been removed, interior demolition will commence using large backhoes equipped with metal cutting shears. Workers using manlifts and specialized cutting equipment will work in areas where shears may not be effective.

Building structural steel will be removed with cranes and/or backhoes equipped with shears. All material will be cut into manageable sized pieces for disposal.

Elevated concrete will be removed using pneumatic hammers mounted on mobile equipment where possible. Some areas may require hand demolition and some may be cut into manageable size sections using concrete saws and then hoisted away using cranes. All grade level concrete will remain as is.

While the main complex is being demolished, personnel requirements will vary depending on the degree to which mechanized methods can be employed. During these mechanized periods, personnel can be used to seal the underground and demolish other site buildings and infrastructure. The last buildings to be demolished will be the main camp kitchen and two wings, water pumphouse, emergency powerhouse, and surface shop. At this point, the crews will be reduced to a minimum and housed in the Manager's house for the final demolition.

As the demolition is occurring, the materials will be loaded into Caterpillar 773 trucks. The truck will haul first to the crown pillar location until it reaches capacity and then to the present landfill location. We believe that using the underground via ramp or shaft to dispose of demolition materials is not practical. We also believe that the present landfill location is of sufficient size and should be acceptable to authorities, given its current use.

Demolition of facilities and the disposal of the materials is expected to take five months (mid-April to mid-August).

Site Reclamation

As the demolition advances on dayshift, the night shift crews will complete the site earthworks reclamation. We propose to dress the roads and airstrip side slopes and to cover the main complex area with a thin layer of esker material.

Support

During the reclamation project, site service will be required similar to the site service requirement during operations. We have assumed a similar crew using the same equipment. We have increased the pickup allocation to six to reflect the number of work places and crew requirements.

The reclamation program should be completed by October, 2008.

YEAR 2009

Demolition

The equipment used to complete the reclamation work will be demobilized on the 2009 winter road.

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Overall Summary

Schedule 1: Overall Summary

Combined Estimates (Nuna, Clark, EBA)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Cost Estimate ($ thousands)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Direct Costs														
Main Complex (Clark,Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9
Residence Complex (Clark,Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6
Site Buildings & Infrastructure (Clark,Nuna	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2
Site Earthworks Reclamation (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8
Tailings (Nuna)	$ -	$ -	$ -	$ -	$ 3,163.4	$ 3,427.1	$ 3,460.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,050.8
Underground (Clark,Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1
Total Directs	$ -	$ -	$ -	$ -	$ 3,163.4	$ 3,427.1	$ 10,239.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,830.4
Indirect Costs														
General Indirects (Nuna)	$ -	$ 10.0	$ 10.0	$ 10.0	$ 425.0	$ 40.0	$ 480.0	$ 500.0	$ -	$ -	$ -	$ -	$ -	$ 1,475.0
Project Administration (Nuna,Clark,EBA)	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9
Supplies & Services (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0
Support Equipment (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,436.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,436.0
Support Labour (Nuna)	$ -	$ -	$ -	$ -	$ 251.3	$ 276.4	$ 705.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,233.2
Utilities & Support (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.7
Transportation & Camp (Nuna)	$ -	$ -	$ -	$ -	$ 213.0	$ 234.1	$ 1,434.5	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ 1,901.6
Total Indirects	$ -	$ 10.0	$ 10.0	$ 10.0	$ 889.3	$ 550.5	$ 5,778.6	$ 520.0	$ -	$ -	$ -	$ -	$ -	$ 7,768.4
Total Project	$ -	$ 10.0	$ 10.0	$ 10.0	$ 4,052.7	$ 3,977.6	$ 16,018.5	$ 520.0	$ -	$ -	$ -	$ -	$ -	$ 24,598.7

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Summary of Direct Costs

Schedule 2: Direct Costs Summary

Combined Estimates (Nuna, Clark, EBA)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Direct Costs Estimate ($ thousands)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Main Complex														
Shaft House (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 198.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 198.6
Hoist Room (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 149.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 149.0
Crushing & Grinding (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,042.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,042.7
Recovery Plant (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,117.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,117.1
Backfill Plant (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.5
Powerhouse (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 397.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 397.2
Warehouse & Offices (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 470.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 470.8
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9
Residence Complex														
Rooms & Corridors (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 56.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 56.5
Kitchen & Dining Area (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 59.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 59.5
Recreation Centre (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 54.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 54.8
Office Area (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 29.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 29.8
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6
Site Buildings & Infrastructure														
Storage & Shop Buildings (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 288.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 288.1
Fuel Tank Farms (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 337.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 337.3
Emergency Powerhouse (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 118.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 118.2
Tailings Line (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 374.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 374.7
Explosives Storage (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 82.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 82.4
Water Supply (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 159.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 159.6
Weather Station (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.8
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2
Site Earthworks Reclamation														
Airstrip (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 80.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 80.5
Lights & Instruments (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 79.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 79.3
Site Roads (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 201.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 201.2
Sewage Ponds (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 161.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 161.0
Final Grading (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 305.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 305.8
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8
Tailings														
Cover Tailings (Nuna)	$ -	$ -	$ -	$ -	$ 3,163.4	$ 3,427.1	$ 3,290.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 9,880.8
Dyke Contouring (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 150.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 150.0
Occurance 8 Berm (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.0
Subtotal	$ -	$ -	$ -	$ -	$ 3,163.4	$ 3,427.1	$ 3,460.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,050.8
Underground														
Equipment Disposal (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 17.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 17.0
Access Closures (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 255.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 255.1
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1
Total Direct Costs	$ -	$ -	$ -	$ -	$ 3,163.4	$ 3,427.1	$ 10,239.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,830.4

Notes. Fingers Lake Esker Contouring included in Tailings Containment Estimate (Farming Esker)

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Summary of Indirect Costs

Schedule 3: Indirect Costs Summary

Combined Estimates (Nuna, Clark, EBA)

Prepared by Nuna Logistics Ltd.

19-Jan-01

C.D.S.

Indirect Costs Estimate ($ thousands)	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
General Indirects														
Advance Work & Planning (Nuna)	$ -	$ 10.0	$ 10.0	$ 10.0	$ 105.0	$ 40.0	$ 215.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 390.0
Mobilization (Nuna)	$ -	$ -	$ -	$ -	$ 320.0	$ -	$ 265.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 585.0
Demobilization (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 500.0	$ -	$ -	$ -	$ -	$ -	$ 500.0
Insurance	*Included in Labour Rates as Off-Site Overhead*													$ -
Subtotal	$ -	$ 10.0	$ 10.0	$ 10.0	$ 425.0	$ 40.0	$ 480.0	$ 500.0	$ -	$ -	$ -	$ -	$ -	$ 1,475.0
Project Administration														
Management (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 221.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 221.6
Administration (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 139.6
Survey (EBA)	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1
Quality Control (EBA)	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1
Supervision (Nuna,Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 693.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 693.5
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9
Supplies & Services														
Special & One-time Supplies (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0
General Supplies & Services (Nuna)	*Included in Labour Rates as On-Site Overhead*													$ -
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 60.0
Support Equipment														
General Support (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 518.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 518.0
Manlifts, Forklifts, Loaders (Clark)	$ -	$ -	$ -	$ -	$ -	$ -	$ 918.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 918.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,436.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,436.0
Support Labour														
Servicing - Tailings (Nuna)	$ -	$ -	$ -	$ -	$ 251.3	$ 276.4	$ 262.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 790.2
Support - Demolition (Nuna)	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.0
Subtotal	$ -	$ -	$ -	$ -	$ 251.3	$ 276.4	$ 705.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,233.2
Utilities & Support														
Communications (Alloc.)	*Included in Labour Rates as On-Site Overhead*			$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Generated Power (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 269.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 269.7
Water Supply (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.0
Compressed Air (Alloc.)	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 299.7
Transportation & Camp														
Scheduled Flights (All)	$ -	$ -	$ -	$ -	$ 122.3	$ 134.3	$ 720.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 977.3
Unscheduled Flights (Alloc.)	*Based on 10% of Post-Closure Scheduled Flight Costs*			$ -	$ -	$ -	$ 72.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 72.1
Camp Catering (All)	$ -	$ -	$ -	$ -	$ 90.7	$ 99.8	$ 641.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 832.2
Temporary Camp (Alloc.)	*Based on Temporary Well-Site for two weeks*			$ -	$ -	$ -	$ -	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ 20.0
Subtotal	$ -	$ -	$ -	$ -	$ 213.0	$ 234.1	$ 1,434.5	$ 20.0	$ -	$ -	$ -	$ -	$ -	$ 1,901.6
Total Indirect Costs	$ -	$ 10.0	$ 10.0	$ 10.0	$ 889.3	$ 550.5	$ 5,778.6	$ 520.0	$ -	$ -	$ -	$ -	$ -	$ 7,768.4

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 4: Main Complex

Combined Estimates (Nuna, Clark)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Main Complex	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Clark Builders ($ thousands)														
Equipment														
Cranes, Backhoes & Shears	$ -	$ -	$ -	$ -	$ -	$ -	$ 840.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 840.9
Labour														
Shaft House	$ -	$ -	$ -	$ -	$ -	$ -	$ 108.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 108.0
Hoist Room	$ -	$ -	$ -	$ -	$ -	$ -	$ 81.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 81.0
Crushing & Grinding	$ -	$ -	$ -	$ -	$ -	$ -	$ 567.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 567.0
Recovery Plant	$ -	$ -	$ -	$ -	$ -	$ -	$ 607.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 607.5
Backfill Plant	$ -	$ -	$ -	$ -	$ -	$ -	$ 241.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 241.2
Powerhouse	$ -	$ -	$ -	$ -	$ -	$ -	$ 216.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 216.0
Warehouse & Offices	$ -	$ -	$ -	$ -	$ -	$ -	$ 256.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 256.0
Subtotal Clark Builders	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,917.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,917.6
Nuna Logistics														
Equipment														
Units Required														
Cat 992 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 773 Trucks	-	-	-	-	-	-	2	-	-	-	-	-	-	
JD 992E Excavator	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat D10 Dozers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Utilization														
Cat 992 Loaders	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Cat 773 Trucks	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	
JD 992E Excavator	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	
Cat D10 Dozers	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 992 Loaders	-	-	-	-	-	-	672	-	-	-	-	-	-	672
Cat 773 Trucks	-	-	-	-	-	-	816	-	-	-	-	-	-	816
JD 992E Excavator	-	-	-	-	-	-	576	-	-	-	-	-	-	576
Cat D10 Dozers	-	-	-	-	-	-	630	-	-	-	-	-	-	630
Equipment Costs ($ thousands)														
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 191.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 191.7
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ 201.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 201.7
JD 992E Excavator	$ -	$ -	$ -	$ -	$ -	$ -	$ 127.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 127.3
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 199.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 199.5
Subtotal Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ 720.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 720.3
Operating Days	-	-	-	-	-	-	60	-	-	-	-	-	-	60
Labour														
Operators (per shift)														
Operators	-	-	-	-	-	-	2.0	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	9.0	-	-	-	-	-	-	
Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 123.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 123.3
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ 57.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 57.8
Subtotal Direct Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 181.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 181.0
Subtotal Nuna Logistics	$ -	$ -	$ -	$ -	$ -	$ -	$ 901.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 901.3
Total Main Complex	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,818.9

Notes: Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates. Servicemen & Labourers are included as Indirect Support Labour Costs
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark)
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs).

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 5: Residence Complex

Combined Estimates (Nuna, Clark)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Residence Complex	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Clark Builders ($ thousands)														
Equipment														
Cranes, Backhoes & Shears	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.7
Labour														
Rooms & Corridors	$ -	$ -	$ -	$ -	$ -	$ -	$ 21.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 21.4
Kitchen & Dining Area	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 22.5
Recreation Area	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.7
Office Area	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 11.3
Subtotal Clark Builders	$ -	$ -	$ -	$ -	$ -	$ -	$ 106.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 106.5
Nuna Logistics														
Equipment Requirement														
Units Required														
Cat 992 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 773 Trucks	-	-	-	-	-	-	2	-	-	-	-	-	-	
JD 992E Excavator	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat D10 Dozers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Utilization														
Cat 992 Loaders	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	
Cat 773 Trucks	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	
JD 992E Excavator	0%	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	
Cat D10 Dozers	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 992 Loaders	-	-	-	-	-	-	96	-	-	-	-	-	-	96
Cat 773 Trucks	-	-	-	-	-	-	68	-	-	-	-	-	-	68
JD 992E Excavator	-	-	-	-	-	-	48	-	-	-	-	-	-	48
Cat D10 Dozers	-	-	-	-	-	-	60	-	-	-	-	-	-	60
Equipment Costs ($ thousands)														
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 27.4
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.8
JD 992E Excavator	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.6
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 19.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 19.0
Subtotal Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ 73.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 73.8
Operating Days	-	-	-	-	-	-	10	-	-	-	-	-	-	10
Labour Requirement														
Operators (per shift)														
Operators	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	7.0	-	-	-	-	-	-	
Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.4
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ 4.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 4.8
Subtotal Direct Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.2
Subtotal Nuna Logistics	$ -	$ -	$ -	$ -	$ -	$ -	$ 94.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 94.0
Total Residence Complex	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.6

Notes: Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates. Servicemen & Labourers are included as Indirect Support Labour Costs
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark).
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs).

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 6: Site Buildings & Infrastructure

Combined Estimates (Nuna, Clark)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Site Buildings & Infrastructure	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Clark Builders ($ thousands)														
Equipment														
Cranes, Backhoes & Shears	$ -	$ -	$ -	$ -	$ -	$ -	$ 404.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 404.1
Labour														
Storage & Shop Buildings	$ -	$ -	$ -	$ -	$ -	$ -	$ 173.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 173.0
Fuel Tank Farms	$ -	$ -	$ -	$ -	$ -	$ -	$ 202.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 202.5
Emergency Powerhouse	$ -	$ -	$ -	$ -	$ -	$ -	$ 71.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 71.0
Tailings Line	$ -	$ -	$ -	$ -	$ -	$ -	$ 225.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 225.0
Explosives Storage	$ -	$ -	$ -	$ -	$ -	$ -	$ 49.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 49.5
Water Supply	$ -	$ -	$ -	$ -	$ -	$ -	$ 95.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 95.9
Weather Station	$ -	$ -	$ -	$ -	$ -	$ -	$ 180.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 180.0
Subtotal Clark Builders	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,401.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,401.0
Nuna Logistics														
Equipment Requirement														
Units Required														
Cat 992 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 773 Trucks	-	-	-	-	-	-	2	-	-	-	-	-	-	
JD 992E Excavator	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat D10 Dozers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Utilization														
Cat 992 Loaders	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	
Cat 773 Trucks	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	
JD 992E Excavator	0%	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	
Cat D10 Dozers	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 992 Loaders	-	-	-	-	-	-	200	-	-	-	-	-	-	200
Cat 773 Trucks	-	-	-	-	-	-	170	-	-	-	-	-	-	170
JD 992E Excavator	-	-	-	-	-	-	120	-	-	-	-	-	-	120
Cat D10 Dozers	-	-	-	-	-	-	263	-	-	-	-	-	-	263
Equipment Costs ($ thousands)														
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 57.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 57.1
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ 42.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 42.0
JD 992E Excavator	$ -	$ -	$ -	$ -	$ -	$ -	$ 26.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 26.5
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 83.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 83.1
Subtotal Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ 208.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 208.7
Operating Days	-	-	-	-	-	-	25	-	-	-	-	-	-	25
Labour Requirement														
Operators (per shift)														
Operators	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	7.0	-	-	-	-	-	-	
Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 38.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 38.5
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ 12.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 12.0
Subtotal Direct Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 50.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 50.6
Subtotal Nuna Logistics	$ -	$ -	$ -	$ -	$ -	$ -	$ 259.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 259.3
Total Site Buildings & Infrastructure	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,660.2

Notes: Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates. Servicemen & Labourers are included as Indirect Support Labour Costs.
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark).
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs).

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 7: Tailings - Load, Haul, & Place Quantities

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Esker Haul by Category (ECMs)														
Operations														
Divider Dykes														
Cell 3b Divider Dyke	-	-	-	-	-	-	-	-	-		-	-	-	-
Cell 3c Divider Dyke	-	-	-	-	-	-	-	-	-		-	-	-	-
Cell 3d Divider Dyke	-	-	-	-	-	-	-	-	-		-	-	-	-
L Dam	-	-	-	-	-	-	-	-	-		-	-	-	-
Total Operations	-	-	-	-	-	-	-	-	-		-	-	-	-
Pre-Closure Reclamation														
Granular Cover														
Cover Cell 1 to1.75 m	-	-	-	-	247,500	-	-	-	-		-	-	-	247,500
Cover Cell 1A to 1.75 m	-	-	-	-	41,250	-	-	-	-		-	-	-	41,250
Cover Cell 2NW to 1 75 m	-	-	-	-	90,125	-	-	-	-		-	-	-	90,125
Cover Cell 2 to 1 75 m	-	-	-	-	79,785	-	-	-	-		-	-	-	79,785
Cover Cell 3A to 1 75 m	-	-	-	-	60,821	-	-	-	-		-	-	-	60,821
Cover Cell 3B to 1.75 m	-	-	-	-	50,160	-	-	-	-		-	-	-	50,160
Cover Cell 3C to 1 75 m	-	-	-	-	54,997	-	-	-	-		-	-	-	54,997
Cover Cell 3D to 1 75 m	-	-	-	-	-	73,500	-	-	-		-	-	-	73,500
Cover Cell 3 to 1.75 m	-	-	-	-	83,000	631,240	-	-	-		-	-	-	714,240
Total Pre-Closure Reclamation	-	-	-	-	707,638	704,740	-	-	-		-	-	-	1,412,378
Post-Closure Reclamation														
Granular Cover														
Cover Cell 3 to 1.75 m	-	-	-	-	-	-	58,000	-	-		-	-	-	58,000
Cover Cell 5 to 1.75 m	-	-	-	-	-	-	644,000	-	-		-	-	-	644,000
Total Post-Closure Reclamation	-	-	-	-	-	-	702,000	-	-		-	-	-	702,000
Total Esker Haul	-	-	-	-	707,638	704,740	702,000	-	-		-	-	-	2,114,378
Quantity Equivalents														
Esker (ECMs)	-	-	-	-	707,638	704,740	702,000	-	-		-	-	-	2,114,378
Esker (tonnes)	-	-	-	-	1,138,374	1,133,712	1,129,304	-	-		-	-	-	3,401,391
Esker (BCMs)	-	-	-	-	615,337	612,817	610,435	-	-		-	-	-	1,838,590
Esker (LCMs)	-	-	-	-	799,939	796,663	793,565	-	-		-	-	-	2,390,166
Haul Distances														
Level Road Haul Distance (km)	-	-	-	-	7.2	8 4	7.9	-	-		-	-	-	
Difficult Terrain Haul Distance (km	-	-	-	-	-	-	-	-	-		-	-	-	
Total Distance (km)	-	-	-	-	7.2	8 4	7 9	-	-		-	-	-	
Esker Depth (m)	-	-	-	-	-	-	-	-	-		-	-	-	
Cycle Times														
Average Truck Cycle Times - 992 Loading 776 Tractor-Trailers (min)														
Esker Haul	-	-	-	-	31 7	35 5	33 9	-	-		-	-	-	
Average Truck Cycle Times - 966 Loading 769 (min)														
Esker Haul	-	-	-	-	29 4	33 1	31 6	-	-		-	-	-	
Operating Days	-	-	-	-	**90**	**99**	**94**	-	-	-	-	-	-	**283**

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 8: Tailings - Equipment Requirements

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Directs - LHP Production Equipment														
Production Equipment Required Productive Hours														
769 Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
776 Tractor-Trailers	-	-	-	-	6,021	6,704	6,385	-	-	-	-	-	-	19,110
966 Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-
992 Loader	-	-	-	-	1,378	1,372	1,367	-	-	-	-	-	-	4,116
D8 Dozers (Farming Esker)	-	-	-	-	787	784	781	-	-		-	-	-	2,352
D8 Dozers (Dump Locations)	-	-	-	-	1,800	1,980	1,880	-	-	-	-	-	-	5,660
D8 Dozers	-	-	-	-	2,587	2,764	2,661	-	-	-	-	-	-	8,012
Production Equipment Required Chargeable Hours														
769 Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
776 Tractor-Trailers	-	-	-	-	6,120	6,732	6,392	-	-	-	-	-	-	19,244
966 Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-
992 Loader	-	-	-	-	1,440	1,584	1,504	-	-	-	-	-	-	4,528
D8 Dozers	-	-	-	-	4,050	4,455	4,230	-	-	-	-	-	-	12,735
Station Positions														
Loaders Shovels	-	-	-	-	1	1	1	-	-	-	-	-	-	
Dozers @ Dump Locations	-	-	-	-	1	1	1	-	-	-	-	-	-	
Production Equipment Required On-Site														
769 Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	
776 Tractor-Trailers	-	-	-	-	4	4	4	-	-	-	-	-	-	
966 Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	
992 Loader	-	-	-	-	2	2	2	-	-	-	-	-	-	
D8 Dozers	-	-	-	-	3	3	3	-	-	-	-	-	-	
Production Equipment Costs ($ thousands)														
769 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
776 Tractor-Trailers	$ -	$ -	$ -	$ -	$ 1,383.6	$ 1,525.2	$ 1,458.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 4,367.3
966 Loader	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
992 Loader	$ -	$ -	$ -	$ -	$ 480.1	$ 493.0	$ 484.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,457.3
D8 Dozers	$ -	$ -	$ -	$ -	$ 719.0	$ 770.2	$ 741.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,230.4
	$ -	$ -	$ -	$ -	$ 2,582.7	$ 2,788.4	$ 2,683.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 8,054.9

Notes: Equipment Hours reflects requirement before taking availability and usage into account. Equipment on-site reflects the requirement after taking availability and usage into account.

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 9: Tailings - Labour Requirements

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Direct Labour Requirement														
Operators (per shift)														
Production Equipment														
Trucks	-	-	-	-	3.5	3.5	3.5	-	-	-	-	-	-	
Loaders	-	-	-	-	1.0	1.0	1.0	-	-	-	-	-	-	
Dozers	-	-	-	-	2.0	2.0	2.0	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	1.5	1.5	1.5	-	-	-	-	-	-	
Welders	-	-	-	-	1.0	1.0	1.0	-	-	-	-	-	-	
Subtotal On-Site (2 shifts)	-	-	-	-	18	18	18	-	-	-	-	-	-	
Indirect Labour Requirement														
Mechanical (per shift)														
Servicemen/Fuelmen	-	-	-	-	1.5	1.5	1.5	-	-	-	-	-	-	
Labourers	-	-	-	-	1.5	1.5	1.5	-	-	-	-	-	-	
Subtotal On-Site (2 shifts)	-	-	-	-	6	6	6	-	-	-	-	-	-	
Direct Chargeable Labour Costs ($ thousands)														
Production Equipment														
Trucks	$ -	$ -	$ -	$ -	$ 303.3	$ 333.7	$ 316.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 953.8
Loaders	$ -	$ -	$ -	$ -	$ 92.5	$ 101.7	$ 96.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 290.7
Dozers	$ -	$ -	$ -	$ -	$ 184.9	$ 203.4	$ 193.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 581.4
Total Direct Labour	$ -	$ -	$ -	$ -	$ 580.7	$ 638.7	$ 606.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,825.9
Indirect Chargeable Labour Costs ($ thousands)														
Production Equipment														
Servicemen/Fuelmen	$ -	$ -	$ -	$ -	$ 134.3	$ 147.8	$ 140.3	$ -	$ -	$ -	$ -	$ -	$ -	$ 422.4
Labourers	$ -	$ -	$ -	$ -	$ 117.0	$ 128.7	$ 122.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 367.8
Total Indirect Labour	$ -	$ -	$ -	$ -	$ 251.3	$ 276.4	$ 262.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 790.2

Notes Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates Servicemen & Labourers are included as Indirect Support Labour Costs
Labour personnel and costs are based on a 2 week in / 2 week out schedule of 11 hour days Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs).

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 10: Site Earthworks Reclamation

Combined Estimates (Nuna, Clark)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

Site Earthworks Reclamation	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Clark Builders ($ thousands)														
Equipment														
Cranes, Backhoes & Shears	$ -	$ -	$ -	$ -	$ -	$ -	$ 18.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 18.2
Labour														
Lights & Instruments	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.0
Subtotal Clark Builders	$ -	$ -	$ -	$ -	$ -	$ -	$ 63.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 63.2
Nuna Logistics														
Equipment Requirement														
Units Required														
Cat 992 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 773 Trucks	-	-	-	-	-	-	2	-	-	-	-	-	-	
JD 992E Excavator	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat D10 Dozers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Utilization														
Cat 992 Loaders	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Cat 773 Trucks	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
JD 992E Excavator	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	
Cat D10 Dozers	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 992 Loaders	-	-	-	-	-	-	532	-	-	-	-	-	-	532
Cat 773 Trucks	-	-	-	-	-	-	1,131	-	-	-	-	-	-	1,131
JD 992E Excavator	-	-	-	-	-	-	152	-	-	-	-	-	-	152
Cat D10 Dozers	-	-	-	-	-	-	499	-	-	-	-	-	-	499
Equipment Costs ($ thousands)														
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 151.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 151.8
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ 279.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 279.5
JD 992E Excavator	$ -	$ -	$ -	$ -	$ -	$ -	$ 33.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 33.6
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 157.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 157.9
Subtotal Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ 622.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 622.8
Operating Days	-	-	-	-	-	-	48	-	-	-	-	-	-	48
Labour Requirement														
Operators (per shift)														
Operators	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	9.0	-	-	-	-	-	-	
Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 73.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 73.2
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ 68.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 68.6
Subtotal Direct Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 141.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 141.8
Subtotal Nuna Logistics	$ -	$ -	$ -	$ -	$ -	$ -	$ 764.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 764.6
Total Site Earthworks Reclamation	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 827.8

Notes: Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates. Servicemen & Labourers are included as Indirect Support Labour Costs.
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark).
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs).

