DORIS NORTH PROJECT
"NO NET LOSS" PLAN

- UPDATE AND DETAILED DESIGN DRAWINGS -
May 2007

Golder Associates

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- UPDATE AND DETAILED DESIGN DRAWINGS -
May 2007

Prepared For:

Miramar Hope Bay Ltd.

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May 2007 **07-1373-0018-1000**

Cover Photo: Downstream view of Roberts Outflow showing dense boulder garden (proposed enhancement site) in foreground and Little Roberts Lake in the background, August 2002.

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1.0 INTRODUCTION

Miramar Hope Bay Limited (MHBL) proposes to construct and operate a new underground gold mine ("Doris North Project") in the West Kitikmeot Region of Nunavut. The project is located 685 km northeast of Yellowknife and approximately 125 km southwest of Cambridge Bay. The mine is on Inuit owned land, approximately 5 km south of the Arctic Ocean. The nearest communities are Umingmaktok, located approximately 75 km to the west, and Bathurst Inlet located 110 km to the southwest.

The overall site infrastructure layout, dated April 2007, is provided in Appendix A1. Details of the revised infrastructure can be found in the Miramar Hope Bay Ltd., Revised Water License Support Document (MHBL 2007), which was submitted to the Nunavut Water Board in April 2007.

In October 2005, Golder Associates Ltd. (Golder) prepared Revision 5 of the "No Net Loss" Plan (NNLP) (Golder 2005). The original NNLP was completed in January 2003. Following that, a revised NNLP was completed in November 2003, which incorporated additional field data collected during 2003. Revision 3 was completed in May 2004, which incorporated information requests from the Department of Fisheries and Oceans Canada (DFO) dated 30 January 2004 and 10 May 2004 (NIRB Files 130 and 151e, respectively) prior to the Nunavut Impact Review Board (NIRB) hearings in July 2004. Revision 4 incorporated additional information requests from DFO dated June 2004 (NIRB File 177b) and requests stated at the NIRB hearings. Revision 5, incorporated minor revisions or additions in response to information requests or technical reviews following the submission of the Draft EIS in June 2005.

The current document provides an update to the October 2005 Revision 5 NNLP, outlining changes resulting from the detailed engineering design that have implications to fish or fish habitat. It also includes detailed design drawings of the fisheries compensation works for the project.

2.0 CHANGES TO THE PROJECT INFRASTRUCTURE POTENTIALLY AFFECTING FISH OR FISH HABITAT

The following text outlines changes that have occurred to the project infrastructure during the engineering design phase that may have implications to fish or fish habitat. The potential effects of the changes to fish and fish habitat, and implications to the assessment of habitat losses and habitat gains from compensation measures, are also discussed below.

2.1 Float Plane and Boat Dock

The previous design of the float plane and boat dock was a rock-filled structure that was to be installed at the northwest end of Doris Lake. The in-lake section of the dock would have protruded approximately 10 m into the lake to a water depth of approximately 3 m, and the dock would have been approximately 40 m in length along the shoreline. Construction of the structure would have required blasting to remove bedrock within Doris Lake.

The rock-filled dock design would have resulted in the loss of aquatic habitat within the filled footprint of the dock that is out of the water; also, there was some risk to fish due to blasting within the lake bed, although MHBL committed to following DFO blasting guidelines (Wright and Hopky 1998) as modified for use in Nunavut. The overall fish habitat loss was estimated to be 0.04 ha.

Based in part on concerns raised by DFO regarding habitat loss and alteration associated with the rockfill design, the current engineering design for the float plane and boat dock is a floating structure, located in a small bay of Doris Lake immediately southeast of the proposed mill (MHBL 2007). The dock portion will be a pre-fabricated modular unit, approximately 25 m long, and about 4 m wide, and will be held in place by six permanently installed bollards.

The implication of the current dock design to the NNLP is that the habitat loss of 0.04 ha associated with the rockfill design will not occur. In addition, the floating structure may provide a limited amount of overhead cover for fish in Doris Lake; however, the extent to which fish will use the overhead cover is unknown.

2.2 Water Intake Structure

The preliminary design included two project-specific water intake structures to be installed at the northwest end of Doris Lake for process water and potable water supply.

The water intakes were to be connected to a floating pumpshack, which would have had no in-lake footprint associated with this structure. With mitigation (e.g., intake screening and sediment control during construction and removal), the construction, operation, and removal of the water intake structures were assessed as not adversely affecting fish habitat within Doris Lake.

The current engineering design for the freshwater intake facilities includes a pumphouse located on the north shore of Doris Lake in close proximity to the float plane and boat dock. The pump intake will be a single 100 mm diameter HDPE pipe set on the bottom of the lake, with the intake approximately 25 m from shore. The pipe will be covered by clean rockfill to anchor it in place (See MHBL 2007, Supporting Document S2, and Engineering Drawings T-11 and T-12 in Supporting Document S4). The intake end of the pipe will be screened in accordance with the DFO "Freshwater End-of-Pipe Fish Screen Guidelines (DFO 1995).

Because no detailed fisheries habitat information is available for the specific location of the proposed intake line in Doris Lake, prior to placement of the water intake line, a detailed habitat assessment will be conducted to assess the fisheries habitat quality in the area to be disturbed by the intake line and rock cover. It is likely that the substrate is primarily bedrock, overlain with a layer of silt in the deeper areas; however, if high quality spawning or rearing habitat is identified, the location of the water intake will be adjusted to avoid disruption of the high quality habitat.

As part of the mitigation measures, installation of the water intake structure will be conducted in a manner to minimize the release of sediment to Doris Lake. The amount of in-water activity will be reduced to the minimum extent possible, and silt curtains or other sediment control technology will be implemented as needed during the placement of the rockfill. Total suspended solids (TSS) levels will be monitored during the construction of the water intake to ensure that the federal water quality guidelines for TSS are met (CCME 2006).

With the appropriate mitigation measures, and the assumed low quality habitat in the area of the intake structure (see above), it is likely that the current intake design will not adversely affect fish or fish habitat. The provision of the rockfill covering over the intake pipeline likely will improve fish habitat, by increasing habitat diversity, providing rearing habitat in the interstices of the rock for juvenile fish, and may provide limited spawning habitat for lake trout and whitefish species at depths below ice formation (i.e., depths greater than 2 m). It should be noted that the intake end of the pipe will be out of the rockfill to prevent entrainment of fish eggs if fish do use the rock substrate for spawning.

3.0 DESIGN DRAWINGS FOR FISH HABITAT COMPENSATION STRUCTURES

3.1 Jetty Spurs

The fish habitat compensation for the loss of habitat associated with the jetty out-of-water footprint included the addition of eight rock spurs off of the jetty, and six rock spurs located along the shore, to provide 1200 m^2 of riprap habitat to provide rearing and foraging habitat for fish. The interstices between the riprap sized rocks will provide increased cover for juvenile fish (in comparison to the existing predominantly sand and silt substrate), and will provide substrate for colonization by marine benthic fauna, which will provide forage for juvenile fish.

The design drawings for the jetty fish habitat compensation structures are provided in Figures 1 and 2. These drawings have been submitted previously to DFO as part of MHBL's application for a Section 35(2) Authorization for Harmful Alteration, Disruption or Destruction (HADD) of fish habitat associated with the jetty construction. Under the current construction schedule, MHBL would like to complete the jetty construction, including the associated habitat compensation structures, by 15 July 2007.

3.2 Roberts Outflow Fish Passage

Currently, the boulder section of Roberts Lake outflow presents a migration hindrance or blockage in low to moderate flow years, thereby resulting in the delay or loss of migrating Arctic char and lake trout during the periods of low flow. Field studies have shown that during these low flow periods, large numbers of adult fish returning to Roberts Lake become stranded in the boulder section and perish. The loss of these fish returning to overwinter and/or spawn in the Roberts Lake system represents a loss of biomass and loss of productive capacity to this system.

The proposed habitat compensation includes the modification of Roberts Lake outflow to facilitate adult fish passage for most low and moderate flow conditions, without affecting the hydraulic control at the outlet of Roberts Lake. The design of the works, illustrated in Figures 3 and 4, includes the strategic removal of boulders to create a passage channel through the area where stranding generally occurs.

3.3 Stream Habitat Enhancement in a Tributary to Roberts Lake

The NNLP also included provision of providing additional stream rearing habitat in a tributary to Roberts Lake. In the Revision 5 of the NNLP, it was proposed that a rock

ledge along a lip of a pool be removed to provide access by juvenile Arctic char to a second pool, thereby increasing rearing habitat. However, during a detailed survey in 2006, it was determined that the low streamflow in most years would make the proposed enhancement unfeasible. As a consequence, an alternative enhancement opportunity, similar to that proposed in previous versions of the NNLP, has been developed. This involves the construction of two additional pools in stream E09 at the south end of Roberts Lake. The objective of the creation of additional small pool habitat in the stream is to increase the summer rearing habitat for Arctic char. In previous field studies in Roberts Lake, Arctic char juveniles were observed to use these small pools within the tributaries for rearing, and likely as a mechanism to avoid predation by larger lake trout and Arctic char in the main body of Roberts Lake. By increasing the amount of rearing habitat (i.e., small pools in the narrow tributary stream), it is expected that there will be a small increase in the juvenile Arctic char survival and growth in this tributary.

The design drawings for the proposed compensation works in Stream E09 are provided in Figure 5. It is anticipated that the construction works would be undertaken in summer 2008.

3.4 Creation of Rearing Habitat in Doris Lake

To provide additional rearing habitat for lake trout and other species in Doris Lake, shallow reefs, created using riprap rockfill, will be constructed at six locations in Doris Lake. Placement of large substrate would create a shallow (<0.25 m deep) area with interstices that will provide rearing and nursery habitat (e.g., cover for feeding and hiding), thereby reducing predation on the juveniles by adult lake trout or other predators. The rock substrate will be colonized by periphyton and invertebrates, thereby providing additional food source for rearing fish (i.e., in comparison to the bedrock or silt substrates). This in turn should result in increased survival of the juvenile fish, and increase the benthic productivity in the enhanced area.

The design drawings for the proposed rearing habitat areas in Doris Lake are provided in Figures 6 to 11. It is anticipated that the construction of the rearing habitat would be undertaken in winter in early 2008.

4.0 SUMMARY

Several changes have been made to the Doris North Project in relation to what was indicated in the October 2006 Final Environmental Impact Statement and supplementary documents submitted for the February 2006 NIRB final hearing. These modifications reflect advances in Project design, as well as input from regulatory agencies, such as the Department of Fisheries and Oceans. Changes that have implications for fish and fish habitat include the following:

- the float plane and boat dock has been changed from a rockfill design, which would affect 0.04 ha of fish habitat, to a floating dock, which is not expected to have any significant impact on fish or fish habitat; and

- the floating freshwater intake design has been changed to a single pipe extending about 25 m out from shore in Doris Lake, placed on the lake-bed and covered with a layer of rock. The intake end of the pipe will out of the rockfill, and will be screened in accordance with DFO guidelines. Although the rock cover is not expected to reduce fish habitat quality, prior to placement of the water intake line, a detailed habitat assessment will be conducted to assess the existing fisheries habitat quality in the area to be disturbed. If high quality spawning or rearing habitat is identified, the location of the water intake will be adjusted to avoid disruption of the high quality habitat.

The fisheries compensation plan for the Doris North project, as laid out in the Fisheries No Net Loss Plan (Golder 2005), includes the following:

- the creation of eight rock spurs along the jetty in Roberts Bay and six rock spurs along the shoreline to increase feeding and rearing habitat for fish in Roberts Bay;

- improvement of access for migrating Arctic char and lake trout moving up into Roberts Lake to overwinter and/or spawn. Currently, fish movements are blocked or hindered at low to medium flow years, and result in loss of a large percentage of the run due to stranding in the boulders;

- creation of rearing habitat in a tributary to Roberts Lake. This will primarily benefit Arctic char juvenile survival, thereby complementing the facilitated access of Arctic char into the lake; and

- creation of shallow rearing habitat at six locations in Doris Lake.

The design drawings for the proposed compensation works are provided in Figures 1-11.

5.0 CLOSURE

The information in this report was prepared for the use of Miramar Hope Bay Ltd., the Department of Fisheries and Oceans, and the Nunavut Water Board relating to the Doris North Project. The material in it reflects Golder's best judgment in light of information available to us at the time of preparation. Any use of this report or any reliance on or decisions to be made based on it by any other third party are the responsibility of such third party. Golder accepts no responsibility for damages, if any, suffered by any other third party as a result of decision made or action based on this report.

GOLDER ASSOCIATES LTD.

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Report reviewed by:

Nathan Schmidt, Ph.D., P.Eng.
Senior Water Resources Engineer, Associate

6.0 LITERATURE CITED

Canadian Council of Ministers of the Environment (CCME). 2006. Canadian Environmental Quality Guidelines. Environment Canada, Hull, Quebec. 8 Chapters.

