Wolverine Project

GENERAL SITE PLAN

VERSION 2006-02

Prepared by:
Yukon Zinc Corporation

November 2006

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1 Introduction

This report, prepared by Yukon Zinc Corporation (YZC), describes the general site plan to deliver the Wolverine Project over a period extending from December 2006 to December 2008. This report replaces the *General Site Plan* submitted in June 2006 (Version 2006-01) by YZC to Yukon Government Energy, Mines and Resources.

Section 2 of this report provides the preliminary project schedule for construction and operation activities. Section 3 outlines the overall project layout and associated mineral claims for the project area (industrial complex area to the tailings facility) and the access road. Sections 4 through 7 detail the activities to be conducted after the effective date of the Quartz Mining License and prior to the effective date of the Type A Water License (A License).

The main construction targets include the access road, permanent camp, industrial complex infrastructure, pre-production underground development, as well as general site preparation activities in the tailings facility area.

2 Preliminary Project Schedule

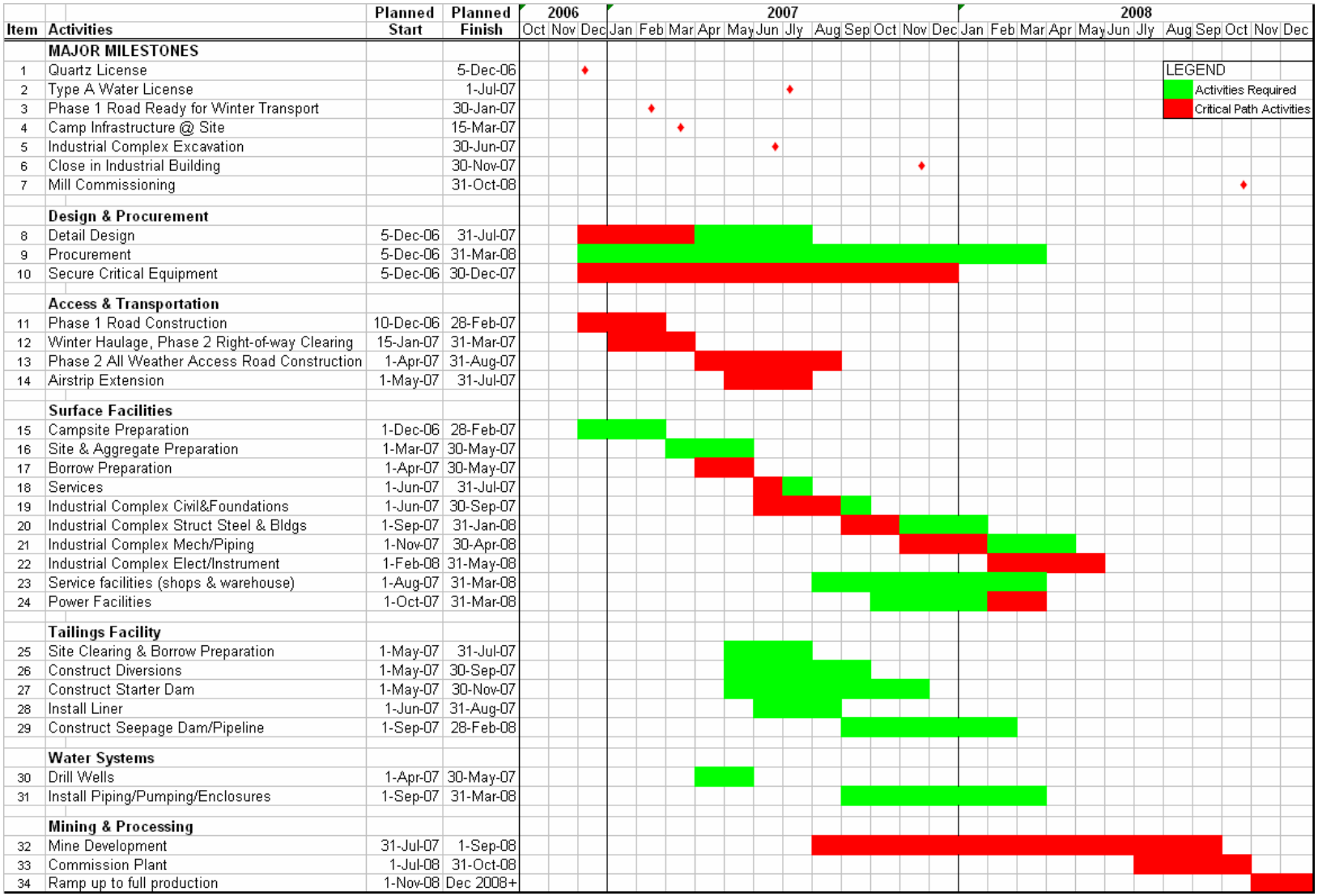
The preliminary schedule for construction and operation activities at the Wolverine Project, including required and critical path activities and milestones, is provided in Figure 1. YZC recognizes that minimal earthwork and concrete work will occur between November 15 and April 1, and have scheduled tasks accordingly. The schedule is subject to a production decision, regulatory approvals, and project financing and is based upon anticipated receipt of the Quartz License in December 2006 and the A License in July 2007.

Dates for the nine key milestones, including receipt of the Quartz License and A License, construction of the Phase 1 access road, transportation of camp infrastructure to site, industrial complex excavation and building close in, pre-production development and mill commissioning are provided in the schedule shown in Figure 1.

Where practical, prefabrication off site will be completed to reduce on site labour and construction time. The development of the surface infrastructure and the underground is estimated to take approximately one and one half years, resulting in commissioning of the plant in July 2008.

Figure 1 Preliminary Schedule for Wolverine Project

Item	Activities	Planned Start	Planned Finish
	MAJOR MILESTONES		
1	Quartz License		5-Dec-06
2	Type A Water License		1-Jul-07
3	Phase 1 Road Ready for Winter Transport		30-Jan-07
4	Camp Infrastructure @ Site		15-Mar-07
5	Industrial Complex Excavation		30-Jun-07
6	Close in Industrial Building		30-Nov-07
7	Mill Commissioning		31-Oct-08
	Design & Procurement		
8	Detail Design	5-Dec-06	31-Jul-07
9	Procurement	5-Dec-06	31-Mar-08
10	Secure Critical Equipment	5-Dec-06	30-Dec-07
	Access & Transportation		
11	Phase 1 Road Construction	10-Dec-06	28-Feb-07
12	Winter Haulage, Phase 2 Right-of-way Clearing	15-Jan-07	31-Mar-07
13	Phase 2 All Weather Access Road Construction	1-Apr-07	31-Aug-07
14	Airstrip Extension	1-May-07	31-Jul-07
	Surface Facilities		
15	Campsite Preparation	1-Dec-06	28-Feb-07
16	Site & Aggregate Preparation	1-Mar-07	30-May-07
17	Borrow Preparation	1-Apr-07	30-May-07
18	Services	1-Jun-07	31-Jul-07
19	Industrial Complex Civil&Foundations	1-Jun-07	30-Sep-07
20	Industrial Complex Struct Steel & Bldgs	1-Sep-07	31-Jan-08
21	Industrial Complex Mech/Piping	1-Nov-07	30-Apr-08
22	Industrial Complex Elect/Instrument	1-Feb-08	31-May-08
23	Service facilities (shops & warehouse)	1-Aug-07	31-Mar-08
24	Power Facilities	1-Oct-07	31-Mar-08
	Tailings Facility		
25	Site Clearing & Borrow Preparation	1-May-07	31-Jul-07
26	Construct Diversions	1-May-07	30-Sep-07
27	Construct Starter Dam	1-May-07	30-Nov-07
28	Install Liner	1-Jun-07	31-Aug-07
29	Construct Seepage Dam/Pipeline	1-Sep-07	28-Feb-08
	Water Systems		
30	Drill Wells	1-Apr-07	30-May-07
31	Install Piping/Pumping/Enclosures	1-Sep-07	31-Mar-08
	Mining & Processing		
32	Mine Development	31-Jul-07	1-Sep-08
33	Commission Plant	1-Jul-08	31-Oct-08
34	Ramp up to full production	1-Nov-08	Dec 2008+



3 Site Layout and Mineral Claims

The activities planned and the infrastructure to be constructed or in use as described herein are located on claims owned by YZC, with the exception of the Money Claims, which are subject to an Option Agreement with YGC Resources Ltd.

Table 1 provides a summary of the claims for the existing site facilities, site roads, the airstrip, the access road, the exploration and new camp locations, organic stockpiles, laydown and borrow locations, the tailings facility and associated infrastructure, and the ore body.

Table 1 Claims List for Wolverine Project Infrastructure

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YB87703	CUP	9	access road, borrow site
YB87704	CUP	10	access road, borrow site
YB87705	CUP	11	access road, borrow site
YB87706	CUP	12	access road, borrow site
YB87707	CUP	13	access road, borrow site
YB87708	CUP	14	access road, borrow site
YB87709	CUP	15	access road, borrow site
YB87710	CUP	16	access road, borrow site
YB87711	CUP	17	access road, borrow site
YB87712	CUP	18	access road, borrow site
YB87713	CUP	19	access road, borrow site
YB45954	FOOT	1	airstrip, tailings pipeline, water supply well, diversion structure, site roads, landfill, incinerator
YB45955	FOOT	2	explosive and cap magazine sites, site roads
YB45956	FOOT	3	tailings pipeline, site roads
YB45957	FOOT	4	explosive and cap magazine sites, site roads
YB45958	FOOT	5	industrial complex, batch plant, tailings pipeline, waste rock pad, camp, site roads, organic stockpile
YB45959	FOOT	6	industrial complex, waste rock pad, camp, site roads
YB45960	FOOT	7	industrial complex, tailings pipeline, camp, site roads
YB45961	FOOT	8	industrial complex, camp, site roads
YB45962	FOOT	9	industrial complex, ore body, site roads
YB45963	FOOT	10	industrial complex, ore body, site roads, organic stockpile
YB51608	FOOT	11	industrial complex, site roads, organic stockpile
YB71274	FOOT	11A	industrial complex, site roads, organic stockpile
YB51609	FOOT	12	industrial complex, ore body, site roads
YB71275	FOOT	12A	industrial complex, ore body, site roads
YB45966	FOOT	13	site roads

Table 1 Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YB45967	FOOT	14	site roads
YB45968	FOOT	15	site roads
YB45969	FOOT	16	site roads
YB45971	FOOT	18	site roads
YB45973	FOOT	20	site roads
YB59982	FOOT	180	exploration camp, site roads
YB59983	FOOT	181	exploration camp, site roads
YB59984	FOOT	182	exploration camp, site roads
YC25006	GOALIE	29	access road
YC25007	GOALIE	30	access road, borrow site
YC25008	GOALIE	31	access road, borrow site
YC25009	GOALIE	32	access road, borrow site
YC25010	GOALIE	33	access road, borrow site
YC25011	GOALIE	34	access road
YC25012	GOALIE	35	access road
YC25013	GOALIE	36	access road
YC25014	GOALIE	37	access road
YC25015	GOALIE	38	access road, borrow site
YC25016	GOALIE	39	access road, borrow site
YC25017	GOALIE	40	access road, borrow site
YC25018	GOALIE	41	access road, borrow site
YC25019	GOALIE	42	access road, borrow site
YC25020	GOALIE	43	access road, borrow site
YC25021	GOALIE	44	access road
YC25022	GOALIE	45	access road
YC25023	GOALIE	46	access road
YC25024	GOALIE	47	access road
YC25025	GOALIE	48	access road
YC25026	GOALIE	49	access road
YC25027	GOALIE	50	access road
YC25028	GOALIE	51	access road
YC25029	GOALIE	52	access road, borrow site
YC25030	GOALIE	53	access road
YC25031	GOALIE	54	borrow site
YC25032	GOALIE	55	borrow site
YC25037	GOALIE	60	access road, borrow site
YC25039	GOALIE	62	access road, borrow site
YC25040	GOALIE	63	access road
YC25041	GOALIE	64	borrow site
YC25042	GOALIE	65	access road
YC25058	GOALIE	81	access road
YC25060	GOALIE	83	access road
YC25062	GOALIE	85	access road

Table 1 Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YC25064	GOALIE	87	access road, borrow site
YC25065	GOALIE	88	access road
YC25066	GOALIE	89	access road
YC25067	GOALIE	90	access road, borrow site
YC25068	GOALIE	91	access road, borrow site
YC25069	GOALIE	92	access road, borrow site
YC25070	GOALIE	93	access road, borrow site
YC25071	GOALIE	94	access road
YC25072	GOALIE	95	access road
YC25073	GOALIE	96	access road
YC25074	GOALIE	97	access road
YC25075	GOALIE	98	access road, borrow site
YC25076	GOALIE	99	access road, borrow site
YC25077	GOALIE	100	access road, borrow site
YC25078	GOALIE	101	access road, borrow site
YC25079	GOALIE	102	access road
YC25080	GOALIE	103	access road
YC25182	GOALIE	205	access road
YC25183	GOALIE	206	access road, borrow site
YC25299	GOALIE	213	access road, borrow site
YC25301	GOALIE	215	access road
YC25303	GOALIE	217	access road
YC25305	GOALIE	219	access road
YC25306	GOALIE	220	access road
YC25308	GOALIE	222	access road, borrow site
YC25310	GOALIE	224	access road, borrow site
YC25312	GOALIE	226	access road, borrow site
YC25316	GOALIE	230	access road
YC25317	GOALIE	231	access road
YC25318	GOALIE	232	access road
YC25319	GOALIE	233	access road
YC25325	GOALIE	239	access road
YC25326	GOALIE	240	access road
YC25327	GOALIE	241	access road
YC25328	GOALIE	242	access road
YC25343	GOALIE	257	access road, borrow site
YC25344	GOALIE	258	access road
YC25345	GOALIE	259	borrow site
YC25346	GOALIE	260	access road, borrow site
YC25347	GOALIE	261	borrow site
YC25348	GOALIE	262	borrow site
YC25349	GOALIE	263	borrow site
YC25350	GOALIE	264	borrow site

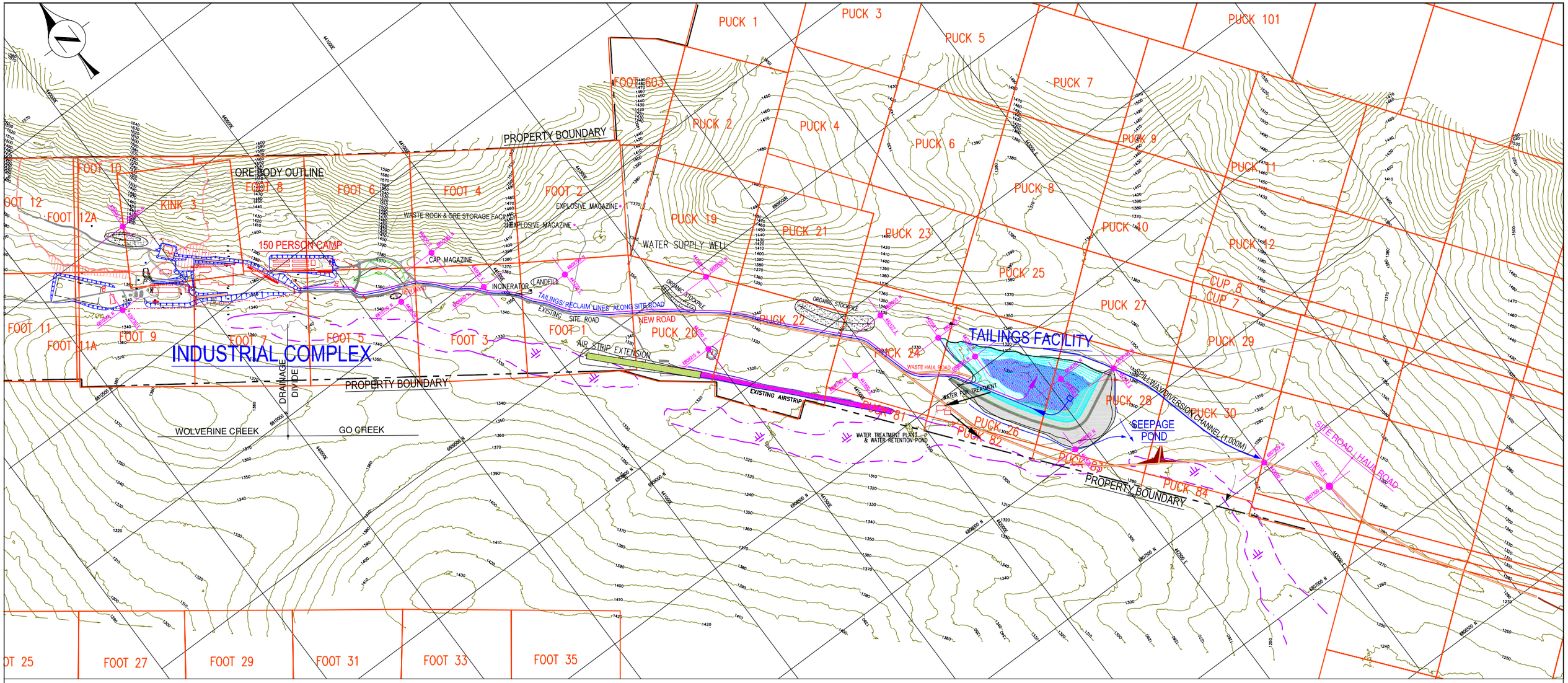
Table 1 Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YC29140	GOALIE	289	access road, borrow site
YC29141	GOALIE	290	access road, borrow site
YC29142	GOALIE	291	access road, borrow site
YC29143	GOALIE	292	access road, borrow site
YC29439	GOALIE	305	access road
YC29440	GOALIE	306	access road
YA69009	KINK	3	industrial complex, ore body, pipelines, organic stockpile
YB16726	MONEY	1	access road
YB16727	MONEY	2	access road
YB16731	MONEY	6	borrow site
YB16736	MONEY	11	access road
YB16737	MONEY	12	access road, borrow site
YB16738	MONEY	13	access road, borrow site
YB16739	MONEY	14	access road, borrow site
YB16740	MONEY	15	borrow site
YB16741	MONEY	16	borrow site
YB51934	MONEY	29	access road
YB51935	MONEY	30	access road
YB55997	PUCK	19	diversion ditch
YB55998	PUCK	20	airstrip, tailings pipeline, water supply well, diversion structure, site roads
YB55999	PUCK	21	organic stockpile, diversion ditch
YB56000	PUCK	22	airstrip, tailings pipeline, site roads, diversion ditch, organic stockpile
YB56002	PUCK	24	airstrip, tailings pipeline, site roads, organic stockpile
YB56003	PUCK	25	diversion ditch
YB56004	PUCK	26	tailings facility, site roads, diversion ditch, water treatment plant
YB56005	PUCK	27	diversion ditch
YB56006	PUCK	28	tailings facility, site roads, access road, borrow site, diversion ditch
YB56008	PUCK	30	tailings facility, site roads, access road, borrow site
YB56010	PUCK	32	access road, borrow site
YB56012	PUCK	34	access road
YB56014	PUCK	36	access road
YB56019	PUCK	41	access road
YB56021	PUCK	43	access road
YB56023	PUCK	45	access road
YB56025	PUCK	47	access road
YB56037	PUCK	59	access road
YB56039	PUCK	61	access road
YB56040	PUCK	62	access road
YB56045	PUCK	67	access road
YB56046	PUCK	68	access road
YB56047	PUCK	69	access road
YB56048	PUCK	70	access road
YB56049	PUCK	71	access road

Table 1 Claims List for Wolverine Project Infrastructure (cont'd)

Grant No.	Claim Name	Claim No.	Wolverine Project Infrastructure
YC31888	PUCK	81	airstrip
YC31889	PUCK	82	tailings facility, site roads, access road, borrow site, water treatment plant
YC31890	PUCK	83	tailings facility, site roads, access road, borrow site
YC31891	PUCK	84	tailings facility

Figure 2 and Appendix A provide the claim boundaries for the general site layout for the main project area and for the mine access road, respectively.



LEGEND:

NEW ROAD

EXISTING ROAD

200m 0m 200m 400m 600m 800m 1000m

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A	YUKON ZINC ISSUE FOR FEASIBILITY UPDATE	07/24/06	BW	

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SCALE	1 = 8000	
Job. No.	1614	

WOLVERINE PROJECT

OVERAL SITE LAYOUT
WITH MINERAL CLAIMS

Drawing No. FIGURE 2

Rev. A

4 Infrastructure Development Overview

Site development activities focus on construction of the mine access road, transportation of construction equipment and materials over the winter period, pre-production underground development as well as the following construction activities:

- clear, strip and bulk excavate the industrial complex and tailings facility areas
- establish the permanent camp and potable water source
- establish the concrete batch plant
- pour building foundations at the industrial complex, erect buildings and install/build internal workings

Figure 3 provides the site development areas, including the industrial complex, camp, landfill and incinerator area, airstrip extension, surface runoff diversion and collection ditches, water supply wells, borrow areas and tailings facility area. Figure 4 provides the general arrangement for the industrial complex and the location of laydown areas, buildings, stockpiles, fuel station and fuel and diesel storage, water management structures and the batch plant. Coordinates showing the extent of the development area are also provided.

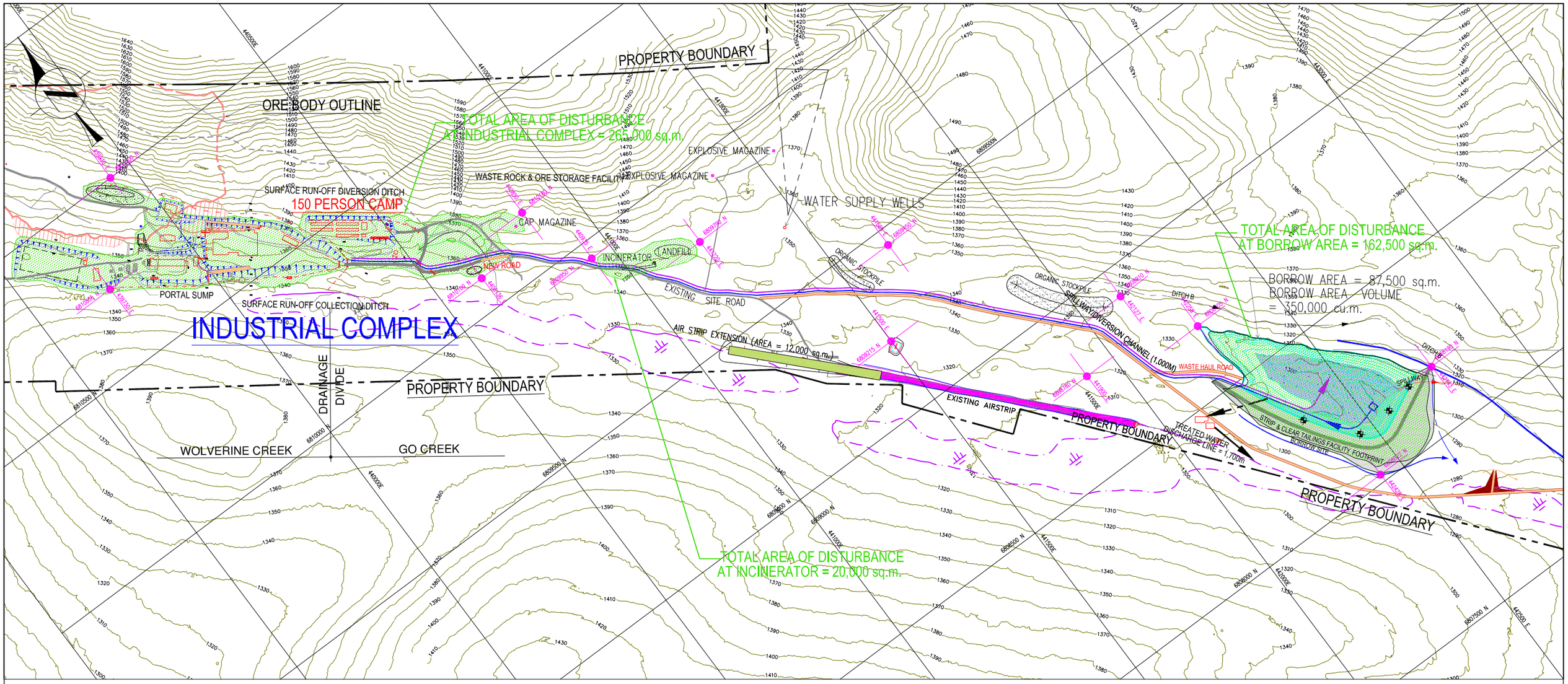
Figure 5 provides cross sections through three areas of the industrial complex shown on Figure 4, including:

- Section A – through laydown area, truck shop, genset and fuel storage areas
- Section B – through mill building and fuel station and storage road
- Section C – through site road and camp

The general layouts of the mill, truckshop, assay lab, administration and camp buildings are provided in Figure 6.

Construction activities will initially be supported by the existing camp infrastructure on Wolverine Lake, as well as the existing site roads and the airstrip. Beyond routine maintenance activities, no additional works are required for the camp and road infrastructure. Other surface works planned include activities at the portal laydown areas that support the current underground activities, including adit dewatering and subsequent water treatment, mine ramp rehabilitation, and pre-production development.

As outlined in Figure 1, scheduled tasks include design and procurement activities (Items 8 to 10), access road and airstrip extension activities (Items 11 to 14), surface facility site preparation and construction activities (Items 15 to 24), tailings facility site preparation activities (Items 25 and 26), as well as the installation of water wells and pipelines (Items 30 and 31) and mine development (Item 32). Details are provided in the following subsections.



LEGEND:

- NEW ROAD
- EXISTING ROAD
- TEST PIT

200m 0m 200m 400m 600m 800m 1000m

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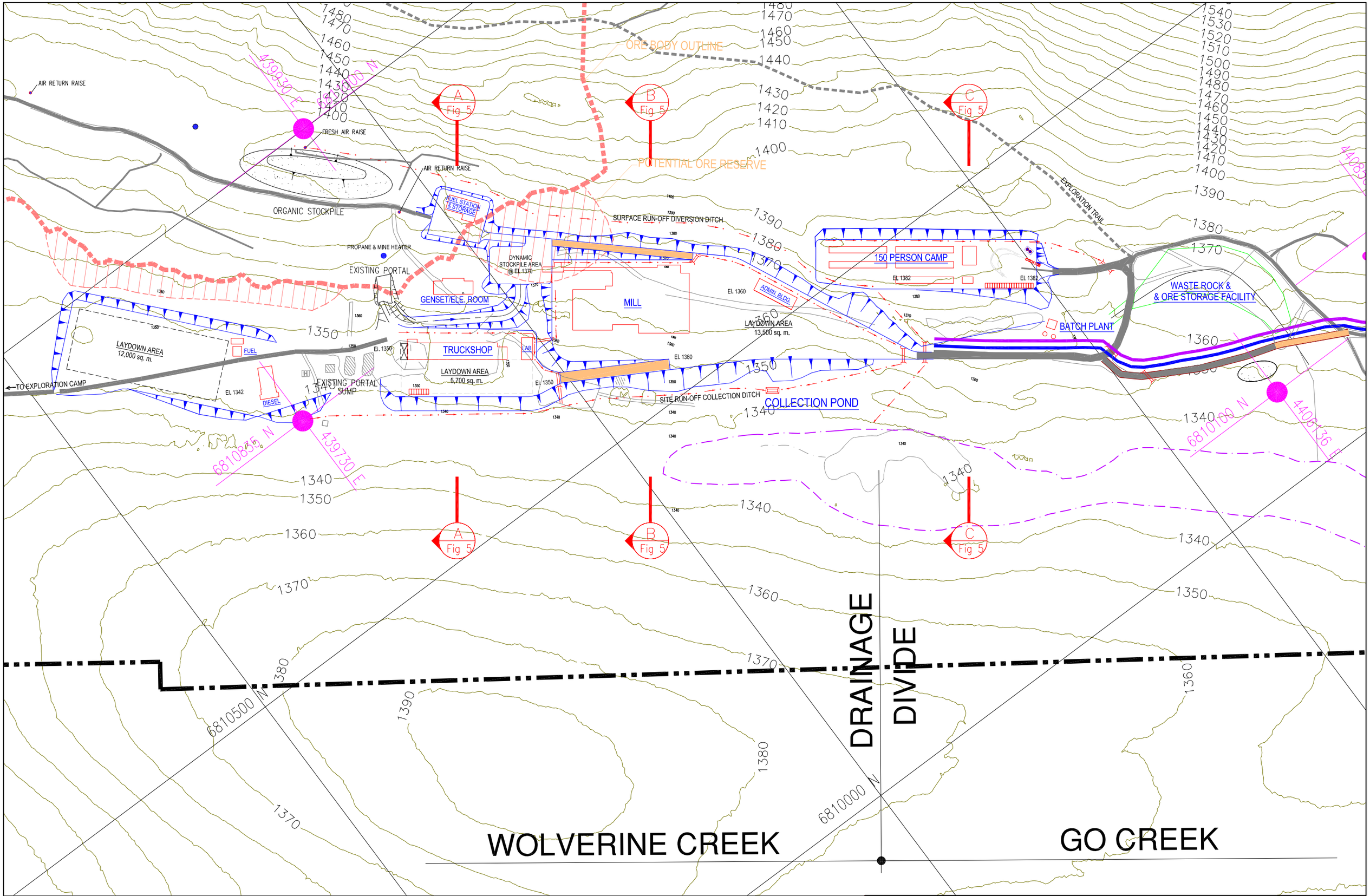
WOLVERINE PROJECT

OVERALL SITE LAYOUT FOR CONSTRUCTION ACTIVITIES

Drawing No. FIGURE 3 Rev.



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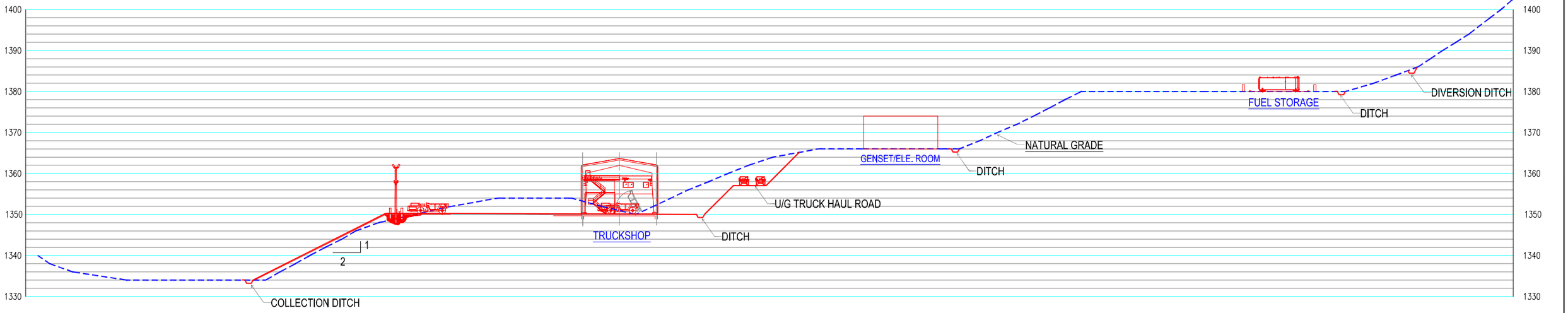
WOLVERINE PROJECT

INDUSTRIAL COMPLEX - GA
WITH WATER MANAGEMENT STRUCTURES

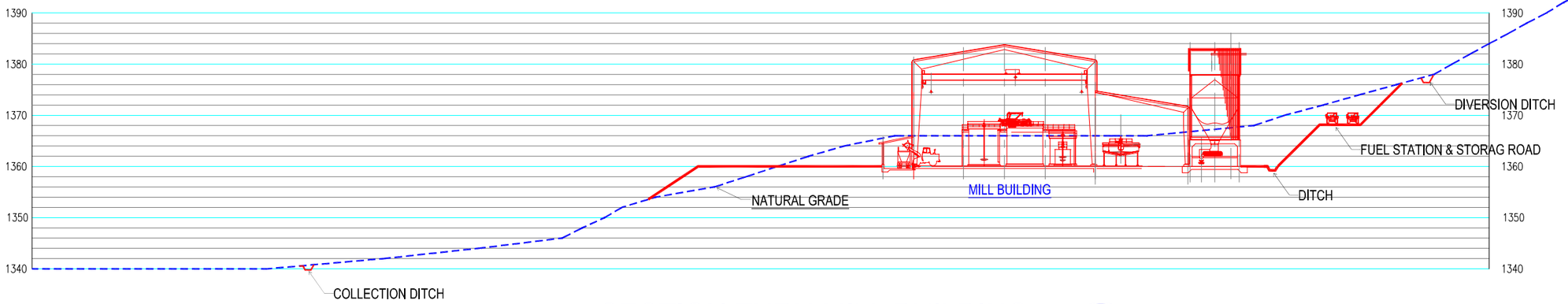
Drawing No. FIGURE 4

Rev.



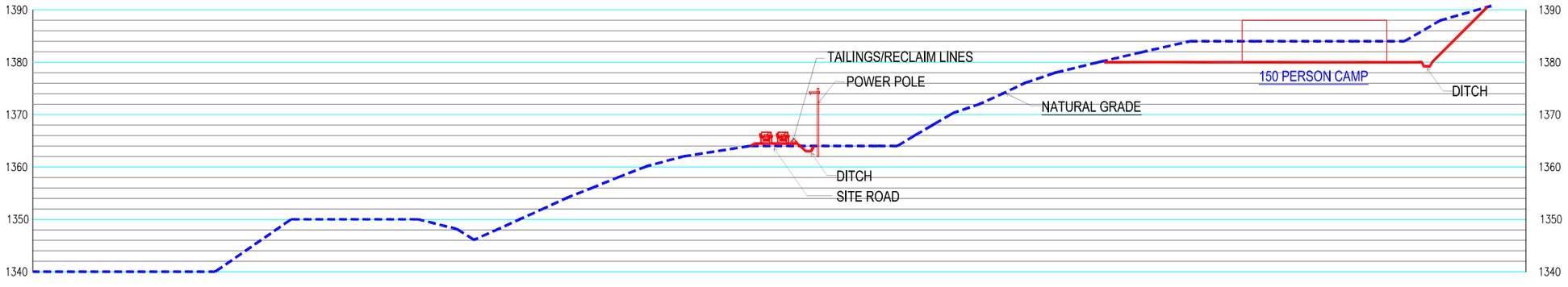
SECTION THRU TRUCKSHOP, GENSET AND FUEL STORAGE

A
Fig 4



SECTION THRU MILL BUILDING

B
Fig 4



SECTION THRU 150 PERSON CAMP

C
Fig 4

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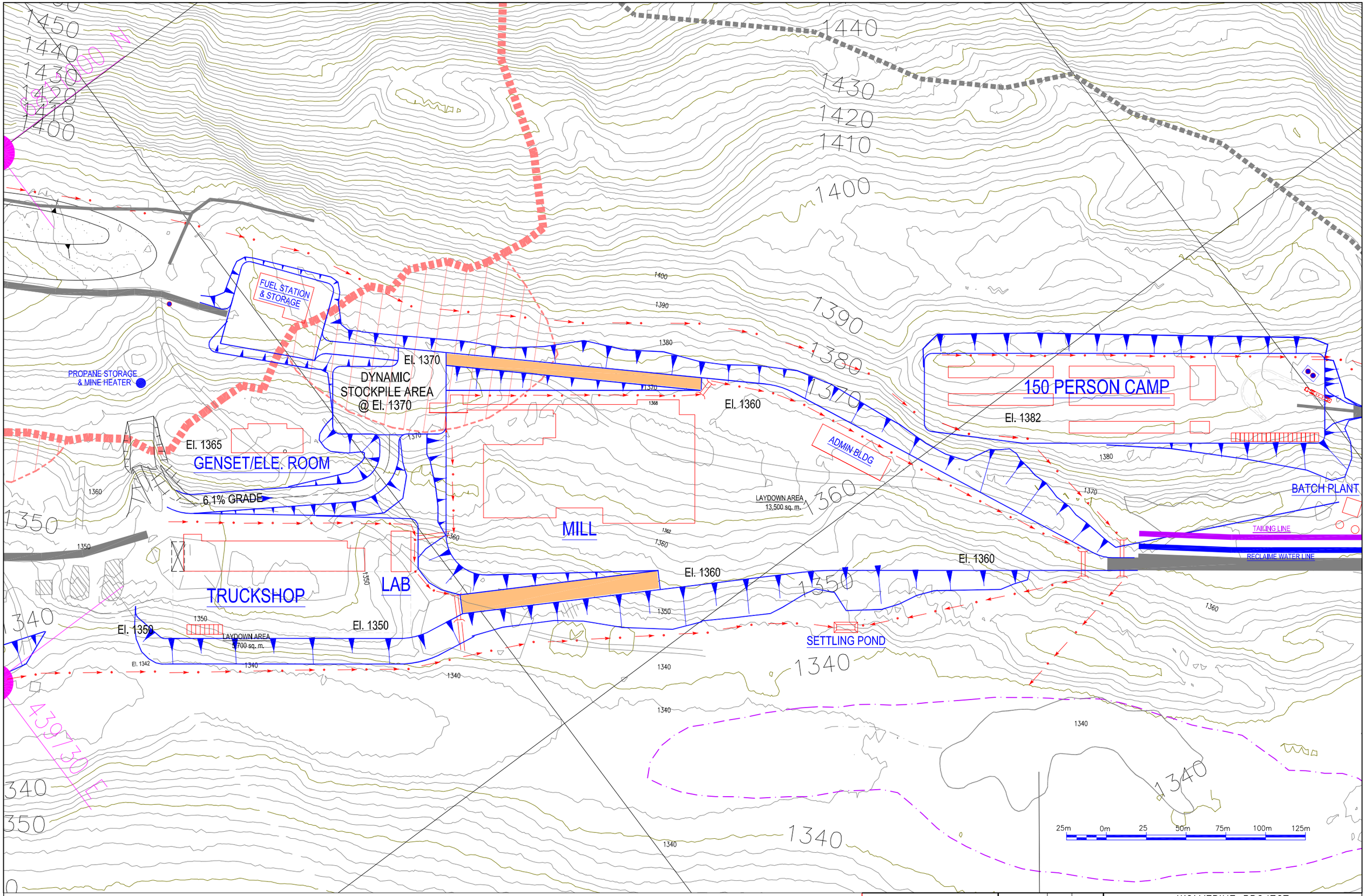
WOLVERINE PROJECT

INDUSTRIAL COMPLEX - SECTIONS

Drawing No. FIGURE 5

Rev.



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Yukon Zinc CORPORATION

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Drawn By	B.Wong	Oct 27 06
SCALE	1=1,100	
Job. No.	1614	

WOLVERINE PROJECT

INDUSTRIAL COMPLEX – GA
MILL, TRUCKSHOP, LAB, ADMIN AND CAMP PLAN

Drawing No. FIGURE 6 Rev.

5 Transportation Infrastructure

Infrastructure to support transportation requirements during site development and operation includes existing and new site roads, the access road and the airstrip.

5.1 Airstrip

In spring 2007, the airstrip will be extended 450 m to the northwest as indicated on Figure 3. The purpose of the extension is to accommodate larger aircraft to transport personnel to and from site. Go Creek runs perpendicular to the airstrip at the northern end, then parallels the airstrip on the western side. Go Creek is less than 5 m in width (at ordinary high water mark) at both the road crossing and airstrip crossing locations and YZC will install culverts under the airstrip and upgrade the existing culverts under the airstrip access road to accommodate 1:100 yr flows.

Ditches will be upgraded on the eastern and western sides of the airstrip and the airstrip access road to promote drainage from the running surfaces and minimize surface erosion.

5.2 Site Roads

Between the airstrip and industrial complex and within the industrial complex, existing roads are shown as gray corridors and new roads are shown as orange corridors in Figures 3, 4 and 6. There are no major stream crossings along any of the new road sections. Roadside ditches will be constructed and culverts installed in low-lying areas where necessary to minimize erosion and allow for proper drainage.

5.3 Access Road

YZC will construct access to the site from kilometre post 190.0 of the Robert Campbell Highway to the project site in two phases with construction of a winter access road (Phase 1) following receipt of the Quartz License, and construction of the all weather access road (Phase 2) in spring 2007.

YZC retained Yukon Engineering Services Inc (YES) to complete the route selection, preliminary design, geotechnical assessment, detailed design, tendering, construction management and quality assurance. YES retained the services of EBA Engineering Consultants Ltd. (EBA) to provide professional geotechnical evaluations of the route and sources, undertake a roadway geotechnical testing program, complete laboratory testing of samples taken along the route and from granular sources, and to provide construction recommendations resulting from their investigations and laboratory results. AMEC Earth & Environmental developed the environmental (ARD/ML) testing protocol provided in Section 5.3.7.

Details pertaining to road design, stream crossing details, borrow sources, environmental and geotechnical testing protocols and outcomes, traffic and access control measures, and reclamation plans and cost estimates for closure of the Phase 1 road and borrow sites are provided below.

5.3.1 Phase 1 Winter Access Road

The first phase of the access road development is the construction of an ~24 km long temporary winter access road from kilometre post 190.0 of the Robert Campbell Highway to the mine site for the purpose of hauling in equipment and supplies required to set up the construction camp and for the onset of construction activities scheduled to commence in spring 2007. From the highway, the access road corridor follows the Putt Creek and Chip Creek drainages before transitioning into the Go Creek drainage and the mine.

Winter accesses are often situated in areas not conducive to all weather access road construction. Examples of situations often desirable for winter road construction, but not desirable for all-weather road construction are:

- Swamps, bogs and marshes – winter roads constructed in frozen conditions are often built of snow and ice across the gentler terrain found at these features for economic reasons. Constructing all weather roads in these situations creates larger impacts, higher construction and maintenance costs, and larger reclamation programs.
- Path of least resistance – winter roads are usually selected along the path of least resistance for bulldozers and "cat-train" deployment. These alignments and grades are often not conducive to the longer terms safe haul of goods and personnel.
- Stream Crossings – winter road stream crossings are usually done over ice, or by way of ice bridges where possible. These locations are selected for their approach grades and gentler relief is usually desirable. The winter road crossing locations are usually chosen where the stream is shallower and wider. All weather road stream crossings must be chosen for flow impact, shorter crossing structures and all-weather foundation conditions.

In order to minimize impact, and to better control access in the long term, YZC has chosen to construct its winter access road along the alignment of the cleared geotechnical investigation trail, which itself is within the footprint of the ultimate all weather access road clearing, and in the steeper side-hill areas, will fall within the ultimate roadway prism.

The winter road will be constructed over a four to six week period during December 2006 to February 2007, and approximately 40 loads would be hauled over the road during February and March 2007. Table 2 provides as summary of the equipment and materials to be transported over the Phase 1 and Phase 2 roads to support the early construction phase. In total, approximately 275 loads will be hauled over the February to September period.

Table 2 Wolverine Project Anticipated Road Usage February to September 2007

Equipment and Supplies	Number of Transport Truck Loads	
Description	**Phase 1: February - March**	**Phase 2: April - September**
Road Bridge and Culverts	3	
Camp Infrastructure	8	132
Structural Steel		12
Earth Moving Equipment	4	2
U/G Equipment	6	
Fuel Tankers/Storage	1	4
Aggregate/Cement	10	50
Rebar		10
Piping/Electrical		12
Genset Units	2	4
Service Vehicles	4	4
Catering/Consumables	2	5

5.3.2 Phase 2 All Weather Access Road

The second phase of road development entails construction of an all-weather access road. The road will be a private, single lane road with passing bays, will have restricted access and will be operated under radio control. The road will be used year round with minimal load restrictions. Design and construction details for this phase will be provided in December 2006.

Prior to construction of the all-weather road, clearing of the right of way will be required. It is preferred to conduct this work during the January to March 2007 period. Winter clearing operations allow for better access on frozen ground, and safe burning-disposal of non-salvageable product (rather than trucking and bury-disposal).

5.3.3 Access Road Design and Specifications

It was necessary for YES to complete the ultimate Phase 2 design, in order to properly plan for the Phase 1 winter access road. The Phase 2 access road design has been revised subsequent to the completion of the geotechnical field investigation (July 2006) and granular investigation (October 2006) programs executed by EBA Engineering Consultants Ltd, and following the Lidar Bare Earth topography provided by Woolpert on behalf of YZC.

The design of the Phase 2 road meets or exceeds Transportation Association of Canada (TAC) RLU 60 Single Lane Resource Road, (with inter-visible two lane sections) employing the standards summarized in Table 3. The Phase 1 winter road will be built within the prism of the ultimate Phase 2 design.

The road design drawings are provided in Appendix A and have been sealed by Paul J. Knysh, Yukon P.Eng. The route is "final", within acceptable uses of the term; the alignment is fixed within a defined corridor of 50m in width, except at controlling stream crossings, where the alignment is considered final at its present location to within +/- 10m. The controlling stream crossings for both phases are provided in Table 4.

The road design is not approved for construction purposes, but is complete in terms of impact and construction requirements. All assessments to date have been completed using techniques suiting the level of investigation required using systematic development planning.

Route selection and design were based on hydrology studies, stream data collection, terrain analyses and air photo interpretation of soils conditions, by hand sample truthing of the mapped interpretations, then by a two phase geotechnical investigation. Contributing information to the design included a review of assessments by:

- Surface Geology, Soils and Associated Interpretations. Wolverine Biophysical Surveys (Mougeot Geoanalysis 1996)
- AXYS Environmental Consulting Ltd. (satellite imagery interpretation of Surficial Materials Distribution)
- Jack Dennett, P.Geol., EBA Engineering Consultants Ltd., YES Geotechnical Sub-consultant (air photo interpretation)
- Paul J. Knysh, P.Eng., and Rob Harvey of Yukon Engineering Services Inc. (air photo interpretation)
- EBA Engineering Consultants Ltd. (Geotechnical Investigation)
- Lidar Bare Earth topography (Woolpert)

Table 3 Adapted Transportation Association of Canada Single Lane Resource Road Standards

• Desirable Minimum Curve Radii	• 170 m
• Minimum Curve Radii	• 120 m
• Minimum Switch-back Radii[1]	• 65 m
• Desirable Maximum Gradient[2]	• 8%
• Minimum "k" Factor Crest	• 15
• Minimum "k" Factor Sag	• 10
• Single Lane Width	• 6 m crowned @ 3%
• Two Lane Width	• 8.5 m crowned @ 3%
• Super-elevation	• Emax 8%
• Minimum Culvert Diameter	• 600mm or Q^{100} whichever is greater
• Culvert Installations	• as per *YG 06010-1, -2, -3, -4, -5, -6, -7*[3]
• Clearing	• Machine and Hand Clearing as per: *YG Sections 03010, 03011*[4] • to 15 m either side minimum, or 3 m beyond cuts (tree root protection), 6 m beyond fills (access to reclaim stripping), whichever is greater
• Surfacing Aggregate	• 300mm as per *YG Section 04060*
• Sideslopes (fill)	• 2H:1V ratio (except as geotechnically modified) • 1.5H:1V ratio, where safety berms are employed
• Backslopes (earth cut)	• 1.5H:1V ratio (except as geotechnically modified)
• Backslopes (rock cut)	• 1.5H:1V ratio (except as geotechnically modified)
• Ditch Depth	• 1 m
• Ditch Type	• "V" Ditch, with widenings for side-borrow
• Safety Berms	• 0.75m Ht. where Fills > 10m, or where downhill side hazard requires. Roadbed widened 1.5m to accommodate
• Compactive Density	• 95% Standard Proctor (Embankment) • 98% Standard Proctor Density (Surfacing Aggregate and culvert bedding/backfill)

[1] Utilized in two situations: Bunker Ck. at km 10.4, to avoid a beaver dam, and at 13.1 km, to avoid two stream crossings and for economic considerations.
[2] TAC recommends maximum gradients of 12% in mountainous terrain, and 10% in semi-mountainous terrain. 8% was selected for safety, erosion control and reduced operating costs. 10% grades were required for short sections
[3] YG = Yukon Highways and Public Works, Transportation Engineering Branch, March 2003
[4] YG = Government of Yukon, February 1997

Table 4 Controlling Stream Crossings along the Road Alignment

Creek Crossing	Appendix A Drawing #	Kilometer Location	Latitude	Longitude	Structure Type
Putt	3 km	3.03	61° 28’ 46.8”	129° 53’ 33.5”	1600 mm Dia. CSP*
Pitch	1.5 km	2.88	61° 28’ 50.1”	129° 53’ 32.1”	2400 mm Dia. CSP
Bunker	9 km	10.38	61° 25’ 21.6”	129° 56’ 01.6”	20 m Bridge
Bogie	15 km	15.7	61° 24’ 00.3”	129° 59’ 25.2”	1000 mm Dia. CSP***
Hawkowl	22.5 km	23.23	61° 24’ 00.4”	130° 03’ 49.8”	1600 mm CSP at 23+225, plus a 1000 mm in the Overflow Stream at 23+200

Notes: *CSP = Corrugated Steel Pipe Helical Culvert. All diameters shown are "minimum anticipated", and are subject to further field confirmation.

