

MEMORANDUM

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Golder Associates Ltd.
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DATE: July 14, 2008
TO: Chris Hanks, Hope Bay Mining Ltd..
FROM: Golder Associates
RE: Stream Crossing Assessments for Doris – Windy Road

1. INTRODUCTION

1.1. *Project Description*

The proposed all-weather road route between Doris and Windy crosses four streams. Habitat and fisheries assessments for these four streams were conducted between 25 and 27 June 2008, after the peak stream flow had subsided. Stream assessments were conducted to determine fish habitat suitability and fish presence in the vicinity of the four road crossing locations (Table 1, Figure 1).

Table 1 Stream Crossing Locations

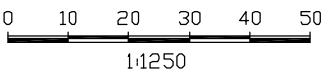
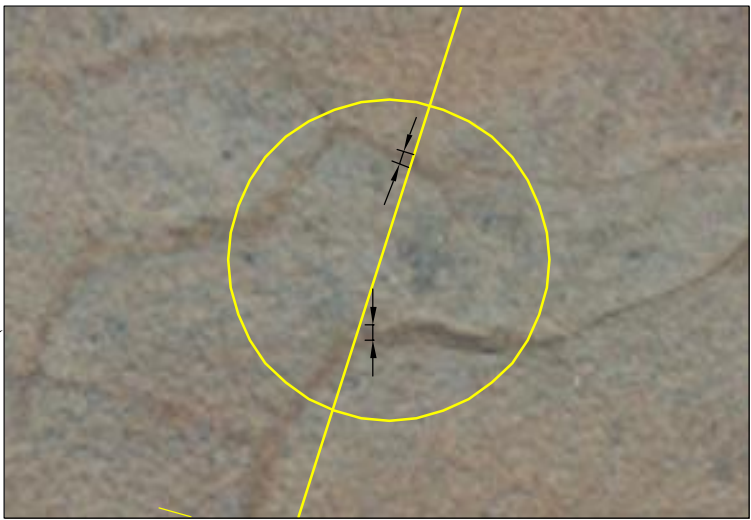
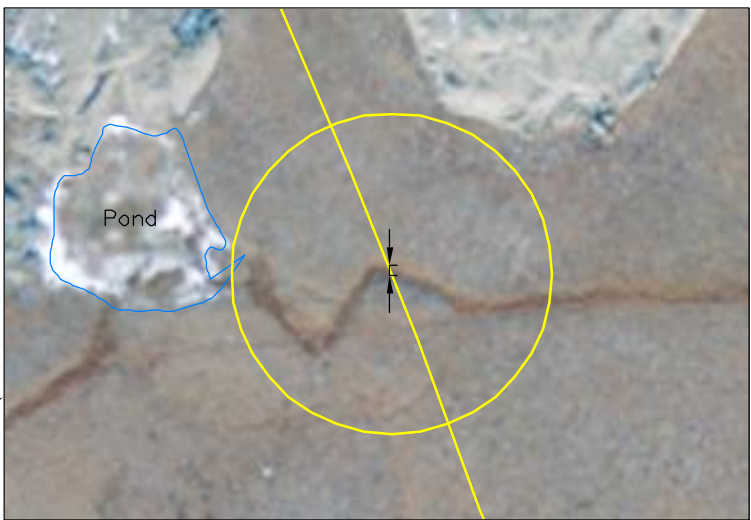
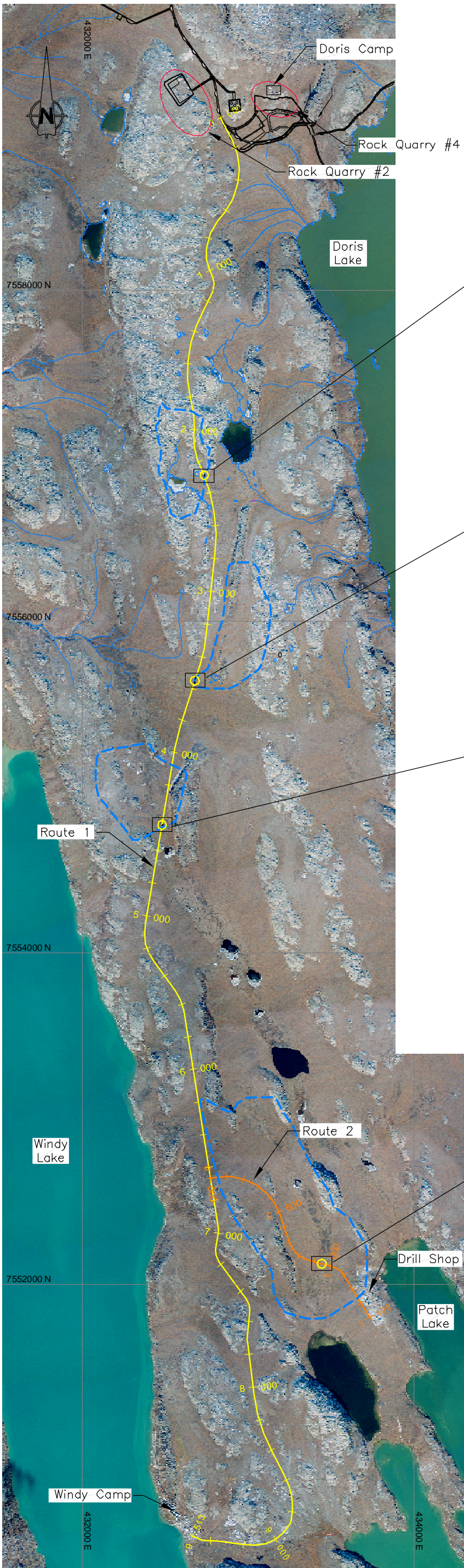
Crossing Number	UTM Coordinates (NAD 83 Zone 13W)	
	Easting	Northing
Stream Crossing 1	432733.9	7556883.2
Stream Crossing 2	432677.2	7555644.3
Stream Crossing 3	432478.9	7554773.8
Stream Crossing 4	433444.3	7552123.4

