ARCHER, CATHRO & ASSOCIATES (1981) LIMITED
1016 - 510 West Hastings Street
Vancouver, B.C. V6B1L8
Telephone: 604-688-2568 Fax: 604-688-2578

ASSESSMENT REPORT

describing

ENVIRONMENTAL, ENGINEERING AND ARCHAEOLOGICAL WORK

at the

ACX CLAIMS
RACKLA GOLD PROPERTY

ACX 1-234 YD08251-YD08484
235-310 YD33163-YD33238

NTS 106D/02 & 03, 105M/14
Latitude 64°5´N; Longitude 134°52´W

located in the
Mayo Mining District
Yukon Territory

prepared by
Archer, Cathro & Associates (1981) Limited

for

ATAC RESOURCES LTD.

by
K. Unger, B.Sc.
April 2011

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INTRODUCTION

The ACX claims are part of ATAC Resources Ltd.'s wholly owned Rackla Gold property which covers a contiguous block of claims 180 km in length. These claims cover several gold exploration targets along strike with ATAC's highly prospective Tiger Zone.

This report compiles work conducted on the southwest corner of the Rackla Gold property by Archer, Cathro & Associates (1981) Limited on behalf of ATAC. Environmental, engineering and archaeological consultants were contracted and their work occurred between March and October of 2010. Reports of the work completed are included in Appendices II-V. The author participated in the program and his Statement of Qualifications is in Appendix I.

PROPERTY LOCATION, CLAIM DATA AND ACCESS

The ACX are 310 continuous claims, which are located in central Yukon at latitude 64°5′ north, and longitude 134°52′ west on NTS map sheets 106D/02 & 03, 105M/14 (Figure 1). The claims are all registered with the Mayo Mining Recorder in the name of Archer Cathro, which holds them in trust for ATAC. Specifics concerning claim registration are tabulated below while the locations of individual claims are shown on Figure 2.

Claim Name	Grant Number	Expiry Date*
ACX 1-234	YD08251-YD08484	April 28, 2015
235-310	YD33163-YD33238	April 28, 2015

*Expiry dates include 2010 work which has been filed for assessment credit but not yet accepted.

The ACX claims lay 71 km northeast of Mayo, the nearest supply centre. The closest road access is at McQuesten Lake, situated about 80 km by road northeast of Mayo. Mayo and Keno City can be reached in all seasons by two wheel drive vehicles using the Yukon highway system. Access to the project in 2010 was by helicopter out of a staging area set up near McQuesten Lake. Daily access to work areas on the project was provided by either a Hughes 500D or Bell 206L helicopter operated by Fireweed Helicopters Ltd or by a Bell 206L operated by Trans North Helicopters, both stationed out of the McQuesten camp.

Respectfully submitted,

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

Kirk Unger, B.Sc.

ATAC RESOURCES LTD.

FIGURE 1

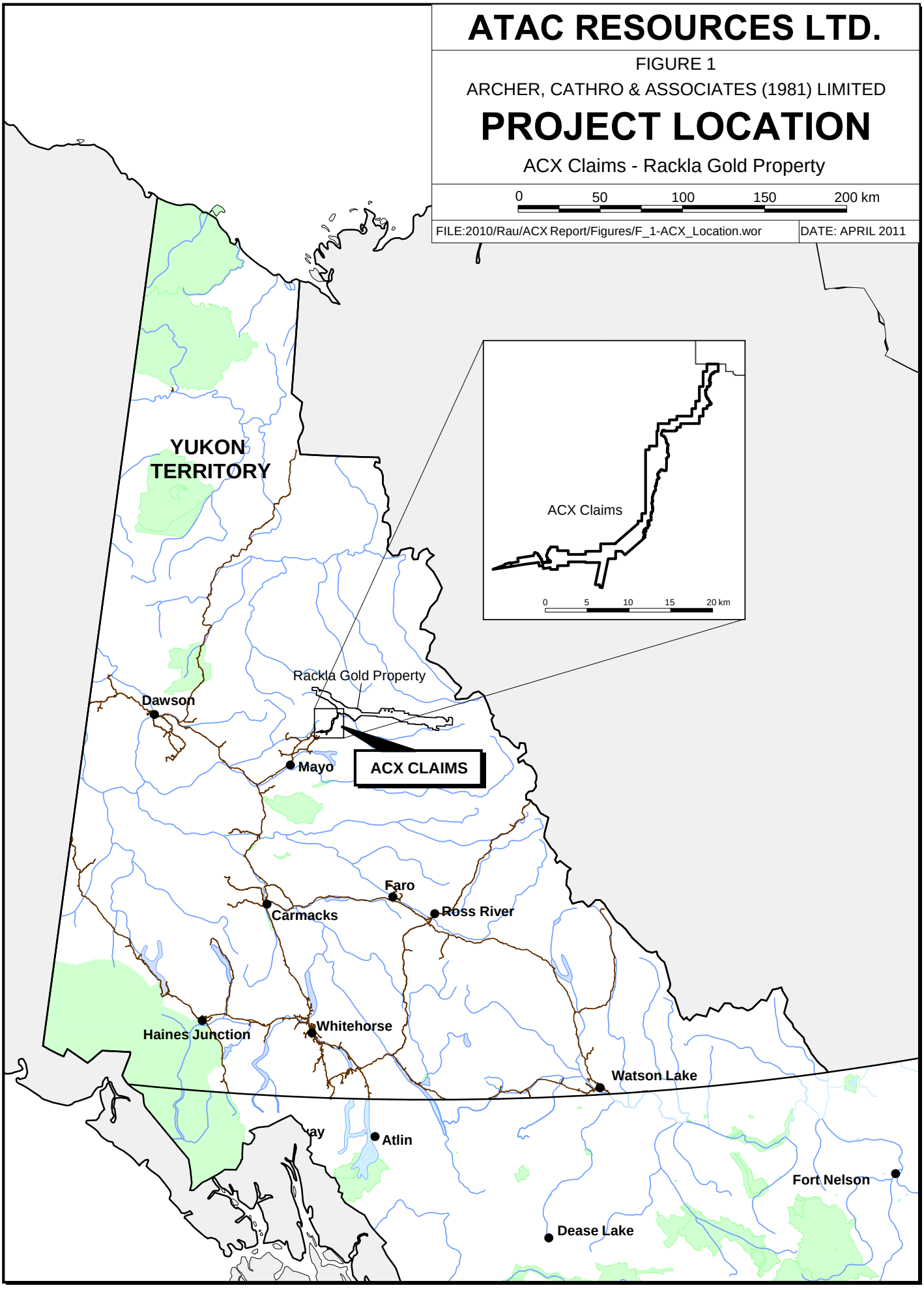
ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

PROJECT LOCATION

ACX Claims - Rackla Gold Property

0 50 100 150 200 km

FILE:2010/Rau/ACX Report/Figures/F_1-ACX_Location.wor | DATE: APRIL 2011



7120000 mN

7110000 mN

7100000 mN

7090000 mN

7080000 mN

T.N.
24° 9' E
0°13.2'
Annual change
decreasing 26.3'

ACX CLAIMS

ATAC RESOURCES LTD.

FIGURE 2

ARCHER, CATHRO & ASSOCIATES (1981) LIMITED

CLAIM LOCATIONS

ACX Claims - Rackla Gold Property

0 1 2 3 4 km

Contour Interval: 100 ft. UTM Zone 8, NAD 83, 106D/0, 03, 105M/14

FILE:2010/Rau/ACX Report/Figures/F_2-Claim_Locations.wor | DATE: APRIL 2011

APPENDIX I

STATEMENT OF QUALIFICATIONS

STATEMENT OF QUALIFICATIONS

I, Kirk Unger, geologist, with business addresses in Whitehorse, Yukon Territory and Vancouver, British Columbia and residential address in Vancouver, British Columbia, hereby certify that:

1. I graduated from the University of Waterloo in 2009 with a B.Sc., Hon. in Science with a minor in Earth Sciences.

2. From 2006 to present, I have been actively engaged in mineral exploration in Yukon Territory, and British Columbia.

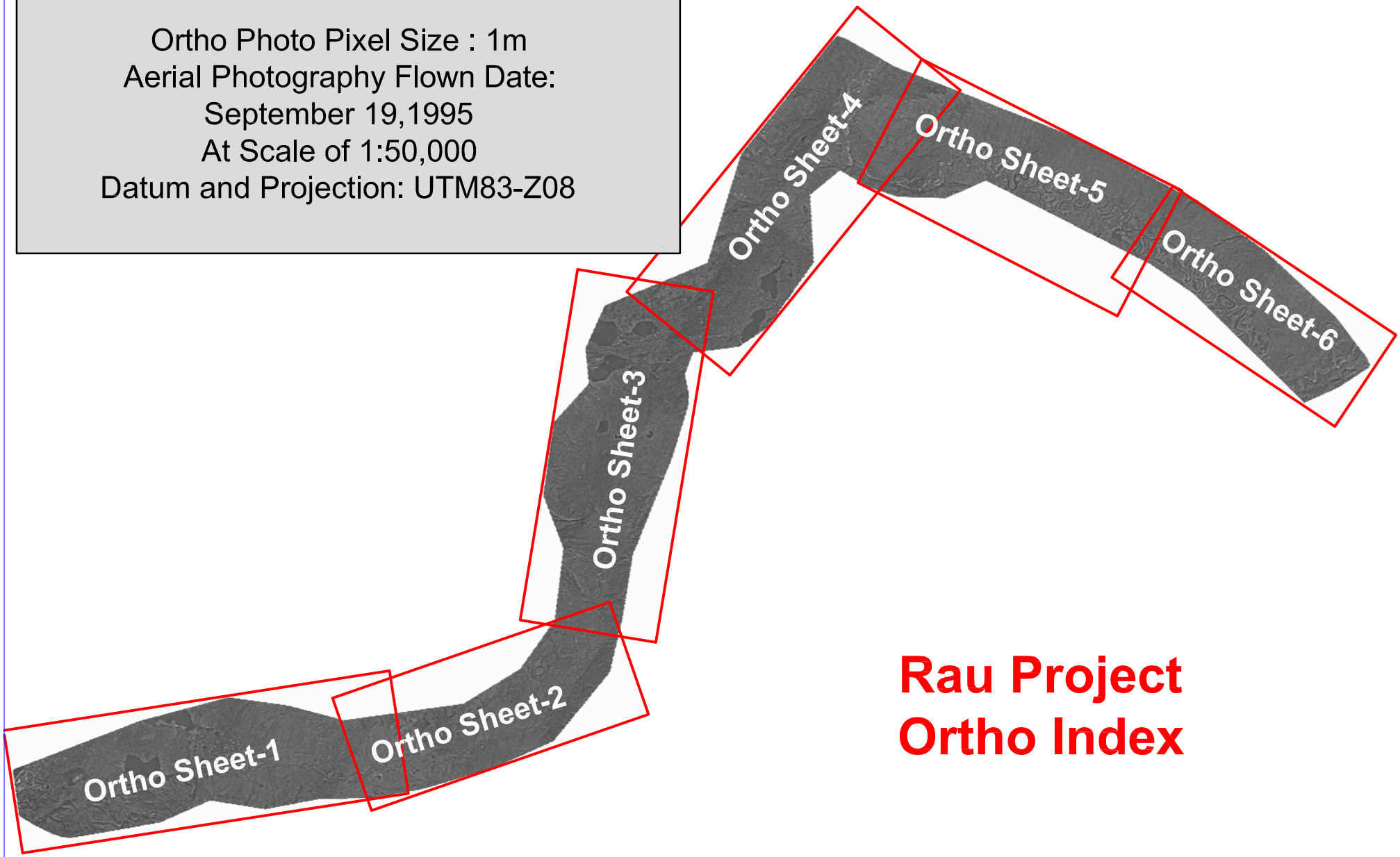
3. I have personally participated in the field work reported herein and have interpreted all data resulting from this work.

Kirk Unger, B.Sc., Hon.

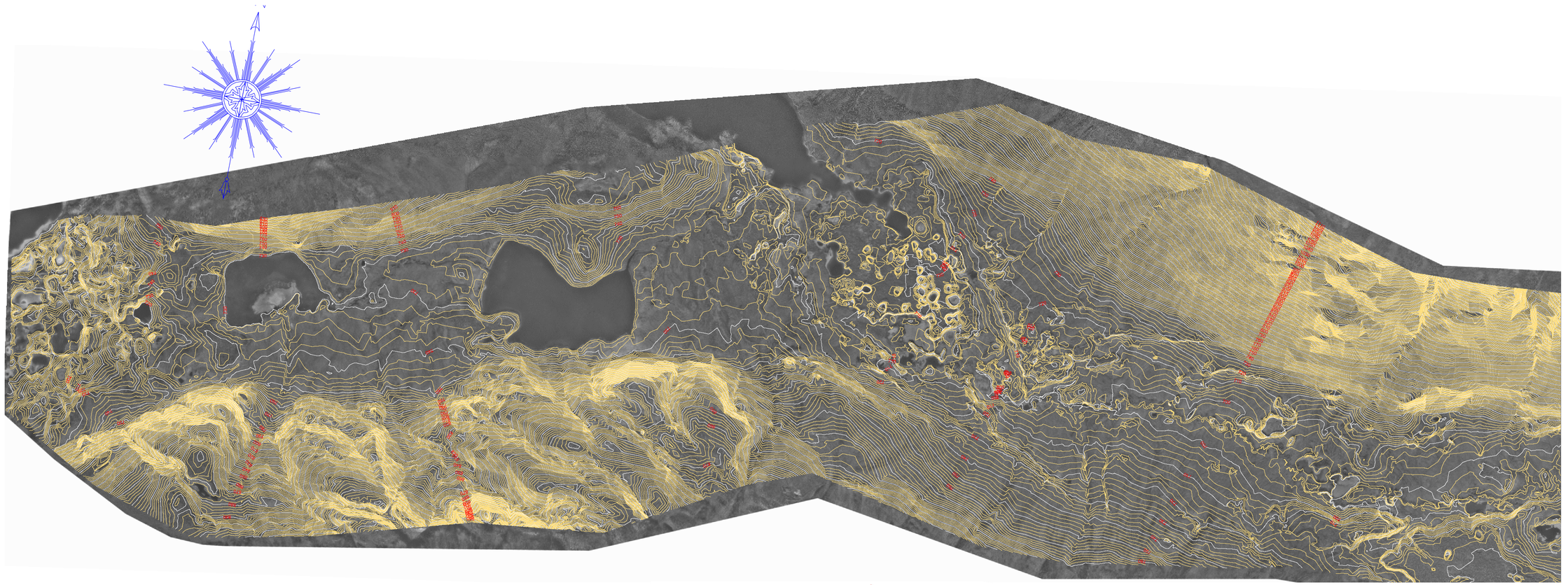
APPENDIX II

REPORT BY CHALLENGER GEOMATICS LTD.

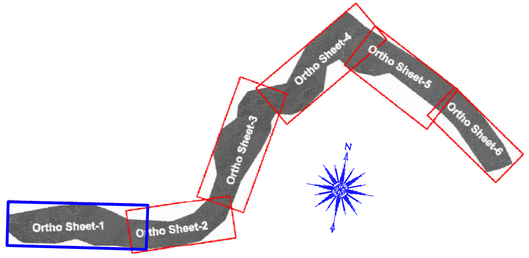
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Aerial Photography Flown Date:
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At Scale of 1:50,000
Datum and Projection: UTM83-Z08



Rau Project
Ortho Index



Notes:
--Ortho Photography Produced by Challenger Geoamtics Ltd.at 1m Pixel Size.
--Aerial Photography Flown Year : September 19,1995 at the Scale of 1:50,000.
--DEM Supplied by Challenger Geomatics Ltd.
--2m/10m Contours Computed from Collected DEM.



Archer, Cathro and Associates (1981) Limited

MAP SHOWING:

Rau Project

2M/10M Contours &Ortho

Sheet-1

500 0 500 1000 1500 Metres

SCALE 1 : 20 000

DATUM: NORTH AMERICAN DATUM 1983
PROJECTION: UTM ZONE 08

PREPARED BY:

CHALLENGER GEOMATICS LTD.

CALGARY (403)253-8101

DATE : April 07, 2010

DRAWN : SW

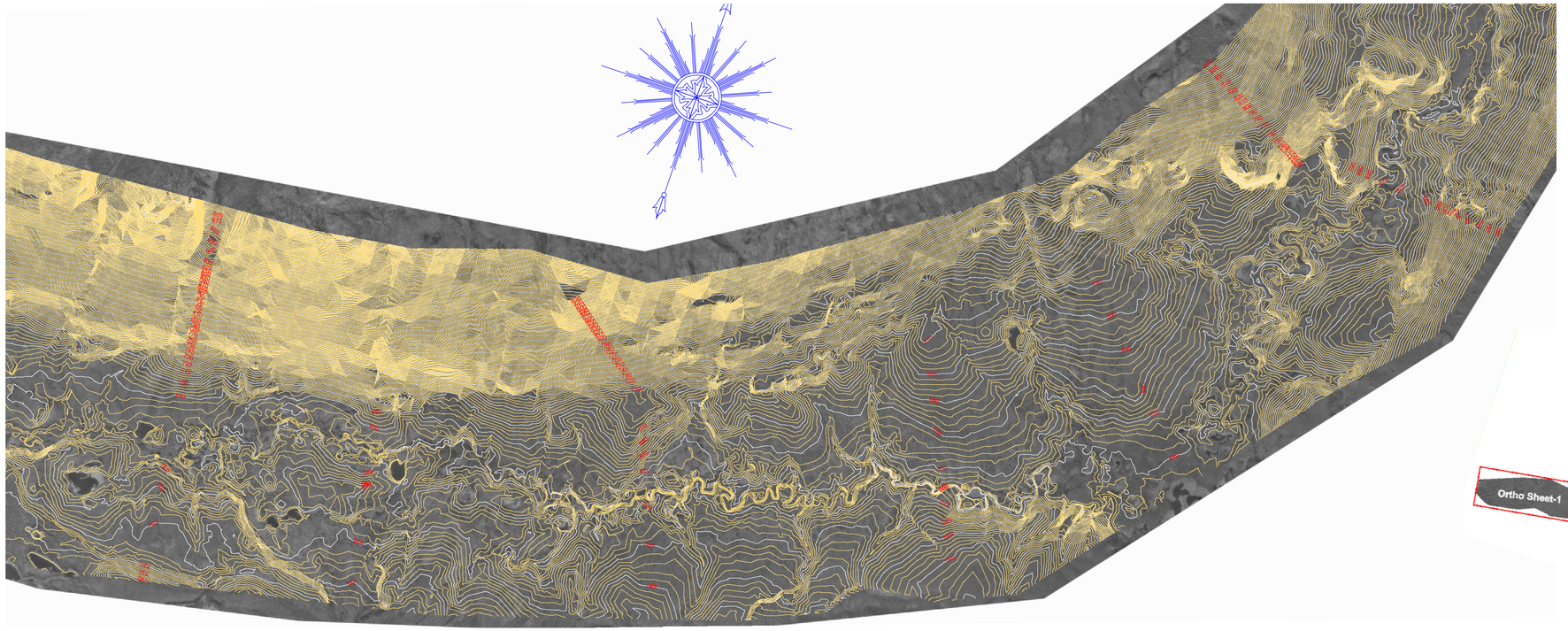
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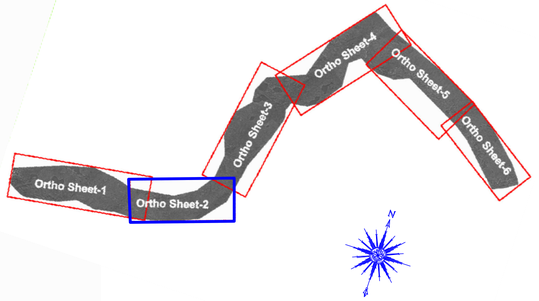
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REVISION : 0

REVISION TABLE

NO	DESCRIPTION	DATE	BY
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Archer, Cathro and Associates (1981) Limited

MAP SHOWING:

Rau Project

2M/10M Contours &Ortho

Sheet-2

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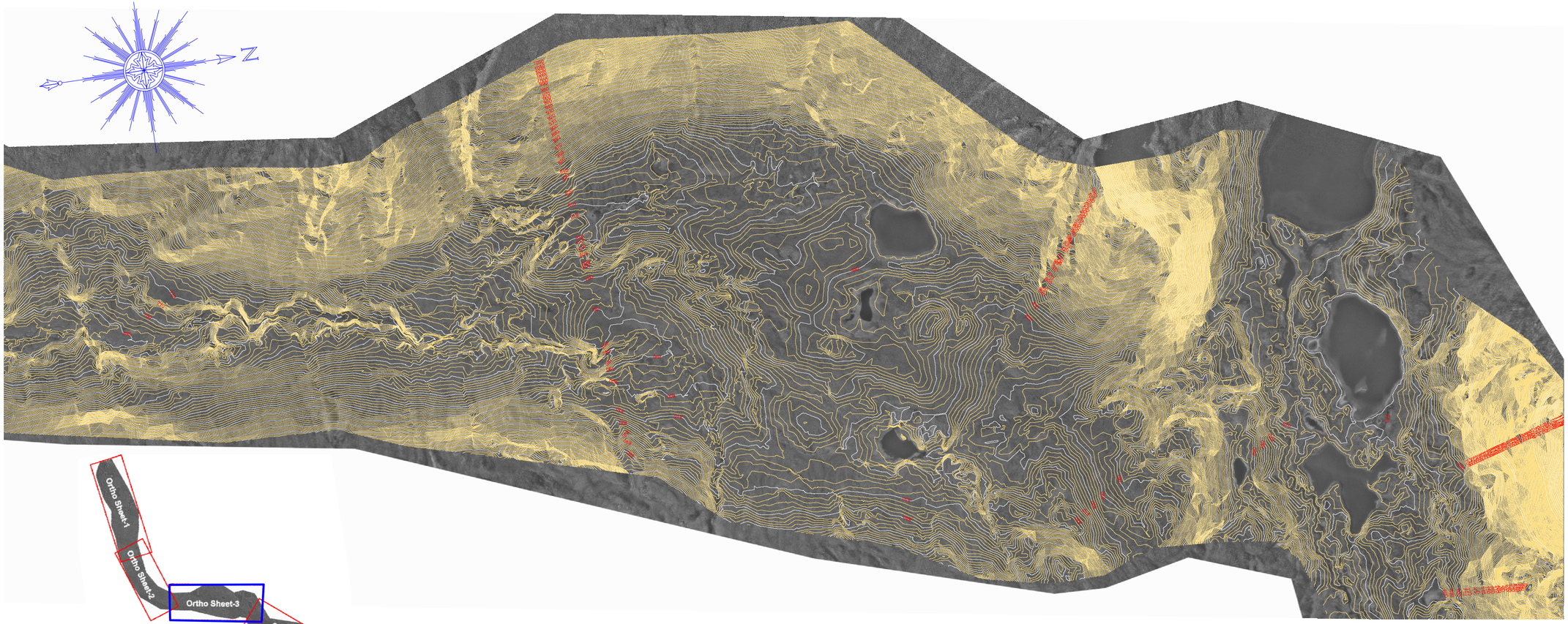
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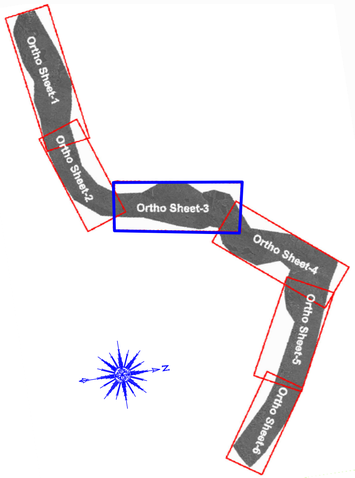
PREPARED BY:
CHALLENGER GEOMATICS LTD.
CALGARY (403)253-8101

DATE : April 07, 2010
DRAWN : sw
JOB NO : 24341
REVISION : 0
ACAD NO : Rau Project

REVISION TABLE

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--2m/10m Contours Computed from Collected DEM.

PREPARED BY:	DATE : April 07, 2010	DRAWN : sw
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CALGARY (403)253-8101	ACAD NO : Rau Project	

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Archer, Cathro and Associates (1981) Limited

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Rau Project

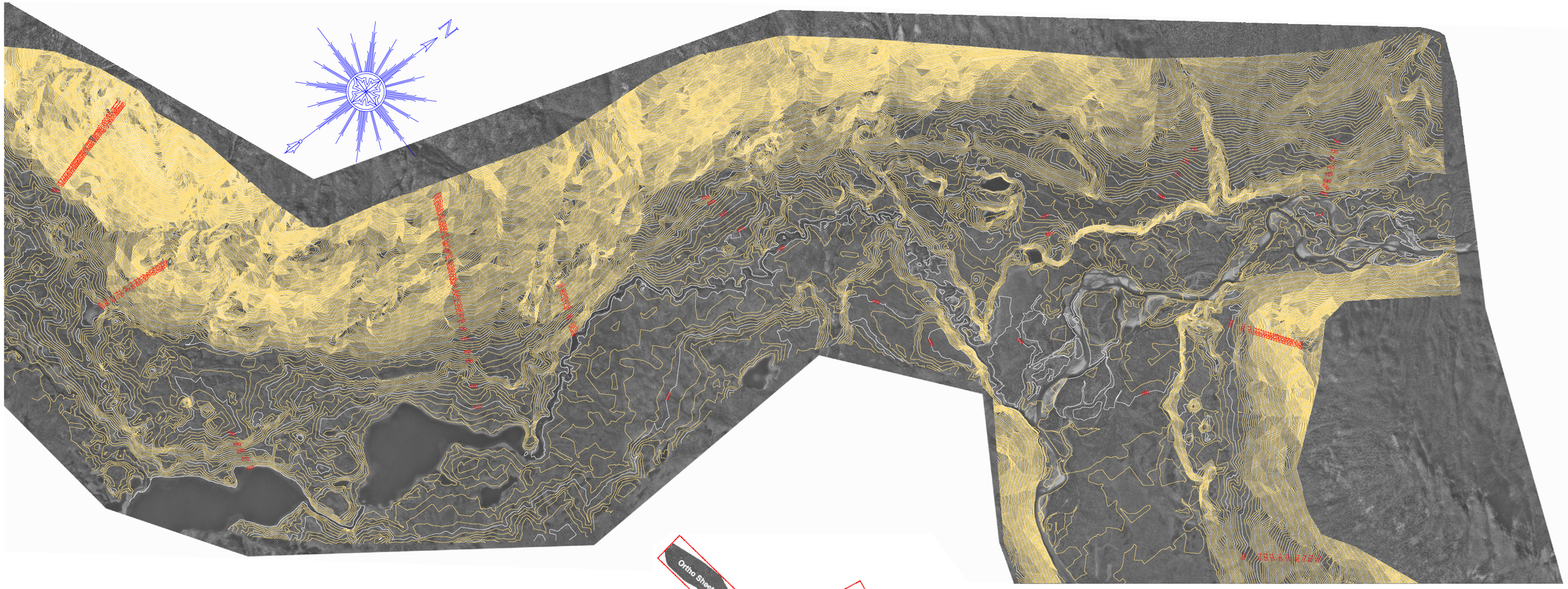
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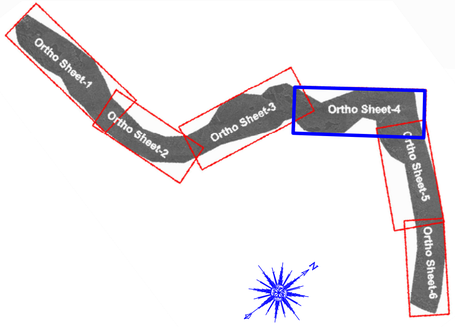
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BY SCALE 1 : 20 000

DATUM: NORTH AMERICAN DATUM 1983
PROJECTION: UTM ZONE 08





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--Aerial Photography Flown Year : September 19,1995 at the Scale of 1:50,000.
--DEM Supplied by Challenger Geomatics Ltd.
--2m/10m Contours Computed from Collected DEM.

Archer, Cathro and Associates (1981) Limited

MAP SHOWING:

Rau Project

2M/10M Contours &Ortho

Sheet-4

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SCALE 1 : 20 000

DATUM: NORTH AMERICAN DATUM 1983
PROJECTION: UTM ZONE 08

PREPARED BY:

CHALLENGER GEOMATICS LTD.

CALGARY (403)253-8101

DATE : April 07, 2010

DRAWN : SW

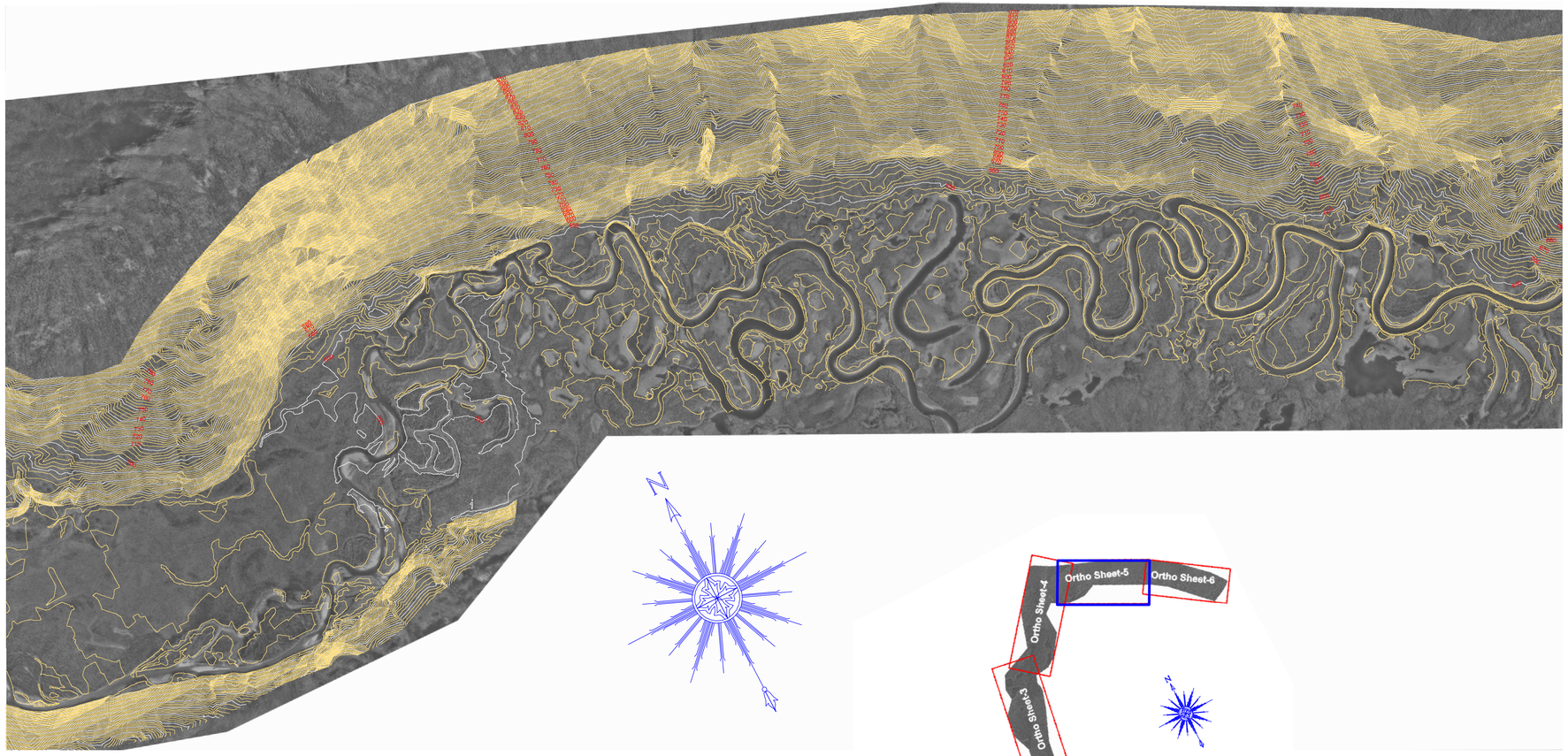
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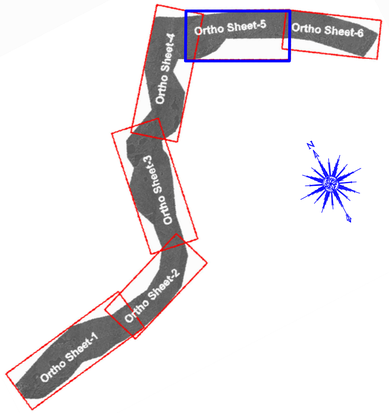
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0	Map Issued	Apr.07,2010	sw





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--Aerial Photography Flown Year : September 19,1995 at the Scale of 1:50,000.
--DEM Supplied by Challenger Geomatics Ltd.
--2m/10m Contours Computed from Collected DEM.

Archer, Cathro and Associates (1981) Limited

MAP SHOWING:

Rau Project

2M/10M Contours &Ortho

Sheet-5

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SCALE 1 : 20 000

DATUM: NORTH AMERICAN DATUM 1983
PROJECTION: UTM ZONE 08

PREPARED BY:

CHALLENGER GEOMATICS LTD.

CALGARY (403)253-8101

DATE : April 07, 2010

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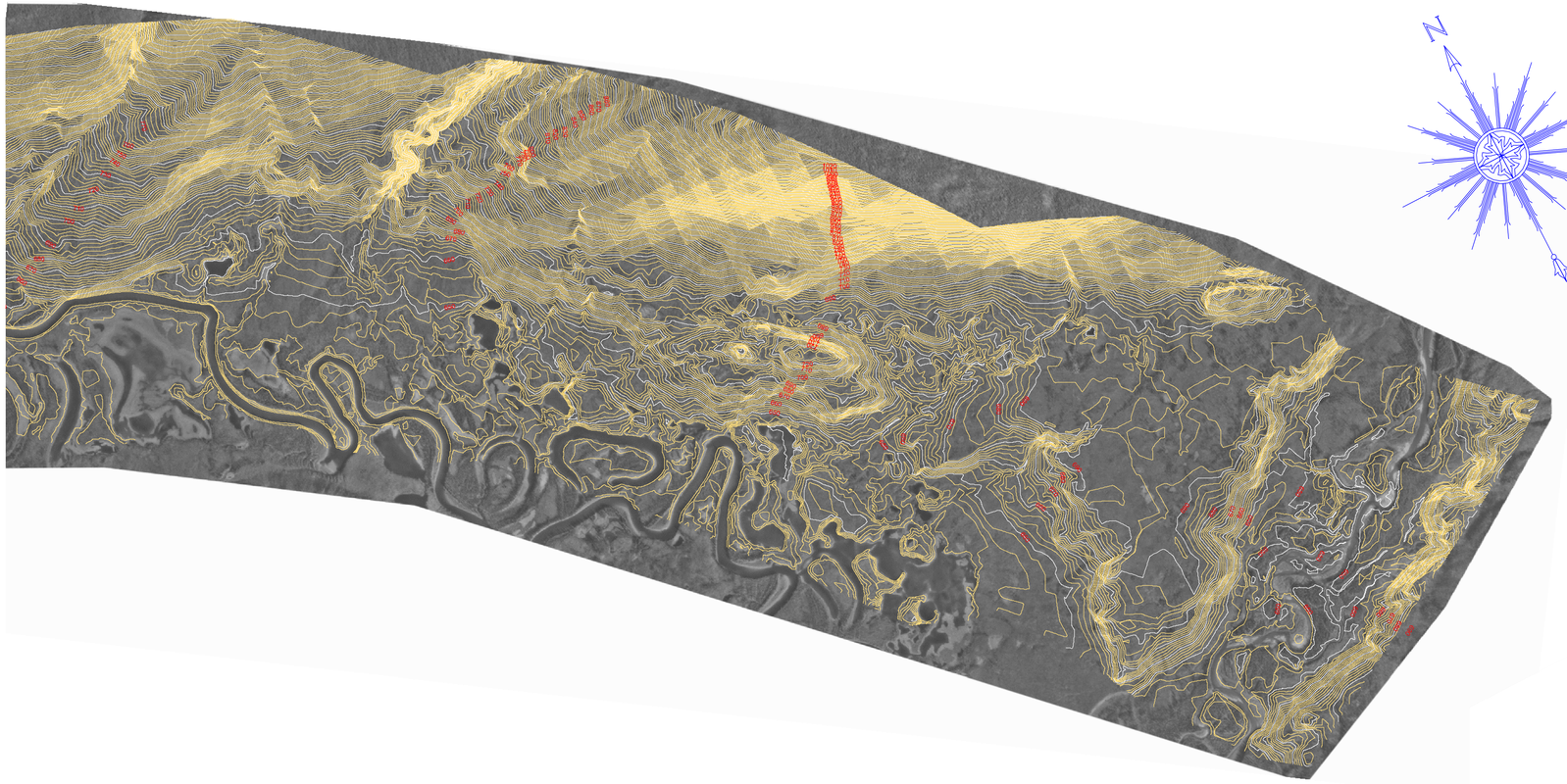
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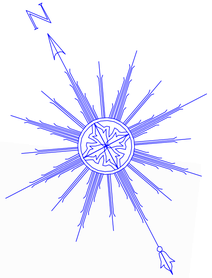
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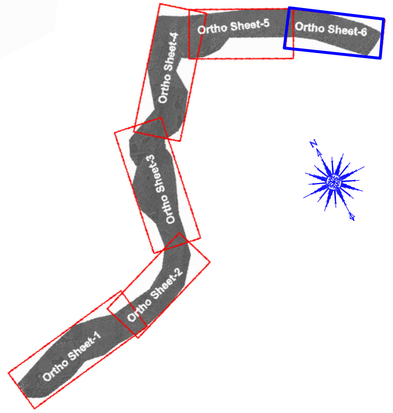
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Archer, Cathro and Associates (1981) Limited

MAP SHOWING:

Rau Project

2M/10M Contours &Ortho

Sheet-6

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SCALE 1 : 20 000

DATUM: NORTH AMERICAN DATUM 1983
PROJECTION: UTM ZONE 08

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--Aerial Photography Flown Year : September 19,1995 at the Scale of 1:50,000.
--DEM Supplied by Challenger Geomatics Ltd.
--2m/10m Contours Computed from Collected DEM.

PREPARED BY:

CHALLENGER GEOMATICS LTD.

CALGARY (403)253-8101

DATE : April 07, 2010

DRAWN : sw

JOB NO : 24341

ACAD NO : Rau Project

REVISION : 0

REVISION TABLE

NO	DESCRIPTION	DATE	BY
0	Map Issued	Apr.07,2010	sw

APPENDIX III

REPORT BY EBA ENGINEERING CONSULTANTS LTD.

ARCHER, CATHRO AND ASSOCIATES (1981) LIMITED

RAU PROPERTY - TERRAIN ASSESSMENT AND ACCESS ROUTE EVALUATION

W14101185

March 2010

EBA Engineering Consultants Ltd.
p. 867.668.3068 • f. 867.668.4349
Calcite Business Centre • Unit 6, 151 Industrial Road • Whitehorse, Yukon Y1A 2V3 • CANADA

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4.1 Surficial Geology 3
4.2 Terrain Hazards 4
5.0 DISCUSSION AND RECOMMENDATIONS 7
6.0 LIMITATIONS 8
7.0 CLOSURE 9

FIGURES

Terrain Legend for Figure 3
Figure 1 Location Map
Figure 2 Potential Road Alignment Options
Figure 3 Detailed Terrain Map (12 sheets)

APPENDICES

Appendix A General Conditions

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) was retained by Archer, Cathro and Associates Ltd. (Archer Cathro) to carry out a preliminary route selection and assessment of terrain for a suitable pioneer trail to the Rau Mining Property, that could be upgraded to an all-weather road pending future mine development. The Rau Property is located in the Wernecke Mountains, about 50 km northeast of Keno City, Yukon and 385 km north of Whitehorse (Figure 1). This part of the central Yukon is included within the Na-cho Ny'a'k Dun (NND) First Nation traditional territory.