Phase 2 design elements have not changed significantly since the initial road design. The following exceptions apply, and are also applicable to the Phase 1 alignment as shown in Appendix A:

- **0 to 0.7 km**–The intersection with the Campbell Highway has been relocated, to 190.0 km of the Campbell Highway. This was done in order to accomplish the following:
  - improve the intersection visibility for public safety
  - avoid permafrost over shallow bedrock 0 to 0.7 km
  - reduce impact by including the first section of roadway within the footprint of the planned Borrow Pit, Staging and Camp Area
- **0.7 to 2.9 km**–Grade-lines were lowered, as ice contents within the discontinuous permafrost in this section were found to be generally less than 10% in granular soils. Should site-specific observations during construction so dictate, road grades will be raised to preserve the permafrost.
- **7.5 to 9.0 km**–Revised grade-lines ensure adequate embankment over ice-rich permafrost in this section. Non-woven geotextile will be applied over undisturbed organic materials prior to backfilling.
- **10.1 to 10.7 km**–Grade-lines have been improved from 10 to 8% as a result of the more accurate surface topography.
- **10.7 to 16.4 km**–Grade-lines have been modified from the consistent 8%, to varying grade-lines of 6% to short “pitches” of 10%, due to the improved topography.
- **16.5 to 17.4 km**–The road alignment was changed in order to avoid wet swampy ground on the glacio fluvial terrace area.
- **Throughout:**
  - accurate surface topography accommodated a complete grade-line revision throughout the entire alignment

- test pit information provided representative bedrock profile information, as well as reliable stripping, waste-cut and grubbing thickness

Phase 2 borrow pit, granular sources and side-borrow areas have been identified for the entire Phase 2 roadway and are shown in Appendix A.

As discussed previously, Phase 1 operations, plans and specifications are based upon the integrity of the Phase 2 design and standards. Acceptable construction planning for Phase 2, necessitate acceptable construction planning for Phase 1. Table 5 describes the conditions, Phase 2 Construction Method, and resultant Phase 1 plan for each segment along the ~24 km route.

5.3.4 Access Tie-In and Staging Areas

Yukon Engineering Services has completed its assessment of the proposed intersection of the all weather access road with the Campbell Highway. This has been done by way of confirming required sight distances based on the Rural Arterial 80 km/hr posting (TAC RAU 80) and designation of the Campbell Highway at present, and the intended RAU 90 designation of the Campbell Highway upgrades over the coming years.

The intersection with the Campbell Highway has been relocated from 189.4 to kilometer post 190.0, at the proposed staging area as shown in Appendix A. A road construction camp and staging area will be constructed near the Campbell Highway for both Phase 1 and Phase 2. The staging area will be used throughout the construction of the mine and road, and the operation of the mine.

Detailed topographic surveys were completed of the proposed Campbell Highway intersection during the geotechnical investigation program. Detailed site drawings and proposed intersection details will be presented to Yukon Highways and Public Works to ascertain their specific requirements or concerns. A Public Highways Access permit application will then be submitted to YG HPW for approval of the Phase 2 plan.

Table 5 Phase 1 and Phase 2 Methods of Clearing and Construction

Range (km)		Clearing Method	Ph. 2 Construction Method	Ph. 2 Comment	Ph 1 Comment
from	to				
0.140	0.525	Machine clearing	Optimal cut to fill methods	Staging, camp, borrow	Staging, camp, borrow
0.525	0.675	Hand clearing	>1.5 m fill (typ)	Bog / swamp crossing	>1.5 m fill (typ) 600 mm csp 0.575 km
0.675	2.840	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Lt of Ph. 2 road
2.840	2.905	Hand clearing	Embankment clean granular	Pitch creek crossing	Ice + snow crossing
2.905	2.995	Machine clearing	Optimal cut to fill methods	Granular deposit between creeks.	Winter road above/Rt of Ph. 2 road
2.995	3.055	Hand clearing	Embankment clean granular	Putt creek crossing	Ice + snow crossing
3.055	3.200	Hand clearing, geotextile, 1.5 m fill (typ)	Geotextile, 1.5 m fill (typ)	Discontinuous ice rich permafrost zone	Winter road above/Rt of Ph. 2 road
3.200	4.175	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
4.175	4.235	Hand clearing	Optimal cut to fill methods	Unnamed stream crossing	Ice + snow crossing
4.235	5.075	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
5.075	5.135	Hand clearing	Optimal cut to fill methods	Unnamed stream crossing	Ice + snow crossing
5.135	5.565	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
5.565	5.625	Hand clearing	Optimal cut to fill methods	Unnamed stream crossing	Ice + snow crossing
5.625	6.740	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
6.740	6.800	Hand clearing	Optimal cut to fill methods	Unnamed stream crossing	Ice + snow crossing
6.800	6.440	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
6.440	6.500	Hand clearing	Optimal cut to fill methods	Unnamed stream crossing	Ice + snow crossing
6.500	7.500	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
7.500	9.100	Hand clearing	Geotextile, 1.5 m fill (typ)	Discontinuous ice rich permafrost zone	Ice + snow crossing
9.100	10.175	Machine clearing w/ strategic hand clearing	Normal w/ strategic geotextile, 1.5 m fill (typ)	Sporadic permafrost, ice content <10% type, some ice content >10%	Winter road above/Rt of Ph. 2 road
10.175	10.425	Hand clearing	Optimal cut to fill, 3 m embankment over creek	Bunker creek crossing, beaver dam	Ice + snow crossing 5 m downstream of Ph. 2 road
10.425	15.080	Machine clearing	Optimal cut to fill methods	Sidehill ascent	Winter road above/Rt of Ph. 2 road
15.080	15.140	Hand clearing	Hand clearing	Unnamed stream crossing	Ice + snow crossing

Table 5 Phase 1 and Phase 2 Methods of Clearing and Construction (cont'd)

Range (km)		Clearing Method	Ph. 2 Construction Method	Ph. 2 Comment	Ph 1 Comment
from	to				
15.140	15.210	Machine clearing	Optimal cut to fill methods	Sidehill ascent	Winter road above/Rt of Ph. 2 road
15.210	15.270	Hand clearing	Hand clearing	Unnamed stream crossing	Ice + snow crossing
15.270	15.670	Machine clearing	Optimal cut to fill methods	Sidehill ascent, rock prevalent	Winter road above/Rt of Ph. 2 road
15.670	15.730	Hand clearing	Hand clearing	Bogie creek crossing	Ice + snow crossing 200 m upstream above h-water
15.730	16.700	Machine clearing	Optimal cut to fill methods	Sidehill ascent, rock prevalent	Winter road above/Rt of Ph. 2 road
16.700	18.800	Machine clearing	Small cut to fills	Glacio fluvial plateau	Winter road above/Rt of Ph. 2 road
18.800	20.295	Machine clearing	Optimal cut to fill methods	Sidehill descent, rock prevalent	Winter road above/Rt of Ph. 2 road
20.295	20.355	Hand clearing	Hand clearing	Unnamed stream crossing	Ice + snow crossing
20.355	20.820	Machine clearing	Optimal cut to fill methods	Sidehill descent	Winter road above/Rt of Ph. 2 road
20.820	20.880	Hand clearing	Hand clearing	Unnamed stream crossing	Unnamed stream crossing
20.880	21.570	Machine clearing	Optimal cut to fill methods	Sidehill	Winter road above/Rt of Ph. 2 road
21.570	21.630	Hand clearing	Hand clearing	Unnamed stream crossing	Unnamed stream crossing
21.630	23.170	Machine clearing	Optimal cut to fill methods	Sidehill	Winter road above/Rt of Ph. 2 road
23.170	23.255	Hand clearing	Hand clearing	Hawkowl creek crossing	Ice + snow crossing 80 m upstream on ex drill road
23.255	23.950	Machine clearing	Optimal cut to fill methods	Sidehill	Winter road above/Rt of Ph. 2 road

Construction needs for the staging area will include:

- access road construction camp, engineering office
- temporary storage of materials, camp and equipment awaiting availability of access to the mine site
- storage of culverts and other associated road construction materials
- parking and maintenance of construction equipment
- fuel, parts and lubricant storage and distribution

Operational needs for the staging area include:

- chaining of trucks during the winter months
- fuel for maintenance equipment
- holding area for vehicles awaiting authorization to proceed onto the access road
- access control gate

5.3.5 Borrow Sources

Originally it was planned to utilize side-borrows for all roadway embankments rather than specific borrow sources. Subsequent geotechnical investigations by EBA however, have indicated ice rich permafrost in portions. This has resulted in the need to extract common excavation as well as granular surfacing material from designated sources in some areas.

Information used to develop the Borrow Source Plan was derived from EBA's geotechnical that was investigation completed in July and October (Appendices B and C). Of the nine possible borrow targets, it is planned to develop five during Phase 2, as summarized in Table 6 and shown in Appendix A:

Table 6 Phase 2 Designated Borrow Sources along the Road Alignment

Pit	Sta	O/S	Gross Area (Ha)	Net Area (Ha)	Avg Depth (m)	Common (m^3)	Granular Surfacing (m^3)	Concrete Aggregate (m^3)	Total (m^3)
P1	350	0	5.3	2.7	2	3,000	3,000	-	6,000
S3A	2700	70	1.6	0.8	2	9,000	3,000	-	12,000
S3B	2950	70	1.1	0.6	2	-	9,000	-	9,000
P2A	11200	60	1.0	0.5	2	-	8,000	-	8,000
P2B	11100	130	0.6	0.5	2	-	5,000	5,000	5,000
P4A	16700	-100	2.9	1.5	2	22,000	7,000	-	29,000
P4B	17450	110	3.0	1.5	2	23,000	7,000	-	30,000
P3	23600	-150	1.0	0.5	2	-	8,000	-	8,000
Totals			**16.5**	**8.5**	**2.0**	**57,000**	**50,000**	**5,000**	**107,000**

Only Pit P1 will be partially developed for Phase 1. Reclamation plans described in Section 5.3.9 include closure of the Phase 1 P1 Pit, in the event that Phase 2 is delayed.

Closure of the borrow sources will be developed according to acceptable construction practices, and to standards currently employed by the Yukon Government in its execution of highway construction contracts. Specifically:

- Prior to clearing, additional construction test pit information will be used to confirm the optimum depth of planned excavation. These depths will be used to confirm the extents of each source, with appropriate consideration to setbacks from streams and escarpments.
- Haul Roads are shown in Appendix A
- A *Borrow Source Development Plan* drawing will be provided by YES on a case-by-case basis. Once approved, the plan will be provided to the Contractor. This Development Plan will include instructions for the development stage: storage of overburden soils and organic stripping materials, stockpiling of granular screened or crushed product for construction and maintenance, designated area for setting up of plant, limits of clearing, any required drainage remedies, and buffer areas; and for the reclamation stage: sloping of borrow walls (2H:1V maximum steepness recommended), re-contouring of pit area and haul road, contouring of organic overburden over the surface area, and seeding.
- Limits of clearing for the borrow source and the haul road will be flagged in the field by YES.
- Clearing, disposal and salvage will be completed by the Contractor, according to standards provided in Government of Yukon *Sections 03010, 03011* (February 1997).
- Once cleared, the extents of the planned borrow excavation will be laid out in the field by YES, leaving the required overburden storage and buffer zones.
- Grubbing and stripping operations will be by way bulldozing materials to the perimeter of the cleared area, leaving adequate space to re-access the materials for reclamation.
- Excavation will be limited to the development area as shown on each specific Borrow Source Development Plan, and as laid out in the field by YES.
- Where granular deposits are underlain by colluvium, till or other materials suitable for common embankment, these materials will be used for roadway sub-grade construction purposes.
- “Oversize” boulders rejected by crushing or screening operations will be employed as rip rap where feasible, or stockpiled for future use as rock pile barricades at the entrances to the borrow source haul roads.

Once construction and maintenance requirements are met, the borrow source sites will be reclaimed as identified in each specific Borrow Source Development Plan.

5.3.6 Geochemical Evaluation

The geotechnical trail from the Robert Campbell Highway to the Wolverine mine property was assessed and sampled along significant road cuts, and significant lithology changes for geochemical testing. A thick organic cover over the first 9 km (from the Robert Campbell Highway) of the road route prevented any bedrock or overburden sampling in this area. The last 5.5 kms were also covered with thick organic layers and the bedrock and/or overburden were not sampled. Sampling was conducted as per the

protocol requirements developed by AMEC Earth & Environmental (Section 5.3.7) and lab results indicate that most of the results are acceptable due to their low sulphide sulphur contents. Additional interpretation will be provided in the forthcoming Phase 2 Road Report. A summary of the onsite inspections and sample locations are provided in Table 7 and shown in Appendix A.

Table 7 Summary of Geochemical Sampling along the Geotechnical Trail for Phase 1 Access Road Construction

Sample Number	UTM NAD 83 Zone 9		Description	Fizz Rating (1-10*)	Sulfide Content (%)	ARD Potential Estimate
	east	north				
WVR06-001	450590	6810680	Small cut on west side of road, poorly sorted, well rounded glacial-fluvial overburden	5	<1	nil
WVR06-002	450080	6810120	Small cut on west side of road, poorly sorted, well rounded glacial-fluvial overburden	0	<1	nil
WVR06-003	450110	6810120	Small cut on west side of road, poorly sorted, well rounded glacial-fluvial overburden	1	<1	nil
WVR06-004	447710	6808360	Small cut on west side of road, poorly sorted sub-rounded to sub-angular glacial overburden	1	<1	nil
WVR06-005	446850	6807650	Large outcrop on west side of road greenstone with abundant greenstone cobbles in creek bed	1	<1	nil
WVR06-006	447120	6807360	Large outcrop on east side of road well foliated greenstone	1	<1	nil
WVR06-007	447310	6807010	Large outcrop on west side of road near creek greenstone	1	<1	nil
WVR06-008	445870	6804660	Large outcrop on west side of road greenstone	1	<1	nil
WVR06-009	444780	6805240	Colluvium on west side of road consisting of cobbles and boulders of greenstone	1	<1	nil
JD10-06-10G	446610	6805630	borrow pit			
JD10-5-1G	449750	6810120	borrow pit			
JD10-4-2-G2	452960	6819010	borrow pit			

* Note: Fizz rating 1= no visible CO_2 production with the addition of 10% HCl; Fizz rating 10= abundant CO_2 production with the addition of 10% HCl.

EBA collected samples from 0 to 3.2 km for geotechnical purposes and upon further examination have submitted two geochemical samples for areas where the organic mat or permafrost did not limit sampling. A sub-sample of these geotechnical samples has been submitted to the lab, and details pertaining to these samples are as follows:

- Primary 1 Borrow Site is located along the west side of the access road between 0 and 1 km near the Robert Campbell Highway. Four test pits completed at the Primary 1 site intersected a blanket of gravelly sand. The proposed borrow area is on a glaciofluvial terrace about 11 ha in area.

- Secondary 3 Borrow Site is located at the confluence of two streams and is bisected by the road alignment between 2.7 and 3.0 km. Six test pits excavated in the area indicate that a blanket of glaciofluvial sand and gravel forms the two small ridges crossed by the road alignment in this area. North of the road alignment the ridges are well-drained and the granular sub-surface material is unfrozen. South of the road alignment, the terrain is flat to gentle and the soils are frozen. This area appears to be a source of good quality granular material, however the extent of the deposit is limited and development may be constrained by close proximity to streams and a perched aquifer near 2.8 km.

5.3.7 Geochemical Testing Protocol

Yukon Zinc Corporation (YZC) retained the services of AMEC Earth & Environmental to develop a protocol for environmental testing of construction materials and cut slopes along the access road from the Robert Campbell Highway to the Wolverine mine property. Construction materials used as borrow material along the road route may consist of unconsolidated sediments (soils, till, gravel, etc.) and bedrock. The protocols outlined below have and will be used for sampling and analysis along the access road to determine acid rock drainage and metal leaching (ARD/ML) potential. At sites of interest, the following actions will be carried out:

1. Visual inspection

   An inspection of the borrow source site or road cut will be completed by a qualified geoscientist or engineer. The inspection will be used to assess the areas for potential ARD/ML conditions. The visual inspection will include a geologic assessment of the following parameters:

   - rock type(s)
   - sulphide content
   - carbonate content
   - presence or absence of other ARD/ML indicators (iron-staining, etc.)

   The inspection will be focused on the potential for the site to produce ARD/ML if disturbed. This assessment will include a visual characterization of the mineralogy of the borrow material. Detailed descriptions of the type and amount of sulphide mineralization will include the size and shape of grains, any visible weathering, and a visual estimate of the proportion of sulphides to host rock. Careful attention will also be paid to features such as quartz and carbonate veins in the host rock, as well as the presence of iron staining and secondary precipitates that may have formed on the host rock during in situ weathering.

2. Sampling

   Following the completion of the visual inspection, the site will be sampled to provide sufficient material for environmental testing. Sampling will be conducted to collect a representative sample from each geologically distinct unit within the area. Samples will weigh a minimum of 2 kg. Depending upon their volume, large homogenous borrow sources may require multiple samples. After sampling, each sample will be bagged and carefully labelled with a unique identifier.

3. Analysis

   Samples will be submitted to a certified environmental laboratory for testing. This will include the following analyses: paste pH, total sulphur, sulphate sulphur, sulphide sulphur (by difference), neutralization potential and metals by aqua regia-ICP. Analytical methods will follow current industry standards and/or those described in the Draft BC ARD Guidelines (Guidelines) by Price (1997[5]).

4. Assessment Analysis

   The resulting field inspection and testing data will be assessed by a qualified geoscientist or engineer. The data will be assessed according to the guidelines and criteria described in the Guidelines. This will include an assessment of the neutralization potential, acid generation potential and metal leaching potential of the borrow sources. Additional testing or assessment may be required as a result of the initial assessment.

   Samples will be screened according to the following criteria as per the Draft BC ARD Guidelines:

   a. Net Potential Ratios (NPR, or NP/AP), where

NPR <1	Likely acid generating
NPR >1 and NPR<2	Potentially acid generating
NPR >2 and NPR<4	Not likely acid generating
NPR >4	Non-acid generating

   b. Sulphide sulphur content, where

S_S >0.3%	Potentially acid generating
S_S <0.3%	Non-acid generating

   c. Paste pH, where

pH<5.5	Potentially acid generating
pH>5.5	Non-acid generating

   d. Neutralization Potential, where

NP<10 kg $CaCO_3$/tonne	Potentially acid generating
NP>10 kg $CaCO_3$/tonne	Non-acid generating

   Materials with NP values below 10 kg $CaCO_3$/tonne should undergo additional testing consisting of the shake flask extraction test (as per the BC ARD Guidelines) to determine the presence of leachable acidity or metals.

   Materials that are likely or potentially acid generating, and/or with leachate chemistries in exceedance of the Guidelines, would be excluded from use as road or construction material. Alternatively, additional study could be conducted on these materials to establish their suitability, or to determine what mitigative steps would need to be taken to ensure the material's safe use.

5.3.8 Geotechnical Testing

Geotechnical Testing Protocols outlined in the June 2006 submission, were employed in two phases by EBA Engineering Consultants Ltd. Test results for both the roadway

[5] Price, W.A. (1997), DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia, British Columbia Ministry of Employment and Investment, Energy and Minerals Division, Smithers, BC, (April), 143p.

investigation (July 2006) and the granular source investigation (October 2006) are provided in Appendices B and C, respectively.

Field work was completed in July 2006 by Jack Dennett, P.Geo. and James Buyck of EBA. The report was completed and sealed by J. Richard Trimble, M.Eng, P.Eng., and Jack Dennett, P.Geo. in August 2006, and submitted to EMR for review. The granular and borrow investigation field work and the Draft Excerpts Report were completed by J. Dennett in October 2006. EBA provided significant findings only at this stage, highlighting suitable borrow sources, suitable granular and possible concrete aggregate sources, as well as soils summaries of the 0 to 3.25 km portion of the roadway alignment. Moisture (ice) content information was provided in critical sections.

The design adjustments and recommended construction methods resulting from these findings and recommendations are provided in Appendix A and in Table 5.

5.3.9 Phase 1 Road Closure Plan

In the event that the project does not proceed to the production phase, reclamation of the Phase 1 winter access road will be required. This will involve the removal of the culvert at 0.575 km and decommissioning of the roadbed and drainage structures. Details pertaining to closure of the Phase 2 access road will be provided in the forthcoming November report.

Culvert and Drainage Structure Removal

It is anticipated that one culvert will be installed and removed as part of Phase 1. This will be done at 0.575 km, and will also form an access barrier upon removal.

All culverts and drainage structures will be removed and disposed of off-site at a suitable location. The following activities are proposed:

- Trenches resulting from the removal of culverts will be swaled or contoured to match the surrounding terrain.
- Where warranted due to fine grain soils, erosion protection will be installed within the remaining swales.
- Ditch blocks will be removed where this is desirable, as there may be instances where cross drainage should be maintained (Appendix A).

Phase 1 Roadbed Decommissioning

The roadbed itself will be contoured and rounded throughout its length, and the following activities are proposed:

- Soils will be shaped to match the surrounding topography.
- All slopes will be flattened or rounded to better suit the surrounding terrain.
- Surfaces of gradients <25% will be scarified (using scarifiers on bulldozers, excavators and graders) to better accept seeding.

Permanent closure of the winter road access will be by way of removal of the culvert and fill material across the bog at 0.575 km, as well as an impassable obstruction at the Robert Campbell Highway.

Phase 1 Closure Costs

YZC proposes to provide security commensurate with outstanding environmental liability associated with the Phase 1 road reclamation and closure costs prior to the onset of activities (anticipated to be November), and subsequently for the Phase 2 all weather access road in spring 2007.

Based on the information provided by YES, YZC has prepared a cost breakdown for the Phase 1 road (Table 8). The cost breakdown is based on the same unit rates provided by a SteveJan Consultants Inc report dated September 20, 2006 (requested by EMR for Version 2006-01 report road closure cost estimate) with revised quantity estimates. The total cost for closure and reclamation of the all-weather access road was provided in report Version 2006-01, and revisions will be provided in the forthcoming November report.

Based on these previous calculations and estimates from YES on volumetric and plan area impact estimates of 5-10% and 20% of the all-weather access road, YZC proposes a cost estimate for the Phase 1 road equivalent to $165,665 (without contingencies factored in), or 25% of the all weather access road estimated cost ($562,000).

Table 8 Closure and Reclamation Cost Breakdown for Phase 1 Winter Access Road

Component	Description-Equipment/Labor	Units	Quantity	Unit Cost	Cost
Lowering road grade	Removing excess material to adjacent areas (including borrow sources) to make road stable against erosion-Cat D8 dozer	hrs	10	$185	$1,850
"	"–Cat 325 excavator	hrs	14	$190	$2,660
"	"–Volvo A35 articulating haul truck	hrs	28	$190	$5,320
Stabilize side slopes	Flatten minor roadside cut banks/fill slopes with small excavator-Cat 325 (includes return travel time for length of road)	hrs	40	$190	$7,600
Culverts – 600 mm dia. size	Work includes uncovering, removal to offsite for re-use, re-sloping banks, armoring wetted portion	Ea	1	$1,500	$1,500
Culvert Crossings-restoration work	Minor restoration work, installation of environmental protection measures	L.S.	1	$4,000	$4,000
Bunker Creek Bridge removal	Removal of 20 m temporary bridge, re-sloping of banks, riparian zone reclamation	L.S.	1	$10,000	$10,000
Scarifying lowered road surface	To encourage revegetation (25 km x 7.5 m)-Cat D8	ha	18.75	$2,000	$37,500
Reclaiming spoil piles	Restoration of spoil piles containing excess organics from road construction-Cat 325	km	25	$1,000	$25,000
Borrow sources-stabilize slopes	Stabilize the slopes of the excavations-Cat D8 dozer	hrs	10	$185	$1,850
Borrow sources-S&F flat areas	Using ATV mounted applicator for seed & fertilizer	ha	1.5	$1,500	$2,250
Borrow sources-hydroseed	Apply hydroseed to steeper slopes (>1V:4H slope)	ha	0.5	$3,000	$1,500
Corridor re-vegetate-broadcast S&F	Using ATV mounted applicator for seed & fertilizer incl staging area (25 km x 7.5 m & 4 ha incorporating natural revegetation of 50% of area)	ha	11.38	$1,500	$17,070
Maintenance S&F-after 1 year	Assume coverage of 50% with S&F, and other 50% with fertilizer alone	ha	11.38	$1,000	$11,380
Permanent barrier at highway access	Trenching and barricading using natural materials in the area, to dissuade casual access-Cat 315	L.S.	1	$2,000	$2,000
			Subtotal 1		**$131,480**
Engineering and Surveying (5%)	For major components, especially removal of bridge or stream crossings				$6,574
			Subtotal 2		**$138,054**
Contingency (20%)					$27,611
			Total		**$165,665**

6 Site Infrastructure Construction

6.1 Industrial Complex

The industrial complex area is an expansion of the existing laydown areas at the portal (Picture 1). The priority for construction of this area is to establish the concrete batch plant and pour key heavy foundations so that buildings can be erected as early as possible in 2007. The temporary batch plant location will be located at the southern end of the industrial complex area, down slope of the camp (Figure 4).

Picture 1 **The industrial complex location will encompass the existing working area, and will extend ~200 m to the southwest (left)**

YZC will pour foundations for the mill, assay lab, administration and truck shop buildings starting in June 2007 (based on the milestones provided in Figure 1). Prior to commencing foundation work, organic material will be stripped and stockpiled northeast of the portal, as shown on Figure 4. Once barren, the ground will be leveled and form work will be constructed as per the footprint indicated in Figure 4.

With the implementation of best practices described in Section 7, YZC will limit erosion and reduce sediment-laden runoff from disturbed areas during construction and operations. A surface runoff diversion ditch on the upslope side of the industrial complex area will be constructed to direct clean runoff around the site to Wolverine Creek. A site runoff collection ditch down slope of the industrial complex area will be constructed to collect runoff from the site, and settle or treat it as necessary in the collection pond, prior to discharging to the Go Creek watershed. There are several other ditches within the complex that will be constructed as required and they will drain to the runoff collection ditch (as shown on Figure 4). Ditches and diversions within the industrial complex area are provided in cross-sections A, B and C in Figure 5 (cross section locations indicated on Figure 4).

Laydown areas for construction supplies are located within the industrial complex in three locations as shown on Figure 4, along the road between the industrial complex and the airstrip, and at the airstrip.

6.1.1 Mill Building and Ancillary Facilities

The mill building site and associated process and ancillary facility locations were selected to take advantage of suitable ground conditions and to minimize the excavation requirements. Ore processing facilities are housed in a 130 m long by 40 m wide pre-engineered steel structure insulated building covered with metal cladding.

The primary crusher and connecting conveyors are located to the northeast end of the mill building close to the portal to minimize ore haul truck travel. Reagent storing, mixing and distributing will occur at the southeast end of the building. The secondary crusher and associated conveyors are also located the southeast end, and at the northwest side concentrates will be loaded into haul trucks within an enclosure with doors at both ends for dust control.

Additional modular buildings associated with the mill building include for the power plant to the west, fuel station and storage area to the northwest, administration building to the east and truckshop and assay lab to the west as shown in Figure 4. Power plant infrastructure will include diesel generators with total estimated power generation capacity of 10.5 MW with operating power requirements of approximately 7.5 MW.

The diesel storage and dispensing tanks will be erected within a lined containment area sized to contain 110% capacity of the tanks. Diesel consumption for the power plant, surface equipment, and underground equipment is estimated at 48,000 L/d, 1552 L/d, and 3450 L/d, respectively.

Fuel storage consists of the following fuel types and in order to maintain at least a two week supply at site, the storage capacities are:

- diesel storage of 720,000 L for power plant and surface equipment use
- diesel (low sulfer) storage of 85,000 L for underground mobile equipment
- gasoline storage of 5000 L for light duty vehicles

The underground mine requires separate openings to supply fresh air and to exhaust return air. Intake air will be heated in the winter using specialized propane fired equipment located on the surface adjacent to the intakes, as shown in Figure 4. Liquid propane will be stored under pressure in torpedo tanks near the heaters, and vaporized through conventional pressure relief equipment before use.

6.1.2 150 Person Camp

During the early part of the construction phase in 2007, the existing infrastructure at the Wolverine exploration camp will be used to house construction workers. A modular 150-person camp will be mobilized to site in early 2007 via the Phase 1 access road. The camp will be limited to 50 persons at any one time prior to the effective date of the A License.

The camp location is situated at the southern end of the industrial complex area. There are numerous benefits associated with this location such as the combining of service facilities (potable water pipelines, sewage treatment plant, power plant) as well as reducing the need for crew buses for shift changes.

Although some clearing and surface leveling will be required at the camp, permanent foundations will not be required. The camp facility will consist of customized modular units outfitted as bedrooms, bathrooms, laundry, kitchen, recreation facilities, etc.

6.1.3 General Site Services

Potable Water

Potable water will be sourced from Wolverine Lake for the exploration camp as per the current infrastructure and after the new camp is functional, potable water will be initially obtained from the existing surface sump location in the headwaters of Wolverine Creek, and subsequently from groundwater wells in an upper reach of the Go Creek watershed (Figure 2). Water use will be limited to 300 m^3 per day for all uses (potable water, drilling, water truck for dust control, etc) prior to the effective date of the A License.

Sewage

When the permanent camp is functional during the 2007 construction phase, sewage will be treated in a pre-packaged treatment plant. The modularized sewage treatment plant (STP) will be a stand-alone fully enclosed treatment plant with no requirement for tanks or ponds. The STP will be sized to treat wastes generated from the mill building, the administration building and the camp. Based on a 150 man camp capacity and effluent volumes of 225 L per day per person, the STP will be designed for treatment of approximately 33 m^3/d. All the components of the system will be factory assembled, inspected, tested and delivered to the site in major assemblies for final installation and commissioning on site.

The STP technology will utilize a fixed growth bacteria process whereby bacteria are grown on a media surface that is rotated into and out of the wastewater. The treated wastewater flows through separate zones each with a progressively higher standard of treatment. The media on which bacteria grow is an engineered plastic disks made from grid extruded medium density polyethylene material with UV light inhibitors. The grid pattern promotes oxygen transfer into the wastewater. The system digests sludge efficiently as a result of the process design. The sludge remains in the primary settling tank during normal operation and will be pumped out every six to nine months depending on the influent total suspended solids level. The system is not prone to upsets and can be operated with varying flows.

Grey and black water will be collected at camp in a surge tank and pumped to the STP. Treated water is not considered to be a waste as it is clean water and will be discharged to the Go Creek drainage. Prior to initial discharge, water analyses will be performed and will include a fish bioassay. When the mill and administration building are operational, water will be sent via sanitary sewer systems to a small in-ground concrete surge tank from where it will be pumped to the STP. The treated wastewater will be pumped to a holding pond and either recycled through the process plant or be discharged to the tailings facility via the tailings pipeline. Digested sludge from the facility will be disposed of in the tailings facility, or hauled offsite for disposal at an approved facility.

6.1.4 Explosive Storage

The powder and cap magazines will remain in the same locations established for the 2005 Advanced Exploration Program (Figure 3). No additional access points or clearing for buffer areas are required.

6.2 Mine Development

The pre-production period will occur from July 2007 (or earlier depending on project financing) to the end of September 2008 to prepare the mine for full operating status scheduled for the end of November 2008. During the pre-production period, an estimated 2203 m of lateral development plus 459 m of raise development is planned (Table 9). Additional activities include:

- continue mine rehabilitation by replacing the roadbed with segregated aggregate, shot-creting the main ramp walls, and encasing the existing steel sets in concrete
- install a door that seals near the top of the decline for ventilation control purposes
- establish access to seven active ore production faces on five mining horizons
- advance three in-stope footwall drifts and excavate two in-stope escape-ways
- provide additional development for ventilation distribution and emergency egress, including: intake, exhaust, and egress raising from surface
- install and commission several mining facilities and systems including power distribution, communications, ventilation, emergency egress, compressed air, water supply and de-watering
- install a paste-fill line into the mine

Figures 7 and 8 provide plan and longitudinal projection views for mine pre-production development. The test mine and operation ramp developments, fresh air raises (FAR) and return air raise (RAR) as well as stope drifts are also shown.

Table 9 Pre-Production Development Schedule

	2007					2008									Totals
Development (meters)	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**June**	**July**	**Aug**	**Sept**	
Ramp	57	55	55	38	97	42	52	53	91	58	32	44	84	10	768
Stope Access				10	10	60	0	30	20	58	78	61	15	40	382
Vent Drift			15	28	0	10	58	18			15	40	31	47	262
In Stope Drifting												150	225	362	737
Diamond Drill Drift													14	40	54
Total Development	***57***	***55***	***70***	***76***	***107***	***112***	***110***	***101***	***111***	***116***	***125***	***295***	***369***	***499***	***2,203***
Vent Raises								80	220						300
Main Escape Raises									85						85
In-scope Raises														74	74
Total Raising								***80***	***305***					***74***	***459***

CLAIM. BOUNDARY

LYNX ZONE

BARRIER PILLAR

WOLVERINE ZONE

439800 E
439900 E
440000 E
440100 E
440200 E
440300 E
6811400 N
6811300 N
6811200 N
6811100 N
6811000 N
6810900 N
6810800 N
439700 E
439600 E

S1100
S1120
S1140
S1160
S1180
S1200
S1220
S1240
S1260
S1280
S1300
S1320
S1090
S1110
S1130
S1150
S1170
S1190
S1210
S1230
S1250
S1270

1100 ESC
1120 ESC
1140 ESC
1160 ESC
1180 ESC
1200 ESC
1220 ESC
1240 ESC
1260 ESC
1280 ESC
1300 ESC
1320 ESC
1080 ESC
1110 ESC
1130 ESC
1150 ESC
1170 ESC
1190 ESC
1210 ESC
1230 ESC
1250 ESC
1270 ESC

1120 RAR
1140 FAR
1160 RAR
1180 FAR
1200 RAR
1220 FAR
1240 RAR
1260 FAR
1280 RAR
1300 FAR
1340 FAR

L1170 DD
L1260 DD
W1160 DD
W1240 DD

L1310
TEST STOPE

L1310 S4

W1310

1345 PORTAL
(EXISTING)

LEGEND:

- EXISTING DEVLOPMENT (TEST MINE)
- PREPRODUCTION DEVELOPMENT
- OPERATION DEVELOPMENT
- STOPE FOOTWALL DRIFTS

REV.	REVISION DESCRIPTION	DATE	BY	APP'D

Yukon Zinc CORPORATION

DESIGNED BY	RMO	
DWG. CHECK	AP	
DRAWN BY	RMO	OCT 30, 06
SCALE: 1:2000		
PROJECT NO. 1614		

WOLVERINE PROJECT

WOLVERINE MINE
PRE-PRODUCTION DEVELOPMENT PLAN

DRAWING NO. Figure 7

REV. A

439600 E 6811100 N | 439700 E 6811000 N | 439800 E 6810900 N | 439900 E 6810800 N | 439700 E 6810700 N

LYNX ZONE | BARRIER PILLAR | WOLVERINE ZONE

EL 1400 m

1300 FAR | 1280 RAR | 1340 FAR

1345 PORTAL (EXISTING)

1320 ESC | S1320

EL 1300 m | S1300 | 1300 ESC | L1310 TEST STOPE | S1310

1280 ESC | S1280

1260 FAR | 1270 ESC | S1270

1260 ESC | S1260 | 1250 ESC

1250 DD | 1240 RAR | S1250

1240 ESC | S1240 | 1240 DD

1220 FAR | 1230 ESC | S1230

1220 ESC | S1220 | 1210 ESC

S1200 | 1200 ESC | 1200 RAR | S1210

EL 1200 m | 1190 ESC | EL 1200 m

1180 ESC | 1180 FAR | S1190

S1180 | 1170 ESC

1170 DD | 1160 RAR | S1170

S1160 | 1160 ESC | 1160 DD

1140 FAR | 1150 ESC | S1150

S1140 | 1140 ESC

1130 ESC | S1130

S1120 | 1120 ESC | 1120 RAR

1110 ESC

1100 ESC | MAIN RAMP | S1110

S1100 | 1090 ESC

EL 1100 m | EL 1100 m

S1090

439600 E 6811100 N | 439700 E 6811000 N | 439800 E 6810900 N | 439900 E 6810800 N | 439700 E 6810700 N

LEGEND:

- EXISTING DEVLOPMENT (TEST MINE)
- PREPRODUCTION DEVELOPMENT
- OPERATION DEVELOPMENT
- STOPE FOOTWALL DRIFTS

REV.	REVISION DESCRIPTION	DATE	BY	APP'D

Yukon Zinc CORPORATION

DESIGNED BY	RMO	
DWG. CHECK	AP	
DRAWN BY	RMO	OCT 30. 06
SCALE:	1:2000	
PROJECT NO.	1614	

WOLVERINE PROJECT

WOLVERINE MINE
PRE-PRODUCTION LONGITUDINAL PROJECTION
LOOKING NORTH-EAST

DRAWING NO. Figure 8

REV. A

6.3 Tailings Facility Area

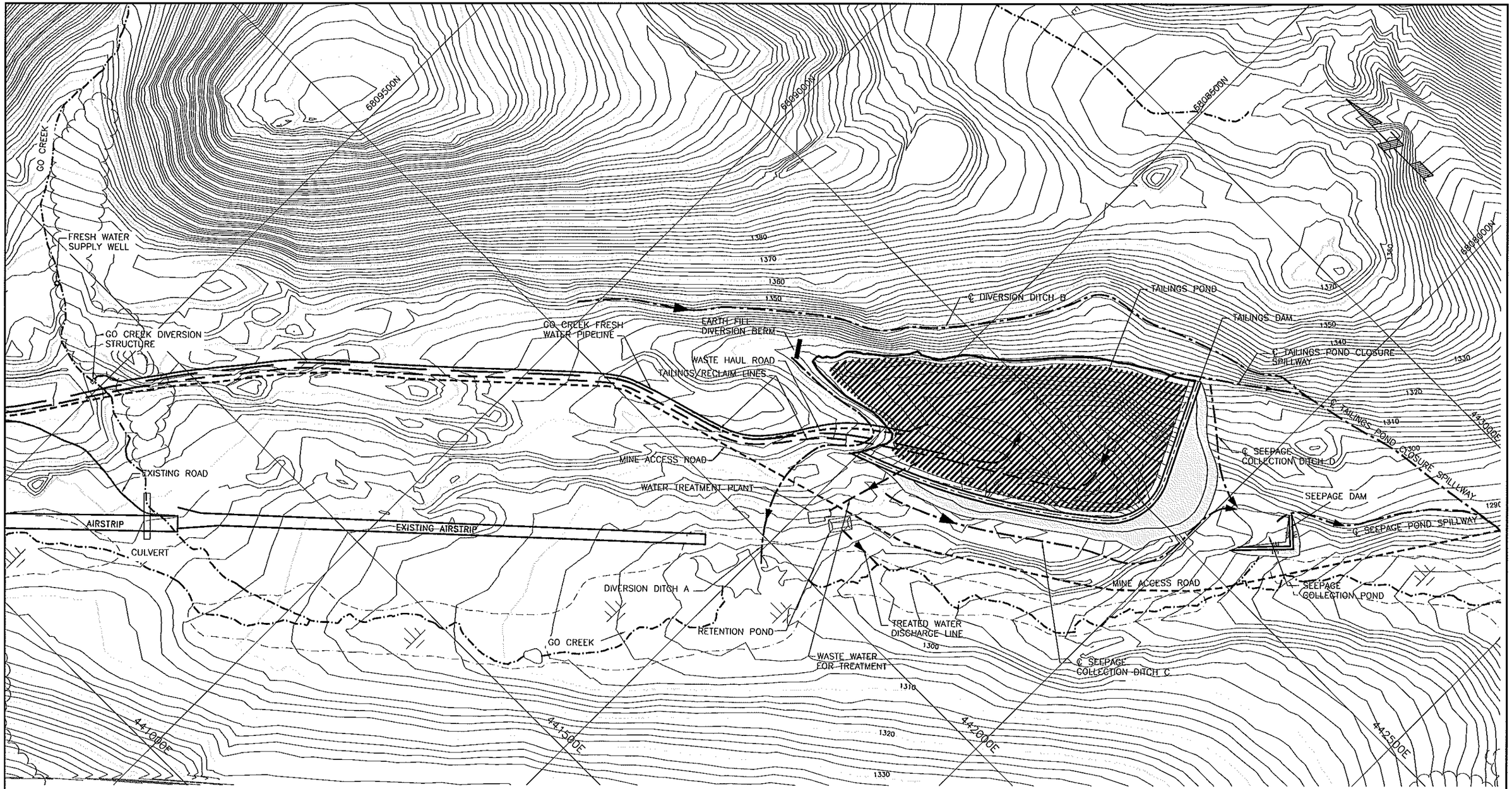
The tailings facility consists of the main dam, a seepage dam, a spillway, seepage collection and diversion ditches, reclaim pump barge and pipeline, and a water treatment plant and retention pond. The reclaim and tailings pipeline extend from the tailings facility to the industrial complex and are aligned upslope of the site road between the two areas (Figures 9 and 10). The water treatment plant is located northwest of the tailings pond (Figure 9).

YZC will construct diversion and collection ditches starting in spring 2007, and will strip and clear the footprint of the area and excavate material from within the footprint for borrow (see Section 6.4). Approximate channel dimensions, and typical diversion and seepage collection ditch plan and profile drawings are provided in Figures 9, 10 and 11. Figure 11 shows the typical profile diversion of Diversion Ditches A and B, including the location of erosion control measures such as grass lining, turf reinforcement mat and riprap

6.4 Borrow Areas

Borrow sources for construction materials required for the industrial complex and tailings dam will be excavated from the tailings facility footprint southeast of the airstrip as shown in Figure 3, and sources previously described in Section 5.3.5 along the access road. The total area of disturbance and volume of material at the tailings facility site are approximately 87,500 and 350,000 m^2, respectively.

Settling ponds will be constructed within the borrow areas to ensure adequate retention time for settling of any collected turbid water. Diversion ditches will be constructed upslope of the borrow areas to direct clean surface runoff to Go Creek, as shown on Figure 3. Appendix D provides the results of acid base accounting test work for four testpit locations within borrow area footprint (Figure 3). Granular material quantities required to manufacture the respective aggregate products are also summarized in Appendix D.



NOTE
1. NOT ALL CULVERTS HAVE BEEN SHOWN.

Figure 9

PRELIMINARY
NOV. 14/2006

NOT FOR CONSTRUCTION

0 250 m

DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE

ISSUE/REVISIONS

NO	DESCRIPTION	BY	DATE

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APP. BY:	RLO	MAY 8/06

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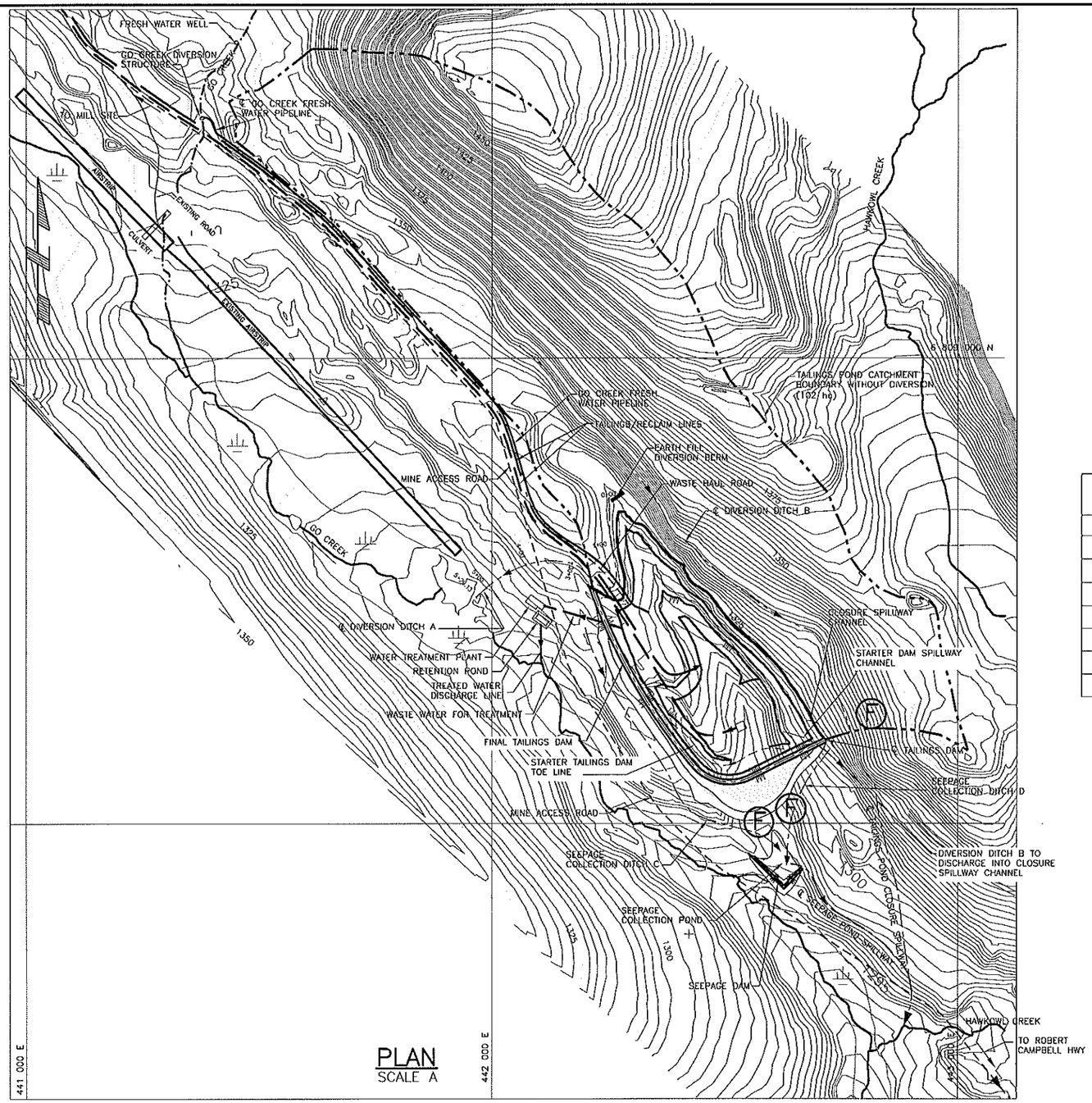
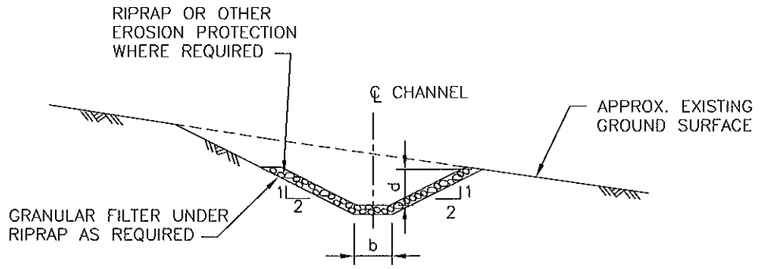
Yukon Zinc CORPORATION
WOLVERINE PROJECT
TAILINGS FACILITY
GENERAL ARRANGEMENT



PLAN
SCALE A



TYPICAL DIVERSION AND SEEPAGE COLLECTION DITCH CROSS–SECTION

(SEE TABLE 1)

TABLE 1 – APPROXIMATE CHANNEL DIMENSIONS

DESCRIPTION	MINIMUM WIDTH b (m)	MINIMUM DEPTH d (m)	INVERT ELEV. AT DAM (m)
DIVERSION DITCH B	1.0	1.3	–
SEEPAGE COLLECTION DITCH C	0.6	0.7	–
SEEPAGE COLLECTION DITCH D	0.6	0.6	–
GO CREEK DIVERSION DITCH (DITCH A)	0.6	0.6	–
STARTER DAM SPILLWAY	2.0	1.4	1308.0
TAILINGS POND CLOSURE SPILLWAY	3.0	1.7	1314.0
SEEPAGE DAM SPILLWAY	0.6	0.6	1286.0
FRESH WATER POND SPILLWAY	2.0	1.4	1345.0

LEGEND

Ⓕ APPROXIMATE LOCATION OF FLOW MEASURING STRUCTURE

NOTES

1. CHANNEL SIZES SHOWN IN TABLE 1 ARE FOR CHANNEL REACHES WITH SLOPES IN THE ORDER OF 0.5%. SMALLER CHANNELS MAY BE USED THROUGH STEEPER SECTIONS WHERE DEEMED APPROPRIATE.
2. MINIMUM DEPTH INCLUDES MINIMUM 0.3m FREEBOARD FOR DIVERSION AND SEEPAGE COLLECTION DITCHES, 0.3m FOR SEEPAGE COLLECTION POND SPILLWAY CHANNEL, AND 0.6m FOR TAILINGS POND AND FRESH WATER POND SPILLWAY CHANNELS.
3. FLOW MEASURING STRUCTURE MAY CONSIST OF A SHARP–CRESTED WEIR WITH A STAFF GAUGE, OR OTHER SUITABLE DEVICE.
4. NOT ALL CULVERTS HAVE BEEN SHOWN.