Stream Crossing 4 is on the Route 2 connector from the main road (Route 1) to the Patch Lake exploration camp. The remaining three stream crossings are on the main road (Route 1) between Doris and Windy camps.

1.2. *Methods*

The field program included photographic documentation of fish habitat for the stream in the vicinity of the road crossing location and sampling for the presence of fish within the streams. Fish sampling was conducted with a Smith-Root Model 12B backpack electrofisher, triangular kick net and Gee minnow traps.



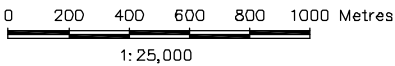


Legend

- Route 1
- Route 2
- Roads and Other Infrastructure Associated with Doris North Project
- Quarries Evaluated as part of the Doris North Project
- Interpreted Watershed Boundary
- Possible Stream Crossing Location

Notes

- Road alignment will be adjusted in the field to adjust to the length of stream crossing.
- Some streams may have more than one channel.



SRK JOB NO.: 1UN010.P01
FILE NAME: 1UN010_P01-2.dwg

HOPE BAY MINING LTD

Doris Camp - Windy Camp Access Road

Stream Crossing Locations
Along Proposed
Road Routes

DATE: March 08	APPROVED: MV	FIGURE: 1
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The settings on the backpack electrofisher were adjusted for site specific conditions at each stream. Electrofishing was not conducted on Stream 1 due to equipment malfunction.

Triangular kick nets were used to sample fish in Stream 1 by moving the net in a sweeping motion in the channel. This technique is effective in narrow and vegetated waterbodies because small fish hiding in the vegetation are captured in the motion or startled out of hiding to allow capture with a dip net.

The Gee minnow traps (40 cm long, 23 cm diameter in the middle, 19 cm diameter at each end) were two-piece wire enclosures with inverted funnel openings. They were baited with processed meat, and submerged in water deep enough to cover the openings on either side of the trap.

2. RESULTS

2.1. *Stream Crossing 1*

Stream Crossing 1 is located on a narrow stream that originates from a small pond created by snowpack melt-water at the base of a rock outcrop west of the crossing (Figure 2), and flows east for approximately 250 m, where it joins with a slightly larger stream exiting a larger pond from the north, flowing south-east towards Doris Lake.

The channel was generally narrow (approximately 0.15 to 0.20 m wide; Figure 3) with some wider areas (0.40 to 0.60 m; maximum of 1.5 m; Figure 4). Several pooled areas were present along the stream, some of which were already isolated from the drop in water level in the stream (Figure 5). Stream depth varied from 0.05 to 0.30 m along the channel length. The stream channel was typically vegetated with grasses, with a few small areas of soft silt substrate.



Figure 2 Head-water pond 45 m upstream (west) of Stream Crossing 1, June 2008



Figure 3 Stream channel facing downstream, 20 m upstream (west) of Stream Crossing 1, June 2008



Figure 4 Stream channel facing downstream 110 m downstream (east) of Stream Crossing 1, June 2008



Figure 5 Ponded area by channel facing east 145 m downstream (east) of Stream Crossing 1, June 2008

Three minnow traps were set for approximately one hour in the stream and approximately 250 m of the stream were sampled using kick nets. No fish were captured or observed in the surveyed stream section.

The shallow depth and low flow during the June stream assessment suggest that this stream is ephemeral, and if flows were present during freeze-up, the stream would freeze to the substrate. It is unlikely that this stream would support fish during open-water periods.

2.2. Stream Crossing 2

Stream Crossing 2 is located on a narrow channel that is fed by snowpack melt-water at the base of a rock outcrop east of the crossing location (Figure 6). The stream flows into a marsh area west of Doris Lake.

The area surrounding the main channel is primarily marsh with ponds created by flooding of the main channel (Figure 7) and pools in the wider areas of the main channel. The main channel was between 0.10 and 0.30 m wide for most of the length (Figure 8). There were wider pool areas that were a maximum of 2.5 m wide. Most of the channel was between 0.05 and 0.25 m deep.