The preferred route (Option A – Figure 2) from the Hansen Lake Road, north of Keno City, Yukon follows the Rankin Creek valley and intersects the Wind River Trail (winter road) at Clark Lakes. The approximate centre of the study area is in UTM Zone 8 at 506000E and 7107000N and the route alignment is located on NTS maps 105M/14, 105M/15, 106D/1, 106D/2 and 106D/3. Stereoscopic air photograph interpretation and terrain mapping was undertaken by EBA Engineering Consultants Limited (EBA) for a minimum two kilometre wide corridor along the preferred access trail option in the Wernecke Mountains.

The Wernecke Mountains area has a long history of mining exploration. The Wind River Trail (winter road) was developed by Amerada Petroleum Corporation in 1959 to haul oil well drilling equipment and supplies to their camps on Eagle Plains. It has subsequently been used to service mining exploration projects.

2.0 METHODOLOGY

Terrain mapping was completed to characterize parent soils, drainage, genesis of surficial materials, slopes and geomorphological processes. This information is useful to identify favourable terrain, soils and environmental conditions for an access route. The following criteria were considered for the proposed route selection:

- minimize stream crossings;
- locate stream crossings in stable reaches with favourable surface conditions for bridge abutments and suitable approaches to minimize impacts;
- avoid areas with potential environmental concerns such as unfavourable soil conditions, permafrost and geomorphological processes such as flooding, landslides and avalanches;
- favourable construction materials;
- minimize environmental impact;
- locate the route in areas with favourable drainage; avoid lower hillslopes that are receiving areas for run-off and shallow groundwater. Locations with better drainage and soil conditions will require less water management and water control structures, and will require less maintenance.

NTS contour maps, geology mapping and air photographs for the study area were reviewed. 1:20,000 scale, black and white 1996 air photograph coverage for most of the route was used and is judged to be suitable for detailed terrain mapping with follow-up ground-truthing. Ground-truthing has not been completed to date and the mapping provided in this report remains at a general reconnaissance level of Terrain Survey Intensity (Level E-RIC, 1996[1]). Field-checking of up to 25% of the terrain polygons is planned for 2010 to increase the Terrain Survey Intensity to Level D, suitable for regional planning.

Stereographic review and interpretation of air photography was completed to map terrain and locate a probable route for a pioneer trail to the Rau Property. Consideration was given to a route that would be suitable for upgrading to an all-season road. Air photograph coverage at 1:20,000 is not available for the section of trail located in the Beaver River valley and terrain mapping in this section was completed at a reduced survey intensity level using 1:50,000 scale (approx.) air photographs. The results of the terrain mapping and route selection are preliminary and terrain soil conditions and water crossing locations cannot be verified until field checking and further aerial reconnaissance is completed.

Selection of the proposed access road alignment options (Figure 2) was guided by terrain conditions interpreted from review of air photographs including slope gradient, soil moisture and drainage, permafrost potential, erosion potential, overburden thickness, stream crossings, proximity to stream channels, assumed soil texture and geomorphological processes.

3.0 PHYSIOGRAPHY

The study area is located at the northern extent of the Stewart Plateau and Wernecke Mountains of the Mayo Lake-Ross River and Wernecke Mountains Ecoregions, and is largely glaciated by one or more glaciations. The area lies mostly within the Wernecke Mountains, which are characterized as steep, rugged topography with narrow valleys, although the valleys are wider in the southern part of this region where the access trail is proposed. Major watercourses in the area form the headwaters of the Stewart River, which flows to the Yukon River. The road corridor lies above 700 metres elevation above sea level with generally low relief. The maximum elevation is about 850 metres at the pass between Rankin and Scougale Creeks. The most common vegetation in valleys and on lower slopes is mixed spruce and aspen forest.

The area is predominantly underlain by metamorphic and sedimentary rocks. Valley floors and lower valley sideslopes are overlain by thick deposits of glaciofluvial material and glacial till. The proposed trail route is located within an area of discontinuous widespread permafrost. The full extent of the route is located on south and east-facing slopes, much of which appears to be in well-drained parent material, terrain conditions that are consistent

[1] Howes, D.E. and E. Kenk. Terrain Classification System for British Columbia. Version 2. Province of British Columbia. 1997.

with a low probability of permafrost. However, ground-truthing and more detailed evaluations are required to establish the extent of permafrost along the corridor.

4.0 SUMMARY OF RESULTS

Five route options were evaluated by stereoscopic air photograph interpretation. The results of the evaluation are summarized on Table 1.

The air photograph interpretation indicates that Option A contains suitable terrain for a pioneer trail that could be improved to construct an operative all-season road occurs throughout the length of the proposed route. A suitable access trail alignment, subject to ground-truthing, has been located through gentle to moderate terrain of suitable material to maximize cost-effective cut and fill methodology (Figures 1 to 12). The proposed pioneer trail is about 70 km in length from the Hansen Lake road to the cut-off for the active exploration site. A further 7 kilometres is proposed from the turn-off to the camp east to a proposed airstrip.

The proposed route from the Hansen Lake road via Gambler Lake and the Keno-Ladue River to Clark Lakes bypasses a section of the Wind River winter trail that is reported to be unsuitable for development as an all season road due to drainage, winter glaciation and overflow issues. The preferred route intersects the Wind River Trail (winter road) at Clark Lakes, following this existing trail to the Rau Property boundary at the Beaver River.

4.1 Surficial Geology

Surficial materials in the study area include fluvial material deposited by present streams and rivers, glacial till, glaciofluvial sands and gravels, and colluvium.

Fluvial plains (Fp) are typically sand and gravel with some silt and cobbles deposited in modern (Quaternary) drainages and include floodplain deposits subject to periodic floods. Till (moraine) deposits are deposited directly by glacier ice without modification by any other agent of transportation. Till (M) mapped in the study area includes Mv: till veneer (0-1m thick) that conforms to bedrock topography; and Mb: till blanket (>1m thick), a gently to moderately sloping plain controlled by bedrock.

Glaciofluvial deposits (FG) are stratified to massive, poorly to well sorted; gravel and sand with minor silt and occasional cobbles and boulders that are deposited by meltwater originating from glacial ice. Glaciofluvial deposits are generally preferred sources of granular material for road construction. A glaciofluvial terrace (FGt) is typically greater than 5 m to 10 m thick.

Colluvial deposits (C), common on all slopes in the region, include diamicton and gravel, shattered bedrock and lenses of sand and silt derived from bedrock and surficial materials by a variety of physical and chemical weathering processes. Transport of dislodged debris occurs as surface creep, sheetwash, or by mass wasting processes. In some sections the

proposed access trail route is located at the base of moderate gradient slopes where colluvium would be the dominant surficial material expected.

Morainal (till) deposits (M) are deposited directly by glacial ice. In the study area, till blanket (Mb; >1m thick) is mapped underlying lower valley slopes of the Beaver River.

4.2 Terrain Hazards

Throughout the study area, the geomorphological processes within the route corridor identified by stereoscopic air photograph interpretation were limited to two areas of potential avalanche (-A) hazard and a small, slow movement landslide about 1.5 km past the junction with the mine access trail. There is some potential for debris flow landslides (-Rd) in streams that drain mountain basins. No areas of potential rockfall were mapped within the road alignment corridor and, with the exception of some stream and river crossings, the proposed trail is located in areas judged to have a low probability of flooding.

Avalanche hazard in the study area is not extensive and is judged to be manageable if the access road was to be used in the winter period. The small landslide identified in the Beaver River valley is judged to be a slow moving and possibly inactive slide initiated on an escarpment from relic undercut by an abandoned river channel (Figure 11). Conscientious drainage management and location of the road corridor on gentle terrain upslope of this feature are judged to be adequate to have a low probability of impact. This area should be ground-truthed to assess terrain stability prior to construction.

Table 1: Summary of Alternate Route Assessments	
ROUTE OPTION	DESCRIPTION AND ASSESSMENT
Option A (Recommended)	From Hansen Lake Road about 12 km northwest of Keno City via Gambler Lake, Rankin Creek and Wind River Trail from Clark Lakes to Beaver River
▪ terrain conditions appear favourable throughout the area of the proposed route; ▪ avoids a potentially problematic section of the Wind River Trail with poor drainage conditions; ▪ optimizes a stable section of the existing Wind River Trail.	
Option B	Alternate access to Route A via Keno City and the Marg Winter Trail
▪ follows a narrow, steep-sided valley with an existing trail. A section of the most northerly part of the existing trail is located within the floodplain of the main stream; ▪ a 600 m section crosses slide debris from a relic landslide on the northwest valley hill slopes; ▪ central section appears to include some glaciofluvial terraces that may provide favourable construction material; ▪ southern section includes existing mining trails, however, many do not correspond to a direct route and may not be practical; ▪ access is through Keno City. Disturbance from commercial traffic was identified as an issue with recent mine access planning and development of the local Alexco Resources Bellekeno Mine; ▪ Conclusion: this is a feasible route; however, some existing trails along the route are pioneer trails that do not correspond to the most favourable alignment. Long sections, particularly in the north, follow narrow, steep-sided valley hillslopes that may limit road location to potentially imperfectly-drained lower slopes and/or the floodplain of the stream. The terrain is less favourable than that of other route options.	
Option C	Alternate access to Route A from the Hanson Lake Road via the north side of Ladue Lake
▪ Much of the route is located within NND Lands; ▪ About 3 km of the route follows close to the shore of Ladue Lake across low valley sideslopes that receive run-off from high mountain slopes with two stream crossings; drainage management and construction close to the lake may require strict environmental conditions; the alternate route by Gambler Lake is likely a more practical alternative; ▪ Conclusion: terrain, location and drainage issues present this route as less favourable than Option A.	

Table 1: Summary of Alternate Route Assessments	
ROUTE OPTION	DESCRIPTION AND ASSESSMENT
Option D	Wind River Trail (winter road) from Hansen Lake Road to Clarke Lakes
▪ much of this route is located in low elevation areas with poor drainage conditions reported; construction through these areas may present unfavourable environmental conditions and higher construction costs; ▪ follows the existing Hansen Lake Road to it's terminus ("km 0"); ▪ km 1 to km 24: the winter trail is located on lower hillslopes; much of this section of the route appears to have a high likelihood of imperfect drainage and it is the receiving area for run-off from upper hillslopes; upgrades to this section may be constrained by water issues that would require disproportionate water management and specialized construction; however, the winter route parallels a broad (FG) terrace with irregular terrain and numerous kettle lakes located within about 2 km north of the winter trail. Surficial materials in this area are more likely to be well drained sands and gravels providing favourable material for road construction and this may be a practical alternate route. ▪ km 24 to km 29 (Clark Lakes): the winter trail is located on lower hillslopes and flat valley floors, receiving considerable run-off drainage from upper hillslopes; in this area there doesn't appear to be a more favourable alternative for the route location; ▪ most of the route has a north-facing aspect with a high probability of permafrost; specialized construction in areas of permafrost would be required to reduce the possibility of permafrost degradation; ▪ new road construction distance (north of the terminus of Hansen Lake Road) is shorter than Option A (29 km verses 37 km for Alternative A); however, poor drainage and soil conditions on the Wind River Trail would likely necessitate relocation of the route through much of the area;	
Option E	Alternate access to Wind River Winter Road via southeast side of Scougale Creek within NND R-4A Settlement Lands
▪ most of the route is located within NND Lands; ▪ terrain along the route is favourable and the parent materials are likely suitable for road construction; ▪ there is no existing trail; the alternate route (Option A) on the northwest side of Scougale Creek follows the existing Wind River Trail; ▪ the south approach to the Beaver River crossing is not optimal (moderately steep, relatively long slope embankment; the south bank of the Beaver River channel is at the toe of the slope).	

5.0 DISCUSSION AND RECOMMENDATIONS

This reconnaissance level study is based solely on air photograph interpretation and the terrain mapping must be field-checked and revised prior to its use for development planning. EBA does not endorse the results of this preliminary study prior to field checking and subsequent mapping revisions.

Based on stereoscopic air photograph interpretation by EBA and an aerial reconnaissance completed by Archer Cathro in 2009, Option A (Table 1) is judged to be the preferred option for the proposed pioneer trail to the Rau Property for the following reasons:

- Favourable terrain conditions and surficial materials;
- optimizes a stable section of the existing Wind River Trail between Clark Lakes and the Beaver River;
- Abundant favourable granular borrow material for road construction is mapped throughout the route;
- Alternate route options include unfavourable terrain conditions in some sections or they are located on NND Settlement Lands.

Assessment of the terrain has been completed at a reconnaissance level with no field checking. Much of the terrain along the proposed route is generally characterized by glaciofluvial deposits with good drainage. Some sections with underlying till and colluvium appear to have favourable or manageable drainage conditions. The proposed route is located on south and east aspects with a resultant lower likelihood of permafrost. Field-checking is recommended to validate the terrain interpretation and confirm soil textures.

Prior to proceeding with advanced planning for construction, low level air photos (e.g., 1:20,000 scale) should be acquired along the Beaver River section of the proposed trail to permit detailed terrain mapping and development planning. Stream crossings should be assessed by a professional to design effective and adequate crossing structures. High energy mountain streams with active geomorphological processes such as debris flows may be encountered and will require specific assessment to select stable crossing locations and suitable structures. River crossings should be surveyed to aid in bridge design. Once access to the area has been established with the development of a pioneer trail, a geotechnical test pitting program is recommended to confirm sub-surface materials along the corridor, at major stream crossings and at potential borrow locations.

Where possible, slopes with less favourable drainage conditions (high soil moisture) (e.g., lower valley hillslopes) should be avoided. Once the results of field checking and revisions are integrated to complete this study, if actual terrain conditions encountered at any specific site do not conform to the broad mapping polygon, a qualified professional should be retained to provide a site specific assessment and to provide recommendations for construction and drainage management.

South-facing slopes are less likely to be underlain by permafrost and are generally preferred for road construction. Permafrost is also less likely in the fluvial plains of major streams and rivers. The presence of permafrost should be evaluated during ground-truthing. If permafrost is identified, alternate routes should be sought to avoid these areas or specific construction methods designed by a qualified professional should be applied for construction in these areas.

Active natural erosion, weathering and periglacial processes are expected to have minimal to negligible impact on the proposed trail alignment. Avalanche conditions were noted on an east-facing slope in the headwaters of Rankin Creek at about kilometer 31 of the proposed access trail and on some slopes in the Beaver River valley. Avalanche hazard should be considered when designing maintenance and safety protocols for an all-season road.

Sixteen potential borrow areas for construction material have been located as a preliminary guide for assessment. These sites require field assessment and testing, and if selected as a source of borrow material for future road construction, a borrow pit would be developed within the area, i.e., borrow material would be acquired from a small part of the exploration area shown. Borrow Areas have been located in gentle to moderate terrain with slopes of less than 30 % gradient and greater than 30 m from a watercourse. The borrow areas are judged to have favourable drainage and are located in areas that could be developed and managed with a low probability of environmental impact.

The airstrip is located on terrain mapped as a glaciofluvial terrace. This terrain type typically provides optimum conditions for development of an airstrip, namely flat topography slightly raised above adjacent terrain, loose sand and gravel parent materials and good drainage.

6.0 LIMITATIONS

The reconnaissance level terrain interpretation was completed by review of air photographs with no field checking. Terrain polygon boundaries were not georectified and all boundaries and access trail locations are approximate. Field checking of terrain must be completed before the surficial geology interpretation is used for development planning. Stream crossings cannot be adequately evaluated prior to an on-site assessment.

7.0 CLOSURE

This report has been prepared for the exclusive use of Archer Cathro and Associates (1981) and their agents for the specific application described in this report. It has been prepared in accordance with generally accepted geoscience practices, and geoscience judgement has been applied in developing the recommendations of this report. Further limitations on the use of this report are outlined in the General Conditions (Appendix A) that form a part of this report.

EBA Engineering Consultants Ltd.

Reviewed by:

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FIGURES

TERRAIN LEGEND FOR FIGURE 3

(1) TERRAIN UNIT SYMBOLS

surficial material ↘ ↙ initiation zone
texture → **aCk - R"b** ← geomorphological process subclass
surface expression ↗ ↖ geomorphological process

Composite Units: Up to three letters may be used to describe any characteristic. Processes follow the dash "-" symbol.

e.g.	Mv•Rk	indicates "Mv" and "Rk" are roughly equal in extent
	Mv/Rk	indicates "Mv" is more extensive than "Rk" (about 2/1 or 3/2)
	Mv//Rk	indicates "Mv" is much more extensive than "Rk" (about 3/1 or 4/1)
	/Mw Rk	indicates "Rk" is partially buried by "Mw"

Stratigraphic Units: When one or more surficial materials overlie a different material or bedrock.

e.g.	Mw Rr	indicates that "Mw" overlies "Rr"

(2) TEXTURE

Specific Clastic Terms

c	clay	< 2 µm
z	silt	2 - 62.5 µm
s	sand	62.5 µm - 2 mm
p	pebbles	2 mm – 64 mm; rounded particles
k	cobbles	64 mm – 256 mm; rounded particles
b	boulders	> 256 mm; rounded particles
a	blocks	> 256 mm; angular particles

Common Clastic Terms

x	angular fragments	mixture of rubble (r) and blocks (a)
g	gravel	mixture of pebbles (p), cobbles (k), boulders (b) and up to 20% sand
r	rubble	angular particles < 64 mm

(3) MATERIALS

C	Colluvium	Products of gravitational slope movements; materials derived from local bedrock and major deposits derived from drift; includes talus and landslide deposits. Includes up to 20% bedrock.
F	Fluvial sediments	Sands and gravels transported and deposited by streams and rivers; floodplains, terraces and alluvial fans.
FG	Glaciofluvial sediments	Sands and gravels transported and deposited by meltwater streams; includes kames, eskers and outwash plains.
LG	Glaciolacustrine sediments	Fine sand, silt and clay deposited in ice-dammed lakes.
M	Till	Material deposited by glaciers without modification by flowing water. Typically consists of a mixture of pebbles, cobbles and boulders in a matrix of sand, silt and clay; diamicton. Includes up to 20% bedrock and/or colluvium.
O	Organic materials	Material resulting from the accumulation of decaying vegetative matter; includes peat and organic soils.
R	Bedrock	Outcrops and bedrock within a few centimetres of the surface. Includes up to 20% colluvium.

4) SURFACE EXPRESSION

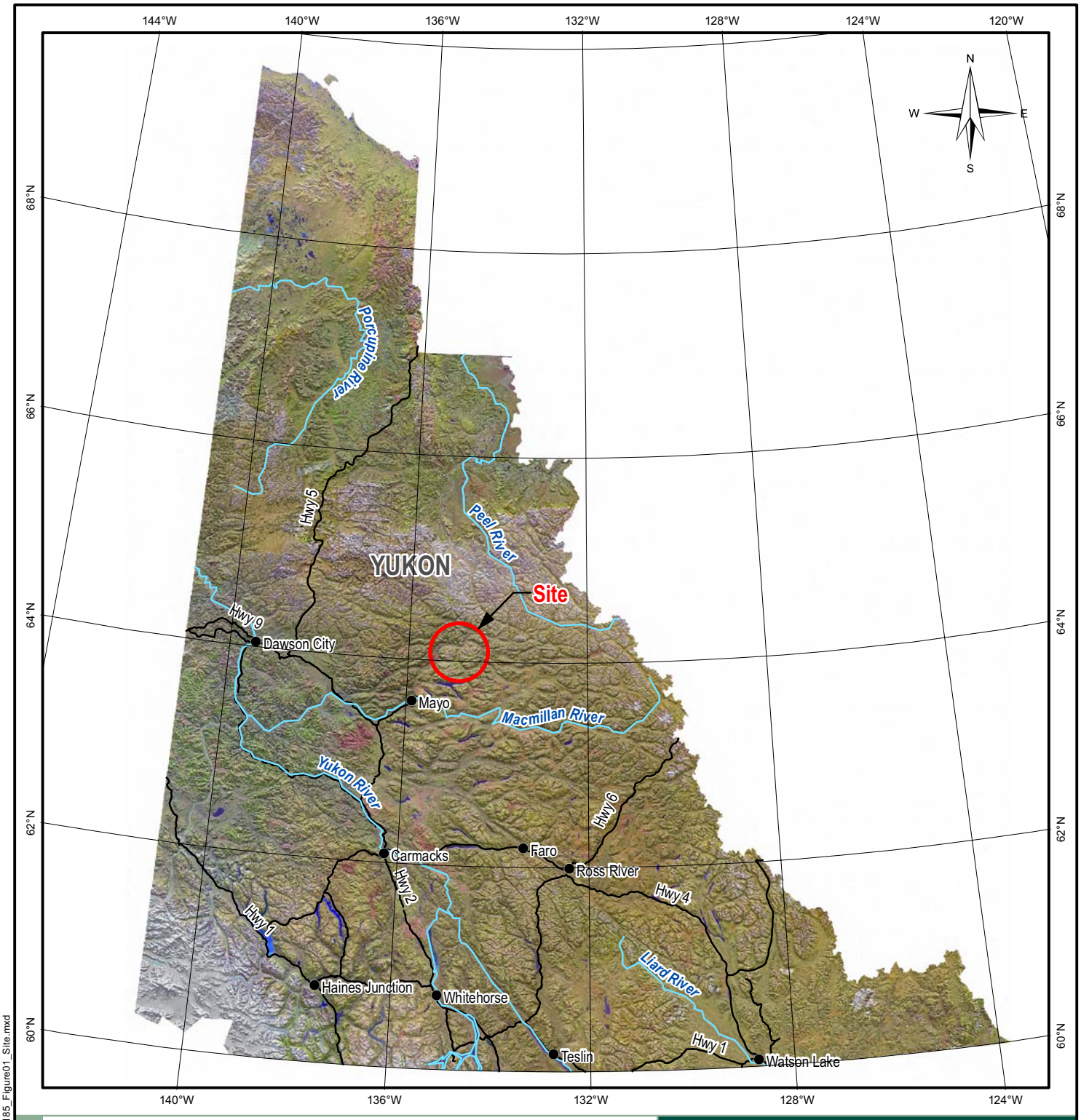
a	moderate slope(s)	predominantly planar slopes; 15-26º (28 - 49%)
b	blanket	material >1-2 m thick with topography derived from underlying bedrock (which may not be mapped) or surficial material
d	discontinuous	used with FG where it indicates partial coverage due to erosion or interrupted deposition with exposure of underlying or secondary (M)
f	fan	a fan-shaped surface that is a sector of a cone; slopes 3-15º (5-27%)
h	hummocky	steep-sided hillocks and hollows; many slopes 15º (27%) and steeper
i	irregular	mostly used with FG; low to moderate relief (less than 10 m) irregularly shaped hummocks, low ridges, hollows, swales typically found in glacial ice-melt areas; may include kettled topography, discontinuous eskers, depressions and discontinuous glaciofluvial channels
j	gentle slope(s)	predominantly planar slopes; 4-15º (6 - 27%)
k	moderately steep slope	predominantly planar slopes; 26-35º (50 - 70%)
m	rolling topography	linear rises and depressions; < 15º (27%)
p	plain	0-3º (0-5%)
r	ridges	linear rises and depressions with many slopes 15º and steeper
s	steep slope(s)	slopes steeper than 35º (> 70%)
t	terrace(s)	stepped topography and benchlands
u	undulating topography	hillocks and hollows; slopes predominantly <15º
v	veneer	material <1-2 m thick with topography derived from underlying bedrock (may not be mapped) or surficial materials; may include outcrops of underlying material
w	mantle	surficial material of variable thickness
x	thin veneer	a subset of v (veneer), where there is a dominance of surficial materials about 10-25 centimetres thick

(5) GEOMORPHOLOGICAL PROCESSES

A	Avalanche	Slope or parts of slope affected by downhill transport of snow and resulting deposition
B	Braiding channel	Active channel zone is characterized by many diverging and converging channels separated by unvegetated bars. Many channels are dry at moderate and low flows, but during major floods, the entire channel zone may be occupied by flowing water.
E	Channelled by meltwater	Erosion and channel formation by meltwater alongside, beneath, or in front of a glacier or ice sheet.
F	Failing	Slope experiencing slow mass movement, such as sliding or slumping
R	Rapid mass movement	Slope or parts of slope affected by processes such as debris flows, debris slides and avalanches, and rockfall
V	Gullying	Slope affected by gully erosion.

Mass Movement Sub-Classes

-R	rapid mass movement
-R"	rapid mass movement - initiation zone
-Rb	rock fall
-Rs	debris slide



LEGEND

- Populated Place
- Major Road
- Major River

NOTES

Base data source:
Geomatics Yukon

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RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Site Location

PROJECTION	DATUM
Yukon Albers	NAD83

Scale: 1:6,000,000

100 50 0 100

Kilometres

EBA Engineering Consultants Ltd.

FILE NO.: W14101185_Figure01_Site.mxd

PROJECT NO.	DWN	CKD	REV
W14101185	MEZ	JD	0

OFFICE	DATE
EBA-VANC	March 23, 2010

Figure 1

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480000 490000 500000 510000 520000 530000 540000 550000

7120000 7110000 7100000 7090000

N W E S

NND R-9B

NND R-5A

NND R-4A

Clark Lakes

McQuesten Lake

Hanson Lakes

Beaver River

Rackla River

Keno Ledue River

Option A

Option B

Option C

Option D

Option E

480000 490000 500000 510000 520000 530000 540000 550000

LEGEND

Proposed Road Alignment Options

- Option A
- Option B
- Option C
- Option D
- Option E
- Road
- Trail

- Contour (100 m)
- Watercourse
- Waterbody
- Quartz Claim
- First Nations Settlement Lands

NOTES

Base data source: NTS 1:50,000 & 1:250,000

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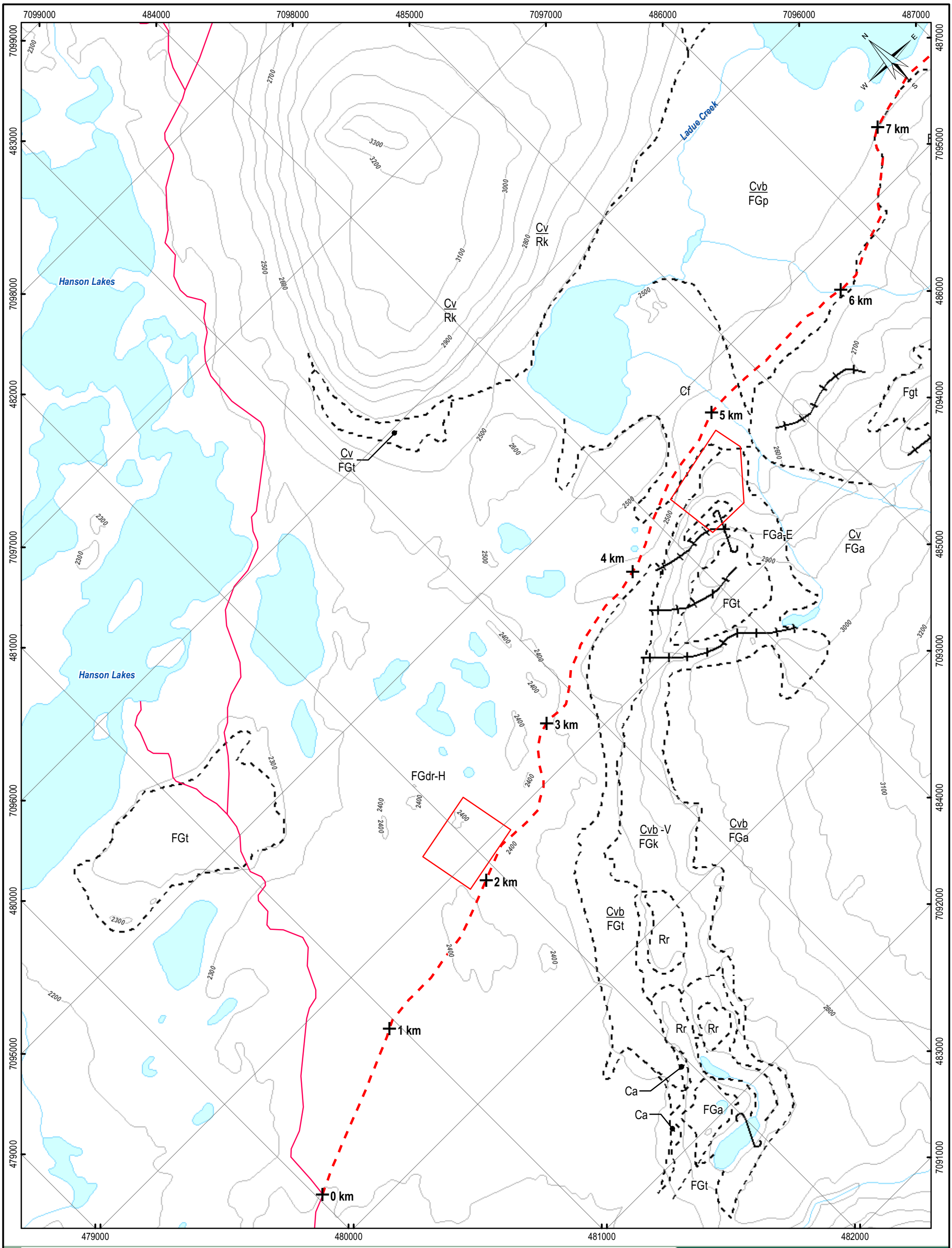
RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Potential Road Alignment Options

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FILE NO.: W14101185_Figure02_Alignments.mxd			
PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 23, 2010		Figure 2

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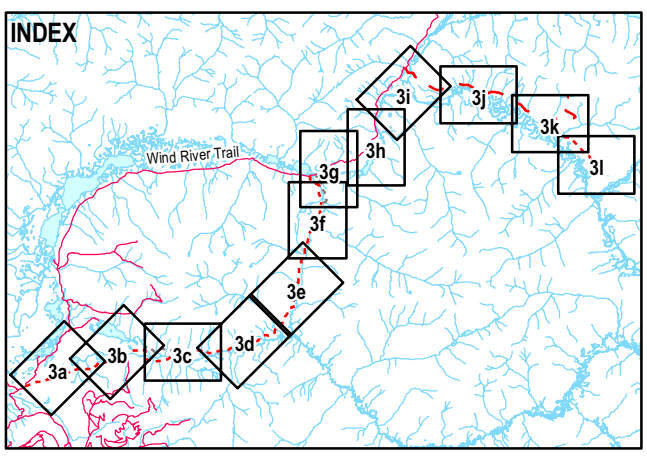
LEGEND

- Terrain Boundary
- Proposed Road Corridor
- Proposed Alternate Road Corridor
- Kilometer Marker
- Potential Borrow Source Development Area
- Glacial Ice Directional Feature (Flutings)
- Glaciofluvial Channel
- Avalanche
- Landslide
- Proposed Airstrip
- Existing Road
- Limited Use Road
- Contours (100 ft)
- Watercourse
- Waterbody
- First Nations Settlement Lands

NOTES

1. Legend of Terrain Symbols Appended
2. Base data source: NTS 1:50,000

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PROPOSED ACCESS CORRIDOR

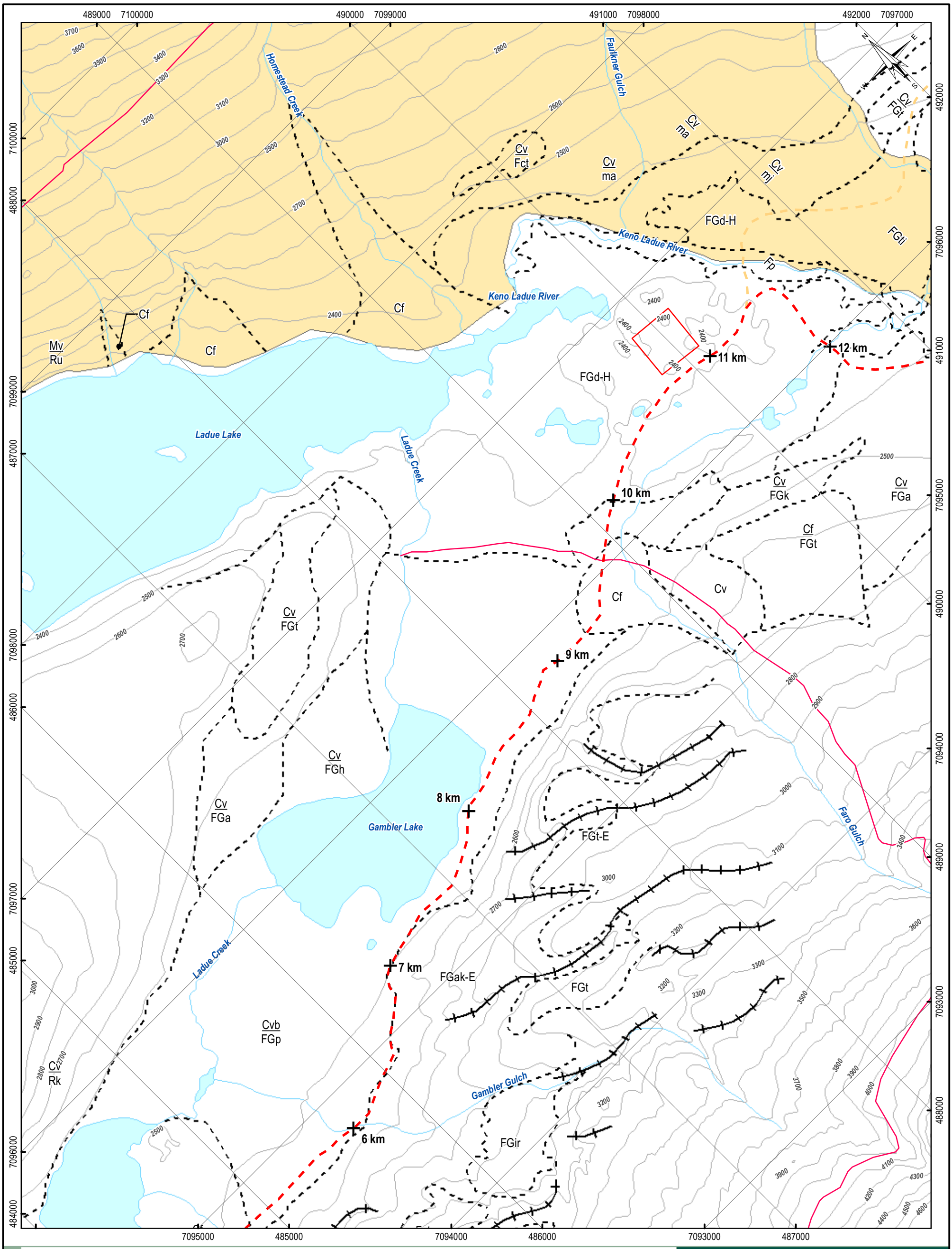
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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3a

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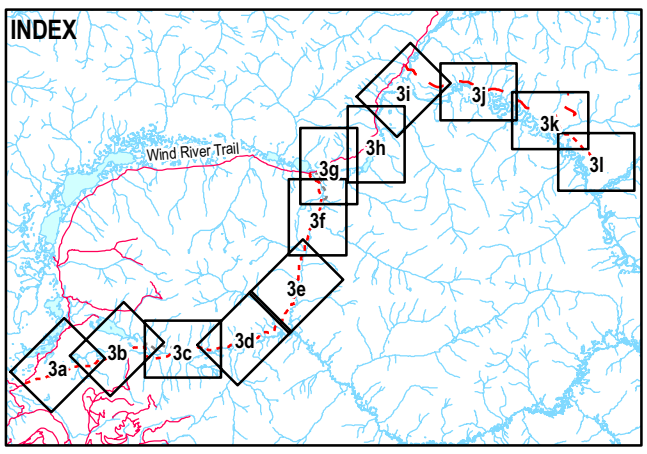
LEGEND

- Terrain Boundary
- Proposed Road Corridor
- Proposed Alternate Road Corridor
- Kilometer Marker
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NOTES

1. Legend of Terrain Symbols Appended
2. Base data source: NTS 1:50,000

ISSUED FOR REVIEW



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PROPOSED ACCESS CORRIDOR

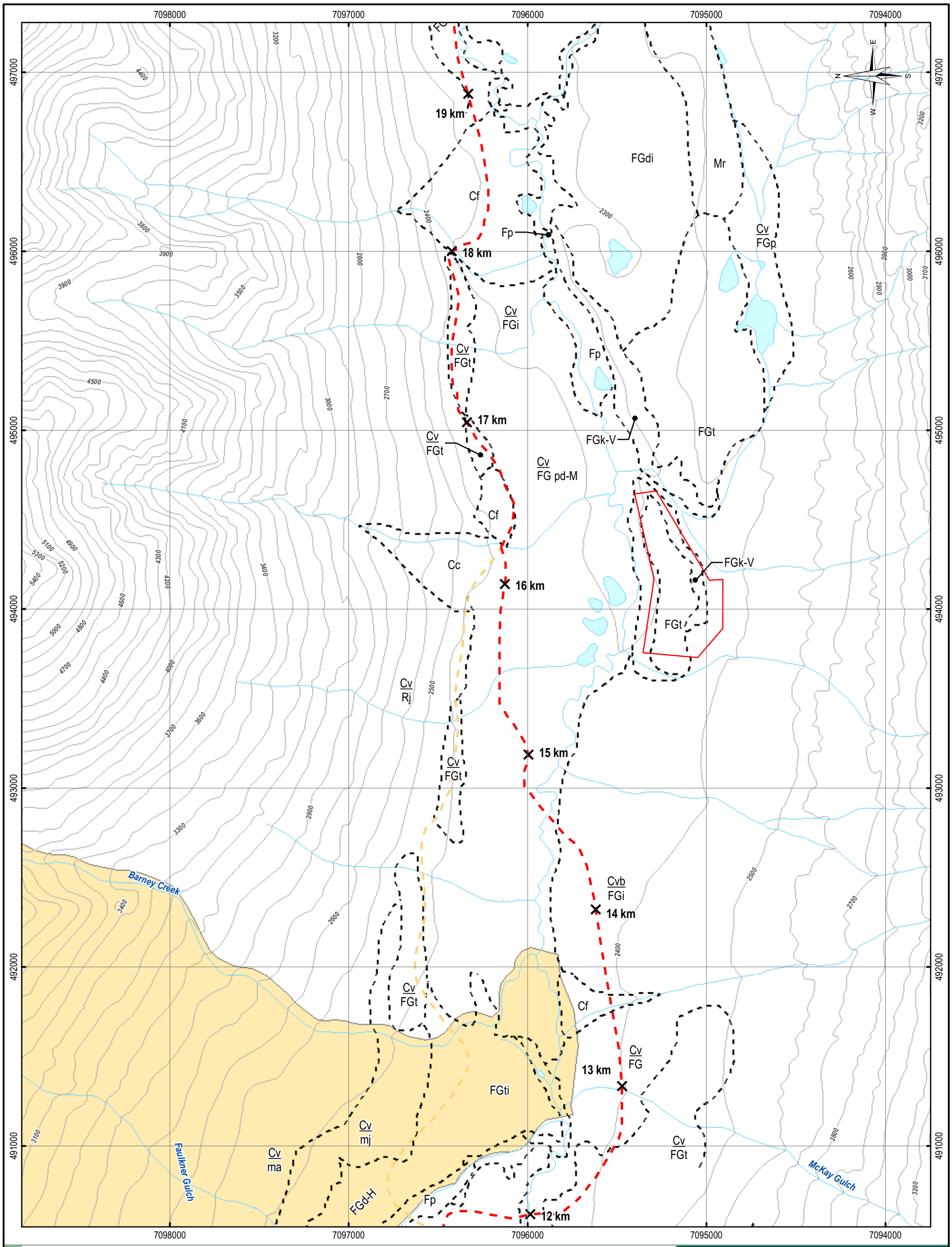
Terrain Mapping

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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

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Figure 3b

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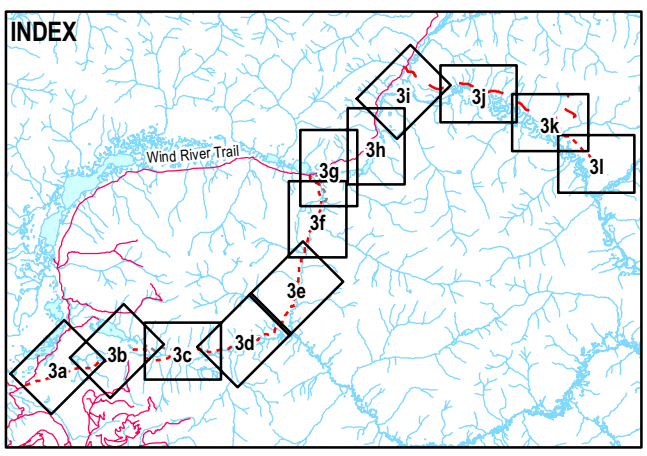
LEGEND

- Terrain Boundary
- Proposed Road Corridor
- Proposed Alternate Road Corridor
- Kilometer Marker
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NOTES

1. Legend of Terrain Symbols Appended
2. Base data source: NTS 1:50,000

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PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:20,000

400 200 0 400

Meters

FILE NO.: W14101185_TerrainMapBook.mxd

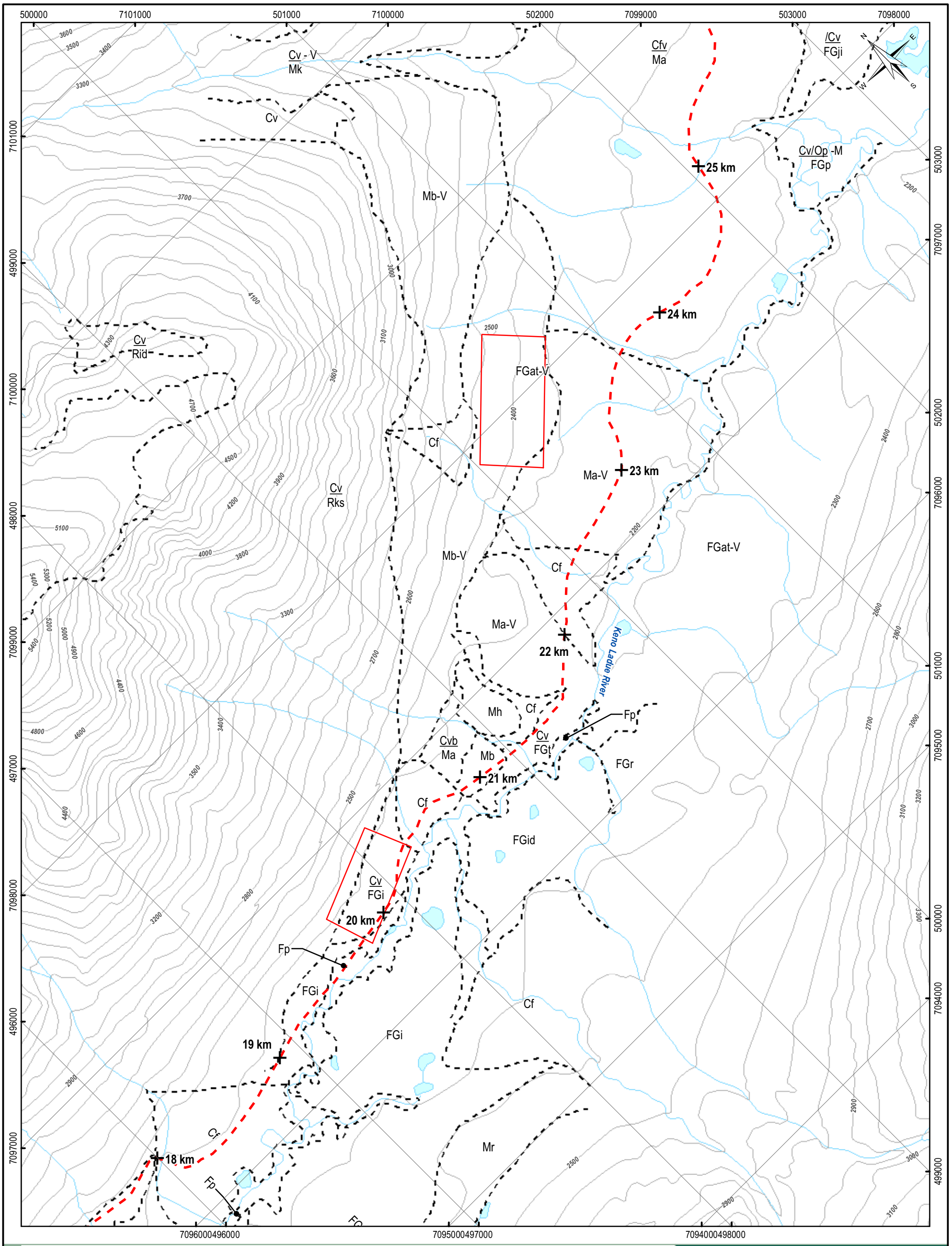
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W14101185	MEZ	JD	0

OFFICE	DATE
EBA-VANC	March 24, 2010

EBA Engineering Consultants Ltd.