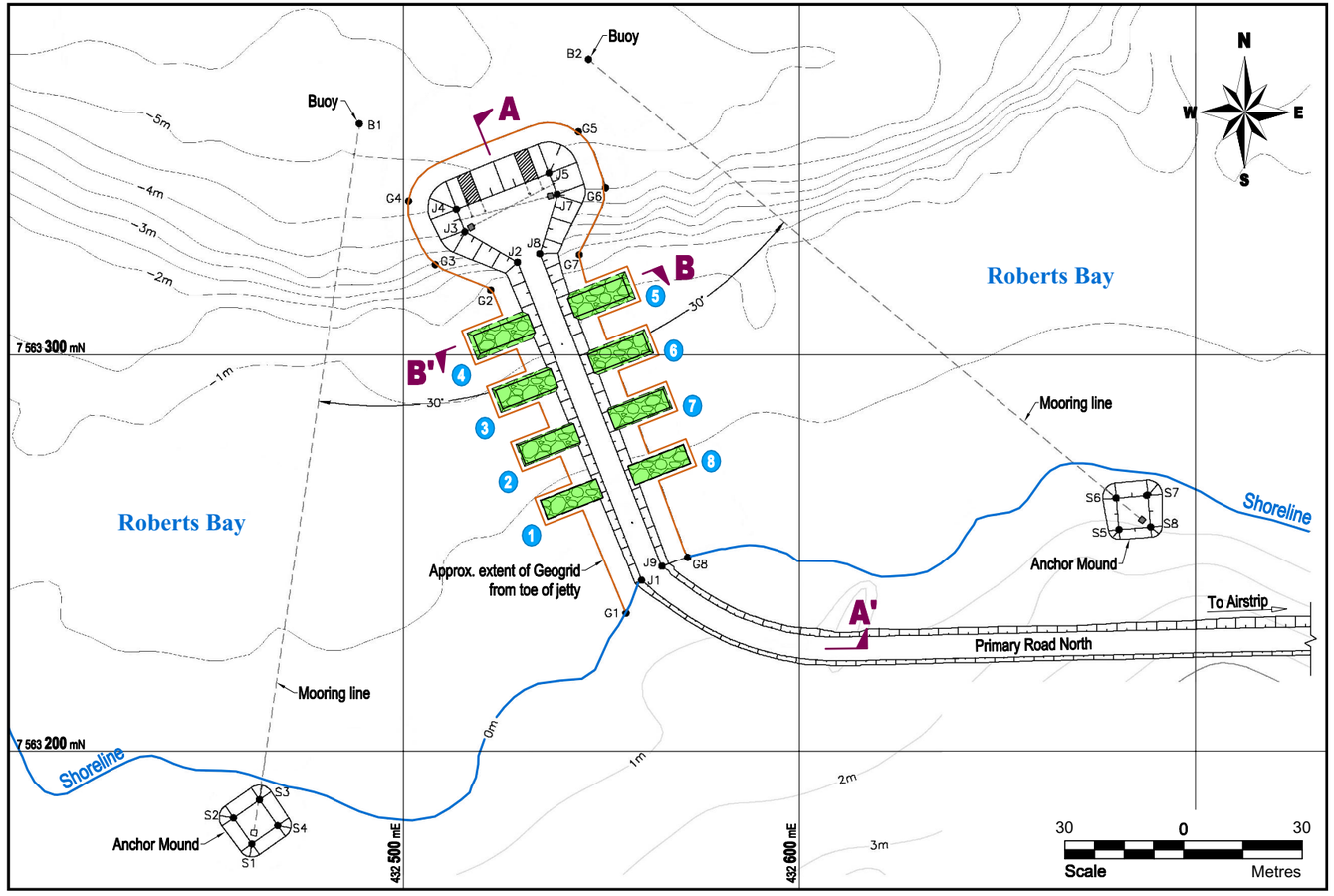
Department of Fisheries and Oceans (DFO). 1995. Freshwater intake end-of-pipe fish screen guideline. Department of Fisheries and Oceans, Ottawa, Ontario. 19 p. + 4 appendices.

Golder Associates Ltd. 2005. Doris North Project "No Net Loss" Plan – Revision 5 – October 2005. Prepared for Miramar Hope Bay Ltd. Golder Report No. 05-1373-008-8000: 72 p + 8 photographic plates + 5 app.

Miramar Hope Bay Ltd. (MHBL). 2007. Revised Water License Application Support Document, Doris North Project, Nunavut, Canada. Submitted to the Nunavut Water Board, April 2007.

Wright, D.G., and G.E. Hopky. 1998. Guidelines for the use of explosives in or near Canadian fisheries waters. Canadian Technical Report of Fisheries and Aquatic Sciences 2107: iv + 34p.

DESIGN DRAWING FIGURES

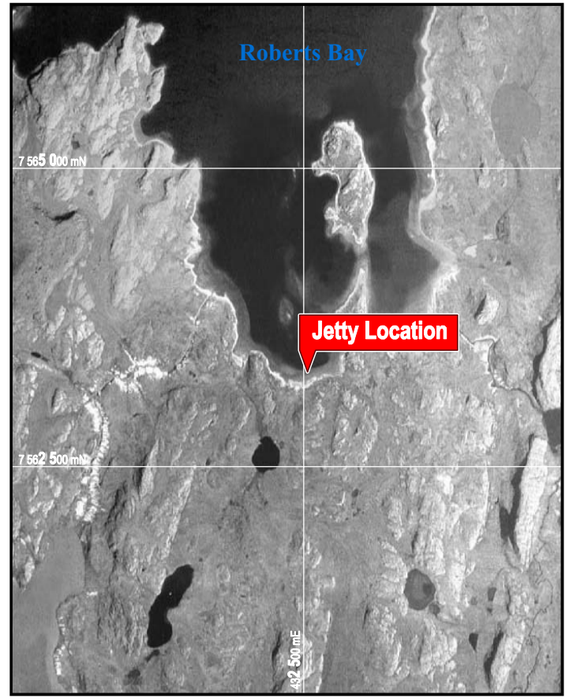


Plan of Jetty

NOTES

1. The intent of the fish habitat compensation is to provide 600 m^2 of additional fish habitat outside of the final footprint of the jetty.
2. The contractor shall, in consultation with the fish habitat design consultant, devise a method of construction that meets the compensation design and intent.
3. For general guidance, technical specifications of material and construction techniques shall follow those specified for the jetty.
4. Spurs shall be constructed in conjunction with the jetty or immediately following completion of the jetty.
5. Construction of the spurs shall be completed by 15 July to protect fisheries.
6. Spurs shall be constructed of clean, competent, certified non-acid generating rock.
7. Gradation of the rock shall meet the specifications for riprap material as shown on drawing G-05 Revision No. B (SRK, 2007).
8. Spurs shall be contained within the silt curtain during construction.
9. Two layers of a bi-axial polypropylene geogrid meeting the specifications listed in Table 8.4 (SRK, 2006) shall be placed on the seabed.
10. The geogrid for the spurs shall extend at least 1 m beyond the outermost edge of the final spur footprint.
11. Angle of repose of the rock is expected to be approximately 1.2 H to 1 V.
12. Settlement of the rock into the marine silt and clays is expected to be 0.5 m annually.
13. Sufficient rock should be included in the jetty stockpile for settlement of the spurs during the operational life of the jetty.
14. The spurs shall be surveyed and visually inspected annually, by a qualified person, to ensure that they meet the design and intent. These inspections shall take place during the operational period of the jetty.
15. Spurs shall be maintained, by the addition of rock, if less than 600 m^2 of compensation habitat is visible above the original seabed.

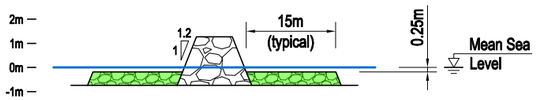
Reference: SRK Consulting Engineers and Scientists, Job No. 1CM014.008, Drawing No. J-01 and J-02, dated March 2007.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.



Overview Plan

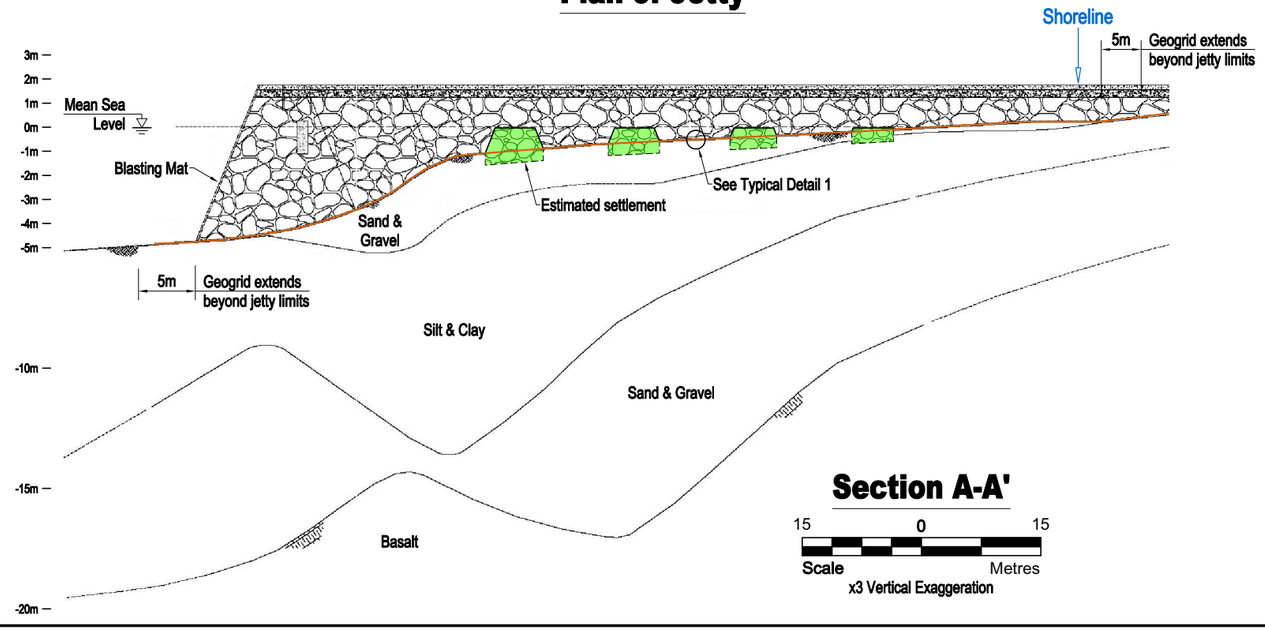
1 0 1
Scale KM

Quantities Table			
Spur	Rock Riprap (m^3)		Geogrid (m^2)
	For initial settlement	For above seabed construction	
4 and 5	110	177	446
3 and 6	98	105	408
2 and 7	89	62	379
1 and 8	80	19	350
Total	**377**	**363**	**1583**



Section B-B'

20 0 20
Scale Metres
x3 Vertical Exaggeration



Section A-A'

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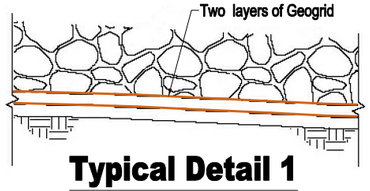
Scale Metres
x3 Vertical Exaggeration



Typical Detail 1

10 0 10
Scale Metres

MIRAMAR HOPE BAY LTD.

Title

Roberts Bay Fish Habitat Compensation Jetty Spur Design

Golder Associates
Edmonton, Alberta

Project No.		06-1373-026	File No.		1731410
Design	BT	24/04/07	Scale	As shown	Rev. 0
Cadd	YW	01/05/07			
Check	NS	01/05/07			
Review	GA	01/05/07			