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Direct Cost Detail

Schedule 11: Underground Closure

Combined Estimates (Nuna, Clark)

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Underground Closure														
Clark Builders ($ thousands)														
Equipment														
Cranes Backhoes & Shears	$ -	$ -	$ -	$ -	$ -	$ -	$ 64.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 64.7
Labour														
Equipment Disposal	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0
Access Closures	$ -	$ -	$ -	$ -	$ -	$ -	$ 150.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 150.0
Subtotal Clark Builders	$ -	$ -	$ -	$ -	$ -	$ -	$ 224.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 224.7
Nuna Logistics														
Equipment Requirement														
Units Required														
Cat 992 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 773 Trucks	-	-	-	-	-	-	2	-	-	-	-	-	-	
JD 992E Excavator	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat D10 Dozers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Utilization														
Cat 992 Loaders	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Cat 773 Trucks	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
JD 992E Excavator	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	
Cat D10 Dozers	0%	0%	0%	0%	0%	0%	70%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 992 Loaders	-	-	-	-	-	-	56	-	-	-	-	-	-	56
Cat 773 Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JD 992E Excavator	-	-	-	-	-	-	32	-	-	-	-	-	-	32
Cat D10 Dozers	-	-	-	-	-	-	53	-	-	-	-	-	-	53
Equipment Costs ($ thousands)														
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.0
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
JD 992E Excavator	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.1
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 16.6
Subtotal Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ 39.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 39.7
Operating Days	-	-	-	-	-	-	5	-	-	-	-	-	-	5
Labour Requirement														
Operators (per shift)														
Operators	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	6.0	-	-	-	-	-	-	
Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.7
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Direct Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 7.7
Subtotal Nuna Logistics	$ -	$ -	$ -	$ -	$ -	$ -	$ 47.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 47.4
Total Underground Closure	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 272.1

Notes Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates Servicemen & Labourers are included as Indirect Support Labour Costs.
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna.EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark)
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs)

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Indirect Cost Detail

Schedule 12: General Indirects

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Advance Work & Planning ($ thousands)														
Nuna Logistics														
Engineering/Planning	$ -	$ -	$ -	$ -	$ 15.0	$ -	$ 50.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0
Advance Sitework	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 20.0
Activity Ramp-up	$ -	$ -	$ -	$ -	$ 60.0	$ 30.0	$ 60.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 150.0
Subtotal	$ -	$ -	$ -	$ -	$ 85.0	$ 30.0	$ 120.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 235.0
Clark Builders														
Engineering/Planning	$ -	$ -	$ -	$ -	$ -	$ -	$ 25.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 25.0
Advance Sitework	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Activity Ramp-up	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 55.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 55.0
EBA Engineering														
Engineering/Planning	$ -	$ 10.0	$ 10.0	$ 10.0	$ 20.0	$ 10.0	$ 40.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 100.0
Advance Sitework	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Activity Ramp-up	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal	$ -	$ 10.0	$ 10.0	$ 10.0	$ 20.0	$ 10.0	$ 40.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 100.0
Total Advance Work & Planning	$ -	$ 10.0	$ 10.0	$ 10.0	$ 105.0	$ 40.0	$ 215.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 390.0
Mobilization ($ thousands)														
Nuna Equipment														
Cat 776 Tractor-Trailers	$ -	$ -	$ -	$ -	$ 200.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.0
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ 95.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 95.0
Cat D8 Dozers	$ -	$ -	$ -	$ -	$ 15.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 30.0
Cat 16G Graders	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0
992E Excavators	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 15.0
Other Equipment & Supplies	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ 30.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 40.0
Subtotal	$ -	$ -	$ -	$ -	$ 320.0	$ -	$ 90.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 410.0
Clark Equipment														
Cranes	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.0
Backhoes	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0
Other Equipment & Supplies	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ 175.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 175.0
Total Mobilization	$ -	$ -	$ -	$ -	$ 320.0	$ -	$ 265.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 585.0
Demobilization ($ thousands)														
Nuna Equipment														
Cat 776 Tractor-Trailers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 200.0	$ -	$ -	$ -	$ -	$ -	$ 200.0
Cat 773 Trucks	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Cat 992 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 75.0	$ -	$ -	$ -	$ -	$ -	$ 75.0
Cat D8 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ 10.0
Cat D10 Dozers	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 25.0	$ -	$ -	$ -	$ -	$ -	$ 25.0
Cat 16G Graders	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ 10.0
992E Excavators	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ 10.0
Other Equipment & Supplies	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 10.0	$ -	$ -	$ -	$ -	$ -	$ 10.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 340.0	$ -	$ -	$ -	$ -	$ -	$ 340.0
Clark Equipment														
Cranes	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 40.0	$ -	$ -	$ -	$ -	$ -	$ 40.0
Backhoes	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 55.0	$ -	$ -	$ -	$ -	$ -	$ 55.0
Other Equipment & Supplies	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0	$ -	$ -	$ -	$ -	$ -	$ 65.0
Subtotal	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 160.0	$ -	$ -	$ -	$ -	$ -	$ 160.0
Total Demobilization	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 500.0	$ -	$ -	$ -	$ -	$ -	$ 500.0

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Indirect Cost Detail

Schedule 13: Project Administration

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
M&A Requirement														
Administration Operating Days	-	-	-	-	-	-	150	-	-	-	-	-	-	150
Supervision														
Project Manager	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Nuna Foremen	-	-	-	-	-	-	2.0	-	-	-	-	-	-	
Clark Foremen	-	-	-	-	-	-	2.0	-	-	-	-	-	-	
Administration														
Accounting	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Clerical	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Monitoring & Reporting														
Field/Environmental Engineer	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Surveyor	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Total On-Site	-	-	-	-	-	-	8.0	-	-	-	-	-	-	

M&A Labour Costs ($ thousands)														
Project Manager	$ -	$ -	$ -	$ -	$ -	$ -	$ 221.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 221.6
Nuna Foremen	$ -	$ -	$ -	$ -	$ -	$ -	$ 346.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 346.8
Clark Foremen	$ -	$ -	$ -	$ -	$ -	$ -	$ 346.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 346.8
Accounting	$ -	$ -	$ -	$ -	$ -	$ -	$ 74.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 74.6
Clerical	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0
Field/Environmental Engineer	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1
Surveyor	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 154.1
Total M&A Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362.9

Notes: Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark).
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs)

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Indirect Cost Detail

Schedule 14: Support Equipment & Labour

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Support Equipment Requirement														
Nuna Support Operating Days	-	-	-	-	-	-	150	-	-	-	-	-	-	150
Units Required														
Cat 966 Loaders	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat 16G Grader	-	-	-	-	-	-	1	-	-	-	-	-	-	
Cat IT28 Toolcarriers	-	-	-	-	-	-	2	-	-	-	-	-	-	
Tractor and End Dump Trailers	-	-	-	-	-	-	1	-	-	-	-	-	-	
Buses	-	-	-	-	-	-	1	-	-	-	-	-	-	
Pickups	-	-	-	-	-	-	6	-	-	-	-	-	-	
Utilization														
Cat 966 Loaders	0%	0%	0%	0%	0%	0%	30%	0%	0%	0%	0%	0%	0%	
Cat 16G Grader	0%	0%	0%	0%	0%	0%	40%	0%	0%	0%	0%	0%	0%	
Cat IT28 Toolcarriers	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	0%	0%	
Tractor and End Dump Trailers	0%	0%	0%	0%	0%	0%	20%	0%	0%	0%	0%	0%	0%	
Buses	0%	0%	0%	0%	0%	0%	5%	0%	0%	0%	0%	0%	0%	
Pickups	0%	0%	0%	0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	
Productive Hours Required														
Cat 966 Loaders	-	-	-	-	-	-	720	-	-	-	-	-	-	720
Cat 16G Grader	-	-	-	-	-	-	1,080	-	-	-	-	-	-	1,080
Cat IT28 Toolcarriers	-	-	-	-	-	-	2,250	-	-	-	-	-	-	2,250
Tractor and End Dump Trailers	-	-	-	-	-	-	450	-	-	-	-	-	-	450
Buses	-	-	-	-	-	-	113	-	-	-	-	-	-	113
Pickups	-	-	-	-	-	-	8,100	-	-	-	-	-	-	8,100
Support Equipment Costs ($ thousands)														
Cat 966 Loaders	$ -	$ -	$ -	$ -	$ -	$ -	$ 107.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 107.1
Cat 16G Grader	$ -	$ -	$ -	$ -	$ -	$ -	$ 168.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 168.2
Cat IT28 Toolcarriers	$ -	$ -	$ -	$ -	$ -	$ -	$ 84.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 84.5
Tractor and End Dump Trailers	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.4	$ -	$ -	$ -	$ -	$ -	$ -	$ 45.4
Buses	$ -	$ -	$ -	$ -	$ -	$ -	$ 4.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 4.0
Pickups	$ -	$ -	$ -	$ -	$ -	$ -	$ 108.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 108.8
	$ -	$ -	$ -	$ -	$ -	$ -	$ 518.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 518.0
Support Labour Requirement														
Operators (per shift)														
Operators	-	-	-	-	-	-	1.5	-	-	-	-	-	-	
Drivers	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Mechanical (per shift)														
Mechanics	-	-	-	-	-	-	1.0	-	-	-	-	-	-	
Welders	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Servicemen/Fuelmen	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Labourers	-	-	-	-	-	-	0.5	-	-	-	-	-	-	
Total On-Site (2 shifts)	-	-	-	-	-	-	9.0	-	-	-	-	-	-	
Support Labour Costs ($ thousands)														
Operators	$ -	$ -	$ -	$ -	$ -	$ -	$ 231.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 231.1
Drivers	$ -	$ -	$ -	$ -	$ -	$ -	$ 72.2	$ -	$ -	$ -	$ -	$ -	$ -	$ 72.2
Servicemen/Fuelmen	$ -	$ -	$ -	$ -	$ -	$ -	$ 74.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 74.6
Labourers	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 65.0
Total Support Labour	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.0	$ -	$ -	$ -	$ -	$ -	$ -	$ 443.0

Notes Maintenance Labour Costs (except Servicemen & Labourers) are included in the Equipment Rates Servicemen & Labourers are included as Indirect Support Labour Costs
Labour personnel and costs are based on a 2 week in / 2 week out schedule of two 11 hour shifts (Nuna,EBA) and a 3 week in / 1 week out schedule of one 12 hour shift (Clark).
Labour Rates include benefits and fringes except Transporation and Camp Catering (both included in Indirect Transportation & Camp Costs)

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Indirect Cost Detail

Schedule 15: Transportation & Camp

Nuna Cost Estimate

Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Transportation														
Flights														
Nuna														
Tailings Containment	-	-	-	-	155	170	162	-	-	-	-	-	-	487
Facilities & Site Demolition	-	-	-	-	-	-	89	-	-	-	-	-	-	89
Project Management	-	-	-	-	-	-	86	-	-	-	-	-	-	86
Indirect Support	-	-	-	-	-	-	97	-	-	-	-	-	-	97
Clark	-	-	-	-	-	-	450	-	-	-	-	-	-	450
EBA	-	-	-	-	-	-	31	-	-	-	-	-	-	31
Incidental	-	-	-	-	8	9	46	-	-	-	-	-	-	63
	-	-	-	-	163	179	961	-	-	-	-	-	-	1,303
Transportation Costs ($ thousands)														
At $750 per Round Trip	$ -	$ -	$ -	$ -	$ 122.3	$ 134.3	$ 720.8	$ -	$ -	$ -	$ -	$ -	$ -	$ 977.3
Camp Catering														
Camp Man-Days														
Nuna														
Tailings Containment	-	-	-	-	2,160	2,376	2,256	-	-	-	-	-	-	6,792
Facilities & Site Demolition	-	-	-	-	-	-	1,243	-	-	-	-	-	-	1,243
Project Management	-	-	-	-	-	-	1,200	-	-	-	-	-	-	1,200
Indirect Support	-	-	-	-	-	-	1,350	-	-	-	-	-	-	1,350
Clark	-	-	-	-	-	-	8,800	-	-	-	-	-	-	8,800
EBA	-	-	-	-	-	-	430	-	-	-	-	-	-	430
Incidental	-	-	-	-	108	119	764	-	-	-	-	-	-	991
	-	-	-	-	2,268	2,495	16,043	-	-	-	-	-	-	20,806
Camp Catering Costs ($ thousands)														
At $40 per Man-Day	$ -	$ -	$ -	$ -	$ 90.7	$ 99.8	$ 641.7	$ -	$ -	$ -	$ -	$ -	$ -	$ 832.2

NUNA LOGISTICS

Echo Bay Mines Ltd.
Lupin Reclamation Plan
Indirect Cost Detail

Schedule 16: Fuel Consumption

Nuna Cost Estimate

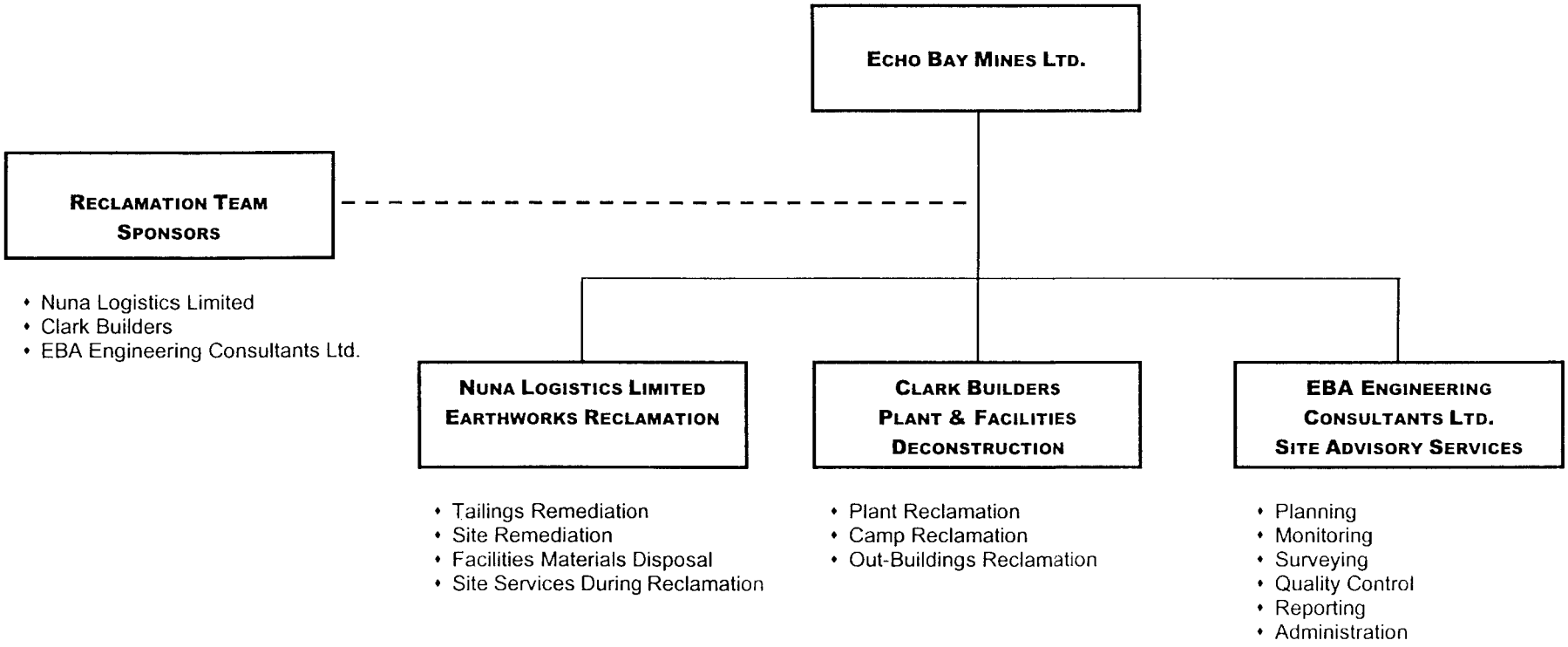
Prepared by Nuna Logistics Ltd.
19-Jan-01
C.D.S.

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total
Fuel Consumption (Litres)														
Facilities & Site Demolition														
992 Loader	-	-	-	-	-	-	140,040	-	-	-	-	-	-	140,040
773 Trucks	-	-	-	-	-	-	131,070	-	-	-	-	-	-	131,070
D10 Dozers	-	-	-	-	-	-	126,315	-	-	-	-	-	-	126,315
Clark Builders Equipment	-	-	-	-	-	-	500,000	-	-	-	-	-	-	500,000
Subtotal Litres	-	-	-	-	-	-	897,425	-	-	-	-	-	-	897,425
Tailings Containment														
769 Trucks	-	-	-	-	-	-	-	-	-	-	-	-	-	-
776 Tractor-Trailers	-	-	-	-	662,340	737,486	702,304	-	-	-	-	-	-	2,102,131
966 Loader	-	-	-	-	-	-	-	-	-	-	-	-	-	-
992 Loader	-	-	-	-	123,978	123,470	122,990	-	-	-	-	-	-	370,438
D8 Dozers	-	-	-	-	116,422	124,377	119,740	-	-	-	-	-	-	360,539
Subtotal Litres	-	-	-	-	902,740	985,334	945,034	-	-	-	-	-	-	2,833,108
Support Equipment														
Cat 966 Loaders	-	-	-	-	-	-	20,160	-	-	-	-	-	-	20,160
Cat 16G Grader	-	-	-	-	-	-	47,520	-	-	-	-	-	-	47,520
Cat IT28 Tootcarriers	-	-	-	-	-	-	13,500	-	-	-	-	-	-	13,500
Tractor and End Dump Trailers	-	-	-	-	-	-	6,750	-	-	-	-	-	-	6,750
Buses	-	-	-	-	-	-	1,125	-	-	-	-	-	-	1,125
Pickups	-	-	-	-	-	-	32,400	-	-	-	-	-	-	32,400
Subtotal Litres	-	-	-	-	-	-	121,455	-	-	-	-	-	-	121,455
Emergency Powerhouse (Post-Closure	-	-	-	-	-	-	490,320	-	-	-	-	-	-	490,320
Total Litres	-	-	-	-	902,740	985,334	2,454,234	-	-	-	-	-	-	4,342,308

Notes: Fuel Costs are included in Equipment Charge Rates. Quantities are for Information only
Fuel Consumption includes fuel required to operate the Lupin facilities (Powerhouse) during demolition.

NUNA LOGISTICS

Organization Chart



NUNA LOGISTICS

John Zigarlick

CHAIRMAN & CHIEF EXECUTIVE OFFICER

John Zigarlick applies to Nuna Logistics, an Inuit corporation, his successful quarter century experience in concepts, direction and execution of remote arctic mining developments while advocating responsible development and advancement of Canada's northern native people. Prior to forming Nuna Logistics, John spent 21 years in the employment of Echo Bay Mines Ltd., including 16 years as President and CEO. He was instrumental in the concept, planning and execution of placing Echo Bay's Lupin gold mine into production. Echo Bay developed from a small silver producer with a net worth of $7 million in 1979, to a corporation with a 1995 market capitalization of approximately $2 billion.

John also spent 11 years in the Canadian Armed Forces Security Branch including a four-year tour in France with a NATO contingent.

Experience

1993 - Present **Nuna Logistics Limited, Edmonton, AB**

- Director, Chairman & Chief Executive Officer.
- Founded Nuna Logistics, an Inuit corporation, 1993.
- Develops business opportunities.
- Conceptualizes infrastructure development in the Nunavut region.
- Contract Completions:
  - BHP Ekati 7,000 ft airstrip;
  - BHP Ekati 160 kms winter road construction.
  - BHP Ekati Panda pit prestripping 10 million tonnes, May 1997 to March 1998.
  - BHP Leslie/Long Lake frozen core dam.
  - Nuna Logistics has supplied equipment support to the Diavik Diamonds development since 1994.
  - Lytton, Jericho 3,600 ft airstrip.
  - Nuna Logistics owns and operates equipment and camps to maintain the annual 640 km winter road under contract to the mining companies operating north of Yellowknife, NWT. Annual tonnage movement in excess of 100,000 tons.
  - winter road construction.
  - Transportation of 20,000 tonnes of cement from Hay River to various remote mine sites.
  - Camp, fuel and supply mobilization.
- Counsels developers in public and private sectors on methodologies.
- Initialized a Hay River business opportunity for a major cement manufacturer.

cont.

John Zigarlick

1968 - 1995 **Echo Bay Mines Ltd., Edmonton, AB**

- 1992 - 1995 Director.
- 1991 - 1992 Director and Vice-Chairman.
- 1977 - 1991 President & Chief Executive Officer, Director.

1968 - 1971 **Irwin Engineering and Management Services Ltd.**

- Managed purchasing and personnel at Echo Bay's silver mine at Port Radium, NT.

Directorships

Nuna Logistics Limited
Kit Resources Ltd.
Pilot Shipping Ltd.

Associations

Mining Association of Canada
Alberta Chamber of Resources
NWT Chamber of Mines
Northern Alberta Institute of Technology's, Entrepreneurial Development
YMCA Small Business Education

Awards

Nunavut Mining Award, sponsored by The Royal Bank, for 25 years contribution to mining exploration and development in the Kitikmeot Region of Nunavut
Canadian Institute of Mining and Metallurgy's John Campbell Sproule Award
Alberta Chamber of Resources "Resource Man of the Year"
Northern Miners Press "Mining Man of the Year"
Prospectors and Developers of Canada "Distinguished Service Award"

NUNA LOGISTICS

Mervyn Hempenstall

PRESIDENT AND CHIEF OPERATING OFFICER

Mervyn Hempenstall has 21 years working experience, 6 of which were spent in Asia, the Middle East, Africa, and Europe on international logistics. He has developed several very successful joint venture companies with aboriginal groups both from a commercial and training/employment point of view. Mervyn joined Nuna Logistics Limited in 1997 and is responsible for the management, marketing and development of the company. Mervyn's experience in estimating and tendering to various major projects and mining companies contributes to the continued controlled growth of Nuna Logistics Limited.

Experience

1997- Present Nuna Logistics Limited, Vancouver, BC

- Responsible for the management, marketing and development of Nuna Logistics.
- Plays an active role in the tendering and site operations as well as the aboriginal and Inuit growth within the company.

1995 - 1997 Kingking Mines Ltd., Davao, Philippines

- Project Consultant and acting Project Manager for the mobilization, logistics and operation of a $67 million drill program and feasibility study for the Kingking Mine project.

1978 - 1995 National Caterers Ltd., Vancouver, BC

- Held various positions becoming President and Chief Operating Officer in 1989.
- Played a key role in developing the company from a $7 million to $75 million revenue base, becoming the largest remote site service company in Canada.
- Managed major projects such as, Hibernia, Alberta Pacific Pulpmill, Daishowa, Peace River, CP Rail Rogers Pass Tunnel, including many mining, pulpmill and pipeline projects.

1974 - 1978 Grandmet International Site Services, UK

- Logistic Manager for various international projects in Africa, the Middle East, and Europe including ARAMCO's 20,000 person projects in Saudi Arabia.
- International Estimating Manager based in London for all projects.

Qualifications

Business Studies and Management Degree, Trinity College University; Dublin, Ireland
Advanced Management Degree, Guelph University; Guelph, Ontario

Memberships

HCIMA, Hotel and Catering Institute Management Association

NUNA LOGISTICS

Courtland Smith, P.Eng.

VICE-PRESIDENT

Court Smith is a Mechanical Engineer with 15 years experience in management and engineering in the mining industry. Court is experienced in conducting feasibility studies, developing cashflows, contracts, and term sheets, mine start-up and operations, preparing capital and operating cost estimates and project scheduling for projects such as Lomas Bayas, Lupin, Kettle River, Izok Lake and George Lake.

Experience

1996 - present **Nuna Logistics Limited, Vancouver**

- Responsible for business development and engineering for contract mining and construction company.
- Development of Prefeasibility study and cashflows for Kit Resources Ltd., NT, projects.

1993 - 1996 **Gibraltar Mines Limited**

- Senior Design Engineer responsible for the development of the Lomas Bayas SX-EW copper project in Chile.
- Developed an evaluation model predicting the capital and operating cost performance and cashflows for Lomas Bayas which resulted in the purchase of the property and the nearby Fortuna de Cobre property.
- Responsible for the development of the feasibility study and basic engineering for Lomas Bayas, Chile; and a proposed McLeese Lake mine expansion.

1983 - 1993 **Echo Bay Mines Ltd.**

- Project Superintendent on Echo Bay's $10M Lamefoot exploration project Kettle River, WA, including surface drilling, metallurgical testing, mobile fleet acquisition, facilities construction, and a 5,000' underground development program.
- Maintenance Superintendent at the Kettle River mine.
- Projects supervision and design for the Lupin gold mine in the NT, responsible for design of various underground and above ground facilities.

1974 - 1982 **EBA Engineering Consultants, BBT Geotechnical Consultants, PetroCanada**

- Materials Technician and Engineering Assistant, acquiring experience in soils, concrete and asphalt testing; geotechnical drilling and lab work including the Polargas pipeline projects and construction quality control for the Dow Chemical expansion and Syncrude tank farm expansion.

Qualifications

Bachelor of Science, Mechanical Engineering, University of Alberta, 1982
Open Pit Mine Engineering Short Course, Queens University, 1989
APEGGA

NUNA LOGISTICS

Pamela Alloway, C.A.

VICE PRESIDENT AND CHIEF FINANCIAL OFFICER

Pamela Alloway is a chartered accountant with 15 years experience in financial and administrative management. Pamela has been with Nuna Logistics Limited since 1994 and is responsible for all areas of financial accounting and tax planning as well as business advisory services. With Pamela's broad knowledge of our business and her understanding of the interrelationships with other mining groups in the Northwest Territories, she is a major contributor to our tender process and project cost analysis.

Experience

1994 - Present **Nuna Logistics Limited, Edmonton, AB**

- Supervises an administrative staff of 6 and is responsible for accounting systems and policies and procedures, planning, budgeting and financial functions, corporate tax planning and compliance, compliance with regulatory agencies, and corporate governance functions.

1981 - 1994 **Ernst & Young, Chartered Accountants, Edmonton, AB**

- Articled with Ernst & Young, one of the largest accounting firms worldwide, and was appointed to manager in 1986.
- Supervised a staff of 6 to 12 providing all aspects of business advisory services to owner managed businesses.

Qualifications

Chartered Accountant, Canadian Institute of Chartered Accountants, 1984

Bachelor of Commerce, University of Alberta, 1981

NUNA LOGISTICS

Patrick McHale

OPERATIONS MANAGER

Patrick McHale is an Operations Manager with 18 years experience in site construction and supervision. Presently responsible for overseeing up to twelve Supervisors who are directly accountable for up to 240 men on various projects. He is skilled at coordinating crews in difficult terrain and extreme weather conditions. Pat's project experience includes supervision of ice and all weather road construction; the mobilization of equipment and materials into remote locations; site construction of airstrips, tank farms and open pit mining; the construction of winter and summer roads, and of leases and plant sites.

Experience

1997 - Present **Nuna Logistics Limited, Edmonton, AB**

- Responsible for all aspects of all site operations and liaisons with client personnel.

1995 - 1997 **Nuna Logistics Limited, Edmonton, AB**

- Supervised a crew of 80 - 200 working on mine pre-stripping and reclamation programs; winter road construction, the mobilization of equipment and materials into remote locations, site construction of airstrips, all weather roads, tank farms and open pit mining.

1993 - 1995 **Self - Employed**

- Actively pursued joint venture gold mining projects involving open pit mines and placer gold operations in Ontario, British Columbia and the Yukon.

1988 - 1993 **Kenaston Contractors Ltd., Devon Alberta**

- Supervised an open pit gold mine in the State of Nevada, U.S.A.; responsible for a crew of 50 constructing summer and winter roads; crushing operations, blasting and quarry operations; airport runways and sites for the Department of National Defense.
- Rebuilt the artificial islands and covering pipelines across the MacKenzie River in Norman Wells, NT and supervised the movement of equipment and materials into remote locations.

1983 to 1988

- Finish Grader Operator - Operated a 140G Grader preparing road base for pavement at various jobs throughout Alberta.

1980 to 1982

- Caterpillar Operator / Supervisor - supervised the construction of oilfield leases and roads, operated and maintained dozers and scrapers.
- Previous to 1980, driller and blaster on hydro projects in Alberta and Ontario.

Cont.

Patrick McHale

Qualifications

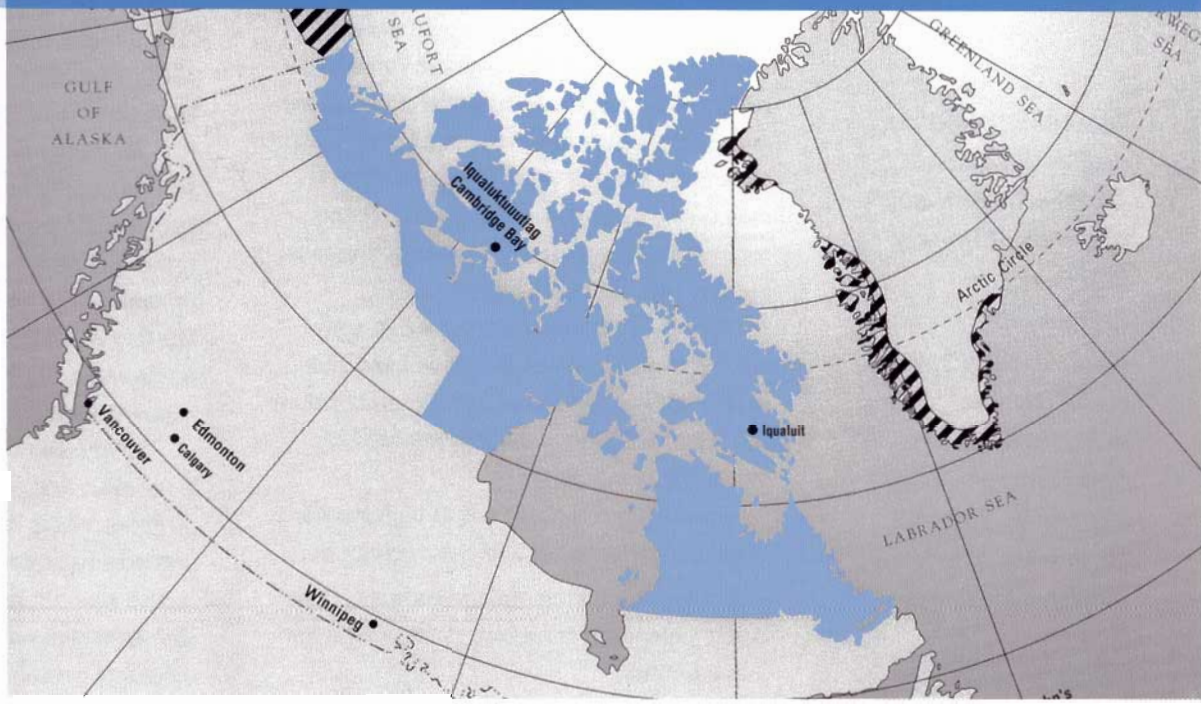
Equipment Operator
NT Blasting
Mine Rescue, NT
W.H.M.I.S., NT
First Aid and CPR
Shift Boss Ticket, NT

NUNA LOGISTICS

The key to successful mining development in to the Canadian Arctic

DEPENDABLE PROJECT DEVELOPMENT

We're at Work on Top of Your World



NUNA LOGISTICS HAS A MULTI MILLION DOLLAR EQUIPMENT BASE AND A PEAK WORKFORCE OF MORE THAN 250 EMPLOYED ON A VARIETY OF PROJECTS THROUGHOUT THE CANADIAN NORTH.

Federally registered and qualified as a "northern company" under Inuit Impact and Benefits Agreements, Nuna Logistics has offices in Vancouver, BC, Edmonton, AB, and Cambridge Bay, NT. Ownership of the company is divided between the Nunasi Corporation (26%), Kitikmeot Corporation (25%) and Pilot Shipping Ltd. (49%).

Founded in 1993 to provide logistical, transportation, construction and mining support services, the company has a multi-million dollar equipment base and a peak workforce of more than 250 people employed on a variety of projects throughout the Canadian North.