Figure 10

PRELIMINARY
NOV 14/2006

NOT FOR CONSTRUCTION

SCALE A 0 300m

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NO	DESCRIPTION	BY	DATE

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NO	DESCRIPTION	BY	DATE

ISSUE/REVISIONS

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APP. BY:	RLO	MAY 8/06

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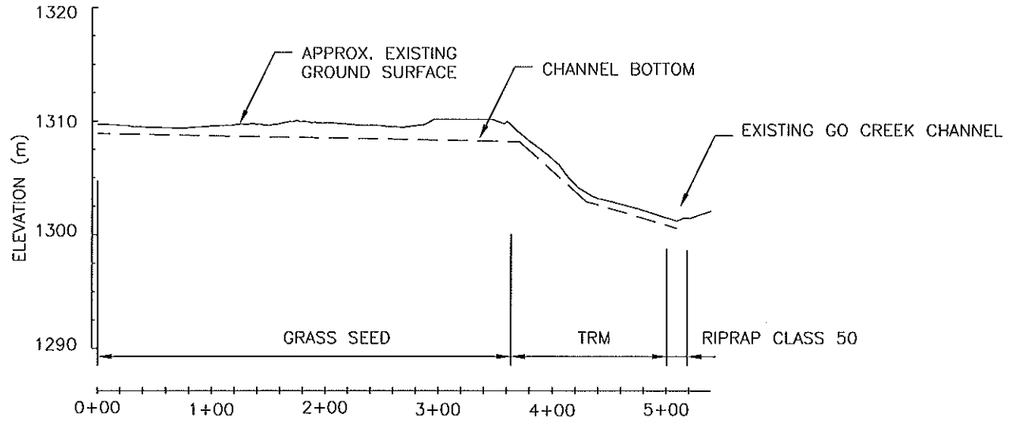
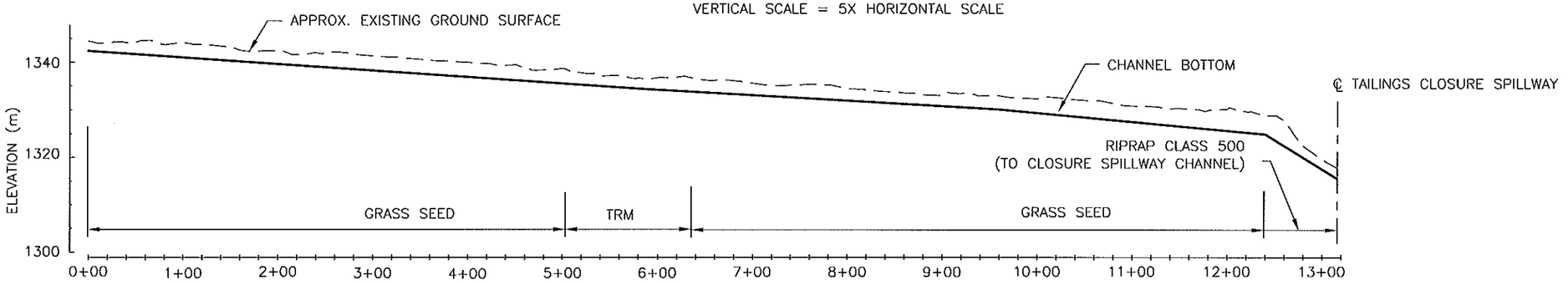
WOLVERINE PROJECT
TAILINGS FACILITY
DIVERSION DITCHES AND SPILLWAYS
PLAN AND TYPICAL SECTION



PROFILE DIVERSION DITCH A

SCALE A

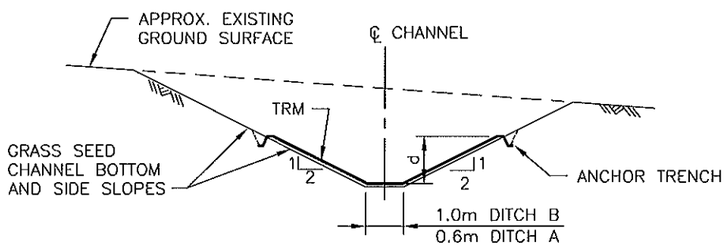
VERTICAL SCALE = 5X HORIZONTAL SCALE



PROFILE DIVERSION DITCH B

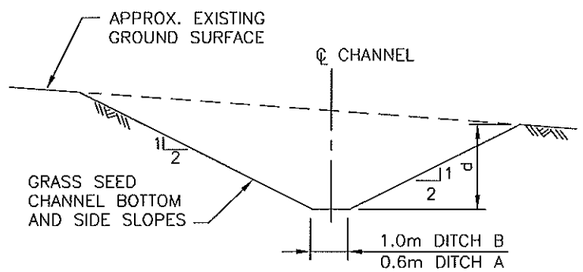
SCALE A

VERTICAL SCALE = 5X HORIZONTAL SCALE



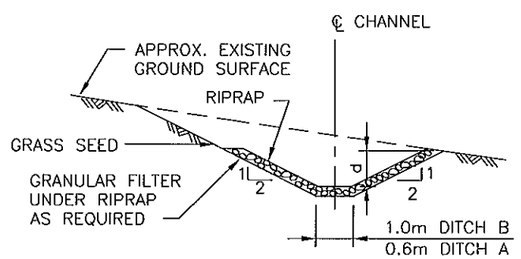
TYPICAL TRM LINED SECTION

NOT TO SCALE



TYPICAL GRASS LINED SECTION

NOT TO SCALE



TYPICAL RIPRAP LINED SECTION

NOT TO SCALE

LEGEND

TRM TURF REINFORCEMENT MAT (SEE NOTE 3)

NOTES

1. FOR LOCATION AND PLAN OF DIVERSION DITCHES SEE DRAWING J1-C-013.
2. FOR CHANNEL DEPTH "d" SEE DWG. J1-C-013.
3. TRM TO BE LAYFIELD TRM #450, OR APPROVED EQUAL.
4. FOR RIPRAP GRADATION SEE DWG. J1-C-015.

PRELIMINARY
OCT. 10, 2006

NOT FOR CONSTRUCTION

Figure 11

SCALE A 0 250 m

DWG. NO.	REFERENCE DRAWINGS

NO	DESCRIPTION	BY	DATE
	ISSUE/REVISIONS		

NO	DESCRIPTION	BY	DATE
	ISSUE/REVISIONS		

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Klohn Crippen Berger

Yukon Zinc CORPORATION

WOLVERINE PROJECT

TAILINGS FACILITY
DIVERSION DITCHES A AND B
PROFILES AND SECTIONS

7 Mitigation Measures for Construction Activities

To ensure construction activities have a minimal impact on the environment, best management practices will be followed. Examples of BMP procedures for sediment and erosion control that will be incorporated in project planning activities are summarized in the sub-sections that follow. While it is recognized that there are general environmental techniques and procedures to minimize environmental damage, site-specific conditions will usually require a solution unique for that location. All onsite activities that interact with the environment will be reviewed by the onsite Environmental Coordinator and Yukon government inspectors, as required. The main steps for review and approval of an activity are as follows:

- obtain information pertaining to the job activity
- determine environmental risk, assess risk and determine mitigation measures
- if required, contact government regulatory agencies and prepare regulatory applications

Mitigation measures including general sediment and erosion control techniques and monitoring plan requirements are provided below and specific plans will be developed upon completion of detailed design for the industrial complex, camp, access road, and tailings facility.

7.1 Sediment and Erosion Control Plan

The key to controlling erosion and sedimentation caused by work-related activities is to manage off and onsite runoff. In general, to minimize erosion and sedimentation, work-related activities will be managed to:

- minimize disturbance to vegetation and limit area of clearing
- minimize length of time that unstable erodible soils are exposed
- stabilize erodible soils as soon as practical by seeding or installing erosion control blankets
- ensure effective installation of sediment control measures (silt fences, sediment traps, etc.) before starting work

Effective ways to control erosion and trap sediment are summarized in Table 10. All sediment traps and barriers (i.e., silt fences, straw bales, etc.) will be inspected regularly while they are in place, and cleaned when required to maintain effectiveness. Sediment-laden or turbid runoff will be directed into vegetated areas and temporary fills or stockpiles will be covered with impermeable covers (e.g., plastic) during heavy rainfall.

Table 10 Description of Sediment and Erosion Techniques

Technique	Description	Application
Vegetation: preservation and replanting	Maintain vegetation, minimize grubbing and maintain root mat, reseed/ replant	On slopes, stream banks, floodplains to permit infiltration and minimize surface disturbance
Silt fences	Geotextile vertical barrier that causes sediment deposition	On slopes with erodible soils – surface applications only (not to be used instream [i.e., flowing water])
Straw bales	Barrier that causes sediment deposition	On slopes with erodible soils and in low surface or low flows only
Sediment traps or basins	Excavate minor depressions to allow sediment to settle	In areas where high volumes of sediment-laden water occurs; may be used with silt fencing or bales
Flumes/ spillways	A chute or pipe of non-erodible material to convey runoff down a slope	In areas with concentrated high velocity surface runoff
Check dams	Small dams to reduce the velocity of storm water flows in swales/ditches	In small open channels
Erosion control blankets	Natural fibre matting used to minimize surface erosion	In areas with surface runoff or channels
Plastic covers	Tarp to cover erosive soils	In non-vegetated areas where a temporary measure is required to control runoff until the site is stabilized

7.2 Monitoring Plan

The purpose of monitoring is to ensure that site activities have minimal adverse environmental effects. Monitoring activities and priorities vary between sites and construction works and will include inspections to ensure that:

- all equipment used for instream work is clean and is in good mechanical order with no fluid leaks
- all fuels and lubricants are stored and refueling and changing of oils/lubricants is conducted well away from any body of water
- spill containment and clean-up equipment are onsite at all times
- all water displaced from concrete forms during concrete pouring is discharged into a sump
- all stockpiles of material are kept above high watermarks
- all mitigation measures are functioning as designed

Environmental monitoring will ensure a high standard of environmental protection and compliance with all regulatory requirements. Details of monitoring programs will be specific to each work activity and specific plans will be developed in conjunction with the various contractors. A fulltime Construction Management and Inspection Team will monitor all construction activities throughout the construction schedule, including clearing operations.

During construction activities in 2007, a qualified Construction Manager or Project Engineer and an Environmental Monitor will be on site to:

- coordinate the activities of contractors and technical specialists
- ensure accurate layout and measurement of the work as well as quality control
- re-design as required to accommodate changes in conditions (i.e., soils conditions or grade-line corrections)
- ensure contractor compliance with all regulatory, permitting and contractual conditions
- prepare daily reports of all construction activities, including equipment employed, areas works, personnel involved, and possible mishaps, outcomes and remedies
- complete photographic journal of all activities and a weekly summary report
- monitor for safety infractions and near misses, and document outcomes and corrective actions

7.3 Wildlife Resource and Heritage Protection Plan

7.3.1 Wildlife Protection

The project area lies at the outer edges of the range of the Finlayson Caribou herd. Moose abound, as do small furbearers, in the project area. Grizzly bears and to a lesser degree Thinhorn sheep are occasionally seen in the project area.

The project results in disturbance of a relatively small area within a region that is rich in wildlife habitat and very little existing disturbance, apart from the Robert Campbell Highway. Using conservative assumptions about the size of the project disturbance footprint, effects on habitat availability for all valued species are expected to be low and barrier effects to wildlife movement are also predicted to be low. The project is on the perimeter of the Finlayson Caribou Herd Range. Concentrate haul south to Watson Lake will avoid potential effects on intensely utilized caribou range to the north. The relatively narrow right-of-way for the access road and low level of traffic will allow wildlife to cross with little impediment. Accordingly effects on wildlife movement patterns are expected to not be significant.

Potential wildlife mortality due to wildlife collisions and hunting on the access road is a concern. Mitigation measures to manage hunting/collision mortality include:

- Access to the mine road will be restricted by a locked gated during the construction, operations, and decommissioning and closure phases of the project.
- Firearms will not be permitted.
- Hunting and fishing will be prohibited at all times on or in the vicinity of the project site. This restriction will apply to all mine employees, managers and contractors and it will be in effect throughout the life of the project from construction through to closure and reclamation. This hunting and fishing prohibition has been in place successfully during the latter part of the exploration phase of the project.
- Fuel haul and concentrate haul volumes are estimated at 13 round trips per day on the mine access road during operations. Incidental traffic will be kept minimal with air

access to the mine predominating for personnel. No private vehicles (including ATVs, snowmobiles, motorized boats or other types of off-road vehicles) will be permitted.

- The maximum speed limit on all access and site roads will be set at 60 km/hr.
- Any observed wildlife corridors will be signed to alert drivers to potential wildlife crossings.

Any mortality on the access road will be recorded and reported and any modifications to the mitigation measures will be considered in consultation with YTG, as required.

Wildlife Attractants

Food wastes are the typical wildlife attractant that is implicated in the development of problem wildlife, especially with respect to problem bears. There are, however, other wildlife attractants that may create problems: chemicals (e.g., road salt), wildlife carcasses (e.g., road kills), and roadside vegetation (e.g., clover). Policy and practice directed at minimizing wildlife concerns related to attractants are presented in Table 11.

Management related to the control of wildlife attractants are intended to minimize and even eliminate the development of problem wildlife. However, in the event a problem wildlife situation arises, the Environmental Coordinator, Mine Manager or designate(s) will initiate the appropriate response actions. Any direct intervention with respect to problem wildlife will be conducted by authorized personnel in consultation with, and as approved and/or directed by Environment Yukon officials.

Bear management practices for this project will have two closely linked components: a Bear Aware program and Bear Safety training. The goal is to reduce human-bear interactions and to reduce and even eliminate black bear and grizzly bear mortalities associated with the project (Table 11). The components will be presented to employees and consultants together unless specialized training in bear safety is required for field survey crews and personnel designated for problem bear responses. In those cases, a professional will provide the appropriate bear safety training course. Note that any direct intervention with respect to problem bears will be conducted in consultation with, and as approved and/or directed by government officials.

Table 11 Mitigation Practices for Issues of Problem Wildlife

Preventing Problem Wildlife	1. Littering is prohibited on and in the vicinity of the project site and along access roads. All garbage (e.g., lunch bags) must be returned to temporary storage containers. Note that this includes organic wastes (e.g., orange peels, apple cores). 2. Food wastes will be disposed of as per the Waste Management Plan. 3. Wastes associated with mechanical maintenance and repairs (e.g., motor oil) will be disposed of as per the Waste Management Plan. 4. All temporary (small) storage containers (e.g., garbage cans) for garbage and recycling will be located indoors in bear-proof buildings. 5. The area around disposal stations will be kept free of garbage and spills will be cleaned up appropriately. 6. Crews working in the field may carry commercially available personal deterrent devices (i.e., bear spray, bear 'bangers') but will require an orientation on the use of these devices. General restrictions on the use and transport of these devices must be followed. 7. Employees are not permitted to have firearms on or in the vicinity of the Project site. 8. Feeding wildlife is prohibited at all times on or in the vicinity of the project site. 9. Report wildlife incidents related to garbage or human food attractants to Environmental Coordinator, Mine Manager or designate(s) as soon as possible. 10. Report improperly disposed of garbage, particularly food wastes, to Environmental Coordinator, Mine Manager or designate(s) as soon as possible. 11. Be 'Bear Aware'. All Project workers will receive a Bear Aware Program orientation. Report all bear observations from in and around the Project site and along access roads.
Dealing with Problem Wildlife	1. Immediately notify the Environmental Coordinator, Mine Manager or designate(s) of any problem wildlife issue. Note that reporting wildlife incidents as they occur will ensure that the proactive rather than reactive measures can be taken to prevent a serious outcome (e.g., human injury, destruction of the problem animal). 2. The Environmental Coordinator, Mine Manager or designate(s) will initiate the appropriate actions in response to a problem wildlife issue. 3. Only authorized personnel are permitted to use non-lethal (e.g., rubber bullets) and lethal problem wildlife interventions. 4. Do not attempt to deal with a problem wildlife issue on your own. Problem wildlife can be dangerous. 5. Conform to recommendations regarding bear safety.

Wildlife and Vehicles

Management procedures and policies are intended to reduce the incidence of wildlife-vehicle collisions and near misses. Table 12 presents management practices for traffic and wildlife/vehicle incidences.

Table 12 Mitigation Practices for Issues of Wildlife and Vehicles

Vehicles and Wildlife	1. Wildlife has the right-of-way on all roads, except where it is judged to be unsafe to do so. 2. Maximum speed limit on all access roads is 60 km/h. 3. Incorporate traffic signs for sensitive wildlife areas. 4. Verbally report ungulate and other large animal carcasses observed on and in the vicinity of the Project site, and along access roads to the Environmental Coordinator, Mine Manager or designate(s) as soon as possible. 5. Conform to road snow clearing requirements, such as exit corridors in areas of high snow, as per the discretion of the Environmental Coordinator, YG Conservation Officer and/or Regional Biologist. 6. Project-related traffic (including ATVs and snowmobiles) is restricted to designated access roads and trails (with certain exceptions). 7. A vehicle collision that results in the death or injury of an ungulate or other large animal must be reported as soon as possible. 8. A near miss between a vehicle and an ungulate or other large animal must be reported as a wildlife 'incident'.

Habitat Management and Wildlife Harassment

Wildlife species are known to be subject to stress in association with human-caused disturbances. Human-caused disturbances that could have potentially adverse effects on wildlife include off-road vehicles, humans on foot, research activities, wildlife viewing, and aircraft overflights.

Management will be directed at minimizing potential project-related effects on wildlife habitat that may either occur directly (habitat loss, nest destruction) or indirectly (habitat avoidance due to sensory disturbance, disruption of daily movements).

The restrictions presented in Table 13 will be essential in the minimizing harassment and effects of wildlife habitat.

Table 13 Mitigation Practices for Issues of Wildlife Habitat and Harassment

Wildlife Habitat	1. Conform to General Restrictions for Wildlife Protection. 2. Conform to restrictions and seasonal restrictions on vegetation clearing as per the direction of the Environmental Coordinator, Mine Manager or designate(s). 3. Vegetated buffers will be maintained adjacent to facilities and access roads. 4. Conform to road snow clearing requirements at the discretion of the Environmental Coordinator. 5. Seeding along road corridors cannot be conducted without approval of the Environmental Coordinator, Mine Manager or designate(s), and will follow seed mix recommendation outlined in the Reclamation Plan. 6. Report wildlife observations from the project site and along access roads.
Wildlife Harassment	1. Any harassment of wildlife will be prohibited on site and by all mine staff, guests and contractors. 2. Adopt and follow the Yukon guidelines for dealing with aerial impacts from helicopters and fixed-wing flights. Aircraft will, to the extent possible, avoid airspace over and in proximity to the Wolverine, Little Wolverine, Little Jimmy and Frances Lakes. 3. All staff, pilots, guests and contractors will receive orientation and training with respect to wildlife harassment policies.

Wildlife Health

Management policy and practices are intended to reduce potential project-related effects on wildlife health. For example, company procedures on the safe and prompt clean up of any chemical spills will be followed, with the recognition that special considerations for wildlife may be necessary in some cases. Table 14 provides mitigation practices for issues pertaining to wildlife health.

Table 14 Mitigation Practices for Issues of Wildlife Health

Wildlife Health	1. Feeding wildlife is prohibited at all times on or in the vicinity of the project site, including during travel to and from the site. 2. Follow company procedures on the safe and prompt clean up of any spills will be followed. 3. Engineering requirements for all ditches and engineered embankments/dams/settling ponds as per the direction of the Environmental Coordinator, Mine Manager or designate(s) will be adhered to. 4. Herbicides will not be used in vegetation management activities. Instead, manual clearing will be conducted when and where required, in adherence to the migratory bird vegetation clearing windows. 5. Report any observations of wildlife in and around potential sources of contaminants (e.g., settling ponds, fuelling sites). 6. Temporary fencing in areas to prevent wildlife access.

Wildlife Reporting

A wildlife records program that includes wildlife observations, location of wildlife features (e.g., active nests or dens), traffic incidents, and wildlife incidents (e.g., aggressive encounters) will be implemented. This information will be regularly reviewed to identify issues of concern (e.g., road segments with a high incidence of roadkills, active dens, etc.). If an issue of concern is identified, a strategy to address the concern will be developed in consultation with the appropriate agencies. The wildlife records program is an important tool in monitoring the effectiveness of the wildlife protection plan recommendations. Two different wildlife records will be recognized:

- Wildlife observations: Observation of sign (e.g., tracks, scat, nests, burrows, etc.) or observations of the animals themselves, behaving in a 'normal' way. Wildlife observations provide information on wildlife habitat use and behavior patterns in relation to the project. Project workers and contractors will be encouraged to record wildlife observations (including notes on habitat use).
- Wildlife incidents: Reports of close or aggressive encounters, unusual behavior in and around site facilities, traffic accidents or near misses, and observations of dead or injured animals. Project workers and contractors will be required to verbally notify the Environmental Coordinator, Mine Manager or designate(s) of wildlife incidents as soon as possible.

While the distinction between wildlife observations and wildlife incidents will be communicated to employees and consultants, there is the potential for overlap, especially regarding observations of certain wildlife (i.e., bears) in the immediate vicinity of project facilities. Thus, all wildlife observation reports should be reviewed for evidence of a potential problem (e.g., habituation).

A written log of wildlife observations and incidents for the mine property and access road will be maintained for the life of the mine (until there are no longer employees on site). The log will include time and date, species, location of observation and other relevant information such as mortality of wildlife and birds. A review of the log will occur periodically with the YTG Regional Biologist for the area. Wildlife collisions and mortalities will be reported immediately to the local Environment Yukon conservation office.

Wildlife observations, monitoring programs, and incidents may require additional mitigation as determined in consultation with the Yukon Environment officials, the Ross River Dena Council, and local stakeholders.

7.3.2 Heritage Resource Protection

There are no heritage resources sites at the project site or along the access road; however, given the proximity of the project to Wolverine Lake, there is the potential for off site activities to disturb heritage sites in the area. The following five points outline Yukon Zinc Corporation's general First Nations heritage protection measures:

1. A heritage awareness program will be included in environmental awareness training to promote the nature and value of heritage resources, clearly express the importance of these sites to the Aboriginal peoples, and orientate personnel to YZC's policy of site identification, protection and mitigation for the benefit of the public.
2. Identified sites in the area will be protected and monitored during project activities.
3. Heritage resource awareness training will be provided in the basic orientation for all workers and contractors.
4. In the event that a heritage site is encountered during construction, work will cease until the site is assessed by a qualified archaeologist and/or a Ross River Dena Council representative. A protection plan may be required, and once developed it will be approved by the regulatory authority.
5. Workers will be required to report the discovery of archaeological sites, or the vandalism of such sites to the Environmental Coordinator, Kaska Environmental Technician, or Mine Manager.

To the extent possible, traditional trails and traplines will not be disturbed or blocked by project activities. Where a disturbance is unavoidable, YZC will reroute the trail, and reclamation of any disturbance will be undertaken as soon as practicable.

8 Waste Management

8.1 Solid Waste

Non-hazardous solid waste will be segregated into the two streams - putrescible and non-putrescible wastes. Regular pick-up times and designated areas will be established for all burnable materials such as kitchen waste, paper, cardboard, and untreated/ unpreserved wood waste. As per the Yukon *Environment Act*, a Commercial Dump Permit under the *Solid Waste Regulations* for the operation of the landfill and an Air Emissions Permit under the *Air Emissions Regulations* for incineration are required.

8.1.1 Putrescible Wastes

Organic food wastes from the kitchen facilities will be segregated, collected in closed bear-proof bins and incinerated daily to minimize wildlife attraction.

8.1.2 Non-Putrescible Waste

Burnable non-organic wastes will be incinerated. Non-burnable materials (such as cans, bottles, etc), used rubber products, scrap metal, and plastic packaging will be collected in designated recycling bins and removed from site periodically.

Non-hazardous solid wastes that cannot be recycled will be buried in a landfill. The landfill will be established early in the construction phase and will remain in use for the life of the mine. Material will be periodically buried under a layer of soil to prevent the loss of garbage through wind action.

The landfill will be designed to accommodate the waste volume generated over the life of the mine and in a manner that will facilitate landfill closure. Surface water runoff will be diverted around the facility.

A sign at the entrance to the site will list conditions for use, emergency contacts and procedures, and items that may not be disposed of within the facility such as: hazardous wastes, acids, corrosives, solvents, oily wastes, explosives, or unsterilized medical waste. YZC will ensure that the site is managed in such a way as to prevent wildlife from being attracted to the facility.

8.1.3 Used Tires

Used tires will be collected and those not used on site during the construction and operation phase to provide vehicle protection barriers will be hauled off site and disposed of in accordance with the Yukon Used Tire Management Program. The Municipality of Watson Lake has a landfill facility that currently accepts used tires at no cost.

To minimize the potential fire hazard created by tire stockpiles, the rules provided by the 2005 National Fire Code of Canada will be followed.

8.2 Special Waste

Special or hazardous wastes are dangerous goods that are no longer used for their original purpose as defined in the federal *Transportation of Dangerous Goods Act and Regulations*. Special waste is regulated by the *Special Waste Regulations* under the

Yukon *Environment Act*, and a Special Waste Permit is required to generate, handle or dispose of a special waste. Special wastes generated, handled and stored during construction activities will likely include used anti-freeze, used batteries, leftover solvents, cleaners, paints, and petroleum products. Details pertaining to the source and management of these substances are provided below.

Hazardous waste will be segregated at the point of generation, placed into appropriate storage containers and then shipped off site to an acceptable disposal or recycling facility in either Whitehorse or Watson Lake. When convenient, YZC will also participate in Environment Yukon's annual commercial special waste collection.

Two facilities in Whitehorse that are permitted to collect and dispose of hazardous wastes such as used oil, waste oil filters, used batteries, antifreeze, waste solvents and lubricants are as follows:

- Sun Set Septic - current trucking costs are $1.60/km and $105/hr while onsite.
- Corvus Industries - current trucking costs are $125/hr and 205L drums are supplied at $80 ea.

Watson Lake is revising its Solid Waste Management Plan and is looking to build local businesses and facilities that have the capacity to support future industrial sites for all types of non-hazardous and hazardous wastes.

All wastes will be handled, stored and disposed of according to the appropriate regulations under the Yukon *Environment Act*, *Contaminated Site Regulation, Special Waste Regulation, Solid Waste Regulation*, and *Storage Tank Regulation*. In addition, unused or damaged explosives will be disposed of in a manner that complies with the *Explosive Act* (Canada).

The following general storage procedures will be followed to prevent special waste from endangering public health and the environment:

- Liquid special wastes will be stored in a tank if the volume is more than 205 L or in containers for smaller amounts. For transportation, flammable and combustible liquids will be stored in containers or tanks that meet the requirements of the federal Transportation of Dangerous Goods Regulations.
- When storing waste in tanks and containers, the National Fire Code guidelines will be followed with regards to distance from buildings and property lines, distance between tanks, dikes and drainage, and emergency access.
- Storage tanks with a capacity of more than 4000 L, or more than twenty-four 45-gallon drums stored in one group will have secondary containment. Tanks will have a clay or plastic liner or a curbed concrete pad surrounding the container, and a spill containment device attached to the intake valve. When containing 45-gallon drums, a drip pan or similar container or two containers (with one placed inside the other) will be used.
- Records of the wastes being stored, including type, volume, origin and storage location will be kept and will be readily accessible to assist response teams if a spill or fire occurs. Copies of waste manifests will be submitted to the Environmental Programs Branch.
- Containers stored outside will be covered to protect them from the weather. Containers will be stored in piles, with 1.5 m between the piles.

- Containers will be closed, except when waste is added or removed.
- The volume of waste will not exceed the limits set out in the National Fire Code for flammable and combustible liquids.
- If wastes with different flash points are stored together, the storage requirements for the liquid with the lowest flash point will be used.
- Containers will be labeled with the waste's identity, PIN no., class, and packing group as per the requirements of the Special Waste Permit, and in accordance with the federal *Transportation of Dangerous Goods Regulations.*
- Wastes will not be mixed or diluted with other wastes or water, as mixed products often cannot be recycled.

In the event of a temporary closure, all unused chemicals or reagents, with the exception of those required for water treatment plant and other incidental uses, that are deemed to have short shelf life will be returned to suppliers/manufacturers. Those chemicals that cannot be returned will be disposed of in a proper manner as per manufacture instructions. Fuel supplies for equipment will remain on site and diesel fuel tanks will remain in service during a temporary closure. YZC will comply with the requirements under the *Yukon Environment Act* pertaining to storage and handling of petroleum products.

8.2.1 Used Oil

The major sources of waste oil will be from mobile equipment and power plant generators. The most common types of used oil are crank case oil, gear oil, transmission fluid, and hydraulic oil. Under the Special Waste Regulations, a special waste permit is required if more than 20 L of used oil is generated per month or stored. For tanks with capacities greater than 4000 L, a permit will be required under the *Storage Tank Regulations.*

Used oil will be collected in designated waste oil tanks located in the mobile equipment maintenance area and near the diesel gensets. The oil will be periodically shipped off site by authorized carriers and taken to permitted facilities for shipping, treatment or recycling.

8.2.2 Waste Oil Filters

Before disposing of waste oil filters, as much oil as possible will be eliminated from them. Steps required to ensure proper disposal include puncturing the top of the filter, setting the filter in a tray and allowing the oil to drain for approximately 24 hours, and crushing the filter to increase waste oil recovery.

Once the oil is drained, the filter will be disposed of by recycling through a company interested in the filter's metal value, or through a disposal operator, or at a landfill site.

8.2.3 Used Batteries

Waste vehicle batteries will be collected for regular shipment to a licensed recycle or disposal facility. A Special Waste Permit is required for handling more than 5 kg of lead-acid batteries per month.

The steps outlined below for storing batteries will be followed to help prevent acid leaks and spills and to avoid contamination of the storage site:

- Batteries will be placed on wooden pallets in secondary containment (i.e., on a liner or berm) to prevent the escape of acid.
- Before putting waste batteries on the pallet, plastic sheeting will be placed on it to completely enclose all of the batteries in a continuous sheet of plastic. All sides will be wrapped to protect the batteries from the weather and to prevent any acid from being discharged into the environment.
- Batteries will not be stacked more than three layers thick and each layer will be separated with a sheet of plywood or other suitable material.

8.2.4 Antifreeze

A permit under the Special Waste Regulations is required if more than 5 L of waste antifreeze is generated within a 30 day period. Used antifreeze will be stored in good quality containers that are leak-free and have tight closures to prevent spills, then shipped to a licensed recycle or disposal facility.

8.2.5 Waste Solvents and Lubricants

Miscellaneous, small quantities of waste solvents and lubricants will be generated through routine maintenance and repair of equipment. Solvents are liquid substances that can dissolve other substances and can be recycled. Paint thinners and strippers, varsols, degreasing fluids, mineral spirits and petroleum distillates are common solvents. Most of these liquids are flammable and toxic. A Special Waste Permit must be obtained from the Environmental Programs Branch if more than 5 L of solvents per month, or more than 5 kg of solvent sludge per month is handled or stored.

Solvents and lubricants will be collected and stored in appropriate drums for regular shipment to a licensed recycle or disposal facility. Containers will be covered to protect them from precipitation and will be kept apart from other waste products. When transporting solvents, the container will be labeled according to the *Transportation of Dangerous Goods Act*.

8.2.6 Contaminated Sites

For wastes contaminated with petroleum hydrocarbons (with <3% hydrocarbon content), such as in the event of a spill, bioremediation will be used. A Land Treatment Facility permitted under the *Contaminated Sites Regulations* (#24-022) is located near the airstrip, and any additional contaminated soil generated and treated during the life of the project will require an amendment to this permit. Remediated soils will be sampled to determine when hydrocarbon contamination has been reduced to acceptable standards, and subsequently stockpiled for use in reclamation projects. Water collected in the land farm will run through an oil-water separator and the water will subsequently be discharged into the tailings facility and the sludge will be disposed of according to *Special Waste Regulations*.

8.2.7 Medical Wastes

A small amount of hazardous waste (such as syringes, bandages etc.) will be generated at the first aid room. This waste will be collected in designated purpose-built containers and disposed of appropriately at an offsite facility.

9 Monitoring and Surveillance

The following sections provide details pertaining to the monitoring and reporting with respect to ground and surface water quality, and water quantity.

9.1 Groundwater Monitoring

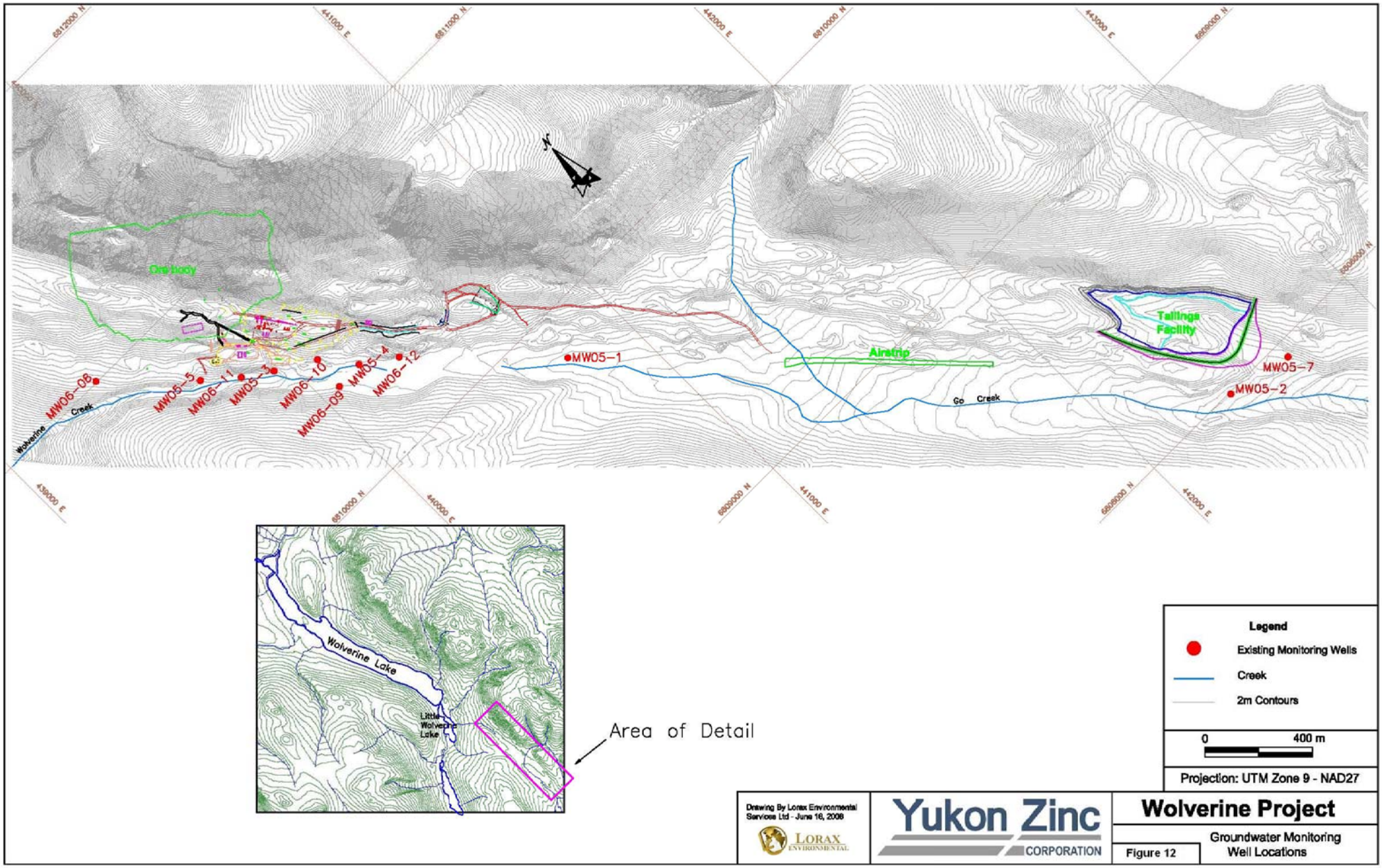
Monitoring of groundwater conditions around the Wolverine Mine facilities will focus on groundwater conditions in the upper Wolverine Creek and Go Creek basins. More specifically, monitoring of groundwater will occur in those areas downgradient of the underground and process plant operations, immediately adjacent to Wolverine Creek, as well as downgradient of the tailings facility in the upper reaches of Go Creek. Monitoring will consist of physical (e.g., piezometric water levels) and water quality determinations at all locations.

9.1.1 Wolverine Creek Basin

Groundwater monitoring wells adjacent to Wolverine Creek and downgradient of the proposed underground operations have been established and are currently being monitored as part of the continuing baseline groundwater characterization program. Well locations are depicted in Figure 12. The objectives of the groundwater monitoring program for the underground and process plant areas within the upper Wolverine Creek basin are as follows:

- provide information to delineate the direction of groundwater flow;
- provide information to estimate the velocity and quantitative rate of groundwater flow;
- monitor and delineate potential effects of mine dewatering on Wolverine Creek; and
- provide sampling locations to continue to document baseline groundwater quality prior to operations and to monitor for any impacts to groundwater quality that result from mining or mining related activities during operations and at closure.

A total of sixteen groundwater monitoring wells have been installed at eight nested locations in the Wolverine Creek basin, as illustrated in Figure 12.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MW06-08
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MW06-11
MW05-3
MW06-10
MW06-09
MW05-4
MW06-12
MW05-1
Airstrip
Tailings Facility
MW05-7
MW05-2
Wolverine Creek
Go Creek
439000 E
6810000 N
440000 E
6809000 N
441000 E
6808000 N
442000 E
Wolverine Lake
Little Wolverine Lake
Area of Detail
Legend
Existing Monitoring Wells
Creek
2m Contours
0
400 m
Projection: UTM Zone 9 - NAD27
Drawing By Lorax Environmental Services Ltd - June 16, 2008
LORAX ENVIRONMENTAL
Yukon Zinc CORPORATION
Wolverine Project
Figure 12
Groundwater Monitoring Well Locations

Table 15 summarizes the well identification and depth of completion for each monitoring well in the upper Wolverine Creek basin.

Table 15 Wolverine Creek Basin Groundwater Monitoring Wells

Well	Depth (m)	Stratigraphic Unit
MW05-3A	19.98	Shallow bedrock
MW05-3B	4.52	Alluvial Overburden
MW05-4A	17.56	Shallow bedrock
MW05-4B	3.89	Alluvial Overburden
MW05-5A	26.50	Shallow bedrock
MW05-5B	4.39	Alluvial Overburden
MW06-08S	21.92	Shallow bedrock
MW06-08M	82.81	Bedrock
MW06-08D	184.71	Deep Bedrock
MW06-09S	21.30	Shallow bedrock
MW06-09M	80.38	Bedrock
MW06-10S	21.33	Shallow bedrock
MW06-10M	104.30	Bedrock
MW06-10D	185.00	Deep Bedrock
MW06-11S	21.30	Shallow bedrock
MW06-12S	21.65	Shallow bedrock

As illustrated, the wells have been designed to monitor groundwater quality at various depths and in different geological units including the shallow alluvial/colluvial aquifer and the shallow, medium and deep bedrock units.

Groundwater levels will be monitored monthly, with static levels recorded prior to sampling. Data will be summarized and reported annually. Reports will include elevation versus time graphs, interpreted equipotentials and updated assessments of the groundwater flow.

Groundwater quality samples will also be collected monthly and analyzed for a suite of parameters including physical parameters, major anions, nutrients and dissolved metals; total metals will not be monitored for groundwater wells. Wells will be purged prior to each sampling following static water level measurements to ensure representative samples are collected.

Analytical parameters to be monitored are listed in Table 16. QA/QC measures will include a travel blank, a field blank prepared from distilled water, a filter blank prepared from the distilled water, a blind field duplicate and a laboratory duplicate.

Groundwater quality sampling frequency may be reduced to quarterly sampling following sufficient data collection and a demonstration that the data is of adequate quality to justify a less frequent sampling program without compromising the integrity of the groundwater monitoring program.

Table 16 Groundwater Quality Monitoring Parameters and Detection Limits

Parameter	Symbol	Detection Limit	Units
Physical Parameters			
Conductivity		2	µS/cm
Hardness		0.5	mg/L
Total Dissolved Solids	TDS	10	mg/L
pH	pH	0.1	pH
Turbidity	NTU	0.1	NTU
Major Anions			
Alkalinity-Total	$CaCO_3$	0.5	mg/L
Bromide	Br	0.1	mg/L
Chloride	Cl	0.5	mg/L
Fluoride	F	0.02	mg/L
Sulphate	SO_4	0.5	mg/L
Nutrient Parameters			
Ammonia Nitrogen	N	0.005	mg/L
Nitrate Nitrogen	N	0.005	mg/L
Nitrite Nitrogen	N	0.001	mg/L
Dissolved Ortho-Phosphate	P	0.005	mg/L
Dissolved Trace Metals			
Aluminum	Al	0.001	mg/L
Antimony	Sb	0.0001	mg/L
Arsenic	As	0.0001	mg/L
Barium	Ba	0.001	mg/L
Boron	B	0.008	mg/L
Cadmium	Cd	0.000017	mg/L
Calcium	Ca	0.05	mg/L
Chromium	Cr	0.0005	mg/L
Cobalt	Co	0.001	mg/L
Copper	Cu	0.0002	mg/L
Iron	Fe	0.005	mg/L
Lead	Pb	0.00005	mg/L
Magnesium	Mg	0.05	mg/L
Manganese	Mn	0.001	mg/L
Molybdenum	Mo	0.001	mg/L
Nickel	Ni	0.0005	mg/L
Phosphorus	P	0.1	mg/L
Potassium	K	1	mg/L
Selenium	Se	0.0005	mg/L
Silicon	Si	0.05	mg/L
Silver	Ag	0.00001	mg/L
Sodium	Na	0.05	mg/L
Strontium	Sr	0.001	mg/L
Thallium	Tl	0.0001	mg/L
Vanadium	V	0.001	mg/L
Zinc	Zn	0.001	mg/L

9.1.2 Go Creek Basin

Monitoring of groundwater conditions in the upper Go Creek basin focuses on monitoring the performance of the tailings facility, in particular the integrity of the Enviroliner system installed to prevent tailings water seepage. The objectives of the groundwater monitoring of the upper Go Creek basin are therefore to:

- provide information to delineate the direction of groundwater flow
- provide information to estimate the velocity and quantitative rate of groundwater flow
- continue to document baseline groundwater quality prior to operations and to monitor for any impacts to groundwater quality that result from operation of the tailings facility during operations and at closure

Existing groundwater monitoring well nests MW05-7A, MW05-7B and MW05-2A are located immediately downgradient of the proposed tailings facility and seepage collection pond. Unlike the Wolverine Creek groundwater wells, only the shallow alluvial and shallow bedrock conditions will be monitored; deeper bedrock installations are not warranted at these locations. Table 17 summarizes the well identification and depth of completion for each monitoring well in the upper Go Creek basin.

Table 17 Go Creek Basin Groundwater Monitoring Wells

Well	Depth (m)	Stratigraphic Unit
MW05-1A	22.9	Shallow Bedrock
MW05-1B	5.0	Alluvial Overburden
MW05-2A	22.9	Shallow Bedrock
MW05-2B	5.0	Alluvial Overburden
MW05-7A	30.2	Shallow bedrock
MW05-7B	4.6	Alluvial Overburden

Groundwater levels will be monitored on a quarterly basis, with static levels recorded prior to sampling. Because there are no dewatering activities in the area, monthly monitoring of groundwater levels are not warranted as compared to the Wolverine Creek basin. Data will be summarized and reported annually. Reports will include elevation versus time graphs, interpreted equipotentials and updated assessments of the groundwater flow.

Groundwater quality samples will also be collected quarterly. Wells will be purged prior to each sampling following static water level measurements to ensure representative samples are collected. Water quality parameter list will be as indicated in

9.1.3 Summary of Groundwater Monitoring

Table 18 provides a summary of the proposed groundwater monitoring program for the Wolverine Creek and upper Go Creek basins including monitoring throughout the life-cycle of the Wolverine operation.

Table 18 Summary of Groundwater Monitoring Program for Wolverine Creek and Go Creek Basins

Well Sites	Purpose	Pre-Construction	Construction	Operations	Closure	Post Closure
MW05-1A/B	Monitor upper reaches of Go Creek groundwater basin	Quarterly	Quarterly	Quarterly	Quarterly	Annual
MW05-2A/B	To monitor impact of tailings facility	Quarterly	Quarterly	Quarterly	Quarterly	Annual
MW05-3A/B	To monitor impact of underground and industrial complex	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW05-4A/B	To monitor impact of underground and industrial complex	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW05-5A/B	To monitor impact of underground and industrial complex	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW05-7A/B	To monitor impact of tailings facility	Quarterly	Quarterly	Quarterly	Quarterly	Annual
MW06-8 S/M/D	To monitor impact of underground	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW06-9 S/M	To monitor groundwater quality on west side of Wolverine Creek (not affected by operations)	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW06-10 S/M/D	To monitor impact of underground and industrial complex	Quarterly	Quarterly	Monthly	Quarterly	Annual
MW06-11 S	To monitor impact of underground and industrial complex			Monthly		
MW06-12 S	To monitor impact of underground and industrial complex			Monthly		

9.2 Surface Water Monitoring

The surface water monitoring program for the Wolverine Project includes the monitoring of hydrologic flows and water quality at strategic locations and has been designed to meet the following objectives:

- continue to provide stream flow data specific to the mine site operations focusing on Go Creek and Wolverine Creek watersheds
- better constrain watershed base flows, particularly in Wolverine Creek
- document water quality in the receiving environment and to verify compliance during discharge periods from the water treatment facility
- provide data to update predictions of water quality impacts, and to support ongoing review of mine water and waste management strategies during operations and at closure

9.2.1 Surface Water Hydrology

A surface water hydrology monitoring network has been established for the Wolverine Project that provides continuous stream flow data for watercourses in the immediate vicinity of mine site operations as well as more regional coverage (Figures 13 and 14).

Stations W9 and W82 have been established on Wolverine Creek at the mouth and in the upper reaches immediately adjacent to the underground operations, respectively. These stations will be utilized to closely monitor the influence of underground dewatering on flow conditions in Wolverine Creek.

Monitoring of flow conditions in Go Creek occurs at stations W80 and W12 (Figure 14). W80 represents the compliance monitoring point for seasonal water treatment plant discharges and flow conditions are closely monitored in conjunction with water quality conditions. Station W12 is also located on Go Creek, just upstream of the confluences of Money Creek and Pup Creek with Go Creek. This station has been historically monitored for flow and monitoring will continue throughout operations to provide data to permit refinements to site water balance conditions.

Regional hydrology is monitored via stations W21 on Nougha Creek and station W22 on Money Creek.

Each hydrology station is equipped with a continuous reading datalogger. Stations will receive at least two annual inspections, once immediately prior to freshet and again in the late summer fall prior to winter low flow conditions. During inspections, equipment will be calibrated. During the initial five years of the operation, stream gauging will occur at each station at least four times per year. Stream gauging data will be used to update each watercourse stage discharge curve. After the first five years, stream gauging will be limited to twice annually.