Figure: 1

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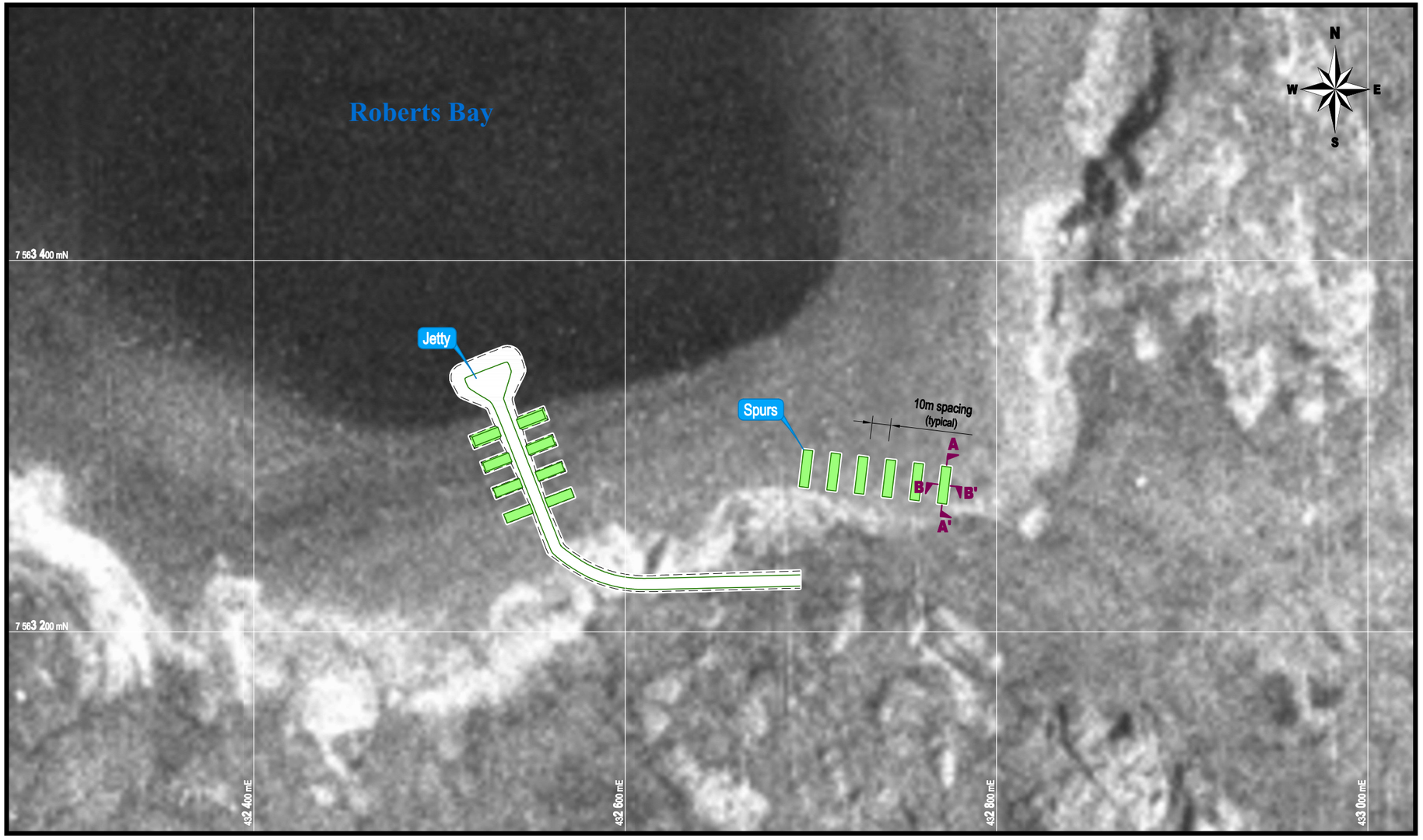
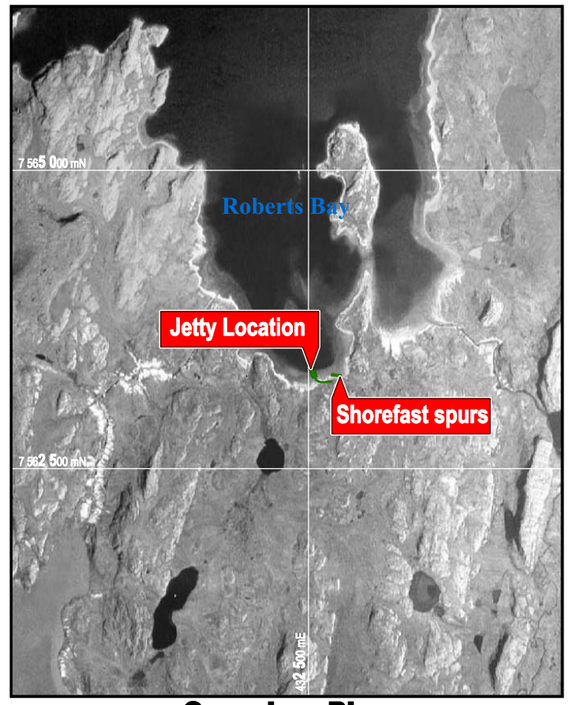


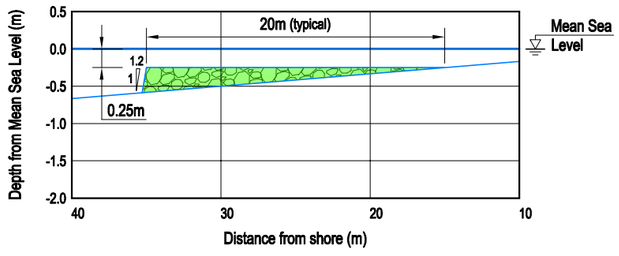


Overview Plan

1 0 1
Scale KM

Plan View

50 0 50
Scale Metres



Section A-A' (Typical)

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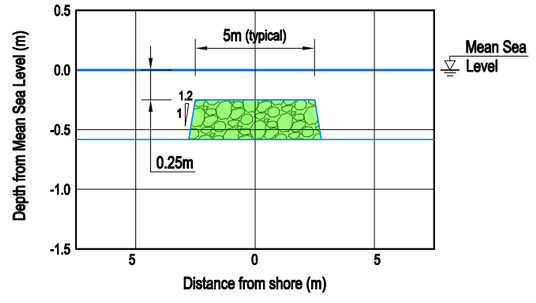
x5 Vertical Exaggeration



Section B-B' (Typical)

5 0 5
Scale Metres
x5 Vertical Exaggeration

NOTES

1. The intent of the fish habitat compensation is to provide 600 m^2 of fish habitat.
2. The contractor shall, in consultation with the fish habitat design consultant, devise a method of construction that meets the compensation design and intent.
3. Spurs shall be laid out in field by a qualified person.
4. A total of six spurs shall be constructed perpendicular to shore.
5. Spurs shall be typically 5 m wide, 20 m long (measured from their root) and spaced approximately 10 m apart.
6. Spurs shall be constructed of clean, competent, certified non-acid generating rock.
7. Gradation of the rock shall meet the specifications for riprap material as shown on drawing G-05 Revision No. B (SRK, 2007).
8. Estimated total quantity of rock is 110 m^3.
9. Settlement of the rock is expected to be minimal.
10. Construction of the spurs shall cease prior to 15 July to protect fisheries.
11. Spurs may need to be contained within a silt curtain during construction.
12. Spurs shall be inspected annually during jetty operation by a qualified person to ensure that they meet the design and intent.
13. Spurs shall be maintained, by the addition of rock, if less than 600 m^2 of compensation habitat is visible above the original seabed.

Reference: SRK Consulting Engineers and Scientists, Job No. 1CM014.008, Drawing No. J-01 and J-02, dated March 2007.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

Roberts Bay Fish Habitat Compensation Shorefast Spur Design

Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731411	
Design	BT	24/04/07	Scale	As shown	Rev. 0
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Check	NS	01/05/07			
Review	GA	01/05/07			

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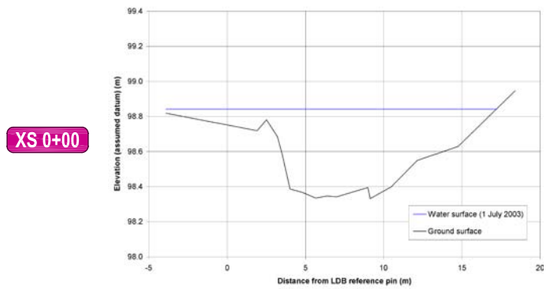
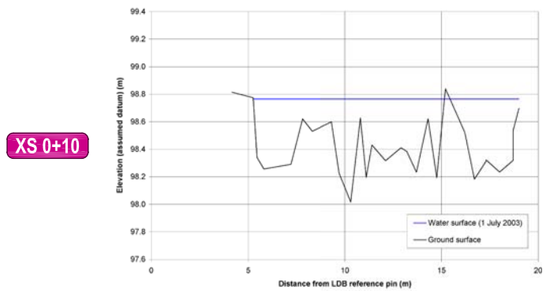
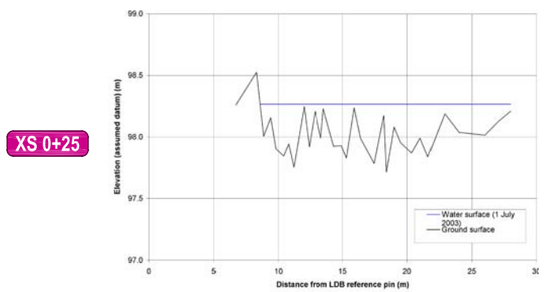
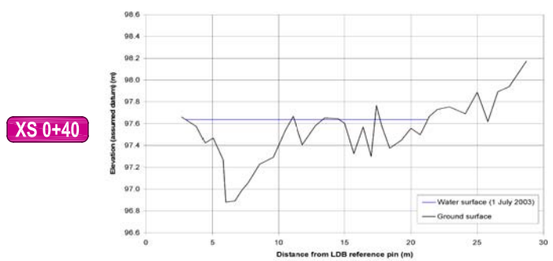
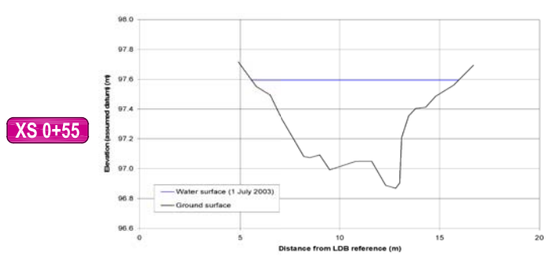
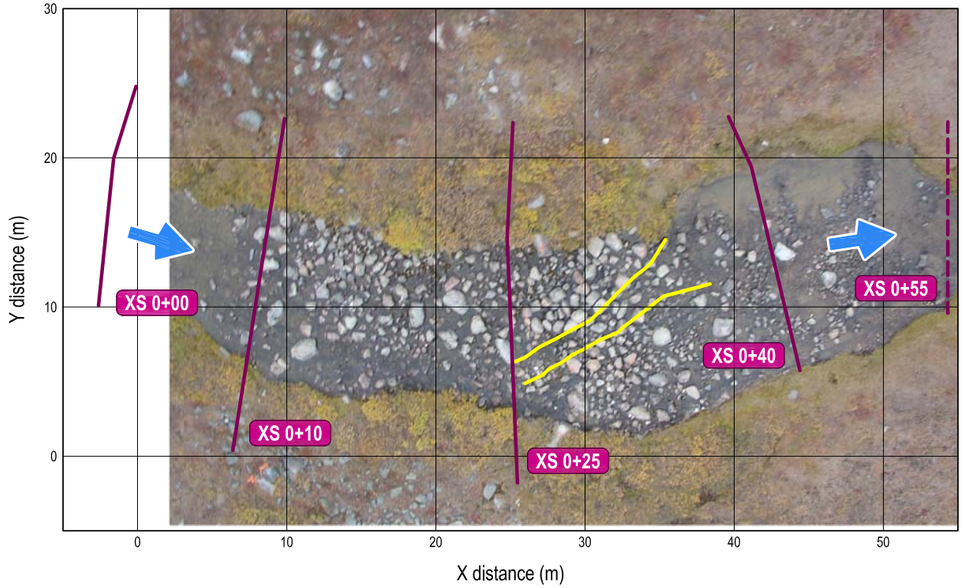




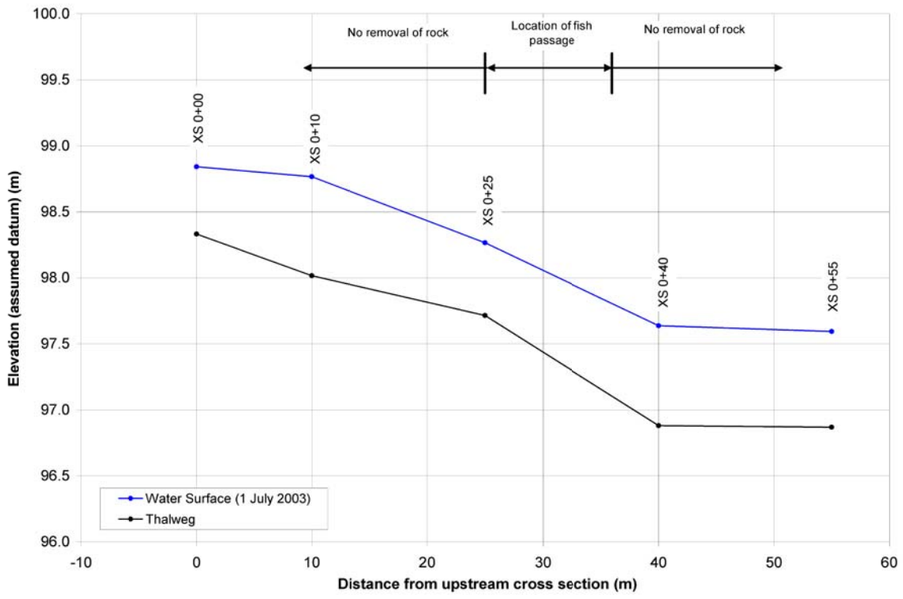


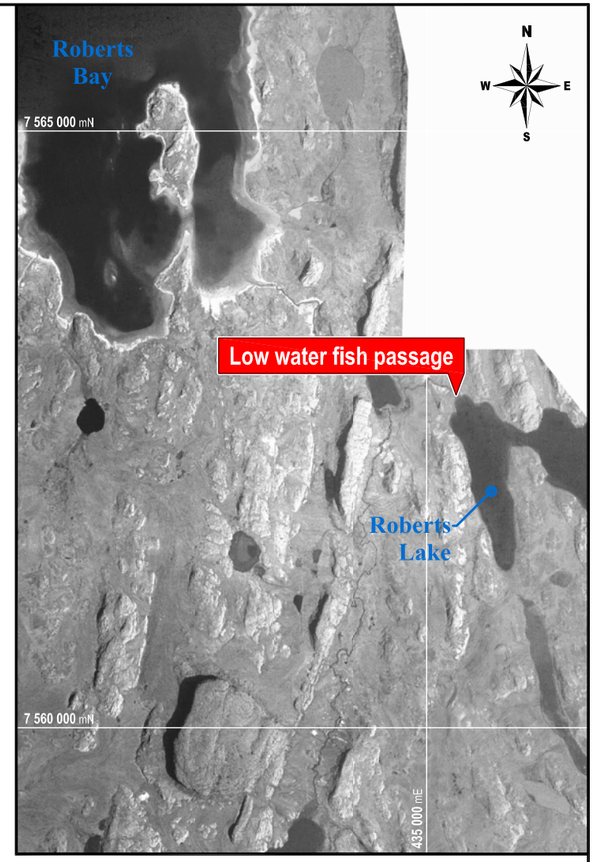






Low Water Fish Passage





Overview Plan

1 0 1
Scale KM

LEGEND

- Low water fish passage
- Cross section location
- Estimated cross section location
- Direction of flow

NOTE

1. See Sheet 2 (Figure 4) for specifications and construction details.

MIRAMAR HOPE BAY LTD.