A non-union company, Nuna Logistics has the highest number of northern residents in its employ and places considerable emphasis on the training and employment of Inuit and Aboriginal people. The company also purchases approximately 75 per cent of its supplies and services (measured dollar volume) from northern sources.

Utilizing the professional knowledge and practical experience of its multi-disciplined management team as well as the environmental know-how and operational skills of its Inuit partners, Nuna Logistics has succeeded in completing over 90 per cent of its projects on time without infringing stringent safeguards for its employees and the environment.

Nuna Logistic's multi-disciplined management team has wide ranging mining and project development experience in the Canadian Arctic.

QUALITY ASSURANCE PROGRAM

Nuna Logistics is committed to providing dependable and comprehensive logistic services to the northern mining industry in Canada. To deliver the highest possible standards of service, the company's management team and on-site

Federally registered and qualified as a "northern company" under Inuit Impact and Benefits Agreements, Nuna Logistics is committed to providing dependable and comprehensive logistic services to the northern mining industry in Canada.

supervisors work closely with its clients to ensure a complete and thorough understanding of their operational objectives as well as the terms and conditions of the planned work.

Work in progress is monitored daily by management in order to maintain consistent cost control and scheduled performance as well as the satisfactory achievement of overall client objectives. A high level of communication is maintained by all concerned and the clients receive regular and detailed progress briefings at every stage of development.

Clients are encouraged to take an active interest in all aspects of the job in hand and confidence is enhanced as a result of immediate and direct access to management and site supervisors.

Nuna Logistics maintains its high standards of quality performance and client service by:

- Employing experienced and knowledgeable site supervisors for whom client satisfaction is a priority.
- Developing a multi-disciplined management team interested in working closely with clients and committed to satisfactory project completion on time and within budget.
- Training and hiring qualified Aboriginal/Inuit people and utilizing their intimate knowledge and operational skills to achieve superior performance under Arctic conditions.
- Purchase of equipment designed for Arctic operation, maintenance of equipment in safe working order and operation of equipment by qualified personnel.
- Maintaining adequate levels of support personnel, equipment and buildings to ensure safe and efficient operations.
- Providing adequate and appropriate safeguards for employees and the environment.

PROACTIVE & PREVENTIVE SAFETY PROGRAMS

Nuna Logistics takes a proactive approach to work site safety as evidenced by awards for no "Lost Time Accidents" while working in excess of 350,000 hours on the development of BHP Diamonds' Ekati Mine.

The company's on-site safety supervisor reports directly to Nuna Logistics' Operations Manager. Responsible for creation, implementation and monitoring training and safety programs, they are also responsible for investigating accidents, incidents and near-miss occurrences and making recommendations for improvements in existing programs.

Safety is an integral part of every job description and employees attend weekly safety meetings where they are encouraged to discuss potential hazards and concerns as well as corrective action taken. Employees are also provided with handbooks outlining their job description, corporate policies, rules of conduct and safe work practices specific to their job function.

NUNA LOGISTICS REPRESENTATIVE CLIENT ROSTER

BHP Diamonds Inc.
Diavik Diamond Mines Inc.
Echo Bay Mines Ltd.
Kennecott Canada Inc.
Kit Resources Ltd.
Tahera Corporation
Monopros Limited
Northwest Territories Government

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

NUNA LOGISTICS

340 Park Place, 666 Burrard Street, Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667 • Fax 604. 682.4473

NUNA LOGISTICS

The key to successful mining development in to the Canadian Arctic

DEPENDABLE PROJECT DEVELOPMENT

Frozen Core Dam Construction & Maintenance

STRUCTURALLY AND ENVIRONMENTALLY SOUND, FROZEN CORE DAMS PROVIDE THE MOST EFFICIENT AND RELIABLE CONTROL OF TAILINGS AND OTHER LIQUIDS.

Nuna Logistics has designed and assembled its own plant for the construction of frozen core dams. Designed to accurately monitor the moisture content and temperature of core granular material prior to placement, the plant can produce up to four thousand tonnes per twenty-four hour shift. Structurally and environmentally sound, frozen core dams provide the most efficient and reliable control of tailings and other materials.

The design and construction of an 800 m long frozen core dam was a key element of BHP's $1 billion Ekati Diamond mine in the Northwest Territories.

SUCCESSFUL CASE IN POINT

BHP DIAMONDS INC.

Nuna Logistics has been involved as a contractor with BHP Diamonds from the early stages of development of the $1 billion Ekati Diamond Mine in the Northwest Territories. A key element of the project involved design and construction of an 800 m long frozen core dam. Thanks to accurate control of throughput and high volume capacity, Nuna Logistics was able to take immediate advantage of cold weather windows as and when they occurred during the very mild winter of 1998. The success of this dam was recognized by the Consulting Engineers of Alberta Showcase '99 Awards. Excellence in Resource Development and Merit in Technology Innovation Awards were presented to EBA Engineering Consultants Ltd., Client: BHP Diamonds Inc., Contractor: Nuna Logistics Limited.

THE KEY TO SUCCESSFUL MINING DEVELOPMENT IN THE CANADIAN ARCTIC

A federally registered company, 51 per cent owned by the Inuit people, Nuna Logistics provides dependable logistical, transportation, construction and mining services to industry in the Canadian Arctic. Involved with virtually every major mining project in Nunavut and the Northwest Territories, the company has built a solid reputation for cost control and on-time project completion. With an experienced and multi-disciplined management team, an equally committed coterie of non-union northern workers and a multi-million dollar equipment base, Nuna is known and respected for its comprehensive knowledge of the North as well as its safety programs and environmental safeguards.

Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies.

FEASIBILITY STUDIES

Thanks to its wide-ranging experience of working in the Canadian Arctic, Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies. From the logistics of mobilization and re-supply to the seamless blending of project engineering, construction and operation, you can depend on Nuna for a thoroughly professional response and a no-nonsense Northern perspective.

NUNA LOGISTICS

Nuna Logistics Limited
340 Park Place, 666 Burrard Street
Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667
Fax 604. 682.4473

Nuna Logistics Limited
3010 Calgary Trail South
Edmonton, AB T6J 6V4
Telephone 780. 434.9114
Fax 780. 434.7758

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

NUNA LOGISTICS

The key to successful mining development in to the Canadian Arctic

DEPENDABLE PROJECT DEVELOPMENT

Construction & Open Pit Mining Development

WITH A LARGE HEAVY EQUIPMENT FLEET AND COMPREHENSIVE SUPPORT FACILITIES, NUNA LOGISTICS OFFERS A COMPLETE TURNKEY PACKAGE FOR CONSTRUCTION AND CONTRACT MINING.

With a large heavy equipment fleet and comprehensive support facilities, Nuna Logistics offers a complete turnkey package for construction and contract mining. No other company is better equipped to provide the people, the expertise and the equipment you need to get the job done on time and within budget.

Nuna's fleet includes 45 to 100-ton rock trucks with the appropriate complement of loaders, dozers, and graders as well as on-site shops, fuel storage, service trucks, office and other facilities essential for efficient and completely self-supporting operations. A large proportion of our labour pool is made up of skilled northern residents accustomed to working under the most demanding and difficult conditions ensuring efficient operation and reliable performance.

The pre-stripping contract for the Panda pit at the $1 billion Ekati Diamond mine in the Northwest Territories involved the movement of 12 million tonnes of material in ten months.

SUCCESSFUL CASE IN POINT

BHP DIAMONDS INC.

Nuna Logistics has been involved as a contractor with BHP Diamonds from the early stages of development of the $1 billion Ekati Diamond mine in the Northwest Territories. Nuna provided a substantial portion of the fleet and all of the manpower for the pre-stripping of the Panda pit involving the movement of 1.2 million tonnes of material per month for a total in excess of 12 million tonnes over a ten-month period.

Other contract work carried out by Nuna included the construction of a 2300 metre airstrip capable of landing jet and Hercules aircraft, construction of an 800 metre long frozen core dam, crushing and supply of backfill material for plant site construction, airstrip and road maintenance, and the transportation of bulk bagged cement 900 km to the mine site for plant construction.

THE KEY TO SUCCESSFUL MINING DEVELOPMENT IN THE CANADIAN ARCTIC

A federally registered company, 51 per cent owned by the Inuit people, Nuna Logistics provides dependable logistical, transportation, construction and mining services to industry in the Canadian Arctic. Involved with virtually every major mining project in Nunavut and the Northwest Territories, the company has built a solid reputation for cost control and on-time project completion. With an experienced and multi-disciplined management team, an equally committed coterie of non-union northern workers and a multi-million dollar equipment base, Nuna is known and respected for its comprehensive knowledge of the North as well as its safety programs and environmental safeguards.

Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies.

FEASIBILITY STUDIES

Thanks to its wide-ranging experience of working in the Canadian Arctic, Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies. From the logistics of mobilization and re-supply to the seamless blending of project engineering, construction and operation, you can depend on Nuna for a thoroughly professional response and a no-nonsense Northern perspective.

NUNA LOGISTICS

Nuna Logistics Limited
340 Park Place, 666 Burrard Street
Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667
Fax 604. 682.4473

Nuna Logistics Limited
3010 Calgary Trail South
Edmonton, AB T6J 6V4
Telephone 780. 434.9114
Fax 780. 434.7758

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

NUNA LOGISTICS

The key to successful mining development in to the Canadian Arctic

DEPENDABLE PROJECT DEVELOPMENT

All Weather Airstrip Construction & Maintenance

NUNA LOGISTICS HAS BUILT SEVERAL ALL WEATHER AIRSTRIP AND RELATED ROAD PROJECTS IN NUNAVUT AND THE NORTHWEST TERRITORIES.

Nothing happens in the Arctic without dependable means of supply and Nuna Logistics' specialized knowledge of northern operations has enabled it to design, build and maintain reliable all weather infrastructure required for continuous and cost efficient operation in otherwise isolated regions of northern Canada.

With its multimillion dollar heavy equipment fleet and on site crushing plants, Nuna Logistics has built several all weather airstrip and related project site roads in Nunavut and the Northwest Territories. The size and reliability of its fleet, the experience of its resident personnel and their intimate knowledge of Arctic weather and soil conditions, make it possible to construct essential infrastructure in a very timely and efficient manner. This enables Nuna's clients to utilize larger aircraft sooner in the project development stage with consequent time and cost savings.

SUCCESSFUL CASE IN POINT

BHP DIAMONDS INC.

Nuna Logistics has designed and built all weather road and airstrips for BHP Diamonds, Diavik Diamonds, Lytton Minerals and the Echo Bay Ulu property. Typically, the company's work for BHP Diamonds Ekati Project involved construction of a 2100 metre airstrip and miles of all weather road in the vicinity of the mine. The airstrip was completed in 5 months and is capable of handling fully loaded jet cargo aircraft. Airstrip and road systems are maintained year round using Nuna Logistics on site graders, dozers and service trucks.

THE KEY TO SUCCESSFUL MINING DEVELOPMENT IN THE CANADIAN ARCTIC

A federally registered company, 51 per cent owned by the Inuit people, Nuna Logistics provides dependable logistical, transportation, construction and mining services to industry in the Canadian Arctic. Involved with virtually every major mining project in Nunavut and the Northwest Territories, the company has built a solid reputation for cost control and on-time project completion. With an experienced and multi-disciplined management team, an equally committed coterie of non-union northern workers and a multi-million dollar equipment base, Nuna is known and respected for its comprehensive knowledge of the North as well as its safety programs and environmental safeguards.

Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies.

FEASIBILITY STUDIES

Thanks to its wide-ranging experience of working in the Canadian Arctic, Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies. From the logistics of mobilization and re-supply to the seamless blending of project engineering, construction and operation, you can depend on Nuna for a thoroughly *professional response and a no-nonsense Northern perspective.*

NUNA LOGISTICS

Nuna Logistics Limited
340 Park Place, 666 Burrard Street
Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667
Fax 604. 682.4473

Nuna Logistics Limited
3010 Calgary Trail South
Edmonton, AB T6J 6V4
Telephone 780. 434.9114
Fax 780. 434.7758

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

NUNA LOGISTICS

The key to successful mining development in to the Canadian Arctic

DEPENDABLE PROJECT DEVELOPMENT

Ice Roads, Exploration & Logistical Support

NUNA LOGISTICS HAS UNPARALLELED EXPERIENCE IN ICE ROAD AND PORTAGE CONSTRUCTION IN THE CANADIAN NORTH.

Nuna Logistics constructs and maintains the 637 km Yellowknife to Lupin mine winter road each season. Camps, shops, laydown areas and fuel storage are strategically positioned along the winter road. This enables Nuna Logistics to respond quickly to clients' needs for supplies, equipment and personnel required for projects in the North.

SUCCESSFUL CASE IN POINT

BHP DIAMONDS INC. WINTER ROAD

Construction and maintenance of the winter road by Nuna Logistics allows for the critical resupply of fuel, materials, equipment, and plant components to both the operating mines of Echo Bay Mines Ltd. and BHP Diamonds Inc. and other exploration properties. The road is operated from the end of January to mid-April each year. Approximately 3000 loads resulting in 120,000 tonnes of material are delivered over the road each season.

Year round access and state-of-the-art transportation equipment enable Nuna Logistics to respond quickly and efficiently to client needs.

ECHO BAY MINES LTD.

THE KEY TO SUCCESSFUL MINING DEVELOPMENT IN THE CANADIAN ARCTIC

A federally registered company, 51 per cent owned by the Inuit people, Nuna Logistics provides dependable logistical, transportation, construction and mining services to industry in the Canadian Arctic. Involved with virtually every major mining project in Nunavut and the Northwest Territories, the company has built a solid reputation for cost control and on-time project completion. With an experienced and multi-disciplined management team, an equally committed coterie of non-union northern workers and a multi-million dollar equipment base, Nuna is known and respected for its comprehensive knowledge of the North as well as its safety programs and environmental safeguards.

Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies.

FEASIBILITY STUDIES

Thanks to its wide-ranging experience of working in the Canadian Arctic, Nuna Logistics offers the most comprehensive and reliable assistance to exploration, mining and engineering companies in the preparation of pre-feasibility and feasibility studies. From the logistics of mobilization and re-supply to the seamless blending of project engineering, construction and operation, you can depend on Nuna for a thoroughly professional response and a no-nonsense Northern perspective.

NUNA LOGISTICS

Nuna Logistics Limited
340 Park Place, 666 Burrard Street
Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667
Fax 604. 682.4473

Nuna Logistics Limited
3010 Calgary Trail South
Edmonton, AB T6J 6V4
Telephone 780. 434.9114
Fax 780. 434.7758

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

NUNA LOGISTICS

The key to successful mining development in the Canadian Arctic

MINING TRUCKS & HEAVY EQUIPMENT

Operator Simulator Training

TOTALLY FLEXIBLE, NUNA LOGISTICS' MOBILE SIMULATOR TRAINING UNIT OFFERS A SAFER, FASTER AND MORE ECONOMICAL WAY TO TEST, TRAIN AND RE-TRAIN YOUR FRONTLINE EQUIPMENT OPERATORS AND SUPERVISORS.

FEATURES

1. High quality image displays create a 195 degree wrap around field of view of photo-realistic graphics, simulated or actual mine site.
2. Side rear view mirrors.
3. Operator console – all controls and dash instruments are functional.
4. Computer controlled three-axis motion base moves to simulate road conditions and grades.
5. Realistic environmental surround sound effects.

A first in Arctic Canada, Nuna Logistics offers comprehensive simulator training for truck and heavy equipment driver/operators and supervisors. More comprehensive and effective than the "real thing", Nuna's Mobile Simulator tests and trains prospective driver/operators and re-trains existing operators and supervisors on site – in less time, at less cost and with greater all around safety and reliability than any real time in-vehicle method.

In use around the world and easy for supervisors to operate, the Simulator's inter changeable vehicle, site and dash components provide completely flexible time, type and range of training. Voice-over, text and graphics can be tailored to order.

Never before have mine owners and contractors had the facilities to regularly test and train new and existing operators using such a safe, selective and productivity enhancing system.

The Simulator's interchangeable vehicle, site and dash components provide completely flexible time, type and range of training.

TYPICAL USER COMMENT

"I found this tool to be one of the most cost-effective, time efficient and detailed evaluation systems available... a person with no experience could be thoroughly trained in the operation of rear dump trucks in a very short amount of time, without hindering the productive capabilities of the existing fleet. The training given to operators is incredible. Never before have we had the tools to instruct in practical terms how to react to brake failures, tire fires, wet and slippery conditions, fog and dust, night driving, etc. – all in one sitting. For me this simulator is one of the most advanced value for money products available to the mining industry and should be used by all."

Peter Edwards
Competency Based Training Advisor for the Mining & Quarrying Industries in Western Australia

SIMUL-TRAINING: KEY TO SKILLS ASSESSMENT, INCREASED PRODUCTIVITY & REDUCED DOWNTIME

Starting the truck

Reversing under shovel

Dumping

Driver/operators are trained to make the split second decisions required to handle situations too dangerous or difficult to teach or test in a real truck.

Operational within minutes of arrival on site, Nuna's Mobile Simulator has been specially designed for work in the harsh environment of the Canadian North. Training supervisors require only basic point-and-click computer skills to test and train operators to deal with day-to-day operations. Driver/operators are also trained to make the split second decisions required to handle situations too dangerous or difficult to teach or test in a real truck. Even night time driving can be simulated.

The benefits of simul-training go far beyond individual performance. There is no risk to trainee, trainer or equipment. Real equipment is kept in production. Production cycle times are not reduced. Unscheduled brake, tire and engine maintenance, most commonly caused by inexperienced operators, is greatly reduced.

The Nuna Simul-Trainer has selectable lesson levels and error feedback for the trainee. A fresh recruit is exposed to all lessons and error warnings, while experienced operators undergoing refresher testing can be tested without assistance from the Simulator. Lessons make use of multimedia including voice-over narration and graphics to get the correct method and message across. Detailed reports are produced for all skill levels.

The reality is simul-training works. The result: a direct benefit to your bottom line.

NUNA LOGISTICS

Nuna Logistics Limited
340 Park Place, 666 Burrard Street
Vancouver, BC Canada V6C 2X8
Telephone 604. 682.4667
Facsimile 604. 682.4473

Nuna Logistics Limited
9839 31st Avenue
Edmonton, AB T6N 1C5
Telephone 780. 434.9114
Facsimile 780. 434.7758

PRINTED ON RECYCLED PAPER
PRINTED IN CANADA

CLARK BUILDERS

Head Office

8429 – 24 Street
Edmonton, Alberta, Canada T6P 1L3
Phone: (780) 417-6700
Fax: (780) 467-9749

Branch Offices

Clark Builders
Suite 906, 4920 – 52 Street
Yellowknife, NT, Canada X1A 3T1
Phone: (867) 873-6337
Fax: (867) 873-8496

Clark Builders Ltd.
185, 1209 – 59th Avenue S.E.
Calgary, Alberta, Canada T2H 2P6
Phone: (403) 253-0565
Fax: (403) 255-2523

e-mail: clark@clarkbuilders.com

www.clarkbuilders.com

CLARK BUILDERS

Contact Directory

Clark Builders
8429 - 24th Street
Edmonton, AB T6P 1L3
Phone: (780) 417-6700
Fax: (780) 467-9749

Andrew Clark, President
Bill Giebelhaus, VP Construction
Brian Robinson, VP Business Development
Jean Dentinger, VP Project Development
Sean Lazarowich, Business Development

Clark Builders Ltd.
185, 1209 - 59th Avenue, SE
Calgary, AB T2H 2P6
Phone: (403) 253-0565
Fax: (403) 255-2523

Jean Dentinger, VP Calgary
Keith Paskin, Mgr., Business Development

Clark Builders
Suite 906, 4920 - 52 Street
Precambrian Building
Yellowknife, NT X1A 3T1
Phone: (867) 873-6337
Fax: (867) 873-8496

Pete Simpson, Mgr., Northern Operations

email: clark@clarkbuilders.com
www.clarkbuilders.com

CLARK BUILDERS™

Corporate Profile

Table of Contents

CLARK BUILDERS™

1 | Corporate Philosophy

At the core of our business is our ability to not only meet but to exceed the expectations of our clients with a promise to deliver projects on time and within budget. This commitment has gained Clark Builders an excellent reputation and a long list of repeat clients who have contributed to our steady growth. Celebrating 26 years of successfully servicing our customers, we expect to top $200 million in sales in 2000!

Clark Builders' integrity, experience and flexibility are what set us apart from our competitors. We are committed to Client satisfaction, quality construction, and we treat all projects with a high degree of attention.

We make our Client's goals – our goals. We understand, share and are committed to the project objectives and offer strategies for achieving these objectives. We enjoy building strong working relationships with our Clients and the design professionals in a team effort where the successful completion of the project is a reward for everyone.

The very nature and diversity of our work has demanded we become proficient in all phases and types of construction. Our large data bank of current costs is continually updated from the many projects we bid competitively in the public and private sector markets. Our proven ability in pre-planning, purchasing, scheduling and meeting budgets has never been compromised and is reflective of the quality workmanship displayed in all our projects.

We at Clark Builders are confident in our ability to provide quality construction within our client's budgetary and schedule constraints.

CLARK BUILDERS™

2 | Scope of Services

After 26 years, Clark Builders continues to grow and evolve, responding to the changing needs of our clients and community.

Construction Management encompasses design, procurement, and construction. Calling upon our in-house capability, experience, and estimating skills, Clark Builders works closely with the Owner and consultants. Factors such as occupancy dates, project requirements, budget limitations, and expeditious project implementation all plays a role in effective construction management.

Project Management includes acquiring land, arranging financing, selecting consultants, securing permits, conducting soil investigations and legal surveys, procuring and supervising construction services, and providing comprehensive contract administration until occupancy.

Clients choose to enter into a **Negotiated Contract** with us based on our reputation for delivery, financial stability and over 26 years of experience. Our strategy is to provide both the competitive pricing associated with *bid-tender* and the increased certainty of negotiated contracts.

Strategic Alliances are formed on the basis of our long-standing working relationships and can provide significant benefits to our clients and us. Alliances are based upon trust, honour and respect. Clark Builders is committed to delivering a value-added, client focused approach.

Our **Pre-engineered Metal Building Division** offers the most efficient structural framing and roof membrane systems available today while at the same time providing significantly reduced construction costs and the advantage of our own erection crews. We have extensive experience in applying and customizing the capabilities of steel building systems to our client's needs.

In the majority of our work, we act as general or prime contractor. Clark Builders has also performed many **Specialized Contracts** for Owners, Construction Managers, and Prime Contractors including:

- Supply and/or erection of pre-engineered metal buildings;
- Large scale cast-in-place concrete work;
- Steel erection/metal decking and cladding;
- Carpentry;
- Site work and building foundations.

CLARK BUILDERS™

3 | Corporate Structure

From the start, the partners recognized the essential value of quality workmanship. "Our business cut its teeth in a remote cold-climate Northern frontier where the level of project planning and attention to detail had to be very high," says Andy. "In subsequent years, those same well-honed skill sets enabled us to go to places like Siberia, China, Japan and Africa to complete some very successful and challenging projects there."

Clark Builders began business in Yellowknife, NT in 1974 and expanded operations to Edmonton in 1979 to capitalize on growth opportunities in that marketplace. In 1994 we opened an overseas division, Canadian International Builders, Inc., with an office in Shanghai, P.R. China to enable us to search out new markets in that dynamic region of the world and beyond. While our Edmonton office allowed us to develop a viable construction presence in Alberta, British Columbia, and the United States, our Shanghai office opened up many opportunities in Russia, China, Japan and as far away as Africa. Our Northern division, based in Yellowknife, is responsible for all work performed in the Northwest Territories.

In 1999, Clark Builders acquired ownership of Carlson Contractors (Calgary) Ltd. (operating as ***Clark Builders Ltd.***) to better position ourselves for the opportunities that exist in Southern Alberta.

The depth of our experience comes from working in harsh and remote locations throughout Canada's Arctic where the season is short and virtually all of the work is of a fast-track nature. We have developed one of the largest inventories of fast-track project experience in Canada's construction industry.

Willing to grow and 'go where the work is' is part of the entrepreneurial spirit of the company that began with Andy Clark. Global development has strengthened our over-all corporate structure by increasing our access to international clients, professional consulting services and material suppliers; enabling us to offer a broad knowledge base and depth of experience to every client!

CLARK BUILDERS™

4 | Ownership

Hard work, skill, innovative thinking and, above all else, dedication to his clients, is the story behind Andy Clark's success over the past 26 years. Andy found in Bill Giebelhaus ~ his partner of 22 years and an individual with a keen mind for all facets of construction ~ a solid work ethic and superior leadership qualities. A skilled and focused management team as well as +300 office and field staff supports them.

Clark Builders is a member of the Clark Builders Group. A corporate partnership in Alberta, the Northwest Territories and the Yukon, Clark Builders has two partners holding ownership:

A.G. Clark Holdings Ltd.	Principal	Andrew Clark
Giebelhaus Developments Ltd.	Principal	William Giebelhaus

The two owners are operating principals and directors of the partnership.

Canadian International Builders, Inc., also a member of the Clark Builders Group, is a corporate company registering business in overseas markets.

5 | Partner Profiles

Andrew Clark, President

Andrew is the original and founding principal of Clark Builders and has an extensive background in general contracting, both in the Canadian North and Alberta. His business and construction experience allows him to direct our corporate operations as well as performing management functions on major contracts requiring his specialized skills. Andrew was selected to represent the NWT on a special Governor General's Advisory Council on the Canadian Economy. In 1995, Andrew was appointed by Premier Ralph Klein to act as a representative on behalf of the Alberta Economic Development Advisory Board. In 1999, he was awarded the 1999 Entrepreneur of the Year Award (Retail/Construction Sector, Prairie Award).

Bill Giebelhaus, Senior Vice President, Construction

Bill directs our design, estimating and construction activities and brings a unique ability to relate current construction procedures to cost effective building design, logistics and efficient, accurate estimating. His structural engineering technology background, over twenty years of practical construction experience, and familiarity with the geographic regions Clark Builders operates in, provides Bill with the skills necessary to oversee these vital aspects of our business.

CLARK BUILDERS™

6 | Financial Abstract

Bank	Bank of Montreal 10199 – 101 Street Edmonton, AB, Canada T5J 3Y4 Contact: Kelly T. Walker, Account Manager (780) 408 0413
Accountant	Deloitte & Touche 2000 Manulife Place, 10180 – 101 Street Edmonton, AB, Canada T5J 4E4 Contact: Mr. Bob McCulloch, Partner of A&A (780) 421 3611
Bonding Agent	The Guarantee Company of North America Bonding Agent: Marsh Canada Limited 2260, 10180 – 101 Street Edmonton, AB, Canada T5J 3S4 Contact: Darryl Craig, Vice President (780) 917 4858 Bonding Capacity: $100,000,000 +
Insurance Broker	Marsh Canada Limited 2260, 10180 – 101 Street Edmonton, AB, Canada Contact: Darryl Craig, Vice President (780) 917 4858

7 | Bonding & Security

Our proven ability to successfully complete projects is reflected in the support we receive from world leading bonding and insurance companies. It is because of this commitment to our clients that we are able to offer a variety of insurance and bonding packages specific to each project.

Clark Builders utilizes the services of Marsh Canada Limited for all corporate insurance. Founded in 1871, they can best be described as a global risk management organization. Facilities have been established with direct access to all the world's most important markets for the placement of insurance.

Bonding is provided by The Guarantee Company of North America. Because of our successful track record, we have a bonding capacity well in excess of our annual volume and we have never been denied a bond. The Guarantee Company is Canada's leading underwriter of Surety Bonds. The Surety consulting group of financial, legal and construction experts have always been available as a resource to us and we have enjoyed a good working relationship with them over the past eight years.

A list of bonding and insurance is included below. (Details available upon request.)

- Bid Bonds
- Performance Bonds
- Labour & Material Payment Bonds
- Maintenance Bonds
- Course of Construction Insurance
- Project Liability Insurance
- Marine Cargo Insurance

CLARK BUILDERS

8 | Professional Affiliations

Clark Builders is a member in good standing with the following associations:

- Alberta Chamber of Commerce
- Alberta Construction Association
- Alberta Economic Development Authority
- Association of Professional Engineers, Geologists & Geophysicists of Alberta
- BOMA Calgary (Builders, Owners & Managers Assoc.)
- Calgary Chamber of Commerce
- Canadian Construction Association
- Canadian Council of Native Business
- Canadian Construction Design-Build Institute
- China Alberta Petroleum Centre (CAPC) Beijing
- Construction Owners Association of Alberta
- Edmonton Chamber of Commerce
- Edmonton Construction Association
- Forest Industry Supplier Association
- Fort MacMurray Chamber of Commerce
- Geonomics Institute
- Jasper Chamber of Commerce
- Merit Contractors Association
- Alberta New Home warranty
- NWT Chamber of Mines
- NWT Construction Association
- NWT Business Advisory Council
- Sherwood Park Chamber of Commerce
- World Trade Centre
- Yellowknife Chamber of Commerce
- World Presidents Organization

9 | Experience

With hundreds of millions of dollars of in-place construction, we've never been in court to either prosecute or be prosecuted; a surprising accomplishment in today's litigation-prone business environment. We value our excellent reputation and pride ourselves in our managerial, technical and business competence!