Figure 3c

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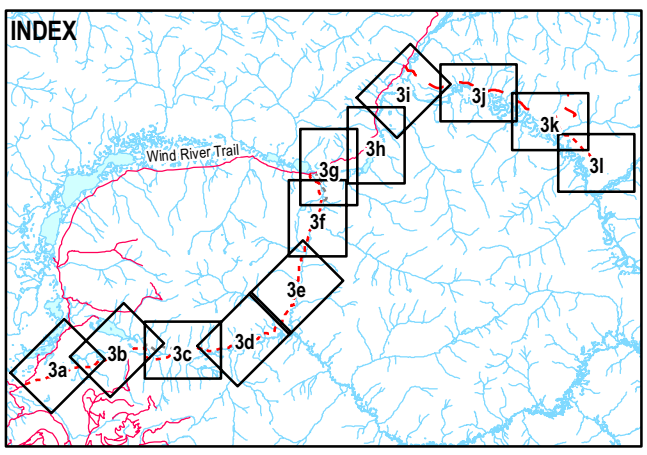
LEGEND

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ISSUED FOR REVIEW



RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION: UTM Zone 8	DATUM: NAD83		
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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

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Figure 3d

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33 km
32 km
31 km
30 km
29 km
28 km
27 km
26 km

LEGEND

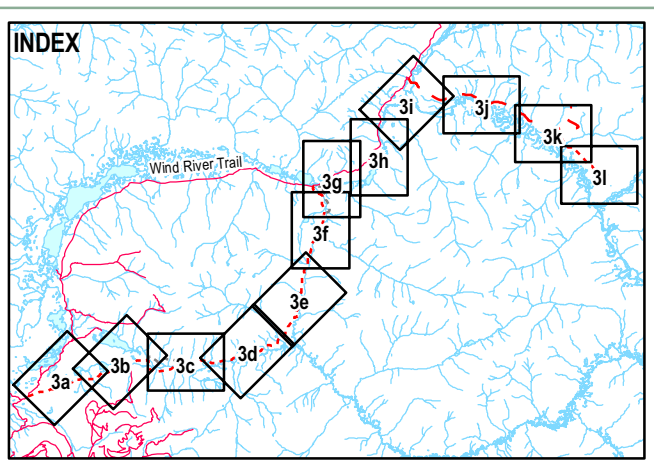
- Terrain Boundary
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NOTES

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ISSUED FOR REVIEW

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RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION: UTM Zone 8	DATUM: NAD83		
Scale: 1:20,000 (400 200 0 400 Meters)			
FILE NO.: W14101185_TerrainMapBook.mxd			
PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3e

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504000 505000 506000 507000 508000

7111000 7110000 7109000 7108000 7107000 7106000 7105000

Cv/Rk
40 km
FGk
Cv/Ra
Cv/Rm
39 km
Mk-V
Mm
Mm
Cv•Mi
Cv/Mb
Mb-E
38 km
Mvb
37 km
Mb
2800
36 km
Cv/Mb
Mb-E
Fp
35 km
Mb
FGa
Cv/Mar
Mr-E
Cf
Mbr
Rankin Creek
Cf
FGt
FGk-V
FGt
FGt
34 km
Mr-E
Cv/Rs
Mb-V
Mb
Fp
Cf
Cv/Rt
Cv/Mb
33 km
Mk

LEGEND

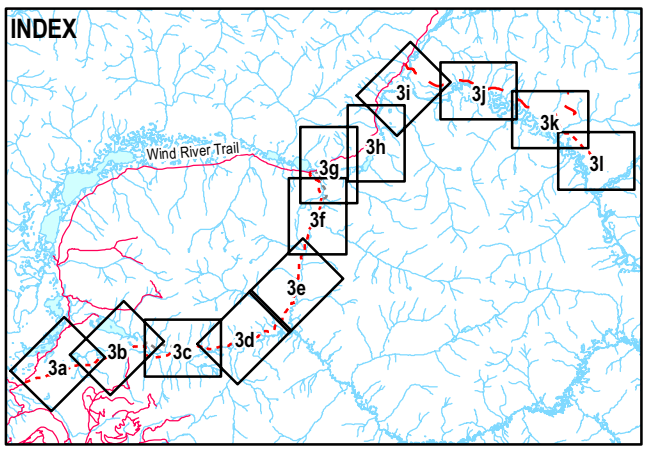
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NOTES

1. Legend of Terrain Symbols Appended
2. Base data source: NTS 1:50,000

ISSUED FOR REVIEW

INDEX



RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION: UTM Zone 8		DATUM: NAD83	
Scale: 1:20,000 (400 200 0 400 Meters)			
FILE NO.: W14101185_TerrainMapBook.mxd			
PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3f

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505000 506000 507000 508000 509000

7115000 7114000 7113000 7112000 7111000 7110000

N W E S

Cf
Cv Rks
Cfc
Cv FGt
Cv Mb
Cv Rk
Cv Ra
Cv Rm
Cv Fgp
Cv•Mi
Ov Fgt
FGa
FGr
FGt
FGk
FGka
FGti
FGak
Fp
Mk-V
Mm
Mb-E

44 km
45 km
43 km
42 km
41 km
40 km
39 km
38 km

Clark Lakes

LEGEND

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ISSUED FOR REVIEW

INDEX

Wind River Trail

3a 3b 3c 3d 3e 3f 3g 3h 3i 3j 3k 3l

RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION: UTM Zone 8	DATUM: NAD83		
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FILE NO.: W14101185_TerrainMapBook.mxd			
PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3g

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509000 510000 511000 512000 513000

7117000 7116000 7115000 7114000 7113000 7112000

51 km
50 km
49 km
48 km
47 km
46 km
45 km

Cf
FGa
FGt
Mb-V
Rk
Scougale Lakes
Cv
Cv
Fgp
FGa
FGak
FGia
FGih
FGdi

N W E S

LEGEND

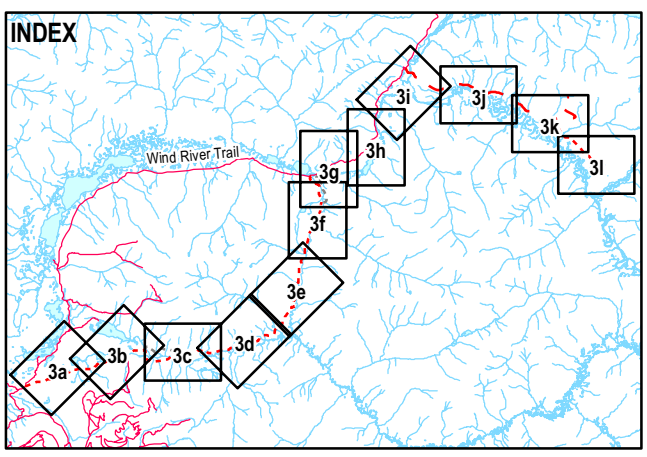
- Terrain Boundary
- Proposed Road Corridor
- Proposed Alternate Road Corridor
- Kilometer Marker
- Potential Borrow Source Development Area
- Glacial Ice Directional Feature (Flutings)
- Glaciofluvial Channel
- Avalanche
- Landslide
- Proposed Airstrip
- Existing Road
- Limited Use Road
- Contours (100 ft)
- Watercourse
- Waterbody
- First Nations Settlement Lands

NOTES

1. Legend of Terrain Symbols Appended
2. Base data source: NTS 1:50,000

ISSUED FOR REVIEW

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RAU MINING PROPERTY
PROPOSED ACCESS CORRIDOR

Terrain Mapping

PROJECTION	DATUM
UTM Zone 8	NAD83

Scale: 1:20,000

400 200 0 400

Meters

EBA Engineering Consultants Ltd.

FILE NO.			
W14101185_TerrainMapBook.mxd			
PROJECT NO.	DWN	CKD	REV
W14101185	MEZ	JD	0
OFFICE	DATE		
EBA-VANC	March 24, 2010		

Figure 3h

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514000 7123000 515000 7122000 516000 7121000 517000 7120000

7123000 513000 7122000 512000 7121000 511000 7120000 510000 7119000

7118000 510000 7117000 511000 7116000 512000 7115000

517000 7119000 516000 7118000 515000 7117000 514000 7116000 513000 7115000

60 km
59 km
58 km
57 km
56 km
55 km
54 km
53 km
52 km
51 km

Cv
FGt
FGk
Fp-I
Cv
FGt
FGk
FGa
FGt
Ov -H
FGp
FGa
FGt
FGtd
Cvf
Cf
FGt
FGtd
FGt
FGk
Cv
FGi
Mb
Cv -A
Rk
Cf

Wind River Trail
Scougale Creek

FGk
FGt
FGk
FGk
FGt
FGk
Fp-I
Fp-I

2500 2600 2700 2800 2900 3000 3100 3200 3300 3400 3500 3600 3700 3800 3900 4000 2200 2300 2400

N W S

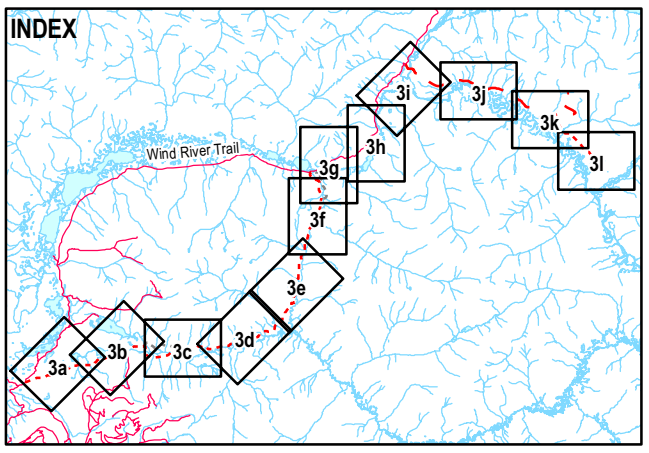
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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3i

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7121000 7120000 7119000 7118000 7117000

523000 522000 521000 520000 519000 518000 517000

67 km
66 km
65 km
64 km
63 km
62 km
61 km

Cv
Mb

Cv
Fp

Cf

Cf

Cv - VA
Rk

Fp

Beaver River

LEGEND

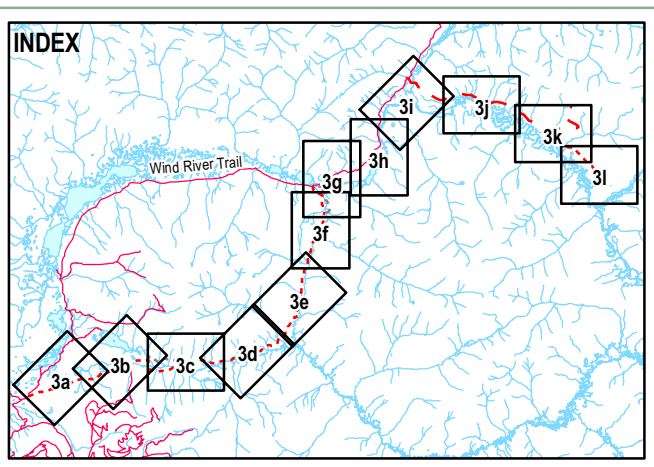
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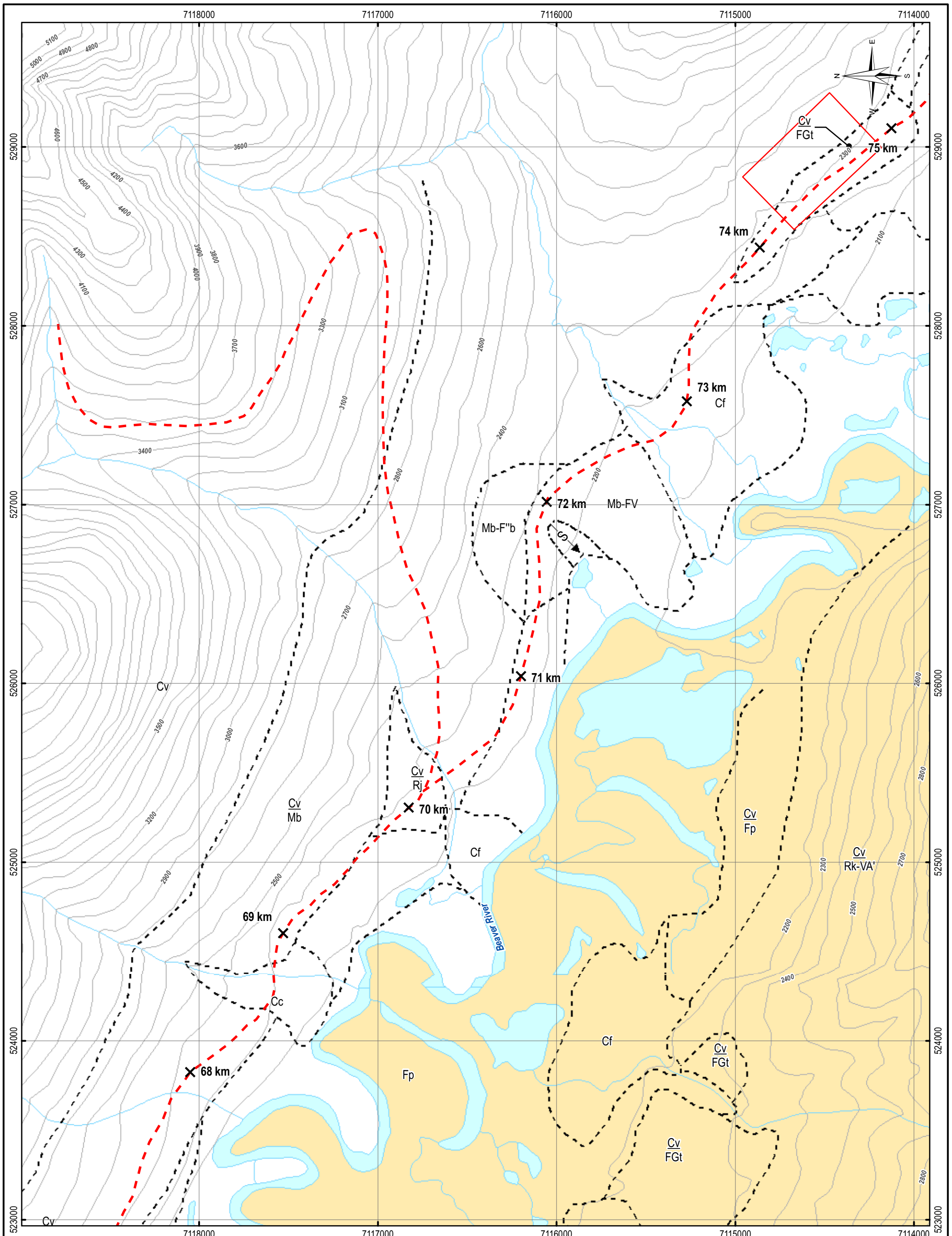
Terrain Mapping

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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3j

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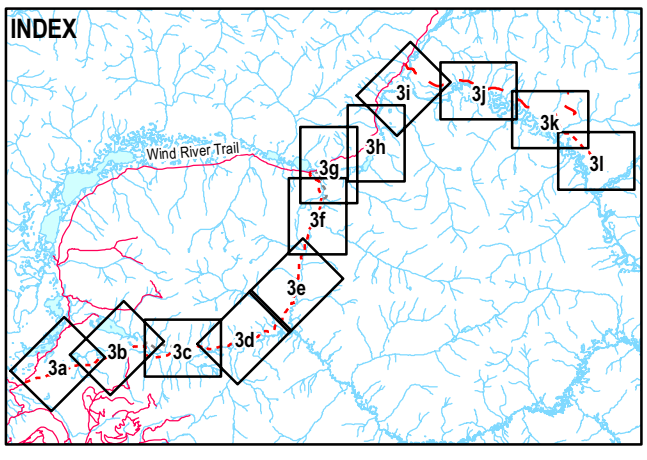
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PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3k

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7115000 7114000 7113000 7112000 7111000

533000 532000 531000 530000 529000 528000

Fp

FGh

Cv

FGt

FGa

FGi

77 km

76 km

75 km

74 km

73 km

Cv
Rh

Cv
FGt

Ft

Cv
Rk-VA'

Cf

LEGEND

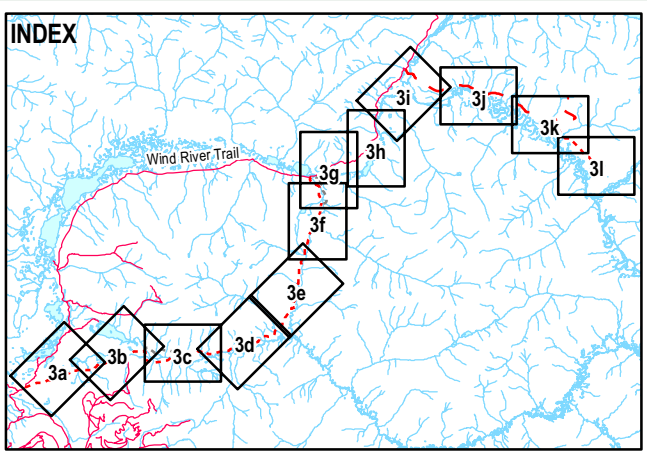
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Scale: 1:20,000 (400 200 0 400 Meters)			
FILE NO.: W14101185_TerrainMapBook.mxd			
PROJECT NO.: W14101185	DWN: MEZ	CKD: JD	REV: 0
OFFICE: EBA-VANC	DATE: March 24, 2010		

EBA Engineering Consultants Ltd.

Figure 3l

APPENDIX

APPENDIX A GENERAL CONDITIONS

GEOTECHNICAL REPORT – GENERAL CONDITIONS

This report incorporates and is subject to these "General Conditions".

1.0 USE OF REPORT AND OWNERSHIP

This geotechnical report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary geotechnical assessment.

This report and the recommendations contained in it are intended for the sole use of EBA's Client. EBA does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than EBA's Client unless otherwise authorized in writing by EBA. Any unauthorized use of the report is at the sole risk of the user.

This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of EBA. Additional copies of the report, if required, may be obtained upon request.

2.0 ALTERNATE REPORT FORMAT

Where EBA submits both electronic file and hard copy versions of reports, drawings and other project-related documents and deliverables (collectively termed EBA's instruments of professional service), only the signed and/or sealed versions shall be considered final and legally binding. The original signed and/or sealed version archived by EBA shall be deemed to be the original for the Project.

Both electronic file and hard copy versions of EBA's instruments of professional service shall not, under any circumstances, no matter who owns or uses them, be altered by any party except EBA. EBA's instruments of professional service will be used only and exactly as submitted by EBA.

Electronic files submitted by EBA have been prepared and submitted using specific software and hardware systems. EBA makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

3.0 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, EBA has not been retained to investigate, address or consider and has not investigated, addressed or considered any environmental or regulatory issues associated with development on the subject site.

4.0 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems and methods employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. EBA does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

5.0 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

6.0 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. EBA does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional investigation and review may be necessary.

7.0 SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgemental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

8.0 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

9.0 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

10.0 INFLUENCE OF CONSTRUCTION ACTIVITY

There is a direct correlation between construction activity and structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques are known.

11.0 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, as well as the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

12.0 DRAINAGE SYSTEMS

Where temporary or permanent drainage systems are installed within or around a structure, the systems which will be installed must protect the structure from loss of ground due to internal erosion and must be designed so as to assure continued performance of the drains. Specific design detail of such systems should be developed or reviewed by the geotechnical engineer. Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function.

13.0 BEARING CAPACITY

Design bearing capacities, loads and allowable stresses quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition assumed. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions assumed in this report in fact exist at the site.

14.0 SAMPLES

EBA will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

APPENDIX IV

BIOPHYSICAL REPORT BY LABERGE ENVIRONMENTAL SERVICES

BIOPHYSICAL INVESTIGATIONS

FOR THE

PROPOSED RAU ROAD ROUTE, 2010

For

ATAC Resources Ltd.

Submitted by

Laberge ENVIRONMENTAL SERVICES

January 2011

Laberge
ENVIRONMENTAL SERVICES
P.O. Box 21072
Whitehorse, Y.T.
Y1A 6P7
Office Phone: 867-668-6838
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EXECUTIVE SUMMARY

Biophysical assessments encompassing hydrology, water quality, wildlife, benthic invertebrates and fisheries were carried out during 2010 along the route of the proposed access road to the Rau Property. Hydrology was the main focus of the biophysical survey on the pioneer road in order to assess which water bodies would be affected by the construction of a winter trail and the expected flow conditions that may be encountered at any point during the year. All of the study streams would be expected to yield little or no flow in the low flow period (January-March), however, some of the streams presented measurable flow in both the March and October surveys, suggesting significant groundwater, or base flow, in some drainages. This might be an indication of frequent aufice (glacier) formation along the proposed route during winter months.

In attempts to characterize the potentially affected watersheds, water quality samples were collected on two occasions from six to eight streams. Most of the streams sampled showed evidence of qualities indicative of natural occurring mineralization in their drainages. Cameron Creek, which drains Mount Cameron, displayed unique characteristics in relation to the other streams. Cameron Creek is acidic (pH 5.23 to 6.28), milky grey in colour and exhibited high concentrations of aluminum, cadmium, cobalt, copper, iron, nickel and zinc, with most of the samples collected here exceeding the respective CCME guidelines. Creek I which drains Keno Hill, notably in the Sadie Ladue mining area, also had elevated metal concentrations.

Wildlife surveys were undertaken three times over the study period with a focus on moose. Moose were common throughout the area and the wetlands provide good rearing habitat for cows and calves. The entire route, particularly that section between Gambler Lake and lower Rankin Creek was obviously an important wintering area. Willow-dominated subalpine creek drainages between 4000 and 5000 feet asl were important habitat for moose during late autumn/early winter.

The streams assessed for aquatic biota were productive with the exception of Cameron Creek, which is likely due to its poor water quality.

It is recommended that detailed baseline biophysical assessments continue in 2011 for future access routes as well as on the main Rau property area.

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1.0 INTRODUCTION

On May 7th, 2010, Archer Cathro on behalf of the proponent ATAC Resources Ltd, submitted a project proposal to YESAB for the construction of a 40 km access road from the Hanson-McQuesten Road to the Wind River Trail. This pioneer access road would provide winter access for the transport of supplies for ongoing exploration at the Rau property. Due to public and government concern, Archer Cathro amended its proposal to instead utilize the existing access route, the Wind River Trail commencing from the Hanson-McQuesten Road to the Beaver River.

Biophysical assessments were however, still completed on the original proposed route for the 2010 season. This included some overlap with the existing Wind River Trail, especially during wildlife investigations. Hydrology was the main focus of the biophysical survey on the pioneer road in order to assess which water bodies would be affected by the construction of a winter trail and the expected flows that may be encountered at any point during the year. Fisheries and benthic invertebrate studies were also undertaken in mid summer and supported with water quality characterization of the various anticipated stream/river crossings.

ATAC Resources Ltd contracted Laberge Environmental Services (LES) to complete the environmental surveys. LES conducted four field surveys throughout 2010: March, June, August and October. Results and discussions for each of the field trips are compiled in this report.

2.0 STUDY AREA

The study area is located in the valley between Keno Hill and the Patterson Range in the south and west, and the Davidson Range to the north, extending from the Hanson Lake area north to Clark Lakes (Figure 1).

This district falls within the ecoregion Yukon Plateau-North northeast of the Tintina Trench and hosts considerable potential for metallic mineral deposits. The glaciated valleys contain numerous wetlands. The study area is within the northern boreal forest with talus slopes at the higher elevations (Yukon Ecoregions Working Group, 2006).

Sample sites were established on the Keno Ladue River and Scougale Creek drainages (Figure 1) and are described in Table 1. All sites were accessed by helicopter.

TABLE 1 SAMPLE SITE DESCRIPTIONS AND SAMPLING MATRIX

Site #	Site Description	NAD 83		Sample Type
		Easting	Northing	
SC	Scougale Creek at the existing Wind River Trail Crossing	505743	7111949	Hydrology, Data Logger, Water Quality, Fisheries.
Creek A	Tributary to Rankin Creek	504495	7105031	Hydrology, Water Quality
Creek A-1	Tributary to Creek A	504541	7105219	Hydrology
CC	Cameron Creek near the proposed road crossing	502382	7098167	Hydrology, Data Logger, Water Quality, Benthic Invertebrates, Fisheries.
KL	Keno Ladue River near the proposed road crossing	492329	7095937	Hydrology, Data Logger, Water Quality, Fisheries.
SB	Silver Basin near the proposed road crossing & approx 150m u/s Keno Ladue River	491640	7095751	Hydrology, Water Quality, Benthic Invertebrates, Fisheries
FG	Faro Gulch approx 1.3 km u/s the proposed road crossing	489282	7096165	Hydrology, Data Logger, Water Quality
GG	Gambler Gulch approx 550 m d/s the proposed road crossing	485256	7095540	Hydrology, Water Quality, Benthic Invertebrates, Fisheries
Creek I	Tributary to small lake east of Gambler Lake approx 850 m d/s proposed road crossing	484636	7095551	Hydrology, Water Quality

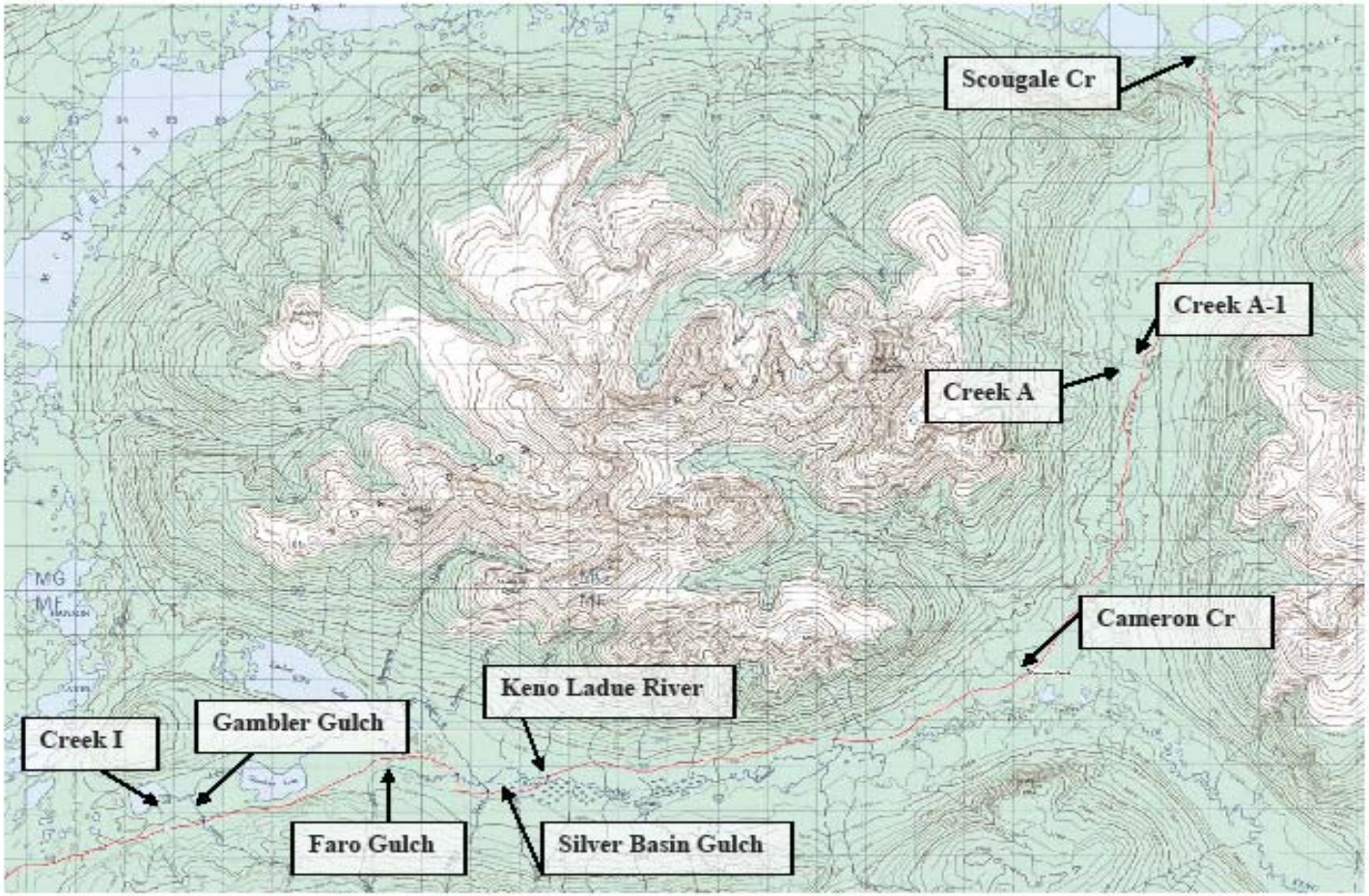


Figure 1 Map of the Sample Sites in Relation to the Proposed Route of the Rau Access Road, 2010.

3.0 METHODS

Four biophysical surveys were conducted along the proposed Rau Road route; March 3rd to 5th, June 10th to 13th, August 9th to 12th, and October 25th to 28th, 2010.

3.1 Surface Water Hydrology

Reconnaissance level stream flow variation and observations on the basin drainage characteristics were part of the assessment, as were periodic instantaneous discharge measurements and deployment of stream dataloggers at strategic points in the affected watersheds. The watershed boundaries were delineated and stream flow variation was described. A qualitative assessment of melting permafrost features did not turn up any significant degradation along the access route; however there have been notable permafrost degradation episodes within the region.

The proposed Rau Access Route crosses many small streams, numbering close to twenty if small intermittent streams are counted. A reconnaissance and map review was conducted. After ground-truthing, nine potential stream crossings were selected for study, four of which were supplied with continuous water level recording dataloggers. Spot flow measurements were conducted between March and October 2010 using standard velocity-area methods or salt dilution techniques.

3.2 Surface Water Quality

Water quality samples were collected on two occasions, in June and in August. The samples were collected in a fast flowing section of the stream, prior to any other sampling activity.

In-situ measurements were taken at each site. Temperature, conductivity, total dissolved solids and pH measurements were obtained using a Hanna multi-probe.

All sample bottles were supplied by Exova of Surrey, B.C. At each site, samples were collected in one litre plastic bottles for sulphates, alkalinity, ammonia and nonfilterable residue. Samples to be analyzed for total metals were collected in 250 ml plastic bottles. The dissolved metals samples

were filtered in the field using disposable sterile syringes and in-line filters (filter pore size 0.45 microns). Dissolved and total metals samples were preserved with nitric acid. All sample bottles with the exception of the dissolved metals sample, were partially filled and rinsed three times prior to collecting sample waters. The dissolved metals sample bottle was rinsed three times with the filtrate. Samples were kept cool prior to shipment to Exova.

3.3 Wildlife Surveys

Aerial wildlife surveys were conducted on three sampling periods with a primary focus on moose. Grant Lortie was the lead wildlife biologist for each trip. The purpose of the surveys was to demonstrate seasonal range use and timing of these events, with some insight into seasonal social behavior and influencing environmental factors proximal to the proposed Rau Road Route.

3.4 Benthic Invertebrates

Due to the varying morphology of each of the examined sites, benthic invertebrates were collected from only three sites. The samples were generally collected from an undisturbed, fast flowing, gravel-strewn riffle habitat during the August field trip. Benthic invertebrates were collected with a D-net equipped with a 400 micron mesh net using the kick and sweep method. Single samples were collected from each location; however large areas of the substrate were sampled in order to capture a representative assemblage of organisms present per site. The bed material disturbed during the 'kicking' process was carried by the current into the collection net. The captured invertebrates and detritus were placed in one-litre Nalgene bottles, preserved in 10% formalin, and shipped to Leslie Davenport of Sandpiper Biological Services, an entomologist in Victoria, B.C., for sorting, identification and enumeration.

At the lab, all samples were washed through two screens with mesh sizes 1 millimetre and 250 microns. All of the organisms retained by the coarse screen were counted and identified, whereas the organisms on the 250 micron screen were subsampled as necessary. A Folsom plankton splitter was used for the subsampling. The majority of the benthos was identified to the genus level.

3.5 Fish Monitoring

Very little fisheries work has previously been conducted in the study area. In 2009, Environment Protection Services and DFO completed a cooperative survey on water quality, stream sediment quality, benthos and fish in some sections of the Keno Ladue River and in Rankin Creek. Few of their sites overlapped with the current study.

The purpose of the current study was to document fish resources in the main water bodies that could be impacted by the construction of the proposed road to the Rau property. It was not a comprehensive study but a snap shot of the habitat and fish assemblages present in mid summer. Five of the streams that appeared to have potential as fish bearing waters were chosen for fisheries assessments. Assessments were conducted by Nick deGraff, fisheries biologist with Can-Nic-A-Nick Environmental Sciences.

Collection Licence # CL-10-43 was obtained from DFO prior to the field work. Several collection methods were employed to achieve as great a success of fish capture as possible. Three Gee type minnow traps were set overnight at each of the sampling sites using methods described by the Yukon River Panel (2007). A Smith Route model LR24 battery powered electrofisher was one method used for establishing fish presence at four of the sites. A conductivity meter was used to measure the conductivity of the surface flows at each site to assist in determining the most appropriate settings of the electrofisher. The shocking time (seconds) and settings used to collect fish were recorded for each sampling site. Angling was conducted at two sites and employed the use of flies and small spinners. The time spent angling as well as the number of strikes and species captured were noted. A 1.5 X 23 meter gill net constructed of 6.4 cm mesh was set overnight across Scougale Creek and monitored twice during a 23 hour period. All captured fish were identified and measured for a length (± 1mm) and weight (± 0.1gm). Weight was determined using an Ohaus Scout II digital scale. A fork length was recorded for Arctic grayling, whitefish and pike while total length was recorded for captured slimy sculpin. All fish were live released at site of capture with the exception of the mortalities resulting from gill netting.

4.0 RESULTS AND DISCUSSION

4.1 Surface Water Hydrology

An aerial reconnaissance was conducted in June to ground-truth all the stream crossings along the proposed Rau Access Route. Eight of nineteen streams were selected for further study; four of which were provided with continuous water level recording dataloggers. During the fisheries assessment, each of the drainages was visited and stream morphology and habitat features were noted (see Section 4.5). Photographs of each site are presented in Appendix A.

Some of the streams were measured up to six times over the 2010 season. LES collected stream discharge data during the four study periods and J. Gibson and Associates measured flows in July and in September. All discharge data is presented in Table 2.

Starting at the southwest end of the route, the first significant stream encountered is Creek I, followed by Gambler Gulch, Faro Gulch and Silver Basin Gulch; all of which drain from the north face of Keno Hill. The Keno Ladue River is then crossed before encountering Cameron Creek, Creek A and Creek A-1; all of which drain the south face of the Davison Range. Finally Scougale Creek is encountered where the proposed route joins the existing Wind River Trail. The study streams are depicted in Figure 1.