Title
Roberts Lake Outflow
Low Water Fish Passage Design
(Sheet 1 of 2)

Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731441	
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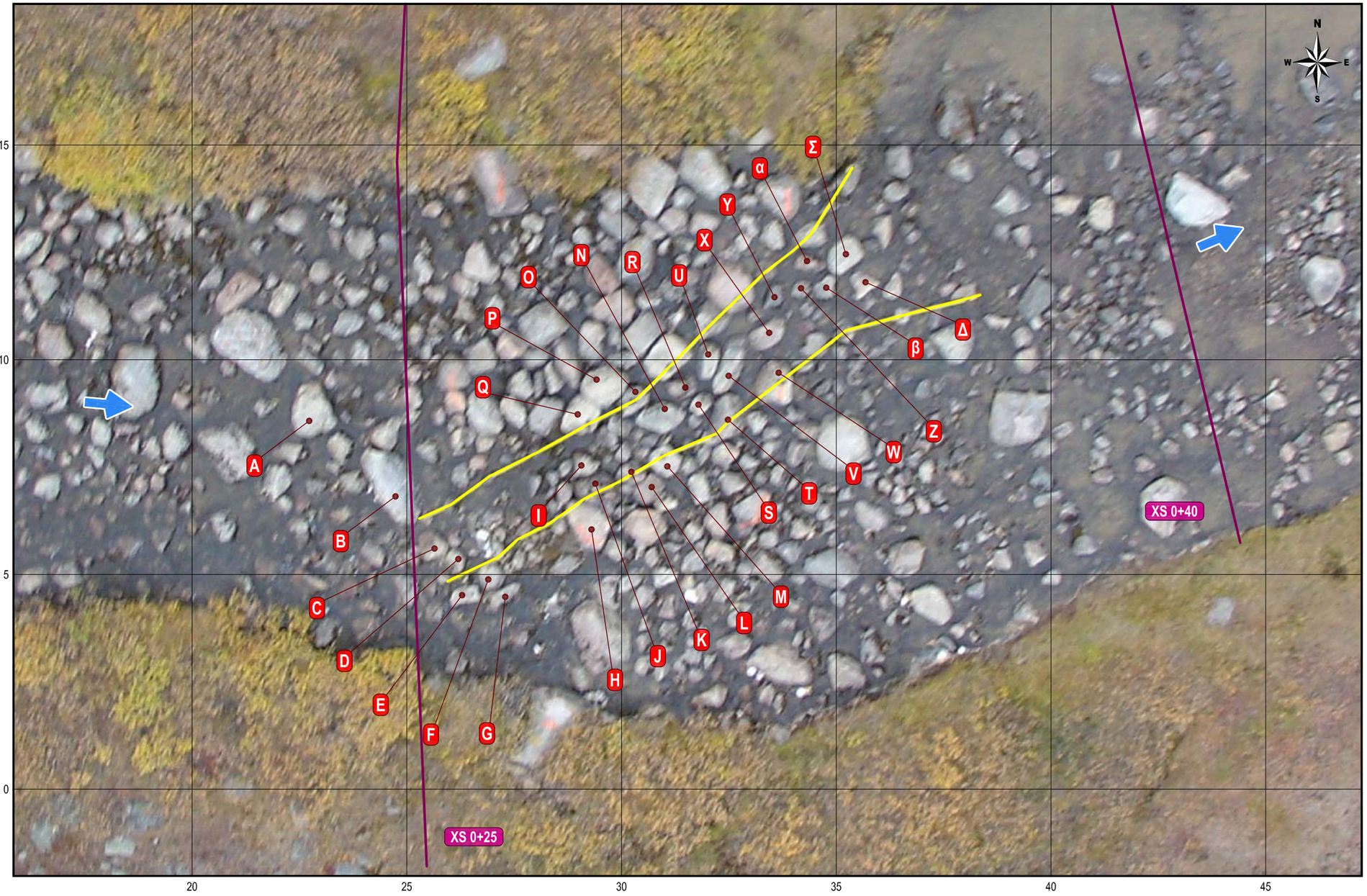
Review	GA	15/05/07			

Figure: 3



LEGEND

- Low water fish passage
- Cross section location
- Estimated cross section location
- Direction of flow

Schedule of rocks to be removed from proposed fish passage.

Rock ID	Length (m)	Width (m)	Thickness (m)	Estimated weight (kg)
C	0.70	0.70	0.50	650
D	0.60	0.50	0.40	320
I	0.70	0.80	0.40	590
J	0.70	0.40	0.60	440
N	0.70	1.10	0.50	1020
R	0.70	0.70	0.60	780
S	0.60	0.50	0.60	480
T	1.00	0.70	0.70	1290
U	0.80	0.40	0.90	760
V	1.40	0.50	0.80	1480
X	0.90	0.50	0.50	590
Y	0.70	0.60	0.50	550
Z	0.50	0.50	0.40	260
α	0.60	0.70	0.40	440
β	0.60	0.70	0.40	440
Σ	0.80	0.70	0.60	890
Δ	0.60	0.60	0.40	380

Schedule of rocks not to be removed.

Rock ID	Length (m)	Width (m)	Thickness (m)	Estimated weight (kg)
A	1.3	1	0.6	2060
B	2.2	1.1	0.9	5750
E	0.5	0.9	0.35	420
F	0.7	0.6	0.5	550
G	1.1	0.6	0.4	700
H	1.4	1	0.6	2220
K	0.6	0.5	0.4	320
L	0.75	0.6	0.6	710
M	0.7	0.7	0.5	650
O	0.8	0.6	0.7	890
P	1	1	0.9	2380
Q	0.9	0.9	0.7	1500
W	1.2	0.8	0.9	2290

Low Water Fish Passage

Instructions for removal

1. The low water fish passage shall be laid out in the field and the construction supervised by a qualified person.
2. Rocks can be removed from the fish passage by either mechanical or manual means.
3. Rocks outside of the fish passage shall be left in place.
4. Rocks removed from the fish passage shall be stockpiled, on either streambank, away from the main channel.
5. Voids in the streambed created by the removal of rocks shall be filled in, with smaller rocks, to maintain a level streambed.
6. Rocks upstream of XS 0+25 shall not be disturbed.

MIRAMAR HOPE BAY LTD.

Title

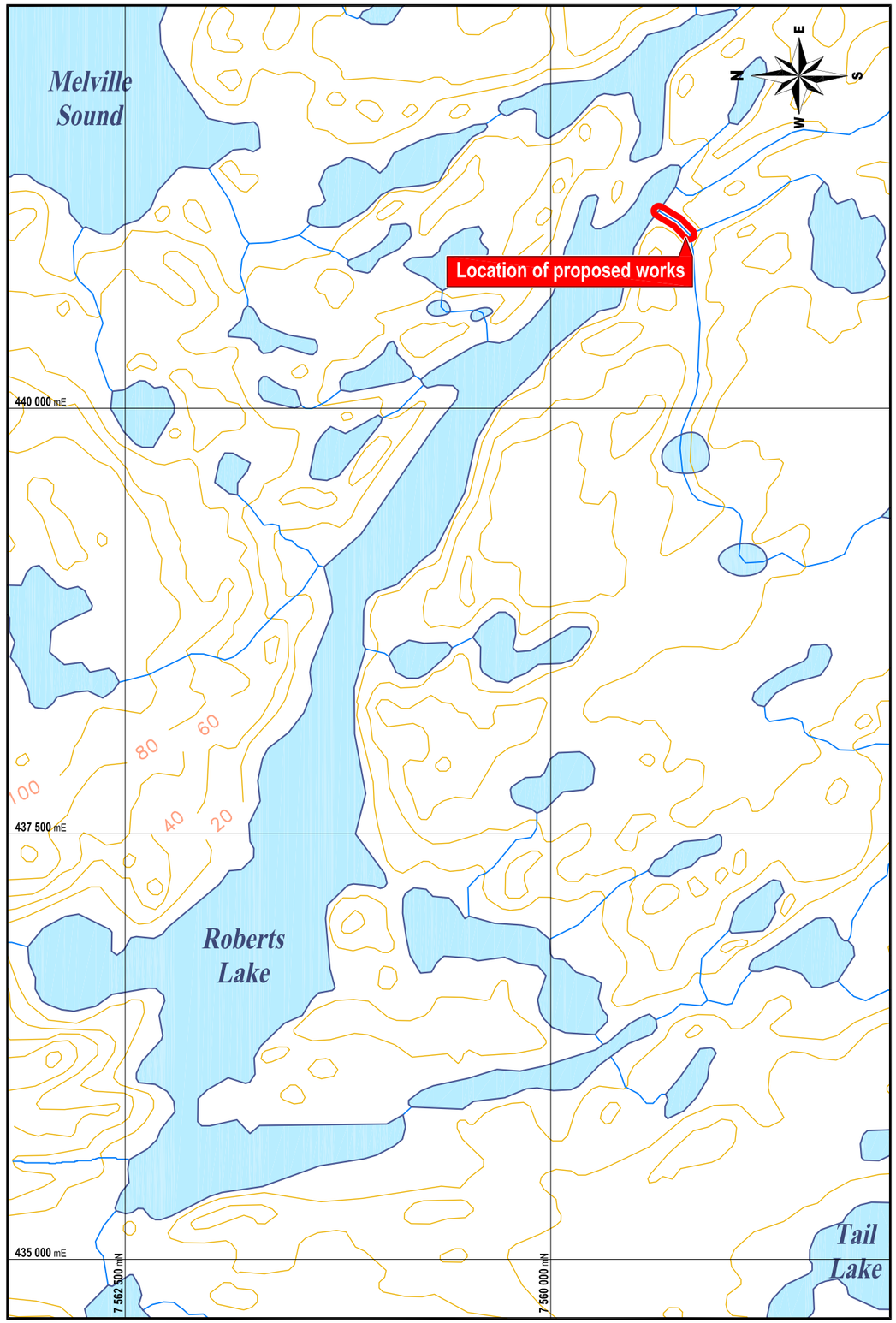
Roberts Lake Outflow
Low Water Fish Passage Design
(Sheet 2 of 2)

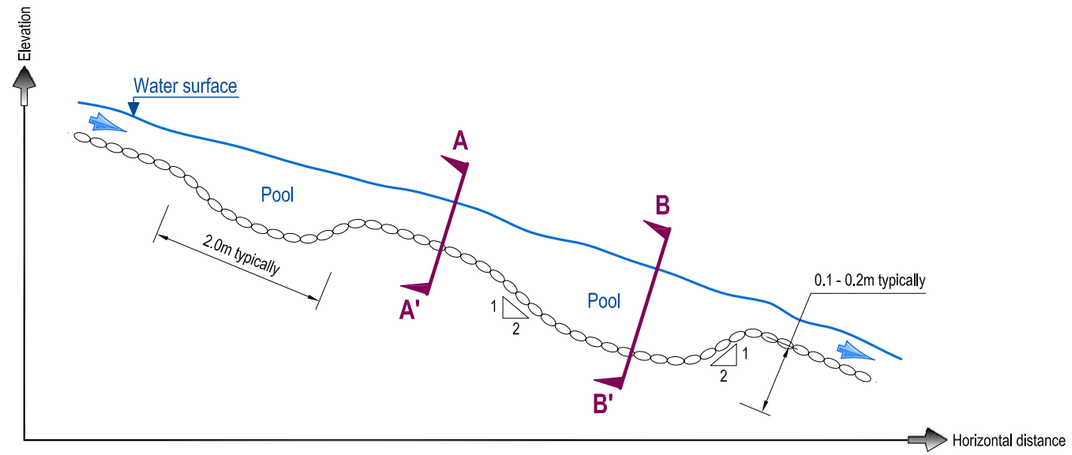
Golder Associates
Edmonton, Alberta

Project No.		06-1373-026	File No.		1731442
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

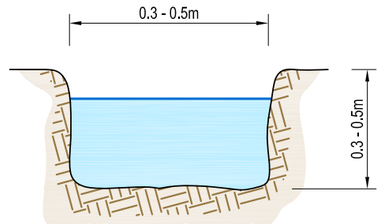
Figure: 4

May 17, 2007 (Thu 4:34 pm)
Images used: airphoto.jpg - miramar 02.jpg -
Drawing path and name: N:\CAD\2006\13730026 Roberts Lake\4000\04 - 1731442 lowWaterFishPassage (2of2).dwg



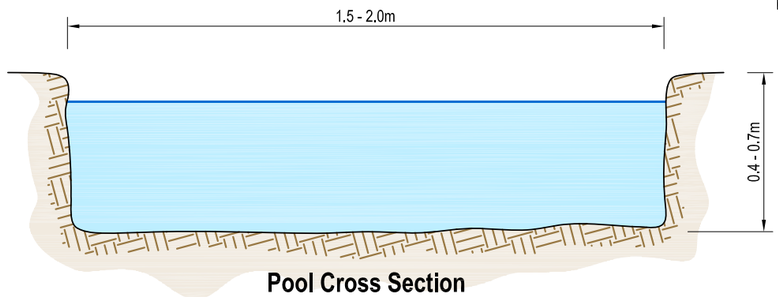


Stream Profile
NTS



Natural Stream Cross Section

Section A-A'
NTS



Pool Cross Section

Section B-B'
NTS

600 0 600
Scale Metres

Reference: Base map provided by Rescan, 22 January 2001.
Note: Contour interval 20m.