Clark Builders' annual volume grew from $200,000 to over $200,000,000 in just 26 years. Our project sizes vary from less than $500,000 to our $45 million Centre Square development in Yellowknife, NT and the $130 million Lupin mine project 400 km north of Yellowknife.

Project locations range from power plants in Pond Inlet (800 km north of the Arctic Circle) to a mine complex and town relocation in the Nevada desert.

We apply our expertise to a wide variety of projects and locales: From construction on 16 stores for Canadian Tire in 10 cities within Alberta to playing an extensive role in the construction of the BHP Diamond Mine, Ekati, NT. Internationally completed projects include a Canadian-style village near Yakutsk, Siberia to a number of housing developments in China and Japan.

Our proven ability to meet schedules and budgets has never compromised the quality of the projects or sacrificed the long-term operating and maintenance considerations.

CLARK BUILDERS

10 | Current Projects Listing

Edmonton Office

DND South Edmonton Militia Armoury, Edmonton	$15.2 million
DND 408 Helicopter Squadron Hangar, Edmonton	$15.0 million
Lockerbie & Hole, Modular Fabrication Yard, Cty. of Strathcona	$6.5 million
Francophone Schools, Ecole Notre Dame & Ecole Pere Lacombe	$5.3 million
Sungro Horticulture – Reconstruct Fertilizer Plant, Seba Beach	$5.0 million
Westjet Hangar, Edmonton International Airport	$4.5 million
Federal Express Cargo Facility, Edmonton International Airport	$3.0 million
Sherwood Park Pentecostal Church	$2.3 million
Drive Products, New Office & Shop	$2.1 million
ATCO, Workshop Storage Building, Joffre	$2.2 million
Northern Store, Fox Lake	$1.3 million
Alta-Fab Shop Expansion, Nisku	$1.2 million
Pinnacle Business Park, Building A-2, Edmonton	$0.8 million
Diavik Diamond Mine, Raw Water Pumphouse, Emergency Vehicle Shed & Cold Storage Building	$0.8 million
Diavik Diamond Mine, Incinerator Building & Permanent Warehouse	$0.6 million
PharaChem Technologies, Cytovax Biotechnologies Tenant Improvements	$0.6 million
Good Samaritan Society, Choice Clinic #2	$0.5 million
Inland Highway Maintenance, Whitecourt	$0.5 million

CLARK BUILDERS™

10 | Current Projects Listing

Calgary Office

Princeton Hall, Calgary	$22.8 million
The Salvation Army Centre of Hope, Calgary	$15.0 million
205 Riverfront, Calgary	$13.2 million
Sovereign Tower, Calgary	$10.5 million
Rocky Mountain Co-op Housing, 70 unit staff housing bldg, Banff, AB	$8.0 million
Calgary Winter Club, Calgary	$5.7 million
Great Plains Business Park Warehouse 'B', Calgary	$5.0 million
Great Plains Business Park Warehouse 'A', Calgary	$3.2 million
Eecol Electric Building, Calgary	$1.3 million

CLARK BUILDERS™

10 | Current Projects Listing

Yellowknife Office

BHP, additions to existing buildings, Ekati, NT	$12.0 million
Canadian Tire Store #453, Yellowknife, NT	$5.9 million
Deninoo School Renovations, Fort Resolution, NT	$ 2.6 million
BHP, Ammonium Nitrate Expansion	$ 2.3 million
Lac de Gras Maintenance Building, NT	$ 0.5 million
Chilkat #3, Yellowknife	$ 0.3 million
BHP, Bulk Lube Storage Building	$ 0.3 million
BHP, Misery Fuel Tank Civil Works	$ 0.2 million

CLARK BUILDERS

BHP Diamond Mine, Ekati, NT

Completed: *September 1998*
Value: *$35.0 million*
Area: *12,562 sq.m.*

Clark Builders has a long history of providing construction and remote site logistics expertise to the mining industry.

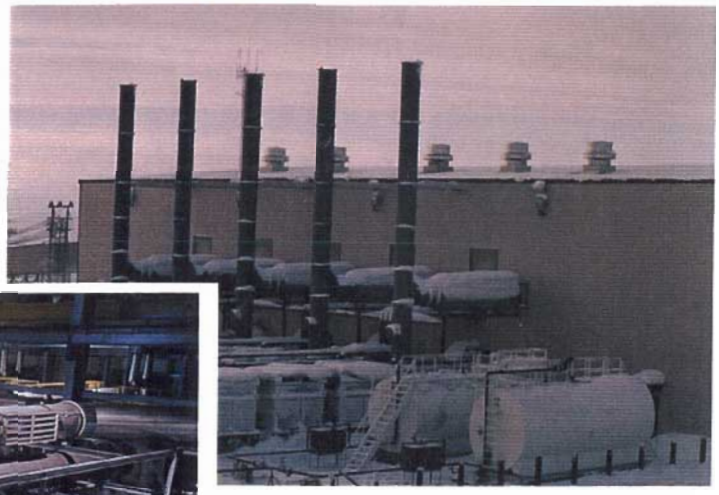
In 1996, our pre-engineered building department secured five "supply-only" contracts in excess of $5 million dollars which included: a 71,000 square foot truck/maintenance shop/warehouse/office complex which is 55'-2" at the eave; a 9,960 square foot warming shed which has an eave height of 34'-3"; a 60,000 square foot ore storage A-frame building with a clear span of 250' a peak height of 91'-6", a low eave of 46'-9", a high eave of 67'-4"; the main security building; and, the services building.

In early December 1996, Clark Builders was awarded additional work packages by BHP for firm price and design build packages:

- Truck Shop/Maintenance Facility
- Warming Shed
- Power Plant
- Security Building
- Utilidors
- Fuel Distribution Systems

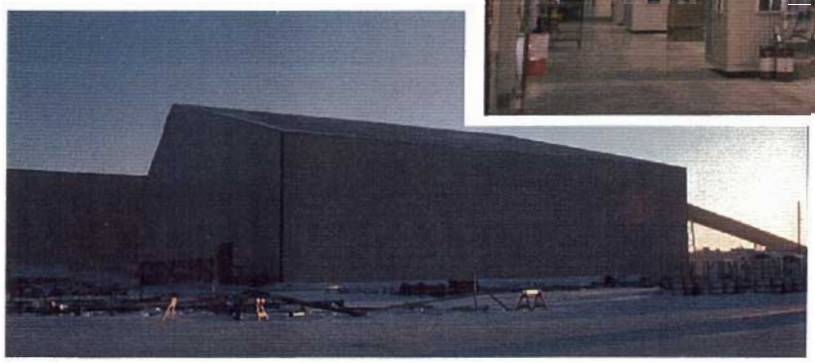
Security Building

Power Plant
Radiators &
Exhaust Stacks



Power House

Truck Shop & Wash Bay



Coarse Ore Building –
Supply Only

CLARK BUILDERS

BHP Diamond Mine, Expansion, Ekati, NT

Completed: *Under Construction*
Value: *$13.0 million*

With a successful start to operations in Canada's first diamond mine, BHP Minerals has called for the expansion of five (5) separate buildings: Truck Shop, Warming Shed, Process Building, Ammonium Nitrate Building and Accommodations Facility. Clark Builders is the Construction Manager, with project completion scheduled for June 2001.

Truck Shop

Warming Shed

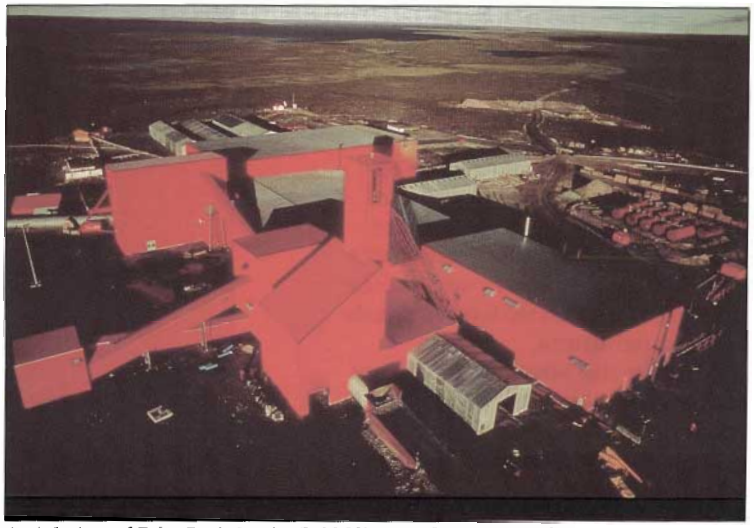
LUPIN GOLD MINES

Contwoyto, N.W.T.
Canada

Clark Builders was the prime contractor for the construction of the Lupin Gold Mine for Echo Bay Mines Ltd., 400 kilometers northeast of Yellowknife, N.W.T.

The project site was completely isolated. All materials, equipment, and manpower had to be air transported to site adding a very demanding logistical challenge to the project.

Clark Builders' assignment was highly industrial in nature and included erection of 65' high buildings, cladding of a 130' high head frame and installing large complicated foundations for stationary and rotating heavy equipment, as well as the construction of a variety of interior mezzanine floors.



Aerial view of Echo Bay's Lupin Gold Mine on Contwoyto Lake.

Pouring concrete at the Lupin Mine in −50°C temperatures.

CLARK BUILDERS™
A member of the Clark Builders Group

Lupin was Echo Bay's first gold mine and the northern most gold mine in the world, outside of Russia. The mine is subject to climatic extremes year-round and the Arctic permafrost extends to a depth of 520 meters (1,700 feet).

Clark Builders deployed their Arctic building logistics team to plan and execute the pouring of the foundations, erection of the building, enclosing key structures and insulating them to survive the severely harsh Arctic winter winds and temperatures.

Despite the adverse conditions and logistical construction challenges, Clark Builders completed the immense project within one year.

Echo Bay Mines remains one of Clark Builders largest advocates. Over the past decade Clark Builders have conquered various challenges for them from the desert state of Nevada, U.S.A. to the fringes of the Arctic Circle, N.W.T.

Offloading building materials at the Lupin mine site.

Erected structural steel framework in the foreground with temporary air supported structure in the background to provide a more temperate working environment.

CLARK BUILDERS™

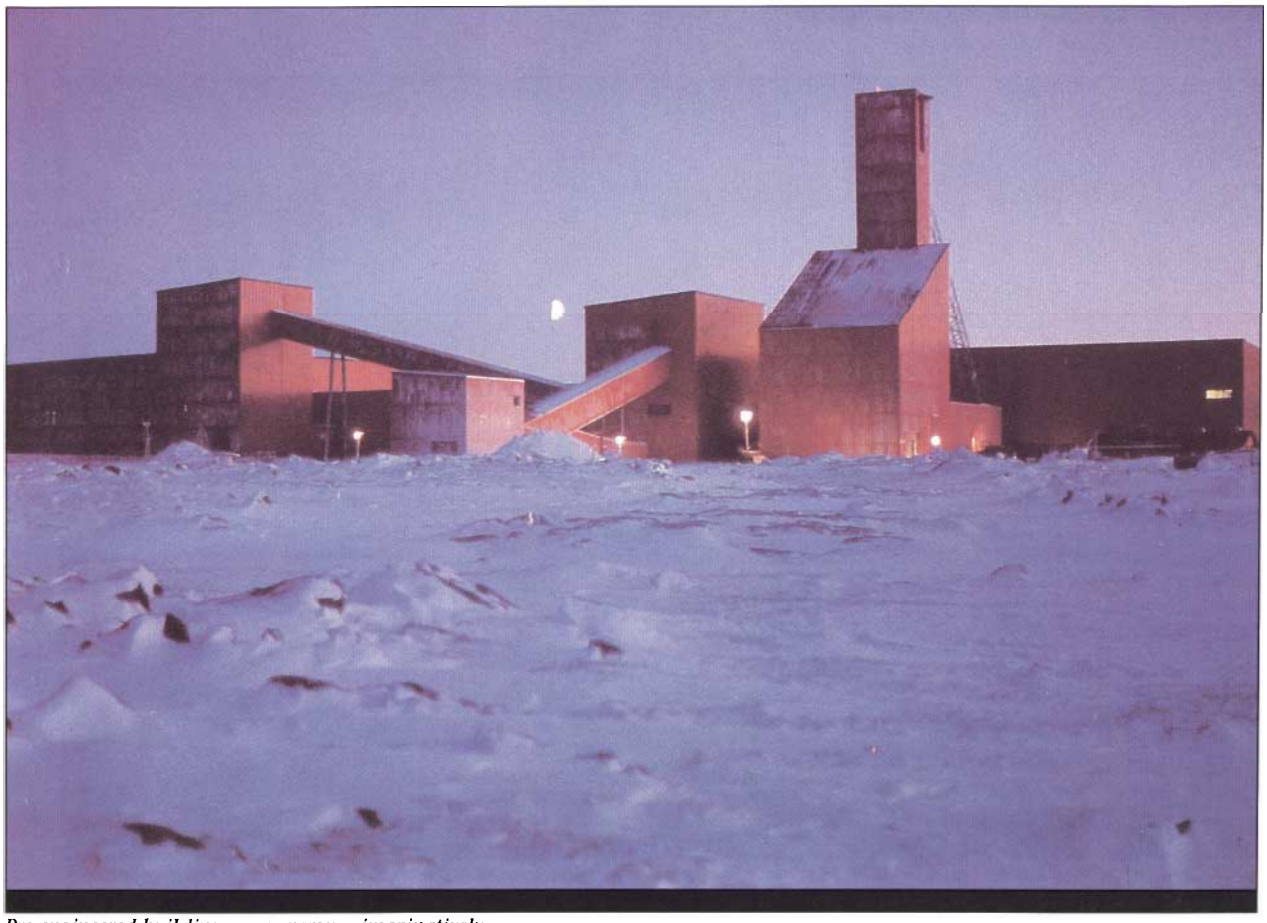
A member of the Clark Builders Group

Echo Bay's Lupin Gold Mine, Contwoyto Lake, Northwest Territories in ful.' operation, using a sensible, effective and efficient method of conserving energy – without a loss of design integrity and functio ı.

Permanent staff accommodation at the Lupin mine site – Canadian Arctic.

CLARK BUILDERS™

A member of the Clark Builders Group



Pre-engineered buildings save energy – imaginatively.

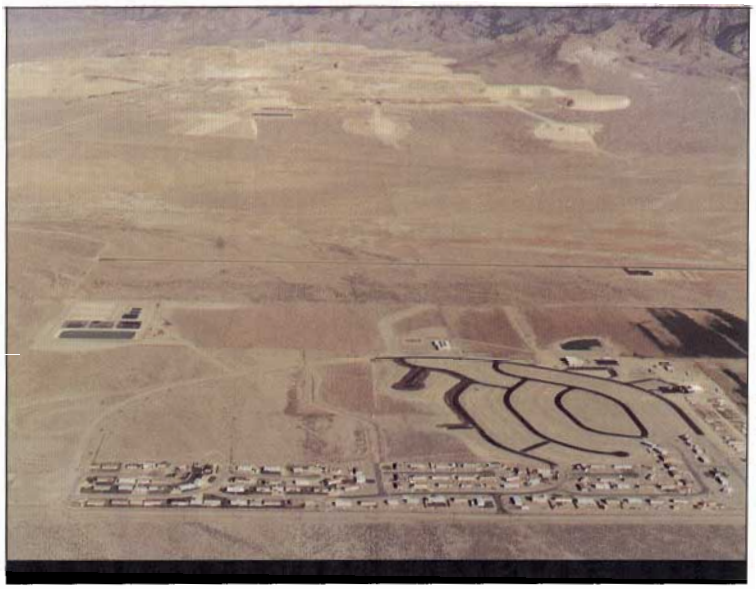
All men, materials and equipment were transported to this isolated Arctic location via Hercules Aircraft.

ROUND MOUNTAIN MINE EXPANSION

Town of Round Mountain
Nevada, U.S.A.

Clark Builders developed an entire community to relocate a population of 800 people on behalf of Round Mountain Gold Corporation.

The comprehensive townsite located 240 km east of Reno, Nevada involved various wood frame, pre-engineered and masonry structures. Clark Builders was responsible for the engineering, procurement and construction of the development. The townsite was constructed as a result of the expansion of the open-pit gold mine, and the resultant closure of the existing town infrastructure.



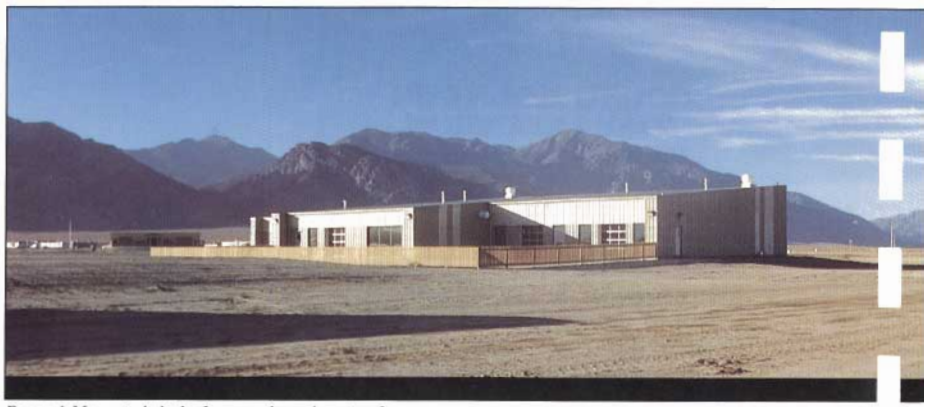
The new Round Mountain townsite under construction west of the gold mine.

6-lane competition indoor swimming pool at Round Mountain.

CLARK BUILDERS™
A member of the Clark Builders Group

Included in the design and construction of the community was an indoor swimming pool with change rooms and a children's wading pool; a softball field complete with bleachers, lights and an underwater sprinkler system; a nine-hole golf course; a full service superstore; a Public Safety Building which houses the volunteer fire department and local Sheriff's Office, and finally a new town library/resource centre.

The community consists of 393 single family residential lots, approximately 10,000 square feet each, with total utility development, paved streets, curbs, gutters and storm sewers. Clark Builders provided the domestic water supply and storage system of 1,000,000 gallons along with an expanded waste water treatment facility (1.6 mgd).



Round Mountain's indoor swimming pool.

Round Mountain's 12,000 sq. ft. (1115 m^2) new grocery store awaits its first load of groceries.

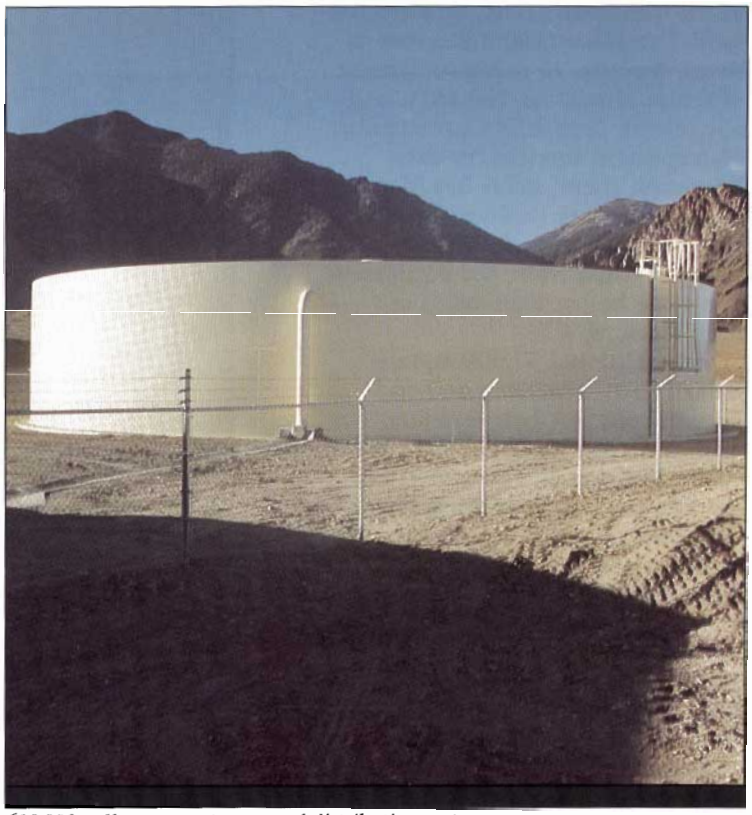
Round Mountain's Town Library nears completion.

CLARK BUILDERS™

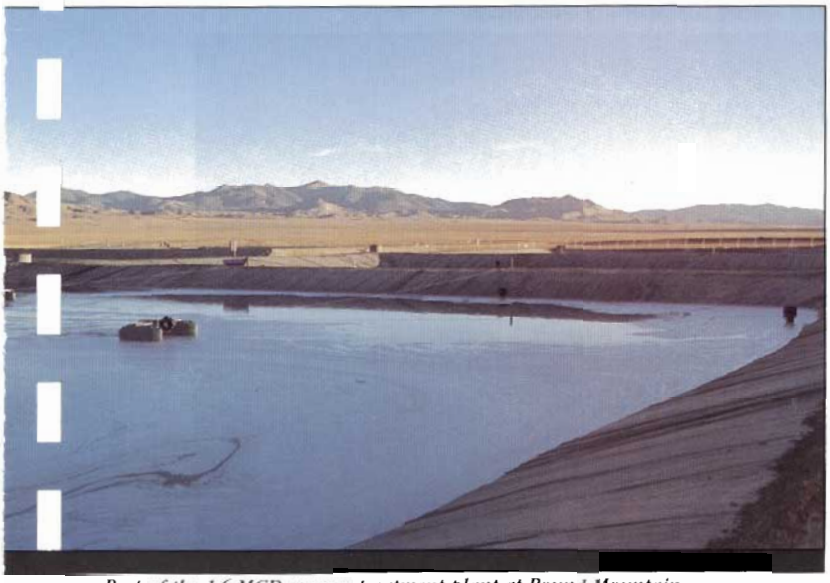
A member of the Clark Builders Group

Drawing upon Clark Builders' construction management expertise, Phase II of the Round Mountain townsite was completed 15% under budget.

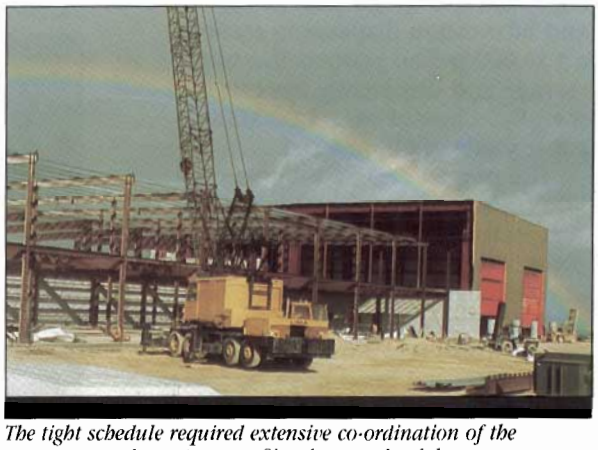
The engineering design and construction skills of Clark Builders were applied over an eight-month period to culminate in a totally planned community comparable to any modern urban setting.



600,000 gallon water storage and distribution system.



Part of the 1.6 MGD sewage treatment plant at Round Mountain.



The tight schedule required extensive co-ordination of the numerous trade contractors. Simultaneously, slabs are prepared, steel is lifted, block is laid, and insulation/cladding is installed.

CLARK BUILDERS™

A member of the Clark Builders Group

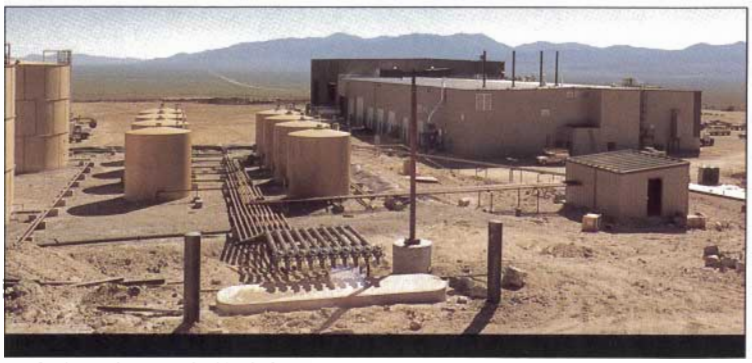
McCOY MINE EXPANSION

Battle Mountain Nevada
U.S.A.

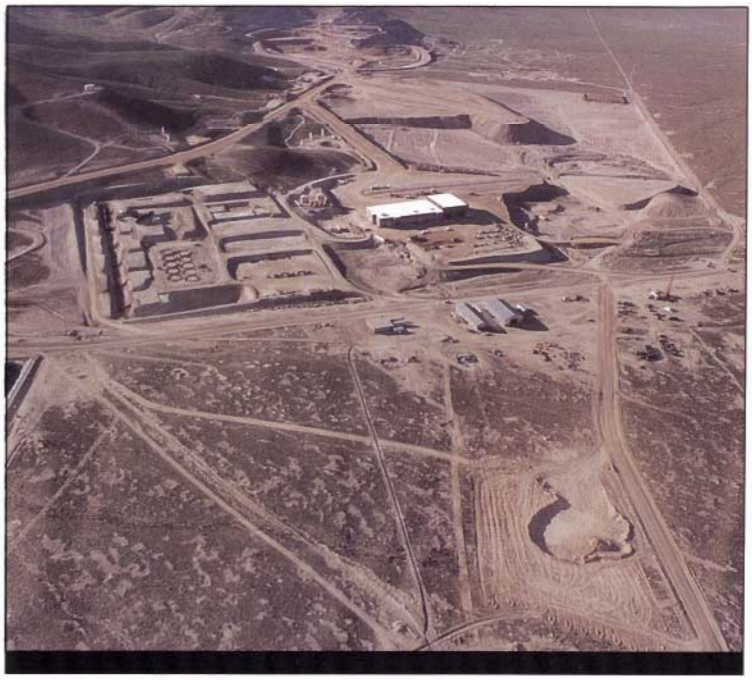
A massive heavy equipment shop and associated office structure were totally dismantled in the Canadian Arctic, transported to McCoy Mine (200 miles east of Reno, Nevada, 21 miles southwest of Battle Mountain, Nevada), and re-erected. Providing Construction Management services for their long-time client, Echo Bay Minerals Company, Clark Builders began site preparation at the McCoy Mine site in Nevada while the equipment shop was being dismantled at Pine Point, N.W.T.

An additional 57,000 square feet of space was designed and constructed by Clark Builders. Within six months from the start of engineering and construction, the heavy equipment shop was available for client usage and 2½ months later the remainder of the large shop/office complex was ready for occupancy. Clark Builders supervised the design and construction of many ancillary buildings associated with the plant expansion. These additions included the two-storey office complex with warehouse and assay lab space, a guard house, a highway style weigh scale, a fuel and lubrication dispensing station, a 300,000 gallon process/fire water storage and dispensing system, and the placement of over 1,000,000 cubic yards of fill material.

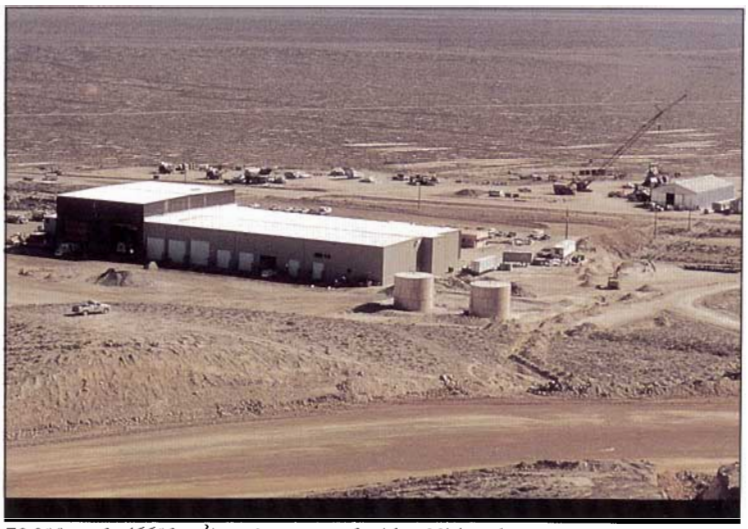
The overall design, engineering and construction of the highly successful McCoy Mine expansion project was completed under their initial budget. They were able to include "extra work" items during construction and mine start-up and still not exceed Echo Bay's budget.



McCoy's Fuel and Lube Tank farm.



The McCoy Mine nearing completion of construction.



70,000 sq. ft. (6603 m^2) under one roof with additional storage buildings nearby.

CLARK BUILDERS™
A member of the Clark Builders Group

GULF OIL BASE CAMP

Tuktoyaktuk, N.W.T.
Canada

Clark Builders was contracted to provide the complete design and construction of the camp service facilities to support Gulf Oil's Beaufort Sea Operations. The project was awarded in the Spring of 1982 with a completion date prior to the onset of adverse arctic winter conditions.