All of the study streams would be expected to yield little or no flow in the low flow period (January-March), however, some of the streams presented measurable flow in both the March and October surveys, suggesting significant groundwater, or base flow, in some drainages. This might be an indication of frequent aufice (glacier) formation along the proposed route during winter months. Peak freshet flow is expected in the area streams around May 15 to early June. Freshet peaks are often dwarfed by summer rainfall events as can be seen in the recorded water levels in each of the four gauged streams around June 22 and again about a month later (see Figures 2 through 5).

Creek I drains an area of only 4.5 km^2 at the access route before draining into a small lake just east of Gambler Lake. Of the five measurements, discharge (herein after referred to by the familiar term “flow”) ranged from negligible in March to a high of 180 L/sec in August with an

average flow of around 70 L/sec. The basin yield (the volume of water per square kilometer) was a robust 3 L/sec/Km^2 when measured on October 26, 2010.

TABLE 2 SUMMARY OF RAU ACCESS ROUTE FLOWS, 2010

Stream / Station	*Date*	*BM#1 Elev* (m)	*Top Angle Iron* Elev (m)	*Water Level* Elev (m)	Discharge (L/s)	Method	Average Q (L/s)	Drainage Basin Area (km2)
Creek A	6/11/2010	n/a	n/a	n/a	541.3	Velocity Meter	306	9.8
	7/24/2010				495.1	Velocity Meter		
	8/11/2010				320.0	Velocity Meter		
	9/7/2010				120.5	Velocity Meter		
	10/27/2010				54.1	Velocity Meter		
Creek A-1	8/11/2010	n/a	n/a	n/a	139.8	Velocity Meter		
	10/27/2010				37.0	Salt dilution		
Creek I (i)	6/11/2010	n/a	n/a	n/a	65.7	Velocity Meter	70	4.5
	7/24/2010				179.6	Velocity Meter		
	8/11/2010				48.0	Velocity Meter		
	9/7/2010				43.2	Velocity Meter		
	10/27/2010				13.5	Velocity Meter		
Silver Basin Gulch	6/11/2010	n/a	n/a	n/a	145.4	Velocity Meter	112	7.6
	7/24/2010				303.3	Velocity Meter		
	8/11/2010				50.7	Velocity Meter		
	9/7/2010				49.2	Velocity Meter		
	10/27/2010				13.4	Velocity Meter		
Gambler Gulch	6/11/2010	n/a	n/a	n/a	96.6	Velocity Meter	105	5.9
	7/24/2010				300.4	Velocity Meter		
	8/11/2010				62.6	Velocity Meter		
	9/7/2010				40.5	Velocity Meter		
	10/27/2010				23.0	Salt dilution		
Faro Gulch	3/4/2010				36.0	Salt dilution	100	8.4
	6/11/2010	100.000	98.424	97.754	112.6	Velocity Meter		
	7/24/2010				315.3	Velocity Meter		
	8/11/2010				59.3	Velocity Meter		
	9/7/2010			97.668	52.6	Velocity Meter		
	10/26/2010				22.0	Salt dilution		
Keno Ladue River	3/4/2010				*	Salt dilution		92.5
	6/11/2010	100.000	99.042	98.627	667.1	Velocity Meter	519	
	8/10/2010				522.7	Velocity Meter		
	9/7/2010			98.552	574.8	Velocity Meter		
	10/26/2010				311.0	Salt dilution		
Cameron Creek	6/11/2010	100.000	98.796	98.158	1686.1	Velocity Meter	819	37.8
	7/24/2010				1284.7	Velocity Meter		
	8/10/2010				563.3	Velocity Meter		
	9/7/2010			98.009	481.3	Velocity Meter		
	10/26/2010				81.0	Salt dilution		
Scougale	3/4/2010				177.0	Salt dilution	1217	187.2
Creek	6/11/2010	100.000	99.568	99.317	nr	Velocity Meter		
	7/24/2010				nr	Velocity Meter		
	8/10/2010				1954.9	Velocity Meter		
	9/7/2010			98.868	1519.5	Velocity Meter		
	10/26/2010				*	Salt dilution		

NOTES: n/a = non applicable as data loggers were not installed at the site
* = flow too sluggish to calculate discharge

Gambler Gulch drains an area of 5.9 km^2 where it crosses the access route before draining into Gambler Lake. The stream presents runs, riffles and pools in a narrow channel. Flow was measured at Gambler Gulch five times over the season. The maximum observed was 300 L/sec on July 24th and the minimum of 41 L/sec on October 26, 2010 resulting in an average flow of 105 L/sec. The basin yield in October was about 7 L/sec/Km^2 suggesting that this stream may present significant base flow given its small drainage area.

Faro Gulch drains an area of 8.4 km^2 off the north face of Keno Hill and presents mainly riffles and runs in a confined channel at the assessed site. A data logger was deployed in Faro Gulch from June to October, 2010. Flow was measured six times over the season with an average of 100 L/sec, maximum of over 300 L/sec in July and minimum of 22 L/sec observed in October, 2010. The basin yield at low flow appears to be about 2.5 L/sec/Km^2. Faro Gulch displays similar characteristics to the other creeks draining Keno Hill from the north; a fairly robust base flow and significant open water flow for its diminutive basin area. Flow variation is depicted in Figure 2.

Silver Basin Gulch drains 7.6 km^2 of the north slope of Keno Hill and consists of riffles and runs throughout the area of the access route. Flow was measured five times over the season and ranged from a low of 13 L/sec in October to a high of 300 L/sec in August, averaging 112 L/sec. Similar to its neighboring creeks, Silver Basin presents a basin yield of 1.7 L/sec/Km^2 at its lowest which suggests that even this small creek may present base flow during the minimum flow period.

The Keno Ladue River is the receiving water of the small tributaries listed above. It drains an area of 92.5 km^2 where it meets the proposed access route. Flow was measured with some difficulty, four times over the season which enabled a crude rating curve and resulting flow variation chart in Figure 3. The Keno Ladue presented an average flow of over 500 L/sec. The two rainfall peaks observed in the other gauges resulted in peak flows over 1,200 L/sec in June and again in July. The basin yield at low flow on October 26th was in the order of 3 L/sec/km^2.

Cameron Creek flows entirely in riffles and runs south from the Davison Range draining an area of 37.8 km^2 where it meets the proposed access route. Cameron Creek was measured five times over the season with a high flow of over 1,700 L/sec measured in June; a low of 81 L/sec in October and an average of 820 L/sec. The creek was provided with a logger and the downloaded data is graphed in Figure 4.

Creek A, comprised entirely of riffles, flows south off the Davidson Range and drains an area of 9.8 km^2 at the proposed access route. It was measured five times over the season with a high flow of 540 L/sec measured in June; a low of 54 L/sec in October and an average flow of 300 L/sec. The basin yield in October was 5.5 L/sec/km^2 suggesting a higher base flow from this

south-facing basin. Creek A-1 is a low-lying stream draining a marshy area and is a tributary to Creek A just upstream of the confluence with Rankin Creek. The creek was measured twice, with a surprising 37 L/sec still flowing in October.

Scougale Creek flows out of Clark Lakes and drains an area of 187.2 km^2 where the proposed access route meets the existing Wind River Trail. It was difficult to measure flow in Scougale due to depth, so the resulting flow variation in Figure 5 is a best estimate only. Scougale Creek is a major tributary and presents a full range of flow patterns from riffle-run through long runs and deep pools.

Figure 2 – Faro Gulch Flow Variation 2010

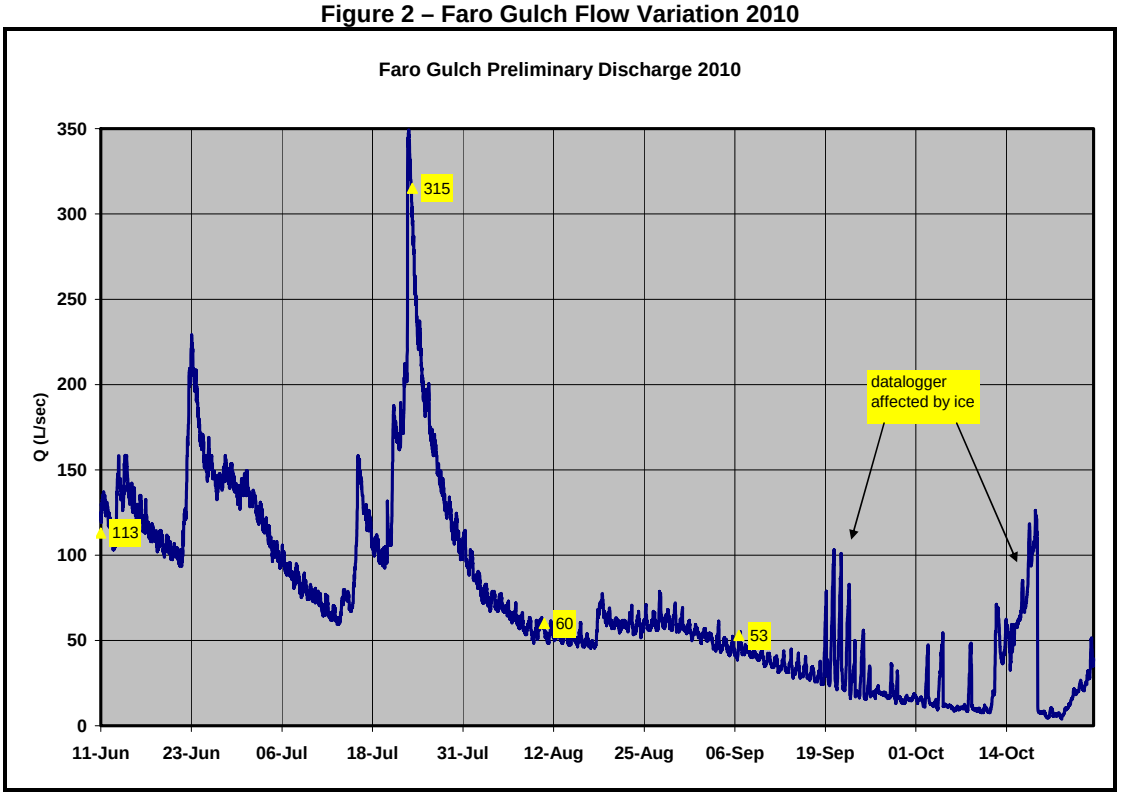


Figure 3 – Keno Ladue Flow Variation 2010

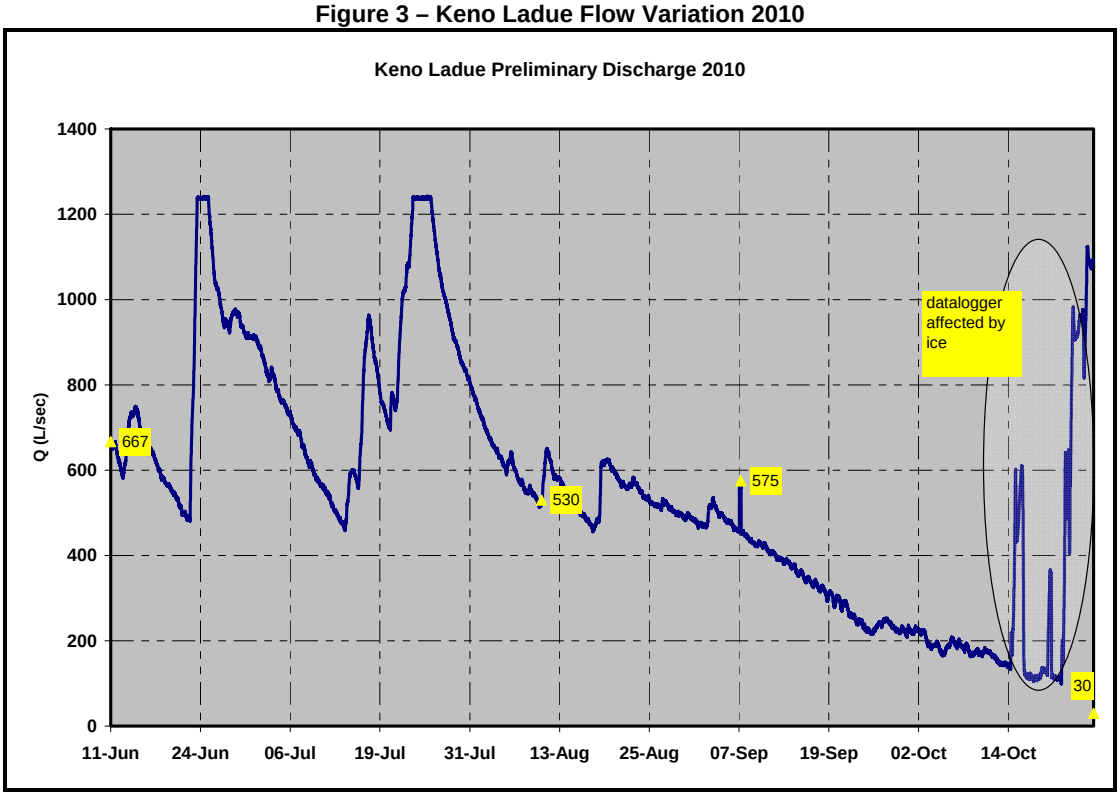


Figure 4 – Cameron Creek Flow variation 2010

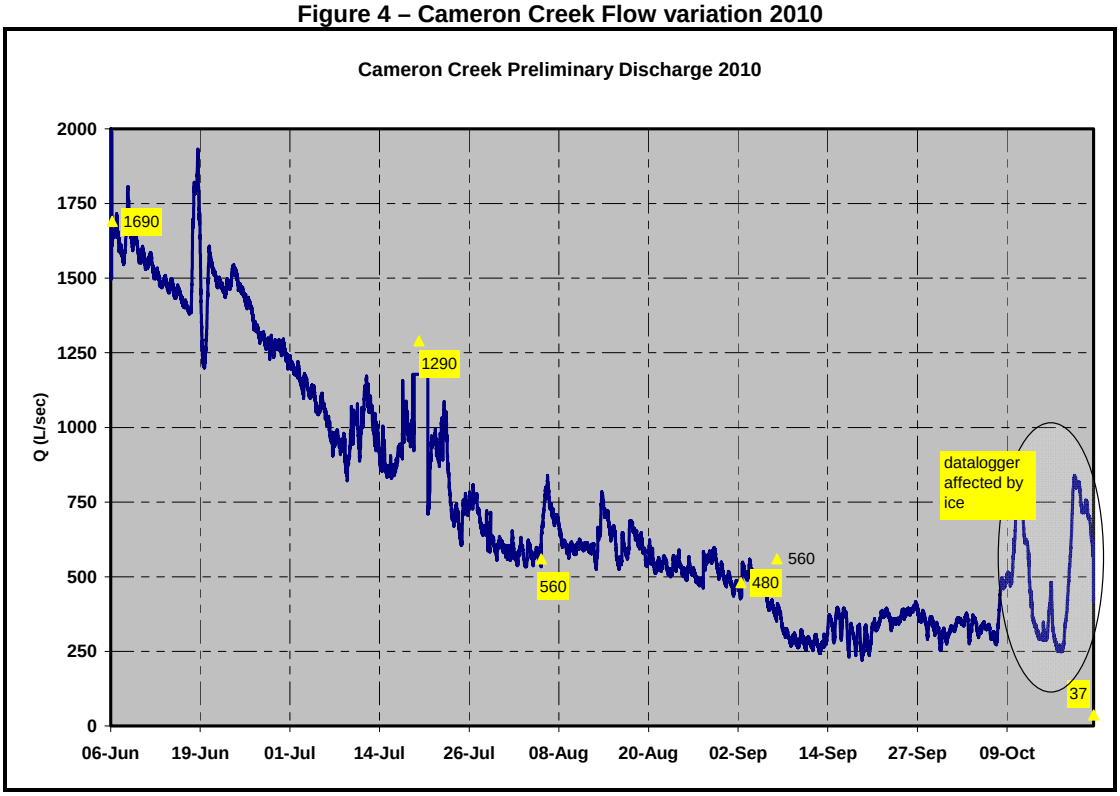
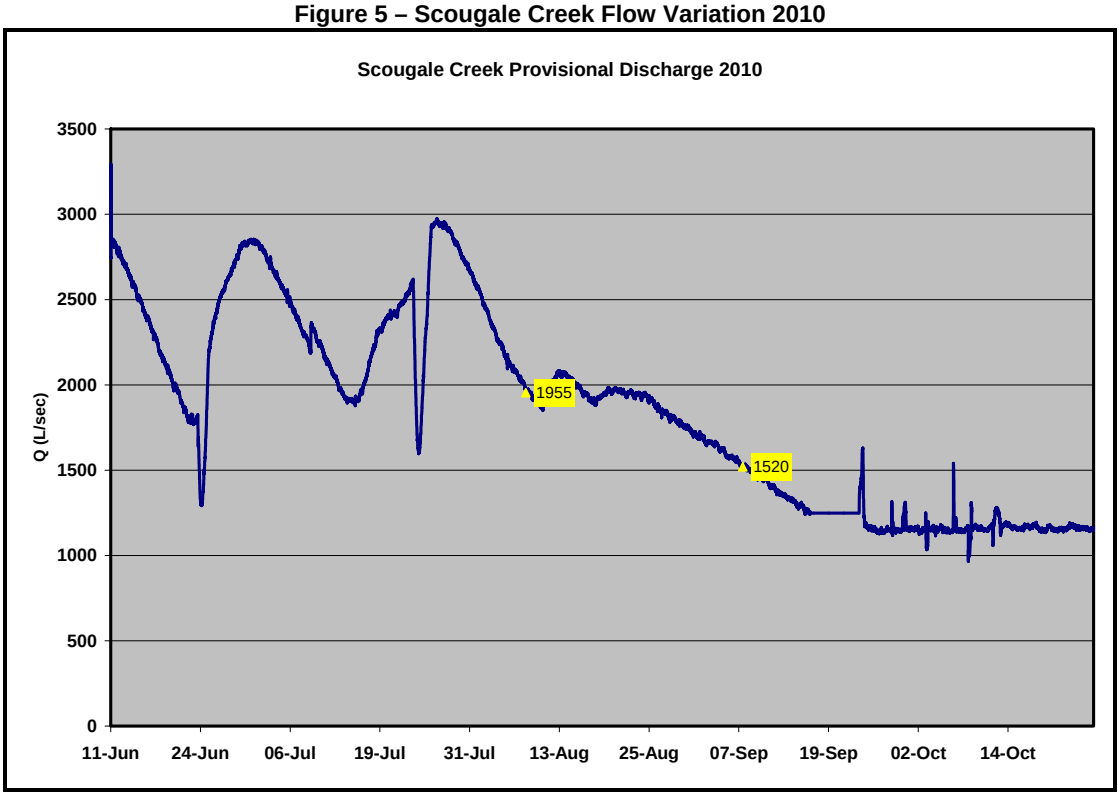


Figure 5 – Scougale Creek Flow Variation 2010



4.2 Water Quality

In attempts to characterize the potentially affected watersheds, water quality samples were collected on two occasions. Water samples were not collected from Creek A and Creek I in June however. In-situ measurements of temperature, pH and conductivity were conducted at each site (Table 3). Discharge data and some of the physical attributes at each site are also included in Table 3. The water temperatures of the smaller creeks were considerably cooler than the larger water bodies, Scougale Creek and Keno Ladue River. Conductivity ranged from 135 us/cm at Cameron Creek in June to 522 uS/cm at Silver Basin Gulch in August. All sampled waters were alkaline with the exception of Cameron Creek which has slightly acidic waters.

To be consistent with the current baseline studies being carried out at the Rau site, the same parameters were analyzed using the same laboratory, Exova, in Surrey, BC. The analytical reports containing all of the data for both study periods can be viewed in Appendix B.

Selected parameters portraying the water characteristics of each stream are presented in Tables 4 and 5 for June and August respectively, and have been compared to the CCME guidelines for the

protection of freshwater aquatic life.

TABLE 3 FIELD DATA FOR PROPOSED RAU ACCESS ROAD, JUNE & AUGUST, 2010

Site #	Date Sampled 2010	Time Sampled	Water Temp oC	pH	Conductivity uS/cm	Average Depth (m)	Average Velocity (m/s)	Wetted Width (m)	Discharge (cms)	Comments
SC	June 11	14:40	11.4	7.71	236					Hobo data logger installed, creek too deep to wade.
SC	August 10	10:00	15.3	8.19	283	0.85	0.21	14.2	1.9549	Water level significantly lower.
Creek A	June 12	10:10				0.27	1.065	1.99	0.5413	Clear water, thick bush, no water samples collected.
Creek A	August 11	10:00	5.7	7.91	152	0.16	0.76	3.0	0.3200	Clear water
CC	June 11	12:30	5.7	5.46	128	0.41	0.862	4.99	1.6861	Hobo data logger installed, water milky coloured, ppt on substrate
CC	August 10	12:35	7.3	6.28	173	0.31	0.50	4.9	0.5633	Water milky coloured, ppt on substrate
KL	June 11	16:30	11.3	7.42	285	0.5	0.306	4.41	0.6671	Hobo data logger installed.
KL	August 10	15:15	12.0	7.75	292	0.38	0.38	4.6	0.5227	Clear water, brown coloured.
SB	June 11	17:30	5.2	7.7	526	0.18	0.506	1.68	0.1454	Orange staining on rocks, clear water.
SB	August 11	12:50	4.6	7.88	612	0.15	0.34	1.2	0.0507	Orange staining on rocks, clear water.
FG	June 11	10:45	3.5	7.92	342	0.18	0.564	1.08	0.1126	PSI 9000 data logger installed, clear water.
FG	August 11	15:15	4.6	8.03	406	0.09	0.52	1.6	0.0593	Clear water.
GG	June 11	18:10	3.6	7.73	313	0.17	0.304	2.02	0.0966	Water samples collected, clear water
GG	August 11	16:15	4.2	7.93	388	0.37	0.16	1.6	0.0626	Clear water.
Creek I	June 11	18:45				0.21	0.213	1.64	0.0657	Clear water, open grassy area, no water samples collected.
Creek I	August 11	18:00	6.8	8.14	603	0.20	0.18	1.6	0.0480	Slightly turbid waters.

The creeks were generally clear but the highly mobile fine substrate at Keno Ladue River and Creek I created turbid conditions on occasion. Hardness varied throughout the study area. Creek A and Cameron Creek had soft water, Scougale Creek and Keno Ladue River waters were hard and the remaining creeks were very hard. Sulphate concentrations generally fell within the normal range (10 to 80 mg/L, CCREM, 1987), except high levels were documented at Silver Basin Gulch, Creek I and Faro Gulch.

Seven of the 30 metals analyzed were not detected in any samples on either occasion; bismuth, boron, mercury, tellurium, thallium, thorium and tin. Only metals whose concentrations exceeded the CCME guidelines are included in the Tables.

Cameron Creek, which drains Mount Cameron, displays unique characteristics in relation to the other streams. Cameron Creek is acidic (pH 5.23 to 6.28), milky grey in colour and exhibits high

TABLE 4 SELECTED WATER QUALITY PARAMETERS FOR STREAMS CROSSING THE PROPOSED RAU ACCESS ROAD, JUNE 2010

Site	SC Scougale Creek	CC Cameron Creek	KL Keno Ladue River	SB Silver Basin	FG Faro Gulch	GG Gambler Gulch	CCME Guideline
Sample Date	6/11/2010	6/11/2010	6/11/2010	6/11/2010	6/11/2010	6/11/2010	
Sample Time	14:40:00	12:30:00	16:30:00	17:30:00	11:10:00	18:10:00	
Total Organic Carbon (mg/L)	4.5	1.1	4.8	2.7	1.7	6.4	
Total Suspended Solids (mg/L)	<2	7	40	<2	4	3	
Total Dissolved Solids (mg/L)	120	108	186	374	242	216	
pH	7.89	**5.23**	7.7	7.83	7.8	7.8	6.5 to 9
Electrical Conductivity (µS/cm)	236	135	284	522	335	308	
Total Alkalinity (mg/L)	87	<5	62	82	58	81	
Sulfate (mg/L)	33.5	50.1	72.7	169	98.8	70.7	
Total Hardness (mg/L as CaCO3))	124	55	146	282	174	165	
METALS (mg/L)							
Aluminum - dissolved	0.081	**0.595**	0.086	0.006	0.005	0.025	0.1
Aluminum - total	**0.256**	**1.48**	**0.268**	0.023	0.068	0.065	0.1
Cadmium - dissolved	**0.00014**	**0.001**	**0.00009**	0.00008	**0.00067**	**0.00013**	*
Cadmium - total	**0.00014**	**0.00102**	**0.00014**	0.00007	**0.00084**	**0.00012**	*
Chromium - dissolved	0.0006	<0.0004	0.0005	0.0006	<0.0004	0.0005	0.001
Chromium - total	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.001
Cobalt - dissolved	0.00159	**0.01423**	0.0015	0.0001	0.00005	0.00018	0.110 or 0.004
Cobalt - total	0.00212	**0.0144**	0.00171	0.00013	0.00018	0.00027	0.110 or 0.004
Copper - dissolved	0.002	**0.009**	0.002	0.001	<0.001	0.002	0.003
Copper - total	0.002	**0.01**	0.003	0.002	0.002	0.002	0.003
Iron - dissolved	0.018	0.231	0.055	0.044	<0.010	0.04	0.3
Iron - total	0.113	**0.556**	0.276	0.068	0.181	0.127	0.3
Lead - dissolved	<0.0001	<0.0001	0.0001	<0.0001	0.0007	<0.0001	0.004
Lead - total	<0.0001	0.0002	0.0007	0.0002	**0.0158**	<0.0001	0.004
Nickel - dissolved	0.018	0.082	0.01	0.002	0.002	0.004	0.110
Nickel - total	0.019	0.081	0.011	0.002	0.002	0.004	0.110
Selenium - dissolved	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0.001
Selenium - total	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	<0.0006	0.001
Zinc - dissolved	0.015	**0.217**	0.016	0.004	**0.068**	0.014	0.030
Zinc - total	0.029	**0.22**	0.024	0.008	**0.081**	0.02	0.030
* The guideline varies with hardness according to the calculation 10{0.86[log(hardness)]-3.2}.							
Calculated cadmium guideline/sample:	0.00004	0.00002	0.00005	0.00008	0.00005	0.00005	
Values highlighted and in **bold** indicate that the CCME guideline has been exceeded							

TABLE 5 SELECTED WATER QUALITY PARAMETERS FOR STREAMS CROSSING THE PROPOSED RAU ACCESS ROAD, AUGUST 2010

Site	SC Scougale Creek	Creek A	CC Cameron Creek	KL Keno Ladue River	SB Silver Basin	FG Faro Gulch	GG Gambler Gulch	Creek I	CCME Guideline
Sample Date	8/10/2010	8/11/2010	8/10/2010	8/10/2010	8/11/2010	8/11/2010	8/11/2010	8/11/2010	
Total Organic Carbon (mg/L)	2.8	1	<0.5	3.9	1.7	1	4.3	2.9	
Total Suspended Solids (mg/L)	<2	17	4	<2	<2	<3	8	50	
Total Dissolved Solids (mg/L)	226	120	154	210	492	310	312	474	
pH	8.1	7.81	**6.13**	7.95	7.99	7.97	7.98	8.15	6.5 to 9
Electrical Conductivity (µS/cm)	288	161	181	302	627	418	400	620	
Total Alkalinity (mg/L)	106	52	<5	83	112	76	106	173	
Sulfate mg/L)	46	27.3	74.7	68.8	207	122	96.1	151	
Total Hardness (mg/CaCO3/L)	147	76.2	75.6	148	326	205	201	346	
METALS (mg/L)									
Aluminum - dissolved	**0.116**	0.018	**0.106**	<0.005	<0.005	<0.005	0.021	0.012	0.1
Aluminum - total	**0.139**	**0.204**	**1.3**	0.039	0.005	0.007	**0.155**	**0.604**	0.1
Cadmium - dissolved	**0.00007**	**0.00012**	**0.00121**	<0.00001	0.00005	**0.00039**	**0.0001**	**0.00217**	
Cadmium - total	**0.00008**	**0.0002**	**0.00118**	0.00004	0.00006	**0.00042**	**0.00014**	**0.00354**	
Chromium - dissolved	<0.0004	0.0006	<0.0004	<0.0004	<0.0004	0.0006	<0.0004	0.0005	0.001
Chromium - total	0.0006	0.0009	<0.0004	0.0006	<0.0004	<0.0004	0.0009	**0.0016**	0.001
Cobalt - dissolved	0.00103	0.00008	**0.0157**	0.00006	0.00013	<0.00002	0.00016	0.00028	0.110 or 0.004
Cobalt - total	0.00122	0.00078	**0.0194**	0.00017	0.0001	0.00003	0.00034	0.00093	0.110 or 0.004
Copper - dissolved	0.002	<0.001	**0.007**	<0.001	<0.001	<0.001	0.001	<0.001	0.003
Copper - total	0.002	0.002	**0.009**	0.001	<0.001	<0.001	0.002	**0.004**	0.003
Iron - dissolved	<0.01	<0.01	0.119	0.109	0.054	0.016	0.078	0.056	0.3
Iron - total	0.048	**0.328**	**0.334**	0.284	0.086	0.047	**0.389**	**1.87**	0.3
Lead - dissolved	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0004	<0.0001	0.0002	0.004
Lead - total	0.0001	0.0006	<0.0001	0.0006	<0.0001	0.0029	0.0005	**0.0053**	0.004
Nickel - dissolved	0.017	0.017	0.096	0.002	0.001	0.001	0.003	0.002	0.110
Nickel - total	0.019	0.021	**0.111**	0.002	0.002	0.001	0.004	0.004	0.110
Silver -dissolved	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0001
Silver - total	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00008	0.0001
Zinc -dissolved	0.006	**0.047**	**0.306**	0.003	0.003	**0.033**	0.014	**0.282**	0.030
Zinc -total	0.013	**0.066**	**0.331**	0.009	0.006	**0.038**	0.026	**0.4**	0.030
* The guideline varies with hardness according to the calculation 10{0.86[log(hardness)]-3.2}.									
Calculated cadmium guideline/sa	0.00005	0.00003	0.00003	0.00005	0.00009	0.00006	0.00006	0.00010	
Values highlighted and in **bold** indicate that the CCME guideline has been exceeded									

concentrations of aluminum, cadmium, cobalt, copper, iron, nickel and zinc, with most of the

samples collected here exceeding the respective CCME guidelines. Cobalt has two recommended guidelines. Cameron Creek waters fell well under the 0.110mg/L threshold for acute toxic effects but exceeded the 30 day period average chronic toxic effect threshold of 0.004 mg/L. The greatest concentrations of aluminium, cobalt, copper and nickel throughout the study area and study period were documented in Cameron Creek.

The other streams were slightly alkaline (pH 7.42 to 8.19) and generally had low concentrations of detected metals, with the following exceptions. Creek I, which was only sampled in August, had the greatest concentration of cadmium, copper, iron, selenium and zinc, all of which exceeded the CCME guidelines. It is speculated that Creek I received tailings and discharge from the Sadie Ladue mine on Keno Hill at some point in the past. In July 2009 Environment Canada (EC) collected sediment samples in the fan through which Creek I flows and confirmed very high levels of lead and zinc, concluding that this material was tailings deposited from milling on the north side of Keno Hill (unpublished data, Environment Protection). A water sampled collected from the Sadie Ladue adit on July 28, 2009, recorded a zinc concentration of 0.41 mg/L. Over flights and ground-truthing by EC and DFO show that the Sadie Ladue discharge becomes Creek I, which drains into the unnamed lake.

Faro Gulch, which also drains Keno Hill, had concentrations of lead and zinc that exceeded the CCME guidelines. EC collected water samples from Faro Gulch on July 28, 2009, approximately 3.5 km upstream of the 2010 location. Their data shows a total lead concentration of 0.00298 mg/L and a total zinc concentration of 0.0651 mg/L (EC unpublished data).

Levels of aluminum in Scougale Creek and Keno Ladue River exceeded the CCME guidelines. The concentration of cadmium exceeded the recommended guideline in all streams except for Silver Basin Gulch.

Creek A, which was only sampled in August, had concentrations of aluminum, cadmium, iron and zinc that exceeded the CCME recommended guidelines.

4.3 Wildlife Surveys

4.3.1 Late Winter Survey

A late winter wildlife survey was conducted on March 4th, 2010, using a Bell 206 helicopter piloted by Ben Drury. Grant Lortie was the wildlife biologist and Stu Withers assisted with observations. Weather conditions were good with excellent visibility for the six hour aerial survey.

Moose

Moose were clearly the most conspicuous and abundant large mammal observed. The entire route, particularly that section between Gambler Lake and lower Rankin Creek was obviously an important wintering area (Table 6). Recent helicopter and ground activity associated with route staking precluded the observation of some moose along the actual route, but recent tracks, trails and visual observations confirm this assessment. Moose were especially evident on the lower slopes of the Davidson Range in the 1972 burn (see Figure 6, Appendix C).

Table 6 Summary of Observed Moose

Waypoint #	Adult Female	Calf	Adult Male	Group
011	7			7
012			1	1
013			1	1
014	1		1	2
015			2	2
016	1			1
021			2	2
025	1	1		2
Totals:	**10**	**1**	**7**	**18**

In addition, an estimated further 15 to 20 moose of undetermined composition were located from Waypoint 001 to 010 inclusive (Figure 7, Appendix C).

In general terms, population status can be surmised from repeated survey work on adjacent areas which indicates a stable, healthy moose population regionally, that in recent years has reached maximum harvest levels (M. O'Donahue, pers. comm.). However, the specifics of season range use and timing of these events are not fully understood and have been explored in the other two surveys.

Woodland Caribou

Caribou are presently not found in the immediate study area (Bleiler et al, 2006). Their COSEWIC

status is special concern.

Mountain Sheep

Mountain sheep were formerly present on Keno Hill but were hunted to extinction in the early 20th century (Bleiler et al, 2006).

Grizzly and Black Bear

Grizzly and black bear are common in the region (Bleiler et al, 2006) but due to the timing of the current study, none were observed during the survey.

Fur Bearers

Fur bearers, wolves, coyotes, foxes, marten, mink, lynx, wolverine and river otter are to varying degrees, economically important to the registered trapline concessions and all are indigenous to the area (Bleiler et al, 2006). Wolves were not observed during the survey but their presence was noted at several of the waypoints. Tracks of 4 to 5 animals were observed at waypoint 007, and older tracks of 8 to 10 wolves were evident at waypoint 019. An old kill site was observed at waypoint 017. In addition, tracks of a river otter were noted near open water at waypoint 022.

Beaver and muskrat are also economically important and common in aquatic habitats in the region.

Rouge River Outfitters has a concession in the study area. They currently have a voluntary No-Hunt agreement with the Mayo Regional Resources Council.

Birds

Canada goose and trumpeter swan tend to be relatively abundant in the area and stay to breed locally (Bleiler et al, 2006). Several species of dabblers and divers inhabit the area during the open water season and detailed information can be found in Heart of the Yukon, along with descriptions of other migrant and resident species. No birds were observed during the March survey.

4.3.2 Early Summer Survey

The early summer wildlife survey was conducted using a Hughes 500D helicopter piloted by Roy John, over approximately a five hour period on June 11th, 2010. Grant Lortie was the wildlife biologist and John Gibson and Bonnie Burns were observers. In conjunction with continuing water quality and hydrology work, this wildlife survey focused primarily on valley bottom wetlands for an appraisal of moose calving habitat. Incidental observations on aquatic furbearers and waterfowl were cursory only, as much of the airtime was required to find and classify moose. The sub alpine and alpine zones of the Davidson Range uplands were examined with no wildlife observed at this time.

Moose

Moose were observed in four wetlands (see Figure 8, Appendix C) and are detailed in the Table below.

Table 7 Summary of Observed Moose, June 2010

Wetland Area	Observations
Ladue Lake-Gambler Lake-Upper Hanson Lakes	3 cow moose with attendant neonate calves
Keno-Ladue River	2 cow moose with neonate calves
Wetland at Cameron Creek and Rankin Creek confluence with Keno Ladue River	4 cow moose, 3 with neonate calves; 1 sub adult male
Clark Lakes	1 cow moose - calf unseen if surviving; 1 adult and 1 sub adult

These results demonstrate the importance of these wetlands as calving areas for resident moose. The observed numbers should be considered as minimums, as moose, because of their cryptic colouration and with cow-calf pairs particularly, spend much daytime resting in available cover. Strangely, and as noted by Pilot R.J., no observations had been made in the Scougale Lakes and in lower Scougale Creek. This area is frequently observed from the air with several daily trips for crew drop off and pick up, with little to report (R. John, pers. comm.)

Further, 9 cast moose antlers, no doubt of varying age, were noted in the 1972 burn along Lower Rankin Creek, confirming this area as winter range.

Black Bear

Three black bear were incidentally encountered:

i) A boar-sow pair at low elevation in open canopy spruce fen on east flank of Davidson Range. The female was black and the male was big (three times her size) and as orange as a pumpkin.

ii) An adult black individual near trail above the upper Clark Lake.

Beaver

An active lodge on upper Hanson Lake was observed.

Waterfowl

No attempt was made to identify or enumerate waterfowl. Several species of divers and dabblers do use these wetlands and were frequently seen. One pair and a single adult Trumpeter swan were noted in the Clark Lake area.

4.3.3 Late Autumn Survey

The late autumn wildlife survey was conducted concurrently with the hydrology program in late October. The aerial survey was completed using a Bell 206 LR, piloted by Norman Smith, for approximately seven hours on October 26th, 2010. Light snow was falling intermittently throughout the day under overcast skies. Visibility was approximately five miles with flat lighting. The ground was covered with roughly a foot of good tracking snow.

It quickly became apparent that valley bottoms and lower slopes were, with a few exceptions, devoid of moose or their sign. Lower elevation observations were noted in a large burn between Mayo and Elsa: two bulls and an isolated cow-calf pair; fresh track of unobserved Moose near Creek A (B. Burns, pers. comm.); and an observed mature bull on the road 100m north of the Stewart Crossing intersection in Mayo.

All other moose were observed on both sides of the proposed route in willow-dominated subalpine creek drainages between 4000 and 5000 feet asl. Figure 9 (Appendix C) and Table 8 concisely summarize these findings.

The noted cow-calf ratio (22/100) and the bull-cow ratio (81/100) require interpretation. The cow-calf ratio would appear low while the bull-cow ratio would appear high. In explanation, cows with calves are the first to leave post rut groups, typically found isolated in denser cover. Due to visibility, time and fuel constraints, no effort was made to account for this population component, which, after much time and expense, an adjustment would be more realistically representative of these ratios.

Other wildlife were not observed, however a wolverine track was noted at the Cameron Creek site (waypoint 062), (S. Withers pers. comm.).

TABLE 8 SUMMARY OF MOOSE OBSERVATIONS, OCTOBER 2010

Way Point #	Mature Male	Immature Male	Female	Female with Calf	Calf	Group Size	Comment
050	2			1	1	4	Off map
051							Faro Gulch
052				1	2	3	
053	2	1	1			4	
054	3					3	
055	1	1	7			9	
056							Keno Ladue R
057						0	McQuesten R
058			1			1	
059	3	2	4			9	
060	1			1	1	3	
061			1			1	
062							Cameron Cr
063	1		2			3	
064	1					1	
065	3		1			4	
066	1					1	
067	1	1	2			4	
068	1		1			2	
068			3				
069			3			3	
070			2	1	1	4	
071	1					1	
072	1		2	1	1	5	
073	3			1	1	5	
074				1	1	2	
075							Scougale Cr
Totals:	25	5	30	7	8	75	

Cow - Calf Ratio = 22/100
Bull - Cow Ratio = 81/100

In summary, the study area appears to support a healthy moose population. An early winter

survey of moose conducted on November 5th to 16th, 2006, by the Yukon Fish and Wildlife Branch, included the current study area within their larger surveyed district. Using a relatively new technique develop by Jay Ver Hoef with the Alaska Department of Fish and Game, the survey was undertaken using a grid system rather than using irregularly shaped survey units. This method allegedly provides a more precise and reliable estimate of population. A total of 71 moose were documented within our specific study area (Ward, 2006).