Figure 13 Locations of Continuous Hydrology Monitoring Stations in the Immediate Vicinity of Wolverine Project Operations and Regional Stations

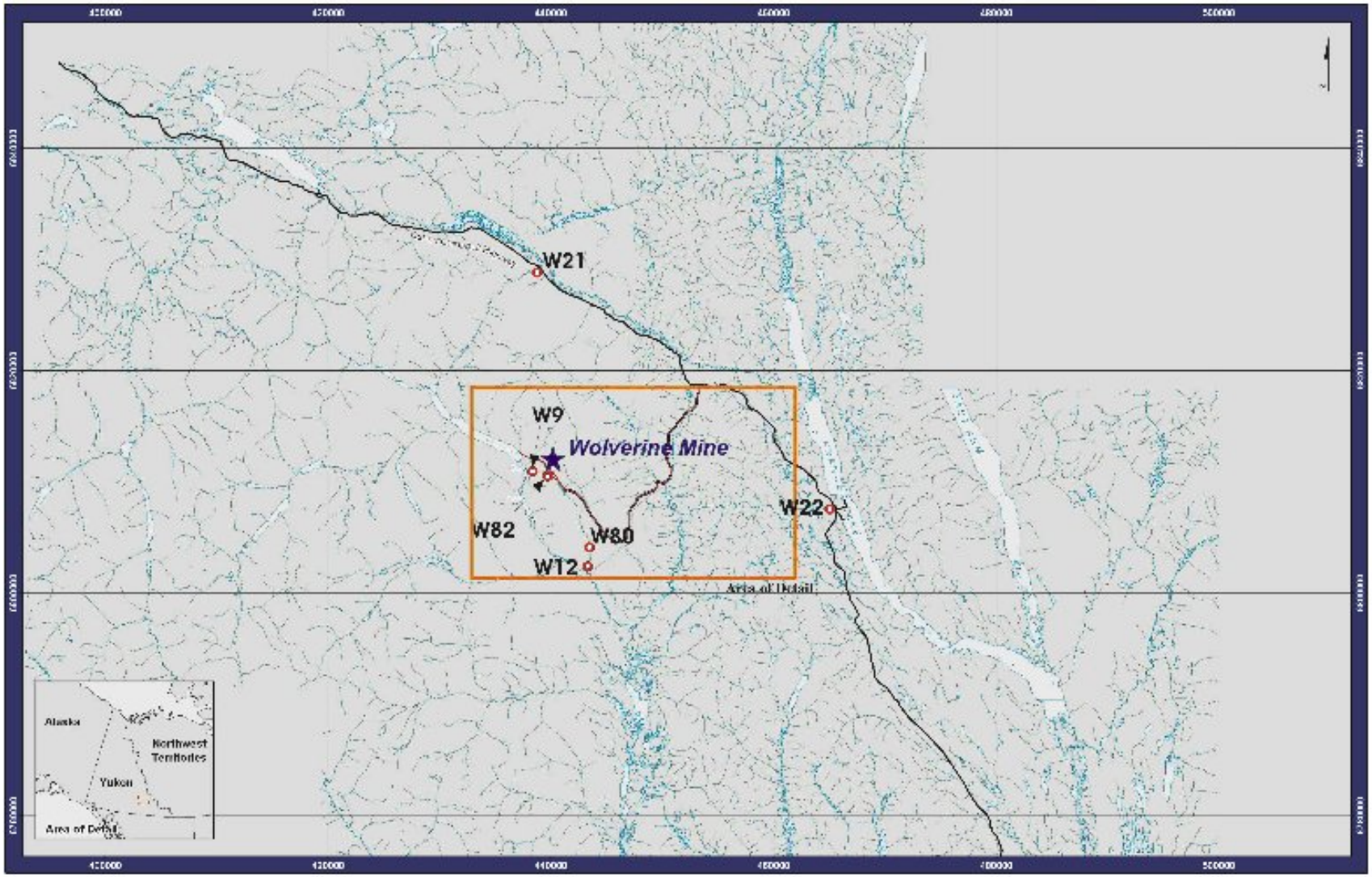
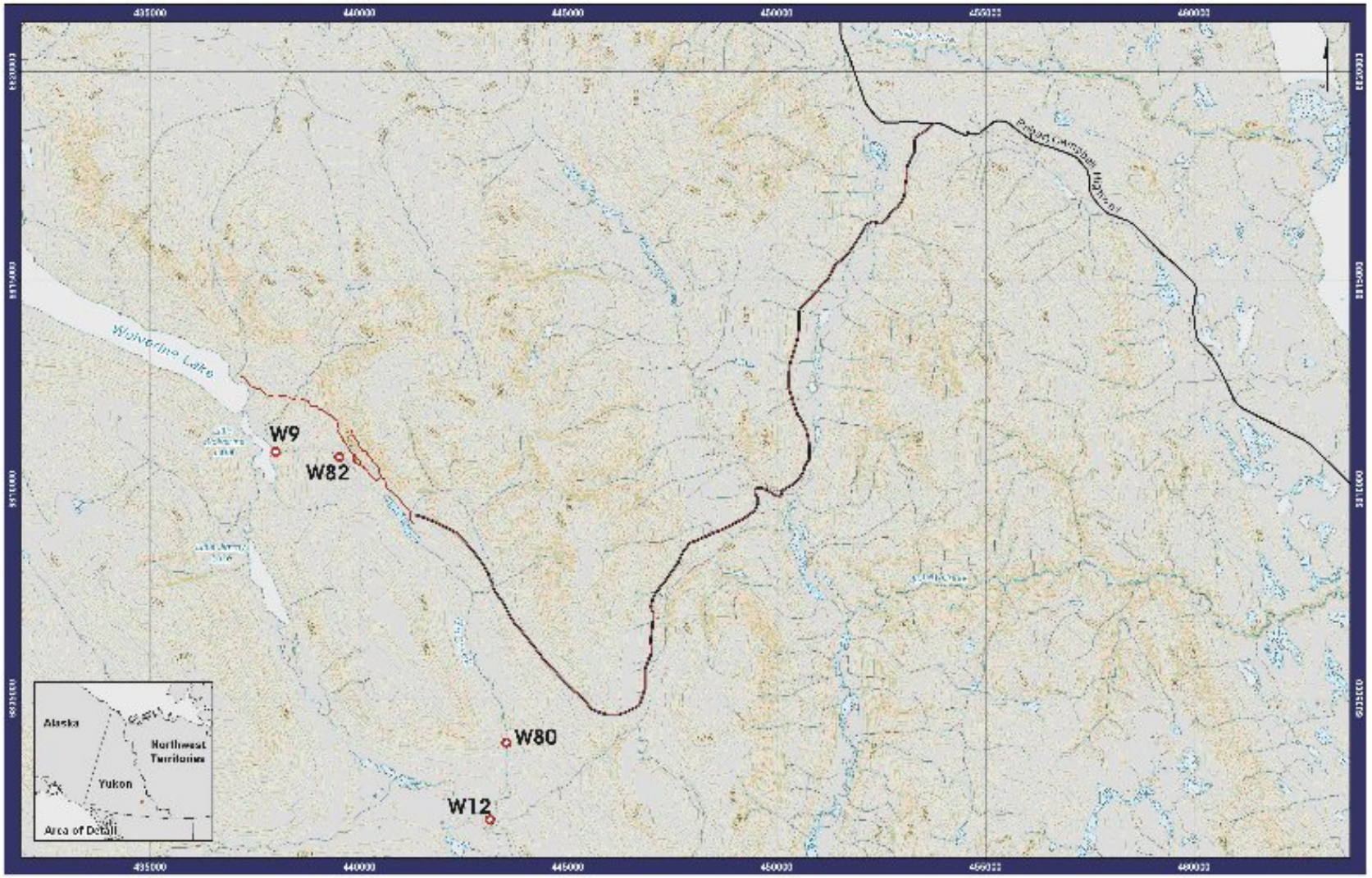


Figure 14 Detail of Station Locations of Continuous Hydrology Monitoring Stations in the Immediate Vicinity of Wolverine Project



9.2.2 Surface Water Quality

The following section presents the proposed monitoring program for receiving waters for the pre-construction, construction, operational and closure phases of the Wolverine Project. Both surface water and water treatment plant discharge monitoring programs are essential to the overall objective of obviating environmental impacts to the receiving environment and maintaining compliance with water quality objectives in Go Creek. In addition, water quality monitoring at key locations along the road route will also be maintained.

The water quality parameters and detection limits to be used in the monitoring program of the receiving surface waters are shown in Table 19 and are similar to those used for previous baseline surveys. Particular attention has been paid to achieving the lowest possible detection limits for key parameters including cadmium and selenium. The list of parameters may be modified at a future date to reflect site-specific conditions of the project.

Surface water quality monitoring stations have been established in all key watersheds of the project area including the Wolverine Creek - Wolverine Lake watershed (stations W1, W21, L1, W8, W82 and W9); Go Creek watershed (stations W31, W16, W15, W81, W80 and W12); Money Creek watershed (stations W14, W22 and W40) and along the road route (stations W71, W72 and W73) (Figures 15 and 16).

Table 20 provides a summary of the surface water monitoring program from pre-construction phase through to closure for all monitoring stations, including the monitoring of key components of the water management system. For all stations in the Wolverine, Go Creek, Money Creek and road route watersheds, surface water quality monitoring during the pre-construction, construction and operational phase of the mine will occur on a monthly basis. For the compliance monitoring point in Go Creek at station W80, water quality monitoring will occur daily during periods of active water treatment plant discharge.

During closure, stations will be sampled monthly, but only on a seasonal basis during the ice free period of May to October. The exceptions to this include stations W21, W8, W71, W72 and W73 where sampling during the closure period will be quarterly during the ice free period (Table 20).

Surface water quality monitoring of the key components of the water management system include monthly monitoring of the tailings impoundment water and daily sampling of the water treatment plant retention pond when the latter is operating during the ice-free period of May to October. Monitoring of the tailings impoundment and water treatment plant retention pond will be at the proposed frequency as long as these systems are operational, which will likely include the early phases of closure of the mine. The retention pond will be decommissioned at final closure and only seasonal (i.e., monthly during ice free periods) monitoring of the tailings impoundment will continue.

Table 19 Surface Water Quality Monitoring Parameters and Detection Limits

Parameter	Symbol	Detection Limit	Units
Physical Parameters			
Conductivity		2	µS/cm
Hardness		0.5	mg/L
Total Suspended Solids	TSS	4	mg/L
Total Dissolved Solids	TDS	10	mg/L
pH	pH	0.1	pH
Turbidity	NTU	0.1	NTU
Major Anions			
Alkalinity-Total	$CaCO_3$	0.5	mg/L
Bromide	Br	0.1	mg/L
Chloride	Cl	0.5	mg/L
Fluoride	F	0.02	mg/L
Sulphate	SO_4	0.5	mg/L
Nutrient Parameters			
Ammonia Nitrogen	N	0.005	mg/L
Nitrate Nitrogen	N	0.005	mg/L
Nitrite Nitrogen	N	0.001	mg/L
Dissolved Ortho-Phosphate	P	0.005	mg/L
Total and Dissolved Trace Metals			
Aluminum	Al	0.001	mg/L
Antimony	Sb	0.0001	mg/L
Arsenic	As	0.0001	mg/L
Barium	Ba	0.001	mg/L
Boron	B	0.008	mg/L
Cadmium	Cd	0.000017	mg/L
Calcium	Ca	0.05	mg/L
Chromium	Cr	0.0005	mg/L
Cobalt	Co	0.001	mg/L
Copper	Cu	0.0002	mg/L
Iron	Fe	0.005	mg/L
Lead	Pb	0.00005	mg/L
Magnesium	Mg	0.05	mg/L
Manganese	Mn	0.001	mg/L
Molybdenum	Mo	0.001	mg/L
Nickel	Ni	0.0005	mg/L
Phosphorus	P	0.1	mg/L
Potassium	K	1	mg/L
Selenium	Se	0.0005	mg/L
Silicon	Si	0.05	mg/L
Silver	Ag	0.00001	mg/L
Sodium	Na	0.05	mg/L
Strontium	Sr	0.001	mg/L
Thallium	Tl	0.0001	mg/L
Vanadium	V	0.001	mg/L
Zinc	Zn	0.001	mg/L

Figure 15 Locations of Surface Water Quality Monitoring Stations for the Wolverine Project Operations and Along the Road Route

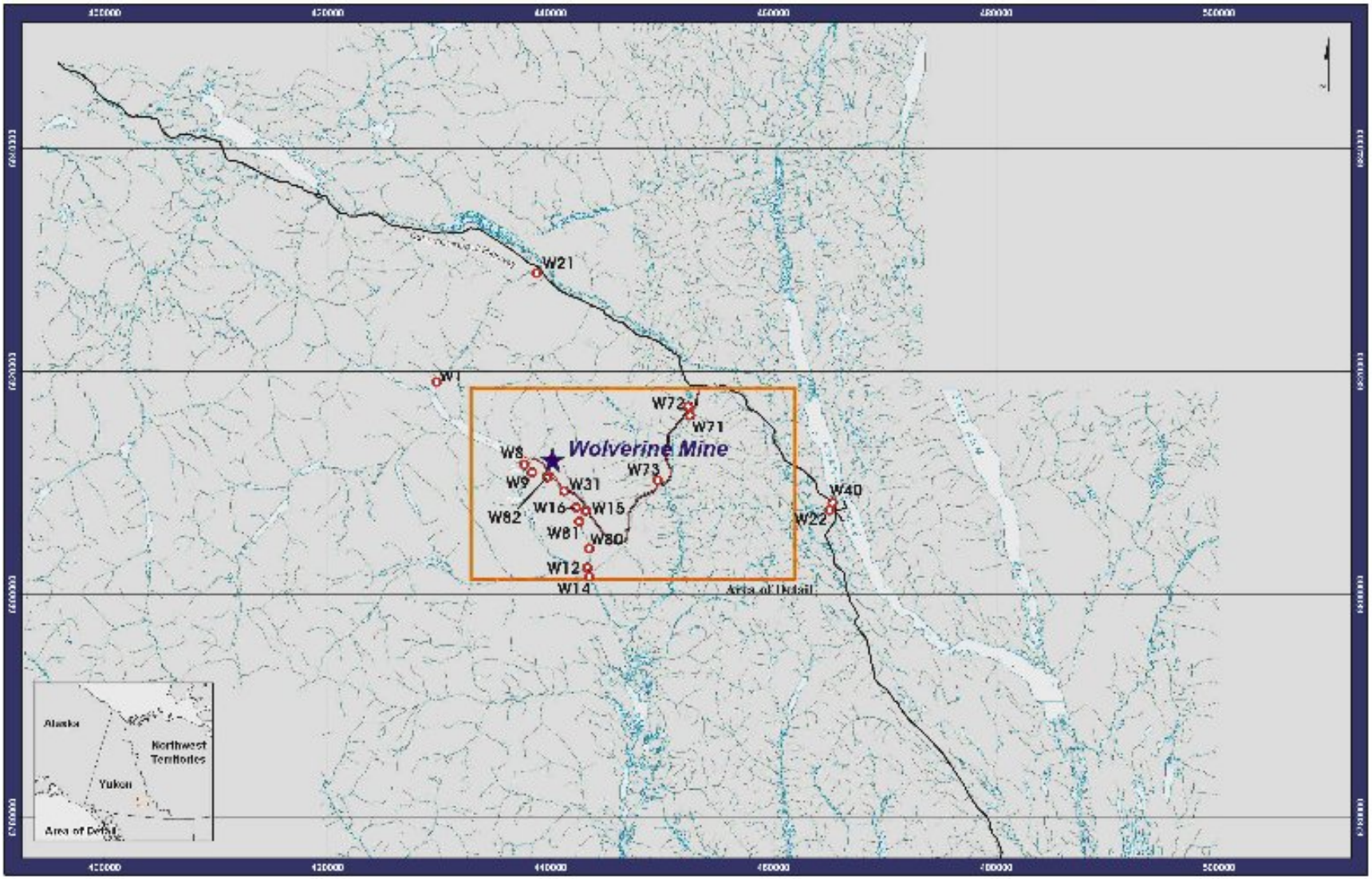


Figure 16 Detail of Surface Water Quality Monitoring Stations in the Immediate Vicinity of Wolverine Project Operations and Along the Road Route

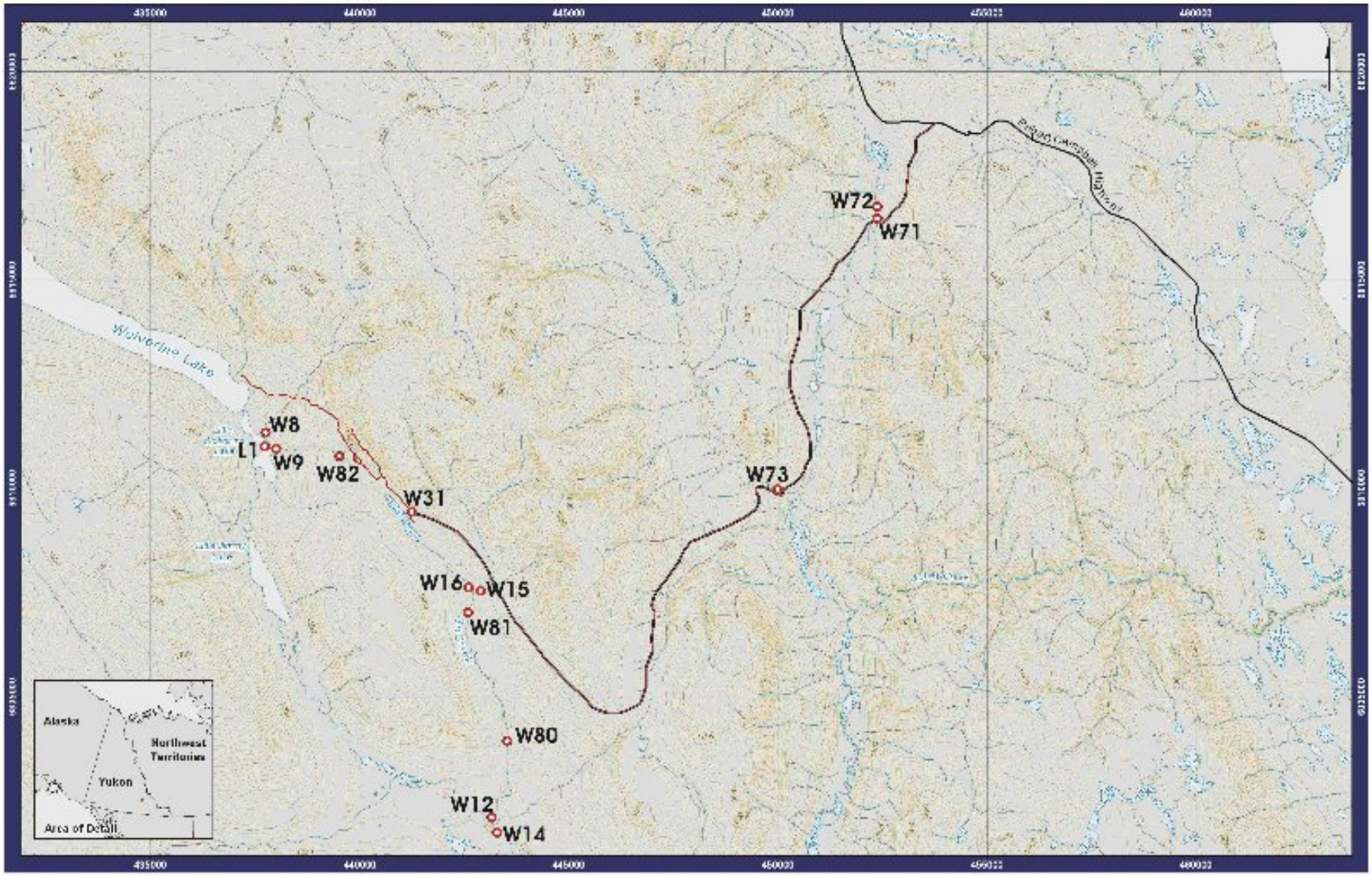


Table 20 Summary of Surface Water Monitoring Program for Wolverine Project

Site	Purpose	Pre-Construction	Construction	Operations	Closure
Wolverine Watershed					
W1	Monitor water quality of Wolverine Lake	Monthly	Monthly	Monthly	Seasonal[1]
L1	Monitor water quality of Little Wolverine Lake	Monthly	Monthly	Monthly	Seasonal
W21	Monitor water quality of Nougha Creek	Monthly	Monthly	Monthly	Quarterly
W8	Monitor water quality of Campbell Creek	Monthly	Monthly	Monthly	Quarterly
Go Creek Watershed					
W31	Monitor upper reaches of Go Creek prior to tailings facility	Monthly	Monthly	Monthly	Seasonal
W16	Monitor upper Go Creek immediately upstream of discharge location	Monthly	Monthly	Monthly	Seasonal
W15	To monitor Hawkowl Creek prior to joining Go Creek	Monthly	Monthly	Monthly	Seasonal
W81	100 m downstream of confluence of Hawkowl Creek with Go Creek. Intermediate station in Go Creek monitoring influence of discharge	Monthly	Monthly	Monthly	Seasonal
W80	Compliance point in Go Creek	Monthly	Monthly	Daily[2]	Seasonal
W12	Go Creek prior to Money Creek	Monthly	Monthly	Monthly	Seasonal
Money Creek Watershed					
W14	Monitor water quality in upper reaches of Money Creek	Monthly	Monthly	Monthly	Seasonal
W22	Monitor water quality in Money Creek upstream of highway	Monthly	Monthly	Monthly	Seasonal
W40	Monitor water quality in Money Creek downstream of highway	Monthly	Monthly	Monthly	Seasonal
Road Route Monitoring					
W71	Monitor water quality at Pitch Creek road crossing	Monthly	Monthly	Monthly	Quarterly
W72	Monitor water quality in Light Creek	Monthly	Monthly	Monthly	Quarterly
W73	Monitor water quality at Bunker Creek road crossing	Monthly	Monthly	Monthly	Quarterly
Water Management					
Tailings Pond	To monitor water quality in the tailings impoundment			Monthly	Seasonal
Retention Pond	Monitor water quality in the retention pond			Daily[2]	

Notes:
[1:] Seasonal monitoring during closure will include monthly monitoring during the ice free period of May to October
[2:] Daily monitoring during discharge periods during operations and early closure

10 Spill Contingency Plan

The measures outlined in the following sections intend to minimize the potential impact to the environment following a fuel spill. The immediate priority is to ensure human safety and limit environmental damage, followed by the action plans to effectively implement the procedures/methods for spill containment and clean up and site remediation measures. The priority sequence is as follows:

- ensure safety: protect life and prevent injury
- protect the environment
- protect infrastructure
- minimize business activity disruption

The following subsections provide details pertaining to spill response equipment, action plans, and training, and specific information on spill containment.

10.1 Equipment

Spill kits will be located at the portal, camp and airstrip, as well as in heavy equipment. Kit contents generally contain oil sorbent pads, pillows and socks, granular sorbent, plug patties for instant leak stop, shovels, and protective equipment including gloves, goggles, and protective suits. All heavy equipment will be equipped with sorbent pads, granular sorbent and gloves, at a minimum.

Dry chemical fire extinguishers will be located near the fueling stations. The water truck can also be used in fire suppression activities and pumps are onsite at the upper portal for spill pumping and fire suppression activities.

The general steps required to be taken in the event of a spill are as follows:

- first responder/observer must ensure their safety and the safety of others
- shut off ignition sources (including electrical sources) and ensure no smoking
- identify and assess the spilled material
- report all spills immediately to site supervisor
- if safe, stop the source of the spill, contain the spill, and proceed with clean-up activities
- Environmental Coordinator will notify senior management immediately and contact the Yukon 24-hour Spill Report Hotline and Client Services and Inspections shortly thereafter once details are determined
- Environmental Coordinator will complete the Spill Report Form
- responsibilities for spill response are summarized in Table 21

Table 21 Roles and Responsibilities for Spill Response

Position	Responsibilities
All Employees (First Observer)	• Assess the initial severity of the spill and safety concerns • Identify the source of the spill • Report all spills to Supervisor and Environmental Coordinator as soon as possible • Determine the size of the spill and stop or contain it, if possible • Participate in spill response as member of cleanup crew
Work Supervisors	• Contact the Mine Manager • Gather facts of the spill • Assist as required in spill response measures
Emergency Response Team	• Conduct cleanup of spills under direction of Mine Manager or Env. Coordinator • Take appropriate response measures- deploy booms, absorbents and other equipment and materials as required • Continue cleanup as directed by Mine Manager or Env. Coordinator
Mine Manager	• Assist in initial and ongoing response efforts • Supervise Spill Response Team • Ensure source of the spill has stopped and contain spill • Record spill information • Ensure co-ordination of equipment and manpower as needed • Oversee the cleanup operation until it is satisfactorily completed • Continue actions until relieved or supplemented by other supervisors • Decide with Environmental Coordinator if mobilization of additional equipment or a contractor is warranted
Environmental Coordinator	• Ensure expeditious response and clean up of spill site and impacted areas • Report the spill to the Yukon 24-Hour Spill Report Line and Client Services and Inspections • Together with the Mine Manager, decide if additional equipment is required for containment and remedial activities • Notify senior management • Oversee completion and distribution of Spill Report • Ensure investigation identifies measures to prevent similar spills
VP Environment and Community Affairs	• Is responsible for all communication with the media. Ensures that all press releases are accurate and in accordance with company policy • Makes financial decisions on major expenses during large spill response
YZC Board of Directors	• Establishes corporate environmental policy based on the recommendations of the Environmental Management Committee

10.2 Spill Response Training

Training and preparedness will be conducted in accordance with both Occupational Health and Safety Regulations and regional legislation. At a minimum, a first responder awareness level training program will be implemented with all key staff and contractors.

All personnel will receive training that includes instruction in spill recognition and assessment, spill hazards, spill reporting, communication procedures, clean-up measures and general emergency response.

Where contract fuel suppliers will be shipping fuels as outlined under the *Transportation of Dangerous Goods Act* and be received by an employee of YZC, these personnel must hold a valid Canadian Certificate of Training in the form of a wallet card. This person

will be responsible for ensuring that the appropriate records are maintained and any incidents involving the shipper and or receiver are reported to the appropriate authorities.

10.3 Spill Containment, Clean-up and Disposal

The potential exists for spills of petroleum products and or various chemicals used at the Wolverine Mine. A spill will typically be in the form of a liquid. Various proven practical methods of containment and recovery are well documented for use in northern climates and are summarized below for each of the following areas: on land, snow, ice or in water. For additional technical information, consult the Environment Canada Report EPS 9/SP/2, December 1986.

10.3.1 Containment

For spills that occur on land, three methods of containment are summarized in Table 22.

Containment on snow is readily achieved and is very effective due to its absorbent quality. Liquid spills (petroleum) will become immobile within the snow pack and easily removed for transport for recovery or disposal. Use the snow to its advantage in construction of snow dykes/dams. Whenever possible, the snow pack should be left in place to avoid contaminating the underlying substrate.

Spills that occur on ice, from either direct spillage or migration to the ice, are greatly affected by the strength of the ice. If the spill does not penetrate the ice, and the ice is safe to work on, then the methods of containment are similar to that on land. Where the spill has penetrated the ice, the situation should be handled similar to that on open water.

A spill occurring on or into open water is very difficult to contain and every effort should be made to prevent the material from entering the water. If in the case of petroleum products, the material floats, then immediate deployment of surface booms should take place to control the spread of material.

Table 22 Spill Containment Option for Land-based Spills

Containment Method	Details Pertaining to Method Application
Snow Dykes	Petroleum products spilling onto frozen snow covered ground may be contained by the construction of snow dykes. For smaller spills the dykes can be built with shovels while larger dykes will typically require the use of heavy equipment In freezing temperatures, water may be sprayed or poured over the dykes to further enhance the barrier. Synthetically lined dykes are more effective than just snow or snow and ice-lined dykes. The impermeability of dykes may be ensured by lining with a polyethylene plastic liner, plastic tarpaulin or similar synthetic material
Sand or Gravel Dykes	During warmer months, containment dykes may be constructed from sand or gravel if these materials are available. For smaller spills, the dykes can be fashioned manually with shovels where as for larger spills, trucks or other heavy equipment (front-end loaders) will normally be required to handle sand and gravel
Trenching or ditching	Used for containing and/or intercepting the flow of liquid spills on land. Ice, snow, loose sand, gravel and surface layers of organic material can usually be scraped or dug away until the underlying frozen substrate is reached. Effective in re-directing flow or simple containment prior to pumping or absorbing the spilled material. Trenching in solid frozen ground or rocky substrate is normally neither practical nor possible.

Actions plans for the clean up of fuels, oils and antifreeze in various environments is provided in Table 23.

Table 23 Action Plan for Fuels, Oils and Antifreeze

	Spill Substance Type		
Location of Spill	**Diesel, Hydraulic, Lube and Waste Oil**	**Gasoline and Jet B Aviation Fuel**	**Ethylene Glycol (Antifreeze)**
On Land	Do not flush into ditches or drainage systems. Prevent entry into waterways and contain with berm or other barrier. Remove small spills with sorbent pads.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Do not contain spill if there is any chance of igniting vapours. On shop floors and in work yards, apply particulate sorbents.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Contain spill by dyking with earth or other barrier. Remove minor spills with universal sorbent. Remove large spills with pumps or vacuum equipment.
On Snow and Ice	Block entry into waterways and contain with berm or other barrier Remove minor spills with sorbent pads or snow Use ice augers and pump when feasible to recover diesel under ice. Burn using Tiger Torches if unrecoverable by other methods, feasible and safe to do so.	Block entry into waterways with snow or other barrier. Do not contain spill if there is any chance of igniting vapours. In work yards, apply particulate sorbents.	Block entry into waterways with berms or other barrier. Do not flush into ditches or drainage systems. Contain spill by dyking with snow or other barrier. Remove minor spills with universal sorbent. Remove contaminated snow with shovels and mechanical equipment.
On Muskeg	Do not deploy personnel and equipment on marsh or vegetation. Remove pooled oil with sorbent pads and/or skimmer. Flush with low-pressure water to herd oil to collection point. Burn only in localized areas, e.g., trenches, piles or windrows. Do not burn if root systems can be damaged (low water table). Minimize damage caused by equipment and excavation.	Do not deploy personnel and equipment on marsh or vegetation. Remove pooled gasoline or Jet B with pumps. Low pressure flushing can be tried to disperse small spills. Burn carefully only in localized areas, e.g., trenches, piles or windrows. Do not burn if root systems can be damaged (low water table). Minimize damage caused by equipment and excavation.	Do not deploy personnel and equipment on marsh or vegetation. Remove pooled gasoline or Jet B with pumps Burning is not feasible. Minimize damage caused by equipment and excavation.
On Water	Contain spill as close to release point as possible. Use spill containment boom to concentrate slicks for recovery. On small spills, use sorbent pads to pick up contained oil. On larger spills, obtain and use skimmer on contained slicks. Do not use sorbent booms/pads in fast currents and turbulent water. Intercept moving slicks in quiet areas using sorbent booms.	Do not attempt to contain or remove spills. Use booms to protect water intakes and sensitive areas.	Ethylene glycol sinks and mixes with water. Isolate/confine spill by damming or diversion.

10.3.2 Recovery

Spilled petroleum products contained within a dyked, trenched or boomed area should be recovered by pumping into a portable storage tank or drum. Pump and suction hoses should be screened to prevent snow, ice or debris from clogging the line or pump. Any remaining material may be absorbed by use of a variety of products, such as 3M brand Conweb and Phase III brand Oil Sponge.

The availability of shovels, rakes and pitchforks are invaluable in any spill clean-up and recovery operation. The use of heavy equipment for larger spill situations such as front-end loaders and haul trucks, make the removal of material easier.

10.3.3 Disposal

Petroleum products such as oil that have been recovered by pumping into a tank or drum, can often be reused. Currently, hydrocarbon contaminated materials are removed to either the burn area for ignition or to the land farm.

The licensed land treatment farm is located adjacent to the airstrip as previously described. Soil is reclaimed through the process of bioremediation through tilling and the breakdown of hydrocarbons by naturally occurring bacteria. The process is most effective when soil temperatures range from 5 to 45ºC. Bioremediation in soil will work so long as the ground is not frozen.

10.3.4 Other Concerns

In the event that the accident/incident is in combination with a fire, extinguishing the fire may be required prior to initiating efforts to stop the spillage. In order to control the resulting runoff (in cases where water is used), and the subsequent spread of the spilled material, the spill site should be contained.

Petroleum and chemical fires have the potential to generate toxic fumes under poor combustion conditions. Approaching and dealing with any fire from upwind is recommended as well as caution with regard to breathing the vapours generated from the fire.

10.4 Reporting

The sequence of reporting that must be strictly followed to ensure that an efficient and effective response occurs, an accurate spill report is completed, and notifications to both YZC management and government agencies is done in a timely fashion is provided in Figure 17.

Most major suppliers in the Yukon are members of the Transportation Emergency Assistance Plan (TEAP). One of the responsibilities of this organization is the sharing of resources, consumables, equipment and personnel in the event of a spill. The transporter of the fuel is responsible for contacting TEAP in the event of a spill.

The person who discovers the spill is considered the First Observer. That person identifies the source of the spill and reports to his or her direct supervisor who gathers the facts of the spill and contacts the Mine Manager. The Mine Manager records the spill information and passes it onto the Environmental Coordinator who will oversee its completion and distribution.

The Environmental Coordinator reports the spill to YZC senior management, the 24-hour Spill Report Line and Client Services and Inspections. Contact numbers are provided in Figure 18.

The following information shall be conveyed to the affected agencies through the 24-hour emergency Yukon Spill Response Line and Client Services and Inspections. This information should be documented on the Spill Reporting Form provided in Figure 19:

- type and volume of spill
- time of the spill
- location and aerial extent of spill or leak (proximity to nearest watercourse)
- safety concerns (fire, injuries)
- response activities initiated and completed and ongoing remedial measures
- known or anticipated adverse environmental impacts

The Canadian Transport Emergency Center (CANUTEC), a branch of Transport Canada, can also be contacted for 24 hr technical advice on Dangerous Goods. Other stakeholders such as the Ross River Dena Council will and Liard First Nation o be notified.

Figure 17 Spill Reporting and Response Procedure

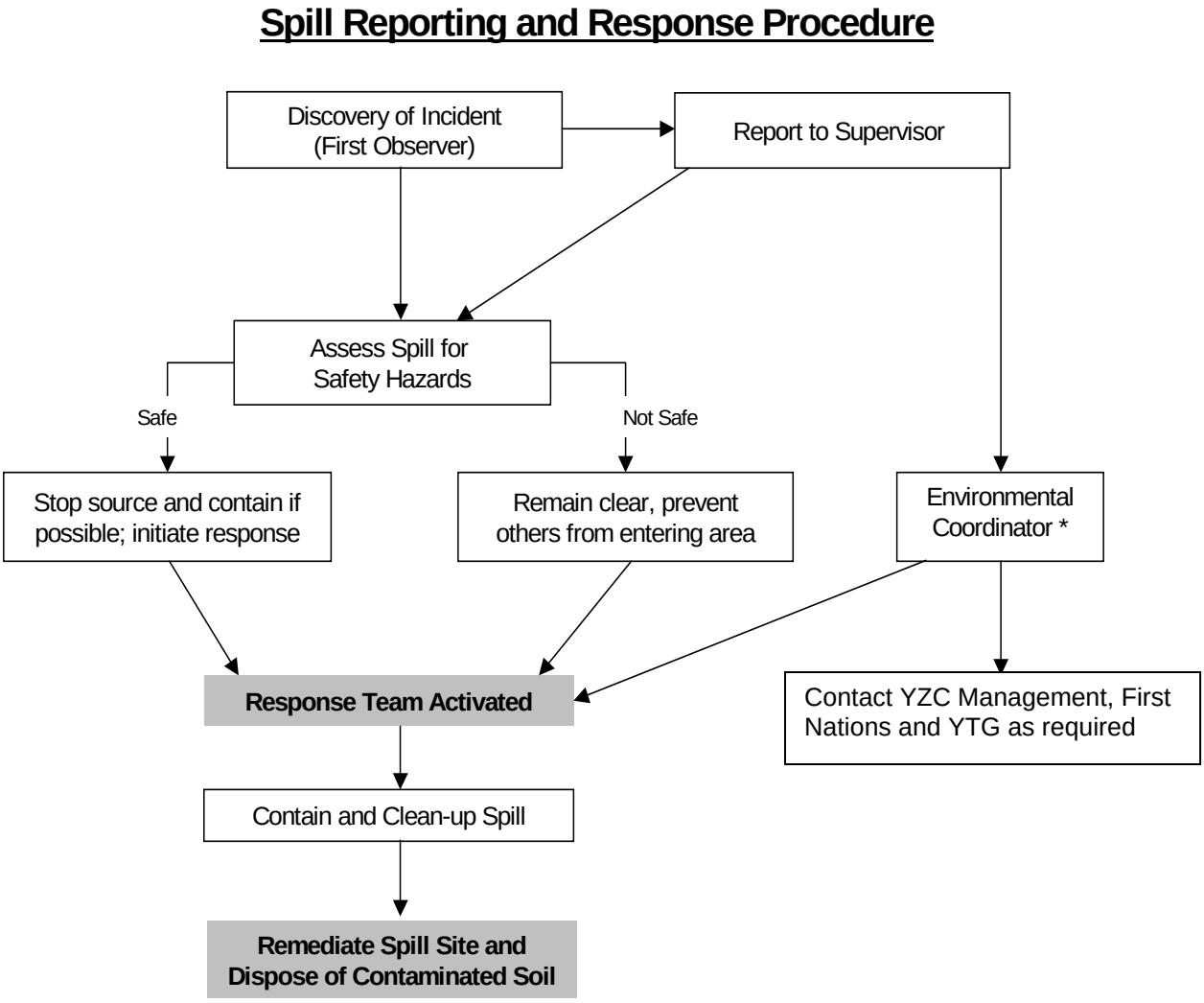


Figure 18 Wolverine Project Emergency Contact Numbers

Wolverine Project
Emergency Telephone Contacts

Yukon Zinc Corporation Contacts:	
President and CEO, Harlan Meade	(604) 682-5474 ext 228
Chief Operating Officer, Ray Mah	(604) 682-5474 ext 313
VP Environment & Community Affairs, Pamela Ladyman	(604) 682-5474 ext 246
	(604) 644-7655 (cell)
First Nation Contacts:	
Ross River Dena Council, Testloa Smith	(867) 969-2097
Liard First Nation, Laurie Allen	(867) 536-2912
Spill Reporting Yukon Government Contacts:	
24-hour Yukon Spill Line	(867) 667-7244
Client Services and Inspections	(867) 456-3882
Watson Lake District Conservation Officer	(867) 536-7363
Whitehorse District Conservation Officer	(867) 667-5221
Environmental Inspections Branch	(867) 667-3436
Mine Rescue Station	(867) 667-5450
Federal Government Contacts:	
Department of Fisheries and Oceans	(867) 393-6722
Environment Canada (Whitehorse)	(867) 667-3400
Transport Canada (CANUTEC 24-hour Service)	(613) 996-6666
Regional Emergency Numbers:	
Hospital	
Watson Lake	(867) 536-4444
Whitehorse	(867) 393-8700
Watson Lake Health Unit	(867) 536-7834
Ambulance	
Watson Lake	(867) 536-4444
Fire Department	
Watson Lake	(867) 536-2222
Whitehorse	(867) 668-8699 or 668-2462
Police	
Watson Lake	(867) 536-5555
Whitehorse	(867) 667-5555
Laboratories (Vancouver)	
ASL Chemex	(604) 984-0221
ALS Environmental	(604) 253-4188
Maxxam Analytics Inc	(604) 444-4808

Figure 19 Wolverine Project Spill Reporting Form

Wolverine Project Spill Reporting Form

1) Date of Incident: _____ Time: _____

2) Spill Type: (check) Oil ____Gasoline ____Diesel ____Other (name)_____

3) Source and Cause: _____

_____

4) Volume: _____(Liters/gallons)

5) Spill Location: _____

6) GPS Coordinates: _____(N)_____(E)

7) Cause of Incident (e.g.: broken hose): _____

8) Weather Conditions: Temperature _____ Wind Direction/Speed _____ Conditions _____

9) Hazards to human life or health: _____

10) Known or Anticipated Environmental Effects: _____

11) Nearest Waterbody and Distance: _____

12) Fire Hazard: Yes ___ No ___

13) Supervisor Onsite: _____

14) Contractor Involved: Yes ___ No ___ Name(s): _____

15) Action taken to date: Containment: _____

Clean up: _____

16) Volume Recovered: _____(Liters/gallons)

17) Subsequent Actions Required: _____

18) Future Preventative Measures: _____

19) Additional Comments_____

_____

20) Reported by:
Name: _____ Title: _____ Company_____

21) Reported to:
Name: _____ Organization: _____ Phone:_____

Reported to:
Name: _____ Organization: _____ Phone:_____

Reported to:
Name: _____ Organization: _____ Phone:_____

Appendix A

Wolverine Access Road Figures - km 0 to km 23.9

Yukon Engineering Services
October 2006

FIGURE 1

Drawings For

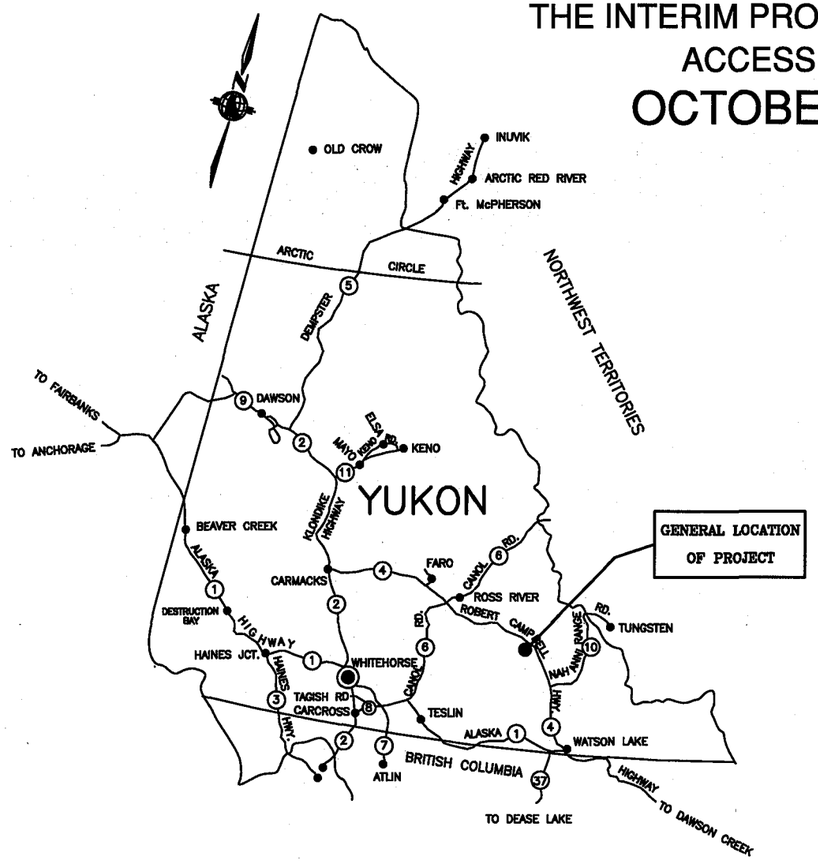
WOLVERINE ACCESS ROAD

km 0.0 to km 23.9

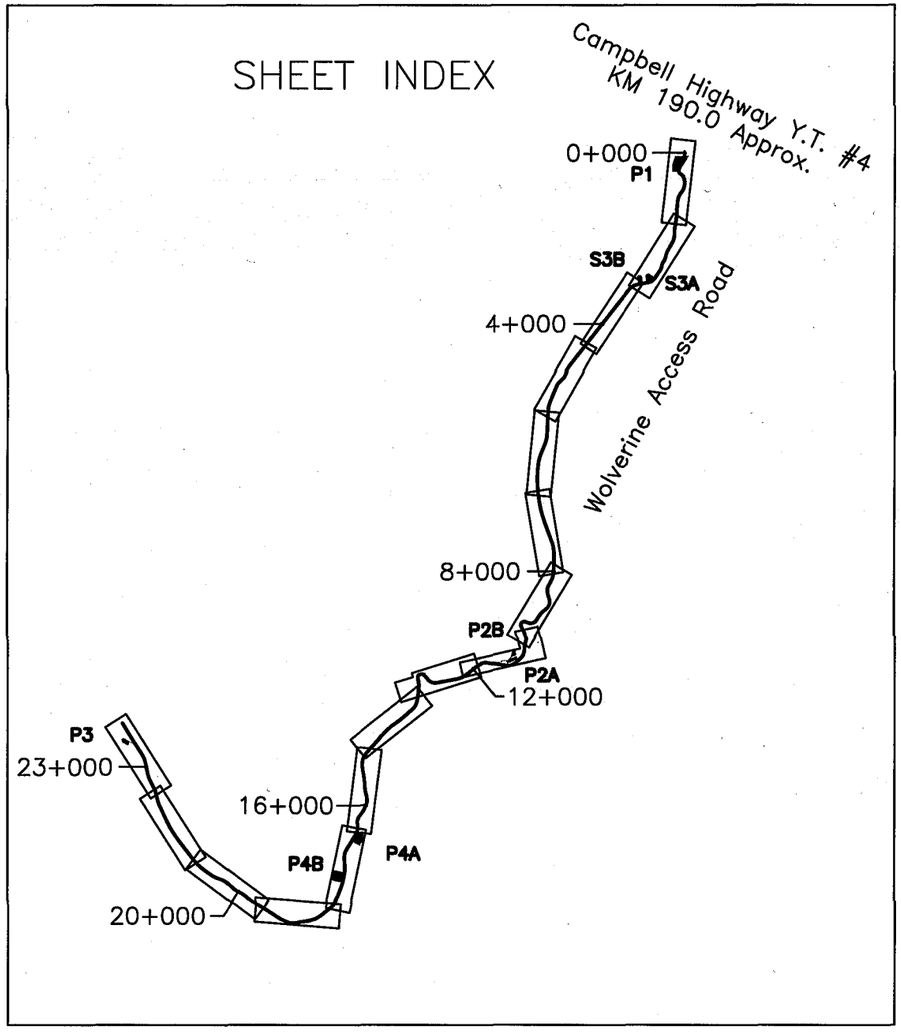
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

OCTOBER 2006

PIT	STA	O/S	GROSS AREA (Ha.)	NET AREA (Ha.)	AVG DEPTH (m)	COMMON (m^3)	GRANULAR SURFACING (m^3)	CONCRETE AGGREGATE (m^3)	TOTAL (m^3)
P1	350	0	5.3	2.7	2	3,000	3,000	-	6,000
S3A	2700	70	1.6	0.8	2	9,000	3,000	-	12,000
S3B	2950	70	1.1	0.6	2	-	9,000	-	9,000
P2A	11200	60	1.0	0.5	2	-	8,000	-	8,000
P2B	11100	130	0.6	0.5	2	-	5,000	5,000	5,000
P4A	16700	-100	2.9	1.5	2	22,000	7,000	-	29,000
P4B	17450	110	3.0	1.5	2	23,000	7,000	-	30,000
P3	23600	-150	1.0	0.5	2	-	8,000	-	8,000
TOTALS			16.5	8.5	2.0	57,000	50,000	5,000	107,000



SHEET INDEX



Yukon Zinc CORPORATION

YUKON ENGINEERING SERVICES

E06015_3_PP.dwg Oct. 24/06

ROBERT CAMPBELL HIGHWAY

GOALIE 102

GOALIE 100

GOAL

ORIGINAL PROPOSED ALIGNMENT

REVISED ALIGNMENT

P1

JD_10_4_1

JD_10_4_2

JD_10_4_3

JD_10_4_4

JD_10_3_7

JD_10_3_6

JD_10_3_5

26JD-2

26JD-3

26JD-4

VD10_4_2_G1

B.C. 0+139.35

E.C. 0+212.14

B.C. 0+264.80

E.C. 0+323.77

B.C. 0+408.09

E.C. 0+438.80

B.C. 0+457.48

E.C. 0+500

B.C. 0+595.30

E.C. 0+576.73

B.C. 0+643.27

E.C. 0+683.31

B.C. 0+734.76

E.C. 0+923.67

B.C. 0+982.30

E.C. 1+000

E.C. 1+114.26

B.C. 1+141.90

E.C. 1+259.80

B.C. 1+319.82

E.C. 1+461.1

E.C. 1+500

NOTE:
CONSTRUCT 2 LANES FROM 0+000 TO 0+100
CONSTRUCT 2 LANES FROM 0+475 TO 0+500

BORROW PRIMARY 1 AND FUTURE STAGING AND CAMP AREA

HAND CLEAR FROM 0+525 TO 0+675

VPI Sta 0+175.00 947.700
VPI Sta 0+250.00 947.500
VPI Sta 0+325.00 945.400
VPI Sta 0+425.00 948.000
VPI Sta 0+550.00 940.000
VPI Sta 0+725.00 940.000
VPI Sta 0+790.00 943.000
VPI Sta 0+900.00 943.200
VPI Sta 1+100.00 943.400
VPI Sta 1+225.00 941.200
VPI Sta 1+325.00 943.500
VPI Sta 1+440.00 941.200