Clark Builders procured all necessary materials and had them crated and shipped to Hay River, N.W.T. for further transport by barge to Tuktoyaktuk, N.W.T. Clark Builders brought in suitable aggregates and a batch plant direct to the site to mix the high quality concrete that was required for the foundations of all the service buildings.

Treated wood piles were drilled and frozen into the permafrost to support Butler pre-engineered buildings. Although this appeared routine to the Clark Builders' designers, this arctic building technique demanded thorough planning to ensure a secure structural footing was achieved.

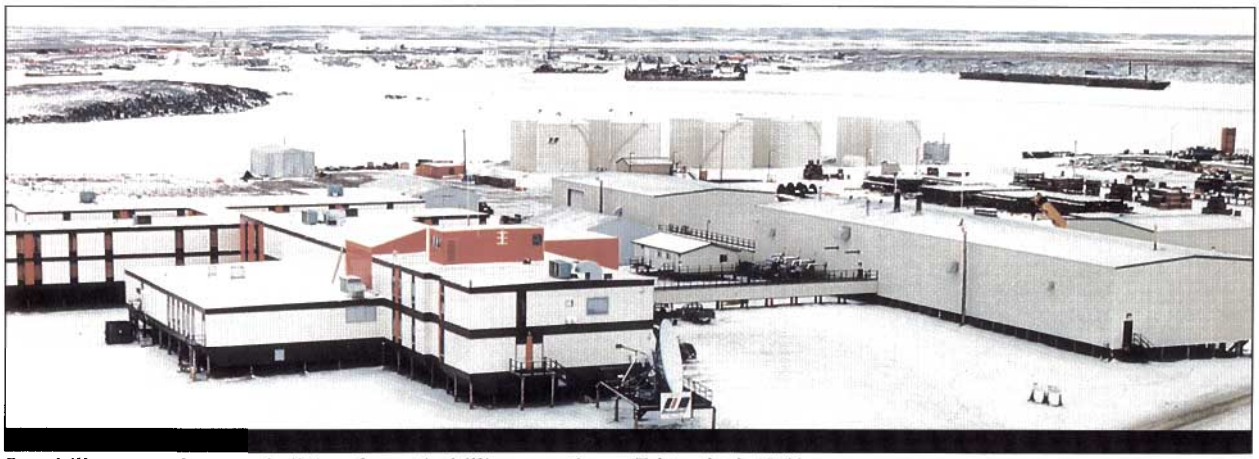
Beaudrill yard and services buildings – Tuktoyuktuk, NWT.

Aerial view of Beaudrill & Arctic Transportation facilities and vessels in Tuktoyuktuk harbour.

CLARK BUILDERS™
A member of the Clark Builders Group

Clark Builders completed the project in four (4) months of on site construction time including all concrete, structural components, electrical and mechanical building systems, and all interior finishes. A quality project done right the first time, on budget and well ahead of schedule.

Arctic Transportation Limited yard and newly constructed warehouse building – Tuktoyuktuk, NWT.



Beaudrill camp and support buildings for arctic drilling operations – Tuktoyuktuk, NWT.

CLARK BUILDERS™

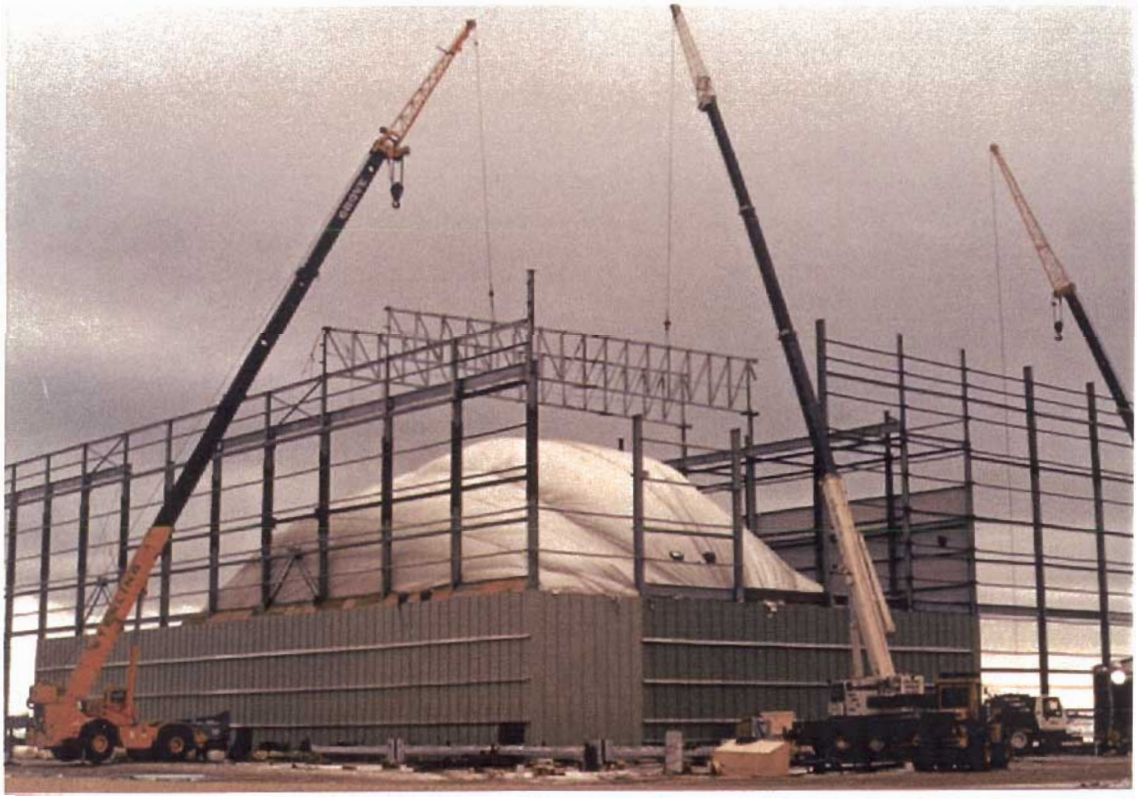
A member of the Clark Builders Group

CLARK BUILDERS

Solv-Ex, Fort McMurray, AB

Completed: *March 1997*
Value: *$10.6 million*
Area: *1600 sq.m.*

We were the on-site general contractor working on a cost-plus basis supplying planning, logistics support, equipment, material and manpower for the construction and execution of a number of their plant facility buildings. The total value of our contract exceeded $10.0 million at the time when Solv-Ex was shut down due to lack of funding.



CLARK BUILDERS

TransAlta Co-composter Facility, Edmonton, AB

Completed:	*February 2000*
Value:	*$23.2 million*
Area:	*32,300 sq.m.*

Aeration Hall
The main wall of this structure is 65 sq.m. long and 36 sq.m. wide posted at 12 sq.m. intervals. The structure is a stainless steel "Behlen" stress skin building.

Dewatering Facility
This pre-engineered metal building consists of three small structures totaling 715 sq.m., the tallest of which is 60' high. These structures support various collateral loads including over 60,000 pounds of ductwork, electrical cable trays and overhead crane ways.

Tipping Building
This is a 5185 sq.m. Butler metal building to introduce compostable material to the plant for further processing.

CLARK BUILDERS

BFI Materials Recovery Facility, Edmonton, AB

Completed: *December 1998*
Value: *$5.8 million*
Area: *6,704 sq.m.*

This waste recycling facility is a state of the art facility set up to handle the sorting of recycle material from Edmonton's blue box program. This is a unique facility which demanded special attention to detail.

Conveyor pits, recessed paver stone inserts in high wear areas, light reflective hardeners and polypropylene fiber reinforced slabs name but a few of the special construction techniques incorporated into the work.

CLARK BUILDERS

Amoco, Bonnyville, AB

The building package included a 50 ton overhead crane running the full length of the building.

Completed:	June 1998
Value:	$3.2 million
Area:	3,931 sq.m.

Clark Builders contracts included:

- Amoco/CU Power Steam Enhancement Facility
- Amoco Booster Pump Station
- Amoco Steam Generator Facility

Our own erection forces enjoyed the challenges of constructing this unique structure.

Extensive miscellaneous steel consisted of interior stairways, interior & exterior walkways, and several elevated platforms.

The Steam Enhancement Building in the foreground - which is almost 100' high at the peak - dwarfs the Steam Generator Facility directly behind it.

SHORT RANGE RADAR SITES

Various Locations,
N.W.T.

Clark Builders was the first contractor to undertake the construction of short range radar defense sites for Defence Canada Construction. These sites replace the outdated technical communications and radar components of the former Distant Early Warning System (DEW Line). These isolated, unmanned locations ranged from Arctic mountain tops to the environmentally sensitive surfaces of the Arctic tundra.

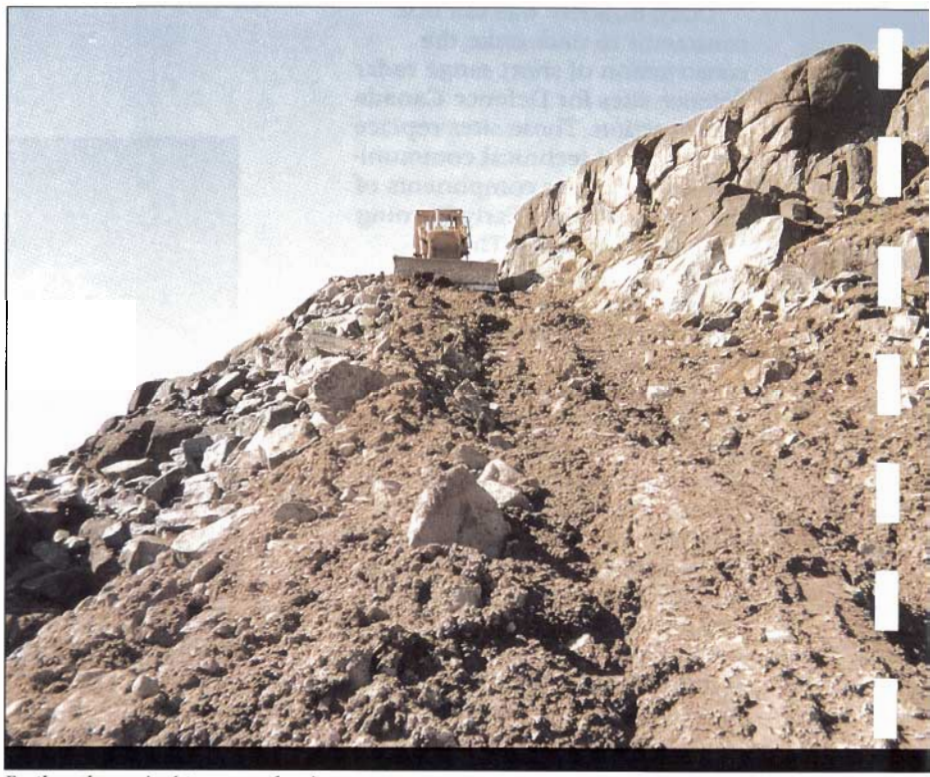
All Clark Builders' Arctic building logistics experience had to be incorporated into the planning, timing and construction of each site. The modes and methods of transporting materials, site preparation, materials storage and backup systems were all unique to each of the demanding project locations. Each of the eight facilities required various building and radar related structures. The structures were primarily steel with foundations consisting of drilled-in steel piles. Fuel storage and distribution systems were required to supply the power generation of each site.

Fuel storage tanks at base of tower.

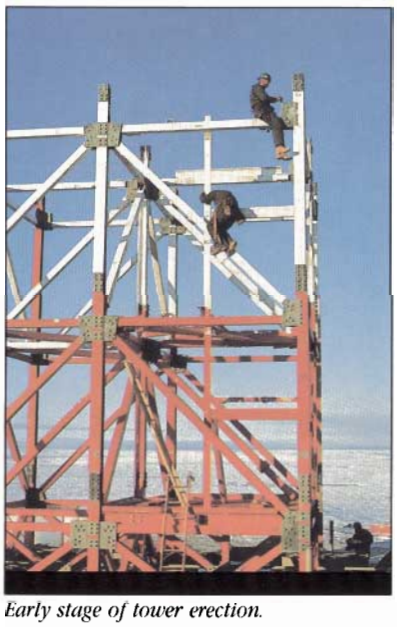
Welding on satellite ground terminal foundation.

CLARK BUILDERS™
A member of the Clark Builders Group

The complex facilities understandably required concise planning to solve the many logistical problems at the extraordinarily remote and inaccessible locations. Able to access the locations only in the winter months in the severely harsh Arctic conditions, demanded planning complete support systems always at the ready; whether it was alternative transportation, emergency camp facilities, backup power generation or an ongoing water supply.



Earthwork required to access the site.



Early stage of tower erection.

Steel piling for foundations.

CLARK BUILDERS™
A member of the Clark Builders Group

Aerial view of site and access route.

Close-up of interior view of services building.

This experience and performance have culminated in the successful completion of the eight short range radar sites a full season ahead of schedule.

Clark Builders has worked on virtually every one of the DEW Line's 31 sites across the north, building power plants, vehicle storage depots, warehouses, and carrying out various renovations such as retrofits and re-roofing.

Camp set-up at construction start.

Aerial view of short range radar site

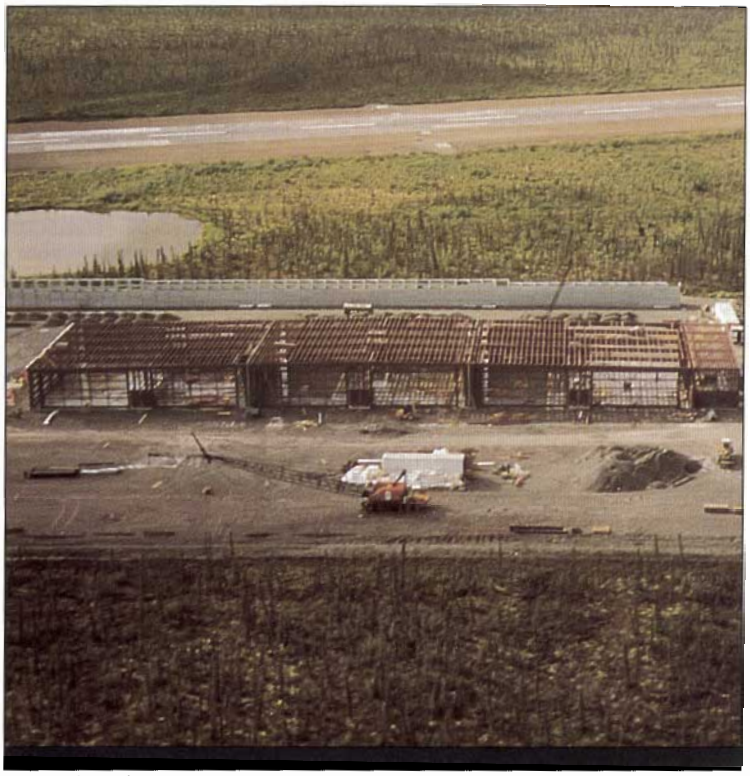
FORWARD OPERATING LOCATION (FOL)

Inuvik, N.W.T.
Canada

In the Fall of 1995, Clark Builders completed an Arctic building logistics challenge on behalf of the federal department of National Defence at the remote airport 10 km out of Inuvik, N.W.T.

As general contractor, the task was to construct a hangar and support facility over a three year period in a desolate, cold weather location void of road access in the spring and fall seasons. With no premix concrete supplier in the region to accommodate the 3100 cubic meters required, Clark Builders set up and operated their own concrete batch plant. The project consisted of the construction of five jet aircraft hangar bays, one maintenance hangar bay, an operations building, an equipment building, complete accommodation facility, a logistics support station, ancillary structures, and the related site works.

Approach area with hangars and equipment building (Inuvik Airport in background).



Aerial view of steel erection and construction of aircraft hangar bays.

F18 fighter jets.

CLARK BUILDERS™
A member of the Clark Builders Group

Limited to only working during the summer season and constrained by a 16-month construction window proved challenging in an environment where the Arctic summer can frequently cause weather delays for construction. Concrete batches were prepared on site to exacting requirements. The variety of floating slab foundations to support the steel frame and pre-engineered structures were placed in unpredictable soil conditions. Advanced planning, Arctic building logistics and cold climate structural technology coupled with the experience and expertise of the Clark Builders' "concept to completion" team again overcame the remote northern construction challenge. This project was turned over to the owner September 14, 1993.

Raising a wall on the 102-room accommodation building.

Cladding being installed on the hangar door steel framing.

Accommodation building aerial view.

CLARK BUILDERS™

A member of the Clark Builders Group

CLARK BUILDERS

RCMP 'G' Division Headquarters, Renovations & Additions
Yellowknife, NT

Completed:	*June 1996*
Value:	*$6.9 million*
Size:	*4,665 sq.m.*

The scope of work included selective demolition of the existing building, 2995 sq.m. of renovations, as well as an addition 1670 sq.m. for a new wing.

CLARK BUILDERS

440 Squadron Extension, Yellowknife, NT

Completed: *May 1997*
Value: *$2.6 million*
Size: *1531 m^2*

The project scope included the design and construction of an addition to an existing hangar for ***Defence Construction Canada.*** *The work included cast-in-place foundations, structural slab, structural steel c/w exterior cladding, siteworks, mechanical & electrical systems connected to existing services, and a new sprinkler system.*

CLARK BUILDERS

ANDREW CLARK
President

Andrew is the original and founding principal of Clark Builders (formerly Clark Bowler Construction) and a principal of Canadian International Builders Inc.

Andrew brings an extensive background in general contracting from the Northwest Territories and high Arctic, Alberta, Nevada, Russia, China and Japan.

His business and construction experience allows him to direct our corporate operations, as well as perform management functions on major contracts requiring his specialized skills. Andrew spearheaded negotiations for the Yakutsk Village and the Airport Terminal Building in Russia, as well as the BHP Diamonds mine project in the Northwest Territories.

He was selected to represent the Northwest Territories on the special 'Governor General's Advisory Council' as a representative for Canadian Economy.

In 1999, Andrew won Ernst & Young's Entreprenuer of the Year Award for the Prairie Region in the Construction/Real Estate division.

RELEVANT PROJECT EXPERIENCE

Andrew Clark is involved with all projects constructed by Clark Builders.

AFFILIATIONS:

Memberships	Board Members
Alberta Economic Development Authority	Member of Economic Council
Alberta Chamber of Commerce	
Alberta Chamber of Resources	Past Board Member
Association of Professional Engineers, Geologists & Geophysicists of Alberta	
Canadian Construction Association	Past Director
Canadian Council of Aboriginal Business	
China - Canada Business Association	
China Alberta Petroleum Centre (CAPC) Beijing	Board Member
Circumpolar Enviro-Economic Institute	
Edmonton Chamber of Commerce	Board Member
Edmonton Construction Association	
Forest Industry Suppliers Association of Alberta	
Geonomics Institute	
N.W.T. Business Advisory Council (1984 - 1987)	
N.W.T. Construction Association	Past Director
Nevada Contractors Association	
Nevada Mining Association	
Northwest Territories Chamber of Mines	
World Trade Centre	
Yellowknife Chamber of Commerce	Past Director
World Presidents Organization (WPO)	

CLARK BUILDERS™

BRIAN LACEY, G.S.C.
Construction Manager

EDUCATION

Architectural / Building Development Technology S.A.I.T., Calgary, AB

Specialized in the area of Project Management

Primavera (P3) Scheduling

CCA Gold Seal Certificate

NWT Mine Safety Certified

WHMIS Certified

MAJOR RESPONSIBILITIES

- Project planning & layout
- Cost control and purchasing
- Management of Construction Management budgets / projects
- Design/Build project management
- Client liaison
- Quality control
- Logistics planning inclusive of:
  - Cat trains over Polar Ice
  - Off strip aircraft
  - Barge Movements
- Site representative for C.M.C. Safety Committee
- Administration and coordination of prime contract commitments
- Subtrade and inspection agency coordination
- Monitoring and planning construction scheduling (Primavera and Microsoft)
- Quantity take-offs and pricing

RELEVANT PROJECT EXPERIENCE

Mr. Lacey's main areas of experience is construction management projects such as the $30 million Canadian Village in Yakutsk, Russia and management of the $40 million Short Range Radar project in the Canadian high Arctic.

His primary experience has taken place in a management capacity on-site on large projects, where the day to day details of construction have been in his direct control. A primary example of this is the on-site management of the $15 million power plant (22 mw) at the BHP Diamonds project in the Canadian Arctic.

Brian was also the on-site project manager for the $23 Million construction management Airport Terminal Building in Yakutsk, Russia. These projects have given Mr. Lacey the knowledge to deal with construction management. More recently, Brian was the Project Manager for the $13 million CMBG Headquarters Facility at Namao and the $5.6 million BFI Material Recovery Facility at the Cloverbar waste management site.

Mr. Lacey's experience lends him to large project management, whether commercial or industrial in nature. Special projects involving remote conditions or harsh climate are also his specialty.

OTHER PROJECT EXPERIENCE
(Partial List Only)

Recreational Projects
- McMahon Stadium Olympic, Calgary, AB

Commercial Projects
- West Point Centre, Phase I, Edmonton
- MTE Warehouse, Edmonton
- Alta-Kor Noodle Factory, Edmonton
- Airport Terminal Building, Yakutsk, Russia
- Eaton's Centre, Calgary, AB

Public Works Projects
- Capital Health Authority – Food Production Centre
- Foothills Hospital Interior Renovations, Calgary, AB
- Foothills Hospital Parkade, Calgary, AB
- Jamatkhana, Edmonton

Industrial Projects
- Drive Products, Office & Shop, Edmonton
- Sungro Horticulture, Seba Beach Reconstruction
- Diavik Diamond Mine, Raw Water Pumphouse, Emergency Shed & Cold Storage Building, NT
- Diavik Diamond Mine, Incinerator Building & Permanent Warehouse
- Cardium Tool Office & Shop, Edmonton
- Burnco Concrete Plant, Edmonton
- TransAlta Digester Foundations
- BFI Materials Recovery Project
- BHP Diamond Mine, NWT (Power Plant Contract)
- CMBG Headquarters Facility for Defence Construction Canada
- Omolon Gold Mine Logistics Mine Site, Magadan Region
- High River Magnesium Plant, High River, AB
- Short Range Radar Sites, (8 locations) for Defence Construction Canada
- TransAlta Co-Composter
  - Tipping Bldg. Fdns. $3.4 M
  - Trommel Bldg. Fdns. $180,000
  - Dewatering Bldg. Fdns. $290,000

  Building Packages
  - Aeration Hall $9.3 M - 274,000 SF
  - Tipping Bldg. $1.7 M - 54,000 SF
  - Dewatering Bldg. $905,000 - 7,700 SF
  - Administration Bldg, $430,500 - ,950 SF
- TransAlta Biofilters

Mix Use Facilities
- Canadian Village - Sakha, Russia

"The working relationship between us was excellent, the attentiveness to BFI and City requests was quick and co-operative, their attitude to safety was beyond reproach and their general approach to the project was in the best interests of BFI and, our client, the City of Edmonton. The result is a quality facility that meets the expectations of both BFI and the City of Edmonton".

Howard Goldby, Senior Project Manager of Business Development for BFI

CLARK BUILDERS

ROGER GEISINGER
Manager, Metal Buildings Division

Education

Chairman - Alberta Metal Building Association

Member - Provincial Apprenticeship Committee, Iron Trade

1980 Southern Institute of Technology, Iron Worker Apprentice Program

1977 University of Alberta Bachelor of Education Degree

Journeyman Ironworker - Metal Building Erector
Certificate No. 040-1/81403, 025X

Safety Courses

- WHMIS - Train the Trainer
- Leadership for Safety Excellence
- Principles of Health & Safety Management
- Auditor Training Program
- Post Injury Loss Reduction - Claims Management Training Seminar

Major Responsibilities

- Estimating, purchasing and managing of pre-engineered building systems, metal cladding and structural steel
- Manage field erection crews.

EXPERTISE

Pre-engineered Building design and construction both in the field and in the office provides a hands on well rounded base. Mr. Geisinger also has numerous design build projects with value engineering components and design build requirements.

Relative Project Experience
(Partial Listing Only)

Industrial Projects

- LA Brayer, Edmonton
- BHP Diamond, Course Ore Storage
- BHP Diamond, Truck Shop Warming Shed
- IPL Pipeline, Various Locations, NWT
- Blue Ridge Lumber
- Borden Chemicals Expansion, Edmonton
- Cominco Mines Expansion, Yellowknife, NWT
- Cominco Mines, Pine Point, NWT
- Bitmin Resources Pilot Plant Suncor, Fort McMurray, AB
- Esso Plant Expansion, Norman Wells, NWT
- Jackfish Lake Generating Station Expansion, Yellowknife
- Power Plants, Tuktoyaktuk & Whale Cove, NWT
- Procor Rail Lining Shop, Joffre, AB
- Industra, Edmonton
- Colomac Mine - Retrofit
- BHP Camp Services Building
- BFI Materials Recovery Facility, Edmonton
- Iceland Fish Hatchery, Iceland
- Manluk Industries, Wetaskiwin

Recreational Projects

- Fort Rae, NWT
- Fox Lake Arena, NWT
- Pelly Bay Arena, NWT
- Sanikiluaq Arena, NWT
- Arctic Bay Arena, NWT
- Whale Cove Arena, NWT
- Wabasca Arena, Alberta
- Inuvik Recreation Centre, NWT
- Ellerslie Curling Rink, Edmonton
- Fort Franklin Arena, NWT
- Erminskin Arena, Hobbema
- Inuvik Arena Addition, Inuvik

Commercial Projects

- 2 Revelstoke Stores, Edmonton
- Revelstoke Store, Calgary
- Revelstoke Store, Kelowna, BC
- Michelin Tire Distribution Centre, St. Albert
- Danco Equipment, Edmonton
- Canadian Tire Warehouse, Red Deer
- Auto Dealership, Yellowknife
- Edmonton Freightliner, North & South
- Liquor Warehouse, Inuvik
- Rae Food Store
- Woolco Store, Yellowknife
- RTL Hangar, Yellowknife
- Adlair Air Hangar, Yellowknife
- Cooper Cameron, Edmonton
- Martin Farm Equipment, Edmonton
- Caron Transport, Sherwood Park
- Alberta Rewind, Edmonton
- Eecol Electric, Edmonton & Calgary
- Sunwest Aviation, Hangar Calgary
- Strathcona Travel Centre, Sherwood Park
- DFI Pipe Storage, Edmonton
- Alta Kor Noodle Factory, Edmonton
- Northlands Storage Building
- Sherrex Systems, Edmonton
- Elateways Warehouse, Shanghai China
- Griffith Oil Tool Addition, Edmonton
- Viridian Shop, Fort Saskatchewan
- Chilkat Warehouse, Yellowknife
- Kingland Ford, Yellowknife
- Fudian Auto Plant, Shanghai China
- Mail Sorting Facility, Roof Retrofit

Public Works Projects

- City of Yellowknife Baling Facility, NWT


SEX

A.B. MacDonald
President

Our mission is to be successful at understanding the unique consulting engineering needs of each client and to fulfill those needs in a safe and proficient manner.

Vision

Our vision is to be recognized by our clientele as a world-class consulting engineering company.

Mission

Our mission is to be successful at understanding the unique consulting engineering needs of each client and to fulfill those needs in a safe and proficient manner.

Success will be measured by:

- Recognition by our clients as their preferred consultant for delivering state-of-the-art innovative engineering and scientific solutions, sound project management and excellent service.
- Dedication by our employees through provision of a challenging work environment and rewarding careers.
- Steady growth and consistent financial return to our shareholders.

Quality

Our quality is based on the following principles:

- Assuring quality in our services is vital to our long-term success in a marketplace which is characterized by ever increasing competitiveness and client expectations.
- Dedication to continuous improvement is necessary to deliver the highest quality services.
- Client satisfaction is the most important measure of quality and we must always strive to exceed our clients' expectations of quality.

Business

We provide specialized services in the fields of arctic, geotechnical, environmental, hydrogeological, forestry, mining, highways, airports, and pavements engineering as well as quality control and quality assurance testing for the construction industry.

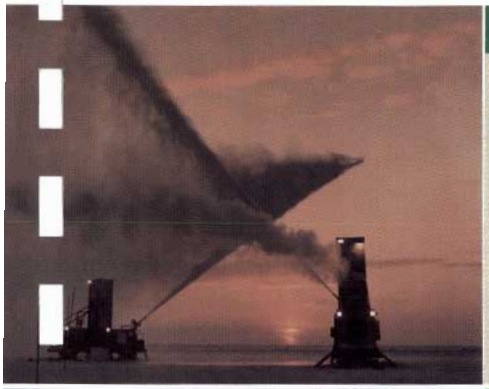
Complete design and project management services are provided on projects where the engineering component is predominantly within our fields of specialization. Typical projects where the full complement of services is provided include: highways, resource roads, tunnels, mines, offshore drilling islands, runways, dams, landfills, site remediation, reclamation and environmental management.