4.4 Benthic Invertebrates

Benthic invertebrates were collected from three sites, Cameron Creek, Gambler Gulch and Silver Basin Gulch. Three phyla were found in this study area: Arthropoda, Annelida and Mollusca. A total of 2,580 benthic invertebrates, representing 59 different taxonomic groups were identified within these phyla. These data are presented in Appendix D.

The total number of organisms for each site was summed to give an abundance value for that site. Taxonomic richness was determined for each site by enumerating all the different taxonomic groups identified from species to phylum as a measure of community diversity. To further characterize the taxonomic wealth of each community, the diversity was related to the population size using the formula: (Diversity – 1) divided by the natural log of the population. To assess the overall health of the benthic community the proportion of chemical sensitive orders (Ephemeroptera, Plecoptera and Trichoptera) present at each site was calculated. These data are included in Table 9.

Table 9 General Statistics on the Benthic Communities, 2010

Stream	Abundance	Diversity	Taxonomic Richness	% EPT
Cameron Cr	53	15	3.5	3.8
Gambler Gulch	926	44	6.3	62.6
Silver Basin Gulch	1,601	37	4.9	64.6

The benthic community at Cameron Creek had a depressed population and low diversity. Very few chemical sensitive organisms were present. Considering the quality of the water in Cameron Creek (see Tables 3 to 5) this is not surprising. When pH is less than 5.5, aquatic biota have

difficulty regulating calcium which may result in the disturbance of reproduction, growth and molting processes (Resh and Rosenberg, 1984). Cameron Creek has acidic waters with a pH of 5.23 documented in June 2010. Metals are released at low pH and the high concentrations documented in Cameron Creek may be creating toxic conditions for aquatic freshwater life.

Population numbers at Gambler Gulch and Silver Basin Gulch were significantly higher and both communities were diverse. A large proportion of each community was comprised of EPT, greater than 60% in both cases.

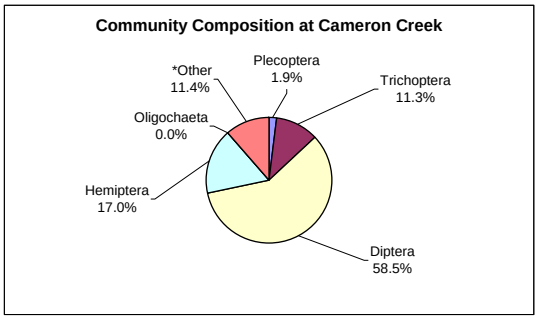
The percent composition of the major taxonomic groups was calculated for each station (Figure 10). Based on the percentages of each group, taxa were classified with respect to their dominance within the benthic community for each site (Table 10). The group “Other” includes invertebrates from Collembola, Coleoptera, Hymenoptera, Ostracoda, Copepoda, Aranaea, Hydracarina, Ephemeroptera, Bivalva and some unidentified individuals of the Class Insecta.

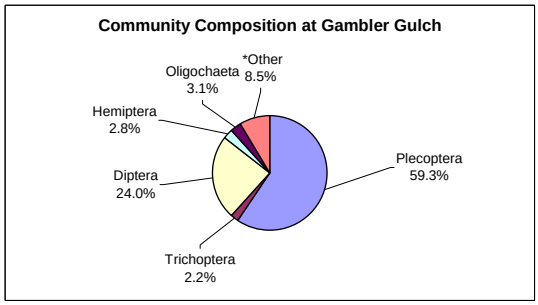
The composition of the community at Cameron Creek is significantly different than that at the other two sites. Diptera was the dominant order at Cameron Creek and shared dominance at Silver Basin Gulch. Plecoptera was the dominant order at Gambler Gulch and at Silver Basin Gulch. There was no subdominant group at Silver Basin Gulch, and Diptera was subdominant at Gambler Gulch. The community at Cameron Creek had three subdominant groups, Hemiptera, Other and Trichoptera. The remaining taxa were common or rare at the other two sites.

The single most abundant group of invertebrates documented in the study area was unidentified larvae of Plecoptera, forming 42% of all the organisms collected. There are only nine families of stoneflies in North America (Hugh, 1991) however these larvae were too immature to identify accurately to family, but were definitely stoneflies. Stoneflies larvae prefer cold, clear running water and they formed 59.3% and 63.4% of the communities at Gambler Gulch and Silver Basin Gulch respectively. Conversely they only formed 1.9% of the population at Cameron Creek.

In summary, the benthic population, in terms of abundance and composition, was markedly different at Cameron Creek than at the other two sites. The assemblages at Silver Basin Gulch and Gambler Gulch were quite similar to each other and represented healthy robust communities.

FIGURE 10 COMPOSITION OF TAXONOMIC GROUPS AT EACH SITE





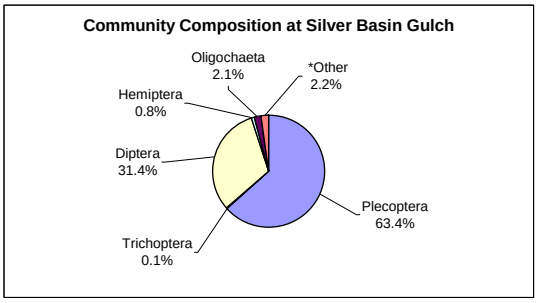


TABLE 10 TAXONOMIC DISTRIBUTION OF BENTHIC INVERTEBRATES

DOMINANT (<25%)	SUBDOMINANT (10% to 24.9%)	COMMON (1.0% to 9.9%)	RARE (0.1% to 0.9%)
Diptera	Hemiptera Other Trichoptera	Plecoptera	

DOMINANT (<25%)	SUBDOMINANT (10% to 24.9%)	COMMON (1.0% to 9.9%)	RARE (0.1% to 0.9%)
Plecoptera	Diptera	Other Oligochaeta Hemiptera Trichoptera	

DOMINANT (<25%)	SUBDOMINANT (10% to 24.9%)	COMMON (1.0% to 9.9%)	RARE (0.1% to 0.9%)
Plecoptera Diptera		Other Oligochaeta	Hemiptera Trichoptera

NOTE: Other includes one or more of the following: Collembola, Coleoptera, Hymenoptera, Copepoda,Ostracoda, Bivalva, Aranaea Hydracarina, Ephemeroptera, Insecta

4.5 Fish Assessment

Fish assessments were conducted at five streams; Scougale Creek, Cameron Gulch, Keno Ladue River, Silver Basin Gulch and Gambler Gulch. Four methods for fish capture were used during the Rau access road study; angling, minnow trapping, gill netting and electrofishing. The morphology at each site dictated which methods would be the most efficient. Table 11 summarizes fish capture results using the various gear types at the five surveyed sites. The habitat at each site is described and tabulated in Appendix E.

Four species were collected in the study area; slimy sculpin, northern pike, lake whitefish and Arctic grayling.

TABLE 11 FISH RESULTS PER METHOD

Angling:

Stream	Drainage	Location (deg/min/sec.s)	Discription	Elevation (m)	Date	Effort (minutes)	Catch*	Length (mm)	Weight (gm)	Comments
Keno Ladue River	Stewart-Yukon	63° 59' 25.3" N 135° 09' 15.5" W	Downstream of Silver Basin Creek	706	11-Aug-10	20	no catch			no strikes
Scougale Creek	Stewart-Yukon	64° 08' 03.7" N 134° 52' 46.2" W	Near Clark Lakes	675	10-Aug-10	10	no catch			no strikes

Minnow Trapping:

Stream	Drainage	Location (deg/min/sec.s)	Discription	Elevation (m)	Lift Date	Trap #	Effort (hrs)	Catch*	Length (mm)	Weight (gm)
Cameron Gulch	Stewart-Yukon	64° 00' 37.6" N 134° 56' 54.9" W	Near Keno Ladue Confluence	664	11-Aug-10	1	22.0	no catch		
					11-Aug-10	2	22.0	no catch		
					11-Aug-10	3	22.0	no catch		
Gambler Gulch	Stewart-Yukon	63° 59' 11.7" N 135° 17' 55.3" W	Near Keno Ladue Confluence	744	11-Aug-10	1	23.5	1 SS	51	1.4
					11-Aug-10	2	23.5	no catch		
					11-Aug-10	3	23.5	no catch		
Keno Ladue River	Stewart-Yukon	63° 59' 25.3" N 135° 09' 15.5" W	Downstream of Silver Basin Cre	706	11-Aug-10	1	17.0	no catch		
					11-Aug-10	2	17.0	no catch		
					11-Aug-10	3	17.0	no catch		
Scougale Creek	Stewart-Yukon	64° 08' 03.7" N 134° 52' 46.2" W	Near Clark Lakes	675	11-Aug-10	1	22.0	no catch		
					11-Aug-10	2	22.0	no catch		
					11-Aug-10	3	22.0	no catch		
Silver Basin Gulch	Stewart-Yukon	63° 59' 19.5" N 135° 10' 6.7" W	Near Keno Ladue Confluence	722	11-Aug-10	1	17.0	no catch		
					11-Aug-10	2	17.0	no catch		
					11-Aug-10	3	17.0	no catch		

*SS = slimy sculpin

Gill Netting:

Stream	Drainage	Location (deg/min/sec.s)	Discription	Elevation (m)	Lift Date	Mesh Size (cm)	Gillnet Length (m)	Effort (hrs)	Catch*	Length (mm)	Weight (gm)	Maturity	Sex
Scougale Creek	Stewart-Yukon	64° 08' 03.7" N 134° 52' 46.2" W	Near Clark Lakes	675	11-Aug-10	6.4	23	23	1 NP	500	250	mature	male
									2 LW	400	850	mature	-
										405	800	mature	-

*NP = northern pike
LW = lake whitefish

TABLE 11 FISH RESULTS PER METHOD

Electrofishing:

Stream	Drainage	Location (deg/min/sec.s)	Discription	Elevation (m)	Date	Shocking Time (sec)	Catch*	Length (mm)	Weight (gm)	Comments
Cameron Gulch	Stewart-Yukon	64° 00' 37.6" N 134° 56' 54.9" W	Near Keno Ladue Confluence	664	10-Aug-10	681 (std.pulse, 90Hz, 550v, 15%DC)	no catch			no fish observed
Gambler Gulch	Stewart-Yukon	63° 59' 11.7" N 135° 17' 55.3" W	Near Keno Ladue Confluence	744	11-Aug-10	494 (std.pulse, 90Hz, 300v, 15%DC)	19 SS (27 adult/juv observed)	47	1.2	200 to 300 m of stream surveyed
								51	1.4	
								52	1.4	
								52	1.5	
								53	1.4	
								53	1.4	
								55	1.6	
								55	1.5	
								55	1.7	
								55	2.1	
								55	2.1	
								60	2.3	
								62	2.0	
								63	2.3	
								65	2.8	
								72	3.8	
								73	4.7	
								77	3.9	
								83	5.0	
Keno Ladue River	Stewart-Yukon	63° 59' 25.3" N 135° 09' 15.5" W	Downstream of Silver Basin Creek Confluence	706	10-Aug-10	649 (std.pulse, 90Hz, 375v, 15%DC)	11 SS (8 adt/juv + fry observed)	41	0.7	200 to 300 m of stream surveyed
								46	0.9	
								47	1.0	
								55	1.5	
								58	2.1	
								58	1.8	
								59	2.1	
								64	3.0	
								66	2.8	
								68	3.6	
								70	3.3	
							5 AG (2 fry observed)	42	0.7	
								48	1.0	
								51	1.2	
								56	2.1	
								62	2.5	
Silver Basin Gulch	Stewart-Yukon	63° 59' 19.5" N 135° 10' 6.7" W	Near Keno Ladue Confluence	722	11-Aug-10	510 (std.pulse, 90Hz, 325v, 15%DC)	9 SS (6 adult/juv observed + numerous fry)	37	0.5	200 to 300 m of stream surveyed
								44	1.1	
								49	1.2	
								55	1.6	
								61	2.8	
								67	3.5	
								72	4.4	
								76	4.0	
								81	5.6	
							1 AG	73	4.5	

AG = Arctic grayling
SS = Slimy Sculpin

No fish were captured or observed at Cameron Gulch. This is a very high energy stream with a steep gradient and is almost entirely a rapid. There were some runs and the occasional scour pool within the reach assessed. The length of Cameron Creek from the sample site to the confluence with the Keno Ladue River was flown and no obstructions or fish passage problems were observed. The chemical composition as well as the acidity of the waters of Cameron Creek may be providing unfavourable conditions for the support of fish populations (see Section 4.2).

Electrofishing was the only successful method for fish capture at Keno Ladue River where 11 slimy sculpin and five Arctic grayling were caught. The surveyed reach consists of 100% glide and runs with deep corner pools in the meanders. No riffle or rapids were observed. The substrate was highly mobile consisting of sand or small gravel. Fish cover values were high largely in the form of cut-banks, deep pools and overhanging vegetation. Kingfishers were active on this stream during the assessment attesting to the fish productivity of the area. Ladue Lake, the headwaters of Keno Ladue River, is known to contain lake whitefish, burbot, northern pike and lake trout (FISS).

Gill netting yielded one northern pike and two lake whitefish from Scougale Creek. This site had the best fish habitat for rearing of the sites in the study area. The deep wide channel has a low gradient, slow water velocities with a substrate covered with a dense carpet of aquatic macrophytes. It is an all glide/run habitat type with no discernable riffles. The wide vegetated riparian area is largely dominated by willows with some sections adjacent to water wetland habitat. Based on the gillnet catches Scougale Creek is an important link for fish movement between Clark and Scougale Lakes.

Nine slimy sculpin and one Arctic grayling were captured using the electrofisher at Silver Basin Gulch. Numerous slimy sculpin fry were observed here. Most of the fish captured were located near the confluence with the Keno Ladue River and fish densities were low as one progressed upstream with the electrofisher. There is good fish habitat just downstream at the confluence with the Keno Ladue River. Silver Basin Gulch is a small drainage but likely responds quickly to rain events and warm weather during snowmelt. It has an active flood plane with an unstable channel in the low reach of the creek. It appears that in recent years, the channel has actually shifted to the west of its original channel to the Keno Ladue River.

One slimy sculpin was caught in a minnow trap at Gambler Gulch and 19 were captured using the electrofisher. Another 27 were observed but not captured during this process. The lower section flows through a sedge and grass meadow with the upper part incised in thick willows. Good fish habitat was observed just downstream at the confluence with Ladue Creek. It is likely that Arctic grayling are seasonal visitors.

Although Creek I was not examined for fisheries during the 2010 survey, this area was a component of a DFO and EC study during their Upper Keno Ladue Drainage Survey in the

summer of 2009. Minnow traps and angling were the fish capture methods used in the unnamed lake that Creek I flows into. Nothing was captured in the minnow traps however two pike were caught by angling at the creek mouth, with fork lengths of 30.55 cm and 27.5 cm. Strikes and observations of several more pike of similar size were made on July 29, 2009 (DFO memo to file, July 31, 2009).

5.0 RECOMMENDATIONS

Hydrology:

The surface water hydrometric monitoring of 2010 provided a good snapshot of conditions along the proposed Rau Access Route between March and October, 2010. Due to the emergence of the Rau Property as a regionally significant mineral exploration project and its potential for further development, it is recommended that the surface water monitoring program along the potential access route be continued in 2011. Regardless of whether or not the route is used to access the Rau, the measurements and observations taken in the area can be used within the context of an environmental baseline study for the Rau Property. It is also recommended that surface water monitoring be expanded within the Rau Property itself and include such continuous and spot flow measurements required to characterize the surface water hydrologic conditions at the Rau Property.

Wildlife:

With regard to moose, the purpose of these surveys was to demonstrate seasonal range use and timing of these events, with some insight into seasonal social behaviour and influencing environmental factors proximal to the proposed route. While these surveys provided population minimums, a comprehensive population appraisal would require a Ver Hoef survey regionally; a methodology beyond the capacity of a single investigator. Pending future project development decisions, a Ver Hoef survey may be a future recommendation. The 2006 Ver Hoef survey that encompassed the Rau Road access route did not include the Rau property itself. It is recommended that such a survey be completed to cover the Rau property as part of the baseline studies for the property.

In the immediate future, it is recommended that a late winter moose survey be undertaken in March 2011, similar to that completed in 2010. Depending on snow conditions, moose movements may be very different by March 2011 compared to the deep snow that was encountered during March 2010.

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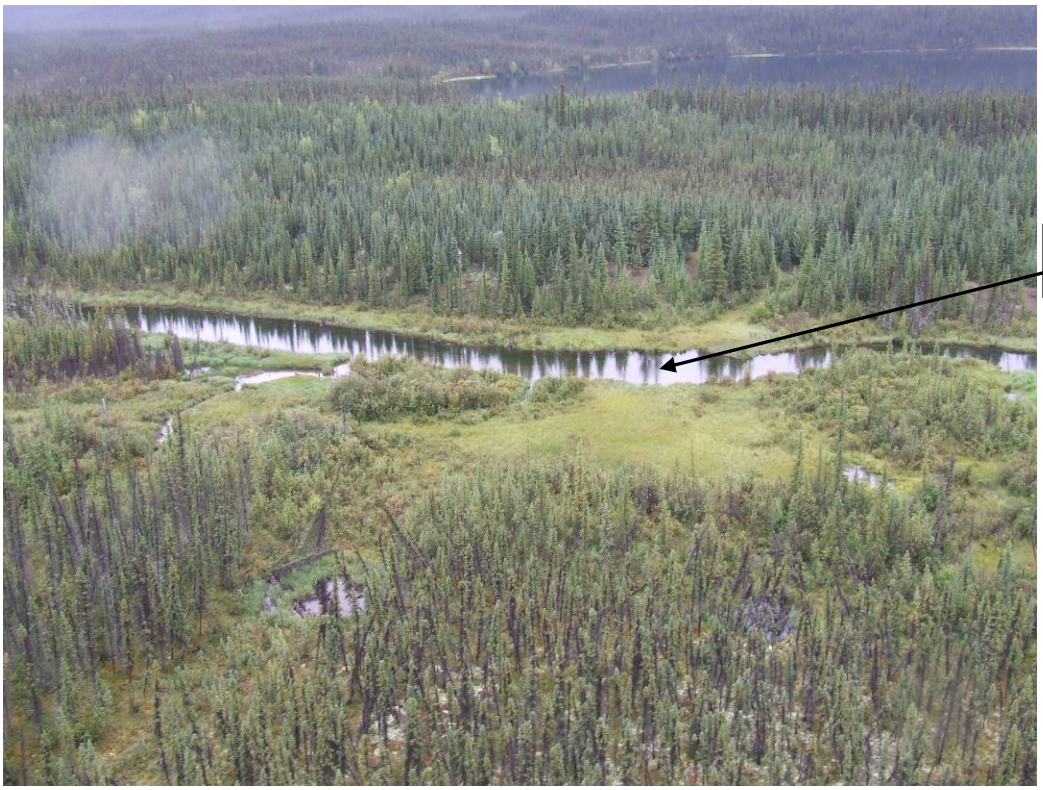
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APPENDIX A

PHOTOGRAPHS, 2010



Scougale Creek looking south from the Wind River Trail Crossing, August 10, 2010.



Aerial view of Scougale Creek at existing crossing, August 11, 2010.



Two Lake Whitefish captured by gill net in Scougale Creek, August 11, 2010.



Scougale Creek looking downstream near the datalogger, October 26, 2010.



Creek A looking upstream, June 12, 2010.



Cameron Creek looking upstream to the data logger, August 10, 2010.



Cameron Creek looking upstream, October 26, 2010.



Keno Ladue River looking upstream from the datalogger, August 10, 2010.



Keno Ladue River looking downstream at the datalogger, October 26, 2010.



Silver Basin Gulch was assessed 150 m upstream of the confluence with the Keno Ladue River, August 11, 2010.



Silver Basin Gulch, October 27, 2010.



Faro Gulch is a shallow shrub-choked creek, June 11, 2010.



Gambler Gulch looking upstream, June 11, 2010.



Gambler Gulch looking downstream, October 27, 2010.



Aerial view of Gambler Gulch, August 11, 2010.



Aerial view of Creek I, August 11, 2010.

APPENDIX B

WATER QUALITY DATA, 2010

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Report Transmission Cover Page

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Contact & Affiliation	Address	Delivery Commitments
Accounts Payable Laberge Environmental Services	, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: null Email: n/a	On [Lot Approval and Final Test Report Approval] send (Invoice) by Post M
Bonnie Burns Laberge Environmental Services	1-405 Ogilvie Street, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: (867) 667-6956 Email: bonnieburns@northwestel.net	On [Lot Verification] send (COA) by Email - Multiple Reports On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (COC, Test Report) by Post M

Notes To Clients:

- An appropriately preserved sample was not received for Ammonia in water analysis of sample 746784-1 to 6. Analysis was performed on unpreserved sample
- Analyses were performed on samples 746784-1 to 6 that exceeded the recommended holding times for pH, ammonia, nitrate and nitrite analysis.

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Sample Custody

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**746784**
Control Number:	
Date Received:	Jun 15, 2010
Date Reported:	Jun 21, 2010
Report Number:	1334346

Sample Disposal Date: July 21, 2010

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Reference Number	746784-1	746784-2	746784-3
Sample Date	Jun 11, 2010	Jun 11, 2010	Jun 11, 2010
Sample Time	18:10	11:10	17:30
Sample Location			
Sample Description	Gambler Gulch	Faro Gulch	Silver Basin
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	6.4	1.7	2.7	0.5
Ammonia - N		mg/L	0.02	0.01	<0.01	
Nitrate - N		mg/L	0.10	0.14	0.20	0.01
Nitrite - N		mg/L	<0.005	<0.005	<0.005	0.005
Metals Dissolved						
Sulfur	Dissolved	mg/L	23.6	36.0	60.0	0.2
Metals Total						
Calcium	Total	mg/L	43.8	47.9	72.8	0.05
Iron	Total	mg/L	0.127	0.181	0.068	0.01
Magnesium	Total	mg/L	13.4	13.1	24.5	0.05
Phosphorus	Total	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Total	mg/L	0.4	0.2	0.4	0.1
Silicon	Total	mg/L	1.88	1.64	1.72	0.05
Sodium	Total	mg/L	0.85	0.70	0.64	0.02
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	3	4	<2	1
Solids	Total Dissolved	mg/L	216	242	374	5
Routine Water						
pH	@ 25 °C		7.80	7.80	7.83	
Electrical Conductivity		µS/cm at 25 C	308	335	522	1
Calcium	Dissolved	mg/L	44.8	50.2	75.8	0.1
Magnesium	Dissolved	mg/L	13.6	13.5	25.2	0.1
Phosphorus	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Dissolved	mg/L	0.3	0.2	0.4	0.1
Silicon	Dissolved	mg/L	2.37	2.11	2.24	0.05
Sodium	Dissolved	mg/L	0.8	0.7	0.6	0.1
Bicarbonate		mg/L	100	70	100	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	81	58	82	5
Chloride	Dissolved	mg/L	0.23	0.22	0.36	0.02
Sulfate (SO4)	Dissolved	mg/L	70.7	98.8	169	0.05
Hardness	as CaCO3	mg/L	168	181	293	5
Hardness	Total	mg CaCO3/L	165	174	282	1
Salinity	Dissolved	g/L	0.002	0.002	0.002	0.0001

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Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
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	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Reference Number	746784-1	746784-2	746784-3
Sample Date	Jun 11, 2010	Jun 11, 2010	Jun 11, 2010
Sample Time	18:10	11:10	17:30
Sample Location			
Sample Description	Gambler Gulch	Faro Gulch	Silver Basin
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Dissolved						
Aluminum	Dissolved	µg/L	25	5	6	5
Antimony	Dissolved	µg/L	<0.2	0.3	<0.2	0.2
Arsenic	Dissolved	µg/L	0.4	0.3	0.5	0.2
Barium	Dissolved	µg/L	38	40	33	1
Beryllium	Dissolved	µg/L	<0.04	<0.04	<0.04	0.04
Bismuth	Dissolved	µg/L	<1	<1	<1	1
Boron	Dissolved	µg/L	<4	<4	<4	4
Cadmium	Dissolved	µg/L	0.13	0.67	0.08	0.01
Chromium	Dissolved	µg/L	0.5	<0.4	0.6	0.4
Cobalt	Dissolved	µg/L	0.18	0.05	0.1	0.02
Copper	Dissolved	µg/L	2	<1	1	1
Iron	Dissolved	µg/L	40	<10	44	10
Lead	Dissolved	µg/L	<0.1	0.7	<0.1	0.1
Lithium	Dissolved	µg/L	2	<1	2	1
Manganese	Dissolved	µg/L	18.0	5.9	12.2	0.2
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Dissolved	µg/L	0.4	0.3	0.4	0.1
Nickel	Dissolved	µg/L	4	2	2	1
Selenium	Dissolved	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Dissolved	µg/L	154	169	262	1.0
Tellurium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Uranium	Dissolved	µg/L	0.8	1.1	1.8	0.4
Vanadium	Dissolved	µg/L	0.2	0.1	0.2	0.1
Zinc	Dissolved	µg/L	14	68	4	1
Zirconium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Trace Metals Total						
Aluminum	Total	µg/L	65	68	23	5
Antimony	Total	µg/L	<0.2	0.6	<0.2	0.2
Arsenic	Total	µg/L	0.5	1.3	0.7	0.2
Barium	Total	µg/L	39	44	34	1
Beryllium	Total	µg/L	<0.04	<0.04	<0.04	0.04

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Analytical Report

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

					Nominal Detection Limit
Reference Number		746784-1	746784-2	746784-3	
Sample Date		Jun 11, 2010	Jun 11, 2010	Jun 11, 2010	
Sample Time		18:10	11:10	17:30	
Sample Location					
Sample Description		Gambler Gulch	Faro Gulch	Silver Basin	
Matrix		Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	
Trace Metals Total - Continued						
Bismuth	Total	µg/L	<1	<1	<1	1
Boron	Total	µg/L	<5	<5	<5	5
Cadmium	Total	µg/L	0.12	0.84	0.07	0.01
Chromium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Cobalt	Total	µg/L	0.27	0.18	0.13	0.02
Copper	Total	µg/L	2	2	2	1
Lead	Total	µg/L	<0.1	15.8	0.2	.1
Lithium	Total	µg/L	2	<1	2	1
Manganese	Total	µg/L	26.6	31.2	16.3	0.2
Mercury	Total	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Total	µg/L	0.5	0.4	0.4	0.1
Nickel	Total	µg/L	4	2	2	1
Selenium	Total	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Total	µg/L	<0.01	0.14	<0.01	0.01
Strontium	Total	µg/L	164	174	279	1.0
Tellurium	Total	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Total	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Total	µg/L	1.2	1.7	0.6	0.4
Uranium	Total	µg/L	0.8	1.2	1.9	0.4
Vanadium	Total	µg/L	0.1	0.1	<0.1	0.1
Zinc	Total	µg/L	20	81	8	1
Zirconium	Total	µg/L	0.1	<0.1	<0.1	0.1

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Reference Number	746784-4	746784-5	746784-6
Sample Date	Jun 11, 2010	Jun 11, 2010	Jun 11, 2010
Sample Time	16:30	12:30	14:40
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	4.8	1.1	4.5	0.5
Ammonia - N		mg/L	0.01	0.01	0.01	
Nitrate - N		mg/L	0.04	0.05	0.04	0.01
Nitrite - N		mg/L	<0.005	<0.005	<0.005	0.005
Metals Dissolved						
Sulfur	Dissolved	mg/L	27.3	17.4	11.6	0.2
Metals Total						
Calcium	Total	mg/L	39.6	12.8	32.9	0.05
Iron	Total	mg/L	0.276	0.556	0.113	0.01
Magnesium	Total	mg/L	11.4	5.56	10.1	0.05
Phosphorus	Total	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Total	mg/L	0.4	0.3	0.5	0.1
Silicon	Total	mg/L	1.89	3.13	1.57	0.05
Sodium	Total	mg/L	0.66	0.67	0.77	0.02
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	40	7	<2	1
Solids	Total Dissolved	mg/L	186	108	120	5
Routine Water						
pH	@ 25 °C		7.70	5.23	7.89	
Electrical Conductivity		µS/cm at 25 C	284	135	236	1
Calcium	Dissolved	mg/L	39.3	12.7	33.6	0.1
Magnesium	Dissolved	mg/L	11.2	5.5	10.2	0.1
Phosphorus	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Dissolved	mg/L	0.4	0.3	0.5	0.1
Silicon	Dissolved	mg/L	2.20	3.49	2.00	0.05
Sodium	Dissolved	mg/L	0.6	0.6	0.7	0.1
Bicarbonate		mg/L	80	<5	100	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	62	<5	87	5
Chloride	Dissolved	mg/L	0.22	0.23	0.23	0.02
Sulfate (SO4)	Dissolved	mg/L	72.7	50.1	33.5	0.05
Hardness	as CaCO3	mg/L	144	54	126	5
Hardness	Total	mg CaCO3/L	146	55.0	124	1
Salinity	Dissolved	g/L	0.002	0.002	0.002	0.0001

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Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Reference Number	746784-4	746784-5	746784-6
Sample Date	Jun 11, 2010	Jun 11, 2010	Jun 11, 2010
Sample Time	16:30	12:30	14:40
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Dissolved						
Aluminum	Dissolved	µg/L	86	595	81	5
Antimony	Dissolved	µg/L	0.4	<0.2	<0.2	0.2
Arsenic	Dissolved	µg/L	0.9	<0.2	0.3	0.2
Barium	Dissolved	µg/L	57	23	25	1
Beryllium	Dissolved	µg/L	<0.04	0.09	<0.04	0.04
Bismuth	Dissolved	µg/L	<1	<1	<1	1
Boron	Dissolved	µg/L	<4	<4	<4	4
Cadmium	Dissolved	µg/L	0.09	1.00	0.14	0.01
Chromium	Dissolved	µg/L	0.5	<0.4	0.6	0.4
Cobalt	Dissolved	µg/L	1.50	14.23	1.59	0.02
Copper	Dissolved	µg/L	2	9	2	1
Iron	Dissolved	µg/L	55	231	18	10
Lead	Dissolved	µg/L	0.1	<0.1	<0.1	0.1
Lithium	Dissolved	µg/L	2	6	3	1
Manganese	Dissolved	µg/L	55.4	189	21.8	0.2
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Dissolved	µg/L	0.4	<0.1	0.2	0.1
Nickel	Dissolved	µg/L	10	82	18	1
Selenium	Dissolved	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Dissolved	µg/L	124	33	148	1.0
Tellurium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Uranium	Dissolved	µg/L	0.5	<0.4	0.5	0.4
Vanadium	Dissolved	µg/L	0.2	<0.1	0.2	0.1
Zinc	Dissolved	µg/L	16	217	15	1
Zirconium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Trace Metals Total						
Aluminum	Total	µg/L	268	1480	256	5
Antimony	Total	µg/L	0.5	<0.2	<0.2	0.2
Arsenic	Total	µg/L	1.4	<0.2	0.3	0.2
Barium	Total	µg/L	61	24	26	1
Beryllium	Total	µg/L	<0.04	0.13	<0.04	0.04

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Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **746784**
Control Number:
Date Received: Jun 15, 2010
Date Reported: Jun 21, 2010
Report Number: 1334346

Reference Number	746784-4	746784-5	746784-6
Sample Date	Jun 11, 2010	Jun 11, 2010	Jun 11, 2010
Sample Time	16:30	12:30	14:40
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Bismuth	Total	µg/L	<1	<1	<1	1
Boron	Total	µg/L	<5	<5	<5	5
Cadmium	Total	µg/L	0.14	1.02	0.14	0.01
Chromium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Cobalt	Total	µg/L	1.71	14.4	2.12	0.02
Copper	Total	µg/L	3	10	2	1
Lead	Total	µg/L	0.7	0.2	<0.1	.1
Lithium	Total	µg/L	2	6	4	1
Manganese	Total	µg/L	57.8	189	44.2	0.2
Mercury	Total	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Total	µg/L	0.4	<0.1	0.2	0.1
Nickel	Total	µg/L	11	81	19	1
Selenium	Total	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Total	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Total	µg/L	133	34	156	1.0
Tellurium	Total	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Total	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Total	µg/L	2.0	2.5	1.1	0.4
Uranium	Total	µg/L	0.5	<0.4	0.5	0.4
Vanadium	Total	µg/L	0.3	0.2	0.2	0.1
Zinc	Total	µg/L	24	220	29	1
Zirconium	Total	µg/L	0.1	<0.1	<0.1	0.1

Approved by: Marie England
Marie England
Consulting Scientist

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**746784**
Control Number:	
Date Received:	Jun 15, 2010
Date Reported:	Jun 21, 2010
Report Number:	1334346

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	*	Alkalinity - Titration Method, 2320 B	16-Jun-10	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	Conductivity, 2510	16-Jun-10	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	pH - Electrometric Method, 4500-H+ B	16-Jun-10	Exova Surrey
Ammonia-N in Water	APHA	*	Titrametric, 4500-NH3 C	16-Jun-10	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	16-Jun-10	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	18-Jun-10	Exova Edmonton
Mercury Low Level (Total) in water	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	16-Jun-10	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	16-Jun-10	Exova Surrey
Metals SemiTrace (Total) in Water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	16-Jun-10	Exova Surrey
Nitrogen - nitrite+nitrate-N	APHA	*	Automated Cadmium Reduction Method, 4500-NO3- F	16-Jun-10	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile)2	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	16-Jun-10	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	16-Jun-10	Exova Surrey

** Reference Method Modified*

References

APHA	Standard Methods for the Examination of Water and Wastewater
EPA	Environmental Protection Agency Test Methods - US
US EPA	US Environmental Protection Agency Test Methods

Comments:

- An appropriately preserved sample was not received for Ammonia in water analysis of sample 746784-1 to 6. Analysis was performed on unpreserved sample
- Analyses were performed on samples 746784-1 to 6 that exceeded the recommended holding times for pH, ammonia, nitrate and nitrite analysis.

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**746784**
Control Number:	
Date Received:	Jun 15, 2010
Date Reported:	Jun 21, 2010
Report Number:	1334346

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

Terms and Conditions: www.exova.ca/terms&conditions

LOT: Control Number

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis
See reverse for your nearest Bodycote Norwest location and proper sampling protocol

Billing Address:			**Copy of Report To:**		Copy of invoice:
Company:	Laberge Environmental Services		Company:		Mail invoice to this
Address:	P.O. Box 21072 Whitehorse, Yukon Y1A 6P7	QA/QC Report [x]	Address:		address for approval [ ]
		Report Result:			Report Result:
Attention:	Bonnie Burns	Fax [ ]	Attention:		Fax [ ]
Phone:	867-668-6838	Mail [ ]	Phone:		Mail [ ]
Fax:		Courier [ ]	Fax:		Courier [ ]
Cell:		e-mail [x]	Cell:		e-mail [ ]
e-mail:	bonnieburns@northwestel.net	e-Service [ ]	e-mail:		e-Service [ ]

Information to be included on Report and Invoice

Project ID: ATAC Resources Ltd
Project Name: Rau Road
Project Location:
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH **Please contact the laboratory to confirm rush dates and times before submitting samples.**

Upon filling out this section, client accepts that surcharges will be attached to this analysis

RUSH required on: All Analysis [ ] or As indicated [ ]
Date Required:
Signature:
Bodycote Authorization:

Sample Custody (Please Print)
Sampled by: Bonnie Burns
Company LES Signature
I authorize Bodycote to proceed with the work work indicated on this form:
Date: June 14/10 Initial: BB
Received by: Sample Temp.
Waybill #: Date
Company Time

RECEIVED JUN 15 2010

Special Instructions / Comments

Note: Do **NOT** send back a cooler with another set of bottles as we do not know if we will be repeating this sampling.

TOC samples were preserved with HCL approx 48 hours after collection, metals samples were filtered and preserved in the field.

Please indicate which regulations you are required to meet: CCME for freshwater aquatic life

FOR LAB USE ONLY
Condiftion of containers/coolers upon arrival at lab

[ ] Check here if Bodycote is required to report results directly to a regulatory body (Please include contact information)

[ ] Check here if you are testing POTABLE WATER for **HUMAN CONSUMPTION**

	Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	Number of Containers	Enter tests above (✓ relevant samples below)										
								Total Metals	Dissolved Met	TOC	pH, EC, TDS	Total Hardnes	Total Alkalinit	NH4, NO2, NO	Total P	Cl	SO4	TSS
1	Gambler Gulch			une 11 @ 18:1	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
2	Faro Gulch			une 11 @ 11:1	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
3	Silver Basin			une 11 @ 17:3	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
4	Keno Ladue River			une 11 @ 16:3	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
5	Cameron Creek			une 11 @ 12:3	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
6	ScougaleCreek			une 11 @ 14:4	H_2O	grab	4	√	√	√	√	√	√	√	√	√	√	√
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

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Report Transmission Cover Page

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Contact & Affiliation	Address	Delivery Commitments
Accounts Payable Laberge Environmental Services	, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: null Email: n/a	On [Lot Approval and Final Test Report Approval] send (Invoice) by Post M
Bonnie Burns Laberge Environmental Services	1-405 Ogilvie Street, Box 21072 Whitehorse, Yukon Territory Y1A 6P7 Phone: (867) 668-6838 Fax: (867) 667-6956 Email: bonnieburns@northwestel.net	On [Lot Verification] send (COA) by Email - Multiple Reports On [Report Approval] send (COC, Test Report) by Email - Merge Reports On [Report Approval] send (Test Report) by Email - Single Report On [Report Approval] send (Test Report) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (Invoice) by Email - Single Report On [Lot Approval and Final Test Report Approval] send (COC, Test Report) by Post M

Notes To Clients:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.
- Some total metal results were less than dissolved metal results for samples 757359-1, -2,-3,-4, -5,-6, -7, and -8. The results were verified and are within expected measurement uncertainty.

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Sample Custody

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Sample Disposal Date: September 22, 2010

All samples will be stored until this date unless other instructions are received. Please indicate other requirements below and return this form to the address or fax number on the top of this page.