-2.94% -0.27% -2.86% -2.60% -6.40% 0.00% 4.62% 0.18% 0.10% -1.76% -2.30% -2.00%

L 40 K 15
L 60 K 24
L 60 K 11
L 140 K 16
L 110 K 17
L 60 K 13
L 60 K 14
L 80 K 978
L 80 K 43
L 60 K 15
L 90 K 21
L 60 K 20

600 12.0 CSP
600 14.9 CSP
600 15.0 CSP
800 12.0 CSP
600 11.0 INS
800 13.0 CSP

Slope Stake Left
Estimated Bedrock
Design Grade
Slope Stake Right
Original Ground @ Centreline
c/w 5m FLUME
c/w 5m FLUME

0+000 100 200 300 400 500 600 700 800 900 1+000 100 200 300 400 1+500

LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
YUKON
PAUL J. KNYSH
TERRITORY
06/10/24

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

ISSUE/REVISIONS

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 0	3

YES YUKON ENGINEERING SERVICES
Yukon Zinc CORPORATION

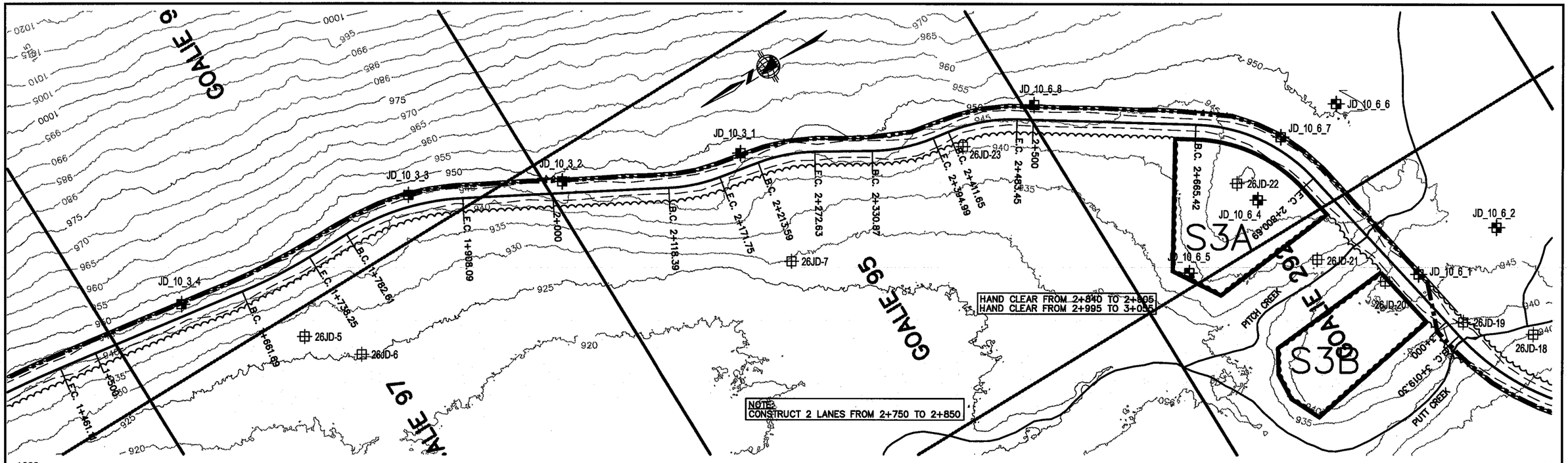
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

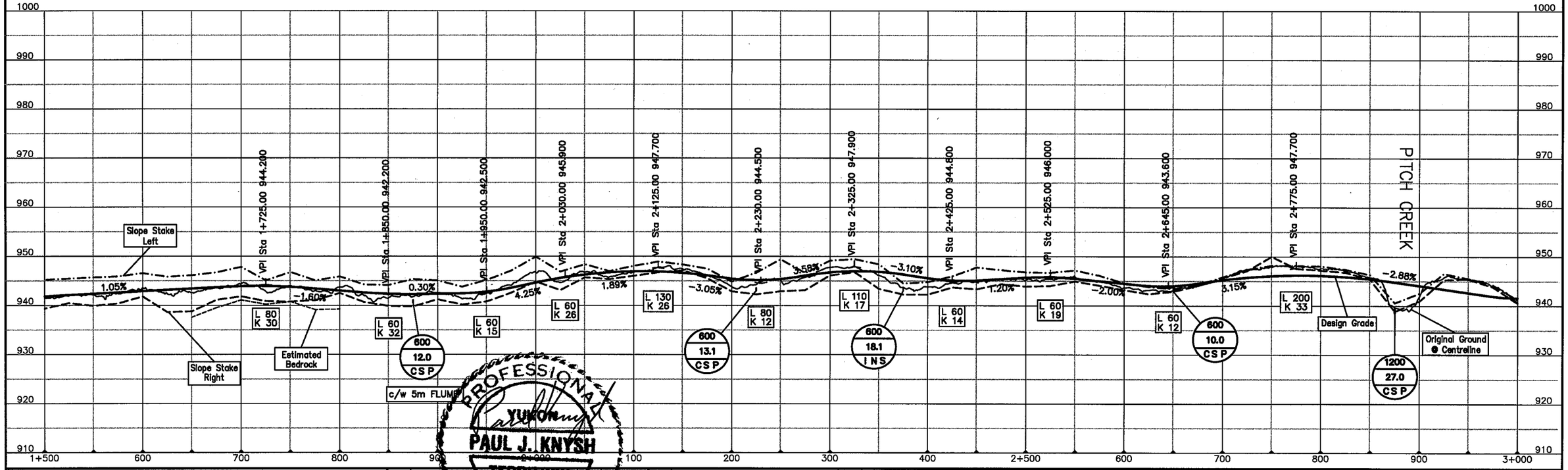
WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 0 TO KM 1.5

FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 0 - Oct 24, 2006





LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
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PROFESSIONAL ENGINEER — YUKON — PAUL J. KNYSH — TERRITORY — 06/10/24

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 1.5	3

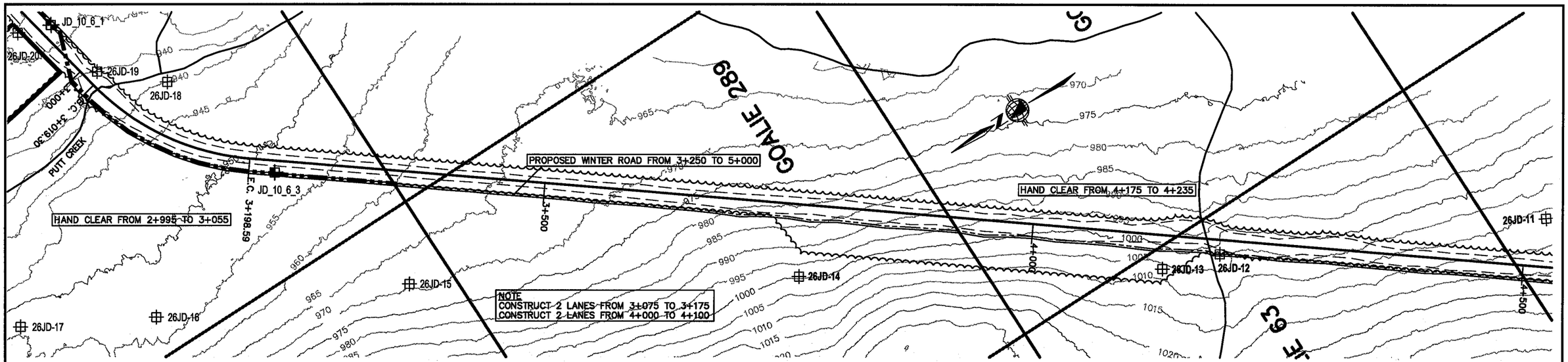
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

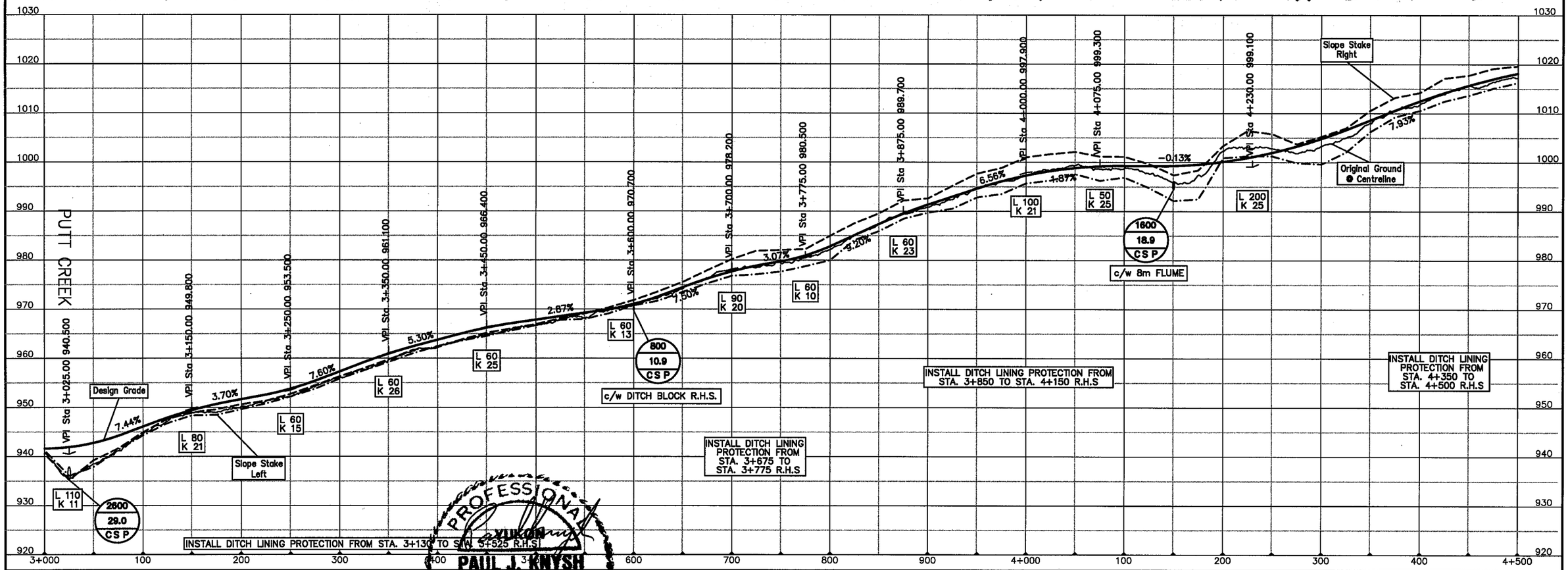
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 1.5 TO KM 3.0
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 1.5 - Oct 24, 2006





LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER YUKON PAUL J. KNYSH TERRITORY

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
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SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 3	3

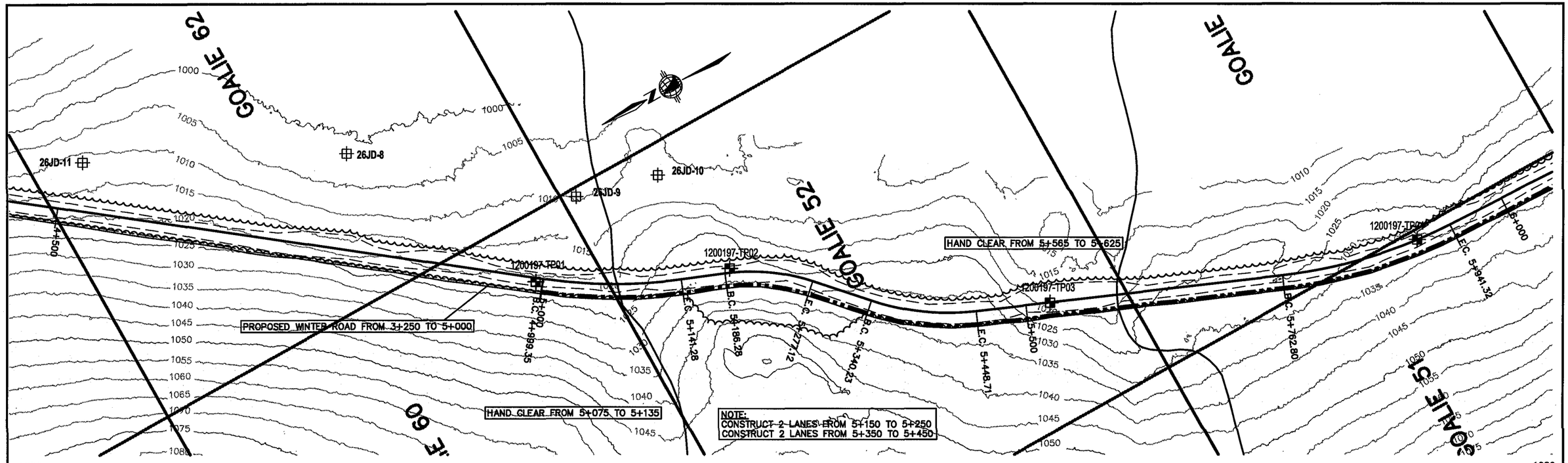
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 3.0 TO KM 4.5
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 3 – Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER YUKON PAUL J. KNYSH TERRITORY 06/10/24

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 4.5	3

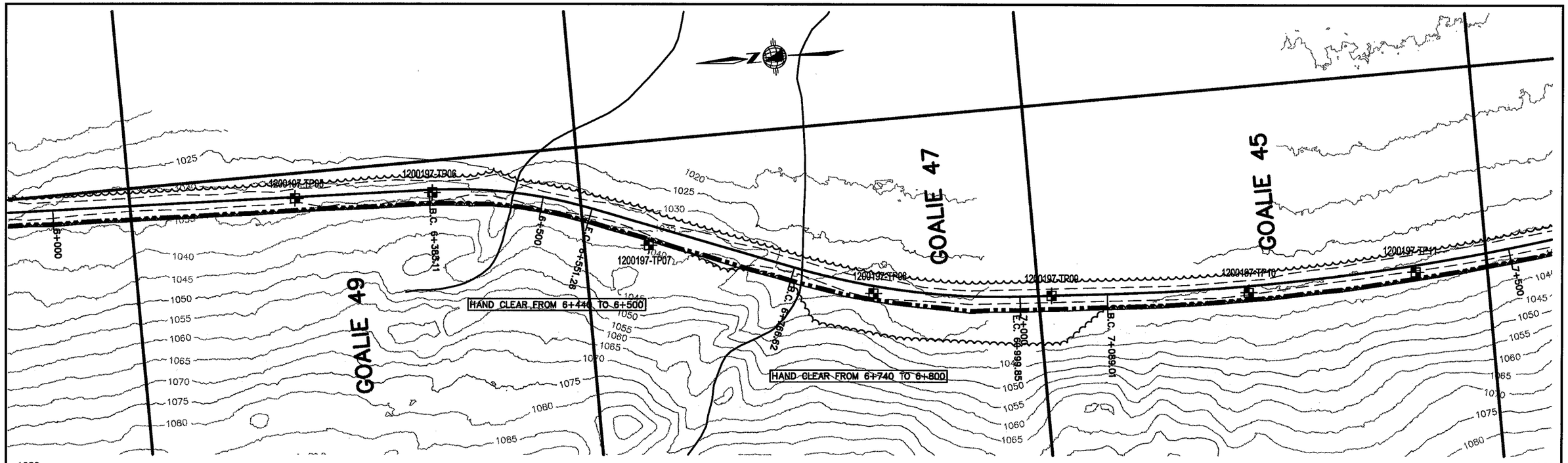
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

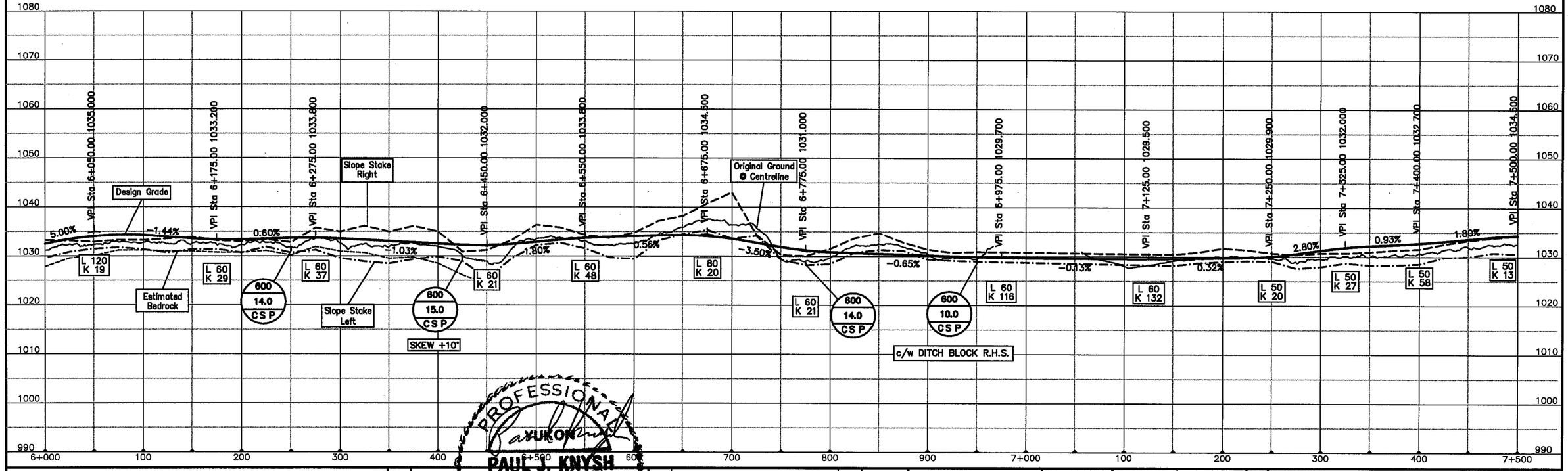
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 4.5 TO KM 6.0
FIGURE 1

S:\VDATA\E06015_3\E06015_3_PP.dwg
km 4.5 - Oct 24, 2006





LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
YUKON
PAUL J. KNYSH
TERRITORY
06/10/24

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SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 6	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

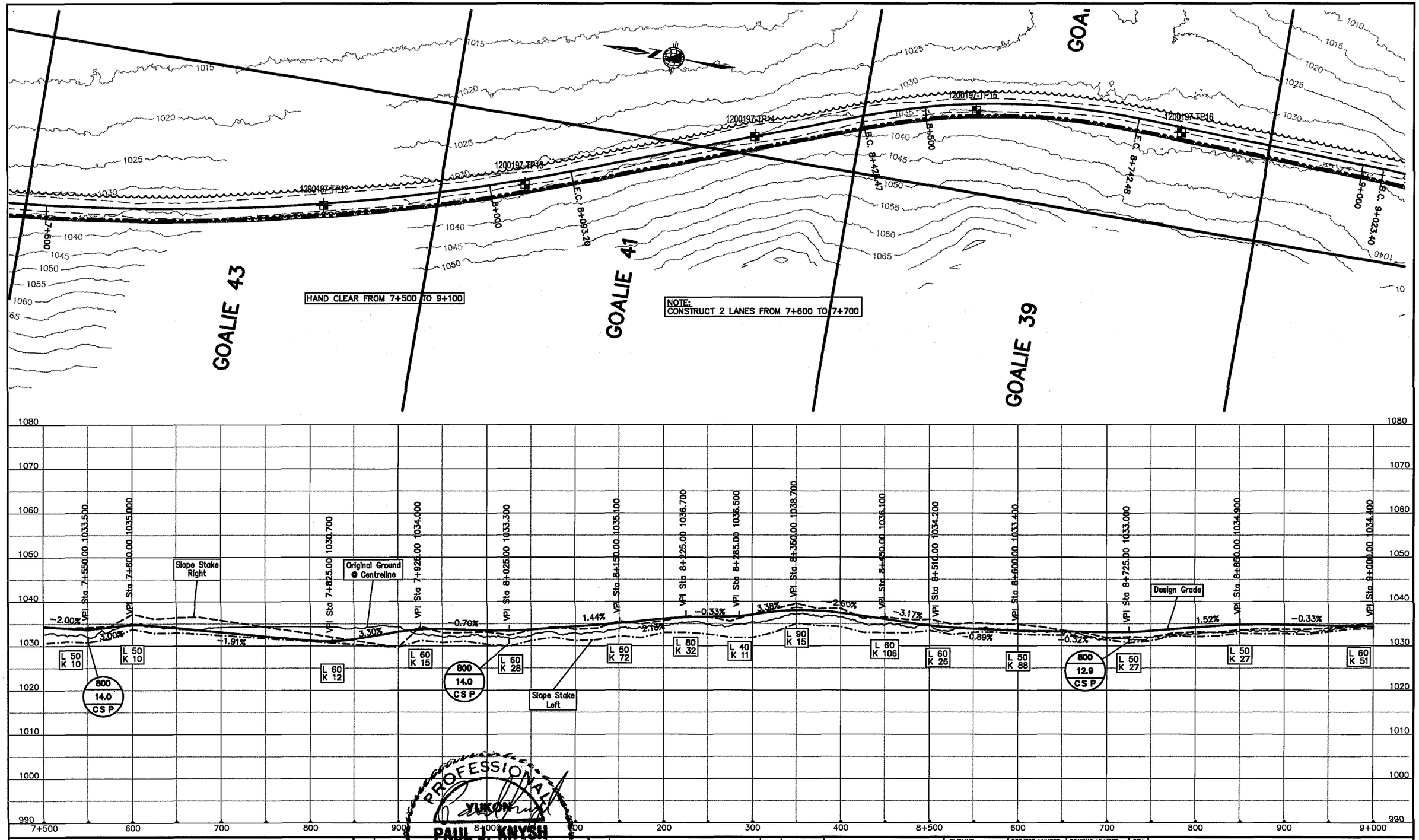
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 6.0 TO KM 7.5

FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 6 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
YUKON
PAUL J. KNYSH
TERRITORY
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SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
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CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 7.5	3

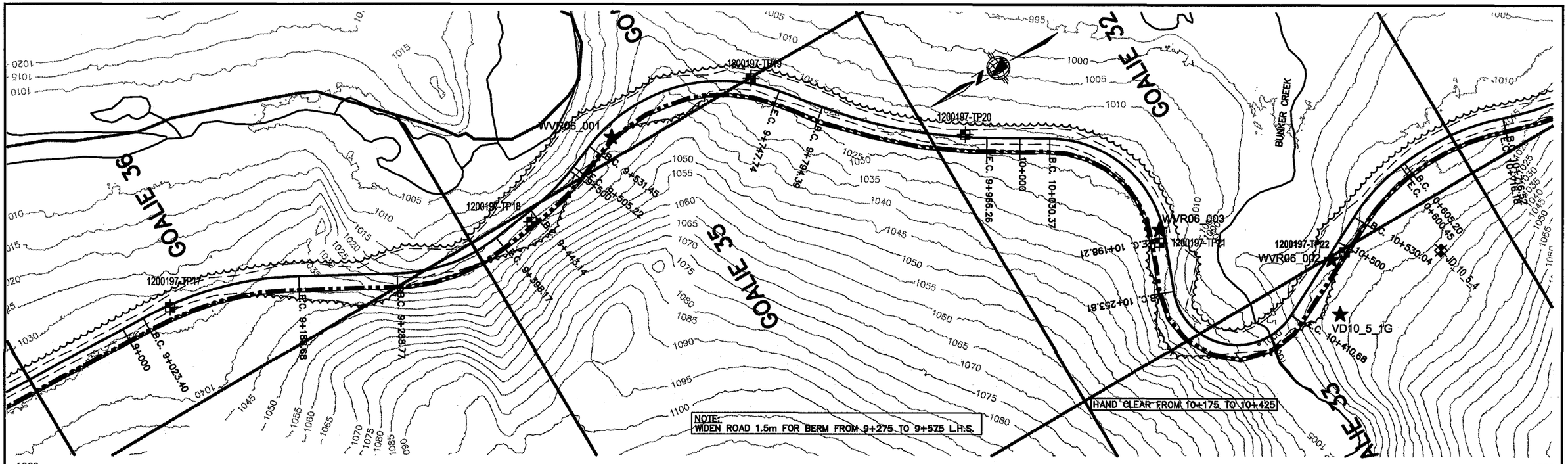
YES YUKON ENGINEERING SERVICES
Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 7.5 TO KM 9.0
FIGURE 1

S:\U099\E06015_3\E06015_3_PP.dwg
km 7.5 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

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1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 9	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 9.0 TO KM 10.5

FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 9 - Oct 24, 2006

NOTE:
CONSTRUCT 2 LANES FROM 10+275 TO 10+450
CONSTRUCT 2 LANES FROM 11+050 TO 11+115
CONSTRUCT 2 LANES FROM 11+975 TO 12+040
WIDEN ROAD 1.5m FOR BERM FROM 10+975 TO 11+150 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 11+325 TO 11+475 L.H.S.

P2A
P2B
PROPOSED BORROW PIT HAUL ROAD
GOALIE 30
GOALIE 31
GOALIE 257
BUNKER CREEK
1200197-TP23
1200197-TP24
1200197-TP25
1200197-TP26
1200197-TP27
1200197-TP28
JD_10_5_3
JD_10_5_2
JD_10_5_4
B.C. 10+856.32
B.C. 10+716.18
E.C. 10+617.28
B.C. 0+605.20
E.C. 0+600.45
B.C. 10+530.04
10+500
B.C. 11+054.61
E.C. 11+666.72
B.C. 11+724.04
E.C. 11+824.04
B.C. 11+946.18
E.C. 11+975.07
B.C. 12+132.32
E.C. 12+000

VPI Sta 10+600.00 1014.700
VPI Sta 10+690.00 1013.300
VPI Sta 10+875.00 1027.600
VPI Sta 10+975.00 1029.000
VPI Sta 11+150.00 1041.000
VPI Sta 11+300.00 1053.000
VPI Sta 11+400.00 1058.000
VPI Sta 11+600.00 1078.000
VPI Sta 11+750.00 1087.000
VPI Sta 11+850.00 1097.400

-1.56%
1.40%
7.73%
1.40%
6.86%
8.00%
5.00%
6.00%
10.40%
10.00%
7.44%

L 50 K 16
L 120 K 13
L 110 K 17
L 90 K 17
L 50 K 44
L 50 K 10
L 50 K 17
L 50 K 13
L 50 K 17

600 17.9 CSP
1200 20.0 CSP
600 19.0 CSP
600 14.0 CSP
600 16.0 CSP
600 17.0 CSP

Slope Stake Left
Slope Stake Right
Original Ground @ Centreline
Design Grade
c/w 6m FLUME
c/w DITCH BLOCK R.H.S.
SKEW -20°

INSTALL DITCH LINING PROTECTION FROM STA. 10+750 TO STA. 10+925 R.H.S
INSTALL DITCH LINING PROTECTION FROM STA. 11+150 TO STA. 11+400 R.H.S
INSTALL DITCH LINING PROTECTION FROM STA. 11+475 TO STA. 11+750 R.H.S
INSTALL DITCH LINING PROTECTION FROM STA. 11+850 TO STA. 12+475 R.H.S

10+500 600 700 800 900 11+000 100 200 300 400 11+500 600 700 800 900 12+000
990 1000 1010 1020 1030 1040 1050 1060 1070 1080 1090 1100 1110

LEGEND:
- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER
YUKON
PAUL J. KNYSH
TERRITORY
06/10/24

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
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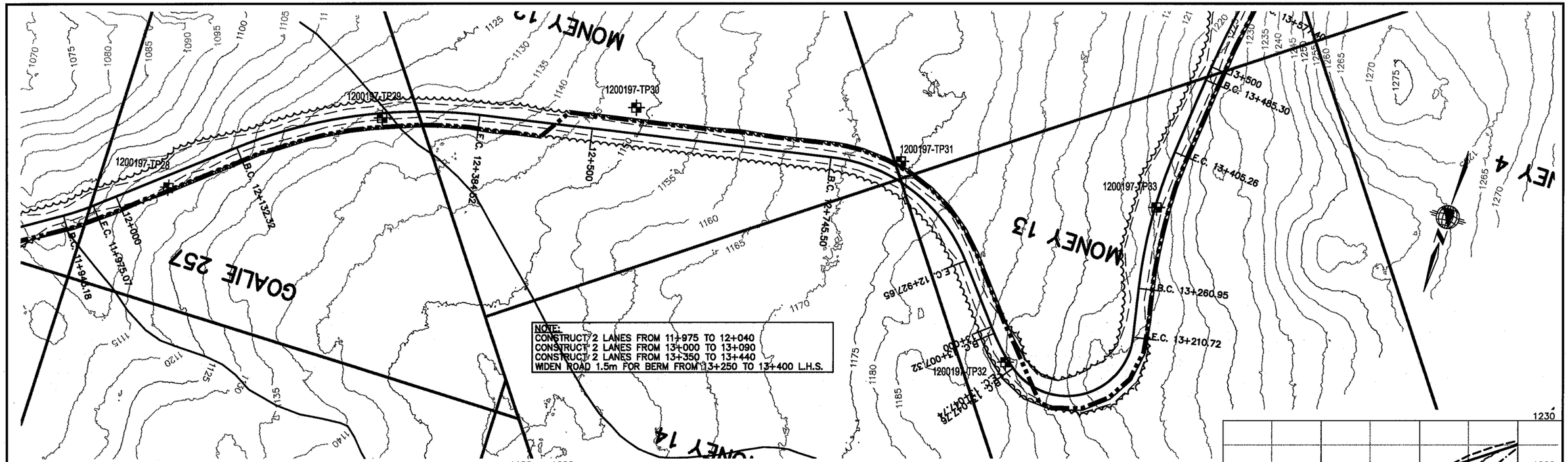
SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

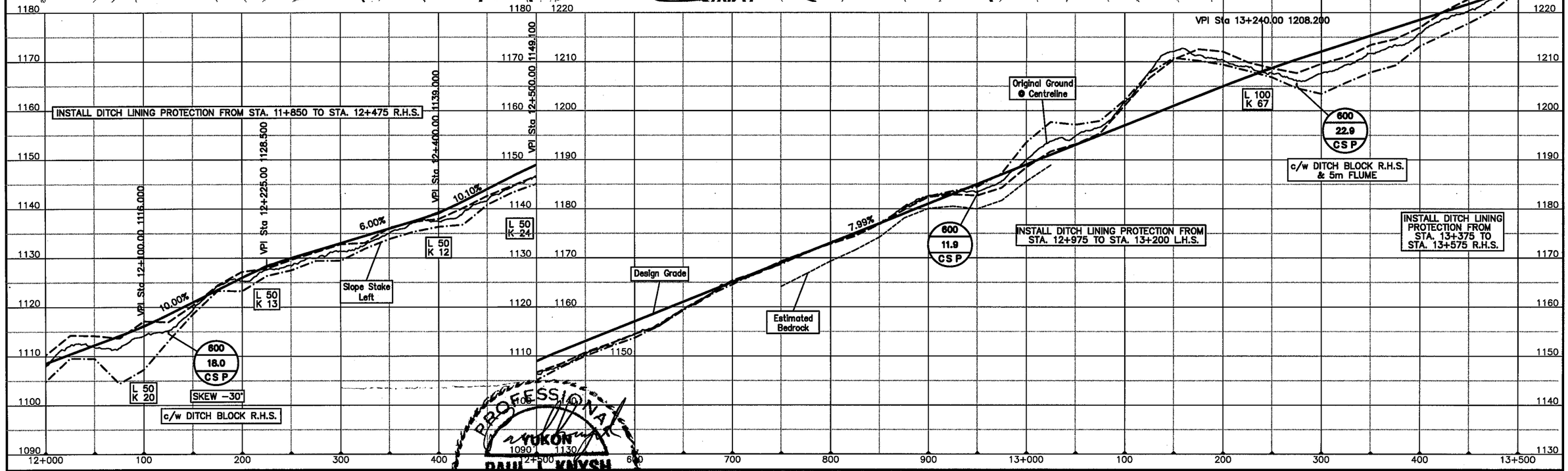
FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 10.5	3

YES YUKON ENGINEERING SERVICES
Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD
WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 10.5 TO KM 12.0
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 10.5 - Oct 24, 2006





LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
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PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 06/10/24

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 12	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 12.0 TO KM 13.5
FIGURE 1

S:\...\E06015_3_PP.dwg
km 12 - Oct 24, 2006

NOTE:
CONSTRUCT 2 LANES FROM 14+200 TO 14+290
CONSTRUCT 2 LANES FROM 14+850 TO 14+940
WIDEN ROAD 1.5m FOR BERM FROM 13+525 TO 13+600 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 13+800 TO 13+900 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 14+100 TO 14+175 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 14+375 TO 14+575 L.H.S.
WIDEN ROAD 1.5m FOR BERM FROM 14+625 TO 14+650 L.H.S.
WIDEN ROAD 1.5m FRO BERM FROM 14+850 TO 14+925 L.H.S.

MONEY 2
MONEY 1
MONEY 30
N
1200197-TP34
1200197-TP35
1200197-TP36
1200197-TP37
1200197-TP38
1200197-TP39
1200197-TP40
WVR06-004
13+647.33
E.C. 13+571.45
B.C. 13+500
B.C. 13+486.30
E.C. 13+40[illegible]
E.C. 13+611.53
B.C. 14+076.55
E.C. 14+175.87
B.C. 14+245.75
E.C. 14+408.41
B.C. 14+453.13
B.C. 14+500
E.C. 14+599.56
B.C. 14+686.04
E.C. 14+768.65
B.C. 14+889.64
E.C. 14+965.46
B.C. 15+036.37
15+060

VPI Sta 14+150.00 1275.800
VPI Sta 13+800.00 1244.500
VPI Sta 14+500.00 1300.500
VPI Sta 14+800.00 1326.500
Slope Stake Right
Original Ground @ Centreline
Design Grade
Slope Stake Left
Original Ground @ Centreline
Estimated Bedrock
Estimated Bedrock
INSTALL DITCH LINING PROTECTION FROM STA. 13+600 TO STA. 13+775 R.H.S.
INSTALL DITCH LINING PROTECTION FROM STA. 13+375 TO STA. 13+575 R.H.S.
INSTALL DITCH LINING PROTECTION FROM STA. 13+925 TO STA. 14+350 R.H.S.
INSTALL DITCH LINING PROTECTION FROM STA. 14+525 TO STA. 15+100 R.H.S.
6.48%
8.94%
7.06%
8.61%
7.29%
L 60 K 24
L 60 K 32
L 60 K 37
L 60 K 44
1000 36.0 CSP
800 19.0 CSP
800 18.9 CSP
c/w 9m FLUME
c/w DITCH BLOCK R.H.S.
c/w DITCH BLOCK R.H.S. & 10m FLUME

LEGEND:
- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

PROFESSIONAL ENGINEER YUKON TERRITORY PAUL J. KNYSH 06/10/24

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

SECTION:	
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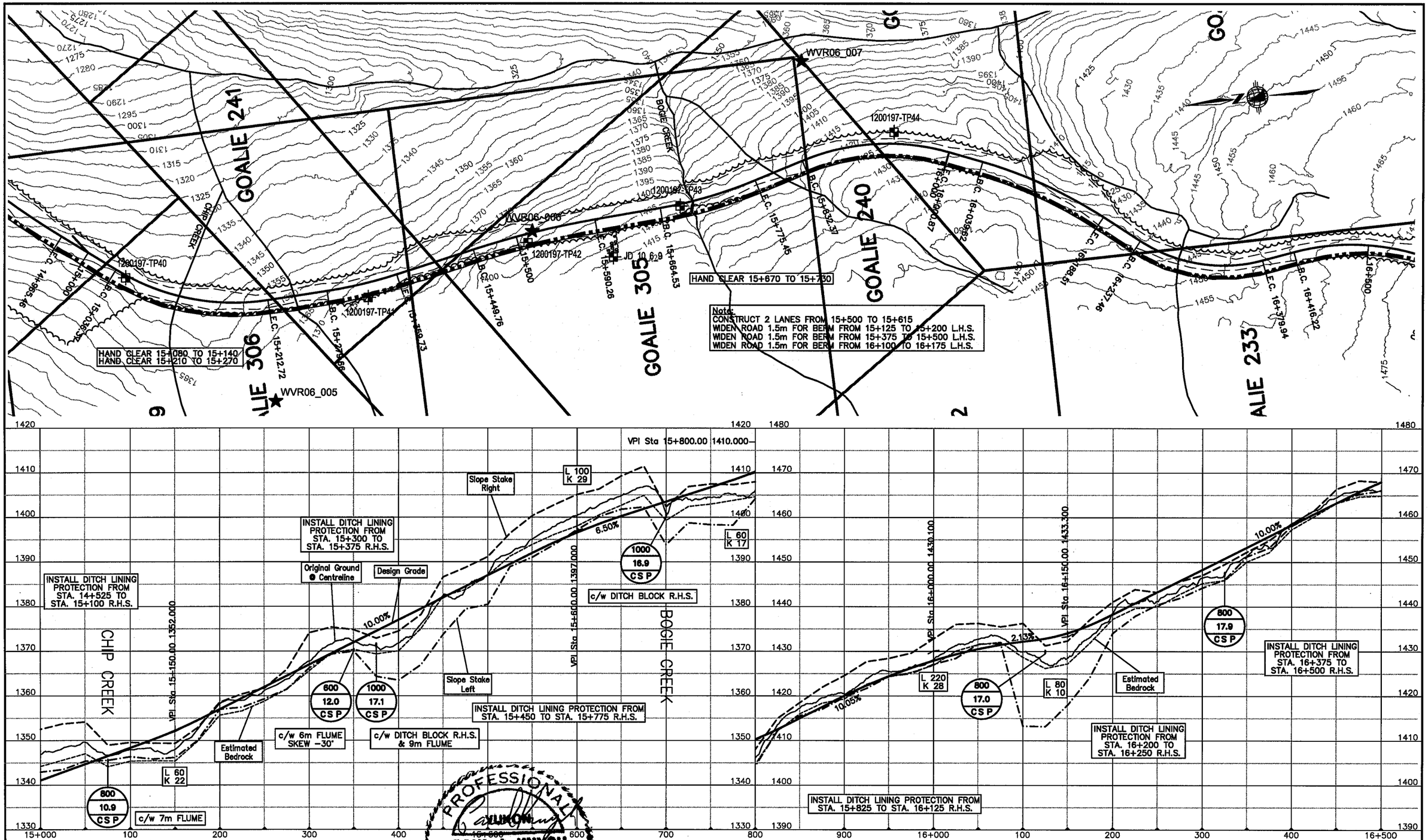
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 13.5	3

YES YUKON ENGINEERING SERVICES
Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD
WOLVERINE PROJECT
PLAN/PROFILE SHEET
KM 13.5 TO KM 15
FIGURE 1

S:\USERS\E06015_3\E06015_3_PP.dwg
km 13.5 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
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2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — 06/10/24

SECTION:	
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CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 15	3

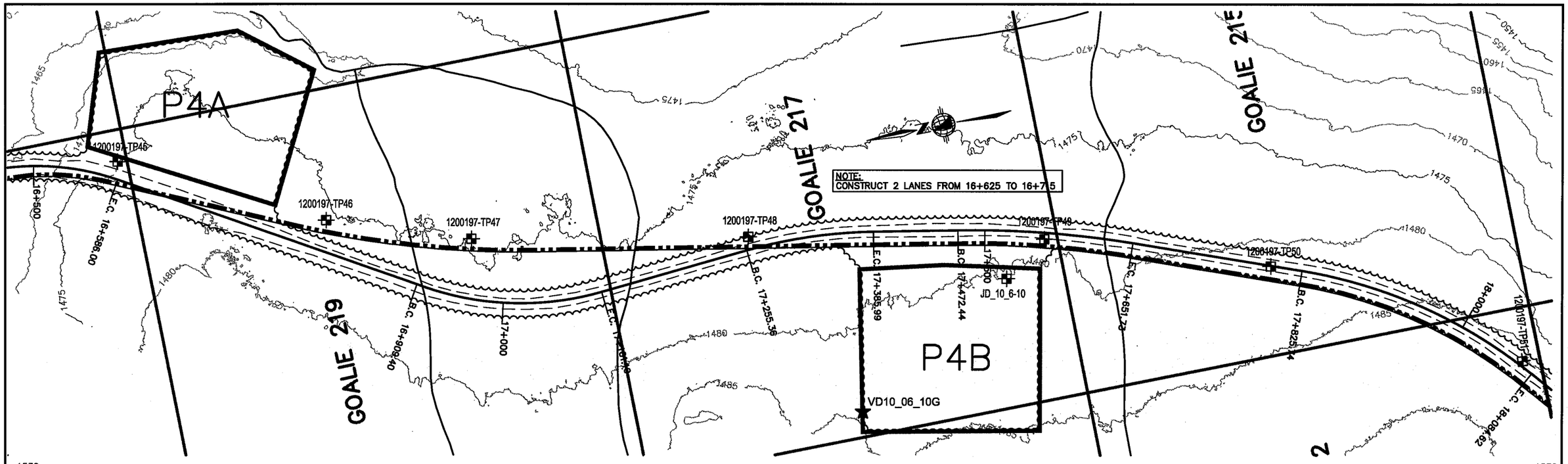
YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 15 TO KM 16.5
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 15 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH — OCTOBER 24

SECTION:	
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CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 16.5	3

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SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 16.5 TO KM 18.0

FIGURE 1

S:\DGN\E06015_3\E06015_3_PP.dwg
km 16.5 — Oct 24, 2006

LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON TERRITORY — PAUL J. KNYSH

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 18	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

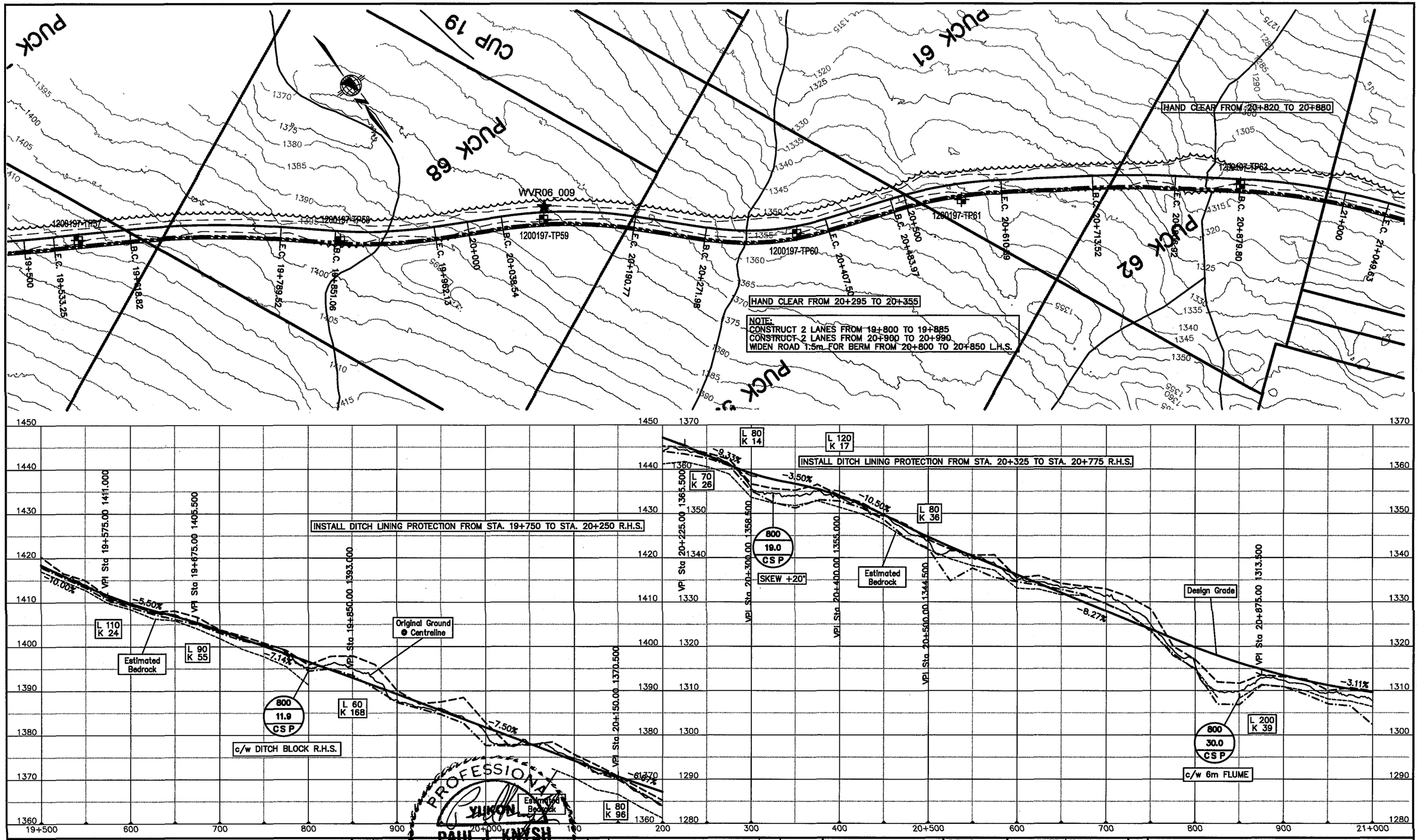
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 18.0 TO KM 19.5

FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 18 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER YUKON TERRITORY PAUL J. KNYSH

SECTION:	
SCALE: 1:4000-H 1:800-V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 19.5	3

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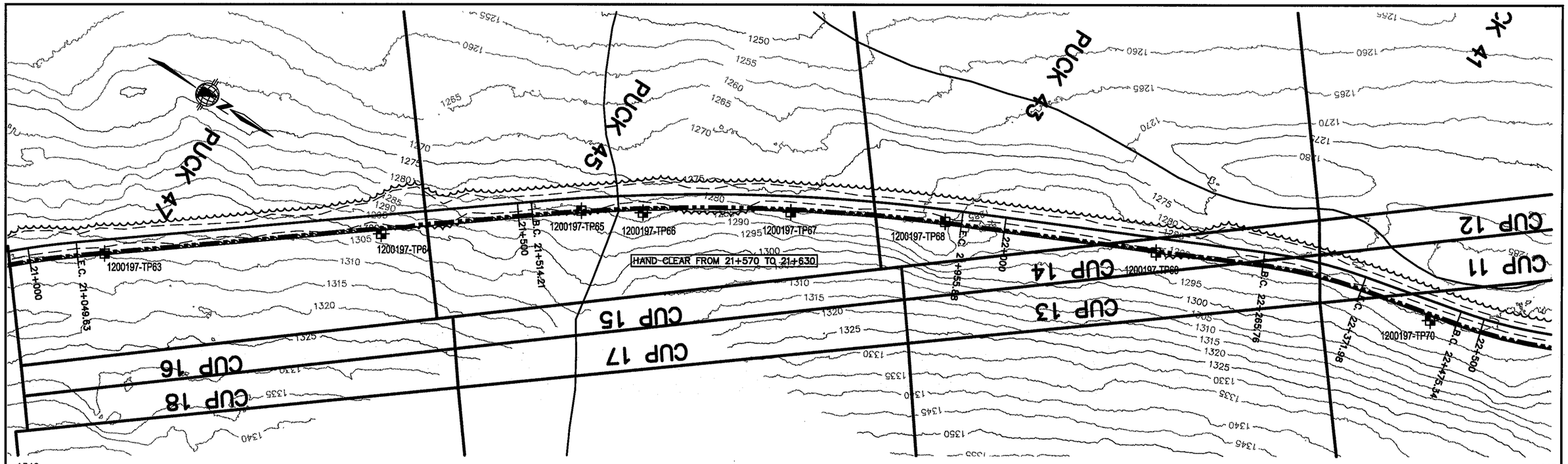
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 19.5 TO KM 21.0
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 19.5 - Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
3	REVISED FOLLOWING GEOTECH REPORT	RH	24/10/06
2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON — PAUL J. KNYSH — TERRITORY OF — 24 OCTOBER 2006

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 21	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

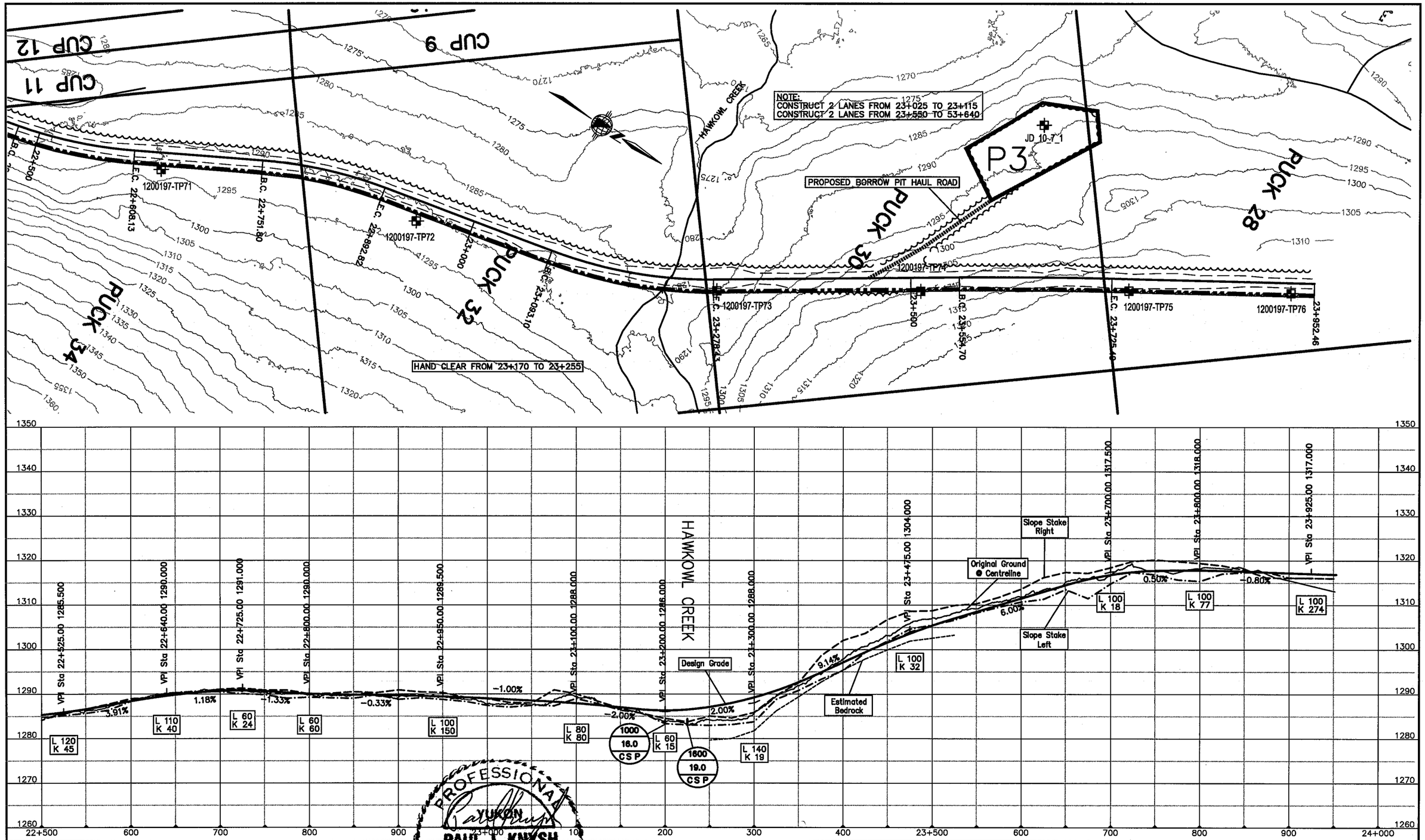
SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 21.0 TO KM 22.5

FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 21 – Oct 24, 2006



LEGEND:

- EXISTING GEOTECHNICAL TRAIL/PROPOSED WINTER ROAD
- 26JD-9 HAND DUG TESTPITS
- 1200197-TP01 TESTPITS
- WVR06-006 GEOCHEMICAL TESTPITS

NO	DESCRIPTION	BY	DATE
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2	ISSUED FOR TENDER	RH	05/06
1	ISSUED FOR DISCUSSION	RH	05/06

PROFESSIONAL ENGINEER — YUKON — PAUL J. KNYSH — TERRITORY

SECTION:	
SCALE: 1:4000–H 1:800–V	DATE
DESIGNED BY: RH	22/10/06
DRAWN BY: GCC	24/10/06
CHECKED BY: PK	24/10/06
APPROVED BY:	

FILENAME:	PROJECT NUMBER	DRAWING NUMBER	REV.
E06015_3_PP.DWG	E06015	km 22.5	3

YES YUKON ENGINEERING SERVICES — Yukon Zinc CORPORATION

SUBSEQUENT TO THE COMPLETION OF THE GEOTECHNICAL PROGRAM PROVIDING FOR THE INTERIM PROPOSED WINTER ACCESS ROAD

WOLVERINE PROJECT

PLAN/PROFILE SHEET
KM 22.5 TO KM 24.0
FIGURE 1

S:\JOBS\E06015_3\E06015_3_PP.dwg
km 22.5 - Oct 24, 2006

Appendix B

Geotechnical Evaluation, Wolverine Access Road

EBA Engineering Consultants Ltd
August 2006

YUKON ENGINEERING SERVICES LTD.
YUKON ZINC CORP.