NOTE

1. Habitat compensation shall be laid out at site by a qualified person.
2. Detailed compensation design shall be undertaken in the field by both a stream engineer and aquatic biologist from a conceptual design approved by Department of Fisheries and Oceans.
3. Manual means will be utilized to construct the compensation works.
4. Where required, large boulders may be broken into manageable pieces using either a Micro-Blaster™ or Boulder Buster™ device or equivalent.
5. A minimum of two pools shall be excavated in a suitable portion of the lower reach of the stream.
6. Pools shall typically be 1.5 to 2 m in length and 2 m in width.
7. Pools shall be excavated to approximately 0.1 to 0.2 m below the natural streambed.
8. Suitable, naturally occurring rock shall be placed in the pools to provide bed and bank stabilization, and cover for fish.

MIRAMAR HOPE BAY LTD.

Title

Stream E-09
Fish Habitat Compensation - Pool

Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731443	
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

Figure: 5

May 17, 2007 (Thu, 4:22 pm)
Images used: miramar 02.jpg - streamProfile.jpg -
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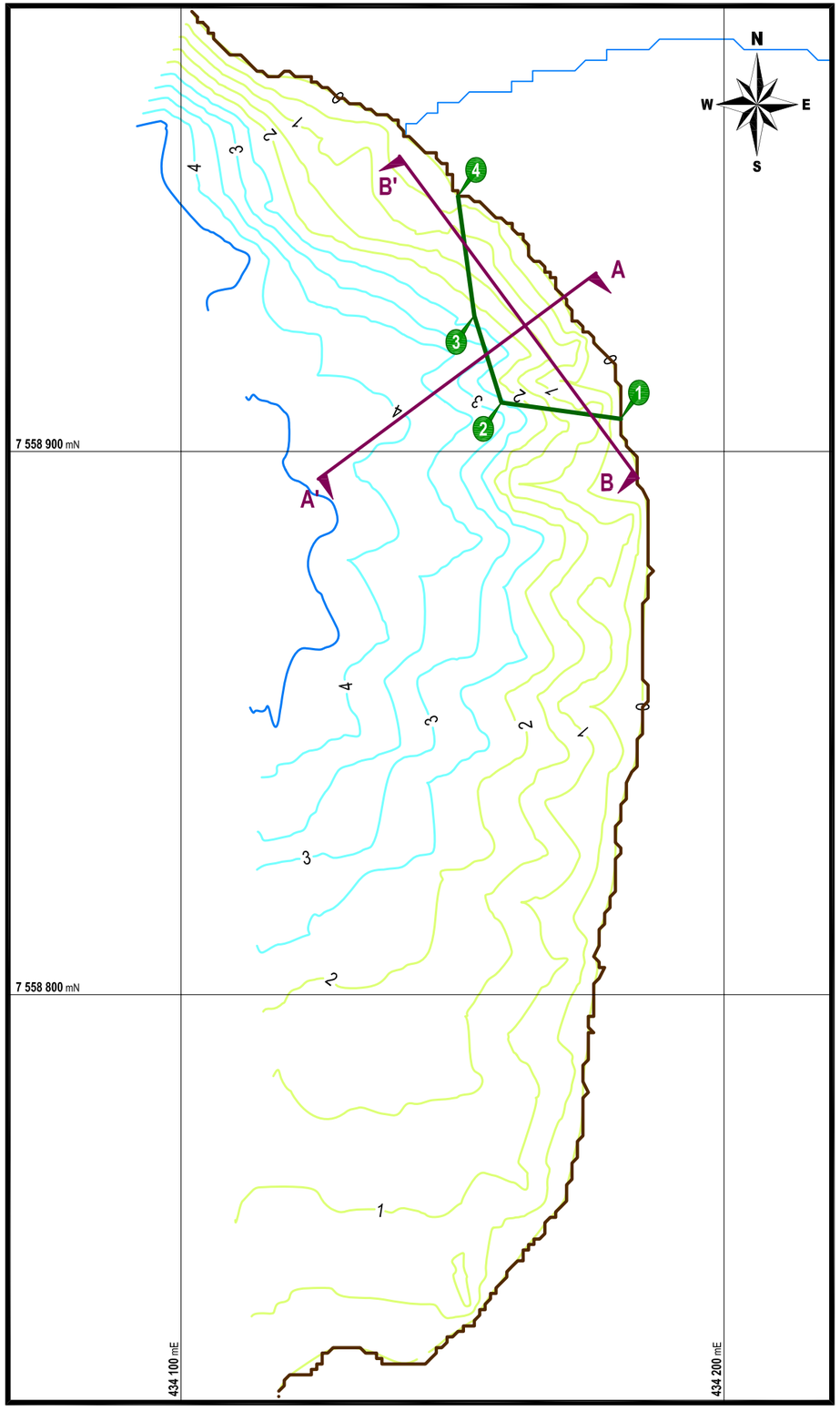
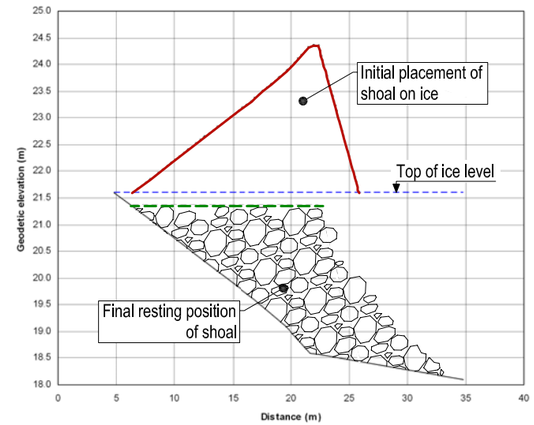
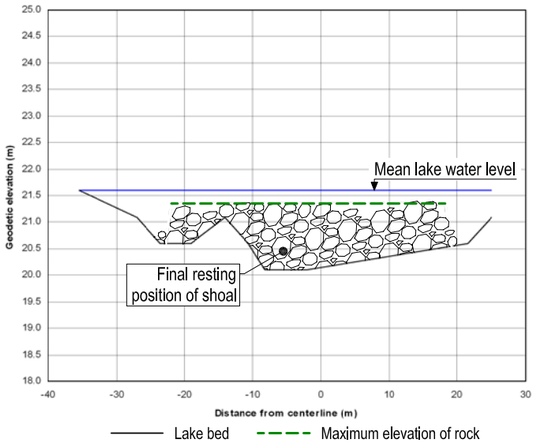




Lake bed at shoal centreline — Shoal pre-launch — Maximum elevation of rock

Section A-A'



Lake bed — Maximum elevation of rock

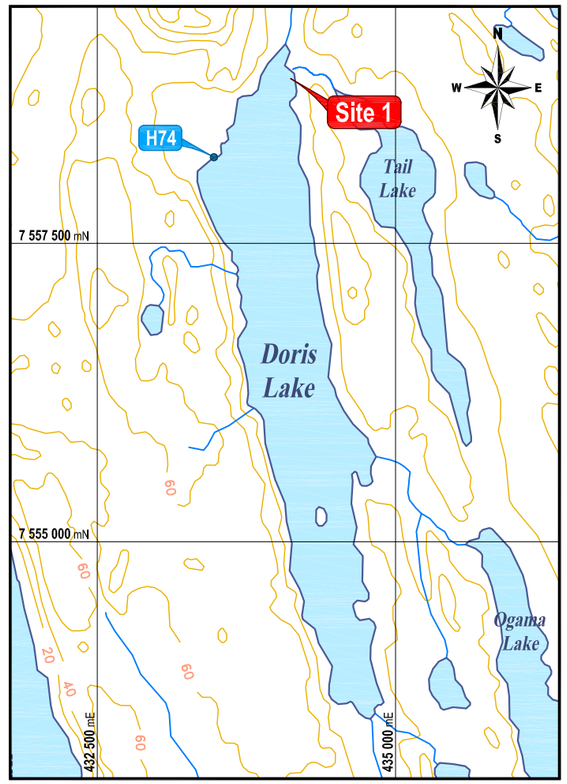
Section B-B'

Site 1		
Point	Easting (m)	Northing (m)
1	434 181	7 558 906
2	434 159	7 558 909
3	434 154	7 558 925
4	434 151	7 558 947

Quantities table	
Site	Rock riprap (m^3)
1	671

Plan of Rearing Shoal

20 0 20
Scale Metres



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
4. Hauling of material and construction shall take place when there is sufficient ice cover on Doris Lake to support estimated loads.
5. Contractor shall consult with a qualified ice engineer to determine bearing capacity of lake ice cover for transport of material.
6. Rock shall be stockpiled on ice cover to mimic lake bed contours.
7. Top elevation of the shoal shall be 21.35 m when in its final resting position.
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.

MIRAMAR HOPE BAY LTD.

Title

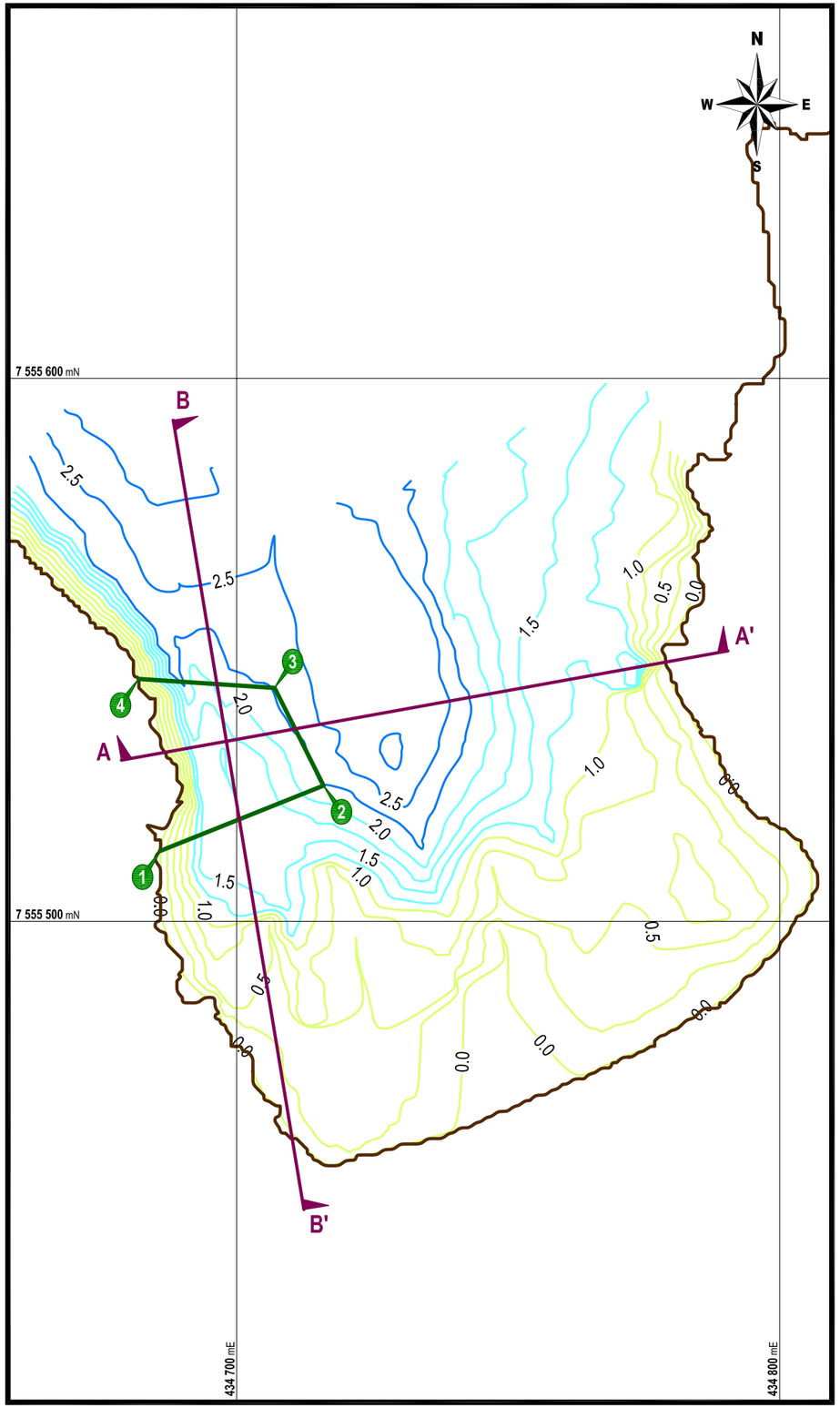
Site 1
Doris Lake Fish Habitat Compensation
Rearing Enhancement