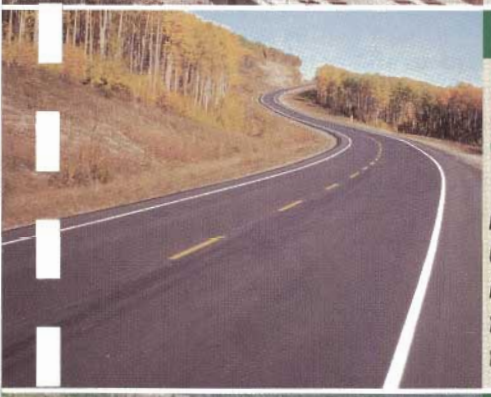
Our geographic area of practice includes Western and Northern Canada, Alaska and Russia. Activity in other geographic areas is provided for specific projects.

Our clientele includes owners in both the private and public sectors as well as other service providers such as contractors, architects and other consulting engineering companies.

A. B. MacDonald
President

EBA Engineering





Arctic Engine

For more than 25 years, EBA has pioneered innovative solutions to the challenges of arctic engineering.

From early work on pipelines and roads to the latest technological advances in Russian oil and gas fields, we've built an international reputation for creative, practical approaches to engineering projects for cold climates around the world.

Our arctic assignments range from small and often remote geotechnical, geophysical and environmental site assessments to huge infrastructure and resource industry developments. Much of our work is for natural resource companies in the oil and gas and mining sectors, as well as for developers and all levels of government. Route location studies for northern pipelines and roads constitute a large component of our activity.

EBA's credentials in arctic engineering extend to site investigations and developing foundation designs for offshore hydrocarbon exploration and production facilities. We've been actively involved in the design of the majority of North America's offshore arctic exploration facilities.

Over the last ten years, the firm's impressive portfolio in northern mining projects has encompassed many of the new mine developments in the Yukon, Northwest Territories and Alaska. Assignments involve all phases of mine development and infrastructure.

Our core group of engineers, terrain scientists and technologists has wide-ranging international experience in permafrost engineering and northern marine geotechnics. That experience translates into an ability to respond effectively to client needs and, equally important, to appreciate the diverse cultural and technical demands of the international marketplace. Familiarity with local and foreign regulatory processes is an important component to expedite project completion.

◁ *Spray Ice Island construction*

▷ *Design and construction supervision of experimental road construction in Siberia, Russia*

ering

Services Offered

- Terrain analysis
- Route evaluation for roads and pipelines
- Design of roads and airstrips
- Permafrost engineering and geothermal analysis
- Foundation design
- Offshore facility design
- Granular resource studies
- Onshore and offshore site investigations
- Onshore and offshore geophysical surveys
- Construction supervision
- Construction quality assurance
- Ground Penetrating Radar
- Environmental site assessments
- Specialized laboratory testing
- Soil liquefaction analysis

Experimental railway sections using heat pipe installations to alleviate thaw settlement

Innovative Solutions

We're pioneers — and proud of it. EBA's unique solutions to arctic engineering challenges include:

- Development and application of geothermal design methods since the 1970's
- Using heat pipes to stabilize structures and embankments founded on permafrost
- Designing frozen core dams for tailings and water impoundment on permafrost
- Developing test procedures and analyses capabilities to evaluate thaw settlement around hydrocarbon production wells in permafrost and determine the impact on casing design

Road route evaluation, Svalbard, Norway

Foundation design and construction supervision during road, dam and port construction for an arctic mine

The Benefits of GEOTHERM and GEOSTRESS

Effective arctic engineering demands a comprehensive understanding of soil properties in some of the world's most inhospitable terrain.

Our two proprietary finite element programs, GEOTHERM and GEOSTRESS, allow a level of sophisticated analysis available nowhere else. GEOTHERM permits the prediction of in situ ground temperature conditions in response to both climatic and human-induced activities. GEOSTRESS permits determination of soil stress conditions that models consolidation, seismic loading and creep of frozen soil.

Both programs use soil properties measured in EBA's geotechnical laboratory facilities, which are among the most advanced in North America for testing frozen soils.

"EBA has provided valuable permafrost engineering expertise on various telecommunication projects across the Yukon and NWT. Their arctic experience with facility foundations and access roads has proven valuable in meeting the challenges of our remote northern installations while appreciating the environmentally sensitive nature of these regions."

— Glenn Bushell, NorthwesTel

Environmenta

Our diversified talent base of engineers, geologists, environmental scientists and technicians offers technical know-how that is widely respected by clients and environmental regulators at all levels.

Because no amount of engineering ability can compensate for lack of communication, EBA takes great pride in fully understanding each client's specific concerns. We apply a cost-effective balance of engineering and science to environmental challenges, achieving sensitive, intelligent solutions.

Our commitment to prompt, economical design is apparent in the dedication of our people. We strive to represent the best interests of our clients and to move complex projects smoothly from assessment to closure. Clients find EBA a valued ally in meeting their environmental needs under the pressures of ever-shifting regulatory regimes and economic restraints.

Contamination assessment of railway yard

Groundwater and surface water contamination assessment

The Stakes Are High

Under current environmental regulations, nothing can be left to conjecture because the stakes are so high. We recognize that although a site investigation or assessment is a small part of the total project cost, the impact on the bottom line can be enormous.

That's why EBA tailors each site investigation or assessment individually. Our aim is to provide an appropriate level of investigation at minimum cost.

t Services

Experience

We've worked extensively with federal, provincial and municipal governments to develop and implement environmental policies. Major developers of commercial, residential and industrial lands depend on EBA for risk assessment. Our consulting expertise is accessed by a wide range of clients, including such sectors as public utilities, manufacturing, petrochemical, oil and gas, exploration, development, production/distribution and transportation.

EBA has forged partnership agreements and evergreen contracts with many clients who count on us to deliver results-driven project management, technical competence and client advocacy.

Services Offered

- Environmental compliance auditing
- Hydrogeology and contaminant transport modelling
- Landfill siting, design, monitoring operations and leachate management
- Real estate consulting, due diligence and property investigations
- Risk assessments and risk-based clean-up criteria
- Site decommissioning remediation and reclamation
- Site evaluations and assessments
- Solid and hazardous waste management
- Science and engineering

EBA's staff works in close-knit multi-disciplinary teams. Professional skills within the Environmental Services Group include chemistry, geology and hydrogeology, hydrology, geomorphology, agricultural and soil sciences, geo-environmental engineering and project management.

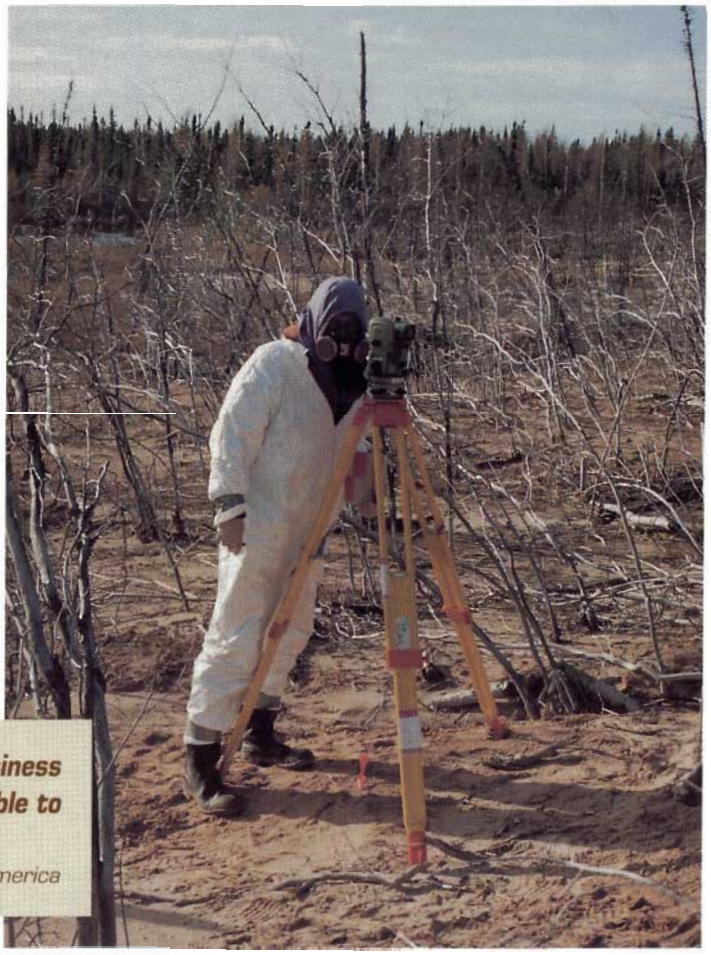
The teams evaluate each situation on the basis of specific site conditions. We combine technical skills with careful project management, co-ordination of resources, regulatory interaction, verification and effective communication.

"EBA's people have taken the time to understand our business and get to know our people, by doing so, they have been able to complete their assignments to our satisfaction."

— Rick McFadyen, CN North America

△ *Contamination investigation of tank farm*

▽ *Site remediation services for abandoned mine clean-up*



Geotechnical

It will come as no surprise that EBA continues to build on its reputation for innovation in the field of geotechnical engineering.

From terrain evaluation and groundwater studies to foundation rehabilitation, our comprehensive services are underpinned by a focus on effective communication between clients and our specialized team of engineers and geoscientists.

Clients also benefit substantially from the geotechnical team's access to knowledge in other disciplines, all readily available within EBA. These encompass hydrogeology, geo-environmental engineering, agriculture, chemical engineering, geology, hydrology, geomorphology and project management.

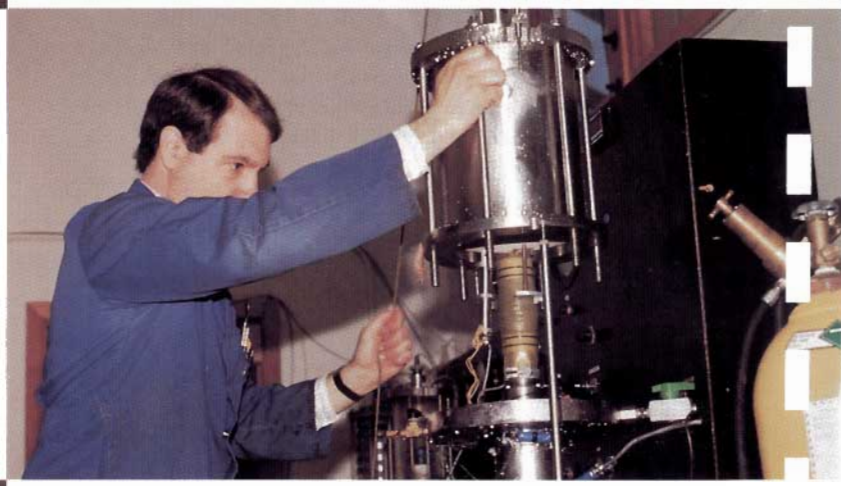
Our geotechnical engineering expertise is accessed by a wide range of public and private sector clients including such sectors as transportation (highways, railways); natural resources (mining, forestry); water resources (dams, groundwater supply) and land developers (subdivisions, foundations).

Experience

With a history of success in some of the world's most challenging terrain, EBA geotechnical engineers are adept at finding unique solutions where site conditions render normal techniques impractical. These range from the use of roller compacted concrete, using mine waste rock for embankment construction, to the use of geotextile filters in a dam where granular material would otherwise have had to be imported at great cost.

Our customized fill placement procedures are another example of our innovative, cost-conscious approach. These procedures allow the use of on-site materials which would otherwise be unsuitable in most cases.

◁ *Geotechnical design for Light Rail Transit tunnel*



▷ *Specialized triaxial test on frozen soil - EBA Laboratories*

Engineering

Design and construction supervision for rock slope stabilization

Many of the sites being developed have required foundations which can withstand the deformation caused by abandoned underground coal workings, thick deposits of compressible sediments or vibrations caused by natural or human activities.

EBA has also completed a significant number of slope stability studies, ranging from the assessment of large-scale movements on natural slopes several hundred metres high to localized failures of resource road fills in remote areas.

Services Offered

SITE INVESTIGATIONS
- Evaluation of landslides and building settlements
- Geophysical surveys
- Subsurface investigation
- Terrain evaluations

ENGINEERING ANALYSIS
- Foundation-bearing capacity
- Groundwater studies
- Seismic and liquefaction response
- Settlement and consolidation
- Slope stability

ENGINEERING DESIGN
- Dam and foundation rehabilitation
- Embankments and slopes
- Excavations
- Retaining walls
- Slope stabilization and ground improvement

CONSTRUCTION SERVICES
- Instrumentation
- Pile installation
- Rock bolting and grouting
- Supervision of earthworks

Unique Resources

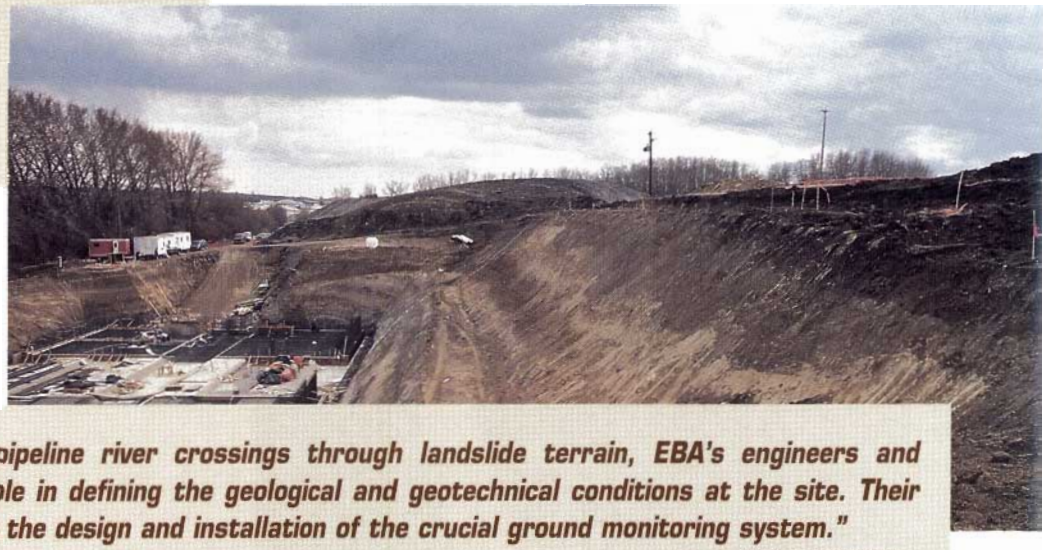
EBA brings a sound combination of professional expertise and advanced technology to the practice of geotechnical engineering. These resources include the availability of geophysical tools and geophysicists, a comprehensive geotechnical laboratory and in-house computer programs for complex engineering analyses.

We have the geophysical expertise to provide services in the following areas:

- Ground Penetrating Radar studies
- Seismic reflection/refraction surveys
- Contact and non-contact resistivity surveys
- Magnetometer surveys
- Offshore geophysical site investigations
- Down-hole geophysical log interpretation

EBA's laboratories perform all standard geotechnical testing and many non-standard tests. Included are direct shear, consolidation and triaxial testing equipment, temperature-controlled stress path and high pressure triaxial cells, a direct simple shear machine, cyclic loading equipment and rock strength testing equipment.

Analytical capabilities available to EBA's engineers include computer programs for slope stability and seepage analysis as well as stress programs which can simulate construction sequencing and permit seismic and liquefaction evaluations.



Geotechnical engineering for water reservoir construction

"During the design of two major pipeline river crossings through landslide terrain, EBA's engineers and technologists played an important role in defining the geological and geotechnical conditions at the site. Their expertise was particularly valuable in the design and installation of the crucial ground monitoring system."

— Gregg O'Neil, NOVA Gas

Transportatio

EBA's transportation team mission is to operate as a prime consultant for functional studies, design, and construction management of highway systems and resource roads.

EBA provides quality preliminary engineering, design, tender package preparation, construction supervision and total contract and construction management services on a wide variety of projects varying from minor to major complexity. Working closely with the other disciplines within EBA, the transportation team provides a complete engineering services package to the client which includes geotechnical engineering, pavement design, hydrotechnical engineering, specialty drafting and safety.

The EBA transportation team prides itself on timely delivery of quality, cost effective engineering services. Accuracy, innovative thought and presentation reflect the team's sensitivity to all client's needs and requests.

Experience

The highway engineers, material inspectors, surveyors, design technologists, utility coordinators, and draftsmen within the group each have in excess of fifteen years of experience in the industry. A regular schedule of workshops includes First Aid and CPR, Transportation of Dangerous Goods, Topsoil Reclamation, Soil Surveying, Planning and Preliminary Engineering, Design and Tender Package Preparation, Quality Assurance, Project Management, Safety, and Equipment Operation and Maintenance.

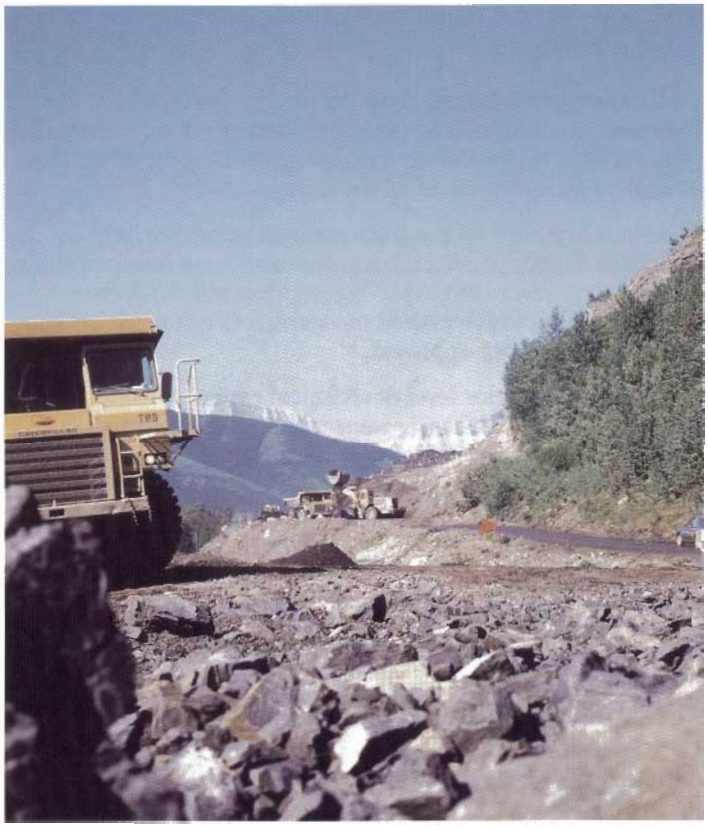
Surveying ▷

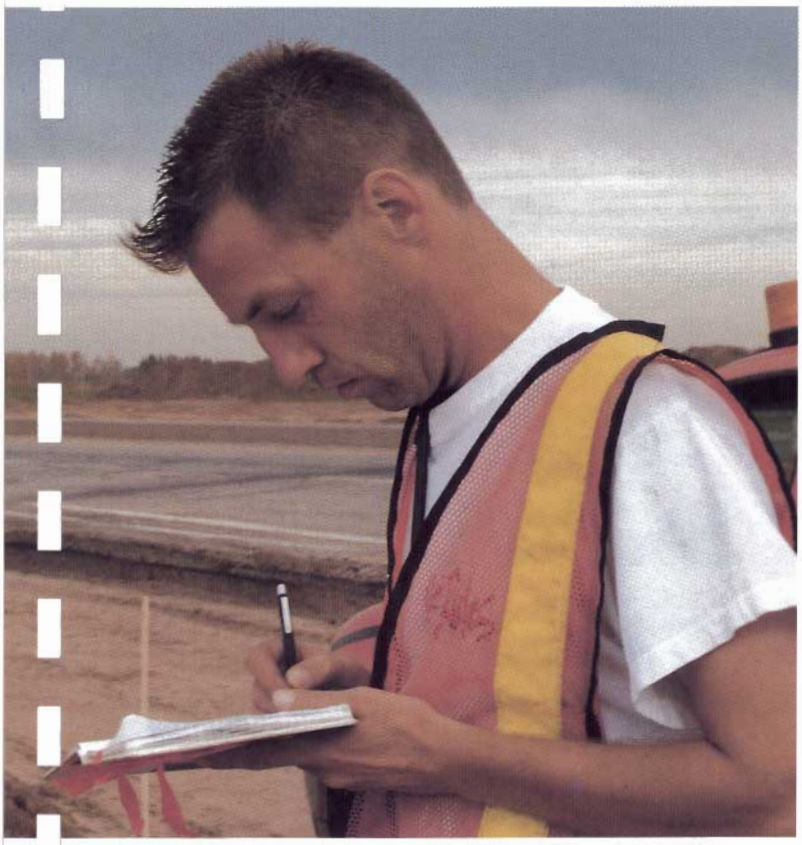
◁ *Highway final paving*

Highway rehabilitation and intersection improvements

n Services

Resource road construction





Services Offered

- Functional studies
- Value engineering
- Cost benefit analysis
- Preliminary engineering
- Soils sampling and testing
- Surveying
- Roadway design
- Geotechnical engineering
- Pavement engineering
- Exploration, operation and reclamation of aggregate sources
- Utility relocation, design and coordination
- Drafting
- Property acquisition
- Geometric assessments
- Hydrotechnical engineering
- Tender package preparation
- Contract administration
- Quality assurance testing
- Contract management
- Claims mediation

Forestry Serv

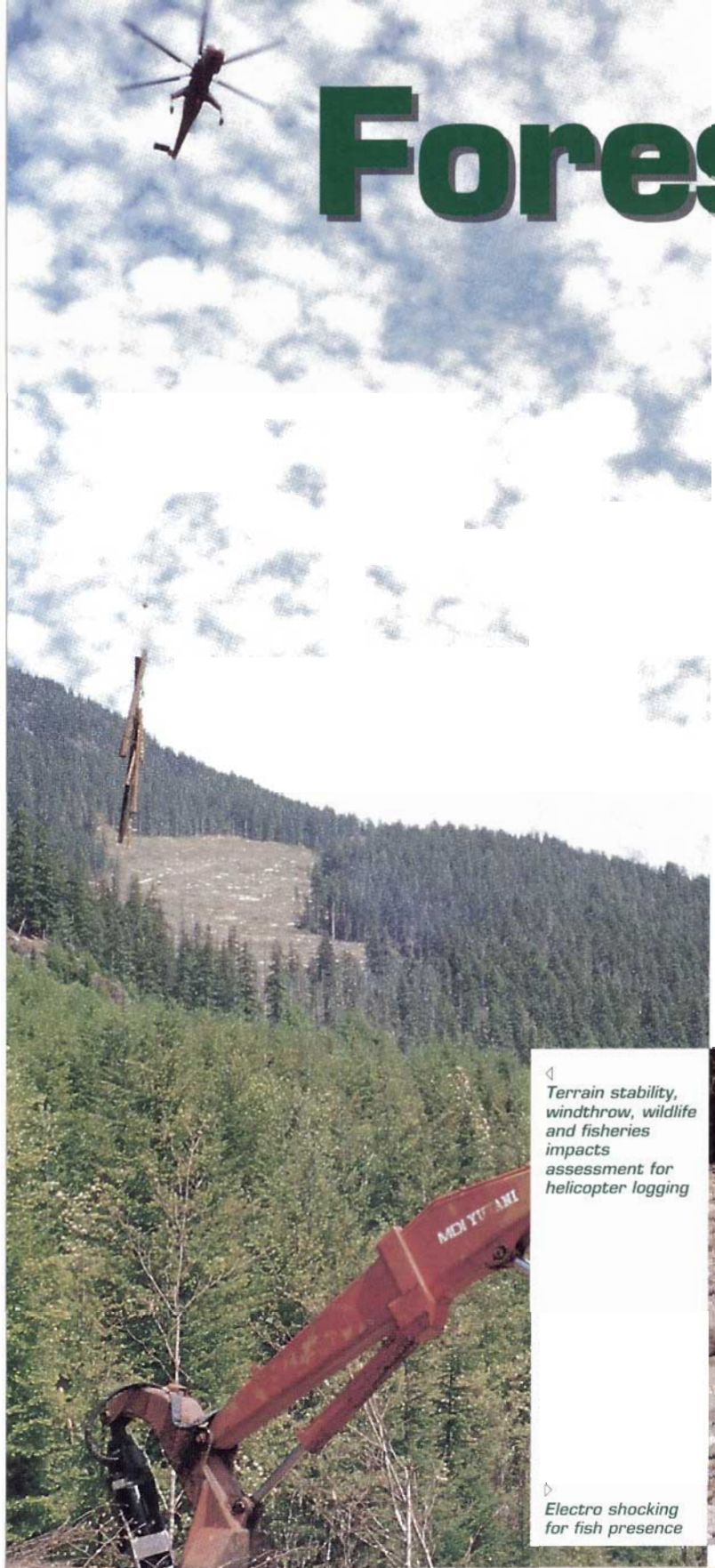
EBA's team of engineers, geoscientists, foresters, and biologists is committed to providing cost effective, technically sound and environmentally safe solutions to geotechnical and biological problems faced by the forest industry.

The team is guided by a results-oriented approach, and an understanding of provincial, regional and local interpretations of the Forest Practices Code. We are thus able to deliver quality services which exceed the standards of due diligence and meet regulatory approval.

EBA offers a superior level of technical expertise gained in over 25 years of service to resource industries in western Canada. We work with an integrated team approach, whether providing layout, design and hazard assessment services for road engineering, or providing road deactivation, landslide rehabilitation and fish inventory and habitat restoration services for watershed restoration projects.

We combine this high level of technical skill with local presence in offices in Vancouver, Nanaimo, Courtenay and Ucluelet on the coast, and in Kelowna, Nelson, Kamloops, Revelstoke and Vernon in the southern interior.

EBA understands the critical importance of on-time delivery of our reports, plans and designs to our forestry clients. We focus on clear communication with clients in order to understand their specific concerns on any project.



Terrain stability, windthrow, wildlife and fisheries impacts assessment for helicopter logging

Electro shocking for fish presence

"In a challenging assignment to determine the causes, mechanisms and remediation strategies in a complex landslide problem area, EBA did an exceptional job in summarizing a considerable amount of available information and presenting their findings. This allowed the project to proceed efficiently through the assessment phase into the detailed investigation and engineering stages, giving us confidence that funding was being effectively spent."

— Kevin P. Turner, P.Eng. Geotechnical Engineer, Ministry of Forests, Kamloops Forest Region

ices

"In carrying out numerous terrain stability assessments for proposed roads and cutblocks as part of our development planning process, EBA produced a quality product that was completed in a cost effective and timely manner."

— Ron Palmer, Development Forester, Pope and Talbot Ltd.

Experience

EBA is one of the largest providers of geotechnical and biological services to the British Columbia forest industry.

We have successfully completed many hundreds of terrain stability site assessments, done terrain stability mapping of many hundreds of thousands of hectares, carried out sediment source surveys and fish, habitat and channel assessments in numerous watersheds comprising several hundred thousand hectares.

We have provided road deactivation prescriptions on thousands of kilometres of road. We have investigated and supplied rehabilitation prescriptions and design for numerous landslides, including some with the highest profiles in B.C., both on the coast and in the interior.

We have recently combined this experience with in-house forestry road development experience to provide an integrated road engineering service with successfully completed projects from the west coast of Vancouver Island to the east Kootenays.

Services Offered

OPERATIONAL PLANNING

- Terrain stability hazard site assessments
- Terrain and terrain stability mapping
- Windthrow and wildlife/danger tree assessment
- Fish stream identification
- Coastal and Interior Watershed Assessment Procedures (C/IWAP)
- Wildlife studies - rare and endangered species

FORESTRY ENGINEERING

- Road location, survey and design
- Road deactivation prescriptions and site supervision
- Landslide assessment, investigation, and remediation
- Bridge site survey and design
- Engineered fills, cut slope design, soils testing

WATERSHED RESTORATION

- Sediment source surveys
- Road deactivation: access management, prescriptions and site supervision
- Landslide rehabilitation: bioengineering and conventional engineered solutions
- IWAP/CWAP
- Integrated Fish, Riparian and Channel Assessment Procedures (FAP, RAP, CAP)
- Fish habitat rehabilitation procedures and design

OTHER

- Research: landslide and gully inventories and statistical analyses
- Forestry Practices Code and internal audits
- Legal expert opinion

Rock slope design and construction supervision

Airport Servic

EBA's airports team mission is to become the foremost prime consultant for airport services. EBA provides world-class prime consulting for airports on a competitive basis with respect to innovative technology, quality, service and price.

Experience

EBA's airports team offers a broad range of consulting services relating to planning, design, construction management, environmental, air side operations, maintenance and pavement management systems, with the level and type of service provided dependant on the size and requirements of the airport. We have completed more than 300 projects on 100 airports and navigational facilities in Western and Arctic Canada, Alaska and Norway.