Three Gee minnow traps were set in the stream for approximately one hour. The minnow traps were set 22 m upstream of the crossing, 35 m and 133 m downstream of the crossing. The stream was sampled using a backpack electrofisher (60 Hz frequency, 8 to 0.4 ms varying pulse width and 400 volts) for 154 seconds over a distance of 60 m. No fish were captured or observed in the surveyed stream section.

The shallow depth and low flow during the June stream assessment suggest that this stream is ephemeral, and if flows were present during freeze-up, the stream would freeze to the substrate. It is unlikely that this stream would support fish during open-water periods.



Figure 6 Head-water pond 130 m upstream (east) of Stream Crossing 2, June 2008



Figure 7 Stream channel and marsh looking downstream 20 m downstream (south-east) of Stream Crossing 2, June 2008



Figure 8 Stream channel facing downstream 60 m upstream (east) of Stream Crossing 2, June 2008



Figure 9 Branching of channel facing downstream 130 m downstream (south-west) of Stream Crossing 2, June 2008

2.3. Stream Crossing 3

Stream Crossing 3 is located on a narrow channel that flows between a small pond 185 m north of the crossing location (Figure 10) and a larger pond 140 m south of the crossing location. The channel flows through a marsh area between the ponds (Figure 11) and the main channel frequently divides and braids (Figure 12). There were two goose nests in the marsh area near the south pond, and one sandhill crane nest on the island in the south pond (Figure 13).

The channel was between 0.05 and 0.30 m deep, and the defined channels ranged from approximately 0.10 and 0.40 m wide. The marsh pools between hummocks were generally 0.15 to 0.30 m deep.



Figure 10 Head-water pond 185 m upstream (north) of Stream Crossing 3, June 2008



Figure 11 Marsh looking south 100 m downstream (south) of Stream Crossing 3, June 2008



Figure 12 Stream channel facing downstream 45 m downstream (south) of Stream Crossing 3, June 2008



Figure 13 South pond 140 m downstream (south) of Stream Crossing 3, June 2008

Three minnow traps were set for approximately one hour. A distance of 200 m was sampled for fish using 370 seconds of backpack electrofishing (60 Hz frequency, 8 to 0.4 ms varying pulse width and 400 volts). One ninespine stickleback (total length of 8 cm) was captured in a minnow trap. This fish was in poor condition and had black lesions on the body. Eight dead, partially decomposed, ninespine stickleback were observed during electrofishing.

The shallow depth and low flow during the June stream assessment suggest that this stream is ephemeral, and if flows were present during freeze-up, the stream would freeze to the substrate. Small fish appear to have access to the stream channel, likely moving upstream from the large south pond; however, the available habitat was marginal. The small stream size and low flow suggests that this stream likely would not support fish during the entire open-water period.

2.4. ***Stream Crossing 4***

Stream Crossing 4 is located on a narrow channel that flows south into a pond north of the north-west arm of Patch Lake. The stream originates in a marsh area north of the stream crossing (Figure 14). The channel alternates between a single defined channel (Figure 15), braided channel (Figure 16) and marsh areas. The stream divides and widens at the mouth where it flows into the pond (Figure 17).



Figure 14 Marsh area 240 m upstream (north) of Stream Crossing 4, June 2008



Figure 15 Stream channel looking north 20 m upstream (north) of Stream Crossing 4, June 2008



Figure 16 Braided stream channel facing upstream 290 m downstream (south) of Stream Crossing 4, June 2008



Figure 17 Stream entering pond north of Patch Lake 400 m downstream (south) of Stream Crossing 4, June 2008

The defined channels were approximately 0.25 to 0.40 m wide, with pool areas up to 2.5 m wide. Depth ranged from 0.05 to 0.40 m deep. The majority of the stream was 0.10 to 0.20 m deep. The marsh areas were also shallow, with depths between 0.10 and 0.20 m.

Three minnow traps were set for approximately one hour. Fish were also sampled by backpack electrofishing at two different settings. A distance of 90 m was electrofished for

211 seconds at 30 Hz frequency, 4 ms pulse width and 400 volts. An additional 300 m of stream was electrofished for 370 seconds at 60 Hz frequency, 8 to 0.4 ms varying pulse width and 400 volts. Fish were not captured or observed in the surveyed stream section.

The shallow depth and low flow during the June stream assessment suggest that this stream is ephemeral, and if flows were present during freeze-up, the stream would freeze to the substrate. It is unlikely that this stream would support fish during open-water periods.

3. Conclusions

The four streams being crossed by the proposed road routes appear to be ephemeral, likely only flowing during spring runoff or wet periods. Any water remaining in the streams during freeze-up would freeze to the substrate. The small size, low flow, and ephemeral nature of the streams would restrict access into the streams from larger fish-bearing waterbodies downstream.

Only Stream 3 appeared to contain fish on a seasonal basis, likely moving into the stream from the downstream pond, but their survival in the stream would be limited to the open-water period. The presence of suitable habitat during the open-water period is likely also very limited. Waterfowl were nesting on the pond and marsh at the downstream end of Stream 3.

4. CLOSURE

We trust the above meets your expectations. If you have any questions or concerns please contact the undersigned at your convenience.

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