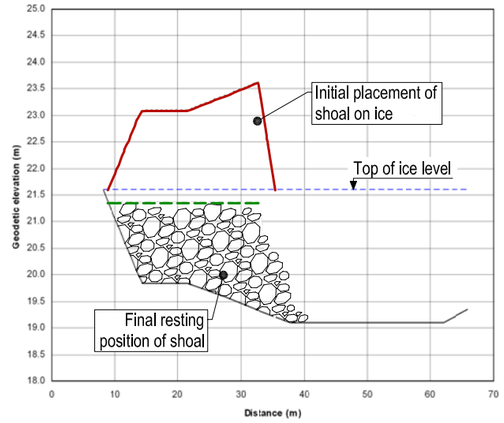
Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731444	
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

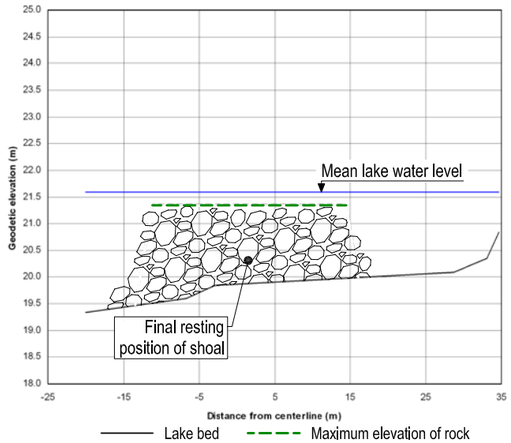
Figure: 6

Drawing path and name: N:\CAD\2006\13730\026 Roberts Lake\4000\06 - 1731444 rearingEnhancement site01.dwg May 16, 2007 (Wed 1:41 pm)
Images used: miramar 02.jpg -





Section A-A'



Section B-B'

Site 2		
Point	Easting (m)	Northing (m)
1	434 686	7 555 513
2	434 716	7 555 525
3	434 707	7 555 543
4	434 681	7 555 544

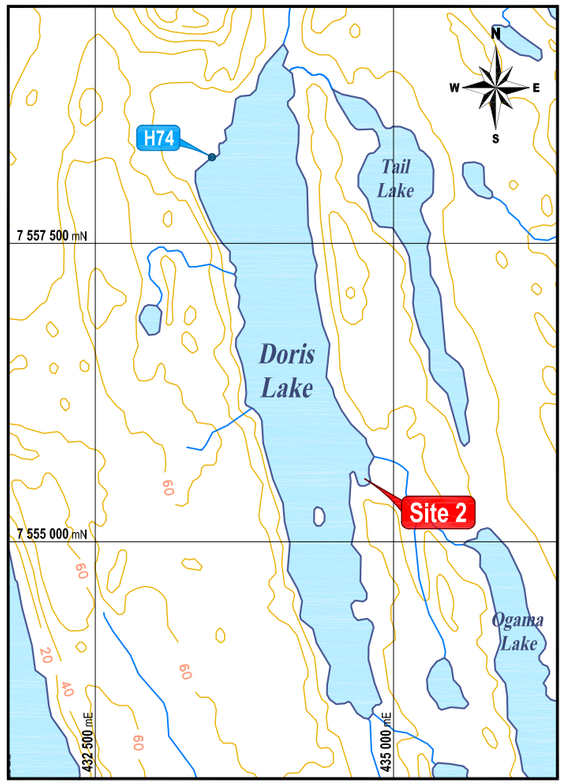
Quantities table	
Site	Rock riprap (m^3)
1	909

Plan of Rearing Shoal

20 0 20
Scale Metres

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
4. Hauling of material and construction shall take place when there is sufficient ice cover on Doris Lake to support estimated loads.
5. Contractor shall consult with a qualified ice engineer to determine bearing capacity of lake ice cover for transport of material.
6. Rock shall be stockpiled on ice cover to mimic lake bed contours.
7. Top elevation of the shoal shall be 21.35 m when in its final resting position.
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

Site 2
Doris Lake Fish Habitat Compensation
Rearing Enhancement

Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731445	
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

Figure: 7

May 16, 2007 (Wed 3:14 pm)
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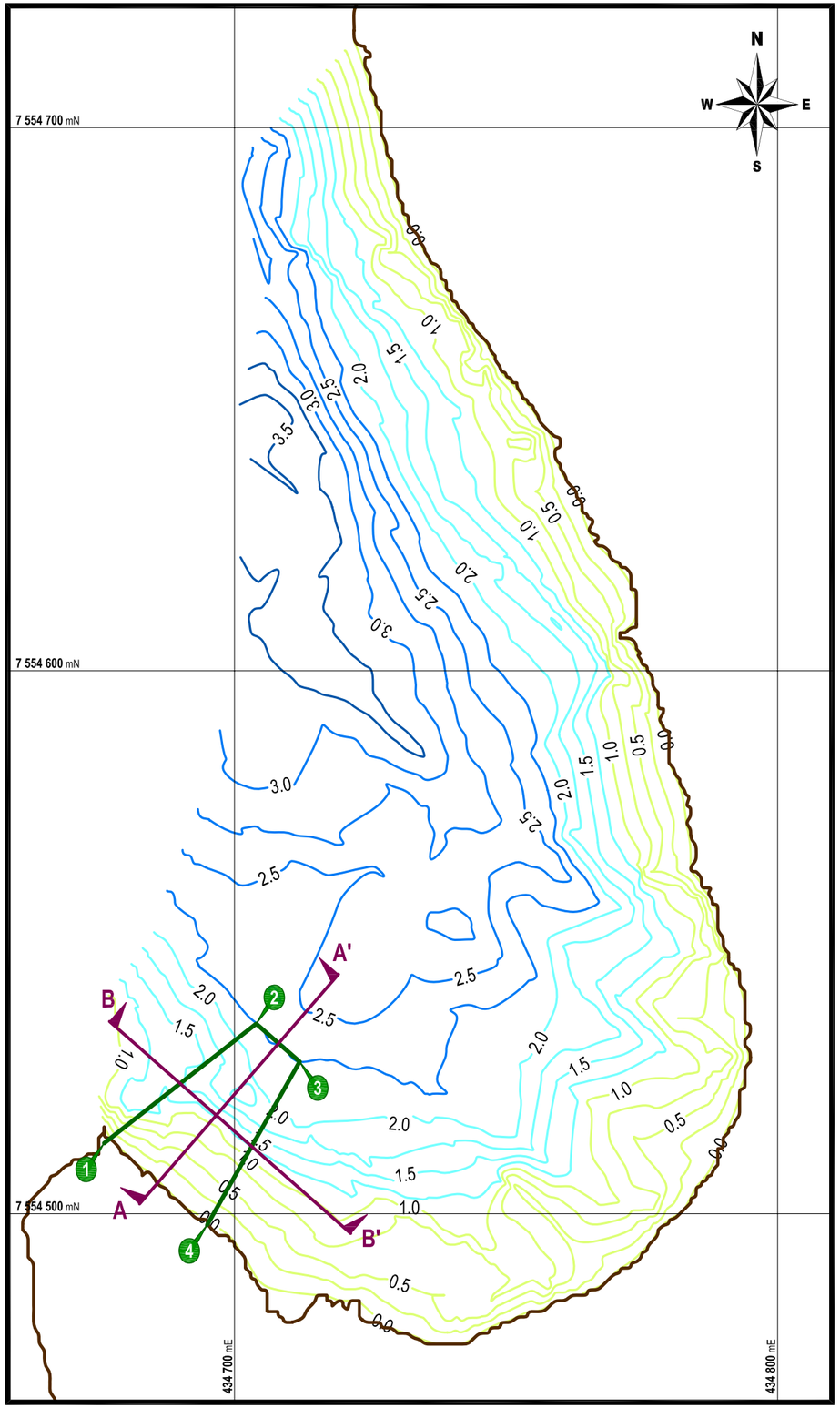
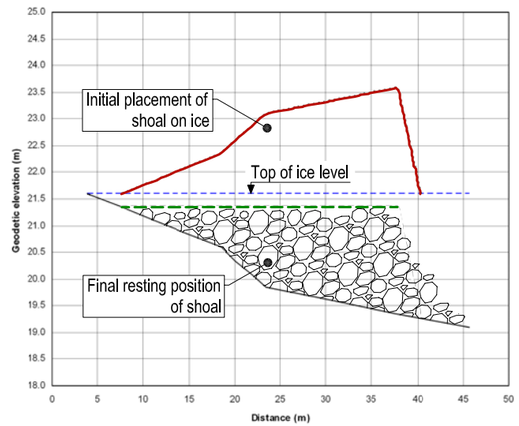
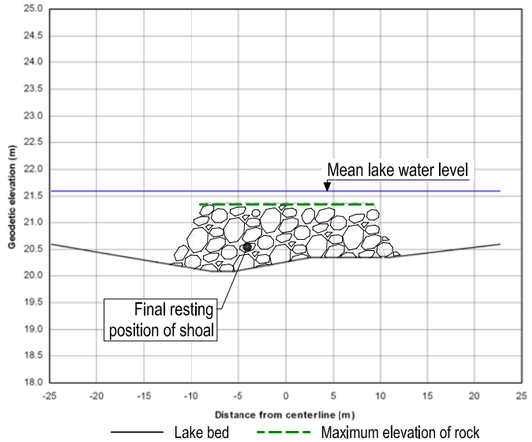
Images used: miramar 02.jpg -





Section A-A'



Section B-B'

Site 3		
Point	Easting (m)	Northing (m)
1	434 676	7 554 513
2	434 704	7 554 535
3	434 712	7 554 528
4	434 695	7 554 498

Quantities table	
Site	Rock riprap (m^3)
1	633

Plan of Rearing Shoal

20 0 20
Scale Metres

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
4. Hauling of material and construction shall take place when there is sufficient ice cover on Doris Lake to support estimated loads.
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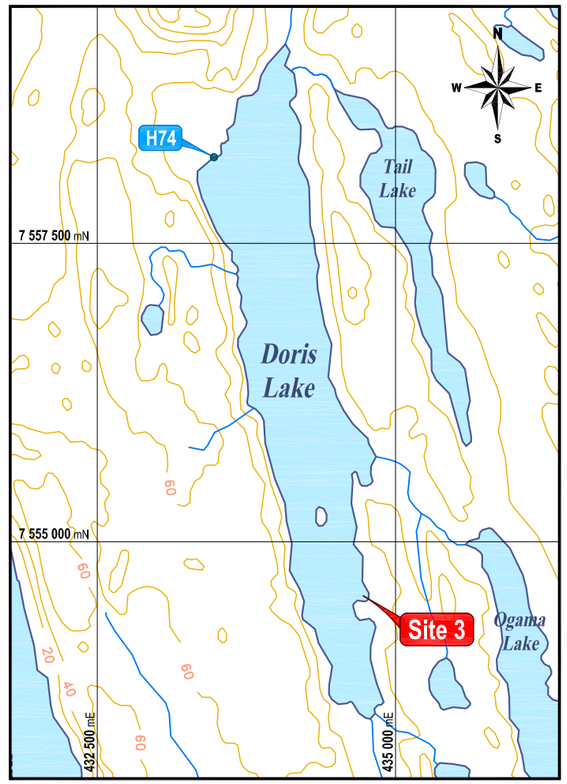
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

Site 3
Doris Lake Fish Habitat Compensation Rearing Enhancement

Golder Associates
Edmonton, Alberta

Project No.		06-1373-026	File No.		1731446
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