These assignments have ranged from design and construction of small local airstrips in Arctic permafrost regions to multi-million dollar airfield facilities at International Airports. EBA employs planners, engineers and technologists experienced in all phases of airport and heliport planning and construction, including air side operations, aerodrome safety standards and design regulations. EBA keeps up to date in the latest changes on airport design requirements through long term relationships established with Transport Canada, NavCan and the airport industry specifically.

◁ *Project management for runway overlay*

▷ *Underground glycol tank installation*

ces

Apron expansion

Asphalt overlay

Services Offered

PLANNING

- Demand and feasibility studies
- Master planning
- Land use plans
- Land use bylaws
- Strategic plans
- Business plans
- Development plans
- Operation plans and manuals
- Economic development strategies
- Airport vicinity protections zoning
- Location studies and site assessments

ENGINEERING

- Design, approvals and construction management services
- Airfield pavement design
- Airport infrastructure including sewer, water, drainage, roads, and parking lots
- Fuel systems
- Geotechnical engineering
- Pavement management systems
- Life cycle cost analyses
- Pavement condition surveys
- Pavement maintenance plans
- Non-destructive subsurface investigations
- Storm water management and hydrology

ENVIRONMENTAL

- Environmental site assessments
- Contaminated site evaluation and design of remedial measures
- Groundwater assessment and monitoring
- Risk assessment studies
- Fuel management and spill prevention programs
- Removal of underground storage tanks
- Agricultural assessment of surplus land
- Development of in-house environmental management systems for airport operators
- Septic field design and assessment for rural airports
- Management of glycol contaminated runoff
- Emergency response and preparedness planning

Slip forming on taxiway

Mining Servic

Our services to the mining industry are provided through close-knit multi-disciplinary teams with experienced technical skills and seasoned project management capabilities. Our engineers in geotechnical, environmental, permafrost, materials, and rock mechanics disciplines work closely with our other trained professionals in related earth sciences, including geology, hydrogeology, hydrology, geomorphology, geophysics, chemistry, biology, and agriculture. We can support mining projects through all phases of permitting, development and closure.

Polaris Mine, Arctic Islands

Expertise

EBA is a leader in providing innovative design and construction expertise to subarctic and alpine mining projects. Examples include frozen core dams to achieve "zero discharge" facilities; a frozen cell dock to withstand large ice flow impacts; frozen mine backfill to facilitate a cost effective underground operation; and thickened tailings deposition schemes to create permafrost tailings.

Ekati Diamond Mine, N.W.T.

Brewery Creek Mine, Yukon

Baley Project, Russia

Services Offered

SITE DEVELOPMENT
- Site evaluation and selection
- Corridor route alignments
- Seismic hazard assessments
- Terrain analyses and bedrock mapping
- Construction materials delineation

CIVIL INFRASTRUCTURE
- Access roads and airstrips
- Plant foundations
- Embankment designs
- Ground improvement
- Construction supervision

WATER RESOURCES
- Hydrology and hydrogeology
- Hydraulics and flood control
- River engineering
- Water supply dams
- Water chemistry evaluations

TAILINGS DISPOSAL
- Tailings dam designs
- Deposition management
- Water balance and seepage analyses
- Liquefaction assessments

HEAP LEACH
- Foundation preparation
- Liner system designs
- Cold weather operations
- Construction quality control

ENVIRONMENTAL SERVICES
- Water quality monitoring
- Environmental site assessments
- Fish habitat assessments
- Site remediation
- Soil/groundwater treatment
- Risk based assessments
- Environmental effects monitoring
- Cumulative effects monitoring
- Environmental management systems
- Waste management plans

REGULATIONS AND PERMITS
- Regulatory and public consultation
- Environmental impact assessments
- Environmental baseline surveys
- Permitting and compliance
- Abandonment and restoration
- Site closure and decommissioning

WASTE DUMPS
- Stock pile design
- Stability assessments
- Acid rock drainage
- Performance instrumentation

ROCK STRUCTURES
- Pit wall stability
- Tunnel and shaft support
- Mine stope backfill
- Dewatering and depressurization

Red Dog Mine, Alaska

"EBA has provided us with effective design concepts and placement strategies for a mine tailings containment plan at our new diamond mine development in the Northwest Territories and has given supportive input to our environmental permitting process"

— Dan Johnson, BHP Diamonds Inc.

Construction

EBA's highly trained team of engineers and technologists provides a broad range of construction-related services, including both engineering, and field and laboratory testing.

The firm's construction engineering practice includes advanced materials engineering capabilities in pavements engineering, asphaltic concrete and Portland Cement concrete, as well as other materials engineering specialties.

Certified laboratory facilities and specialized technical equipment are available for testing a variety of construction materials including concrete, asphaltic concrete, soil, rock and steel.

We also assist clients by offering laboratory testing services for a wide variety of manufactured products, such as reinforcing steel, wire rope, plastic pipe and sealer products. Both destructive and non-destructive testing services are available.

EBA's commitment to client service includes complete field quality control/quality assurance testing and monitoring services during construction. These services are provided by a team of engineers and technologists with practical construction experience.

Our engineering and testing services can be accessed directly by owners, developers, contractors, manufacturers, government agencies and other engineering firms. They are also provided to support investigation, design and research conducted through EBA's other engineering disciplines.

Design and construction quality assurance during retaining wall construction

Pavement rutting investigation to assess and mitigate rutting distress

Services

Innovative Solutions

We've achieved an international reputation as leaders in the practice of materials engineering. For example, soil density equipment developed on the basis of proven principles of nuclear physics was first used commercially in Canada by EBA more than 20 years ago. More recently, we've pioneered the development of superior asphalt paving mixtures, applying the Superpave™ process that was developed as part of the Strategic Highways Research Program in the United States.

By maintaining our technological leadership, we're committed to bringing the best solutions to our clients.

Services Offered

- Construction engineering
- Construction materials design
- Field quality control and quality assurance testing
- Laboratory testing of construction materials
- Laboratory testing of manufactured products
- Pavement condition evaluations
- Pavement engineering
- Technical specification writing

The firm's unique practice in pavements engineering includes design of both rigid and flexible pavements, construction supervision of pavement engineering projects, audits of transportation agency practices and investigative studies of pavement distress.

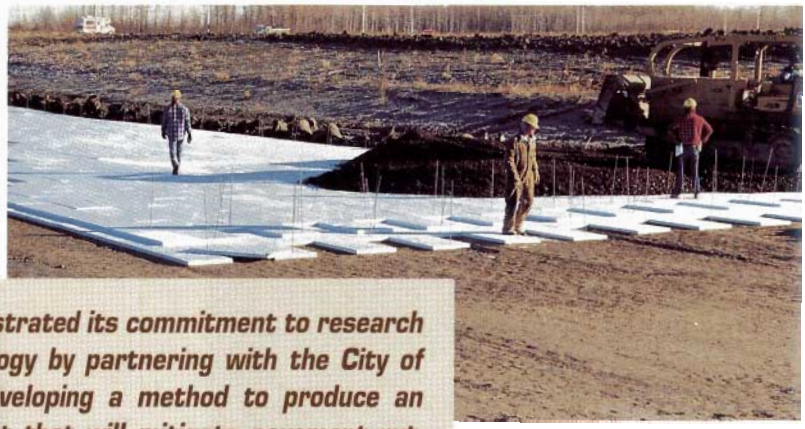
EBA is at the forefront of pavements technology through participation in research and development studies with the Strategic Highways Research Program in the United States, the Canadian Strategic Highways Research Program and the Transportation Association of Canada. Our own research projects, such as Road Radar™, underscore our commitment to applying advanced technologies to engineering practice.

Equipment Resources

EBA maintains specialized field and laboratory testing equipment including:

- Asphalt cement testing equipment
- Field laboratory trailers
- Gyratory compactor for asphaltic concrete mixes
- Linear traverse equipment for entrained air measurement in hardened concrete
- Marshall stability and flow equipment
- Non-destructive equipment for locating reinforcing steel
- Nuclear densometers
- Pavement condition measuring equipment
- Petrographic microscopes
- Tinius Olson compression/tension testing frames

Field density determination using nuclear densometer



Design and construction quality assurance of insulation installation to mitigate frost heave

"EBA has demonstrated its commitment to research and new technology by partnering with the City of Lethbridge in developing a method to produce an asphalt pavement that will mitigate pavement rutting as well as working with us on developing a better method of determining delamination in bridge decks by the use of radar technology."

— Bud Hogeweide, City of Lethbridge

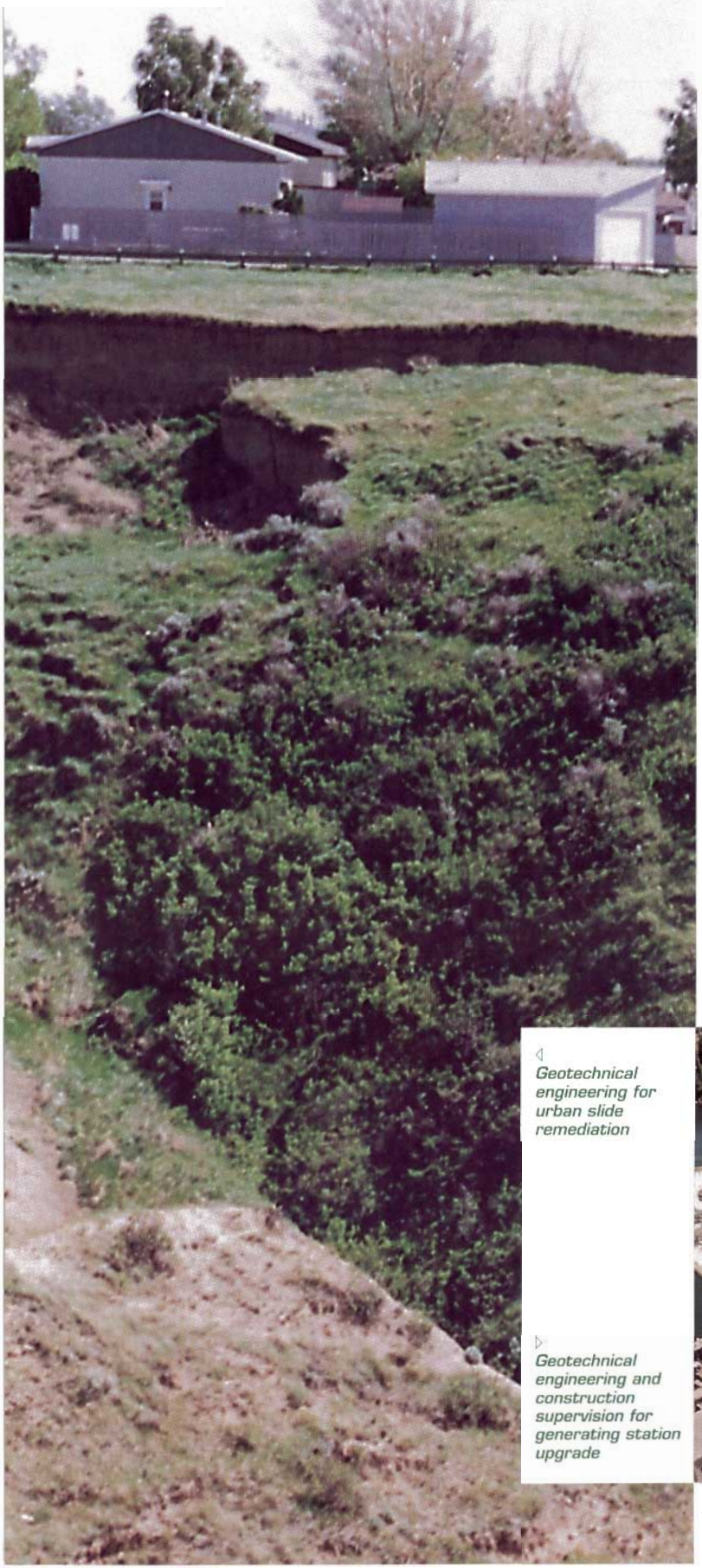
Special Proje

EBA offers clients innovative, leading edge solutions to Special Projects involving complex engineering and environmental problems. Project teams can be tailored to specific project needs by drawing on the specialized expertise of the firm's diverse engineering disciplines, contracting and construction specialists and environmental professionals experienced in all aspects of environmental impact. This fully integrated multi-disciplinary approach ensures project work is carried out efficiently and to the highest possible standard.

Special Projects can range from intricate engineering designs that require advanced numerical analysis to obtain the most cost effective solution, to large design-build projects that need innovative application of proven methods in a multi-skilled design environment.

Special Project areas in the natural resources, industrial and urban development sectors include:

- Landslide analysis, mitigation and remediation including application of advanced techniques such as risk analyses and satellite interferometry
- Oil sands technology including design for facility infrastructure foundations, tailings structures, pit slopes and earth structures
- Use of shredded tires as drainage layer material for solid waste landfill facility
- Tunnelling and earthworks engineering including hydroelectric projects
- Bridge and offshore foundations subject to adverse environmental loads
- Residential and industrial building foundations in complex and sensitive soils.



Geotechnical engineering for urban slide remediation

Geotechnical engineering and construction supervision for generating station upgrade

cts

We select our project teams after consultation with our clients to determine their unique needs.

The importance of a good match between client and project team is paramount. EBA's project team members are carefully chosen on the basis of their ability to meet clients' needs through the strength and suitability of their technical and communication skills.

Innovative application of shredded tires for landfill drainage

Services Offered

- Geohazard assessments
- Risk evaluations
- Emergency preparedness plan
- Fast tracking — "just in time" design
- Leading edge solutions
- Advanced numerical analysis
- Value engineering
- Permit application
- Review board representation
- Impact assessments
- Compliance with government regulations
- Cost control
- As-built drawings
- Tender preparation and evaluation
- Contract administration
- Procurement strategy
- Resident engineering
- Construction quality assurance testing
- Instrumentation and performance review

Project Management

From concept to commissioning, EBA offers clients a comprehensive project management package within our earth sciences and environmental fields of practice. These coordinated services incorporate all components, including planning, investigation, design, tendering, contract administration and post-construction services.

We assist clients in the public and private sectors on projects varying in size from less than $1 million to more than $50 million. Drawing on many years of experience, EBA's skilled staff applies established systems and procedures to control the essential aspects of all projects in order to achieve practical, cost effective solutions.

EBA's multi-faceted knowledge base promotes value-added engineering. Our project management teams draw on specialized skills from within EBA's various engineering disciplines, including geotechnical engineering, environmental services, construction services and arctic engineering.

"EBA kept the project on schedule and within budget which was a significant achievement"

— Peter Hartridge, City of Nelson

Prime consultant for tunnel and portal construction

Infrastructure Services

EBA provides a number of pavement data collection services to the transportation sector. These services are provided directly to transportation agencies as well as through EBA's transportation and pavement engineering services.

Services Offered

RADAR
- ACP and PCC bridge deck assessment
- Structural profile survey
- Void detection and mapping
- Crack analysis

FALLING WEIGHT DEFLECTOMETER
- Structural adequacy testing
- Road ban testing

GPS AND VIDEO LOGGING
- GPS mapping
- Video inventory surveys

ROADWAY SURFACE PROFILING
- Class 1 IRI and rut measurements

APPENDIX B

NORTHERN MINING EXPERIENCE

NORTHERN MINING EXPERIENCE

EBA's environmental and geotechnical experience on northern mining projects has included involvement in all phases of mine development, from baseline assessments and feasibility studies for proposed mines to the development of mine abandonment plans and the clean up of previously abandoned mines. Our project experience reflects a wide variety of physical science, engineering and biological skills applied to baseline assessment activities, environmental impact assessments, operational planning, engineering, restoration, monitoring, and audit activities. EBA is a leader in providing innovative design and construction expertise to subarctic and alpine mining projects. At many subarctic mine locations, severe climates, difficult groundwater or permafrost conditions have required specialized design approaches for mine structures, plant foundations and associated facilities such as roads, airstrips, waste rock dumps, and tailings disposal areas.

In some instances, cold climate can be used as an advantage. Some of the innovative solutions that have been used by EBA for northern mining projects include the following: the design and construction of frozen core dams to achieve "zero discharge" facilities; the design and installation of a frozen cell dock to withstand large ice floe impacts; the designed use of frozen mine backfill for an efficient and cost effective underground mine operation; and the use of a thickened tailings deposition scheme to create permafrost tailings. Furthermore, EBA is well versed in design techniques for maintaining permafrost ground conditions beneath engineered structures through the use of ventilated pads and thermosyphons, and for creating artificially frozen ground to provide ground control during mining and tunnelling operations.

The following provides some brief descriptions of northern mining projects in which EBA has been involved. A further summary of experience is provided in Table 1.

- **EKATI™ MINE**
  Long Lake, NT (1994 - present); Client: BHP Diamonds Inc.

  EBA has provided geotechnical services for preliminary design, environmental review, and final design for Canada's first diamond mine. EBA carried out geotechnical drilling and ground penetrating radar investigations for plant site development, tailings containment structures, borrow source evaluations and reclamation planning; provided recommendations for facility foundations, waste dumps and mine site airstrip and access roads; developed a tailings management plan; BHP's abandonment and restoration plan; and designed several frozen core tailings dams. EBA continues to provide resident engineering services and project management during the construction of dams, roads, waste rock dump sites, and site infrastructure. During 1999-2000, EBA contributed engineering and environmental support for the production of the Environmental Assessment Report required by the MVEIRB for approval of a three pit expansion at the EKATI™ Mine.

- **DIAVIK PROJECT**
  Lac De Gras, NT (1995 – present); Client: Diavik Diamond Mines Inc.

  EBA conducted the geotechnical site investigations and Ground Penetrating Radar (GPR) surveys for identification of granular borrow materials and determination of lakebed soil conditions. EBA also developed conceptual designs for an extensive dike system in up to 30 m water depths to permit open pit development in Lac De Gras. EBA recently completed final design analyses for the waste rock stockpiles and, in association with Acres International Limited, completed final design of the water protection dikes (cofferdams).

- **KENNADY LAKE EXPLORATION PROJECT**
  Kennady Lake, NT (1998 – present); Client: Monopros Limited/De Beers

  EBA was initially retained to assist in the completion of regulatory submissions for a Class B Water Licence. The project included the provision of professional advice on potential environmental impacts, reclamation planning and engineering issues, as well as regulatory concerns. EBA was subsequently retained to undertake regional environmental baseline data collection studies in anticipation of the project's Environmental Assessment Report for the MVEIRB.

- **TERRA MINE SITE**
  Camsell River, NT (1999 – present); Client: Public Works of Canada

  EBA was retained to complete an environmental site investigation at the mine site to assist in the development of specifications to implement site closure. Included with the site investigation is the planned completion of a hazardous waste inventory, including volumes and disposal options, an assessment of salvage value of the remaining equipment and structures on the site, and an evaluation of potential remedial options for the site to achieve site closure and abandonment. An evaluation of the ARD potential of the mine site was also included.

- **SNAP LAKE EXPLORATION PROJECT**
  Snap Lake, NT (1998 – present); Client: Winspear Resources Ltd.

  EBA completed a project description report in support of applications for a Class B Water Licence and a Class A Water Licence. Work included project management, development of a tailings management plan and the undertaking of various environmental studies required for screening purposes.

- **GIANT MINE**
  Yellowknife, NT (1997 – present); Clients: Royal Oak Mines, DIAND

  EBA was retained by Royal Oak Mines to assist in the completion of several studies, including an Abandonment and Restoration Plan, Surface Contamination studies, Spill Contingency Plan, Hazardous Waste Management Inventory and the development of a Management Strategy to deal with the final disposal of arsenic trioxide waste. This study

involved the preparation of various documents for review by applicable regulatory agencies and the development and implementation of environmental studies at the mine site. Included with the surface contamination study were surface plans depicting the distribution of arsenic soil levels across the mine property.

BOSTON GOLD PROJECT
Bathurst Inlet, Nunavut (1997 – 1999); Client: BHP World Minerals

EBA was retained to collect geotechnical and permafrost data at the project site; to provide preliminary designs for the proposed winter access road to connect the mine site with an arctic port site at Roberts Bay and for the proposed airstrip, apron and its connecting all-season access road; and to carry out a prefeasibility evaluation of tailings disposal options, including preliminary design of the selected tailings disposal facility.

- **DONLIN PROJECT**
  Crooked Creek, Alaska (1998 – present); Client: Placer Dome Technical Services Limited

  EBA prepared a prefeasibility design and costing study for tailings containment, seepage collection, and water storage dams at Crooked Creek, Alaska. Study identified siting preferences, reviewed available geotechnical and geological data, established water balance and storage volume requirements, examined alternative design and construction options, and developed a prefeasibility level cost estimate with due consideration to construction limitations.

- **POGO PROJECT**
  Delta Junction, Alaska (1998 – Present); Client: Teck Corporation

  EBA conducted preliminary geotechnical and geophysical studies for evaluating potential tailings dams and dry stack sites in discontinuous permafrost terrain. Data was collected through airphoto interpretation, helicopter reconnaissance, soil and rock drilling, permeability testing, ground temperature instrumentation and ground penetrating radar and electromagnetic geophysical techniques. A prefeasibility level geotechnical report focusing on site screening for tailings disposal was produced. EBA also conducted a winter geotechnical drilling program at the proposed waste rock storage pad, provided containment structure design incorporating a synthetic liner system underlain by ice-rich permafrost soils, and will be providing Quality Control services during construction of this structure.

- **RED DOG MINE**
  Kotzebue, Alaska (1986 – 1998); Client: Cominco Alaska, Inc.

  EBA provided foundation recommendations and input to the design and construction of inland mill facilities and a seaport distribution facility on the Chukchi Sea coast. EBA evaluated selected material sources for haul road construction and backfill requirements, conducted site sampling and laboratory testing, and provided design parameters, recommendations and specifications for various foundation elements, including rock

socketed piles, footings, rock anchors, retaining walls and ventilated gravel pads. A lined water retention dam was also designed and constructed. EBA has continued to provide geotechnical services to various supplemental mine expansion projects.

- **CON MINE, NT**
  Yellowknife, NT (1990 – 1998); Client: Nerco/Miramar

  EBA was retained to conduct an evaluation of the extent of surface contamination associated with the Con Mine was completed. The project included the development and implementation of a soil and water sampling program which included the establishment of three control sites. Samples were analyzed for arsenic, heavy metals, cyanide, oil and grease, conductivity, and ph. The project findings were summarized in a report submitted to the client. EBA has also designed and constructed Con Mine's tailings dams and carried out the annual dam inspections.

- **BALEY GOLD MINE**
  Chita Oblast, Russia (1995 – 1997); Client: Davy International Ltd.

  EBA was retained to fulfil geotechnical and hydrological engineering requirements for a feasibility study for a large-scale upgrading and reopening an existing gold mine. Study includes review of extensive Russian engineering documents pertaining to previous site activities, carrying out a geotechnical drilling investigation, and developing design recommendations for tailings dams, waste rock dumps, diversion structures, plant site facilities, pit wall stability, and river relocation.

- **MINTO PROJECT**
  Carmacks, YT (1995 – 1997); Client: Minto Resources Ltd.

  EBA conducted several site investigations at the project site. The results were utilized to develop the preliminary and final design and specifications for a 30 m high tailings/water retention dam, as well as all access roads, diversion ditches and waste dumps, and all foundations for the camp and plant site facilities. EBA also assisted Minto Resources during the RERC screening process and water license applications, and provided quality control services during construction of the dam's grout curtain and mine site facility foundations.

- **KUBAKA GOLD MINE**
  Magadan Oblast, Russia (1995 – 1996); Client: Omolon Gold Mining Company

  EBA was retained to evaluate alternative tailings deposition methods for a gold mine in the Magadan Oblast of Russia. A thickened tailings deposition scheme was developed to ensure that the tailings will become permafrost. Excess water produced by tailings consolidation and surface precipitation is stored behind a frozen core dam. The system developed was

evaluated to be the most cost effective and environmentally effective system for tailings disposition. The work was carried out in conjunction with a Russian engineering firm.

- **BREWERY CREEK GOLD MINE**
  Dawson City, YT (1994 – 1996); Client: Loki Gold Corp. (now Viceroy)

  EBA carried out drilling, testpitting and ground penetrating radar surveys for access road upgrading, delineation of borrow materials, and construction of a heap leach pad and haul roads. Full-time inspection and testing services were provided for all aspects of earthwork construction. At the heap leach pad site, specific services included delineation of permafrost areas beneath the pad, supervision of the subcutting and backfill to remove the permafrost, and quality control testing on the balance of the foundation soils for conformance to Water License specifications.

- **IZOK PROJECT**
  Izok Lake, Nunavut (1992-1995); Client: Metall Mining Corporation

  EBA conducted geotechnical investigations and provided design recommendations for the mine site, access road alignment and port facilities. The mine site is located well within a region of continuous permafrost although an overlying lake has a thermal influence on the orebody. EBA conducted an extensive drilling program with supplemental geophysical surveys including ground penetrating radar and electromagnetic soil conductivity readings.

- **POLARIS MINE**
  Little Cornwallis Island, Nunavut (1981-1994); Client: Cominco Ltd.

  EBA has provided various services to this project, most of which have involved the innovative use of thermal control methods to achieve improved ground conditions. These include the design of a frozen backfill system to allow nearly complete recovery of the pillars; an assessment of the annual underground heat balance to enable the design of mine ventilation chiller units to maintain permafrost conditions; the design of frozen cell dock to withstand large ice floe forces; the design and construction of a frozen core dam to provide a "zero discharge" structure for tailings pond containment, and reclamation planning.

- **FORT KNOX GOLD PROJECT**
  Fairbanks, Alaska (1991-1992); Client: Fairbanks Gold Ltd.

  EBA conducted a geotechnical program to support the feasibility study. EBA's tasks included review of existing information; geotechnical field mapping, logging, installation of instrumentation and laboratory testing; detailed pit slope stability calculations and pit orientation effects evaluation; design of roads and dams in deep, extremely ice-rich organic overburden conditions; development of stability concepts for over 5 miles of sidehill diversion canal; and surface hydrology and groundwater studies.

- **ENVIRONMENTAL ASSESSMENT OF SEVEN ABANDONED MINES**
  NWT (1992); Client: DIAND

  An investigation of mine tailings, mine and industrial wastes at seven abandoned mine sites was conducted. The objective was to identify existing and potential liabilities associated with each mine site to define cost effective reclamation strategies. Public presentations and meeting were also a component of the project.

- **COLOMAC GOLD MINE**
  Indin Lake, NT (1987-present); Clients: Neptune Resources Corporation, DIAND

  EBA carried out geothermal analyses for a feasibility evaluation of vat leaching as a potential alternative gold extraction process. EBA conducted geotechnical site investigations and provided foundation designs for the various mine facilities, including mill and crusher facilities, fuel storage tank farm, and 200-man camp. EBA also designed and prepared specifications for an airstrip and provided input into the designs and locations of the water supply, sewage disposal systems, access roads, and tailings disposal pipeline. Most recently, EBA conducted an assessment of the tailings deposit in support of future reclamation planning.