GEOTECHNICAL EVALUATION
WOLVERINE LAKE MINE ACCESS ROAD
km 189.5 ROBERT CAMPBELL HIGHWAY
YUKON

EBA File: 1200197

August 2006

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

TABLE OF CONTENTS

1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) was retained to conduct a geotechnical evaluation of the proposed access road to the Yukon Zinc mining property at Wolverine Lake, Yukon. The work was requested by Yukon Engineering Services Ltd. (YES) of Whitehorse on behalf of Yukon Zinc Corp (YZC). The objective of the evaluation is to provide geotechnical recommendations for the construction of the access road.

The scope of work for this project was presented in a proposal and budget prepared by EBA and submitted to Robert Harvey, P.Eng. of YES in June 2006.

2.0 SCOPE OF WORK

The main tasks of the study included a review of background reports, geology, and previous terrain mapping; a hand-excavated testpit program between km 0 to km 5 to field-check terrain and soil conditions, and an excavator supported testpitting program from km 5 to km 24. The scope of work for this project consisted of the following:

- Review area geology, previous terrain mapping and air photo interpretation to examine and reassess previous mapping, slope stability and potential borrow sources
- Conduct a field program to evaluate terrain and shallow soil conditions from km 0 to km 5 using hand testpits. There is presently no access to this section of the proposed route.
- Conduct a field program to evaluate soil conditions and collect samples for laboratory testing from km 5 to km 24 using an excavator provided by YZC to dig testpits.
- Conduct geotechnical laboratory testing on soil samples collected. Tests include moisture determination on all samples and grain size analysis on select samples.
- Prepare base maps to locate all testpit locations
- Prepare interim reports and a final report to present a description of the work completed, including the results of all evaluation work, testpit logs, laboratory analysis results and geotechnical recommendations for road construction.

3.0 PROJECT BACKGROUND

The study area includes 24 km of a proposed access road that starts at km 189.5 on the Robert Campbell Highway (Yukon Highway 4) and is initially aligned south and southwest, following the valley of Light Creek past the divide at km 8 and across Bunker Creek at km 10. The alignment follows Chip Creek to km 19, where it turns northwest to eventually cross the Hawkowl Creek tributary of Money Creek, maintaining a northwest bearing to Wolverine Lake. The access road route is covered on NTS map sheets 105H/5 and 105G/8.

Part of the access road, from about km 24.5 to the Wolverine Lake Mine Site and camp at approximately km 27.5 and km 28.5 respectively, is developed as an access road to the airstrip and was not evaluated as part of this study.

4.0 METHODOLOGY

Geology and previous terrain mapping were reviewed and air photo interpretation was carried out to aid in the design of the field program. Available air photographs were of small scale, which precluded detailed terrain mapping and limited the interpretation of expected soil conditions.

Terrain field checking and hand testpitting was carried out on June 26 and June 27, 2006 using a motorhome provided by YES as a field camp based at km 190 on the Robert Campbell Highway. An excavator-supported testpitting program, based at the Wolverine Mine Site camp, was carried out from July 10 to July 13, 2006. Seventy-six testpits were excavated at about 300 m intervals and soil samples were taken within the testpits at depth intervals of 1 m and/or at changes in stratigraphy.

Moisture and grain size analysis was carried out at EBA's Whitehorse geotechnical laboratory on samples recovered during the excavator-supported test-pitting program. The results of testpit logs and lab analysis are compiled on ESEbase logs and used to provide recommendations for construction.

5.0 RESULTS AND DISCUSSION

Subsurface conditions

Seventy-six excavator testpits (km 5 to km 24) and 19 hand testpits (km 0 to km 5) were located along the road alignment to define its subsurface soil profile. Much of the alignment is underlain by shallow bedrock. A hard metavolcanic unit underlies km 0 to km 2 with a few outcrops forming low relief ridges. A veneer of peat-rich organics and/or gravelly sand colluvium typically overlies the bedrock in this section. Shallow bedrock, a soft fissile phyllite, was intersected throughout the latter half of the proposed alignment from km 14 to km 24. Surficial materials in this section were mostly colluvium with sections of till and pockets of fluvial gravels. Soil textures were variable and are described in the detailed logs of each testpit log (appended).

Near km 0 of the Wolverine Lake Access Road, at the Robert Campbell Highway, terraces of glaciofluvial gravel and sand are common and may provide convenient sources of granular fill. At km 0, however, bedrock is exposed on the shallow cutslope of the highway (Station 26JD24, Figure 1). Shallow bedrock conditions appear to continue to about km 2 of the proposed access road. Except where narrow, east-west trending outcrops occur, a thin veneer of gravelly sand colluvium or a thin, frozen organic veneer at sidehill meadow bog areas typically overlies bedrock in this area.

From about km 2.0 through km 3.2, including the crossings of Pitch Creek (km 2.90) and Light Creek (km 3.03), the terrain appears to be underlain by glaciofluvial sand and gravel. Alluvium (sand, some silt, some gravel) was observed at a low relief terrace on the west side of Light Creek (Station 26JD18, Figure 1).

Soil textures and conditions on the proposed road alignment are summarized on Table 1.

In some sections the reliability of the geotechnical testing is insufficient to provide reliable evaluation of sub-surface conditions. Testpit depths were less than 0.5 m at km 0 to km 0.5 and excavator testpits are recommended to provide deeper access from km 2 to km 5. Many excavator testpits were less than 0.5 m deep because the excavator provided was insufficient to penetrate frozen or dense soils.

Permafrost

The project area is within the zone of discontinuous permafrost. The active zone of seasonally thawed soil is estimated to be 0.5 to 2.0 m in undisturbed soils. Excess ice was present in a minority of samples and moisture contents are typically low (< 10%), although some localized high-ice content areas were observed and should be expected, usually near the base of the active layer (and typically on north-facing slopes with thick organic soil cover).

At eight of the 19 hand testpits and 25 of the 76 excavator testpits, frozen soil conditions were encountered. Depth to frozen ground ranged from about 0.3 m to 2.0 m. Frozen soil conditions were associated with thick organic cover, most of which are characterized as open, shallow gradient sideslope bog areas with black spruce/moss/larch vegetation. Testpitting with heavy equipment to depths greater than 0.5 m is required to characterize the ice content of these frozen soils—the excavator supplied for this program was not capable of these excavation requirements.

Permafrost conditions from about km 7 to km 14 may require thick fill (minimum 1500 mm) in localized sections to minimize the potential for permafrost degradation. Recommendations for construction in permafrost sections are provided in Section 7 and summarized in Table 7.1.

6.0 BORROW SOURCES

Nine potential borrow sources were selected for evaluation, including 3 primary sites and 6 secondary sites. Primary 1 at about km 0.5 and Secondary 1 at km 1 presently have no access for equipment and were not tested. However, granular glaciofluvial terraces of sand and gravel were identified at the Robert Campbell Highway near the access road. Further assessment and regulatory permitting would be required prior to acquiring borrow material from these sources.

Secondary 2 and Secondary 3 sites at km 3 also have no access for equipment. However, hand testpits indicated good quality gravelly sand granular material at glaciofluvial terraces at the confluence of Light Creek and Pitch Creek. Air photo interpretation of the terrain indicates that the features hosting this material appear to cover about 15 ha and may be at least 4 m thick. However, only a fraction of the deposit may be exploitable, as the deposit is incised by both Pitch Creek and Light Creek and riparian protection zones will be required.

Testpits on the road alignment at a potential borrow source at km 5 (Secondary 4) indicate soils with favourable textures. Testpits up to 3.5 m deep intersected sandy gravels and gravelly sand with trace to some silt. Testpit TP03 intersected 0.6 m of poorly graded fine sand between 1.2 of sandy gravel and > 1.7 m of gravelly sand (some silt).

Favourable coarse textured soil was intersected from km 14.4 to km 18.4; however, shallow bedrock in this section may limit quantities. The maximum proven soil depth was 2.5 m.

Testpits to evaluate the potential for favourable granular borrow are recommended at Primary 2 (km 11) and Primary 3 (km 24).

Borrow source target locations are shown on YES Figure 3 following EBA Figures 1-7.

7.0 RECOMMENDATIONS

Road Design and Construction

General recommendations for construction of the road include placement of uniform 300 mm granular fill in areas of shallow bedrock and unfrozen soils. Embankments of fill slopes should be constructed with slopes of 2:1. In primarily granular areas, the imported fill may be eliminated, but adequate ditches for road drainage must be provided.

In areas of frozen soil (permafrost), a uniform minimum fill of 1500 mm, including a cap of 300 mm granular fill, is recommended. Ground should be prepared by hand-clearing the vegetation at the site. Non-woven heavy highway-grade geotextile will be overlain on undisturbed ground over cut vegetation on an area equivalent to the footprint of the access road. Overlap of geotextile segments will be 1 m. Assuming a road surface width of 4.5 m, the average width of the access road footprint is approximately 10.5 m.

Twelve sections with unique ground conditions and accompanying recommendations for construction are described in Table 7.1 (following page). The ground conditions characterized are extrapolated from test pit results at typical spacing of about 300 m. During road construction, actual ground conditions may differ from that described. The recommendations in Table 7 are intended as a guide for those sections with the conditions in the accompanying description. If conditions encountered during construction are different from that described, EBA should be consulted to provide suitable recommendations.

After stripping, the subgrade must be compacted to at least 98% Standard Proctor maximum dry density (ASTM D698). All imported fill must be compacted in maximum lift thickness of 300 mm, with each lift compacted to at least 98% Standard Proctor maximum dry density (ASTM D698).

Site Grading, Surface Conditions, Groundwater and Drainage

Permafrost and shallow bedrock presents a barrier to vertical percolation of groundwater. In most sections, much of the run-off is transported downslope as shallow groundwater "sheet" drainage (e.g., km 0 to km 2, km 7 to km 22.5 and km 23.5 to km 24). In these areas, collecting drainage in ditches and concentrating drainage flow to culverts can be problematic where culvert outflows scour sensitive slopes (e.g., fine-textured soil, permafrost). In these sections, care should be taken to place culverts at all existing watercourses, with emphasis on small ephemeral or intermittent watercourses that may not be immediately visible to the untrained eye. Where culverts are required between natural watercourses, they should be placed at the ground surface and outflows should be armoured with rip rap to disperse energy during high flow periods. Construction of sub-grade with a permeable course of large boulders is preferred on wet slopes where natural watercourses have not developed.

Table 7.1 SITE DESCRIPTION and CONSTRUCTION PRESCRIPTION

KP	TESTPITS	DESCRIPTION	RECOMMENDATIONS for CONSTRUCTION
0 - 2.0	JD1 to JD6	Peat organic veneer and/or colluvium overlying competent bedrock (rock not confirmed at JD6)	strip organic layer and stockpile for future rehabilitation; minimum 300 mm granular fill; good granular borrow material available at glaciofluvial terraces observed at Robert Campbell Highway.
2.0 - 2.5	JD7 and JD23	Peat organic veneer overlying fluvial gravel and sand – permafrost	hand cut trees and leave ground vegetation undisturbed; cover with heavy highway grade geotextile with minimum 1500 mm fill, including 300 mm granular cap; borrow material available at glaciofluvial terraces observed at Robert Campbell Highway.
2.5 - 4	JD22 to JD14	Fluvial gravel and sand; unfrozen at shallow depths;	strip organic layer and stockpile for future rehabilitation; good granular borrow material in this area, but access limited by streams;
4.0 - 4.7	JD13 and JD11	Gravelly sand colluvium overlying till; unfrozen;	strip organic layer and stockpile for future rehabilitation; cap with minimum 300 mm granular fill; build embankments at a slope of 2:1; good borrow material at km 5;
4.7 - 4.9	JD8	Gravelly silty sand colluvium [overlying till?]; permafrost	hand cut trees and leave ground vegetation undisturbed; cover with unwoven heavy highway grade geotextile with minimum 1500 mm granular fill; use 1 m overlap with adjacent geotextile lengths.
4.9 - 7.1	JD9; TP01 to TP09	Mainly sand and gravel, trace to some silt; some sections of sandy silt with some gravel; unfrozen [frozen soil at 0.4m, TP04 assumed to be within seasonally active zone]; km 6.2 and 6.4: depth to bedrock 1.5 m and 1.8 m, but deeper in other sections (> 3.5 m at km 5.2 and 6.9).	strip organic layer and stockpile for future rehabilitation; minimum 300 mm granular fill over bedrock and silty till with embankments at a slope of 2:1; good borrow material at km 5;
7.1 – 9.9	TP10 to TP 20	Variable texture: fine to coarse grained; permafrost.	hand cut trees and leave ground vegetation undisturbed; cover with unwoven heavy highway grade geotextile with minimum 1500 mm granular fill, build embankments at a slope of 2:1;
9.9 – 13.9	TP21 TO TP35	Permafrost is encountered at depth (1.6 to 2.8 m) [frozen soil at 0.3 m in TP31 is assumed to be due to seasonal frozen conditions]; some sections have moderate gradient (27-49%) sideslopes;	fill construction is preferred in this section; however, cut and fill may be acceptable depending upon specific foundation conditions encountered during construction (field decision);
13.9 - 19.7	TP36 to TP57	Variable texture: mostly sandy silty gravel to gravelly sandy silt; some sections of gravelly silty sand; bedrock was intersected at depths of 1.5 m to 2.5 m; unfrozen.	strip organic layer, stockpile for future rehabilitation; minimum 300 mm granular fill with embankments at slope of 2:1
19.7 - 22.5	TP58 to TP70	Variable texture: sandy silty gravel to gravelly silty sand; some sections of gravelly sandy silt; shallow, soft, fissile bedrock; unfrozen.	strip organic layer, stockpile for future rehabilitation; minimum 300 mm granular fill with embankments at slope of 2:1;
22.5 - 23.5	TP71 to TP73	Variable texture; silty sand, sandy gravel, sandy silt; unfrozen; bedrock not intersected; pit depth ranged from 2.5 m to 4.0 m;	strip organic layer, stockpile for future rehabilitation; minimum 300 mm granular fill with embankments at slope of 2:1;
23.5 - 23.9	TP74 to TP76	Variable texture: sandy silty gravel to gravelly silty sand; some sections of gravelly sandy silt; shallow, soft, fissile bedrock [phyllite]; unfrozen.	strip organic layer, stockpile for future rehabilitation; minimum 300 mm granular fill with embankments at slope of 2:1;

8.0 CLOSURE

Conclusions and recommendations presented herein are based on observations of land-surface and shallow soil conditions, current understanding of slope processes and the review of previous geology and terrain mapping. This report has been prepared for use by Yukon Engineering Services and Yukon Zinc Corp., which includes distribution as required for purposes for which this investigation was commissioned. This evaluation has been carried out in accordance with generally accepted engineering and geoscience practice, and engineering/geoscience judgement has been applied in developing the recommendations in this report. The report incorporates and is subject to the General Conditions attached as Appendix A.

Respectfully submitted,
EBA Engineering Consultants Ltd.

PROFESSIONAL ENGINEER
YUKON TERRITORY
J. RICHARD TRIMBLE

Aug 17/06

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Project Director, Yukon Region
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e-mail: rtrimble@eba.ca

PERMIT TO PRACTICE
EBA ENGINEERING CONSULTANTS LTD.
SIGNATURE
Date Aug 17/06
PERMIT NUMBER PP003
Association of Professional Engineers of Yukon

FIGURES

1200197-TP64

1200197-TP63

1200197-TP62

1200197-TP61

1200197-TP60

1200197-TP59

1200197-TP58

1200197-TP57

1200197-TP56

1200197-TP55

1200197-TP54

1200197-TP53

1200197-TP52

1200197-TP51

1200197-TP50

1200197-TP49

1200197-TP48

1200197-TP47

1200197-TP46

1200197-TP45

21+000

20+000

19+000

18+000

17+000

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SCALE 1:7500

LEGEND:

- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

NOTES:

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2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

C:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 6] August 16, 2006 - 1:30pm jbuyck

EBA Engineering Consultants Ltd.	CLIENT Yukon Zinc CORPORATION / Yukon Engineering Services			PROJECT	GEOTECHNICAL ASSESSMENT WOLVERINE LAKE ACCESS ROAD
				TITLE	SITE PLAN SHOWING TESTHOLE LOCATIONS
DWN. JSB	CHKD. JRT				
EBA JOB NO. 1200000.xxx	FILE: 1200197 EBA TP.dwg	REVISION NO.: 1	DATE: Aug. 2006		Figure 6

1200197-TP37
1200197-TP38
1200197-TP39
1200197-TP40
1200197-TP41
1200197-TP42
1200197-TP43
1200197-TP44
1200197-TP45
1200197-TP46
1200197-TP35
1200197-TP36
1200197-TP3
E.C. 16+002
E.C. 15+000
E.C. 14+000
E.C. 13+000
E.C. 12+000
E.C. 11+000
E.C. 10+000
E.C. 9+000
E.C. 8+000
E.C. 7+000
E.C. 6+000
E.C. 5+000
E.C. 4+000
E.C. 3+000
E.C. 2+000
E.C. 1+000
E.C. 0+000
Diamond 16+890
Diamond 16+286
Diamond 15+799
Diamond 15+247
Diamond 14+794
N

0 50 100 150 250 500

SCALE 1:7500

NOTES:
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2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

LEGEND:
- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

EBA Engineering Consultants Ltd.

CLIENT: Yukon Zinc Corporation; Yukon Engineering Services

PROJECT: GEOTECHNICAL ASSESSMENT
WOLVERINE LAKE ACCESS ROAD

TITLE: SITE PLAN SHOWING
TESTHOLE LOCATIONS

DWN. JSB	CHKD. JTD/JRT		
EBA JOB NO. 1200197	FILE: 1200197 EBA TP.dwg	REVISION NO.: 1	DATE: Aug. 2006

Figure 5

Q:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 5] August 16, 2006 - 1:32pm jbuyck

1200197-TP18
1200197-TP19
1200197-TP20
1200197-TP21
1200197-TP22
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1200197-TP25
1200197-TP26
1200197-TP27
1200197-TP28
1200197-TP29
1200197-TP30
1200197-TP31
1200197-TP32
1200197-TP33

LEGEND:

HAND DUG TESTPITS (JUNE 2006)

TESTPITS (JULY 2006)

0 50 100 150 250 500

SCALE 1:7500

NOTES:
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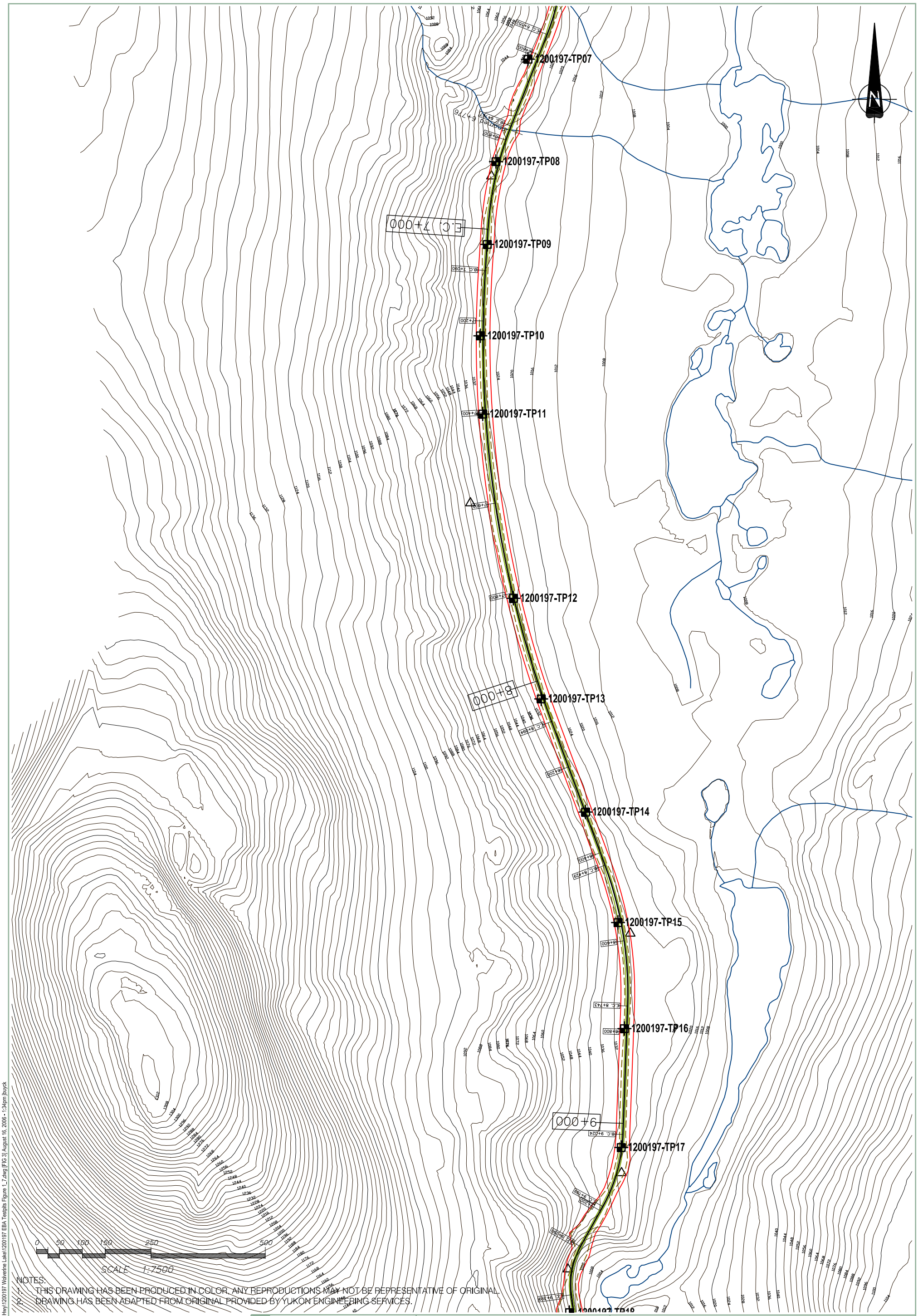
2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

EBA Engineering Consultants Ltd.		CLIENT Yukon Zinc CORPORATION / Yukon Engineering Services		PROJECT	GEOTECHNICAL ASSESSMENT WOLVERINE LAKE ACCESS ROAD
				TITLE	SITE PLAN SHOWING TESTHOLE LOCATIONS
DWN. JSB	CHKD. JRT				
EBA JOB NO. 1200197		FILE: 1200197 EBA TP.dwg	REVISION NO.: 1	DATE: Aug. 2006	Figure 4

C:\Whitehorse\Data\0201\drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 4] August 16, 2006 - 1:33pm Buyck



NOTES:
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2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

LEGEND:
- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

EBA Engineering Consultants Ltd.

CLIENT: Yukon Zinc CORPORATION; Yukon Engineering Services

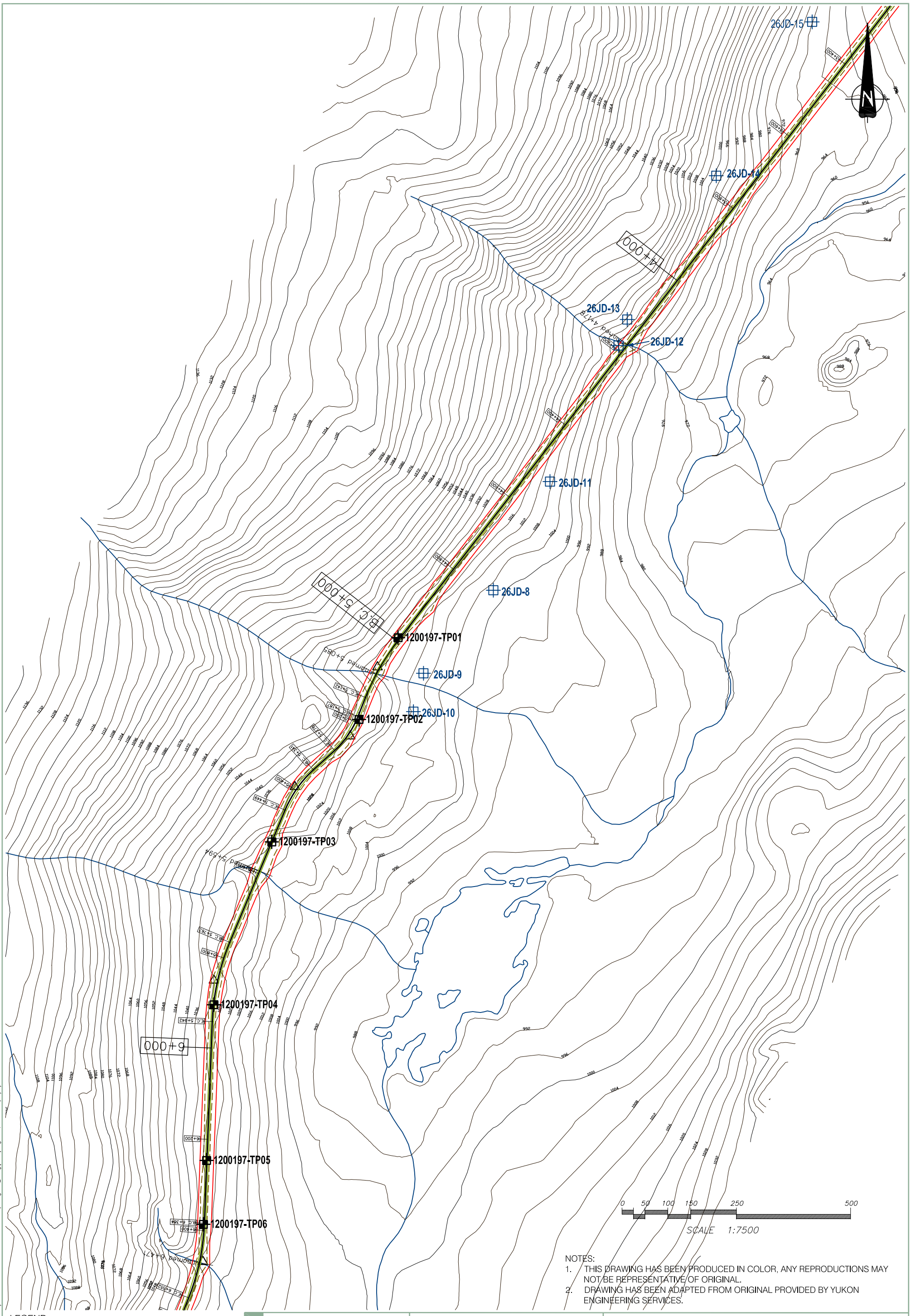
PROJECT: GEOTECHNICAL ASSESSMENT
WOLVERINE LAKE ACCESS ROAD

TITLE: SITE PLAN SHOWING
TESTHOLE LOCATIONS

DWN. JSB	CHKD. JTD/JRT		
EBA JOB NO. 1200197	FILE: 1200197 EBA TP.dwg	REVISION NO.: 1	DATE: Aug. 2006

Figure 3

Q:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 3] August 16, 2006 - 1:34pm jbuyck



LEGEND:

- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

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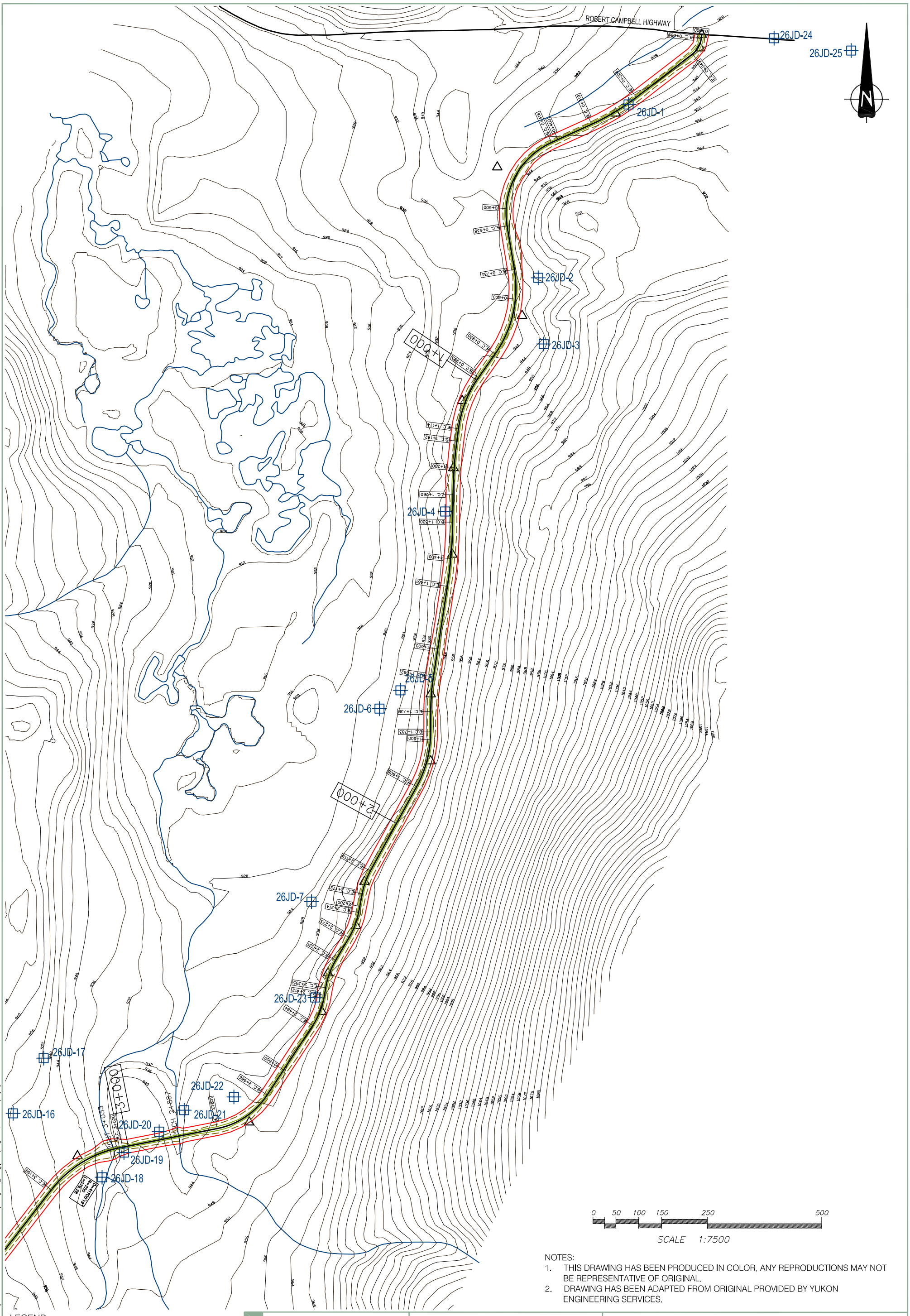
2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

EBA Engineering Consultants Ltd.	CLIENT: Yukon Zinc Corporation / Yukon Engineering Services	PROJECT: GEOTECHNICAL ASSESSMENT WOLVERINE LAKE ACCESS ROAD	
DWN. JSB / CHKD. JTD/JRT		TITLE: SITE PLAN SHOWING TESTHOLE LOCATIONS	
EBA JOB NO. 1200197	FILE: 1200197 Fig 2.dwg	REVISION NO.: 1	DATE: Aug. 2006

Figure 2

Q:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 2] August 16, 2006 - 1:35pm jbuyck



LEGEND:

- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

NOTES:

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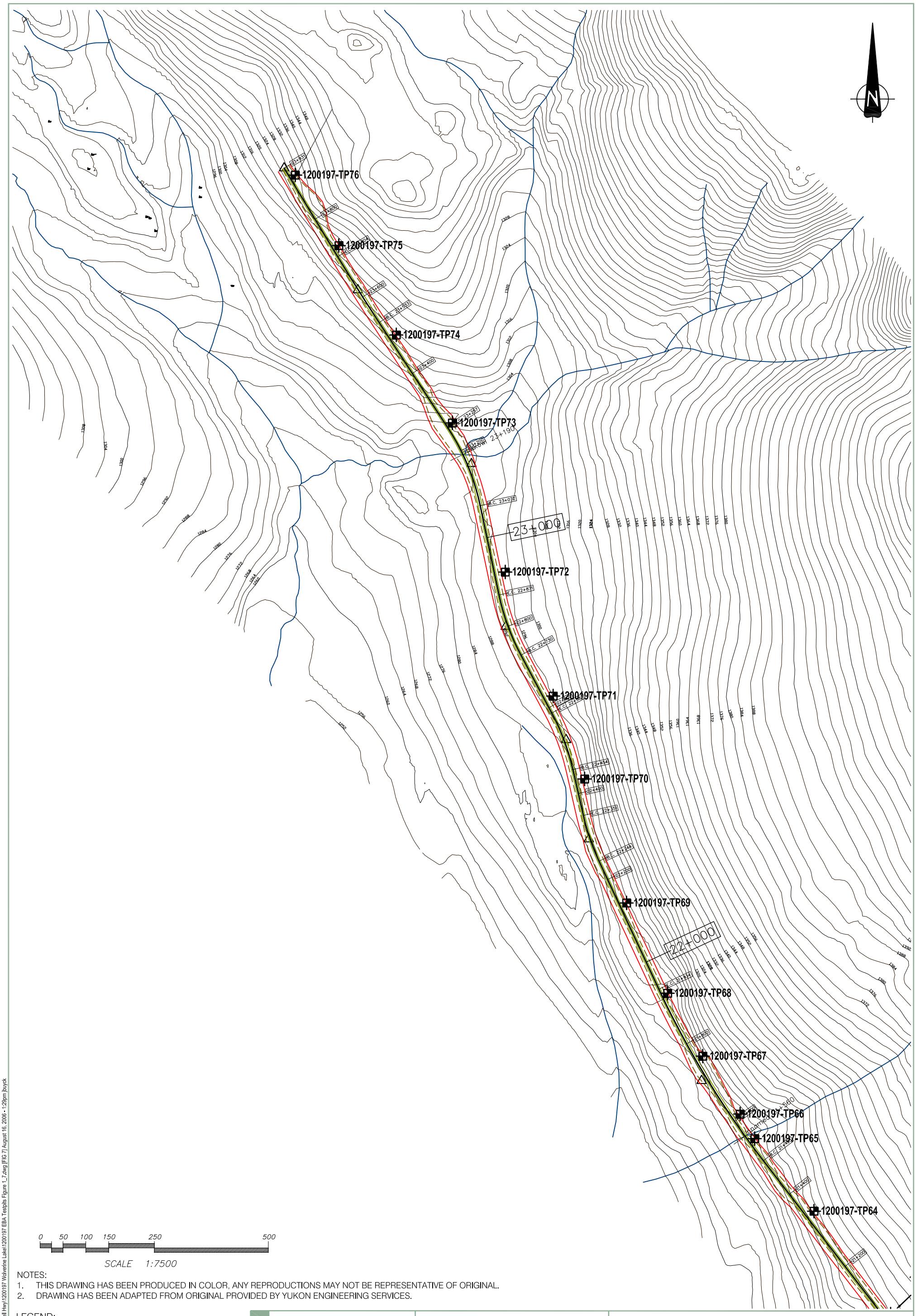
2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

EBA Engineering Consultants Ltd.	CLIENT: Yukon Zinc Corporation; Yukon Engineering Services	PROJECT: GEOTECHNICAL ASSESSMENT WOLVERINE LAKE ACCESS ROAD	
DWN. JSB / CHKD. JTD/JRT		TITLE: SITE PLAN SHOWING TESTHOLE LOCATIONS	
EBA JOB NO. 1200197	FILE: 1200197 Fig 1.dwg	REVISION NO.: 1	DATE: Aug. 2006

Figure 1

Q:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 1] August 16, 2006 - 1:35pm jbuyck



NOTES:
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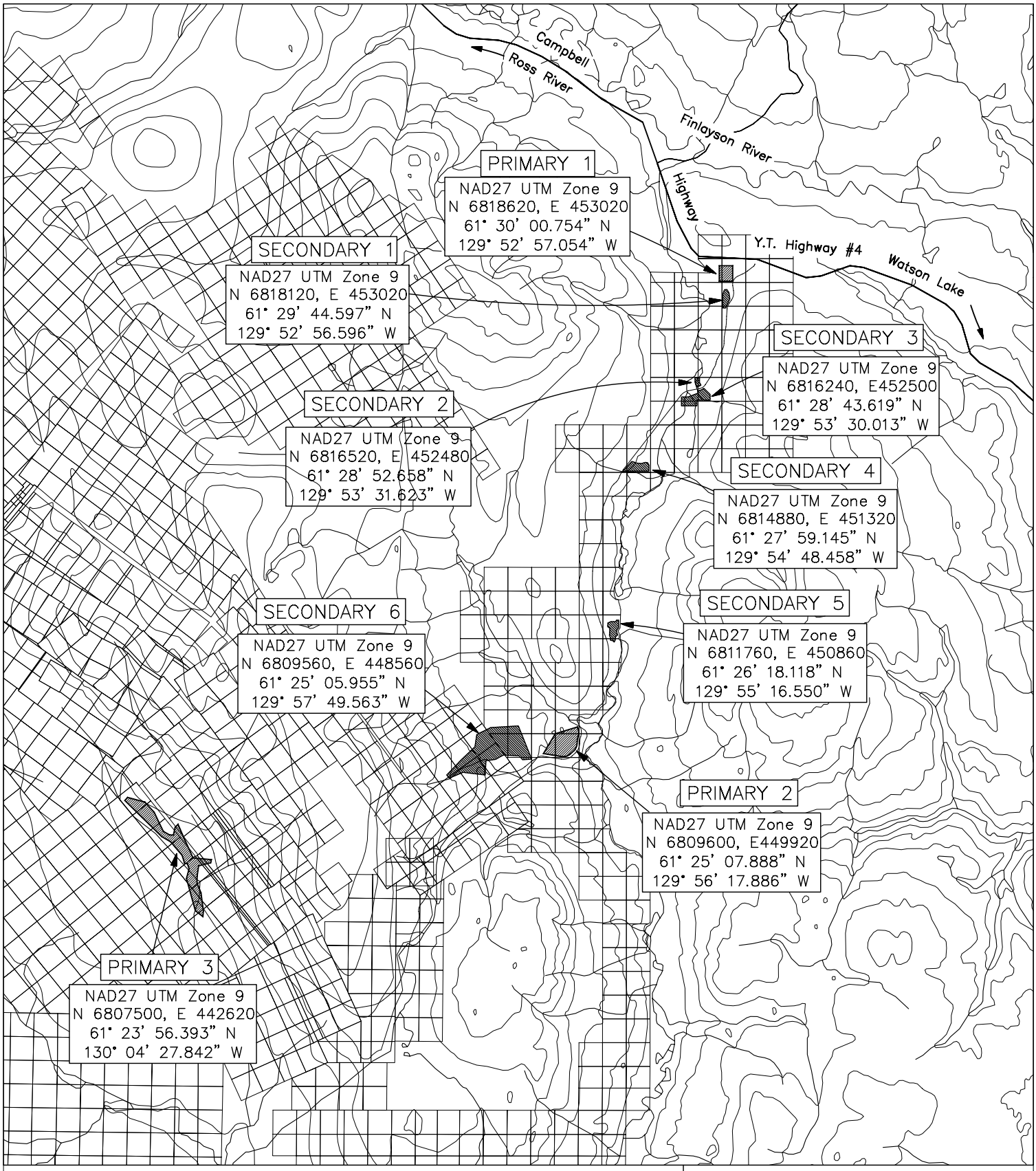
2. DRAWING HAS BEEN ADAPTED FROM ORIGINAL PROVIDED BY YUKON ENGINEERING SERVICES.