☐ Extend Sample Storage Until _____ (MM/DD/YY)

The following charges apply to extended sample storage:

Storage for an additional 30 days	$ 2.50 per sample
Storage for an additional 60 days	$ 5.00 per sample
Storage for an additional 90 days	$ 7.50 per sample

☐ Return Sample, collect, to the address below via:

- ☐ Greyhound
- ☐ DHL
- ☐ Purolator
- ☐ Other (specify) _____

Name _____
Company _____
Address _____
_____
Phone _____
Fax _____

Signature _____

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-1	757359-2	757359-3
Sample Date	Aug 11, 2010	Aug 11, 2010	Aug 11, 2010
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Gambler Gulch	Faro Gulch	Silver Basin
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	4.3	1.0	1.7	0.5
Ammonia - N		mg/L	<0.01	<0.01	<0.01	
Nitrate - N		mg/L	0.09	0.11	0.13	0.01
Nitrite - N		mg/L	<0.005	<0.005	<0.005	0.005
Metals Dissolved						
Sulfur	Dissolved	mg/L	31.6	41.2	70.0	0.2
Metals Total						
Calcium	Total	mg/L	53.9	56.3	86.8	0.05
Iron	Total	mg/L	0.389	0.047	0.086	0.01
Magnesium	Total	mg/L	16.1	15.7	26.7	0.05
Phosphorus	Total	mg/L	<0.01	<0.010	<0.010	0.01
Potassium	Total	mg/L	0.5	0.5	0.6	0.1
Silicon	Total	mg/L	2.24	1.91	1.94	0.05
Sodium	Total	mg/L	1.55	1.49	1.35	0.02
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	8	<3	<2	1
Solids	Total Dissolved	mg/L	312	310	492	5
Routine Water						
pH	@ 25 °C		7.98	7.97	7.99	
Electrical Conductivity		µS/cm at 25 C	400	418	627	1
Calcium	Dissolved	mg/L	52.2	53.8	83.9	0.1
Magnesium	Dissolved	mg/L	15.6	15.0	25.8	0.1
Phosphorus	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Dissolved	mg/L	0.2	0.2	0.4	0.1
Silicon	Dissolved	mg/L	2.06	1.86	1.89	0.05
Sodium	Dissolved	mg/L	1.2	1.1	1.0	0.1
Bicarbonate		mg/L	130	90	140	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	106	76	112	5
Chloride	Dissolved	mg/L	<0.02	<0.02	<0.02	0.02
Sulfate (SO4)	Dissolved	mg/L	96.1	122	207	0.05
Hardness	as CaCO3	mg/L	195	196	316	5
Hardness	Total	mg CaCO3/L	201	205	326	1
Salinity	Dissolved	g/L	0.0029	0.0027	0.0025	0.0001

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Analytical Report

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

		Reference Number	757359-1	757359-2	757359-3	
		Sample Date	Aug 11, 2010	Aug 11, 2010	Aug 11, 2010	
		Sample Time	NA	NA	NA	
		Sample Location				
		Sample Description	Gambler Gulch	Faro Gulch	Silver Basin	
		Matrix	Water	Water	Water	
Analyte		**Units**	**Results**	**Results**	**Results**	Nominal Detection Limit
Trace Metals Dissolved						
Aluminum	Dissolved	µg/L	21	<5	<5	5
Antimony	Dissolved	µg/L	<0.2	0.3	<0.2	0.2
Arsenic	Dissolved	µg/L	0.5	0.3	0.8	0.2
Barium	Dissolved	µg/L	47	53	37	1
Beryllium	Dissolved	µg/L	<0.04	<0.04	<0.04	0.04
Bismuth	Dissolved	µg/L	<1	<1	<1	1
Boron	Dissolved	µg/L	<4	<4	<4	4
Cadmium	Dissolved	µg/L	0.10	0.39	0.05	0.01
Chromium	Dissolved	µg/L	<0.4	0.6	<0.4	0.4
Cobalt	Dissolved	µg/L	0.16	<0.02	0.13	0.02
Copper	Dissolved	µg/L	1	<1	<1	1
Iron	Dissolved	µg/L	78	16	54	10
Lead	Dissolved	µg/L	<0.1	0.4	<0.1	0.1
Lithium	Dissolved	µg/L	2	<1	2	1
Manganese	Dissolved	µg/L	31.1	13.6	35.0	0.2
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Dissolved	µg/L	0.4	0.3	0.3	0.1
Nickel	Dissolved	µg/L	3	1	1	1
Selenium	Dissolved	µg/L	0.6	<0.6	1.0	0.6
Silver	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Dissolved	µg/L	200	210	315	1.0
Tellurium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Uranium	Dissolved	µg/L	1.3	1.7	1.9	0.4
Vanadium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Zinc	Dissolved	µg/L	14	33	3	1
Zirconium	Dissolved	µg/L	0.1	<0.1	<0.1	0.1
Trace Metals Total						
Aluminum	Total	µg/L	155	7	5	5
Antimony	Total	µg/L	<0.2	0.3	<0.2	0.2
Arsenic	Total	µg/L	1.1	0.5	0.6	0.2
Barium	Total	µg/L	51	54	38	1
Beryllium	Total	µg/L	<0.04	<0.04	<0.04	0.04

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Analytical Report

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-1	757359-2	757359-3
Sample Date	Aug 11, 2010	Aug 11, 2010	Aug 11, 2010
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Gambler Gulch	Faro Gulch	Silver Basin
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Bismuth	Total	µg/L	<1	<1	<1	1
Boron	Total	µg/L	<5	<5	<5	5
Cadmium	Total	µg/L	0.14	0.42	0.06	0.01
Chromium	Total	µg/L	0.9	<0.4	<0.4	0.4
Cobalt	Total	µg/L	0.34	0.03	0.10	0.02
Copper	Total	µg/L	2	<1	<1	1
Lead	Total	µg/L	0.5	2.9	<0.1	0.1
Lithium	Total	µg/L	3	<1	2	1
Manganese	Total	µg/L	43.0	17.9	36.6	0.2
Mercury	Total	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Total	µg/L	0.5	0.3	0.3	0.1
Nickel	Total	µg/L	4	1	2	1
Selenium	Total	µg/L	1.0	<0.6	0.8	0.6
Silver	Total	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Total	µg/L	210	215	317	1.0
Tellurium	Total	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Total	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Total	µg/L	3.4	<0.4	<0.4	0.4
Uranium	Total	µg/L	1.2	1.7	1.9	0.4
Vanadium	Total	µg/L	0.4	<0.1	<0.1	0.1
Zinc	Total	µg/L	26	38	6	1
Zirconium	Total	µg/L	0.2	<0.1	<0.1	0.1

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-4	757359-5	757359-6
Sample Date	Aug 10, 2010	Aug 10, 2010	Aug 10, 2010
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	3.9	<0.5	2.8	0.5
Ammonia - N		mg/L	<0.01	<0.01	0.01	
Nitrate - N		mg/L	0.02	0.06	0.02	0.01
Nitrite - N		mg/L	<0.005	<0.005	<0.005	0.005
Metals Dissolved						
Sulfur	Dissolved	mg/L	22.4	24.1	14.4	0.2
Metals Total						
Calcium	Total	mg/L	41.5	17.4	38.1	0.05
Iron	Total	mg/L	0.284	0.334	0.048	0.01
Magnesium	Total	mg/L	10.9	7.80	12.5	0.05
Phosphorus	Total	mg/L	<0.01	<0.010	<0.010	0.01
Potassium	Total	mg/L	0.6	0.4	0.4	0.1
Silicon	Total	mg/L	2.13	4.28	1.60	0.05
Sodium	Total	mg/L	1.25	1.51	1.27	0.02
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	<2	4	<2	1
Solids	Total Dissolved	mg/L	210	154	226	5
Routine Water						
pH	@ 25 °C		7.95	6.13	8.10	
Electrical Conductivity		µS/cm at 25 C	302	181	288	1
Calcium	Dissolved	mg/L	40.2	16.7	36.4	0.1
Magnesium	Dissolved	mg/L	10.6	7.5	12.0	0.1
Phosphorus	Dissolved	mg/L	<0.01	<0.01	<0.01	0.01
Potassium	Dissolved	mg/L	0.4	0.3	0.1	0.1
Silicon	Dissolved	mg/L	2.05	3.98	1.54	0.05
Sodium	Dissolved	mg/L	1	1.2	1	0.1
Bicarbonate		mg/L	100	<5	130	5
Carbonate		mg/L	<6	<6	<6	6
Hydroxide		mg/L	<5	<5	<5	5
T-Alkalinity	as CaCO3	mg/L	83	<5	106	5
Chloride	Dissolved	mg/L	0.20	0.19	<0.02	0.02
Sulfate (SO4)	Dissolved	mg/L	68.8	74.7	46.0	0.05
Hardness	as CaCO3	mg/L	144	72	140	5
Hardness	Total	mg CaCO3/L	148	75.6	147	1
Salinity	Dissolved	g/L	0.002	0.0031	0.002	0.0001

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-4	757359-5	757359-6
Sample Date	Aug 10, 2010	Aug 10, 2010	Aug 10, 2010
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Dissolved						
Aluminum	Dissolved	µg/L	<5	106	116	5
Antimony	Dissolved	µg/L	0.5	<0.2	<0.2	0.2
Arsenic	Dissolved	µg/L	1.4	<0.2	0.5	0.2
Barium	Dissolved	µg/L	71	33	30	1
Beryllium	Dissolved	µg/L	<0.04	0.08	<0.04	0.04
Bismuth	Dissolved	µg/L	<1	<1	<1	1
Boron	Dissolved	µg/L	<4	<4	<4	4
Cadmium	Dissolved	µg/L	<0.01	1.21	0.07	0.01
Chromium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Cobalt	Dissolved	µg/L	0.06	15.7	1.03	0.02
Copper	Dissolved	µg/L	<1	7	2	1
Iron	Dissolved	µg/L	109	119	<10	10
Lead	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Lithium	Dissolved	µg/L	2	7	4	1
Manganese	Dissolved	µg/L	31.1	157	19.8	0.2
Mercury	Total Dissolved	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Dissolved	µg/L	0.4	<0.1	0.1	0.1
Nickel	Dissolved	µg/L	2	96	17	1
Selenium	Dissolved	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Dissolved	µg/L	132	48	192	1.0
Tellurium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Dissolved	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Dissolved	µg/L	<0.4	<0.4	<0.4	0.4
Uranium	Dissolved	µg/L	0.5	<0.4	0.7	0.4
Vanadium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Zinc	Dissolved	µg/L	3	306	6	1
Zirconium	Dissolved	µg/L	<0.1	<0.1	<0.1	0.1
Trace Metals Total						
Aluminum	Total	µg/L	39	1300	139	5
Antimony	Total	µg/L	0.4	<0.2	<0.2	0.2
Arsenic	Total	µg/L	1.6	<0.2	0.4	0.2
Barium	Total	µg/L	74	34	30	1
Beryllium	Total	µg/L	<0.04	<0.04	<0.04	0.04

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-4	757359-5	757359-6
Sample Date	Aug 10, 2010	Aug 10, 2010	Aug 10, 2010
Sample Time	NA	NA	NA
Sample Location			
Sample Description	Keno Ladue River	Cameron Creek	Scougale Creek
Matrix	Water	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Bismuth	Total	µg/L	<1	<1	<1	1
Boron	Total	µg/L	<5	<5	<5	5
Cadmium	Total	µg/L	0.04	1.18	0.08	0.01
Chromium	Total	µg/L	0.6	<0.4	0.6	0.4
Cobalt	Total	µg/L	0.17	19.4	1.22	0.02
Copper	Total	µg/L	1	9	2	1
Lead	Total	µg/L	0.6	<0.1	0.1	0.1
Lithium	Total	µg/L	2	8	5	1
Manganese	Total	µg/L	41.5	184	28.4	0.2
Mercury	Total	ug/L	<0.01	<0.01	<0.01	0.01
Molybdenum	Total	µg/L	0.5	<0.1	0.1	0.1
Nickel	Total	µg/L	2	111	19	1
Selenium	Total	µg/L	<0.6	<0.6	<0.6	0.6
Silver	Total	µg/L	<0.01	<0.01	<0.01	0.01
Strontium	Total	µg/L	147	54	200	1.0
Tellurium	Total	µg/L	<0.1	<0.1	<0.1	0.1
Thallium	Total	µg/L	<0.01	<0.01	<0.01	0.01
Thorium	Total	µg/L	<0.4	<0.4	<0.4	0.4
Tin	Total	µg/L	<0.1	<0.1	<0.1	0.1
Titanium	Total	µg/L	1.4	0.6	<0.4	0.4
Uranium	Total	µg/L	0.5	<0.4	0.7	0.4
Vanadium	Total	µg/L	0.2	<0.1	<0.1	0.1
Zinc	Total	µg/L	9	331	13	1
Zirconium	Total	µg/L	<0.1	<0.1	<0.1	0.1

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Reference Number	757359-7	757359-8
Sample Date	Aug 11, 2010	Aug 11, 2010
Sample Time	NA	NA
Sample Location		
Sample Description	Creek A	Creek I
Matrix	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Inorganic Nonmetallic Parameters						
Organic Carbon	Total Nonpurgeable	mg/L	1	2.9		0.5
Ammonia - N		mg/L	<0.01	0.02		
Nitrate - N		mg/L	0.05	0.04		0.01
Nitrite - N		mg/L	<0.005	0.005		0.005
Metals Dissolved						
Sulfur	Dissolved	mg/L	8.4	52.8		0.2
Metals Total						
Calcium	Total	mg/L	21.9	99.3		0.05
Iron	Total	mg/L	0.328	1.87		0.01
Magnesium	Total	mg/L	5.23	23.8		0.05
Phosphorus	Total	mg/L	<0.01	0.036		0.01
Potassium	Total	mg/L	0.8	0.4		0.1
Silicon	Total	mg/L	2.93	3.66		0.05
Sodium	Total	mg/L	1.34	1.67		0.02
Physical and Aggregate Properties						
Solids	Total Suspended	mg/L	17	50		1
Solids	Total Dissolved	mg/L	120	474		5
Routine Water						
pH	@ 25 °C		7.81	8.15		
Electrical Conductivity		µS/cm at 25 C	161	620		1
Calcium	Dissolved	mg/L	20.6	96.4		0.1
Magnesium	Dissolved	mg/L	4.9	22.9		0.1
Phosphorus	Dissolved	mg/L	<0.01	<0.01		0.01
Potassium	Dissolved	mg/L	0.5	0.4		0.1
Silicon	Dissolved	mg/L	2.53	2.79		0.05
Sodium	Dissolved	mg/L	1.0	1.6		0.1
Bicarbonate		mg/L	60	210		5
Carbonate		mg/L	<6	<6		6
Hydroxide		mg/L	<5	<5		5
T-Alkalinity	as CaCO3	mg/L	52	173		5
Chloride	Dissolved	mg/L	<0.02	0.41		0.02
Sulfate (SO4)	Dissolved	mg/L	27.3	151		0.05
Hardness	as CaCO3	mg/L	72	335		5
Hardness	Total	mg CaCO3/L	76.2	346		1
Salinity	Dissolved	g/L	0.0026	0.0040		0.0001

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Analytical Report

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-7	757359-8
Sample Date	Aug 11, 2010	Aug 11, 2010
Sample Time	NA	NA
Sample Location		
Sample Description	Creek A	Creek I
Matrix	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Dissolved						
Aluminum	Dissolved	µg/L	18	12		5
Antimony	Dissolved	µg/L	<0.2	1.2		0.2
Arsenic	Dissolved	µg/L	<0.2	0.7		0.2
Barium	Dissolved	µg/L	32	55		1
Beryllium	Dissolved	µg/L	<0.04	<0.04		0.04
Bismuth	Dissolved	µg/L	<1	<1		1
Boron	Dissolved	µg/L	<4	<4		4
Cadmium	Dissolved	µg/L	0.12	2.17		0.01
Chromium	Dissolved	µg/L	0.6	0.5		0.4
Cobalt	Dissolved	µg/L	0.08	0.28		0.02
Copper	Dissolved	µg/L	<1	<1		1
Iron	Dissolved	µg/L	<10	56		10
Lead	Dissolved	µg/L	<0.1	0.2		0.1
Lithium	Dissolved	µg/L	3	4		1
Manganese	Dissolved	µg/L	1.1	134		0.2
Mercury	Total Dissolved	ug/L	<0.01	<0.01		0.01
Molybdenum	Dissolved	µg/L	0.1	0.9		0.1
Nickel	Dissolved	µg/L	17	2		1
Selenium	Dissolved	µg/L	<0.6	1.2		0.6
Silver	Dissolved	µg/L	<0.01	<0.01		0.01
Strontium	Dissolved	µg/L	92	331		1.0
Tellurium	Dissolved	µg/L	<0.1	<0.1		0.1
Thallium	Dissolved	µg/L	<0.01	<0.01		0.01
Thorium	Dissolved	µg/L	<0.4	<0.4		0.4
Tin	Dissolved	µg/L	<0.1	<0.1		0.1
Titanium	Dissolved	µg/L	<0.4	<0.4		0.4
Uranium	Dissolved	µg/L	<0.4	3.5		0.4
Vanadium	Dissolved	µg/L	<0.1	<0.1		0.1
Zinc	Dissolved	µg/L	47	282		1
Zirconium	Dissolved	µg/L	<0.1	<0.1		0.1
Trace Metals Total						
Aluminum	Total	µg/L	204	604		5
Antimony	Total	µg/L	<0.2	1.2		0.2
Arsenic	Total	µg/L	0.3	2.9		0.2
Barium	Total	µg/L	37	73		1
Beryllium	Total	µg/L	<0.04	<0.04		0.04

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Analytical Report

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Reference Number	757359-7	757359-8
Sample Date	Aug 11, 2010	Aug 11, 2010
Sample Time	NA	NA
Sample Location		
Sample Description	Creek A	Creek I
Matrix	Water	Water

Analyte		Units	Results	Results	Results	Nominal Detection Limit
Trace Metals Total - Continued						
Bismuth	Total	µg/L	<1	<1		1
Boron	Total	µg/L	<5	<5		5
Cadmium	Total	µg/L	0.20	3.54		0.01
Chromium	Total	µg/L	0.9	1.6		0.4
Cobalt	Total	µg/L	0.78	0.93		0.02
Copper	Total	µg/L	2	4		1
Lead	Total	µg/L	0.6	5.3		0.1
Lithium	Total	µg/L	3	5		1
Manganese	Total	µg/L	14.6	182		0.2
Mercury	Total	ug/L	<0.01	0.01		0.01
Molybdenum	Total	µg/L	0.1	1.0		0.1
Nickel	Total	µg/L	21	4		1
Selenium	Total	µg/L	<0.6	1.4		0.6
Silver	Total	µg/L	<0.01	0.08		0.01
Strontium	Total	µg/L	91	351		1.0
Tellurium	Total	µg/L	<0.1	<0.1		0.1
Thallium	Total	µg/L	<0.01	<0.01		0.01
Thorium	Total	µg/L	<0.4	<0.4		0.4
Tin	Total	µg/L	<0.1	<0.1		0.1
Titanium	Total	µg/L	7.7	13.1		0.4
Uranium	Total	µg/L	<0.4	3.8		0.4
Vanadium	Total	µg/L	0.5	1.7		0.1
Zinc	Total	µg/L	66	400		1
Zirconium	Total	µg/L	<0.1	0.2		0.1

Approved by:

Andrew Garrard, BSc
General Manager

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Quality Control

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Inorganic Nonmetallic Parameters

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Ammonium - N	ug/L	9.805	-110.00	10.00	yes
Date Acquired:	August 17, 2010				
Organic Carbon	mg/L	0.078	-0.5	0.5	yes
Date Acquired:	August 17, 2010				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Ammonium - N	ug/L	105.76	85	115	yes
Date Acquired:	August 17, 2010				
Ammonium - N	ug/L	91.65	70	130	yes
Date Acquired:	August 17, 2010				
Nitrite - N	mg/L	107.33	90	110	yes
Nitrate and Nitrite - N	mg/L	93.91	90	110	yes
Date Acquired:	August 17, 2010				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Ammonia - N	mg/L	0.6		0.00	0.00	yes
Ammonium - N	mg/L	0.72	0.62	0.52	0.72	yes
Nitrate - N	mg/L	0.63	0.65	0.55	0.75	yes
Nitrate and Nitrite - N	mg/L	0.63	0.65	0.55	0.75	yes
Date Acquired:	August 17, 2010					
Nitrate - N	mg/L	<0.01	0.00	-0.15	0.15	yes
Nitrite - N	mg/L	1.25	1.192	1.040	1.340	yes
Nitrate and Nitrite - N	mg/L	1.24	1.19	0.89	1.49	yes
Date Acquired:	August 17, 2010					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Organic Carbon	mg/L	237	240	10	1.0	yes
Date Acquired:	August 17, 2010					
Ammonia - N	mg/L	1.6	1.6	20	0.50	yes
Nitrate - N	mg/L	0.09	0.09	15	0.05	yes
Nitrite - N	mg/L	<0.005	<0.005	10	0.030	yes
Nitrate and Nitrite - N	mg/L	0.09	0.09	10	0.05	yes
Date Acquired:	August 17, 2010					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Nitrate - N	mg/L	<0.01	-0.01	0.02	yes
Nitrite - N	mg/L	<0.005	-0.004	0.006	yes
Nitrate and Nitrite - N	mg/L	<0.01	0.00	0.01	yes
Date Acquired:	August 17, 2010				
Organic Carbon	mg/L	116	102.7	129.5	yes
Date Acquired:	August 17, 2010				

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Quality Control

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Inorganic Nonmetallic Parameters - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Organic Carbon	mg/L	15.1	13.4	16.6	yes
Date Acquired:	August 17, 2010				
Organic Carbon	mg/L	3.3	2.5	3.9	yes
Date Acquired:	August 17, 2010				

Metals Dissolved

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	0.108	0.060	0.090	0.130	yes
Antimony	mg/L	0.0128	0.0150	0.0110	0.0190	yes
Arsenic	mg/L	0.0115	0.0109	0.0089	0.0131	yes
Barium	mg/L	0.068	0.070	0.063	0.077	yes
Beryllium	mg/L	0.0132	0.01200	0.01029	0.01371	yes
Boron	mg/L	0.093	0.075	0.050	0.110	yes
Cadmium	mg/L	0.01760	0.01790	0.01534	0.02066	yes
Chromium	mg/L	0.0691	0.0677	0.0563	0.0797	yes
Cobalt	mg/L	0.0818	0.07980	0.07010	0.08990	yes
Copper	mg/L	0.067	0.065	0.060	0.070	yes
Iron	mg/L	0.04	0.04	0.03	0.06	yes
Lead	mg/L	0.0552	0.0531	0.0451	0.0610	yes
Manganese	mg/L	0.0751	0.0780	0.0710	0.0850	yes
Molybdenum	mg/L	0.0767	0.07390	0.06161	0.08639	yes
Nickel	mg/L	0.065	0.063	0.057	0.069	yes
Selenium	mg/L	0.0206	0.0190	0.0147	0.0233	yes
Silver	mg/L	0.01140	0.01250	0.01041	0.01359	yes
Strontium	mg/L	0.047	0.043	0.037	0.049	yes
Thallium	mg/L	0.01010	0.00996	-0.01370	0.03370	yes
Vanadium	mg/L	0.0545	0.05390	0.04740	0.06060	yes
Zinc	mg/L	0.068	0.067	0.059	0.075	yes
Date Acquired:	August 16, 2010					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Sulfur	mg/L	31.6	31.0	30	3.0	yes
Date Acquired:	August 16, 2010					

Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	-0.0215	-0.08	0.10	yes
Iron	mg/L	-0.0001	-0.030	0.030	yes
Magnesium	mg/L	-0.0265	-0.06	0.06	yes
Manganese	mg/L	-0.0051	-0.0098	0.0022	yes

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Quality Control

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Metals Total - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Phosphorus	mg/L	-0.0205	-0.033	0.027	yes
Potassium	mg/L	0.2215	-0.30	0.30	yes
Silicon	mg/L	0	-2.55	3.15	yes
Sodium	mg/L	0.601	-0.23	0.19	yes
Date Acquired:	August 16, 2010				
Calcium	mg/L	-0.0177	-0.13	0.17	yes
Iron	mg/L	0.0033	-0.029	0.031	yes
Magnesium	mg/L	-0.0093	-0.09	0.09	yes
Manganese	mg/L	-0.0051	-0.0098	0.0022	yes
Phosphorus	mg/L	-0.0208	-0.033	0.027	yes
Potassium	mg/L	0.178	-3.83	4.09	yes
Silicon	mg/L	0.049	-2.40	3.00	yes
Sodium	mg/L	0.3602	-0.23	0.19	yes
Date Acquired:	August 16, 2010				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	90.75	90	110	yes
Iron	mg/L	83.50	70	130	yes
Magnesium	mg/L	89.24	90	110	yes
Manganese	mg/L	91.40	90	110	yes
Phosphorus	mg/L	87.02	90	110	yes
Potassium	mg/L	107.20	85	115	yes
Silicon	mg/L	87.80	80	120	yes
Sodium	mg/L	92.64	90	110	yes
Date Acquired:	August 16, 2010				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Aluminum	mg/L	1.49	1.799	1.537	2.063	yes
Antimony	mg/L	0.436	0.4500	0.3348	0.5652	yes
Arsenic	mg/L	0.358	0.3890	0.3168	0.4612	yes
Barium	mg/L	1.22	1.197	1.093	1.307	yes
Beryllium	mg/L	0.437	0.45100	0.39460	0.50740	yes
Boron	mg/L	0.47	0.523	0.420	0.626	yes
Cadmium	mg/L	0.348	0.34800	0.29778	0.39822	yes
Calcium	mg/L	50.7	50.20	46.23	54.21	yes
Chromium	mg/L	0.370	0.4050	0.3354	0.4746	yes
Cobalt	mg/L	0.444	0.47900	0.39060	0.50940	yes
Copper	mg/L	0.32	0.341	0.292	0.348	yes
Iron	mg/L	1.92	1.914	1.669	2.151	yes
Lead	mg/L	1.04	0.9160	0.7828	1.0492	yes
Magnesium	mg/L	30.3	30.10	26.50	33.70	yes
Manganese	mg/L	2.34	2.2450	2.0460	2.4540	yes
Molybdenum	mg/L	0.356	0.35990	0.29934	0.42066	yes

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	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Metals Total - Continued

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Nickel	mg/L	1.20	1.320	1.085	1.355	yes
Potassium	mg/L	27	24.90	21.30	28.50	yes
Selenium	mg/L	0.668	0.6590	0.5126	0.8054	yes
Silver	mg/L	0.0842	0.08990	0.07860	0.10140	yes
Sodium	mg/L	11.9	10.00	8.02	11.98	yes
Strontium	mg/L	0.31	0.301	0.256	0.346	yes
Thallium	mg/L	0.431	0.39050	0.31608	0.46392	yes
Vanadium	mg/L	4.17	4.50000	3.98340	5.01660	yes
Zinc	mg/L	0.732	0.779	0.688	0.870	yes
Date Acquired:	August 16, 2010					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	53.9	54.9	20	0.05	yes
Iron	mg/L	0.389	0.374	20	0.050	yes
Magnesium	mg/L	16.1	16.4	20	0.05	yes
Manganese	mg/L	0.040	0.040	20	0.0050	yes
Phosphorus	mg/L	<0.01	<0.010	20	0.050	yes
Potassium	mg/L	0.5	0.6	20	0.10	yes
Silicon	mg/L	2.24	2.26	20	0.10	yes
Sodium	mg/L	1.55	1.66	20	0.10	yes
Date Acquired:	August 16, 2010					

Physical and Aggregate Properties

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Solids	mg/L	3050	3060	30	25	yes
Date Acquired:	August 17, 2010					

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Solids	mg/L	550	471	619	yes
Date Acquired:	August 17, 2010				
Solids	mg/L	24	19	34	yes
Date Acquired:	August 17, 2010				
Solids	mg/L	<5	-5	5	yes
Date Acquired:	August 17, 2010				
Solids	mg/L	<2	-2	2	yes
Date Acquired:	August 17, 2010				

Routine Water

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Calcium	mg/L	-0.0224	-0.05	0.05	yes
Iron	mg/L	0.0001	-0.031	0.029	yes

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	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Routine Water - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Magnesium	mg/L	0.007	-0.05	0.07	yes
Manganese	mg/L	-0.0054	-0.008	-0.000	yes
Phosphorus	mg/L	-0.0245	-0.04	0.04	yes
Potassium	mg/L	-0.034	-0.4	0.4	yes
Silicon	mg/L	0.026	-0.20	0.25	yes
Sodium	mg/L	0.1474	-0.2	0.2	yes
Date Acquired:	August 16, 2010				
Calcium	mg/L	-0.0228	-0.13	0.16	yes
Iron	mg/L	0.0032	-0.024	0.025	yes
Magnesium	mg/L	-0.0098	-0.07	0.08	yes
Manganese	mg/L	-0.0049	-0.009	0.002	yes
Phosphorus	mg/L	-0.0254	-0.14	0.16	yes
Potassium	mg/L	0.0394	-0.8	0.8	yes
Silicon	mg/L	-0.047	-1.76	2.02	yes
Sodium	mg/L	0.1978	-0.3	0.4	yes
Date Acquired:	August 16, 2010				
Chloride	mg/L	0	-0.20	0.20	yes
Sulfate (SO4)	mg/L	0.281074	-0.38	0.38	yes
Date Acquired:	August 16, 2010				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
pH	pH	100.21	98	101	yes
Date Acquired:	August 16, 2010				
Calcium	mg/L	92.44	91	109	yes
Iron	mg/L	90.90	0	0	yes
Magnesium	mg/L	92.00	91	109	yes
Manganese	mg/L	92.90	90	110	yes
Phosphorus	mg/L	89.26	90	110	yes
Potassium	mg/L	94.28	85	115	yes
Silicon	mg/L	97.60	80	120	yes
Sodium	mg/L	94.13	90	110	yes
Date Acquired:	August 16, 2010				
Chloride	mg/L	107.12	85	115	yes
Sulfate (SO4)	mg/L	102.41	85	115	yes
Date Acquired:	August 16, 2010				
Chloride	mg/L	95.94	90	110	yes
Sulfate (SO4)	mg/L	99.93	90	110	yes
Date Acquired:	August 16, 2010				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
T-Alkalinity	mg/L	10	10	8	11	yes

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Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Routine Water - Continued

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Date Acquired: August 16, 2010						
Calcium	mg/L	23.4	25.11	21.93	28.29	yes
Magnesium	mg/L	13.8	15.04	13.00	17.08	yes
Manganese	mg/L	0.070	0.078	0.063	0.093	yes
Potassium	mg/L	12.4	12.4	10.6	14.3	yes
Sodium	mg/L	4.9	5.0	4.3	5.6	yes
Date Acquired: August 16, 2010						

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Calcium	mg/L	52.2	52.6	30	1.00	yes
Iron	mg/L	0.084	0.085	30	0.060	yes
Magnesium	mg/L	15.6	15.7	30	1.00	yes
Manganese	mg/L	0.028	0.028	30	0.015	yes
Phosphorus	mg/L	<0.01	<0.01	30	0.10	yes
Potassium	mg/L	0.2	0.2	30	1.0	yes
Silicon	mg/L	2.06	2.02	30	0.15	yes
Sodium	mg/L	1.2	1.1	30	1.0	yes
Date Acquired: August 16, 2010						
Hardness	mg CaCO3/L	201	205	20	1.000	yes
Date Acquired: August 16, 2010						
pH		7.72	7.77	2		yes
Electrical Conductivity	dS/m at 25 C	0.275	0.277	10	0.005	yes
Bicarbonate	mg/L	180	180	10	10	yes
Carbonate	mg/L	<6	<6	10	10	yes
Hydroxide	mg/L	<5	<5	10	10	yes
P-Alkalinity	mg/L	<5	<5	10	5	yes
T-Alkalinity	mg/L	144	144	10	5	yes
Chloride	mg/L	1.78	1.78	15	0.25	yes
Sulfate (SO4)	mg/L	46.0	45.6	15	0.50	yes
Date Acquired: August 16, 2010						

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Chloride	mg/L	0.75	0.75	6	0.01	yes
Sulfate (SO4)	mg/L	4.16	4.21	6	0.01	yes
Date Acquired: August 16, 2010						

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
pH		9.97	9.08	10.92	yes
Electrical Conductivity	µS/cm at 25 C	217	165	243	yes
P-Alkalinity	mg/L	37	9	53	yes
T-Alkalinity	mg/L	96	90	101	yes
Date Acquired: August 16, 2010					

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Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
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Report Number: 1349611

Routine Water - Continued

Control Sample	Units	Measured	Lower Limit	Upper Limit	Passed QC
Electrical Conductivity	µS/cm at 25 C	1410	1330	1510	yes
Date Acquired: August 16, 2010					
Electrical Conductivity	µS/cm at 25 C	<1	-2	2	yes
Date Acquired: August 16, 2010					

Trace Metals Dissolved

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	9.654	-10	10	yes
Antimony	µg/L	0.013	-0.4	0.2	yes
Arsenic	µg/L	0.076	-0.5	0.5	yes
Barium	µg/L	0.26	-0	0	yes
Beryllium	µg/L	-0.013	-0.10	0.10	yes
Bismuth	µg/L	0.045	-1.0	1.0	yes
Boron	µg/L	-0.99	-6	5	yes
Cadmium	µg/L	0.01	-0.03	0.03	yes
Chromium	µg/L	0.004	-0.1	0.2	yes
Cobalt	µg/L	-0.048	-0.07	0.07	yes
Copper	µg/L	0.266	-1	1	yes
Iron	µg/L	-1.923	-7	13	yes
Lead	µg/L	0.24	-0.1	0.1	yes
Lithium	µg/L	0.09	-1	1	yes
Manganese	µg/L	0.446	-1.0	1.1	yes
Molybdenum	µg/L	-0.083	-0.31	0.29	yes
Nickel	µg/L	0.247	-1	1	yes
Selenium	µg/L	-0.58	-1.7	1.3	yes
Silver	µg/L	-0.018	-0.05	0.05	yes
Strontium	µg/L	0.088	-0	0	yes
Tellurium	µg/L	-0.109	-0.7	0.7	yes
Thallium	µg/L	-0.009	-0.03	0.03	yes
Thorium	µg/L	0.2	-1.5	1.5	yes
Tin	µg/L	0.353	-3.0	3.0	yes
Titanium	µg/L	-0.022	-0.2	0.2	yes
Uranium	µg/L	-0.018	-0.03	0.03	yes
Vanadium	µg/L	0.003	-0.35	0.35	yes
Zinc	µg/L	3.247	-2	4	yes
Zirconium	µg/L	0.043	-0.0	0.0	yes
Date Acquired: August 16, 2010					
Aluminum	µg/L	9.991	-6	6	yes
Antimony	µg/L	0.01	-0.4	0.3	yes
Arsenic	µg/L	-0.026	-0.4	0.3	yes
Barium	µg/L	0.463	-0	1	yes

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Trace Metals Dissolved - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Beryllium	µg/L	-0.013	-0.10	0.10	yes
Bismuth	µg/L	0.02	0.0	0.0	yes
Boron	µg/L	-1.385	-18	19	yes
Cadmium	µg/L	0.009	-0.03	0.03	yes
Chromium	µg/L	-0.004	-0.1	0.2	yes
Cobalt	µg/L	-0.049	-0.30	0.30	yes
Copper	µg/L	0.343	-1	1	yes
Iron	µg/L	-1.322	-12	18	yes
Lead	µg/L	0.231	-0.3	0.4	yes
Lithium	µg/L	0.103	-0	0	yes
Manganese	µg/L	0.449	-0.5	0.7	yes
Molybdenum	µg/L	-0.106	-0.95	0.85	yes
Nickel	µg/L	0.218	-1	1	yes
Selenium	µg/L	-0.364	-1.7	1.7	yes
Silver	µg/L	-0.02	-0.67	0.47	yes
Strontium	µg/L	0.081	-2	4	yes
Tellurium	µg/L	-0.126	-0.7	0.7	yes
Thallium	µg/L	-0.009	-0.06	0.06	yes
Thorium	µg/L	0.013	-0.7	0.5	yes
Tin	µg/L	0.296	-3.8	4.0	yes
Titanium	µg/L	-0.013	-0.3	0.2	yes
Uranium	µg/L	-0.016	-0.04	0.02	yes
Vanadium	µg/L	-0.024	-0.30	0.30	yes
Zinc	µg/L	3.566	-11	19	yes
Zirconium	µg/L	0.021	-0.0	0.0	yes
Date Acquired:	August 16, 2010				
Mercury	ng/L	5.8	-9.99	9.99	yes
Date Acquired:	August 18, 2010				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	103.00	85	115	yes
Date Acquired:	August 18, 2010				
Aluminum	µg/L	88.92	70	130	yes
Antimony	µg/L	91.04	85	115	yes
Arsenic	µg/L	96.20	90	110	yes
Barium	µg/L	97.30	90	110	yes
Beryllium	µg/L	100.08	90	110	yes
Bismuth	µg/L	109.92	90	110	yes
Boron	µg/L	92.40	70	130	yes
Cadmium	µg/L	103.56	90	110	yes
Chromium	µg/L	92.04	90	110	yes
Cobalt	µg/L	91.70	90	110	yes

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Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Trace Metals Dissolved - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Copper	µg/L	93.22	90	110	yes
Iron	µg/L	87.92	80	120	yes
Lead	µg/L	107.44	90	110	yes
Lithium	µg/L	96.72	90	110	yes
Manganese	µg/L	89.82	90	110	yes
Molybdenum	µg/L	97.64	90	110	yes
Nickel	µg/L	92.04	90	110	yes
Selenium	µg/L	101.60	90	110	yes
Silver	µg/L	0.08	0	0	yes
Strontium	µg/L	105.08	90	110	yes
Thallium	µg/L	107.04	90	110	yes
Tin	µg/L	98.92	90	110	yes
Titanium	µg/L	91.76	90	110	yes
Uranium	µg/L	109.70	85	115	yes
Vanadium	µg/L	88.22	90	110	yes
Zinc	µg/L	92.72	90	110	yes
Zirconium	µg/L	101.24	90	110	yes

Date Acquired: August 16, 2010

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Mercury	ug/L	0.10	0.18	0.16	0.22	yes

Date Acquired: August 18, 2010

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	21	21	20	20	yes
Antimony	µg/L	<0.2	0.2	20	1.0	yes
Arsenic	µg/L	0.5	0.6	20	1.0	yes
Barium	µg/L	47	47	20	5	yes
Beryllium	µg/L	<0.04	<0.04	20	1.00	yes
Boron	µg/L	<4	<4	20	5	yes
Cadmium	µg/L	0.10	0.14	20	0.50	yes
Chromium	µg/L	<0.4	<0.4	20	5.0	yes
Cobalt	µg/L	0.16	0.15	20	0.50	yes
Copper	µg/L	1	1	20	5	yes
Iron	µg/L	78	68	20	50	yes
Lead	µg/L	<0.1	<0.1	20	0.5	yes
Lithium	µg/L	2	2	20	5	yes
Manganese	µg/L	31.1	30.2	20	0.5	yes
Molybdenum	µg/L	0.4	0.5	20	0.50	yes
Nickel	µg/L	3	3	20	5	yes
Selenium	µg/L	0.6	<0.6	20	0.5	yes
Silver	µg/L	<0.01	<0.01	20	0.50	yes
Strontium	µg/L	200	201	20	0	yes

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	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Trace Metals Dissolved - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Tellurium	µg/L	<0.1	<0.1	20	0.5	yes
Thallium	µg/L	<0.01	<0.01	20	0.10	yes
Thorium	µg/L	<0.4	<0.4	10	0.1	yes
Tin	µg/L	<0.1	<0.1	20	0.5	yes
Titanium	µg/L	<0.4	<0.4	20	0.5	yes
Uranium	µg/L	1.3	1.1	20	0.10	yes
Vanadium	µg/L	<0.1	<0.1	20	0.50	yes
Zinc	µg/L	14	14	20	5	yes
Zirconium	µg/L	0.1	<0.1	20	0.5	yes
Date Acquired:	August 16, 2010					
Mercury	ug/L	<0.01	<0.01	20	0.05	yes
Date Acquired:	August 18, 2010					

Trace Metals Total

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Aluminum	µg/L	-0.079	-7	7	yes
Antimony	µg/L	-0.017	-0.4	0.2	yes
Arsenic	µg/L	0.068	0.0	0.0	yes
Barium	µg/L	-0.012	-0.1	0.2	yes
Beryllium	µg/L	-0.013	-0.10	0.10	yes
Bismuth	µg/L	0.071	-3.0	3.0	yes
Boron	µg/L	1.109	-6	5	yes
Cadmium	µg/L	-0.014	0.00	0.00	yes
Chromium	µg/L	-0.039	0.0	0.0	yes
Cobalt	µg/L	-0.053	-0.06600	0.06600	yes
Copper	µg/L	-0.093	-0.830	0.790	yes
Iron	µg/L	-0.25	-7	13	yes
Lead	µg/L	0.006	0.000	0.000	yes
Lithium	µg/L	-0.041	-0	0	yes
Manganese	µg/L	-0.009	-0.9	0.9	yes
Molybdenum	µg/L	-0.084	-0.31	0.29	yes
Nickel	µg/L	-0.063	-1	1	yes
Selenium	µg/L	0.04	-1.7	1.3	yes
Silver	µg/L	-0.008	-0.07	0.05	yes
Strontium	µg/L	-0.008	-0.3	0.3	yes
Tellurium	µg/L	-0.051	-0.7	0.7	yes
Thallium	µg/L	-0.008	-0.03	0.03	yes
Thorium	µg/L	0.315	-1.50	1.50	yes
Tin	µg/L	-0.065	-3.0	3.0	yes
Titanium	µg/L	-0.059	-0.2	0.2	yes
Uranium	µg/L	-0.017	-0.0	0.0	yes
Vanadium	µg/L	-0.017	-0.30	0.30	yes