APPENDIX B
SUMMARY OF EBA EXPERIENCE – NORTHERN MINING PROJECTS

MINE/LOCATION	YEAR	OWNER/CLIENT	EBA'S ROLES
EKATI™ Diamonds Project, Long Lake, NWT	1994 - present	BHP Diamonds Inc.	- site investigations - foundation designs - tailings dam designs - granular resource evaluation - abandonment and reclamation planning - environmental assessment support - regulatory lead and liaison
Diavik Diamond Project, Lac de Gras, NWT	1995-present	Kennecott/Diavik Diamond Mines Inc.	- cofferdam design - geophysical investigation - mining methods study
Kennady Lake Diamond project, NWT	1997-present	De Beers	- water licence approvals - environmental baseline studies - community consultation - regulatory liaison - tailings containment design - abandonment and reclamation planning
Snap Lake Diamond project, NWT	1998	Winspear Diamonds Inc.	- water licence approvals - environmental baseline studies - ARD studies - regulatory liaison
Boston Gold Project, Bathurst Inlet, NWT	1997-1999	BHP World Minerals	- site investigations - airstrip design - access road design - winter road design - tailings disposal facility design
Colomac Mine, Indin Lake, NWT	1987-1988 1999-2000	Neptune Resources/ DIAND	- geothermal analysis - development of a water treatment strategy relating to cyanide - large scale hydrocarbon site assessment - hazardous waste management - reclamation planning - development of aquatic assessment studies - site investigation/foundation design - airstrip design - road and pipeline route evaluation - construction quality assurance
Red Dog Mine, Kotzebue, Alaska	1986 - 1998	Cominco Alaska Inc.	- foundation design for mill site - seaport remedial works - granular resource evaluation and development for 80 km haul road - construction quality assurance - dam design and construction surveillance
Minto Project, YT	1994-1997	Minto Explorations Inc.	- site investigations - tailings/water retention dam design - foundation design
Kubaka Gold Mine, Magadan Oblast, Russia	1995 - 1996	Omolon Gold Mining Company	- site investigation - tailings dam design

APPENDIX B
SUMMARY OF EBA EXPERIENCE – NORTHERN MINING PROJECTS

MINE/LOCATION	YEAR	OWNER/CLIENT	EBA'S ROLES
			- construction quality assurance
Brewery Creek Mine, Dawson City, YT	1994 - 1996	Loki Gold Corp.	- drilling and testpitting - geophysical radar survey - heap leach pad foundations - earthworks construction inspection - qualify control testing
Raglan Project, Quebec	1992 - 1996	Falconbridge	- frozen sand backfill feasibility study - frozen core dam design - foundation designs - construction supervision
Izok Project, NWT	1992-1995	Metall Mining Corporation	- geotechnical evaluation - plant site - geotechnical evaluation - port site - design of 300 km haul road - design of winter ice crossings
Polaris Mine, Little Cornwallis Island, NT	1981-1994	Cominco	- site investigations/foundation design - frozen dock design - frozen core tailings dam design - frozen underground backfill - reclamation planning
Fort Knox Gold, Alaska	1991-1992	Fairbanks Gold	- geotechnical investigations - feasibility study
Fairbanks Gold, Alaska	1991	Amax Northwest	- feasibility study
Mount Hundare, Watson Lake, YT	1991	Curragh Resources	- construction quality assurance - site investigation
Ulu Mine, NWT	1991	BHP-Utah	- site investigation - granular resource evaluation - terrain analysis
Rayrock Mine, Rae, NWT	1991	Dept. of Indian and Northern Affairs	- contamination assessment - clean up recommendations
Kiggavik Mine, Baker Lake, NWT	1990-1991	FEARO	- review of preliminary design concepts
Cigar Lake Mine, Cigar Lake, Saskatchewan	1989-1991	Cigar Lake Mining	- tunnel lining design with ground freezing system - evaluation of boxhole mining method.
Mount Skukum, Carcross, YT	1988	Mount Skukum Mining Corp.	- construction quality assurance
Keno Hill, Elsa, YT	1987	United Keno Hill Mines Ltd.	- mine abandonment and reclamation plan - site investigation
Mactung/Macpass , NWT/YT	1983	Amax	- site field investigations/foundation recommendation

APPENDIX B
SUMMARY OF EBA EXPERIENCE – NORTHERN MINING PROJECTS

MINE/LOCATION	YEAR	OWNER/CLIENT	EBA'S ROLES
			- airstrip design - conceptual design of tailings dams
Con Mine, Yellowknife, NWT	1980-1998	Nerco/Miramar	- tailings dam design/construction - arsenic plant construction - annual tailings dam inspection - reclamation planning
Terra Mine, Camsell River, NWT	1999-present	Public Works Canada	- site investigations - hazardous waste inventory - closure and reclamation planning
Faro Mine, Faro, YT	1978-1995	Curragh Resources	- residential subdivisions - site investigation - facility foundation recommendations - dewatering systems
Cantung, NWT	1975-1985	Canada Tungsten	- site investigation, foundation design - construction quality assurance
Miscellaneous Abandoned Mines (7), NWT	1992	DIAND	- mine site tailings and waste assessment - liability analyses - reclamation planning

SENIOR ENVIRONMENTAL GEOLOGIST

R.B. (Brent) Murphy, M.Sc., P.Geol.

EBA Engineering Consultants Ltd.

Mr. Murphy, of EBA's Yellowknife office is currently the Manager for Northern Operations in the NWt and Nunavut and has 15 years of experience in the area of applied environmental sciences. In the Northwest Territories, Brent has managed the conduct of baseline environmental studies for the Monopros Kennady Lake project, has provided technical and management services for the Colomac Mine care and maintenance project and provided technical assistance to the Mackenzie Valley Land and Water Group. As a result of this experience, Mr. Murphy has gained a good understanding of the existing and evolving regulatory regimes for the Western Territories and Nunavut.

Before joining EBA, Mr. Murphy was involved extensively in water and groundwater projects in the Maritimes. He has considerable experience in the design, development and evaluation of chemical data relating to regional and project-specific water quality surveys. Project experience includes baseline environmental impact assessments, evaluations of mining and industrial properties and mineral exploration field. He also attained experience in dealing with arsenic related issues having been involved with arsenic related groundwater studies in New Brunswick as well as site-specific arsenic studies in the Northwest Territories. Mr. Murphy has been involved with projects throughout eastern Canada, northern Ontario, Nunavut and the Northwest Territories.

Relevant project experience for Mr. Murphy includes the following:

- Mine Reclamation and Feasibility Studies/Baseline and Operational Monitoring Programs-Environmental Effects Monitoring Programs (EEMP)/Design/Implementation
- Groundwater Resource Studies/Exploration/Development
- Hydrogeological/Geological/Geophysical Investigations
- Environmental Legislation/Provincial and Federal Regulatory Agencies including CEAA, NWT Water Act, MVRMA
- Environmental Impact Assessments/Environmental Audits
- Environmental Management Plans (EMPs)
- Environmental Effect Monitoring Programs (EEMPs)
- Risk Assessments/Compliance Audits
- Remediation (Phase IV ESAs) Systems Design / Construction / Monitoring
- Phase 1, 2 and 3 Environmental Site Assessments / Design / Reporting
- Remediation (Phase IV ESAs) Systems Design / Construction / Monitoring
- Resource Market Analyses and Evaluations

Years of Experience: 15

Education:

B.Sc., St. Francis Xavier University

M.Sc., Geo-Chemistry, Acadia University

Summary of Experience:

15 years - Water Quality Management and Evaluation, EIAs and Environmental baseline studies, EEMPs, Phase 1, 2, 3 and 4 Environmental Site Assessments Design and Reporting; Water Distribution, Maintenance and Treatment; Water and geological investigations; and mine reclamation and related studies. Arsenic chemistry and evaluation of arsenic related contamination issues.

Affiliations:

Member, Geological Association of Canada

Member, Canadian Institute of Mining and Metallurgy

Member, NWT Association of Professional Engineers, Geologists and Geophysicists

SENIOR GEOTECHNICAL ENGINEER

K.W. (Kevin) Jones, P.Eng.

EBA Engineering Consultants Ltd.

Mr. Jones is a Project Director for EBA's Frontier Group. He has eighteen years experience in permafrost engineering, offshore engineering, geotechnical investigations, and design and analysis of a variety of structures in arctic areas of Canada, Alaska and Russia. Responsibilities include planning, project management, client liaison, and quality control.

Mr. Jones is presently serving as Project Director for EBA's project role with Nishi-Khon/SNC-Lavalin for final design of the infrastructure for Diavik's proposed open pit mine in Lac de Gras, NWT. Previous to the final design phase, he was responsible for developing preliminary cofferdam designs, and for the original site investigations and geophysical surveys to determine lakebed soil and rock characteristics and to define potential borrow material sources.

Other relevant project engineering experience includes:

- Project Director for the development of preliminary designs for a tailings and water containment dam in discontinuous permafrost-soils at the Minto Project in the Yukon Territory.
- Senior Project Engineer responsible for analysis and design of a ground freezing system and tunnel liner for a tunnelling and mining operation at the Cigar Lake uranium mine in northern Saskatchewan.
- Project Engineer responsible for supervision of geotechnical operations during site investigation operations at the Colomac gold mine in the Northwest Territories.
- Project Engineer for field laboratory and on-site materials testing for an earth fill dam with a sheet pile cutoff and geomembrane liner at the Con Mine, NWT., site selection and design recommendations for tailings dam and dykes, and for monitoring of blasting operations during the construction of treatment pits for a large arsenic treatment facility.
- Project Engineer for supervision of geotechnical operations during numerous offshore site investigations for potential exploration sites in the Beaufort Sea.
- Conducted numerous offshore site investigations for exploration sites in the Canadian and Alaskan Beaufort sea including borrow searches and foundation investigations for exploration sites.

Years of Experience: 20

Education:

Diploma, Civil Engineering Technology

B.Eng., Civil Engineering, Lakehead University

Summary of Experience:

7 years - permafrost engineering, design, construction and project management for foundations, dams and mining developments in northern Canada.

8 years - site investigation, terrain evaluation, arctic onshore and offshore engineering for hydrocarbon exploration and development projects.

3 years - specialized laboratory testing, geotechnical drill sampling, subsurface instrumentation.

Affiliations:

Member, Association of Prof. Engineers, Geologists and Geophysicists of Alberta

Member, Association of Prof. Engineers, Geologists and Geophysicists of the Northwest Territories

Member, Canadian Geotechnical Society

Member, Geotechnical Society of Edmonton

PRINCIPAL ENGINEER

D.W. (Don) Hayley, M.Sc., P.Eng.

EBA Engineering Consultants Ltd.

Mr. Hayley is Principal Engineer for EBA's Frontier Practice. His entire consulting career has been focused on arctic engineering, primarily related to northern resource development. He has contributed to numerous feasibility and design studies for projects such as transportation facilities over permafrost terrain, arctic pipelines, northern mining developments, and exploratory drilling and production structures. Mr. Hayley has developed innovative approaches to the design of structures for permafrost conditions. He is particularly familiar with construction practice and environmental standards in arctic regions worldwide.

- Some of Mr. Hayley's most significant arctic project management and corridor route study experience includes:
- Geotechnical Project Manager for design of earthwork facilities and tailings dams for Ekati Mine, NWT, Canada's first diamond mine.
- Directed site data collection and preliminary designs for a proposed winter access road to connect BHP's Boston Gold mine site in Nunavut with an arctic port site at Roberts Bay, and for a proposed airstrip, apron and its connecting all-season access road.
- Design and preparation of engineering sections of Environmental Impact Submission for 300 km long winter resource road in Canada's Central Arctic, for the proposed Izok Lake Mine. Also Geotechnical Project Manager for design of mill and seaport facilities for the proposed Izok Lake base metal mine, Central Mackenzie District, NWT.
- Prime geotechnical consultant to Polar Gas project and Arctic Pilot project gas pipeline studies. Terrain suitability evaluation and analyses of potential problems such as permafrost, thaw-settlement and river crossings were performed.
- Project Manager for geotechnical investigation and design of facilities for the Colomac Gold Mine in discontinuous permafrost, north of Yellowknife, NWT. Prime consultant for design of a 1500 m airstrip at the site.
- Project Manager for a 15 year research program to stabilize zones of thaw-settlement sinkholes within discontinuous permafrost terrain along the Hudson Bay Railway to Churchill, Manitoba.

Years of Experience: 30

Education:

B. Eng., Civil Engineering, Carleton University, Ontario.

M. Sc., Civil Engineering, University of Alberta.

Summary of Experience:

30 years - permafrost engineering, design, construction, and project management for arctic and subarctic projects, both onshore and offshore, including transportation and pipeline corridors, mining development, hydrocarbon exploration projects, and dams.

Affiliations:

Member, Association of Prof. Engineers, Geologists and Geophysicists of Alberta

Member, Association of Prof. Engineers of Yukon Territory

Member, Association of Prof. Engineers, Geologists and Geophysicists of the Northwest Territories

Member, Association of Prof. Engineers of Saskatchewan

Chairman, Canadian National Committee for the International Permafrost Association

Past Chairman, Permafrost Subcommittee of the Associate Committee on Geotechnical Research, National Research Council of Canada

ARCTIC GEOTECHNICAL SPECIALIST

T.E. (Ed) Hoeve, M.Eng., P.Eng.

EBA Engineering Consultants Ltd.

Mr. Hoeve of EBA has more than 18 years of varied geotechnical experience in the areas of permafrost engineering, geotechnical evaluations, mining, design and stability analyses, construction inspection, and field instrumentation. He has been involved with projects in many communities across the Northwest Territories as well as projects in Alberta and the Canadian Beaufort Sea. Relevant project experience for Mr. Hoeve includes the following:

Mackenzie Valley

Ed has worked in most of the communities in the NWT providing geotechnical investigations, foundation design services, and construction monitoring. For example,

- Construction quality assurance projects for approximately 210 km of NWT Highways since 1990
- Remedial foundation work for powerhouse settlement in Inuvik
- Foundation design for a school in Tsiigehtchic
- Geotechnical design for a heliport in Fort McPherson
- Geotechnical design for an arena in Fort Good Hope
- Geotechnical input to foundations for Vermillion Creek and Canyon Creek bridges at Norman Wells
- Geotechnical design for Ochre River Bridge at Wrigely
- Geotechnical design for water treatment plant at Fort Simpson

Beaufort Sea

- Conducted soil-structure interaction for Amoco's portable offshore exploratory drilling caisson. Foundation stress and deformation response to set-down and lateral ice loading, and the overall stability of the structure under ice loading were modelled.

- Performed design analysis for allowable ice load to foundation soil profile and berm geometry for the deployment of Gulf Canada's Mobile Arctic Caisson (MAC).

- Assessed the consolidation and settlement properties of the foundation soils for the Endicott Production Facility in Alaska.

- Project engineer for the design of an artificial island geometry and structural design of a sheet pile dock for Ellice L-39 island for Chevron Resources Ltd.

Years of Experience: 18

Education:

B.A.Sc. University of Waterloo, Civil Engineering

M. Eng. University of Alberta, Geotechnical Engineering

Summary of Experience:

15 years - with EBA Engineering in Edmonton, Calgary, and Yellowknife Offices.

10 years - as senior geotechnical engineer and manager of EBA's Yellowknife Office.

Affiliations:

Member, Association of Prof. Engineers, Geologists and Geophysicists of Alberta.

Member, Association of Prof. Engineers, Geologists and Geophysicists of the Northwest Territories

Member, Canadian Geotechnical Society.

ARD EXPERT

L.M. (Linda) Broughton, P. Eng.

EBA Associate

Ms Broughton, an EBA associate, is the Managing Director for Watermark Consulting and is a registered Professional Engineer in British Columbia and the Yukon. She has over 14 years of experience providing expert advice in the fields of acid rock drainage and environmental management for mining operations. Her areas of specialization include water chemistry, site contamination and risk assessment in mining projects. She has provide technical expertise respecting mining environmental regulations and permitting issues to consultants, mining companies and various government departments. She has written or assisted with several Manuals and Guidelines publications for government agencies and mining companies world wide. She has completed work at ten mining sites in the NWT and Yukon territories.

Relevant project experience for Ms. Broughton includes the following:

- Water Licence Application to the NWT Water Board, BHP Diamond Mine Northwest Territories.
- Developed water quality monitoring and management (ARD) for the Meadowbank Gold Mine, Nunavut.
- Preparation of a Water Licence and Closure plan for the Canada Tungsten Mine, NWT.
- Expert review of ARD Aspects of Mine for the Montana Department of Environmental Quality, US Forest Service.
- Competition of ARD Prediction Report in the North for the Department of Indian and Northern Affairs Canada.
- Development of a Modelling Methodology for the Prediction of Drainage Water Quality from Waste Rock Dumps for Environment Canada and the BC Ministry of Energy, Mines and Petroleim Resources.
- Permitting and Environmental Assessment for the United Keno Hill Mines Limited in the Yukon.

Years of Experience: 14

Education:

B.Sc. Eng. Mining Engineering, Queens University

M.A.Sc. Mining and Mineral Processing Engineering, University of British Columbia

Summary of Experience:

14 years - Water Quality Management and Evaluation, Acid Rock Drainage, Environmental Site Assessments Design and Reporting; Water Distribution, Maintenance and Treatment; Water and geological investigations; and mine reclamation and related studies.

Affiliations:

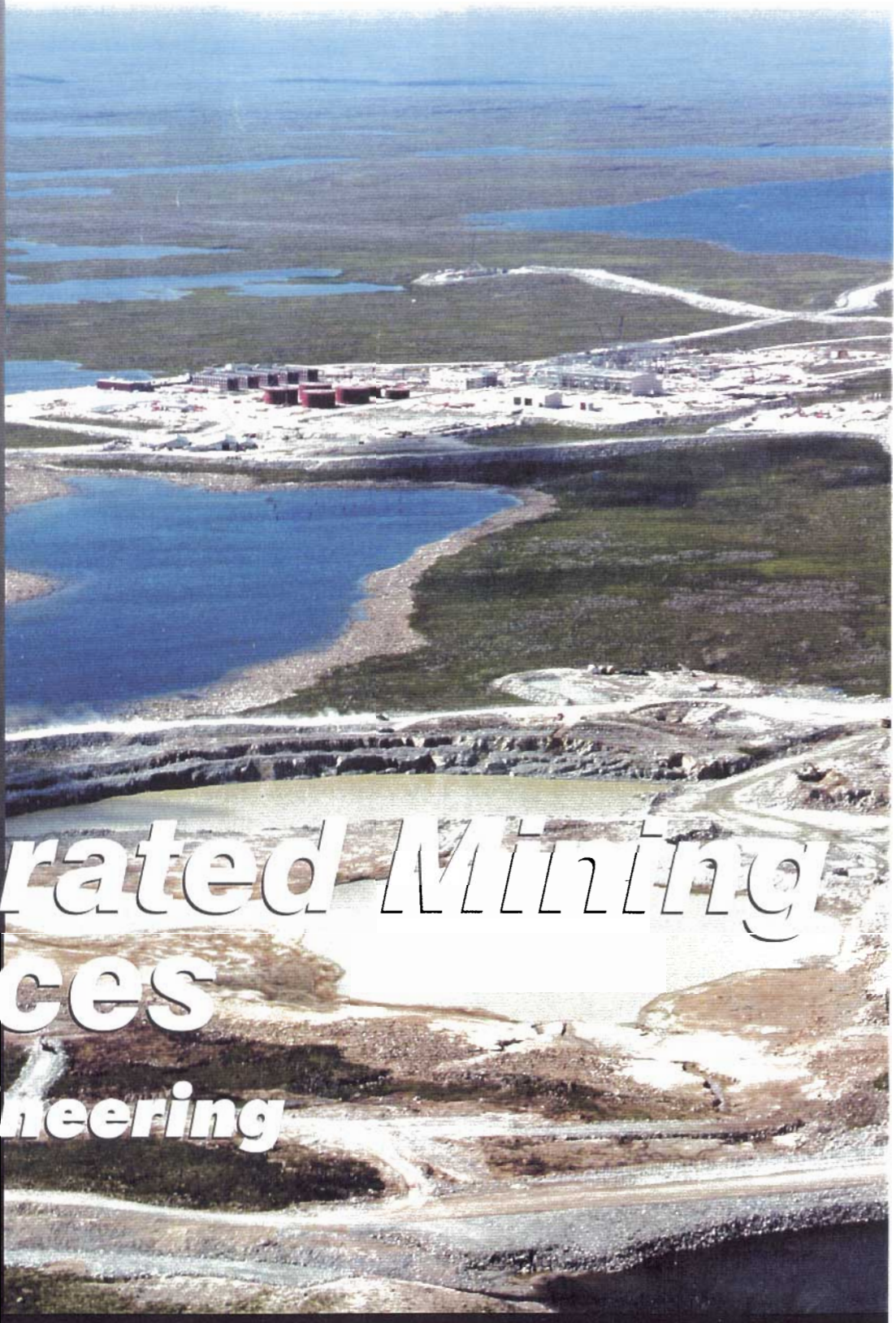
Member, Association of Professional Engineers and Geoscientists of BC

Member, Association of Professional Engineers of Yukon Territory

Member, Canadian Institute of Mining and Metallurgy

Member, International Council on Metals and the Environment

- Baseline Surveys
- Regulatory and Public Consultations
- Permitting and Compliance
- Aboriginal Traditional Knowledge Facilitation
- GIS Mapping and Data Analysis
- Environmental Impact Assessments
- Geotechnical Services
- Tailings Deposition Management
- Earthwork Designs
- Abandonment and Restoration



Integrated Mining Services

EBA Engineering

eba

E-mail: info@eba.ca • Web Site: http://www.eba.ca

Selected Projects

Ekati Diamond Mine

Diavik Diamond Project

Brewery Creek Mine

Pogo Project

Donlin Creek

Minto Project

Polaris Mine

Red Dog Mine

Kubaka Mine

Colomac Mine

Boston Gold Project

Izok Project

Anvil Range Mine

Kudz Ze Kayah Project

Dublin Gulch Mine

Raglan Mine

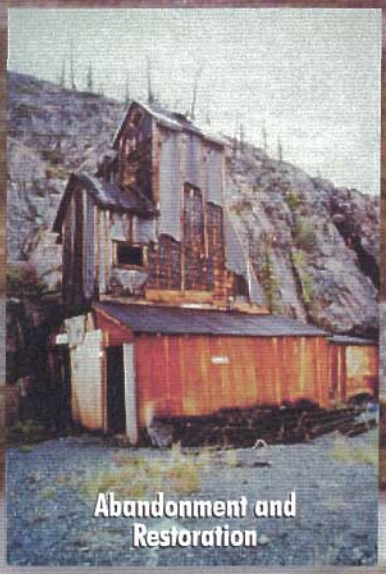
Fort Knox Gold Mine

Refugio Mine

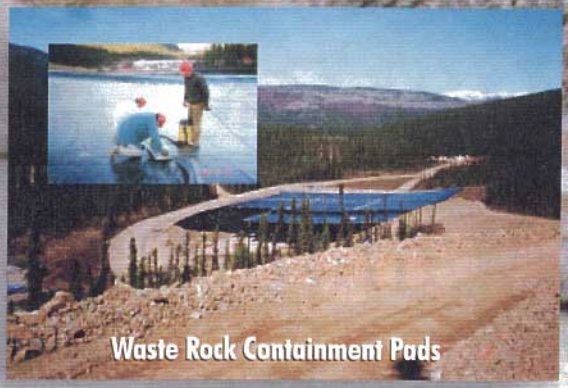
Sa Dena Hes

Mount Nansen Mine

Foundation Design and Construction Monitoring



Abandonment and Restoration



Waste Rock Containment Pads

environmental e
mining projec ha
mine development, fro
feasibility studi s f
development of mine an
of previously abandoned min
a wide variety of physic sci
skills applied to baseline ass
impact assessments, opera
restoration, monitoring, nd
providing innovative desig
arctic, sub-arcti an

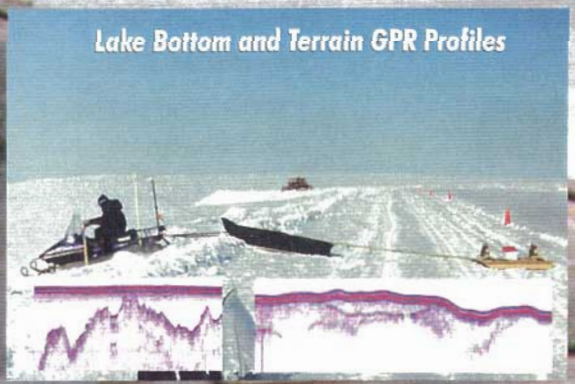
...proudly se
industry or

Road Design and Project Management

EBA
...ical and
...perience on northern
...s included all phases of
...n baseline assessment and
...r proposed mines to the
...donment plans and the cleanup
...es. Our project experience reflects
...ering and biological
...essment activities, environmental
...itional planning, engineering,
...udy activities. EBA is a leader in
...n and construction expertise to
...ulfine mining projects.

...rving the mining
...over 20 years

Site Assessment and Remediation



Lake Bottom and Terrain GPR Profiles

Tailings Management Structures

Selected Clients

- BHP Diamonds
- Diavik Diamond Mines
- Cominco
- Kennecott Corporation
- Amax Gold
- Placer Dome
- Teck Corporation
- Viceroy Minerals
- New Millenium Mining
- Falconbridge
- Monopros
- Winspear Resources
- Royal Oak Mines
- Inmet Mining
- United Keno Hill Mines
- BHP World Minerals
- Curragh Resources
- Cameco Corporation
- Fairbanks Gold
- WMC International

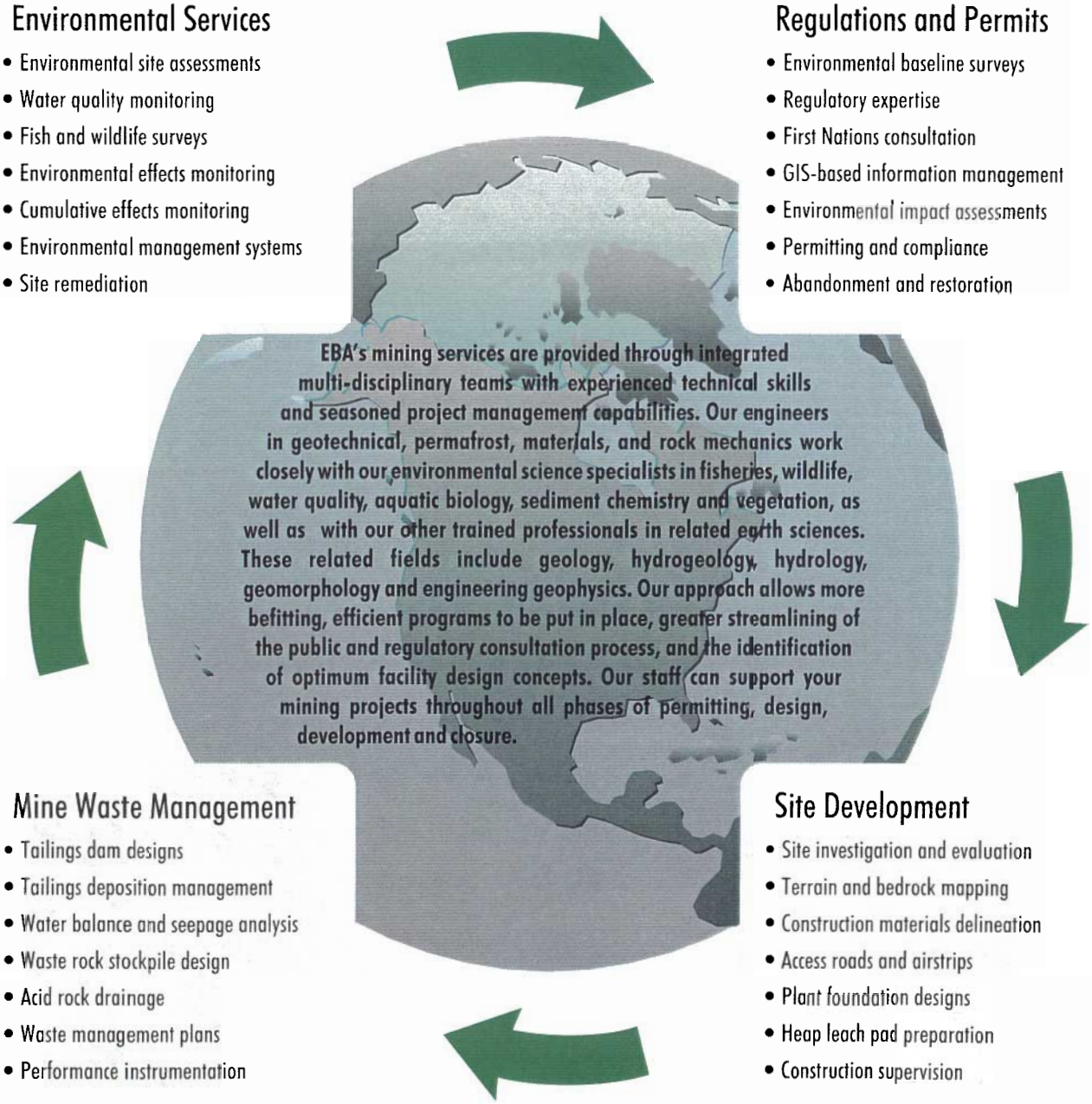
EBA's Cornerstones of Service to the Mining Industry

Environmental Services

- Environmental site assessments
- Water quality monitoring
- Fish and wildlife surveys
- Environmental effects monitoring
- Cumulative effects monitoring
- Environmental management systems
- Site remediation

Regulations and Permits

- Environmental baseline surveys
- Regulatory expertise
- First Nations consultation
- GIS-based information management
- Environmental impact assessments
- Permitting and compliance
- Abandonment and restoration



EBA's mining services are provided through integrated multi-disciplinary teams with experienced technical skills and seasoned project management capabilities. Our engineers in geotechnical, permafrost, materials, and rock mechanics work closely with our environmental science specialists in fisheries, wildlife, water quality, aquatic biology, sediment chemistry and vegetation, as well as with our other trained professionals in related earth sciences. These related fields include geology, hydrogeology, hydrology, geomorphology and engineering geophysics. Our approach allows more befitting, efficient programs to be put in place, greater streamlining of the public and regulatory consultation process, and the identification of optimum facility design concepts. Our staff can support your mining projects throughout all phases of permitting, design, development and closure.

Mine Waste Management

- Tailings dam designs
- Tailings deposition management
- Water balance and seepage analysis
- Waste rock stockpile design
- Acid rock drainage
- Waste management plans
- Performance instrumentation

Site Development

- Site investigation and evaluation
- Terrain and bedrock mapping
- Construction materials delineation
- Access roads and airstrips
- Plant foundation designs
- Heap leach pad preparation
- Construction supervision

Call one of our offices for more information or to request our Statement of Qualifications for your project.

	Edmonton	Vancouver	Yellowknife	Whitehorse	Anchorage
Phone:	(780) 451-2121	(604) 685-0275	(867) 920-2287	(867) 668-3068	(907) 561-4085
Fax:	(780) 454-5688	(604) 684-6241	(867) 873-3324	(867) 668-4349	(907) 561-7071