LEGEND:
- HAND DUG TESTPITS (JUNE 2006)
- TESTPITS (JULY 2006)

EBA Engineering Consultants Ltd.	CLIENT: Yukon Zinc Corporation; Yukon Engineering Services	PROJECT: GEOTECHNICAL ASSESSMENT WOLVERINE LAKE ACCESS ROAD	
DWN. JSB / CHKD. JTD/JRT		TITLE: SITE PLAN SHOWING TESTHOLE LOCATIONS	
EBA JOB NO. 1200197	FILE: 1200197 EBA TP.dwg	REVISION NO.: 1	DATE: Aug. 2006

Figure 7

Q:\Whitehorse\Data\0201drawings\Campbell Hwy\1200197 Wolverine Lake\1200197 EBA Testpits Figure 1_7.dwg [FIG 7] August 16, 2006 - 1:29pm jbuyck



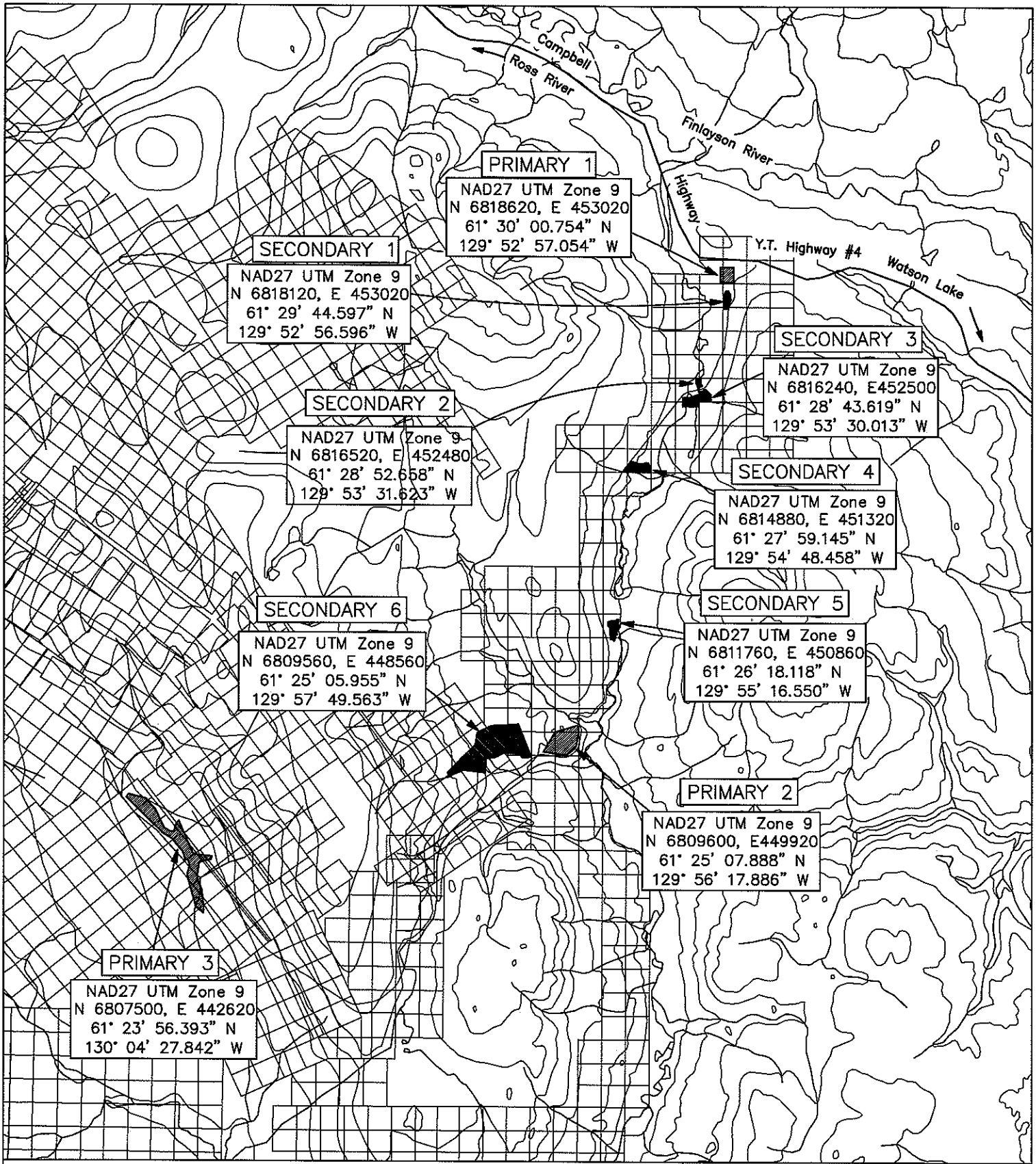
Yukon Zinc Corporation
Wolverine Access Road

Figure 3 - Wolverine Access Road
Proposed Borrow Sources

S:\INFO\DWG\LOGOS\YZC_Logo.jpg

Yukon Engineering Services

SCALE: 1:100 000	DRAWN: GCC	PROJECT: E06-015
DRAWING: Borrow Targets\Figure 3	CHECKED: PK	DATE: 31/07/06



Yukon Zinc Corporation
Wolverine Access Road

Figure 3 - Wolverine Access Road
Proposed Borrow Sources

S:\INFO\DWG\LOGOS\YZC_Logo.jpg

Yukon Engineering Services

SCALE: 1:100 000	DRAWN: GCC	PROJECT: E06-015	
DRAWING: Borrow Targets\Figure 3	CHECKED: PK	DATE: 31/07/06	

TESTPIT LOGS

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP01
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6814855 E451073	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – some sand, black, moist			
	■					SAND (TILL) – gravelly, some silt, well graded sand, fine to medium grained angular gravel, compact, damp, medium grey – coarse gravels and some cobbles throughout			2.0
1.0							FROZEN Nf, Vc, 5–10%		4.0
							UNFROZEN		6.0
2.0	■								8.0
						END OF TESTPIT 2.4 m – very hard excavating			10.0
3.0									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2.4 m
COMPLETE: 06/07/11

06/08/16 11:53AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP02
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6814672 E450975	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (TILL) – sandy, some silt, compact, moist, brownish grey			
1.0									2.0
						SAND (EOLIAN) – fine to medium grained, uniform, damp, dark grey			4.0
						– coarse gravel and cobbles below 1.8 m			
						– becomes silty below 1.8 m			6.0
2.0						– becomes gravel, sandy below 2.0 m		● ▲ ■	
									8.0
						– very compact below 2.5 m			
3.0									10.0
						END OF TESTPIT 3.5 m – very hard excavating			
									12.0
4.0									
									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

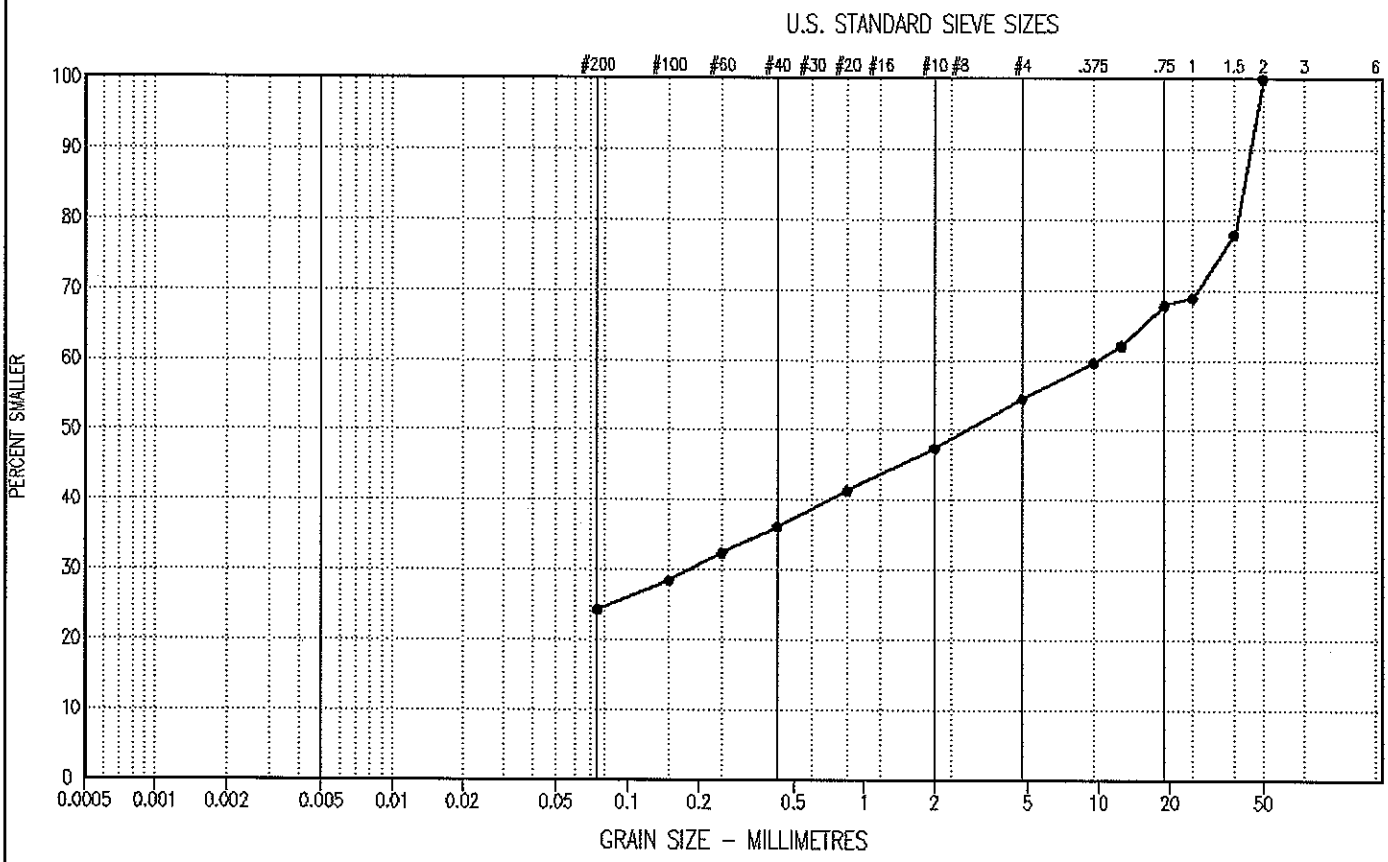
COMPLETION DEPTH: 3.5 m
COMPLETE: 06/07/11

06/08/16 11:50AM (YUKONPD4)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP02	2.00 – 2.20	--- 24 ---		30	46	–	–	

Project: 0201-1200197 Date Tested: 06/04/08 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP03
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6814451 E450810	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (TILL) – gravelly, silty, very compact, moist, grey – coarse gravel and cobbles below 0.5 m			
1.0	■								4.0
2.0	■								6.0
									8.0
3.0						END OF TESTPIT 3.0 m – very hard excavating			10.0
4.0									12.0
									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 3 m
COMPLETE: 06/07/11

06/08/16 11:50AM (YUKONP04)

Proposed Access Road	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP04
Wolverine Lake, YT	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
	UTM ZONE: 8 N6814047 E450657	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT – silty, black, frozen	UNFROZEN		0.0
						GRAVEL (TILL) – sand, silty, fine to medium grained, damp, light greyish brown	FROZEN Vc, 15–20%		
						END OF TESTPIT 0.4 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.4 m
COMPLETE:

06/08/16 11:50AM (YUKONPD4)

Proposed Access Road	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP05
Wolverine Lake, YT	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
	UTM ZONE: 8 N6813706 E450641	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT – silty	UNFROZEN		0.0
						SILT (TILL) – sandy, trace of gravel			
	■					BEDROCK – highly weathered, highly fractured, fine to coarse angular particles, saturated, dark brown			
1.0						– becomes competent with depth			2.0
▼									▼ 4.0
						END OF TESTPIT 1.5 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: 1.5 m
REVIEWED BY: JRT	COMPLETE:

06/08/16 11:51AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP06
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6813566 E450634	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SILT (TILL) – sandy, gravelly, well graded sand, fine to medium grained subangular gravel, compact, damp, light brownish grey – gravel content increases with depth			
1.0									2.0
									4.0
	■					BEDROCK (PHYLLITE) – highly weathered, coarse angular particles, grey			
						END OF TESTPIT 1.8 m (REFUSAL)			6.0
2.0									
									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 1.8 m
COMPLETE: 06/07/11

06/08/16 11:51AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP07
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6813351 E450560	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (TILL) – silty, sandy, coarse subrounded gravel, compact, damp, grey			
1.0						– some gravel below 1.0 m			2.0
									4.0
2.0						– difficult to excavate below 2.0 m			6.0
									8.0
						END OF TESTPIT 2.7 m (REFUSAL) – becomes very compact at 2.7 m			
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

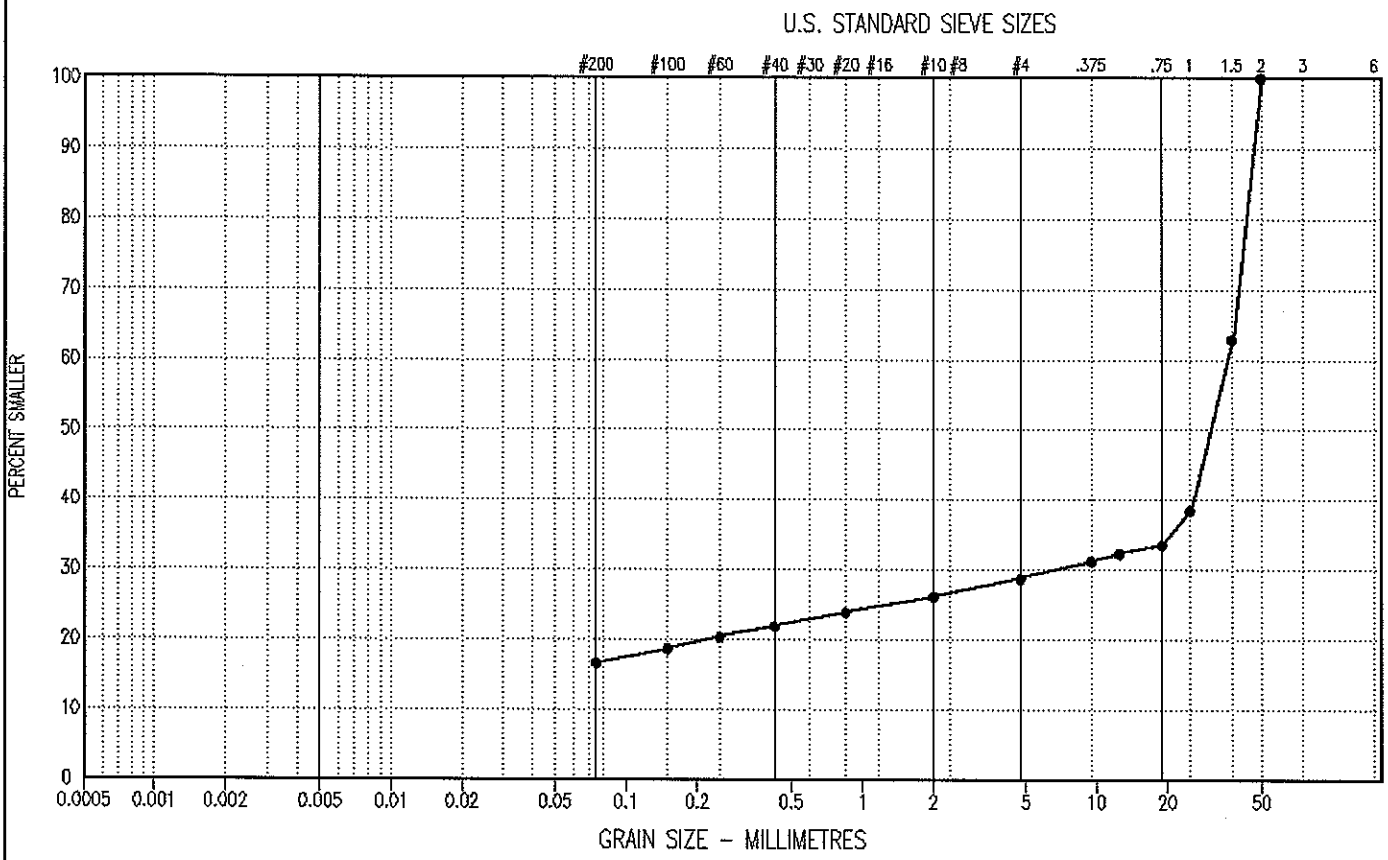
LOGGED BY: JSB	COMPLETION DEPTH: 2.7 m
REVIEWED BY: JRT	COMPLETE: 06/07/11
	Page 1 of 1

06/08/16 11:51AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●—●	1200197-TP07	0.50 – 0.70	---	17 ---	11	72	–	–	

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP08
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6813127 E450490	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (FLUVIAL) – sandy, trace to some silt, well graded subrounded gravel, coarse sand, compact, dry, reddish brown			
1.0	■								2.0
									4.0
						– colour changes to light grey around 1.8 m – major sloughing below 2.5 m – trace to no silt below 1.8 m			6.0
2.0									
									8.0
3.0	■								10.0
						END OF TESTPIT 3.5 m – slough below 3.5 m			12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB	COMPLETION DEPTH: 3.5 m
REVIEWED BY: JRT	COMPLETE: 06/07/11
	Page 1 of 1

06/08/16 11:51AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP09
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6812946 E450471	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	FROZEN		0.0
						SAND – silty, fine grained, blackish grey – some coarse angular gravel below 0.4 m			
1.0							UNFROZEN		2.0
									4.0
2.0									6.0
									8.0
3.0						GRAVEL – sandy and silty, well graded subrounded gravel, compact, damp, grey			10.0
						END OF TESTPIT 3.0 m (REFUSAL) – very difficult excavating below 2.5 m			12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2.5 m
COMPLETE: 06/07/11

06/08/16 11:51AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP10
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6812746 E450456	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, blackish grey			
	■					GRAVEL AND SAND – (COLLUVIAL) – trace of silt, well graded subrounded gravel, coarse sand, compact, moist, dark brownish grey	FROZEN Nbe, Vc, 5–10%	▲ ● ■	
						END OF TESTPIT 0.5 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

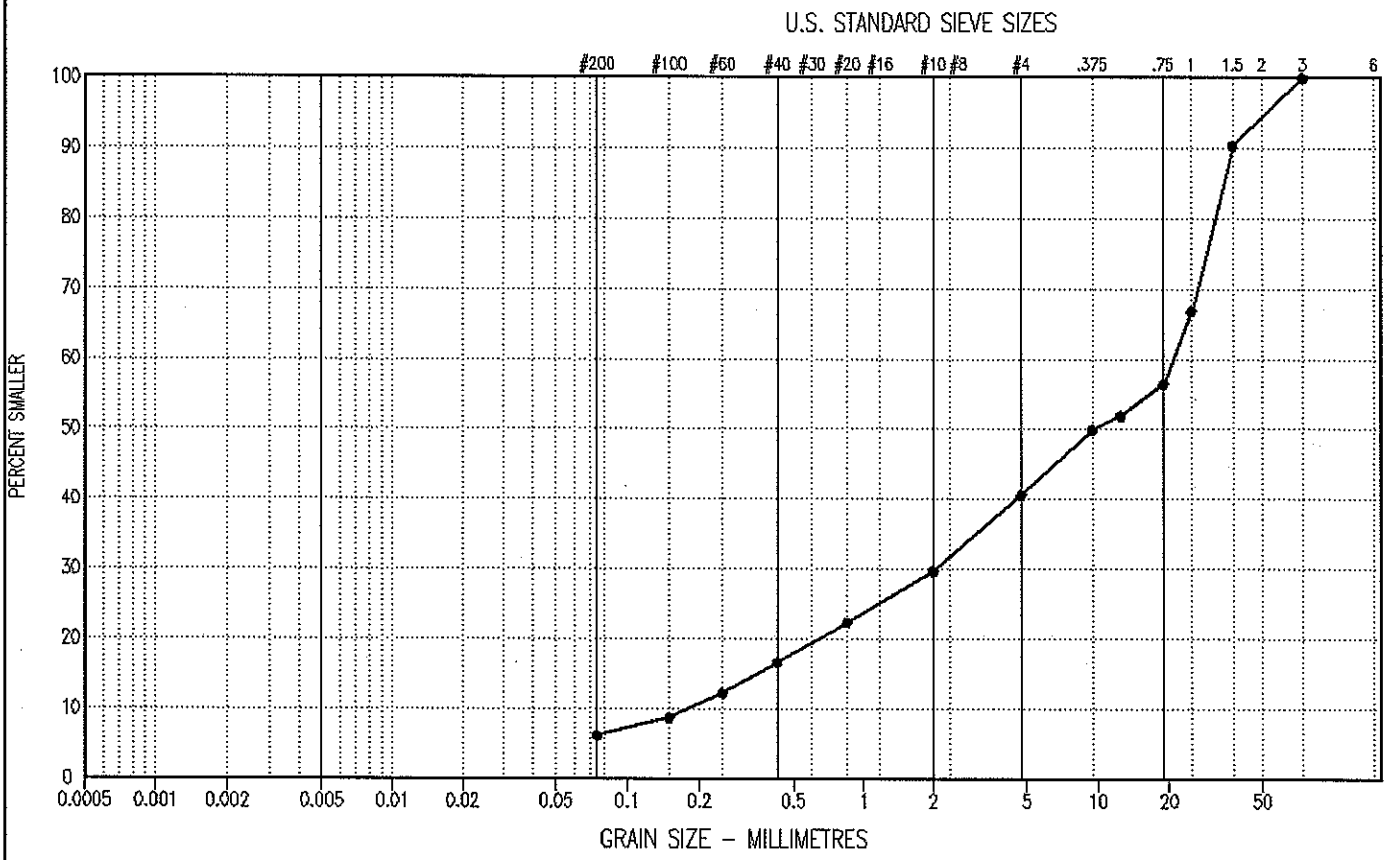
LOGGED BY: JSB	COMPLETION DEPTH: 0.5 m
REVIEWED BY: JRT	COMPLETE: 06/07/11

06/08/16 11:51AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197–TP10	0.30 – 0.50	---	6 ---	34	60	111.3	1.1	GW–GM

Project: 0201–1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP11
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6812575 E450461	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, blackish grey			
						GRAVEL (TILL) – sandy, some silt, well graded, subrounded gravel, coarse sand, mottled brown	FROZEN Vx, 20–30%		
						END OF TESTPIT 0.3 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT	COMPLETE: 06/07/11
	Page 1 of 1

06/08/16 11:51AM (YUKONP84)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP12
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6812245 E450509	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, blackish grey			
	■					GRAVEL (TILL) – sandy, silty, well graded subrounded gravel, coarse sand, mottled brown	FROZEN Vc, 10–15%		
						END OF TESTPIT 0.3 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 0.3 m
COMPLETE: 06/07/11

06/08/16 11:51AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP13
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6811952 E450589	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, blackish grey			
						GRAVEL – sandy, trace to some silt, subrounded well graded gravel, coarse sand	FROZEN Vc, 30–40%		
						END OF TESTPIT 0.3 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 0.3 m
COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP14
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6811710 E450674	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (TILL) – sandy, silty, subrounded well graded gravel, coarse sand, moist, grey	FROZEN Vc, 15–20%		
						END OF TESTPIT 0.3 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.3 m
COMPLETE:

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP15
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6811463 E450757	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 ■ PERCENT SAND ■ 20 40 60 80 PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, medium grey – becomes gravelly below 0.2 m	----------		2.0
1.0						END OF TESTPIT 0.3 m (REFUSAL)	FROZEN Vx, Vr, 10–15%		4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT

COMPLETION DEPTH: 0.3 m
COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP16
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6811231 E450771	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 ■ PERCENT SAND ■ 20 40 60 80 PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, compac, very moist to wet, dark brown – gravelly below 0.2 m	FROZEN Vx, Vr, 20–25%		2.0
1.0						END OF TESTPIT 0.3 m (REFUSAL)			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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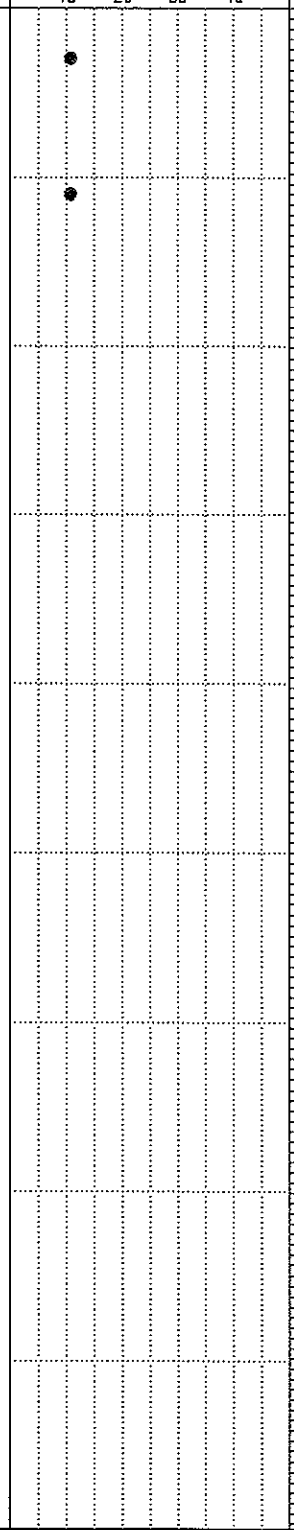
REVIEWED BY: JRT	COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP17
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6810971 E450764	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN	0.0
						SILT (TILL) – sandy, some gravel, some clay, well graded sand, fine to medium grained subrounded gravel, compact, damp, medium grey – becomes gravelly below 0.3 m		
							FROZEN Vx, Vr, 10–15%	
						END OF TESTPIT 0.6 m (REFUSAL)		
1.0								2.0
								4.0
2.0								6.0
								8.0
3.0								10.0
								12.0
4.0								14.0



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Whitehorse, Yukon

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REVIEWED BY: JRT	COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP18
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6810610 E450651	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
						SAND – some gravel, trace of silt, well graded, subangular gravel, coarse sand, wet, compact, medium grey	---------- FROZEN Nf, Vs, 5–10%
1.0	■						
						– becomes gravelly around 1.5 m	
2.0	■					END OF TESTPIT 2.0 m	
3.0							
4.0							

▲ PERCENT SILT OR FINES ▲ (20 40 60 80)
■ PERCENT SAND ■ (20 40 60 80)
PLASTIC M.C. LIQUID (10 20 30 40)

Depth(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

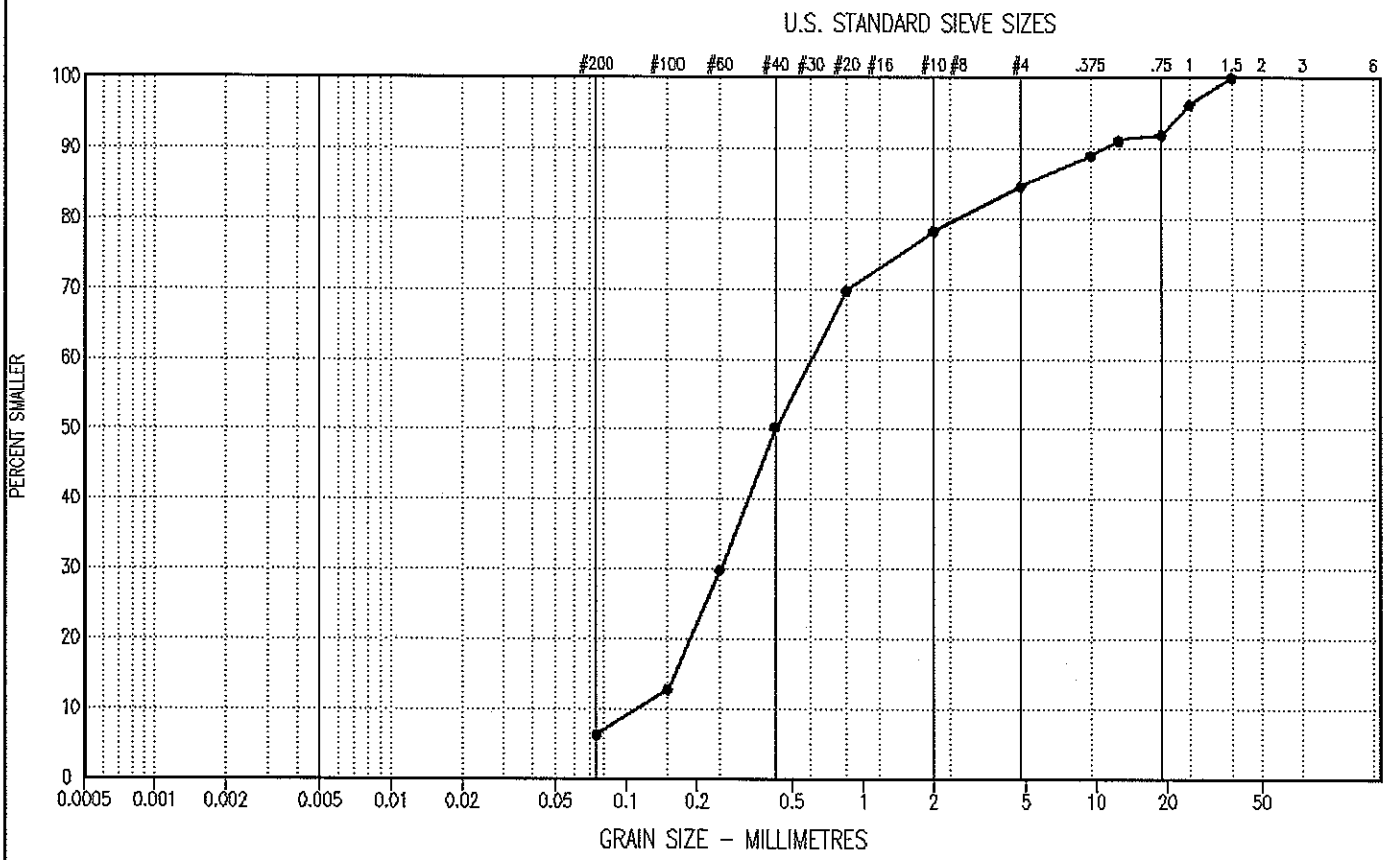
EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 2 m
	REVIEWED BY: JRT	COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:52AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP18	1.80 – 2.00	---	6 ---	78	16	5.4	0.8	SP-SM

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP19
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6810343 E450663	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND – silty, gravelly, well graded sand, fine to medium grained gravel, moist, compact, medium grey			2.0
						– becomes coarser grained, gravel increasing in content around 0.5 m			
1.0	■								4.0
						END OF TESTPIT 1.3 m (REFUSAL)	FROZEN Nbn, Vs, 10–15%		6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 1.3 m
COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP20
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6810184 E450502	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT (TILL) – sandy, trace of gravel, well graded sand, fine to medium grained subangular gravel, compact, moist, medium grey – gravel below 0.2 m, well graded, subrounded	FROZEN Vc, trace		2.0
1.0						END OF TESTPIT 0.3 m (REFUSAL)			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.3 m
COMPLETE: 06/07/11

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP21
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6810070 E450307	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					SILT (TILL) – gravelly, sandy, fine to medium grained, subrounded gravel, well graded sand	
1.0						– gravel content increases and becomes coarser around 1.2 m – some silt below 1.2 m	
	■						
2.0						END OF TESTPIT 2.0 m – some slough below 1.2 m	
3.0							
4.0							

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID

10 20 30 40

Depth(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 2 m
	REVIEWED BY: JRT	COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:52AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP22
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809913 E450203	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND (TILL) – silty, gravelly, well graded sand, fine to medium grained subangular gravel, compact, damp, grey – some silt around 0.4 m – becomes coarser gravel around 1.0 m			2.0
1.0	■					– becomes silty, some gravel around 1.0 m			4.0
						END OF TESTPIT 1.7 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

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REVIEWED BY: JRT

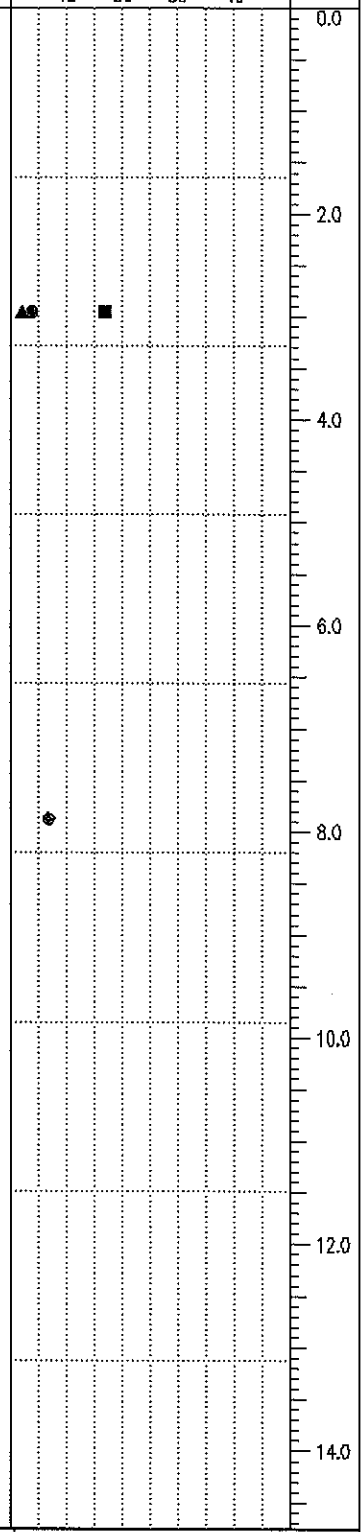
COMPLETION DEPTH: 1.7 m
COMPLETE: 06/07/11

06/08/16 11:53AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP23
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809612 E450215	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
						GRAVEL AND SAND – trace of silt, fine to medium grained subrounded gravel, medium to coarse sand, compact, damp, greyish brown – coarser gravels and cobbles from 0.1 to 1.0 m – becomes cleaner with depth	
1.0							
2.0						– coarser gravels below 2.0 m – colour changes to light grey around 2.0 m – trace to some silt below 2.0 m	
						END OF TESTPIT 2.5 m (REFUSAL)	FROZEN Nbn, Vs trace
3.0							
4.0							



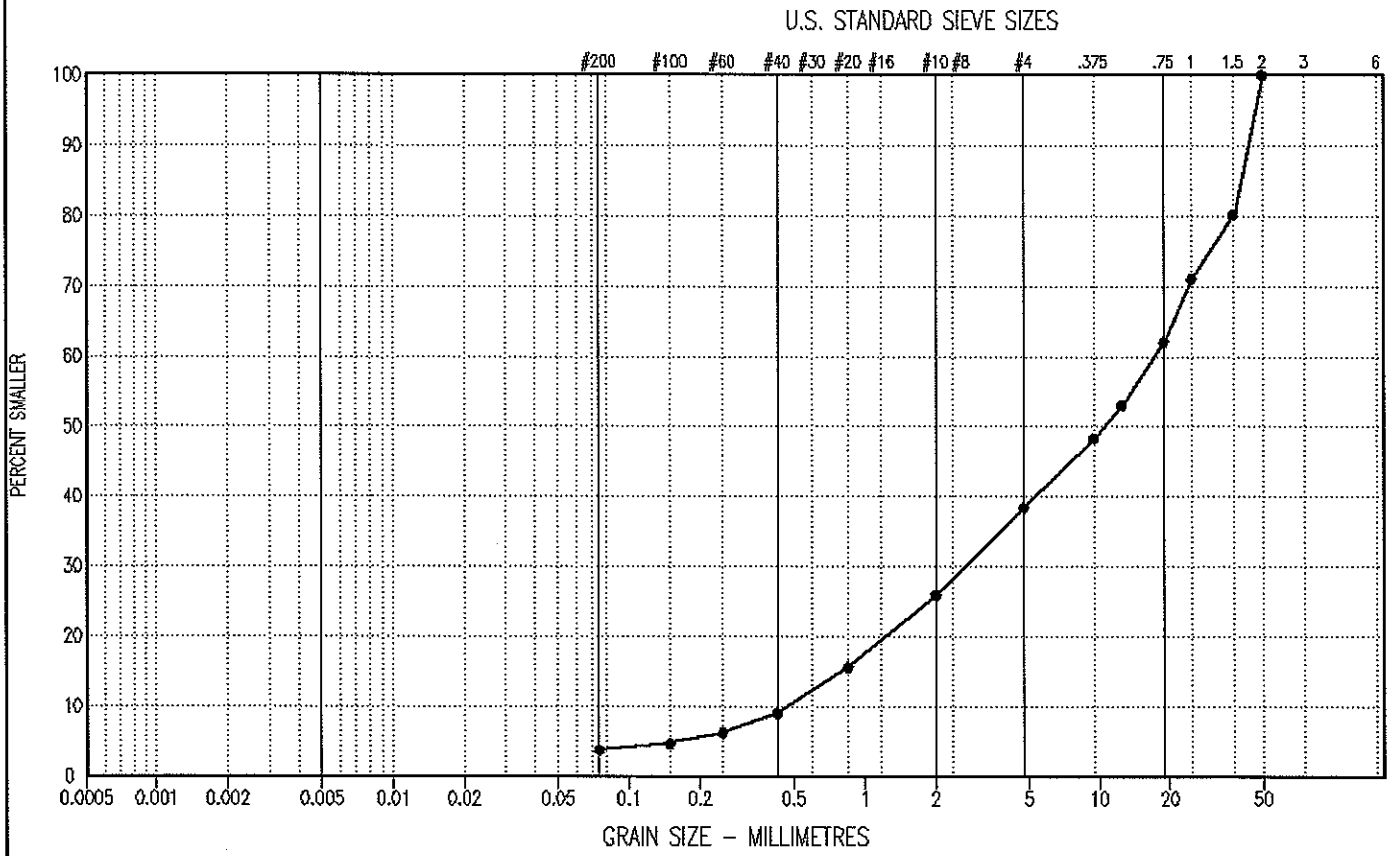
EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB REVIEWED BY: JRT	COMPLETION DEPTH: 2.5 m COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:53AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197–TP23	0.80 – 1.00	---	4 ---	34	62	35.6	1.0	GP

Project: 0201–1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP24
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809366 E450123	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN	0.0
						SAND (COLLUVIUM) – gravelly, some silt, medium to coarse sand, well graded subangular gravel, compact, damp, light greyish brown		
1.0						– coarser gravel below 1.2 m		4.0
						SAND (TILL) – silty, gravelly, trace of clay, well graded sand, fine to medium grained subangular gravel, compact, damp, grey		6.0
2.0								8.0
3.0						END OF TESTPIT 3.0 m (REFUSAL)	FROZEN Vr, Vx, 5–10%	10.0
4.0								12.0
								14.0

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID

10 20 30 40

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 3 m
	REVIEWED BY: JRT	COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:53AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP25
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809287 E449853	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND – gravelly, trace of silt, well graded sand and angular gravel, compact, moist, reddish brown			
1.0						– some gravel below 0.8 m – colour changes to medium grey around 0.8 m			2.0
									4.0
2.0						SAND (TILL) – silty, gravelly, trace of clay, well graded sand, fine to medium grained subangular gravel, compact, damp, grey			6.0
						END OF TESTPIT 2.2 m (REFUSAL)			8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 2.2 m
COMPLETE: 06/07/11

06/08/16 11:53AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP26
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809312 E449628	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 ■PERCENT SAND■ 20 40 60 80 PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, compact, moist, dark brown			
						SAND – gravelly, trace to some silt, well graded sand, fine to medium grained gravel, compact, moist, reddish brown			
1.0									2.0
									4.0
						– gravel content increases becoming coarser below 1.5 m			
2.0									6.0
							FROZEN Nbn, Vs trace		8.0
						END OF TESTPIT 2.5 m (REFUSAL)			
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT	COMPLETE: 06/07/11
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06/08/16 11:53AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP27
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809280 E449368	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, trace of fine gravel			
						GRAVEL (TILL) – sandy, some silt, trace of clay, well graded sand, subrounded gravel, light grey – coarse gravels and cobbles throughout testpit			
1.0	■							● ■	2.0
									4.0
									6.0
2.0						– trace to some silt below 2.0 m			
	■						FROZEN Vc, Vr, trace	●	8.0
						END OF TESTPIT 2.4 m (REFUSAL)			
3.0									10.0
									12.0
4.0									14.0

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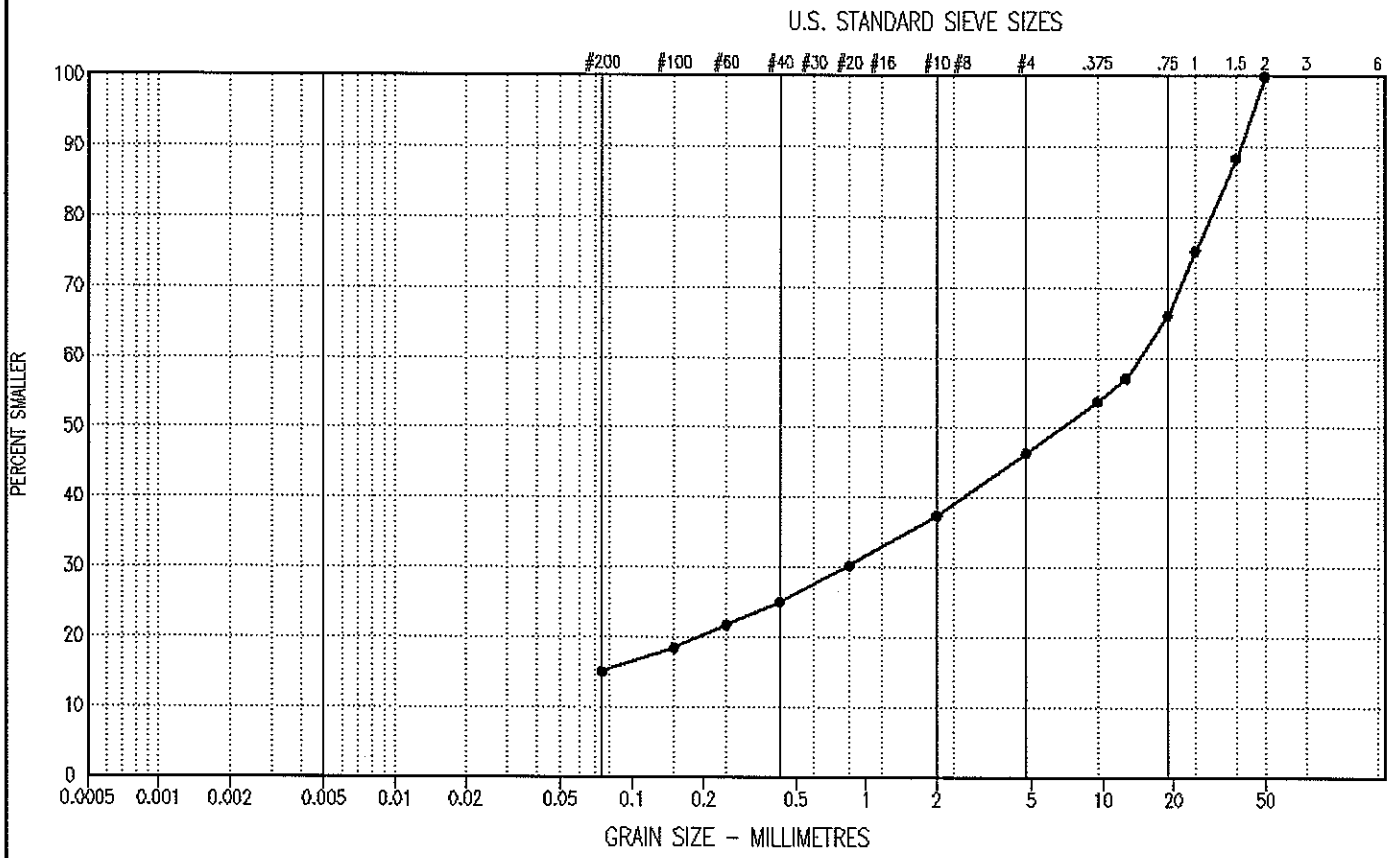
REVIEWED BY: JRT	COMPLETE: 06/07/11

06/08/16 11:53AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP27	0.80 – 1.00	---	15 ---	31	54	–	–	

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP28
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809186 E449222	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL AND SAND (TILL) – silty, trace of clay, well graded sand, fine to medium grained subangular gravels, compact, damp, light greyish brown – gravel content increases with depth – becomes silty below 0.4 m		●	
1.0									2.0
									4.0
2.0	■							●▲■	6.0
						END OF TESTPIT 2.4 m	FROZEN Vc, 5–10%		8.0
3.0									10.0
									12.0
4.0									14.0

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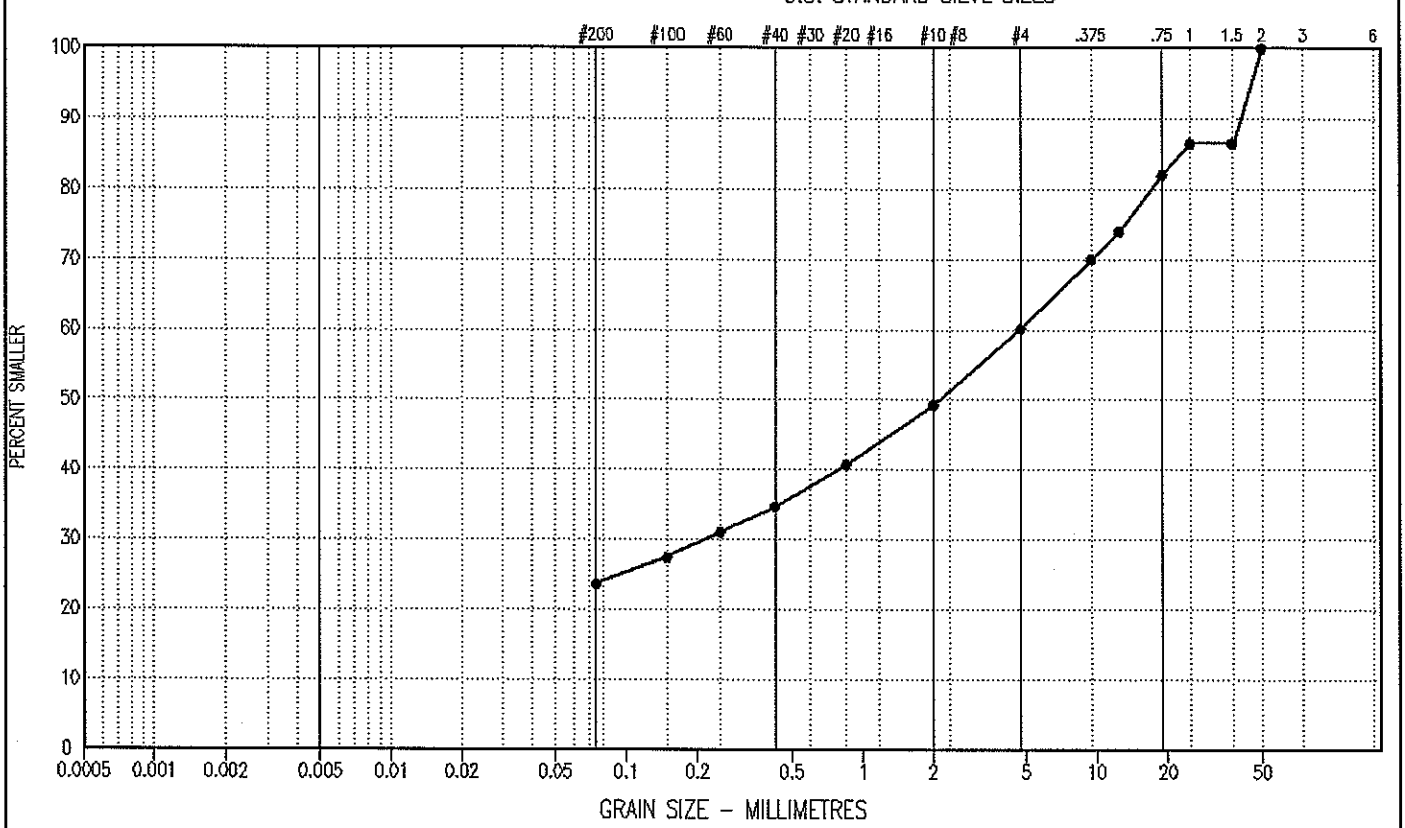
COMPLETION DEPTH: 2.4 m
COMPLETE: 06/07/11

06/08/16 11:53AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP28	2.20 – 2.40	---	24 ---	36	40	–	–	

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP29
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809053 E449036	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					SAND (TILL) – gravelly, silty, well graded angular sand and gravel, compact, moist, light grey – coarser gravels and cobbles below 0.5 m	
1.0							
2.0	■					END OF TESTPIT 2.0 m (REFUSAL)	FROZEN Vc, Vr trace
3.0							
4.0							

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

Depth(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

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	REVIEWED BY: JRT	COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:53AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP30
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808965 E448792	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▯▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND (TILL) – silty, trace of clay, gravelly, compact, damp, coarse angular sand and gravel, dark grey			
1.0						– coarser gravel, some cobbles below 1.2 m – colour changes to greyish brown around 1.2 m			4.0
							FROZEN Vc, Vr trace		6.0
2.0						END OF TESTPIT 2.0 m (REFUSAL)			8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 2 m
COMPLETE: 06/07/11

06/08/16 11:54AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP31
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808936 E448518	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0	■					ORGANIC ROOT MAT	UNFROZEN	●	0.0
						SAND (TILL) – silty, gravelly, trace of clay, well graded sand and angular gravel, compact, damp, medium grey	FROZEN Vx, 10–15%		2.0
1.0						END OF TESTPIT 0.3 m			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 0.3 m
COMPLETE: 06/07/11

06/08/16 11:54AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP32
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6809099 E448354	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ▨ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (TILL) – sandy, trace of silt, coarse angular sand and gravel, moist, compact, grey – becomes coarser gravel with cobbles below 0.4 m		●	
1.0									2.0
									4.0
	■						FROZEN Vx, Vr trace	▲ ■ ●	
						END OF TESTPIT 1.8 m (REFUSAL)			6.0
2.0									
									8.0
3.0									10.0
									12.0
4.0									
									14.0

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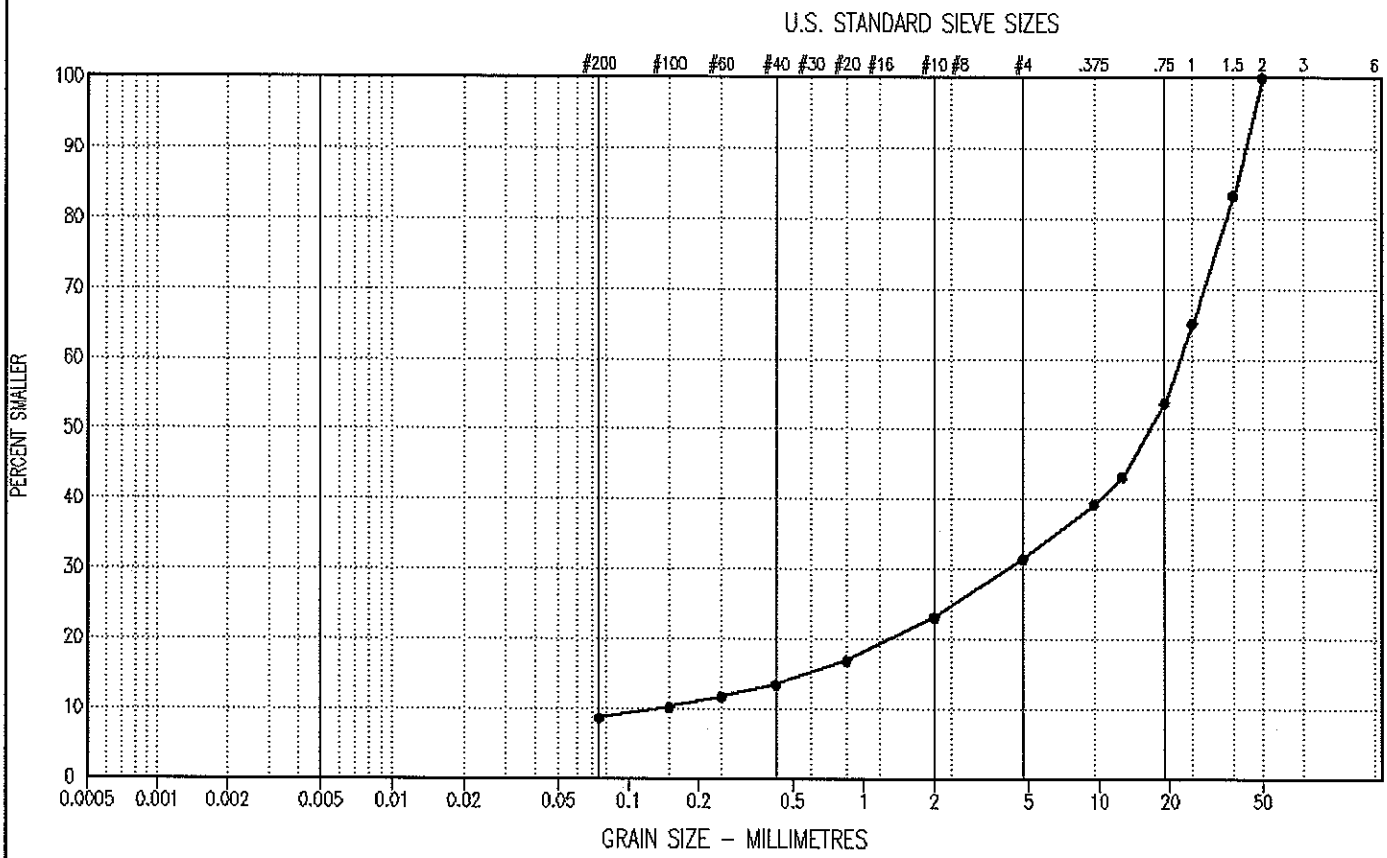
COMPLETION DEPTH: 1.8 m
COMPLETE: 06/07/11