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Quality Control

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Trace Metals Total - Continued

Blanks	Units	Measured	Lower Limit	Upper Limit	Passed QC
Zinc	µg/L	-1.133	-2	4	yes
Zirconium	µg/L	-0.004	-0.0	0.0	yes
Date Acquired:	August 16, 2010				
Aluminum	µg/L	0.086	-4	8	yes
Antimony	µg/L	-0.021	-0.6	0.4	yes
Arsenic	µg/L	0.163	-0.6	0.6	yes
Barium	µg/L	-0.012	-0.1	0.1	yes
Beryllium	µg/L	-0.013	-0.09	0.09	yes
Bismuth	µg/L	0.007	0.0	0.0	yes
Boron	µg/L	-1.084	-12	11	yes
Cadmium	µg/L	-0.016	-0.08	0.08	yes
Chromium	µg/L	-0.089	-0.1	0.2	yes
Cobalt	µg/L	-0.055	-0.07500	0.08700	yes
Copper	µg/L	-0.108	-1.930	1.430	yes
Iron	µg/L	-5.494	-10	20	yes
Lead	µg/L	0.013	-0.150	0.210	yes
Lithium	µg/L	-0.009	-0	0	yes
Manganese	µg/L	-0.011	-1.0	1.1	yes
Molybdenum	µg/L	-0.117	-1.67	1.81	yes
Nickel	µg/L	-0.092	-1	1	yes
Selenium	µg/L	-0.532	-2.5	1.5	yes
Silver	µg/L	-0.02	-0.13	0.07	yes
Strontium	µg/L	-0.017	-0.2	0.2	yes
Tellurium	µg/L	-0.105	-0.2	0.2	yes
Thallium	µg/L	-0.01	-0.32	0.34	yes
Thorium	µg/L	0.026	-1.75	0.95	yes
Tin	µg/L	-0.22	-0.5	0.4	yes
Titanium	µg/L	-0.014	-0.2	0.3	yes
Uranium	µg/L	-0.02	-0.5	0.5	yes
Vanadium	µg/L	-0.032	-0.30	0.30	yes
Zinc	µg/L	-0.961	-4	6	yes
Zirconium	µg/L	-0.031	-0.1	0.1	yes
Date Acquired:	August 16, 2010				
Mercury	ng/L	5.8	-9.990	9.990	yes
Date Acquired:	August 18, 2010				

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Mercury	ng/L	103.00	85	115	yes
Date Acquired:	August 18, 2010				
Aluminum	µg/L	96.16	70	130	yes
Antimony	µg/L	95.92	85	115	yes
Arsenic	µg/L	101.28	90	110	yes

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Quality Control

Bill To: Laberge Environmental Services
Report To: Laberge Environmental Services
Box 21072
1-405 Ogilvie Street
Whitehorse, YT, Canada
Y1A 6P7
Attn: Bonnie Burns
Sampled By: Bonnie Burns
Company: LES

Project:
ID: ATAC Resources Ltd.
Name: Rau Road
Location:
LSD:
P.O.:
Acct code:

Lot ID: **757359**
Control Number:
Date Received: Aug 16, 2010
Date Reported: Aug 23, 2010
Report Number: 1349611

Trace Metals Total - Continued

Calibration Check	Units	% Recovery	Lower Limit	Upper Limit	Passed QC
Barium	µg/L	99.30	90	110	yes
Beryllium	µg/L	102.56	90	110	yes
Bismuth	µg/L	106.64	90	110	yes
Boron	µg/L	95.48	70	130	yes
Cadmium	µg/L	102.12	90	110	yes
Chromium	µg/L	99.44	90	110	yes
Cobalt	µg/L	99.06	90	110	yes
Copper	µg/L	101.58	90	110	yes
Lead	µg/L	102.72	90	110	yes
Lithium	µg/L	98.90	90	110	yes
Manganese	µg/L	94.34	90	110	yes
Molybdenum	µg/L	100.28	90	110	yes
Nickel	µg/L	101.52	90	110	yes
Selenium	µg/L	101.20	90	110	yes
Silver	µg/L	0.10	0	0	yes
Strontium	µg/L	103.44	90	110	yes
Thallium	µg/L	102.80	90	110	yes
Tin	µg/L	97.28	85	115	yes
Titanium	µg/L	96.16	90	110	yes
Uranium	µg/L	99.82	85	115	yes
Vanadium	µg/L	95.94	90	110	yes
Zinc	µg/L	93.18	90	110	yes
Zirconium	µg/L	104.08	90	110	yes
Date Acquired:	August 16, 2010				

Certified Reference Material	Units	Measured	Target	Lower Limit	Upper Limit	Passed QC
Mercury	ug/L	0.10	0.175	0.161	0.219	yes
Date Acquired:	August 18, 2010					

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Aluminum	µg/L	155	146	15	100	yes
Antimony	µg/L	<0.2	0.3	15	2.0	yes
Arsenic	µg/L	1.1	1	15	2.0	yes
Barium	µg/L	51	52	15	10.0	yes
Beryllium	µg/L	<0.04	<0.04	15	0.40	yes
Boron	µg/L	<5	<5	15	40	yes
Cadmium	µg/L	0.14	0.18	15	0.10	yes
Chromium	µg/L	0.9	0.8	15	6.0	yes
Cobalt	µg/L	0.34	0.32	15	0.20000	yes
Copper	µg/L	2	2	15	5.000	yes
Iron	µg/L	385	371	15	100	yes
Lead	µg/L	0.5	0.5	15	1.000	yes
Lithium	µg/L	3	3	15	10	yes

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Quality Control

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Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
	Box 21072	Name:	Rau Road
	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Trace Metals Total - Continued

Replicates	Units	Replicate 1	Replicate 2	% RSD Criteria	Absolute Criteria	Passed QC
Manganese	µg/L	43.0	42.7	15	1.0	yes
Molybdenum	µg/L	0.5	0.6	15	0.20	yes
Nickel	µg/L	4	4	15	10	yes
Selenium	µg/L	1.0	1.3	15	5.0	yes
Silver	µg/L	<0.01	<0.01	15	0.10	yes
Strontium	µg/L	210	208	15	10.0	yes
Tellurium	µg/L	<0.1	<0.1	20	0.5	yes
Thallium	µg/L	<0.01	<0.01	15	0.10	yes
Thorium	µg/L	<0.4	<0.4	15	1.00	yes
Tin	µg/L	<0.1	<0.1	15	1.0	yes
Titanium	µg/L	3.4	3.0	15	1.0	yes
Uranium	µg/L	1.2	1.2	15	1.0	yes
Vanadium	µg/L	0.4	0.4	15	0.40	yes
Zinc	µg/L	26	25	15	10	yes
Zirconium	µg/L	0.2	0.3	15	1.0	yes

Date Acquired: August 16, 2010

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Methodology and Notes

Bill To:	Laberge Environmental Services	Project:	
Report To:	Laberge Environmental Services	ID:	ATAC Resources Ltd.
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	1-405 Ogilvie Street	Location:	
	Whitehorse, YT, Canada	LSD:	
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Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Method of Analysis

Method Name	Reference		Method	Date Analysis Started	Location
Alk, pH, EC, Turb in water	APHA	*	Alkalinity - Titration Method, 2320 B	16-Aug-10	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	Conductivity, 2510	16-Aug-10	Exova Surrey
Alk, pH, EC, Turb in water	APHA	*	pH - Electrometric Method, 4500-H+ B	16-Aug-10	Exova Surrey
Ammonia-N in Water	APHA	*	Titrametric, 4500-NH3 C	17-Aug-10	Exova Surrey
Anions by IEC in water (Surrey)	APHA	*	Ion Chromatography with Chemical Suppression of Eluent Cond., 4110 B	16-Aug-10	Exova Surrey
Carbon Organic (Total) in water (TOC)	APHA		High-Temperature Combustion Method, 5310 B	17-Aug-10	Exova Edmonton
Mercury Low Level (Total) in water	EPA	*	Mercury in Water by Cold Vapor Atomic Fluorescence Spectrometry, 245.7	16-Aug-10	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	16-Aug-10	Exova Surrey
Metals SemiTrace (Dissolved) in water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	20-Aug-10	Exova Surrey
Metals SemiTrace (Total) in Water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	16-Aug-10	Exova Surrey
Metals SemiTrace (Total) in Water	US EPA	*	Metals & Trace Elements by ICP-AES, 6010C	20-Aug-10	Exova Surrey
Nitrogen - nitrite+nitrate-N	APHA	*	Automated Cadmium Reduction Method, 4500-NO3- F	17-Aug-10	Exova Surrey
Solids Dissolved (Total, Fixed and Volatile)2	APHA	*	Total Dissolved Solids Dried at 180 C, 2540 C	17-Aug-10	Exova Surrey
Solids Suspended (Total, Fixed and Volatile)	APHA	*	Total Suspended Solids Dried at 103-105'C, 2540 D	17-Aug-10	Exova Surrey

** Reference Method Modified*

References

US EPA	US Environmental Protection Agency Test Methods
EPA	Environmental Protection Agency Test Methods - US
APHA	Standard Methods for the Examination of Water and Wastewater

Comments:

- pH analysis was performed past the recommended holding time of 15 minutes from sample collection.
- Some total metal results were less than dissolved metal results for samples 757359-1, -2,-3,-4, -5,-6, -7, and -8. The results were verified and are within expected measurement uncertainty.

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Methodology and Notes

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	Whitehorse, YT, Canada	LSD:	
	Y1A 6P7	P.O.:	
Attn:	Bonnie Burns	Acct code:	
Sampled By:	Bonnie Burns		
Company:	LES		

Lot ID:	**757359**
Control Number:	
Date Received:	Aug 16, 2010
Date Reported:	Aug 23, 2010
Report Number:	1349611

Please direct any inquiries regarding this report to our Client Services group.
Results relate only to samples as submitted.
The test report shall not be reproduced except in full, without the written approval of the laboratory.

757359

LOT: _____ Control Number _____

Environmental Sample Information Sheet

Note: Proper completion of this form is required in order to proceed with analysis

See reverse for your nearest Bodycote Norwest location and proper sampling protocol

Billing Address:			**Copy of Report To:**		**Copy of invoice:**
Company:	Laberge Environmental Services		Company:		Mail invoice to this address for approval ☐
Address:	P.O. Box 21072 Whitehorse, Yukon Y1A 6P7	QA/QC Report [x]	Address:		
		Report Result:			Report Result:
Attention:	Bonnie Burns	Fax ☐	Attention:		Fax ☐
Phone:	867-668-6838	Mail ☐	Phone:		Mail ☐
Fax:		Courier ☐	Fax:		Courier ☐
Cell:		e-mail [x]	Cell:		e-mail ☐
e-mail:	bonnieburns@northwestel.net	e-Service ☐	e-mail:		e-Service ☐

Information to be included on Report and Invoice

Project ID: ATAC Resources Ltd
Project Name: Rau Road
Project Location:
Legal Location:
PO#:
Proj. Acct. Code:
Agreement ID:

RUSH Please contact the laboratory to confirm rush dates and times before submitting samples.

Upon filling out this section, client accepts that surcharges will be attached to this analysis

RUSH required on: All Analysis ☐ or As indicated ☐

Date Required: _____

Signature: _____

Bodycote Authorization: _____

Sample Custody (Please Print)

Sampled by: Bonnie Burns

Company LES *Signature*

I authorize Bodycote to proceed with the work work indicated on this form:

Date: 08/13/10 Initial: BB

Received by: RECEIVED AUG 16 2010 Sample Temp

Waybill #: Date

Company Time

Special Instructions / Comments

Note: Do **NOT** send back a cooler with another set of bottles as this was the last round of sampling.

All metals samples were preserved and filtered in the field.

FOR LAB USE ONLY

Condiftion of containers/coolers upon arrival at lab

☐ Check here if Bodycote is required to report results directly to a regulatory body (Please include contact information)

☐ Check here if you are testing POTABLE WATER for **HUMAN CONSUMPTION**

Please indicate which regulations you are required to meet: CCME for freshwater aquatic life

	Sample Identification	Location	Depth IN CM M	Date/Time Sampled	Matrix	Sampling Method	↓ Number of Containers	Total Metals	Dissolved Met	TOC	pH, EC, TDS	Total Hardnes	Total Alkalinit	NH4, NO2, NO	Total P	Cl	SO4	TSS
								Enter tests above (✓ relevant samples below)										
1	Gambler Gulch			11-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
2	Faro Gulch			11-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
3	Silver Basin			11-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
4	Keno Ladue River			10-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
5	Cameron Creek			10-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
6	ScougaleCreek			10-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
7	Creek A			11-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
8	Creek I			11-Aug-10	H_2O	grab	5	√	√	√	√	√	√	√	√	√	√	√
9																		
10																		
11																		
12																		
13																		
14																		
15																		

NOTE: All hazardous samples must be labelled according to WHIMIS guidelines.

APPENDIX C

WILDLIFE SURVEY FIGURES

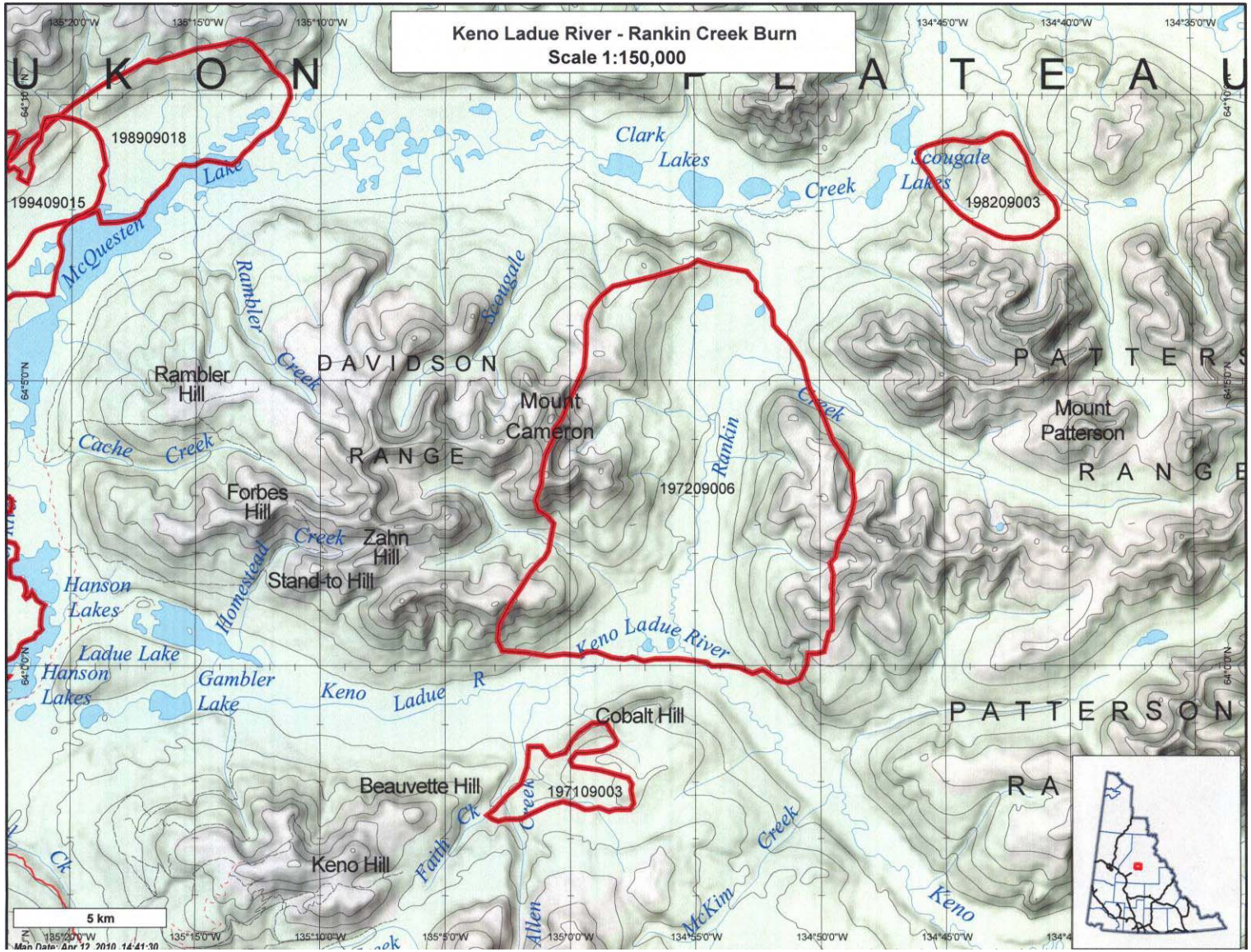


Figure 6 **During the March survey, moose were especially evident on the lower slopes of the Davidson Range within the 1972 burn area.**

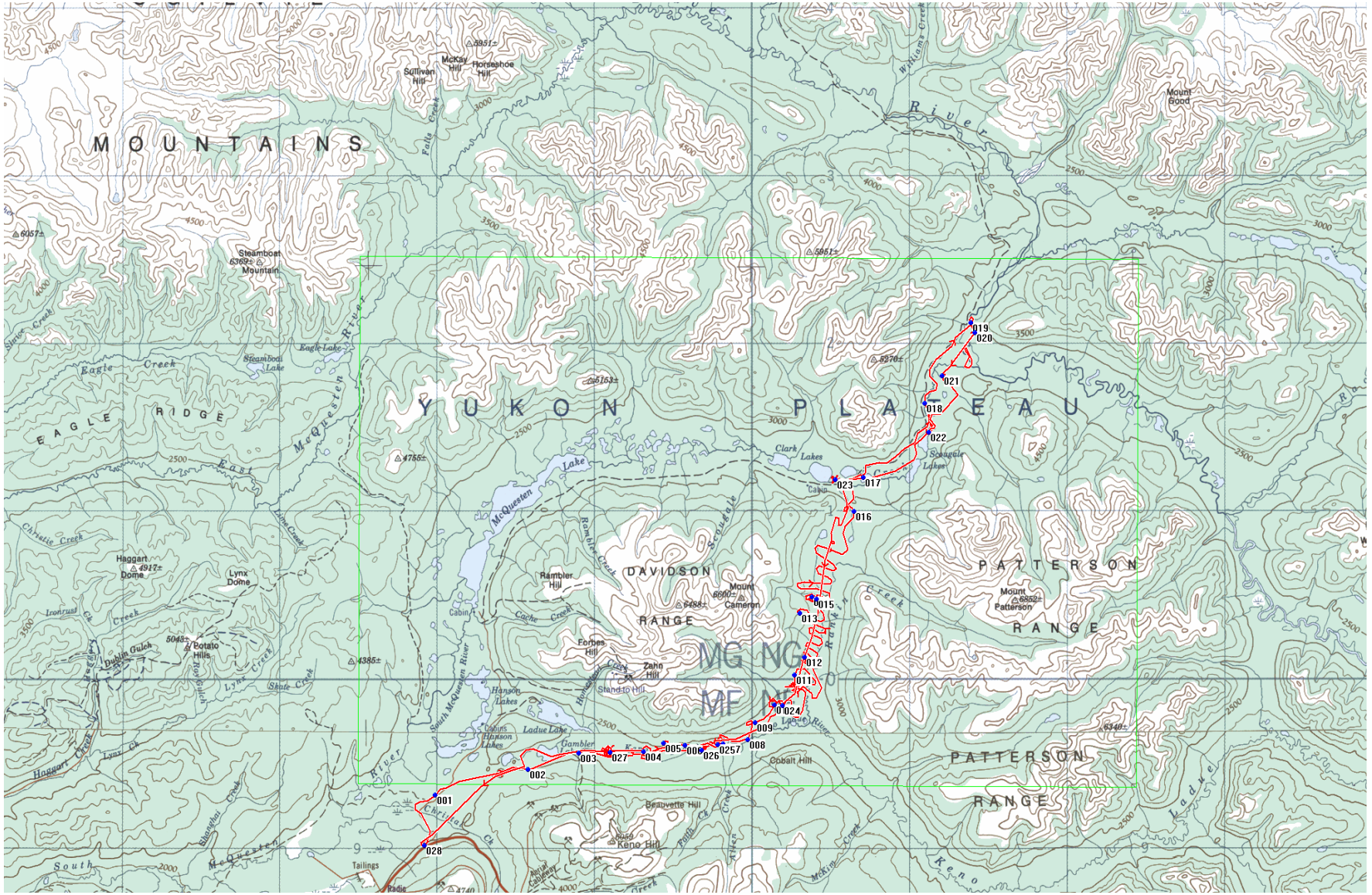


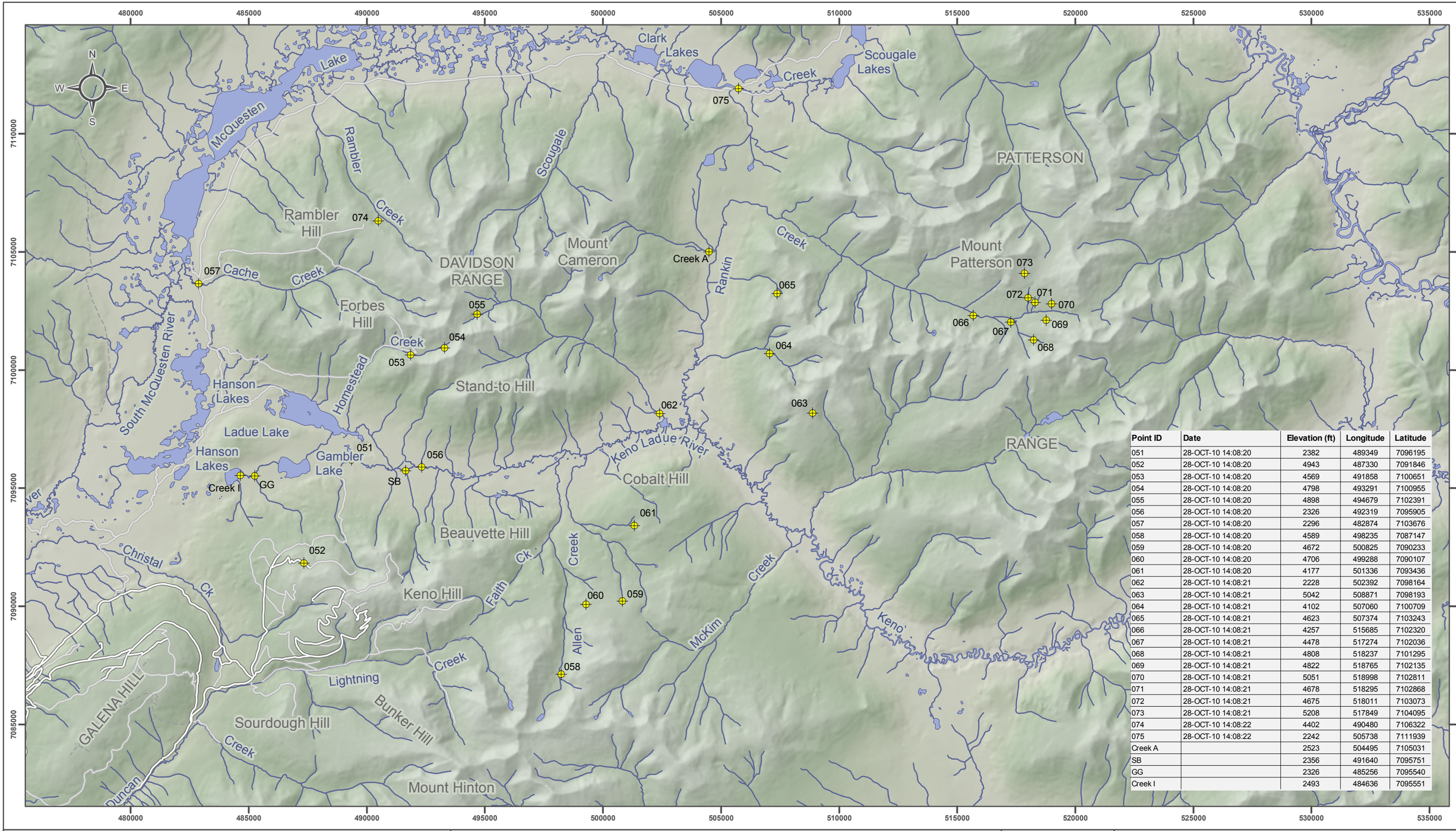
Figure 7 Waypoints of Observations during wildlife survey on March 4, 2010.



Figure 8 Map of the four wetlands where the moose surveys were concentrated on June 11, 2010.

FIGURE 9 is the foldout map following this page:

Observations during the moose survey on October 26, 2010.



Point ID	Date	Elevation (ft)	Longitude	Latitude
051	28-OCT-10 14:08:20	2382	489349	7096195
052	28-OCT-10 14:08:20	4943	487330	7091846
053	28-OCT-10 14:08:20	4569	491858	7100651
054	28-OCT-10 14:08:20	4798	493291	7100955
055	28-OCT-10 14:08:20	4898	494679	7102391
056	28-OCT-10 14:08:20	2326	492319	7095905
057	28-OCT-10 14:08:20	2296	482874	7103676
058	28-OCT-10 14:08:20	4589	498235	7087147
059	28-OCT-10 14:08:20	4672	500825	7090233
060	28-OCT-10 14:08:20	4706	499288	7090107
061	28-OCT-10 14:08:20	4177	501336	7093436
062	28-OCT-10 14:08:21	2228	502392	7098164
063	28-OCT-10 14:08:21	5042	508871	7098193
064	28-OCT-10 14:08:21	4102	507060	7100709
065	28-OCT-10 14:08:21	4623	507374	7103243
066	28-OCT-10 14:08:21	4257	515685	7102320
067	28-OCT-10 14:08:21	4478	517274	7102036
068	28-OCT-10 14:08:21	4808	518237	7101295
069	28-OCT-10 14:08:21	4822	518765	7102135
070	28-OCT-10 14:08:21	5051	518998	7102811
071	28-OCT-10 14:08:21	4678	518295	7102868
072	28-OCT-10 14:08:21	4675	518011	7103073
073	28-OCT-10 14:08:21	5208	517849	7104095
074	28-OCT-10 14:08:22	4402	490480	7106322
075	28-OCT-10 14:08:22	2242	505738	7111939
Creek A		2523	504495	7105031
SB		2356	491640	7095751
GG		2326	485256	7095540
Creek I		2493	484636	7095551

National Topographic Data Base (NTDB) compiled by Natural Resources Canada at a scale of 1:50,000. Cadastral data compiled by Natural Resources Canada. Reproduced underlicense from © Her Majesty the Queen in Right of Canada,Department of Natural Resources Canada. All rights reserved. Digital elevation model created by the Yukon Department of the Environment interpolated from the digital 1:50,000 Canadian National Topographic Database (NTDB Edition 2) contour and watercourse layers. Obtained from Geomatics Yukon.

Datum: NAD 83; Map Projection: UTM Zone 8N

1:150,000 (when printed on 11 x17 inch paper)

0 1 2 4 6 8 Kilometres

GPS Points/Observations

Secondary Road

Limited-used road

Trail

Watercourse

Waterbody

ACCESS CONSULTING GROUP

WILDLIFE SURVEY

DRAWN BY MD	OCTOBER 2010	VERIFIED BY : GL

Map Document: (D:\Project\AllProjects\Grant_Lortie\20101029_v1.mxd)
29/10/2010 – 4:10:40 PM

APPENDIX D

BENTHIC INVERTEBRATE DATA, 2010

APPENDIX D BENTHIC INVERTEBRATES IDENTIFIED IN THE RAU ACCESS ROAD STUDY AREA, 2010

Phylum	Class	Order	Family	Genus/ species	Cameron Creek	Gambler Gulch	Silver Basin Gulch	Total	%
Arthropoda	**Insecta**								
	Unid				1	2	3	6	0.2
		Ephemeroptera							
		Unid J or Damaged				7	2	9	0.3
			Ameletidae	Ameletus sp			12	12	0.5
			Baetidae	Baetis sp		20		20	0.8
			Heptageniidae	Unid J or Damaged		1		1	0.04
			Heptageniidae	Cinygmula sp		1	1	2	0.1
			Heptageniidae	Epeorus sp			1	1	0.04
		Plecoptera							
		A					1	1	0.04
		Unid J or Damaged			1	546	559	1106	42.9
			Capniidae				116	116	4.5
			Chloroperlidae	Sweltsa sp group		3	123	126	4.9
			Taeniopterygidae	Taenionema sp			216	216	8.4
		Trichoptera							
		Unid J or Damaged			6	20	2	28	1.1
		Coleoptera							
		A				1		1	0.04
		L			2		1	3	0.1
			Staphylinidae A		1			1	0.04
		Diptera							
		Unid J or Damaged			14	6	18	38	1.5
		A			1	1	2	4	0.2
			Ceratopogonidae	Unid J/Dam		1	1	2	0.1
			Chironomidae A			2	1	3	0.1
			Chironomidae P		1	13	15	29	1.1
			Chironomidae	Unid J or Damaged	12	167	211	390	15.1
			Chironomidae	Cricotopus/Orthocladius	1	2		3	0.1
			Chironomidae	Diamesa sp		2	171	173	6.7
			Chironomidae	Pseudodiamesa sp	1		20	21	0.8
			Chironomidae	Synorthocladius sp			4	4	0.2
			Empididae	Chelifera sp/Metachela sp			7	7	0.3
			Muscidae	Limnophora sp			2	2	0.1
			Psychodidae	Pericoma/ Telmatoscopus sp		1		1	0.04
			Simuliidae A			1		1	0.04
			Simuliidae L	Unid J or Damaged		9	1	10	0.4
			Simuliidae	Gymnopais sp			10	10	0.4
			Simuliidae	Prosimulium sp L		3	5	8	0.3
			Simuliidae	Unid P		1	3	4	0.2
			Simuliidae	Simulium sp L		4		4	0.2
			Simulidae	Twinnia sp		5		5	0.2
			Tipulidae	Dicranota sp		4	32	36	1.4
			Tipulidae	Ormosia sp	1			1	0.04
		Collembola							
		Unid J				1	1	2	0.1
			Hypogastruridae	Hypogastrura sp		1		1	0.04
			Isotomidae	Isotomurus sp			2	2	0.1
			Sminthuridae	Sminthurides sp		1		1	0.04
		Hemiptera							
		Unid J				5		5	0.2
		Homoptera							
		Unid J or Damaged			6	14		20	0.8
			Aphididae N		3	7	13	23	0.9
		Hymenoptera	Unid J or Damaged						
			Adult		2	2		4	0.2
	Arachnida	**Araneae**	terr			2		2	0.1
		Hydracarina							
		Unid or Damaged				5	2	7	0.3
			Sperchontidae	Sperchon sp		1		1	0.04

Unid = unidentified A = adult J = juvenile L = larva P = Pupa terr = terrestrial

APPENDIX D **BENTHIC INVERTEBRATES IDENTIFIED IN THE RAU ACCESS ROAD STUDY AREA, 2010**

Phylum	Class	Order	Family	Genus/ species	Cameron Creek	Gambler Gulch	Silver Basin Gulch	Total	%
	Crustacea	**Copepoda**							
			Cyclopoida			9	3	12	0.5
			Harpacticoida			12	6	18	0.7
		Ostracoda							
			Candonidae	Candona sp		9		9	0.3
			Unid			4		4	0.2
Annelida	**Oligochaeta**	**Haplotaxide**	Enchytraidae			8	8	16	0.6
			Naididae				21	21	0.8
			Tubificidae			3		3	0.1
		Lumbriculidae	Lumbriculidae			1	5	6	0.2
			Lumbriculidae	Kincaidiana hexatheca		17		17	0.7
Mollusca	**Bivalva**	**Veneroida**	Pisidiidae	Pisidium sp		1		1	0.04
Total per site:					53	926	1601	2580	100
Diversity per site:					15	44	37	59	

Unid = unidentified A = adult J = juvenile L = larva P = Pupa terr = terrestrial

APPENDIX E

HABITAT DATA, 2010

Parameter		Cameron Gulch	Gambler Gulch	Keno Ladue River	Scougale Creek	Silver Basin Gulch
Site	Survey Date	Aug. 10, 2010	Aug. 10, 2010	Aug. 10, 2010	Aug. 10, 2010	Aug. 11, 2010
	Site Elevation (m)	664	744	706	675	722
	Site Survey Length (m)	80	100	100	100	100
Channel	Ave. Channel Width (m)	7.5	2.4	4.9	30.7	3.8
	Ave. Wetted Width (m)	7.1	1.7	4.9	20.6	1.5
	Ave. Bankfull Channel Depth (m)	0.5	1.6	0.9	> 1	0.4
	Ave. Residual Pool Depth (m)	0.3	0.5	0.3	n/a	0.3
	Stage	high	moderate	high	high	moderate
	Gradient (%)	2.6	0.4	0.1	0.1	1.5

Parameter		Cameron Gulch	Gambler Gulch	Keno Ladue River	Scougale Creek	Silver Basin Gulch
Cover	Cover Abundance (%)	moderate (~15)	moderate (~20)	abundant (~25)	abundant (~50)	moderate (~15)
	Dominant Cover Type	boulders, o/h vegetation	o/h vegetation	o/h vegetation and undercut banks	deep pools and instream vegetation	o/h vegetation
	Subdominant Cover Type	deep pools	undercut banks, small woody debris and deep pools	deep pools	small and large woody debris	undercut banks
	Other Cover Types Present	undercut banks, small and large woody debris	large woody debris	small and large woody debris, instream vegetation	o/h vegetation	small woody debris, deep pools
	LWD Frequency	few	few	few	few	none
	Crown Closure (%)	0	21-41	21-41	0	41-71
	Left Bank Shape	vertical (>45°)	vertical (>45°)	vertical (>45°)	sloping (<45°)	vertical (<45°)
	Texture	fines	fines	fines	fines	fines
	Riparian Vegetation	shrubs and conifers	grasses and shrubs	grasses and shrubs	grasses and shrubs	grasses and shrubs
	Riparian Stage	shrub and mature forest	shrub	shrub	shrub	shrub
	Right Bank Shape	sloping (<45°)	vertical (>45°)	vertical (>45°)	sloping (<45°)	vertical (>45°)
	Texture	fines	fines	fines	fines	fines
	Riparian Vegetation	shrubs and conifers	grasses and shrubs	grasses and shrubs	grasses and shrubs	grasses and shrubs
	Riparian Stage	shrub and mature forest	shrub	shrub	shrub	shrub
	Instream Vegetation	none	none	sedges	vascular plants	none

Parameter		Cameron Gulch	Gambler Gulch	Keno Ladue River	Scougale Creek	Silver Basin Gulch
Morphology	Dominant Bed Material	cobble	gravel	fines	fines	gravel
	Subdominant Bed Material	gravel	fines	gravel	sand	fines
	D95 (cm)	28	3	0.5	0.5	9
	D (cm)	28	3	0.5	1.0	9
	Morphology	cascade-pool	riffle-pool	runs-pool	large channel	riffle-pool
	Pattern	sinuous	tortuous meanders	tortuous meanders	sinuous	tortuous meanders
	Islands	occasional	occasional	none	none	none
	Bars	side	side	side	none	side
	Confinement	unconfined	unconfined	unconfined	unconfined	unconfined

APPENDIX V

HERITAGE REPORT BY MATRIX RESEARCH LTD.

Archaeological Consulting

Heritage Resources Overview Assessment of the Rau Property Proposed Pioneer Road Route, on Behalf of ATAC Resources Ltd.

Prepared by: Matrix Research Ltd.

Prepared for: ATAC Resources Ltd.

March, 2010

CONTACTS

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March, 2010

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Matrix Research Ltd. would like to thank all of the people from the various organizations who contributed to the project. The project proponent was Bill Wengzynowski of Archer, Cathro & Associates (1981) Limited, on behalf of ATAC Resources Ltd. Bill supplied information and mapping for the study area.

Joella Hogan, Manager of Heritage and Culture, First Nation of Na Cho Nyak Dun assisted the project by researching traditional use and known heritage values.

Ruth Gotthardt at the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon, discussed the proposed development with us and provided information on past heritage resources work in the study area. We thank her for her input and comments.

The opinions, recommendations, omissions, and / or errors in this report are those of Matrix Research Ltd. alone and do not necessarily reflect the positions held by the Proponent, the First Nation of Na Cho Nyak Dun, or Government of Yukon.

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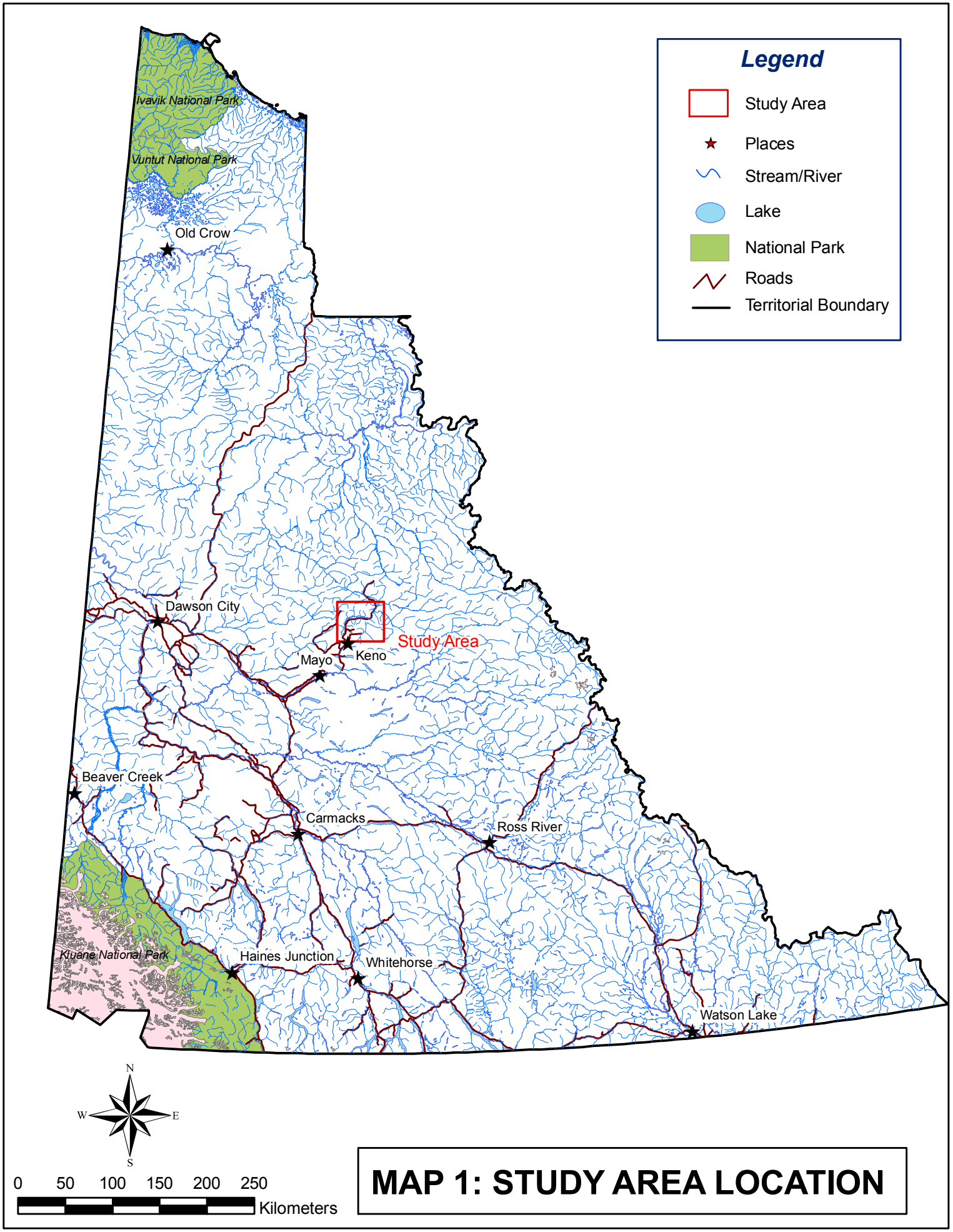
MANAGEMENT SUMMARY

This report details the results of a Heritage Resources Overview Assessment (HROA) for the Rau Property Proposed Road Route.