Figure: 8

May 16, 2007 (Wed 3:42 pm)
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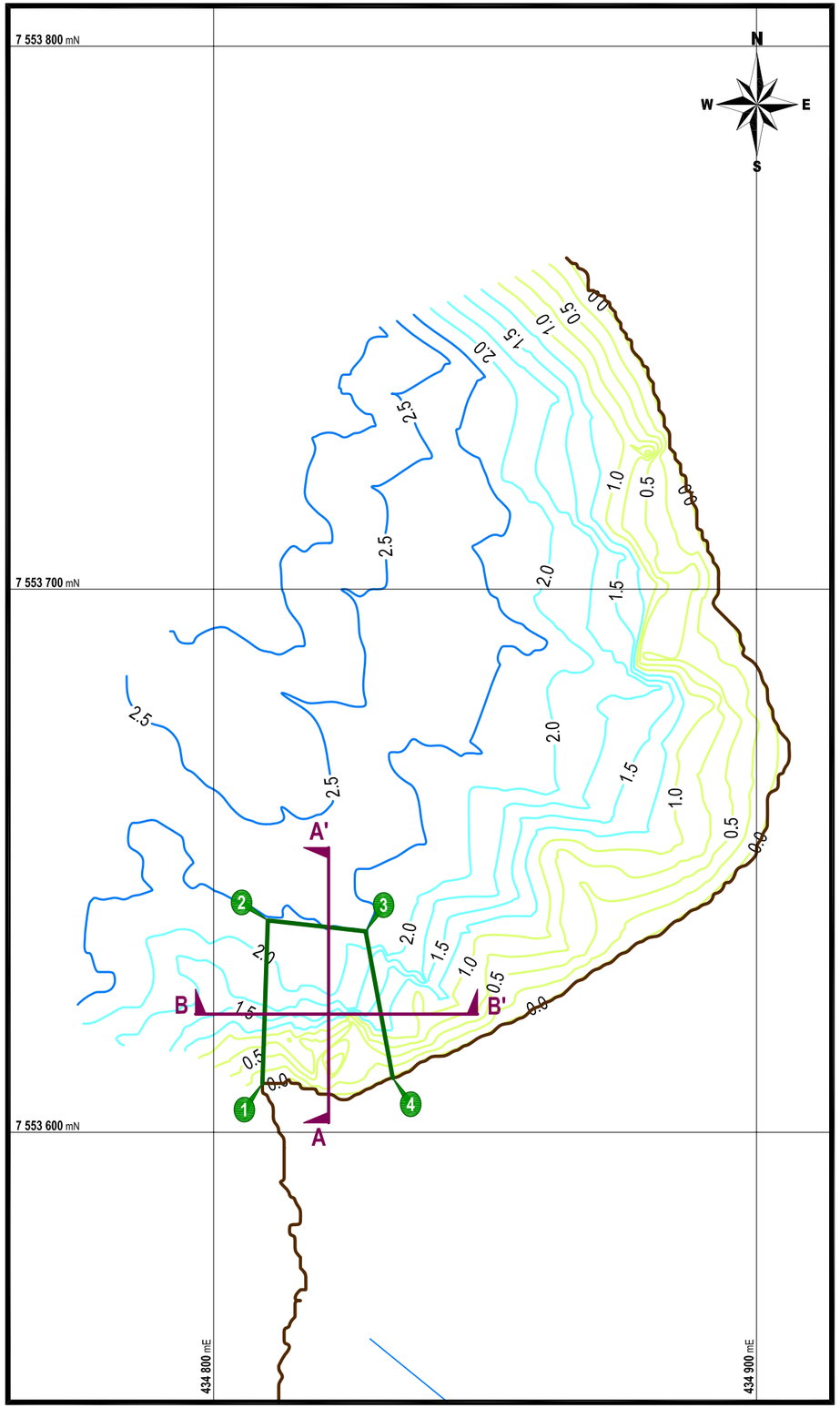
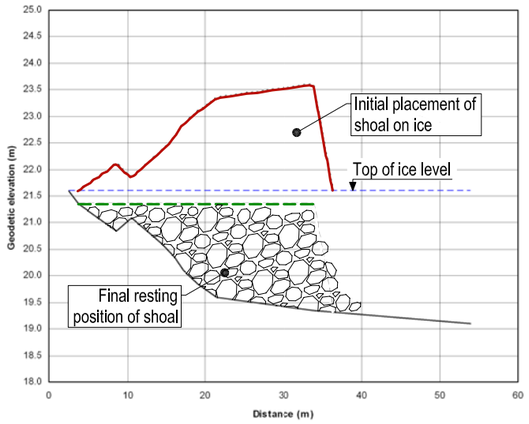
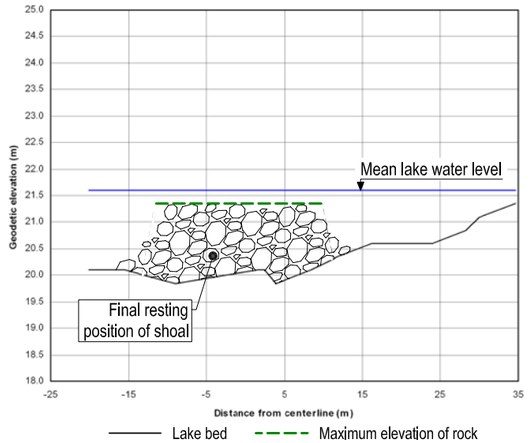




Section A-A'



Section B-B'

Site 4		
Point	Easting (m)	Northing (m)
1	434 809	7 553 609
2	434 810	7 553 639
3	434 828	7 553 637
4	434 833	7 553 610

Quantities table	
Site	Rock riprap (m^3)
1	680

Plan of Rearing Shoal

20 0 20
Scale Metres

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
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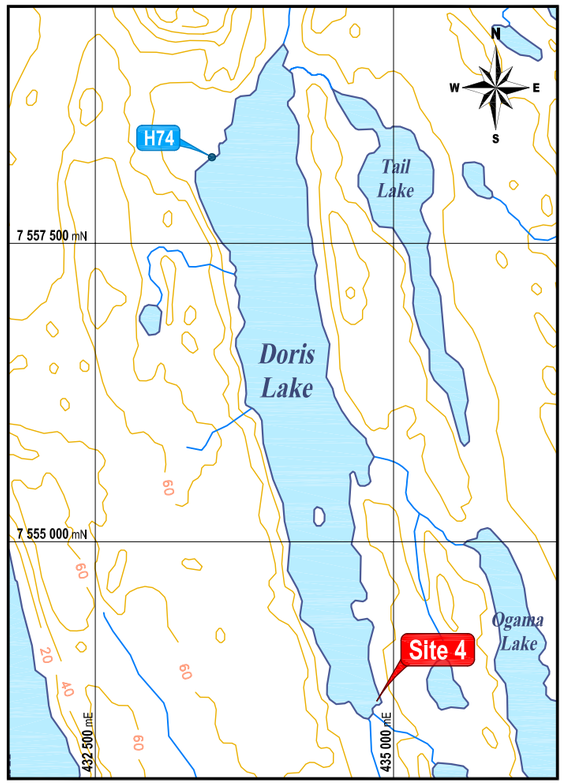
7. Top elevation of the shoal shall be 21.35 m when in its final resting position.
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006.
SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

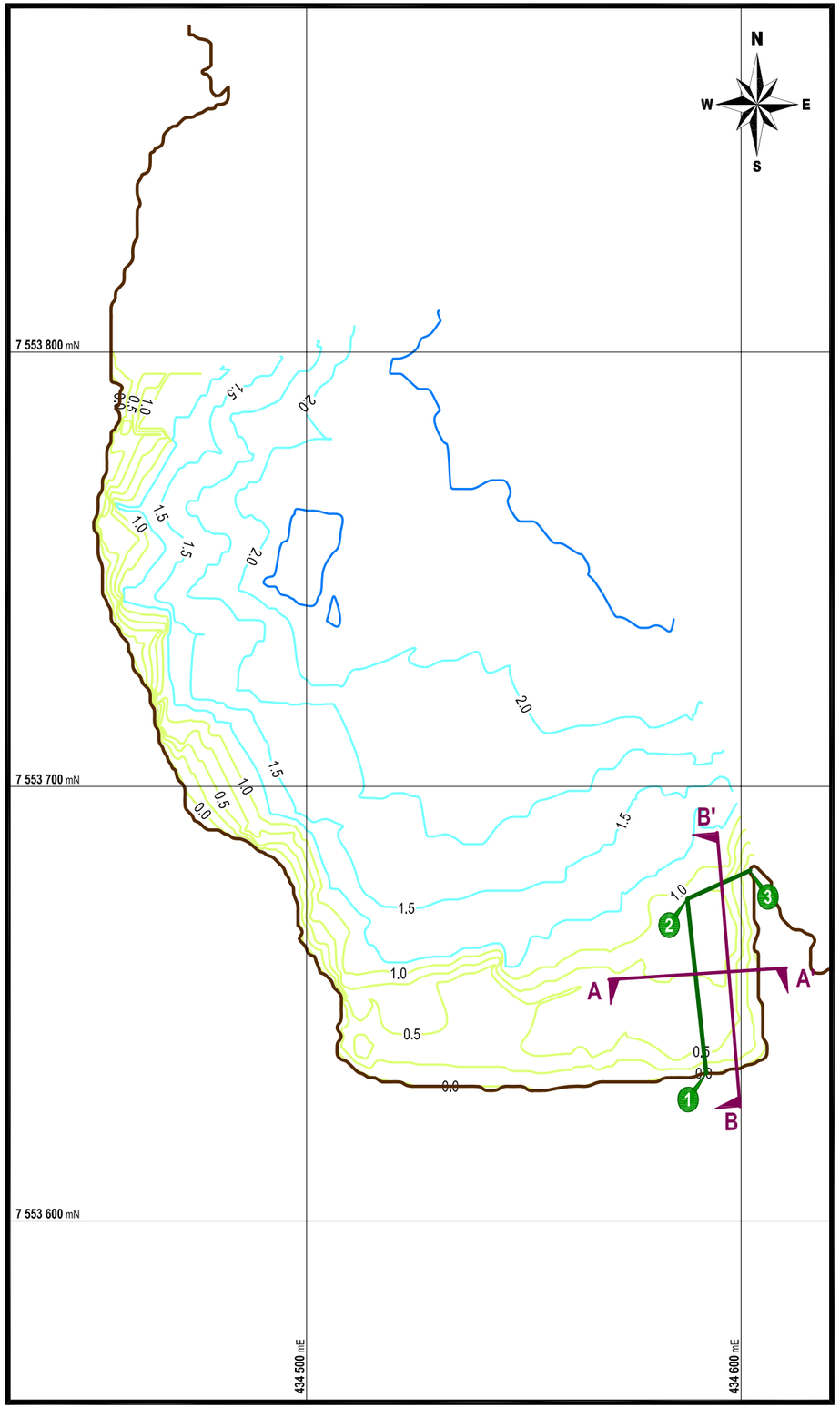
Site 4
Doris Lake Fish Habitat Compensation
Rearing Enhancement

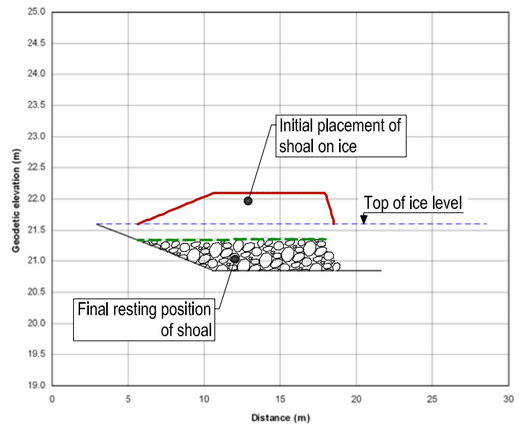
Golder Associates
Edmonton, Alberta

Project No.		06-1373-026	File No.		1731447
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

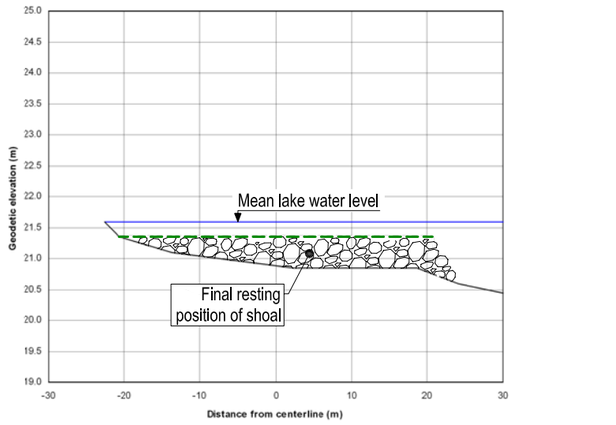
Figure: 9

Images used: miramar 02.jpg -
Drawing path and name: N:\CAD\2006\1373\00\26 Roberts Lake\4000\09 - 1731447 rearingEnhancement site04.dwg May 16, 2007 (Wed 4:19 pm)





Section A-A'



Section B-B'

Site 5		
Point	Easting (m)	Northing (m)
1	434 592	7 553 634
2	434 587	7 553 674
3	434 602	7 553 680

Quantities table	
Site	Rock riprap (m^3)
1	171

Plan of Rearing Shoal

25 0 25
Scale Metres

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
4. Hauling of material and construction shall take place when there is sufficient ice cover on Doris Lake to support estimated loads.
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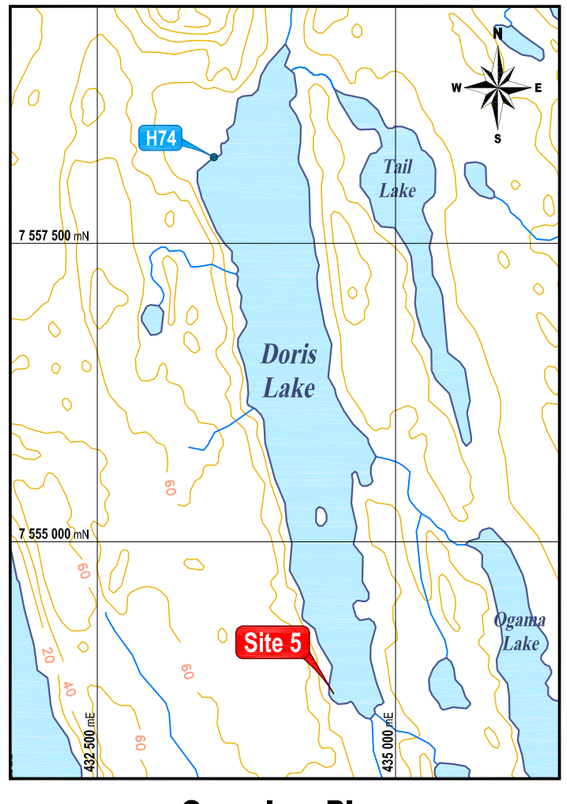
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006. SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

Site 5
Doris Lake Fish Habitat Compensation
Rearing Enhancement

Golder Associates
Edmonton, Alberta

Project No.	06-1373-026		File No.	1731448	
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