The HROA was anticipated to be required as part of the Yukon Environmental and Socio-economic Assessment Board (YESAB) proposed development review process. The objective of this heritage study was to determine the precontact heritage potential within the proposed road route area. Based on the HROA findings, numerous areas associated with hydrological features or significant topographical features have been classified as moderate to high heritage potential. It is recommended that further heritage resources investigations be conducted within the areas classified as moderate or high heritage potential. Given the long mining history of the area, it is anticipated that post-contact heritage resources will also be encountered within the proposed road route.

Heritage resources are protected from non-permitted alterations or disturbance by the *Historic Resources Act* (Government of Yukon 2002) and the *Archaeological Sites Regulations* (Government of Yukon 2003). To ensure that the discovery of any unanticipated heritage resources is addressed, it is recommended that the Proponent inform their personnel and contractors that, in the event that heritage resources are encountered, all development activities in the vicinity of the heritage resources must be suspended immediately. In such cases the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon must be contacted immediately with information on the heritage remains and the nature of the disturbance. Information on the identification of heritage resources can be found in a publication entitled *Handbook for the Identification of Heritage Sites and Features* (Gotthardt and Thomas 2005).

This study was designed as a heritage resources overview assessment and was not intended to evaluate or comment on Traditional Aboriginal use of the areas in which development is proposed. The results of this study, therefore, should not be considered valid for that purpose.



MAP 1: STUDY AREA LOCATION

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Appendix A: Glossary of Archaeological Terms

1.0 INTRODUCTION

This report details the results of a Heritage Resources Overview Assessment (HROA) for the proposed Rau Property Proposed Road Route. This study was conducted at the request of Archer, Cathro & Associates (1981) Limited on behalf of ATAC Resources Ltd.

ATAC Resources Ltd. is conducting mineral exploration within their Rau Property. To support these activities they are proposing a pioneer road route for fall and winter access to the property, with possible potential for upgrade to an all-season road should the need arise. The majority of the proposed route is located on ATAC Resources Ltd. quartz claims. The route begins at Hanson Lake Road, north of Keno, and follows the Keno-Ladue, Rankin Creek, and Scougale Lakes valleys to its terminus at the Beaver River.

The HROA was anticipated to be required as part of the Yukon Environmental and Socio-economic Assessment Board (YESAB) proposed development review process. The objective of this heritage study was to determine the heritage potential within the proposed road route.

1.1 Report Format and Distribution

This report is divided into seven sections and one appendix.

Section 1: Introduction

This section introduces the HROA, the relevant legislative references and definitions and a summary of contacts made with First Nations.

Section 2: Project Description

This section discusses the intent of the heritage assessment in relation to the proposed development.

Section 3: Project Area

This section describes the location of the HROA study area and contains a map showing its geographical setting. A brief overview of previous archaeology within the area is also presented.

Section 4: Methodology

This section discusses the methods used while conducting the heritage assessment.

Section 5: Results

This section summarizes the results of the HROA.

Section 6: Recommendations

This section provides recommendations for the management of heritage resources potential identified during the HROA.

Section 7: References Cited

This section lists bibliographic information for all references cited in this report.

Appendices

Included with this report is one appendix containing a glossary of archaeological terms.

1.2 Legislative References

Legislation that ensures the management and protection of archaeological and historical resources is found in the *Historic Resources Act* (Government of Yukon 2002) and *Archaeological Sites Regulations* (Government of Yukon 2003). This legislation applies to archaeological and historical sites older than 45 years whether they are located on public or private land.

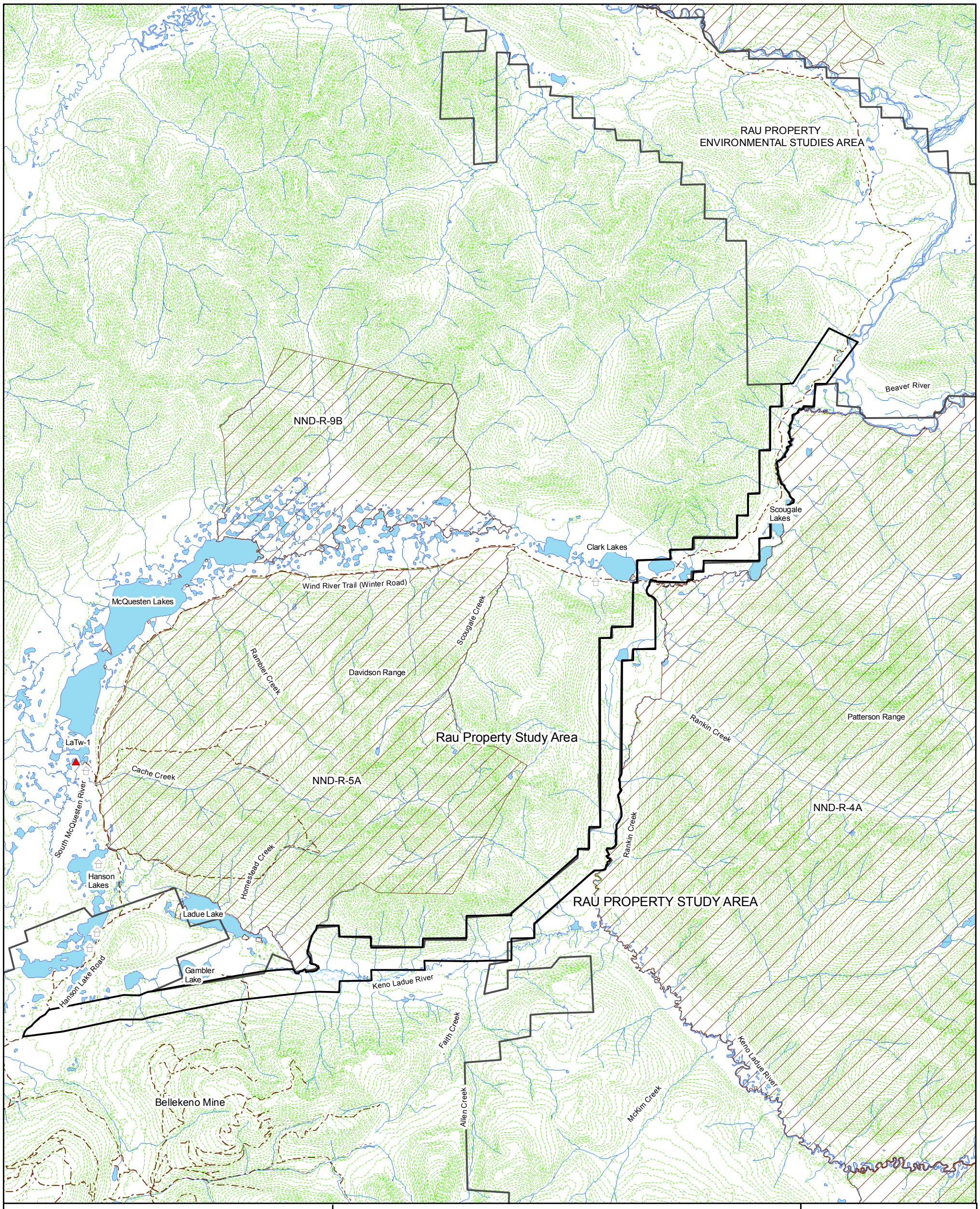
1.3 First Nations Referral and Correspondence

The area assessed during this study is located within the First Nation of Na Cho Nyak Dun (FNNND) Traditional Territory. Matrix Research Ltd. contacted FNNND to initiate discussion concerning the heritage resources overview assessment and to obtain any existing traditional land use information or oral history pertinent to the study area. Joella Hogan, Manager of Heritage and Culture for FNNND researched and provided information on traditional use and known heritage values within the proposed development area.

2.0 PROJECT DESCRIPTION

The aim of a Heritage Resources Overview Assessment (HROA) is to assess the potential for heritage resources (such as archaeological or historic sites) within a proposed development area and to make recommendations concerning the need and scope for further heritage studies.

The Rau Property Proposed Pioneer Road Route is currently in the planning stage. The development consists of the proposed road route and surrounding claim corridor. This proposed road is to consist of a pioneer access road for fall and winter use, connecting the existing Hanson Lake Road to the Rau Property.



MAP 2:
NTS STUDY AREA
LOCATION MAP

Proponent: ATAC Resources
Development: Rau Property Proposed Road Route
Location: Keno Ladue River
NTS Map Sheet: 106 D/2, 106 D/3,
105 M/14, 105 M/15

Date: March 11, 2010

UTM Area Center: 8W E 503954 N 7106094
Job #: M10-003-Rau

LEGEND

- Claim Boundary
- Study Area
- Road
- River/Stream
- 30m Contour
- Large Stream/Lake
- Cabin
- Previously Recorded Site
- First Nations Settlement Lands

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1:150,000

MATRIX Research Ltd

3.0 PROPOSED DEVELOPMENT AREA

3.1 Natural Setting

The proposed development area is located within the Yukon Plateau-North ecoregion of the Yukon, approximately 118 km northeast of Stewart Crossing and approximately 62 km northeast of the community of Mayo. The proposed road route is situated in the valley between the Davidson Range and Patterson Range approximately 4.0 km southwest of McQuesten Lakes.

The ecoregion is characterized by a series of plateaus and valleys located northeast of the Tintina Trench. Forest cover is comprised mainly of lodgepole pine and black and white spruce up to elevations of 1500 m. At higher elevations shrub birch, scattered pine, white spruce and subalpine fir form the forest cover with lichen understory. Vegetation turns to shrub and lichen tundra with increasing elevation. Temperatures in the ecoregion are the most extreme of the Yukon ranging from -62^{o}C to +36^{o}C in the valley areas, with higher terrain experiencing less extreme ranges in temperature. Annual average precipitation of the ecoregion is ~ 300 mm with areas in the east receiving upwards of 600 mm of precipitation (Smith *et al.*, 2004).

Permafrost is present in most of the ecoregion for 90% of the year with areas on southern slopes experiencing thaw during the summer months. The ecoregion was covered by the McConnell glaciations with some evidence for the presence of Reid and pre-Reid glaciations found above and beyond the western limit of the McConnell glaciations. Deglaciation occurred approximately 10,000 years ago, leaving extensive areas of kettle kame topography and glacial lakes in the many valleys of the region (Smith *et al.*, 2004).

Sediments in the higher elevations consist of thin blankets of weathered bedrock, with till found at middle to low elevations. On the valley floors glaciofluvial sand and gravel with glaciolacustrine deposits found in the west. The glaciofluvial sand and gravel have variable thickness and composition however they are usually stable surfaces. The glaciolacustrine sediments can be upwards of 18 m thick in areas such as the Keno-Ladue River valley and the Stewart River valley (Smith *et al.*, 2004).

3.2 Post-contact History

The ecoregion contains considerable potential for metallic mineral deposits and has had many mines throughout the region with more in the planning stages. Due to the high quality mineral deposits many non-aboriginals were drawn to the area. In the 1890s the first prospectors panned the McQuesten and Stewart Rivers, eventually moving northeast to the Sheep Mountain (later called Keno Hill) area. It was here in 1918 that Louis Bouvette found silver rich galena in loose rocks and staked a claim called

Roulette. Within a few years most of the Keno Hill area had been staked with claims and a town was established at Keno City. These claims were worked on and off until 1989 when the mine closed and the communities of Keno City and nearby Elsa all but disappeared. Remnants of the mining industry can still be seen on the landscape today with old roads, trails, tramways and buildings dotting the old mine area (Yukon Development Corporation 2004).

A portion of the Wind River Trail is located inside the northern extent of the Rau Property Proposed Road Route. The Wind River Trail, also known as the Amerada Road and Proctor's Trail was constructed in 1959 for the Amerada Petroleum Corporation as only 30 miles of the Dempster Highway had been completed at that time. The Wind River Trail initially consisted of a winter road of packed snow wide enough to haul oil well drilling equipment and supplies to their camps on Eagle Plains. The road was later upgraded to a summer use road as far as McQuesten Lakes (Yukon Heritage 2009).

3.3 Ethnography and Traditional Use

The area surrounding the proposed Rau Property Proposed Road Route is within the traditional territory of the First Nation of Na Cho Nyak Dun (FNNND), who are Northern Tutchone. The following brief review of Northern Tutchone ethnography is taken from McClellan (1981) and Thomas (2003). Emphasis has been placed on material culture, seasonal round and subsistence strategies as they relate to activities that are most likely to have left physical evidence of past human use.

The Northern Tutchone are members of the Athapaskan language family and are organized into two moieties, the Crow and the Wolf, with matrilineal inheritance. These moieties determined who people could marry and where they could fish or hunt as they were forbidden to marry people from within the same moiety. The primary political unit was the regional group made up of five to ten nuclear families sharing a common chief (*dän co*) however this group may not have lived together for the entire year (Thomas 2003). The Northern Tutchone seasonal subsistence round involved the summer aggregation of the group at selected fishing camps chosen for the availability of migrating salmon. Settlement near these locations involved several families who used the same fishing location each year. Berry gathering and preservation was also carried out at this time of year. A variety of berries and roots were available and constituted an important food source. By late summer there was a dispersal of the group into the upland region as food stores required additions or replenishment. Game was now sought to be dried for winter caches. Caribou, moose, mountain goat and sheep and bear were among the large game animals taken with hare and beaver also trapped / hunted for their fur and food. In December and January the people usually regrouped to share stored foods but once again dispersed by late winter to find game. Food storage was accomplished through the use of storage caches near the main dwellings. The food was generally dried or smoked on drying racks (McClellan 1981).

The Northern Tutchone built conical or rectangular lean-tos with a tied pole framework, brush walls, and roofs of moss, bark or skin. These structures would often house several families sharing a central fireplace. Near the main dwellings meat and fish drying racks would be erected, racks for boat frames and toboggans, frames for skin tanning and smoking, as well as small huts for menstruants and parturients nearby. No excavation was required for a main foundation and evidence of postholes and central hearths are the primary features most likely to be found archaeologically for such structures. During the winter when groups dispersed, domed winter tents of caribou or moose hide were stretched over frameworks of saplings.

A wide variety of implements were used for hunting, fishing, and plant food gathering. Stone tools (projectile points, knives, scrapers, and flaking debris) are implements commonly recovered in archaeological contexts. In some cases these hunting / fishing implements were made from antler, bone and native copper which are sometimes recovered on archaeological sites depending on preservation conditions. During ethnographic and historic times, many kinds of traps, snares, corrals and hunting blinds were used and still can be seen on the landscape today. Box and funnel traps were used in conjunction with weirs were used to catch salmon, trout, pike and large whitefish. Dip nets, gill nets, leisters, hooks, gaffs, spears and lines were also used to catch fish (McClellan, 1981).

Oral history from the Germaine family indicates that they trapped and hunted in the area surrounding Keno Hill and McQuesten Lakes for generations as the valley is rich in moose, beaver, martin and lynx. They also stated that the McQuesten Lakes have lingcod, whitefish, pike and inconnu and that the family set nets in the narrows of an emptying creek. The area was also a good source of blueberries in the summer. Later, after the prospectors started to settle, the Germaines provided fish and wild game to the mining camps (Yukon Development Corporation 2004).

Oral tradition also recounts that Fort Selkirk Indians traditionally travelled the Stewart River country to trap and hunt. Mayo Elder Sam Peter stated that from Fort Selkirk, they travelled up the McQuesten River (Et'O Nyak) to the Beaver River (Mayo Historical Society 1990).

Currently, members of the First Nation Na Cho Nyak Dun, have cabins in and around McQuesten Lakes and Clark Lakes. The region is known for good hunting and fishing (Joella Hogan, pers. comm.).

3.4 Previous Heritage Work

No information could be found for previous archaeological or heritage survey work that has been undertaken in the proposed development area.

One archaeological site, **LaTw-1**, located at the south end of McQuesten Lakes, consisting of lithic artifacts, debitage, bone and charcoal was incidentally identified and recorded in 1957 by MacNeish (57-2ASR). No further work has been completed at this site.

4.0 METHODOLOGY

The following section describes the methods used for the Heritage Resources Overview Assessment (HROA). The background information summarized in Section 3.0 was considered along with review of airphotographs and satellite imagery to produce a preliminary assessment of heritage resources potential in the study area. The results of the HROA are presented in Section 5.0.

4.1 Heritage Resources Overview Assessment

All available maps, digital elevation models, satellite imagery, airphotographs, ethnographies, histories, and archaeological reports for the study area were examined. Criteria used to determine potential for heritage resources included: proximity to streams and water bodies, known heritage sites, known aboriginal or historic trails, topography, vegetation cover, and presence of fish and wildlife habitat.

4.2 Limitations of the HROA

Given that there is only one previously recorded site within close proximity to the study area the criteria used to determine heritage resources potential during this study was primarily derived from previous experience in comparable areas throughout the Yukon. The lack of detailed information on environmental and geomorphological changes throughout the glacial and post-glacial periods, ethnographic data, the very few heritage studies conducted in this area, and the low number of known sites within the immediate study area, significantly limits our current understanding of past settlement patterns and land use of the area.

When viewing the HROA results it is important to note that low potential does not mean **no** potential. It is possible for heritage sites to be located outside of areas identified as having moderate or high heritage resources potential. To ensure that the discovery of any unanticipated heritage resources is addressed, it is recommended that the Proponent inform their personnel and contractors that, in the event that heritage resources are encountered, all development activities in the vicinity of the heritage resources must be suspended immediately. In such cases the Cultural Services Branch, Department of Tourism and Culture, Government of Yukon must be contacted immediately with information on the heritage remains and the nature of the disturbance.

5.0 RESULTS

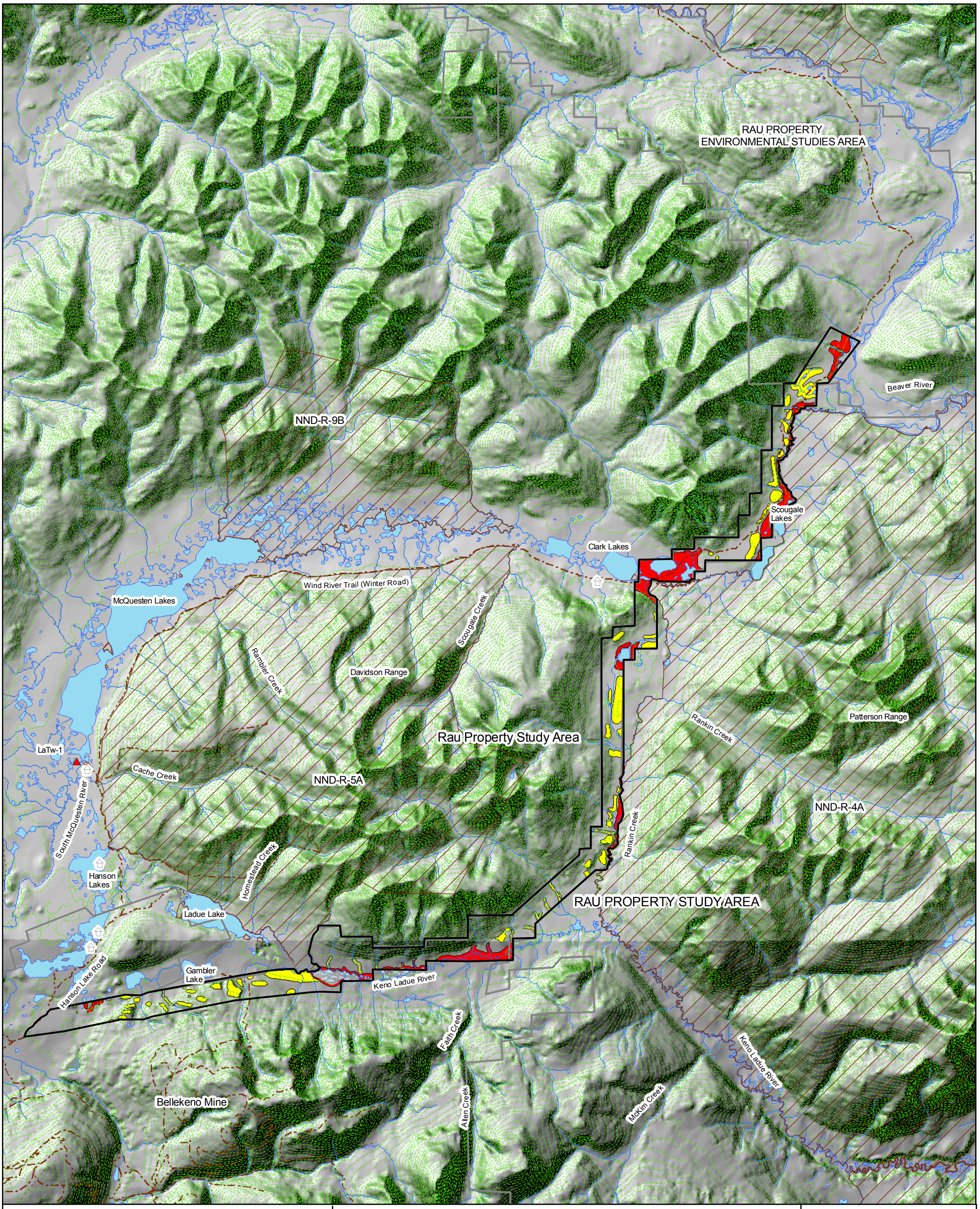
5.1 HROA Results

The land base in the study area has been classified into zones of heritage potential. Heritage potential is rated as high, moderate, or low. It is important to note that low potential does not mean no potential and it is possible for heritage resources to be encountered anywhere in the study area. Zones of heritage potential are portrayed as polygons on the enclosed map (Map 3). GIS shapefiles are also provided so that these HROA polygons can be overlaid onto development planning maps.

The proposed pioneer road route is contained within the valley between the Davidson and Patterson Ranges providing a natural overland thoroughfare between McQuesten Lakes and Beaver River. Numerous unnamed drainages, small creeks, rivers and lakes are located within the Rau Property Proposed Road Route and claim corridor. Many of these small tributaries feed major creeks and rivers such as Rankin Creek, Keno Ladue River and Beaver River. These smaller tributaries and associated landforms have been given a rating of moderate heritage resource potential and have been buffered by a minimum of 50 m on either side of the drainage.

Larger waterways such as Keno Ladue River, Rankin Creek and Beaver River and their associated landforms have been buffered by a minimum 100 m and have been given a rating of high heritage resource potential due to their possible past use as fishing, hunting and trapping areas. In addition the area surrounding Clark Lakes and their associated wetlands, as well as large wetlands throughout the proposed development route have been highlighted as areas of high heritage potential due to the potential past use of these areas for hunting and trapping.

All other areas highlighted are of moderate heritage resource potential due to topographical features such as terraces, knolls and ridges associated with significant water features such as streams, wetlands and small lakes all of which are tributary to the main water systems: Rankin Creek, Beaver River, Keno Ladue River and the McQueston Lakes and wetlands. These areas are considered to have moderate precontact heritage resources potential as they are on well drained topographic features or are in upland areas on prominent landforms that provide good vantage points or strategic hunting positions.



MAP 3: ARCHAEOLOGICAL OVERVIEW ASSESSMENT MAP

Proponent: ATAC Resources
Development: Rau Property Proposed Road Route
Location: Keno Ladue River
NTS Map Sheet: 106 D/2, 106 D/3,
105 M/14, 105 M/15

Date: March 11, 2010

UTM Area Center: 8W E 503954 N 7106094
Job #: M10-003-Rau

LEGEND

- Claim Boundary
- Study Area
- Road
- River/Stream
- 30m Contour
- Large Stream/Lake
- Cabin
- Previously Recorded Site
- First Nations Settlement Lands
- Moderate Archaeological Potential
- High Archaeological Potential

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6.0 HERITAGE RESOURCE MANAGEMENT RECOMMENDATIONS

This section provides recommendations, including a discussion of gaps in heritage data, a prediction of the type and number of sites expected, and a discussion of the options for managing heritage sites during development planning.

6.1 Gaps in the Heritage Resources Record of the Study Area

No systematic archaeological survey has been undertaken in and around the proposed road route. The lone previously identified archaeological site, **LaTw-1**, located at the southern end of the McQuesten Lakes in 1957 was incidentally discovered and has not been revisited. Consequently, regional site density and distribution is relatively unknown. Likewise, post-contact heritage resources have not been surveyed or documented in the study area.

6.2 Heritage Resource Potential and Resource Values

A significant portion of the study area is considered to have precontact heritage resources potential. Areas considered to have high to moderate precontact heritage resources potential are typically near hydrological features on distinct, well-drained topographic features or are in upland areas on prominent landforms that provide good vantage points or strategic hunting positions. Generally, moderate and high potential areas are more frequent along major water features, such as wetlands, creeks and rivers in the bottom of the valley. This is because the valley would have provided an easier route of travel through the mountain ranges and provided access to game and fish associated with numerous hydrological features along the valley floor. From the archaeological record, it is inferred that larger, more permanent sites will be positioned adjacent to the major hydrological features (i.e., McQuesten Lakes, Beaver River and Keno Ladue River).

It is expected that most precontact heritage sites in the proposed road route area will consist of small, short-term camps related to hunting, trapping, or travel activities. Sites resulting from these activities are normally manifested as small lithic scatters; however, local environmental and geological conditions such as frozen sediments may support the preservation of some organic materials. The remains of structures are not expected to be readily visible in this area given the short-term settlement occupation, but there may be evidence of cultural depressions.

In addition, it is expected that post-contact mining sites will be located within the proposed development area due to the numerous mines and mining related activity throughout the area since the 1890s. These sites may consist of tramways, buildings, roads and trails as well as mine sites and mining equipment.

6.3 Heritage Resource Management Options

Numerous areas within the Rau Property Proposed Road Route are assessed as having moderate to high heritage potential. A Heritage Resources Impact Assessment (HRIA) is recommended for these areas prior to any potentially ground-altering development activities. A HRIA offers the opportunity to ground-truth the heritage resources potential and can negate or confirm the presence of heritage resources. In the event that heritage resources are discovered in the development area, management options can be provided.

6.4 Recommendations

The areas identified as having moderate and high heritage resources potential are shown on Map 3 (Section 5).

It is recommended that a HRIA be carried out within the areas considered to have moderate and high heritage resources potential prior to the proponent undertaking any potentially land-altering development activities.

This study was designed solely as a Heritage Resources Overview Assessment and was not intended to evaluate or comment on Traditional Aboriginal use of the areas in which the development is proposed. The results of this study, therefore, should not be considered valid for that purpose.

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APPENDIX A

Glossary of Archaeological Terms

ABORIGINAL; INDIGENOUS: Pertaining to the original occupants of a given region.

A-HORIZON: the uppermost, often dark-coloured natural level in a soil profile characterized by roots, humus, and a lack of clay, iron, carbonates and soluble salts which have leached to lower levels.

ARCHAEOLOGY: The science concerned with the recovery, analysis, description and explanation of the remains of past human cultures.

ARCHAEOLOGICAL SURVEY OR SITE INVENTORY: Examination of a locality for evidence of past human activity and the recording of that evidence to produce an inventory of sites in that locality.

ARTIFACT: Any manually portable product of human workmanship. In its broadest sense includes tools, weapons, ceremonial items, art objects, all industrial waste, and all floral and faunal remains modified by human activity. In the Yukon, an artifact is an object that is older than 45 years and has been abandoned.

BARK-STRIPPED TREE: A tree which has had bark removed by First Nations people for a number of possible purposes (i.e. fibre, food, medicine)

BASALT: A fine-grained volcanic rock used for the manufacture of chipped stone artifacts. Colour ranges from black to grey; texture granular to glass like.

B-HORIZON: That natural level within a soil profile which directly underlies the surficial A-horizon and which contains the clay, iron oxides and carbonates which have leached down from it.

BIFACE: A stone artifact flaked on both sides.

BORDEN NUMBER: A standardized number consisting of four letters and one number assigned to each archaeological site which identifies it and denotes its general location in Canada.

BORDEN SYSTEM: A code of 4 letters and a number used to designate archaeological sites in Canada (e.g. GtRx 7; FlJr 10 etc.). Proposed by Charles E. Borden, University of British Columbia, in 1954. The alphabetic prefix refers a block of l0 minutes by l0 minutes within a grid system which covers all of Canada south of 62 N latitude. The numerical suffix indicates the site within this block in numerical order of registration.

CACHE: A deliberate store of equipment, food, furs or other resources placed in, or on the ground (perhaps protected by a rock CAIRN), or raised above the ground on a platform.

CACHEPIT: Small circular depressions (less than 3 m) that were used to store food.

CHALCEDONY: A semi-translucent silicate (quartz) rock with a wax-like luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Commonly called agate.

CHERT: A mainly opaque, fairly granular, silicate rock with a dull shiny luster and a great range of colours, used as raw material for the manufacture of chipped stone artifacts. Varieties include jasper and flint.

CONCHOIDAL FLAKE: A type of spall resulting from the fracture of fine-grained, or glassy rocks. Characterized by a bulb of percussion, striking platform remnant, and extremely sharp edges. A predictable fracture pattern that allows the manufacture of predetermined tools from these materials.

CONTACT: The time of first prolonged direct contact between First Nations peoples and Europeans. The term is synonymous with the Historic period which is characterized by contemporary written works.

CONTEXT: The spatial relationships of archaeological items and samples within a site. "Primary Context" refers to materials found in their original position; "Secondary Context" refers to materials which have been displaced and redeposited by disturbance factors; "Geological Context" is the relationship of the archaeological finds to geological strata.

CONCENTRATION: A notable accumulation of archaeological materials in a small area, such as a "concentration of flakes" etc.

CORE: (1) A blocky nucleus of stone from which flakes or blades have been removed (see MICROBLADE CORE). (2) A column or lineal sample of materials obtained by "coring" the ground, trees, etc.

CORTEX: The naturally weathered outer surface of a pebble.

CULTURE: The distinctive lifeway – including language, technology, sustenance, social organization, customs, beliefs and rituals – practiced by a people. This term can also be used to refer to the culture of particular groups of people at a particular point in time. In and archaeological context, the term culture refers to materials or objects of human origin, in contract to natural.

CULTURAL DEPOSIT: Sediments and materials laid down by, or heavily modified by, human activity.

CULTURAL DEPRESSION: A pit excavated by people into natural sediments. Pits have been excavated for a variety of reasons including: houses (pithouses, house pit), food storage (cache, cache pit), food cooking (roasting pit, berry trenches, hearth) and burials.

CULTURALLY MODIFIED TREE (CMT): A tree that had been intentionally altered in some way. CMTs usually consists of bark-stripped trees, that is, trees that have had the bark to access the cambium for eating, for extracting tree sap, for manufacture, or for medicinal purposes, by First Nations people. Blazed trees may also be referred to as CMTs.

CULTURE SEQUENCE: The chronological succession of cultural traits, phases or traditions in a local area.

CULTURE TYPE: A chronologically limited cultural unit within a local culture sequence, characterized by sufficient descriptive traits to set it apart from all other units. A phase is generally represented by 2 or more components in several sites and is the basic classification of archaeological "cultures".

DACITE: Volcanic rock (or lava) that characteristically is light in color and contains 62% to 69% silica and moderate a mounts of sodium and potassium.

DATUM: A fixed reference point on an archaeological site from which measurements are taken.

DEBITAGE: Waste by-products from tool manufacture.

DETRITUS: Waste by-products from tool manufacture. Most frequently applied to chips and fragments resulting from stone flaking.

DISTURBANCE: A cultural deposit is said to be disturbed when the original sequence of deposition has been altered or upset by post-depositional factors. Agents of disturbance include

natural forces such as stream or wind erosion, plant or animal activity, land-slides etc.; and cultural forces such as later excavations.

ETHNOGRAPHIC ANALOGY: Interpretation of archaeological remains by comparison to historical cultures.

ETHNOGRAPHY: That aspect of cultural anthropology concerned with the descriptive documentation of living cultures.

ETHNO-HISTORY: The study of ethnographic cultures through historical records.

ETHNOLOGY: The aspect of cultural anthropology concerned with the comparative and processional analysis of ethnographic cultures.

FAUNAL REMAINS: Bones and other animal parts found in archaeological sites. Important in the reconstruction of past ecosystems and cultural subsistence patterns (see: MICROFAUNAL REMAINS).

FEATURE: A non-portable product of human workmanship. Usually clusters of associated objects; pit houses, structures, hearths, cache pits, mining activities, cooking ovens, etc.

FLAKE: A fragment removed from a core or nucleus of cryptocrystaline or fine-grained rock by percussion or pressure. May be used as a tool with no further deliberate modification, may be RETOUCHED, or may serve as a PREFORM for further reduction.

FLINT: A microcrystaline silicate rock similar to CHERT, used for the manufacture of flaked stone tools. Colour most commonly grey, honey-brown, or black.

GROUND STONE: Stone artifacts shaped by sawing, grinding, and/or polishing with abrasive materials (e.g. "ground slate knives", "polished soapstone pendants" etc.).

HEARTH: A fireplace, often circular and may be unlined, rock or clay-lined, or rock-filled. Minimally consists of fire-altered rock and charcoal.

HERITAGE RESOURCES IMPACT ASSESSMENT (HRIA): A study undertaken for a proposed development project to determine whether it will adversely affect historical, archaeological, or paleontological remains, generally indicated by the presence of shovel tests.

HERITAGE SITE: A location of archaeological or historical interest that contains evidence of past human activities. Heritage sites may consist of artifacts or features.

HISTORIC ARCHAEOLOGY: The archaeological investigation of POST-CONTACT sites.

HISTORIC PERIOD: The time after European contact or the beginning of written recording. In the Yukon, this period dates to the past 100 to 150 years.

HORIZON: Layers typical of the soil profile in a particular region.

HOUSE-PIT: An aboriginally excavated house floor. See PITHOUSE.

IN SITU: Archaeological items are said to be "in situ" when they are found in the location where they were last deposited.

LITHIC: Of/or pertaining to stone. A lithic artifact is one manufactured from stone.

LITHIC INDUSTRY: That part of an archaeological artifact assemblage manufactured of stone.

LITHIC SCATTER: An archaeological site consisting of two or more stone artifacts.

LITHIC TECHNOLOGY: The process of manufacturing tools etc., from stone. Most frequently refers to stone flaking.

LOCALITY: A very large site or site-area composed of 2 or more concentrations or clusterings of cultural remains.

MATRIX: An inclusive term for the natural and cultural sediments of an archaeological site.

MICROFAUNAL REMAINS: Very small animal remains, such as rodent bones, tiny bone fragments, insects, small molluscs, etc., discovered in an archaeological site.

MIDDEN: A deposit of camp refuse associated with human occupational sites. Most frequently refers to coastal SHELL-MIDDENS.

MUNSELL COLOUR CODE: A system of describing colours by a code of letters and numbers defining "hue", "value" and "chroma". Important in accurately describing the colours of archaeological soils and sediments.

OBSIDIAN: Natural volcanic glass. Colour ranges from nearly translucent through black, red and green. The most easily flaked raw material for the manufacture of flaked stone tools.

PALEOSOL: "Old Soil." Buried soil horizons indicative of past soil conditions different from that presently prevailing.

PETROGLYPH: Pictures, symbols, or other artwork pecked, carved or incised on natural rock surfaces.

PICTOGRAPH: Aboriginally painted designs on natural rock surfaces. Red ochre is the most frequently used pigment and natural or abstract designs may be represented.

PITHOUSE: A semi-subterranean "earth-lodge" winter dwelling. Usually consisted of an earth-covered log framework roof over a circular to rectangular excavation. The archaeological feature is called a housepit.

POST-CONTACT PERIOD (Also "Historic Period"): Refers to the period following the first arrival of Europeans.

POT-HUNTER: An "amateur archaeologist" who vandalizes and destroys sites to add to his private collection, or for monetary gain.

PRE-CONTACT: Refers to the period before the first arrival of Europeans in a given area.

PREHISTORIC: The period prior to written records for any given area. In North America synonymous with PRE-CONTACT.

PRELIMINARY FIELD RECONNAISSANCE (PFR): A study undertaken for a proposed development project to determine whether it will adversely affect heritage remains, generally indicated by the lack of need for shovel tests.

PROJECTILE POINT: An inclusive term for arrow, spear or dart-points. Characterized by a symmetrical point, a relatively thin cross-section and some element to allow attachment to the projectile shaft. Flaked stone projectile points are usually classified by their outline form: triangular, leaf-shaped, lanceolate, stemmed, corner-notched, and side-notched.

PROVENIENCE: The horizontal and/or vertical position of an object in relation to a set of spatial co-ordinates.

QUARTZ CRYSTAL: Pure silicate rock-crystal. Usually perfectly clear with six crystal surfaces. May be used as a raw material for lithic tool manufacture.

RETOUCH: The removal of small secondary flakes along the edge of a lithic artifact to improve or alter the cutting properties of that edge. Retouch flaking may be BIFACIAL or UNIFACIAL.

RETOUCHED FLAKE: A stone flake which has had one or more edges modified by the deliberate removal of secondary chips.

ROCK-SHELTER: A shallow cave or rock overhang large enough to have allowed human occupancy at some time.

SCRAPER: A tool presumably used in scraping, scouring, or planing functions. Most frequently refers to flaked stone artifacts with one or more steep UNIFACIALLY RETOUCHED edge(s).

SETTLEMENT PATTERN: The spatial distribution of cultural activities across a landscape at a given moment in time.

SHOVEL-SCREENING: A rapid excavation procedure in which the site matrix is shoveled directly through a screen (usually 1/4" mesh).

SHOVEL TEST: a small scale, generally informal test excavation to ascertain the nature of the deposits, to determine the presence or absence of a heritage site, or to delimit the boundaries of a known site.

SITE: Any location with detectable evidence of past human activity. Includes HISTORICAL SITES, HABITATION SITES, KILL-SITES, QUARRY SITES, ROCK-ART SITES, BURIAL SITES, etc. See HERITAGE SITE.

SITE SURVEY: The process of searching for and describing heritage sites in a given area.

SOIL-SAMPLE: A quantity of soil, site matrix, or sediments collected for physical, or chemical analysis.

STORAGE-PIT (Also called CACHE-PITS): Circular excavations usually less than 3 m in diameter assumed to have aboriginally functioned as storage "cellars".

STRATA: Depositional units or layers of sediment distinguished by composition or appearance. (Singular: "stratum").

STRATIGRAPHY: The study of various deposits, built up over time, which form delineated layers (such as ash, charcoal or crushed shell) in the earth walls of a pit.

SURVEY(ING): (1) In Archaeology, the process of locating archaeological sites. (2) More generally, the process of mapping and measuring points on the ground surface.

SURVEY AREA: The region within which heritage sites are to be located.

TOOL: An artifact that has been intentionally modified or formed for a specific purpose (i.e. projectile point, knife, scraper).

TYPE: A distinctive formal artifact class restricted in space and time, e.g. the "Folsom Point" is a projectile point "type".

TYPOLOGY: The classification of artifacts according to analytical criteria, to determine and define significant trends or variations in time and space.

UNIFACE: A stone artifact flaked only on one surface.

USE-WEAR: Polish, striations, breakage, or minor flaking which develop on a tool's edge during use. Microscopic examination and study of the wear may indicate the past function of tools.

WETLAND: Areas of land that are inundated by surface water or ground water sufficient to support the growth and reproduction of vegetative and aquatic life.

WORKED: Having chips, flakes, scratches or other evidence of deliberate modification on stone, bone, antler, shell, etc.

ZOOARCHAEOLOGY: The study of faunal remains found in archaeological sites and their cultural significance.

Modified from:

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