Figure: 10

May 17, 2007 (Thu 4:23 pm)
Images used: miramar 02.jpg -
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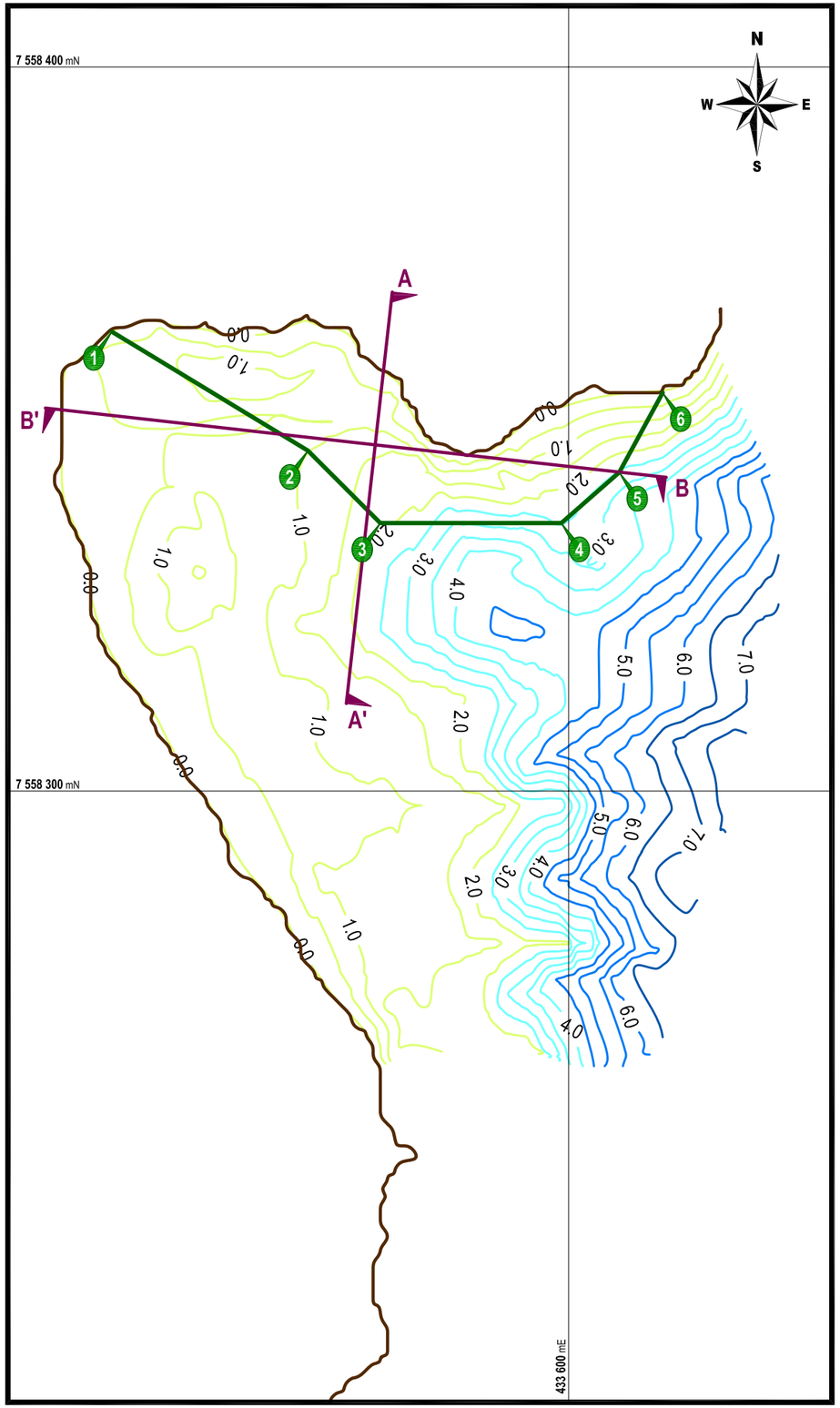
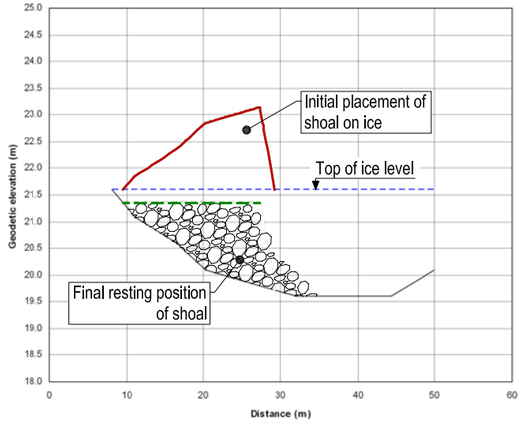
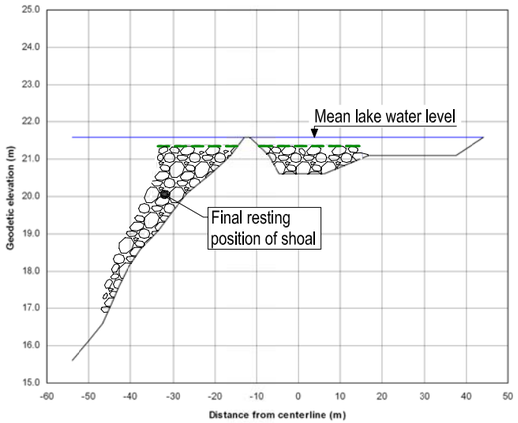




Section A-A'



Section B-B'

Site 6		
Point	Easting (m)	Northing (m)
1	433 536	7 558 363
2	433 564	7 558 347
3	433 574	7 558 337
4	433 599	7 558 337
5	433 607	7 558 344
6	433 613	7 558 355

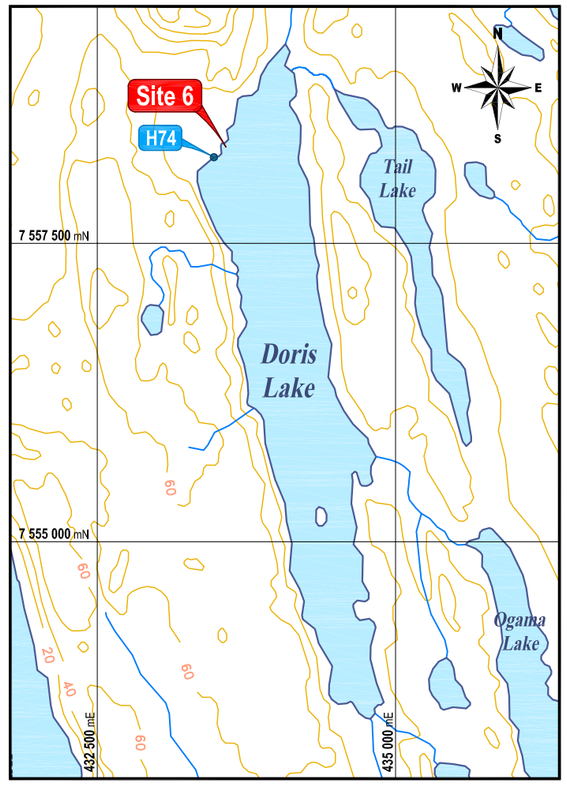
Quantities table	
Site	Rock riprap (m³)
1	835

Plan of Rearing Shoal

15 0 15
Scale Metres

NOTES

1. Shoals shall be laid out in field by a qualified person.
2. Shoals shall be constructed of clean, competent, certified non-acid generating rock.
3. Rock shall meet the specifications for riprap as specified in "Technical Specification for Tailings Containment Area and Surface Infrastructure Components" (SRK 2006).
4. Hauling of material and construction shall take place when there is sufficient ice cover on Doris Lake to support estimated loads.
5. Contractor shall consult with a qualified ice engineer to determine bearing capacity of lake ice cover for transport of material.
6. Rock shall be stockpiled on ice cover to mimic lake bed contours.
7. Top elevation of the shoal shall be 21.35 m when in its final resting position.
8. Elevations shall be referenced to the benchmark (geodetic elevation 21.546m) located at the Doris Lake Hydrometric Station H74 (68° 07' 56" N, 106° 34' 34" W).
9. A temporary benchmark shall be established at each site prior to construction.
10. Shoals shall be inspected after the first year of operation to ensure that the top elevation is 0.25 m below the mean lake water level.



Overview Plan

NTS

LEGEND

- Extent of shoal
- Shoreline
- 0.5 - 2.0 m contour lines
- 2.0 - 4.0 m contour lines
- 4.0 - 5.0 m contour lines

Bathymetric contour interval: 0.5m

Reference: Transects for bathymetry provided by Golder Associates Ltd., May 2006. SRK Consulting Engineers and Scientists, Technical Specification for Tailings Containment Area and Surface Infrastructure Components, October 2006.

MIRAMAR HOPE BAY LTD.

Title

Site 6
Doris Lake Fish Habitat Compensation
Rearing Enhancement

Golder Associates
Edmonton, Alberta

Project No.		06-1373-026	File No.		1731449
Design	BT	09/05/07	Scale	As shown	Rev. 0
Cadd	RW	09/05/07			
Check	NS	14/05/07			
Review	GA	15/05/07			

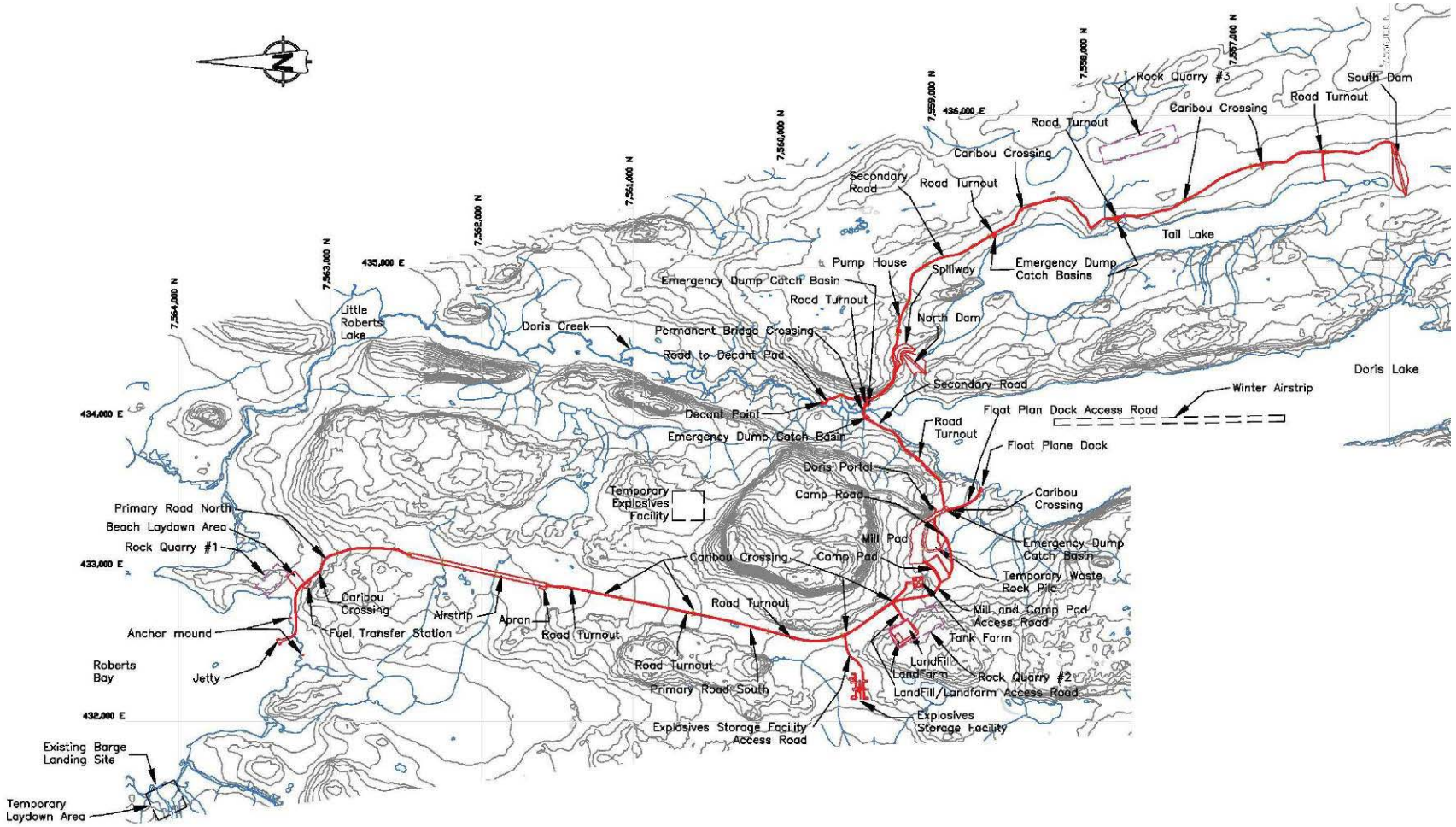
Figure: 11

Drawing path and name: N:\CAD\2006\13730026 Roberts Lake\4000\11 - 1731449 rearingEnhancement site06.dwg May 17, 2007 (Thu 4:25 pm)
Images used: miramar (2).jpg -

APPENDIX A

Doris North Project Infrastructure

Appendix A1 Overall Site Infrastructure Layout



Source (MHBL 2007)