06/08/16 11:54AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●—●	1200197–TP32	1.60 – 1.80	---	9 ---	22	69	153.2	5.6	GP–GM

Project: 0201–1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP33
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808902 E448255	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, moist, compact, reddish brown			
	■					SAND (TILL) – silty, gravelly, trace of clay, coarse sand and gravel, subangular, compact, moist, grey			
1.0						– coarser angular gravels and cobbles below 1.2 m			4.0
						– less sand and silt below 1.5 m			
	■					BEDROCK (black meta-volcanic) – fairly fractured, good quality	FROZEN Vx, Vr trace		6.0
2.0						END OF TESTPIT 2.0 m (REFUSAL)			8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 2 m
COMPLETE: 06/07/11

08/08/16 11:54AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP34
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808637 E448223	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⧸ NO RECOVERY ☒ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					GRAVEL – sandy, coarse, some silt, coarse angular gravel and sand, compact, moist, grey	
1.0						– coarser gravels and cobbles below 0.8 m – less sand with depth – some silt below 1.0 m	
2.0	■					END OF TESTPIT 2.0 m	FROZEN Vx, Vr trace
3.0							
4.0							

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

Depth(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 2 m
	REVIEWED BY: JRT	COMPLETE: 06/07/11
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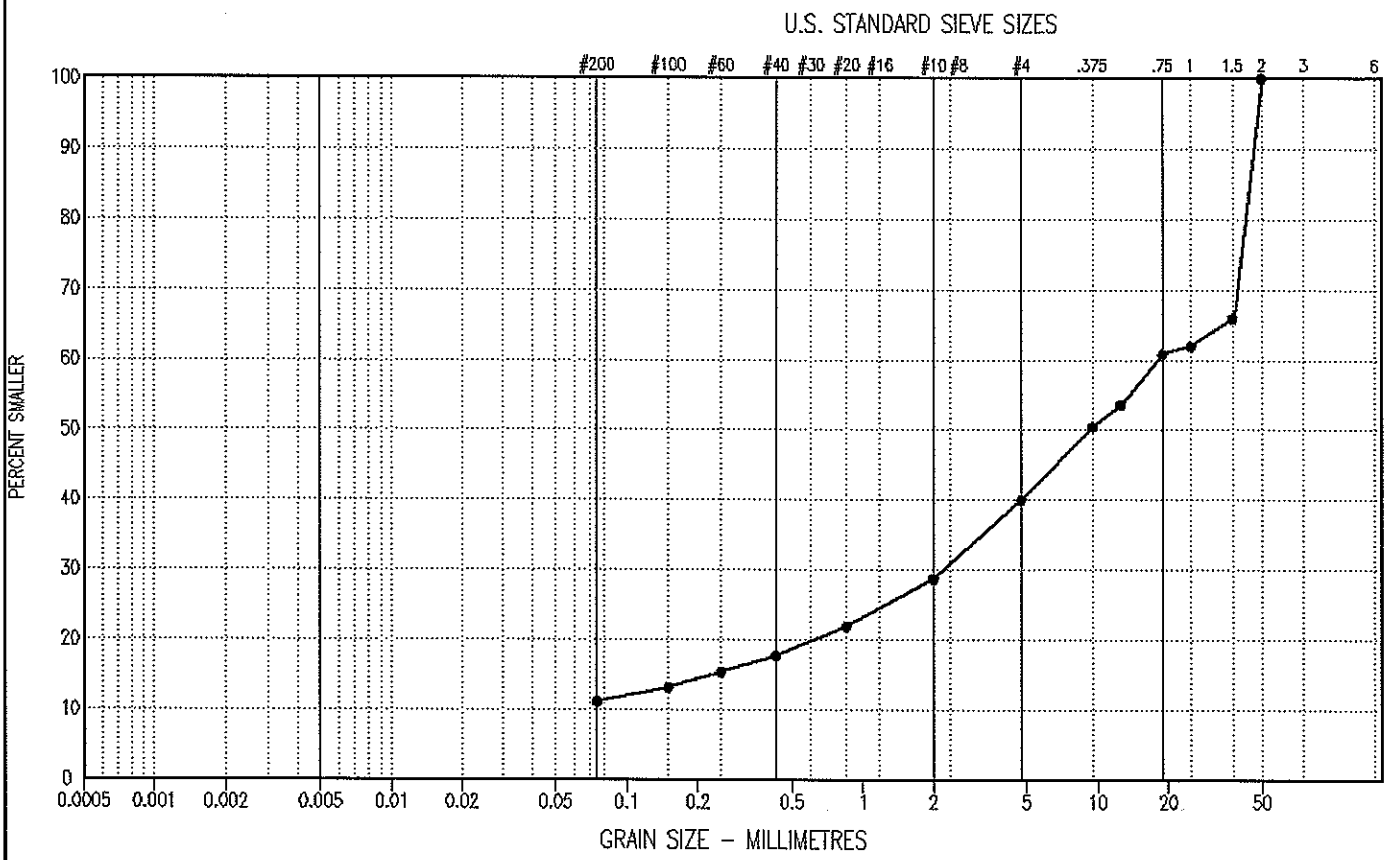
06/08/16 03:53PM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	1200197-TP34	1.80 – 2.00	---	11	---	28	61	–	8.4	GP-GM

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP35
Proposed Access Road	EXCAVATOR: 320 C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808410 E448086	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, compact, medium brown			
						SAND (TILL) – gravelly, silty, trace of clay, well graded, angular sand and gravel, compact, moist, medium brown			2.0
1.0									4.0
	■					BEDROCK – sand and silt infilled, highly weathered and fractured, fair quality			
							FROZEN Vc, Vr trace		6.0
2.0						END OF TESTPIT 1.8 m (REFUSAL)			
									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 1.8 m
	REVIEWED BY: JRT	COMPLETE: 06/07/11
		Page 1 of 1

06/08/16 11:54AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP36
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808251 E447904	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⧸ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, compact, moist, dark brown			
						BEDROCK (PHYLLITE) – sand and silt, infilled, angular, weathered and highly fractured – major sloughing throughout testpit			2.0
1.0						– large cobbles with some boulder sized angular rock below 1.0 m			4.0
						END OF TESTPIT 1.5 m – sloughing			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 1.5 m
REVIEWED BY: JRT	COMPLETE: 06/07/11
	Page 1 of 1

06/08/16 11:54AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP37
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808066 E447667	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (TILL) – gravelly, coarse grained angular sand and gravel, compact, moist, grey – angular cobbles and boulders below 0.4 m – gravel content increases below 0.8 m			2.0
1.0									4.0
	■								6.0
2.0						END OF TESTPIT 1.8 m			8.0
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

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COMPLETION DEPTH: 1.8 m
COMPLETE: 06/07/12

06/08/16 11:54M (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP38
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807972 E447578	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN	0.0
						GRAVEL (TILL) – sandy, silty, coarse grained angular gravel and sand, compact, damp, light greyish brown		
						– some silt below 0.5 m		2.0
1.0	■					– becomes coarser grained with cobbles throughout		4.0
2.0	■					– becomes silty below 2.0 m – less gravel below 2.0 m		6.0
						END OF TESTPIT 2.5 m – some sloughing		8.0
3.0								10.0
								12.0
4.0								14.0

▲ PERCENT SILT OR FINES ▲ 20 40 60 80
■ PERCENT SAND ■ 20 40 60 80
PLASTIC M.C. LIQUID
10 20 30 40

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Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2.5 m
COMPLETE: 06/07/12

06/08/16 11:54AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP39
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807773 E447410	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (FLUVIAL) – sandy, some silt, well graded subrounded, subangular gravel and sand, compact, moist, light reddish grey – some cobbles throughout		●	2.0
1.0						– trace of silt below 1.0 m			4.0
2.0	■							▲● ■	6.0
									8.0
						END OF TESTPIT 2.5 m – some sloughing throughout			
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT

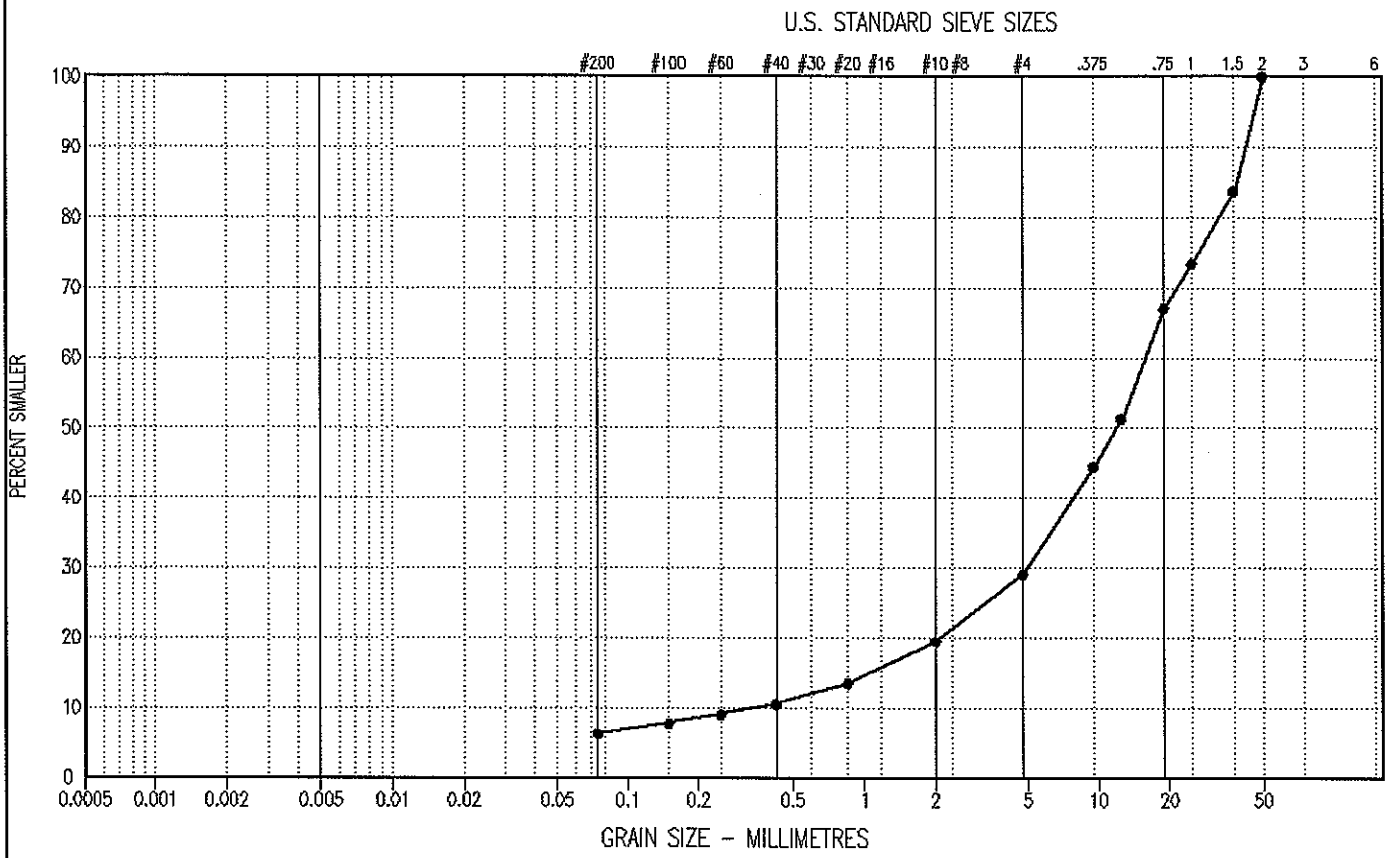
COMPLETION DEPTH: 2.5 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP39	1.80 – 2.00	---	6 ---	23	71	43.5	4.3	GP-GM

Project: 0201-1200197 Date Tested: 06/08/07 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP40
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807605 E447255	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, trace of fine gravel, moist, medium grey			
	■					GRAVEL – sandy, some silt, well graded angular gravel and sand, compact, moist, grey – cobbles throughout testpit			
1.0									2.0
									4.0
2.0	■					END OF TESTPIT 2.0 m – sloughing throughout			6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT

COMPLETION DEPTH: 2 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP41
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807339 E447200	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL – sandy, trace of silt, coarse grained, angular gravel and sand, compact, dry, grey			
						– cobbles throughout			2.0
1.0									4.0
						– becomes gravelly below 1.5 m			
						BEDROCK – highly fractured, angular, fair quality, medium grey			6.0
2.0						– becomes competent with depth			8.0
						END OF TESTPIT 2.5 m (REFUSAL)			
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT

COMPLETION DEPTH: 2.8 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP42
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807154 E447239	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL – some sand, some silt, coarse grained angular gravel and sand, compact, moist, brownish grey – cobbles and boulders throughout – trace of silt below 0.5 m – no samples obtained due to coarseness of material			2.0
1.0									4.0
						END OF TESTPIT 1.5 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 1.5 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP43
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806980 E447259	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL – some sand, trace of silt, coarse grained angular gravel and sand, compact, damp, reddish grey			
						– cobbles throughout gravel			2.0
1.0	■					– becomes finer grained below 0.8 m – colour changes to grey below 0.8 m		▲■	4.0
									6.0
2.0	■							●	
						END OF TESTPIT 2.2 m (REFUSAL)			8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

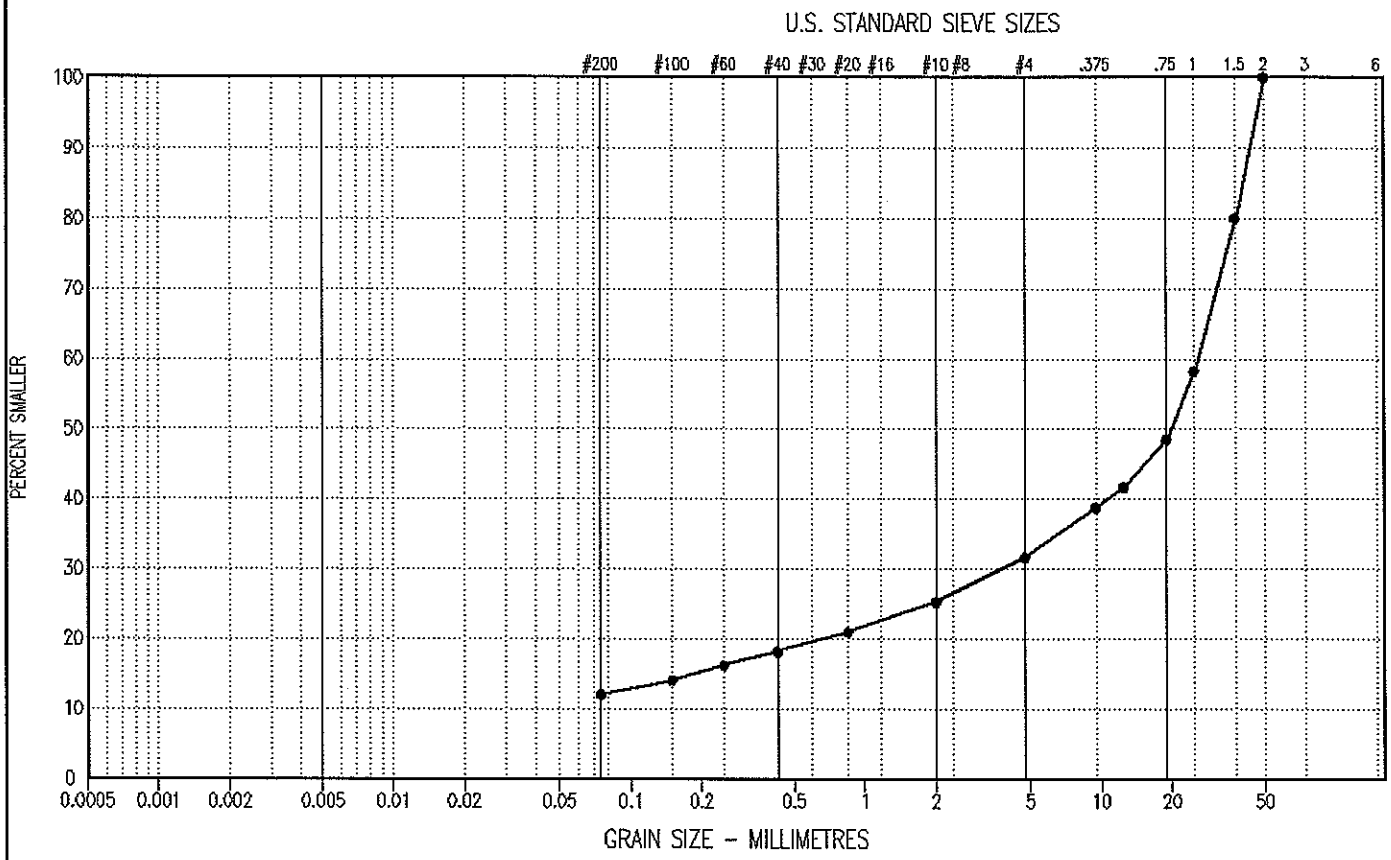
COMPLETION DEPTH: 1.5 m
COMPLETE: 06/07/12

06/06/16 11:55AM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	1200197-TP43	0.80 – 1.00	---	12 ---	19	69	–	–	GM

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP44
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806731 E447312	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (FLUVIAL) – sandy, trace silt, coarse grained angular gravel and sand, compact, moist, greyish brown – cobbles and some boulders present below 0.5 m			
1.0						END OF TESTPIT 1.1 m – pit previously excavated by operator during original clearing			2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 1.1 m
REVIEWED BY: JRT	COMPLETE: 06/07/12
	Page 1 of 1

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP45
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806137 E447109	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND – silty, fine to medium grained			
						BEDROCK – sand and silt infilled, highly fractured, weathered, fair quality			
						– becomes more competent with depth			2.0
1.0						END OF TESTPIT 1.0 m (REFUSAL) – no samples obtained due to material coarseness			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 1 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP46
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805942 E447007	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL – sandy, trace of silt, coarse grained, compact, moist, dark brown			
						– angular cobbles with some boulder below 0.5 m			2.0
1.0						– colour changes to medium grey 0.5 m			4.0
						BEDROCK – competent			
						END OF TESTPIT 1.2 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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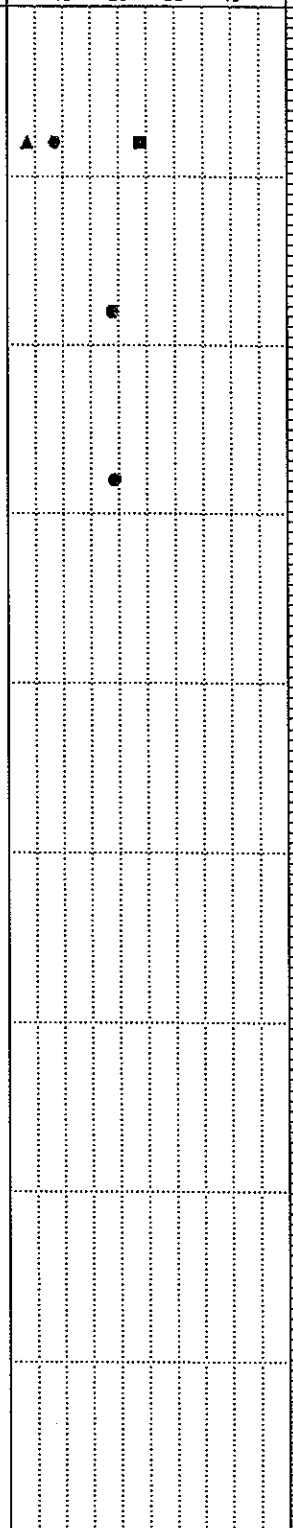
LOGGED BY: JSB	COMPLETION DEPTH: 1.2 m
REVIEWED BY: JRT	COMPLETE: 06/07/12
	Page 1 of 1

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP47
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805801 E446958	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					SAND AND GRAVEL – trace silt, coarse angular gravel, well graded sand, compact, moist, dark brown	
1.0	■					SAND – some silt, fine to medium grained, loose to compact, very wet, grey	
	■					– becomes silt, some sand, fine grained around 1.2 m – water encountered, possibly from upper gravels	
2.0						END OF TESTPIT 1.5 m – sloughing throughout	
3.0							
4.0							



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LOGGED BY: JSB
REVIEWED BY: JRT

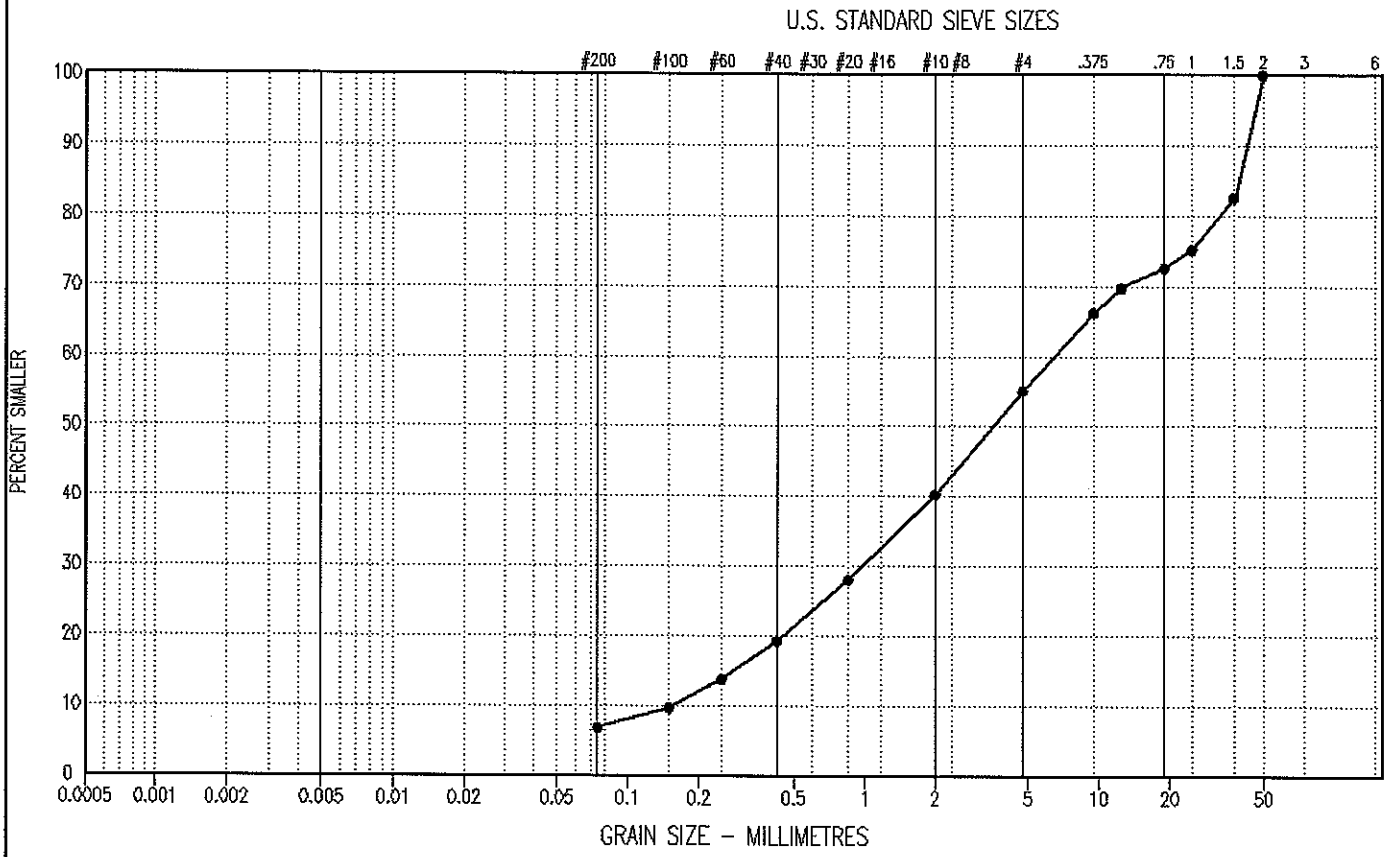
COMPLETION DEPTH: 1.5 m
COMPLETE: 06/07/12

06/08/16 03:53PM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	1200197-TP47	0.30 – 0.50	---	7 ---	48	45	43.0	1.0	SP-SM

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP48
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805524 E446902	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (FLUVIAL) – some sand, trace of silt, coarse angular gravel, compact, damp, dark brown			
						– cobbles throughout			2.0
1.0									4.0
	■					SAND (TILL) – silty, gravelly, well graded sand, fine to medium grained, subangular gravel, compact, damp, medium grey			6.0
2.0						END OF TESTPIT 2.0 m			
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2 m
COMPLETE: 06/07/12

06/08/16 11:56AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP49
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805229 E446838	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (FLUVIAL) – sandy, trace of silt, coarse angular gravel, coarse sand, compact, moist, grey – cobbles from 0.2 to 0.5 m – gravel becomes well graded below 0.5 m			2.0
1.0									4.0
2.0	■					END OF TESTPIT 2.2 m			6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2.2 m
REVIEWED BY: JRT	COMPLETE: 06/07/12
	Page 1 of 1

06/08/16 11:56AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP50
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805009 E446764	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲PERCENT SILT OR FINES▲ 20 40 60 80 / ■PERCENT SAND■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND (TILL) – silty, trace of fine gravel, fine grained, compact, moist, light grey – becomes gravelly, subrounded, well graded around 0.4 m – angular cobbles and some boulders below 0.4 m			2.0
1.0									4.0
						BEDROCK – competent END OF TESTPIT 1.3 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 1.3 m
COMPLETE: 06/07/12

06/08/16 11:56AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP51
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804778 E446617	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						BEDROCK (PHYLLITE) – highly fractured, weathered, sand and silt infilled, brown			
▼						– water encountered at 0.6 m – becomes competent with depth			2.0 ▼
1.0						END OF TESTPIT 0.8 m (REFUSAL)			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 0.8 m
REVIEWED BY: JRT	COMPLETE: 06/07/12
	Page 1 of 1

06/08/16 11:56AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP52
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804612 E446429	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (TILL) – sandy, silty, trace of clay, coarse angular gravel and sand, compact, damp, reddish brown			
	■					SILT (TILL) – sandy, some gravel, well graded sand, fine to medium grained, angular, compact, moist, grey			2.0
1.0						END OF TESTPIT 1.0 m (REFUSAL)			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 1 m
COMPLETE: 06/07/12

06/08/16 11:56AM (YUKONP24)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP53
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804525 E446184	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						BEDROCK – sand and silt infilled, highly fractured, slightly weathered – large boulder sized pieces encountered			
1.0						END OF TESTPIT 0.5 m (REFUSAL)			2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.5 m
COMPLETE: 06/07/12

06/08/16 11:56AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP54
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804486 E445998	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, fine grained, compact, moist, dark brown			
						BEDROCK – sand and silt infilled, fractured, weathered			
						END OF TESTPIT 0.4 m (REFUSAL)			
1.0									2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.4 m
COMPLETE: 06/07/12

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP55
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804530 E445757	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND – gravelly, silty, coarse grained, compact, moist, reddish brown			
						GRAVEL (TILL) – sandy, silty, trace of clay, coarse angular gravel and sand, compact, damp, grey			2.0
						BEDROCK – fractured, competent			
1.0						END OF TESTPIT 0.8 m (REFUSAL)			4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.8 m
COMPLETE: 06/07/12

06/08/16 11:55AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP56
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804649 E445551	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (PHYLLITE) – some sand, some silt, coarse angular gravel and sand, compact, moist, grey			2.0
1.0						SAND (TILL) – gravelly, silty, trace of clay, coarse angular sand and fine to medium gravel, compact, wet, grey			4.0
						END OF TESTPIT 1.2 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB | COMPLETION DEPTH: 1.2 m
REVIEWED BY: JRT | COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP57
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804810 E445295	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (TILL) – sandy, silty, trace of clay, coarse angular gravel and sand, compact, moist, grey – cobbles and some boulders throughout testpit		●▲■	2.0
1.0									4.0
						BEDROCK – competent END OF TESTPIT 1.2 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

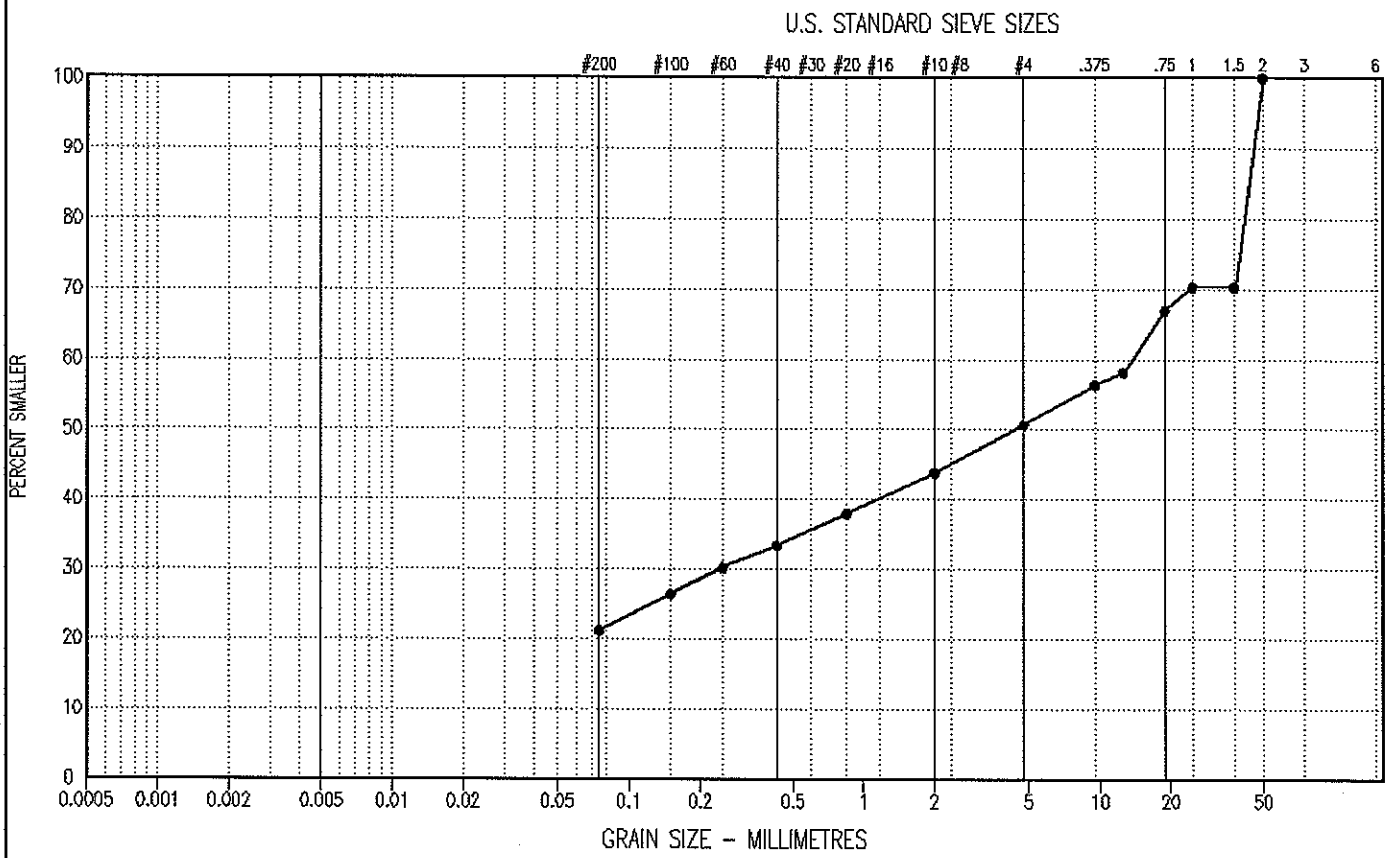
COMPLETION DEPTH: 1.2 m
COMPLETE: 06/07/12

06/08/16 03:53PM (YUKONP04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP57	0.40 – 0.60	--- 21 ---		29	50	–	–	

Project: 0201-1200197 Date Tested: 06/08/07 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP58
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6804986 E445059	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SILT – sandy, fine grained, compact, moist, grey			
						BEDROCK (PHYLLITE) – sand and silt, infilled, weathered, highly fractured, flat, angular, elongated, grey – cobble and boulder sized pieces throughout – competent at 0.5 m			
1.0						END OF TESTPIT 0.5 m (REFUSAL)			2.0
									4.0
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.5 m
COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP59
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805103 E444861	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SILT – sandy, fine grained silt, moist, dark brown			
						GRAVEL – sandy, some silt, coarse grained, angular, compact, moist, grey – flat, elongated, poor quality rock pieces			
1.0									2.0
									4.0
2.0	■					END OF TESTPIT 2.0 m			6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2 m
REVIEWED BY: JRT	COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP60
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805286 E444641	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					SILT (TILL) – sandy, gravelly, silty, trace of clay, well graded sand, fine to medium grained angular gravel, compact, moist, dark grey	
1.0	■					– becomes less sand and gravel	
						BEDROCK (PHYLLITE) – poor quality, highly fractured	
						END OF TESTPIT 1.5 m (REFUSAL)	
2.0							
3.0							
4.0							

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID 10 20 30 40

Depth(ft): 0.0, 2.0, 4.0, 6.0, 8.0, 10.0, 12.0, 14.0

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REVIEWED BY: JRT	COMPLETE: 06/07/12
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06/08/16 11:57AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP61
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805366 E444469	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SAND (TILL) – silty, gravelly, trace of clay, well graded sand, fine to medium grained, subangular gravel, compact, moist, grey			
1.0						BEDROCK (PHYLLITE) – poor quality, highly weathered, soft, flat, elongated particles – some cobble sized more competent pieces below 1.0 m			2.0 4.0
2.0						– competent at 1.8 m END OF TESTPIT 1.8 m (REFUSAL)			6.0 8.0
3.0									10.0
4.0									12.0 14.0

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REVIEWED BY: JRT

COMPLETION DEPTH: 1.8 m
COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP62
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805539 E444207	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ⫼ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT – sandy, some gravel			
	■					BEDROCK (PHYLLITE) – poor quality, soft, highly fractured, greyish black			2.0
1.0						– some coarser and cobble sized pieces below 1.0 m – more competent with depth			4.0
	■					END OF TESTPIT 1.6 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 1.6 m
REVIEWED BY: JRT	COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP63
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805686 E494080	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						SILT AND SAND – gravelly			
	■					BEDROCK (PHYLLITE) – silt and sand infilled, good quality, highly fractured, moist grey			
						– cobble, some boulders below 0.8 m			
1.0									2.0
						– competent at 1.2 m			4.0
						END OF TESTPIT 1.2 m (REFUSAL)			
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

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REVIEWED BY: JRT

COMPLETION DEPTH: 1.2 m
COMPLETE: 06/07/12

06/08/16 11:57AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP64
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6805912 E443912	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (TILL) – silty, gravelly, trace of clay, well graded sand, fine to medium grained angular gravel, compact, moist, grey			
						– some cobble present below 0.8 m			2.0
1.0						BEDROCK (PHYLLITE) – good quality, high fractured, silt infilled, grey			
						– competent at 1.2 m			4.0
						ENDO OF TESTPIT 1.4 m (REFUSAL)			
2.0									6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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REVIEWED BY: JRT	COMPLETE: 06/07/12
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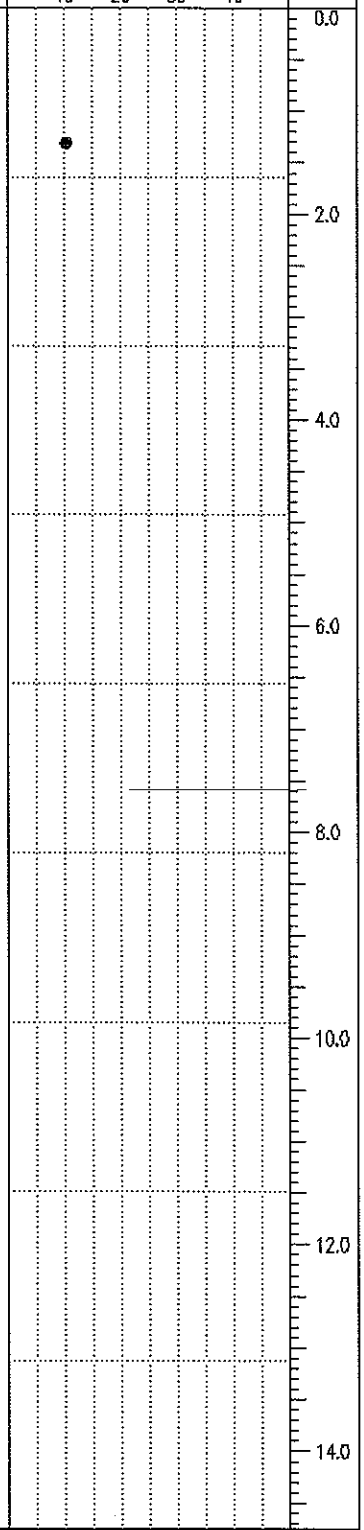
06/08/16 11:58AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP65
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806071 E443702	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION
0.0						ORGANIC ROOT MAT	UNFROZEN
	■					SAND (TILL) – silty, gravelly, trace of clay, well graded sand, fine to medium grained angular gravel, compact, moist, grey – cobbles below 0.6 m	
1.0							
2.0							
3.0							
4.0						BEDROCK – competent END OF TESTPIT 1.2 m	



EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 1.2 m
	REVIEWED BY: JRT	COMPLETE: 06/07/12
		Page 1 of 1

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP66
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806125 E443750	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (TILL) – silty, gravelly, trace of clay, well graded sand, coarse angular gravel			
1.0									4.0
	■					– very competent, hard digging below 1.8 m			
2.0						END OF TESTPIT 2.0 m (REFUSAL)			6.0
									8.0
3.0									10.0
									12.0
4.0									14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 2 m
REVIEWED BY: JRT	COMPLETE: 06/07/12
	Page 1 of 1

06/08/16 11:58AM (YUKONPD4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP67
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806252 E443668	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL – sandy, silty, coarse, angular, compact, moist, dark brown – cobbles, some boulders from 0.2 to 0.6 m – finer grained gravels below 0.6 m – colour changes to reddish brown below 0.6 m			
1.0									2.0
									4.0
2.0	■					BEDROCK (PHYLLITE) – poor quality, highly fractured, flat, angular			6.0
	■					– becomes competent at 2.5 m			8.0
						END OF TESTPIT 2.5 m – sloughing from upper layers			
3.0									10.0
									12.0
4.0									14.0

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Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2.5 m
COMPLETE: 06/07/13

06/08/16 11:58AM (YUKON04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP68
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806390 E443591	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (RESIDUUM) – silty, trace of gravel, angular, moist, compact, reddish brown			
						– mottled reddish brown, grey			2.0
1.0						– less gravel, becomes fine grained with depth below 1.0 m			4.0
	■								
									6.0
2.0									
	■								8.0
						END OF TESTPIT 2.5 m – sloughing			
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 2.5 m
	REVIEWED BY: JRT	COMPLETE: 06/07/13
		Page 1 of 1

06/08/16 11:58AM (YUKONPB4)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP69
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806588 E443501	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (TILL) – sandy, silty, trace of clay, well graded gravel, compact, moist, grey – cobbles, some boulders below 0.2 m – colour changes to blackish grey below 0.6 m			2.0
1.0									4.0
	■					BEDROCK (PHYLLITE) – poor quality, angular, highly fractured, soft, dark grey			6.0
2.0						– becomes competent with depth			8.0
						END OF TESTPIT 2.5 m (REFUSAL) – some sloughing throughout			10.0
3.0									12.0
4.0									14.0

EBA Engineering Consultants Ltd. Whitehorse, Yukon	LOGGED BY: JSB	COMPLETION DEPTH: 2.5 m
	REVIEWED BY: JRT	COMPLETE: 06/07/13
		Page 1 of 1

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP70
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6806860 E443409	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	Depth(ft)
0.0						ORGANIC ROOT MAT		0.0
						GRAVEL – sandy, silty, coarse grained angular gravel and sand, compact, moist, blackish brown		
						SILT – sandy, gravelly, fine to medium grained, angular sand and gravel, grey	FROZEN Nbn, Vs, 15–20%	2.0
1.0						END OF TESTPIT 0.8 m (REFUSAL)		4.0
2.0								6.0
								8.0
3.0								10.0
								12.0
4.0								14.0

▲ PERCENT SILT OR FINES ▲ 20 40 60 80

■ PERCENT SAND ■ 20 40 60 80

PLASTIC M.C. LIQUID

10 20 30 40

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 0.8 m
COMPLETE: 06/07/13

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP71
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807042 E443340	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (RESIDUUM) – silty, some gravel, coarse grained angular sand and gravel, compact, moist, light grey – interbedded layer of silt throughout			
1.0						– colour changes to reddish brown below 1.0 m			4.0
	■					– sand and gravel becomes softer finer gravel below 1.8 m – silt content increases with depth – colour changes to mottled grey, brown and red			6.0
2.0									8.0
3.0									10.0
	■					GRAVEL (TILL) – sandy, some silt, coarse angular gravel and sand, compact, saturated, dark brown			12.0
4.0 ▼						END OF TESTPIT 4.0 m			▼ 14.0

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LOGGED BY: JSB	COMPLETION DEPTH: 4 m
REVIEWED BY: JRT	COMPLETE: 06/07/13

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP72
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807314 E443235	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ☰ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					SAND (TILL) – silty, gravelly, fine grained, moist, compact, dark grey			2.0
1.0						– gravel content increases and becomes coarser below 1.2 m			4.0
	■								6.0
2.0						– trace of gravel below 2.0 m – very compact, difficult to excavte beyond 2.0 m			8.0
	■								10.0
3.0						END OF TESTPIT 2.8 m (REFUSAL)			12.0
4.0									14.0

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LOGGED BY: JSB
REVIEWED BY: JRT

COMPLETION DEPTH: 2.8 m
COMPLETE: 06/07/13

06/08/16 11:58AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP73
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807641 E443119	ELEVATION:

SAMPLE TYPE: GRAB SAMPLE | NO RECOVERY | STANDARD PEN. | 75 mm SPOON | CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL (FLUVIAL) – sandy, trace of silt, well graded subrounded gravel and sand, loose, damp, reddish brown – becomes silty below 0.5 m – colour changes to medium grey around 0.5 m			
1.0									2.0
									4.0
2.0						– becomes trace of silt below 2.0 m – coarse sand below 2.0 m			6.0
									8.0
						END OF TESTPIT 2.5 m (REFUSAL)			
3.0									10.0
									12.0
4.0									14.0

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

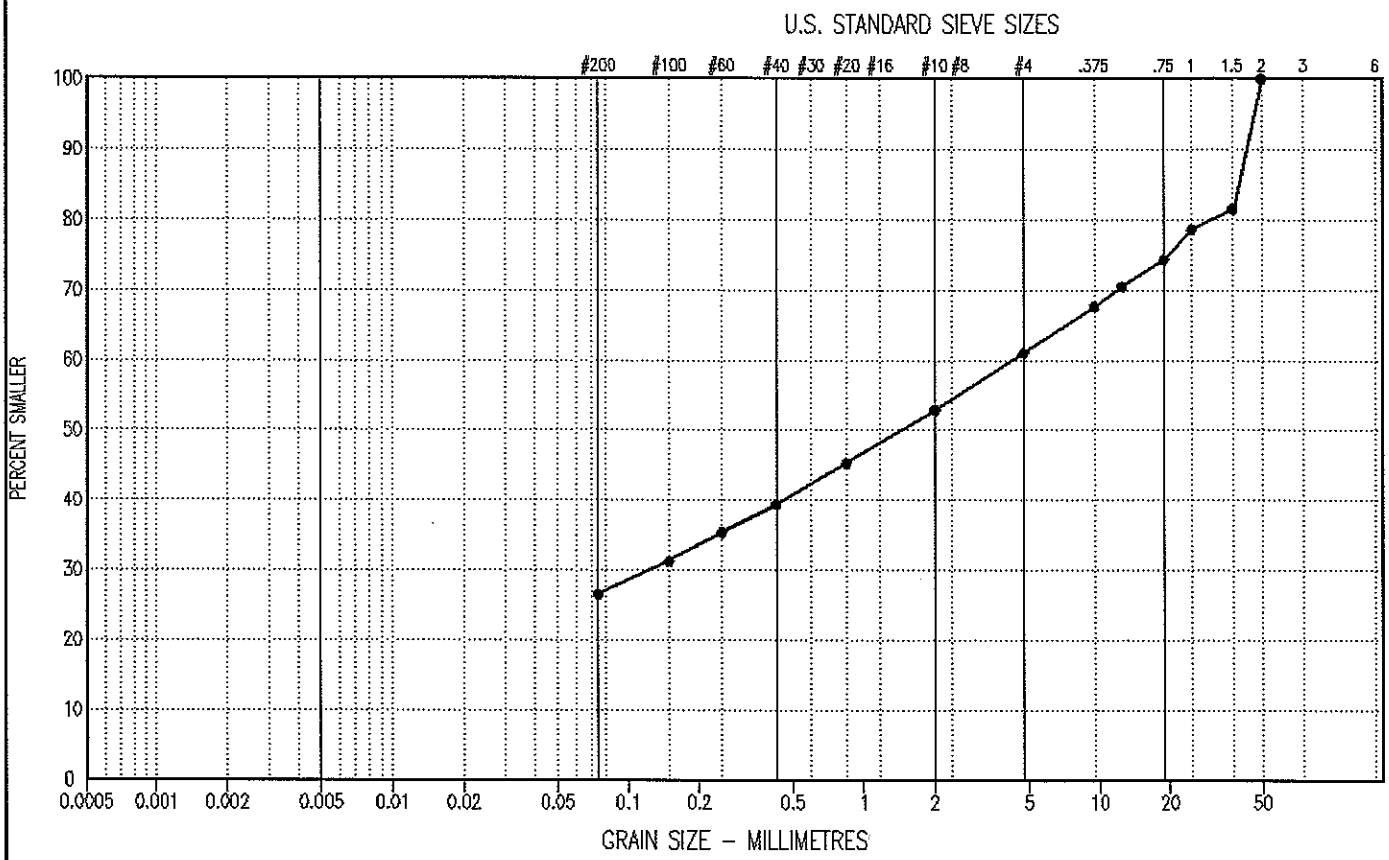
COMPLETION DEPTH: 2.5 m
COMPLETE: 06/07/13

06/08/16 11:59AM (YUKONF04)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	1200197-TP73	1.50 – 1.70	--- 27 ---		34	39	–	–	

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP74
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807834 E442996	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▭ 75 mm SPOON ▯ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL (FLUVIAL) – sandy, silty, well graded angular gravel and sand, compact, moist brown – cobbles and some boulders throughout			
1.0						– becomes trace of silt around 1.0 m			2.0 / 4.0
	■								
2.0						BEDROCK – competent END OF TESTPIT 1.8 m			6.0 / 8.0
3.0									10.0
4.0									12.0 / 14.0

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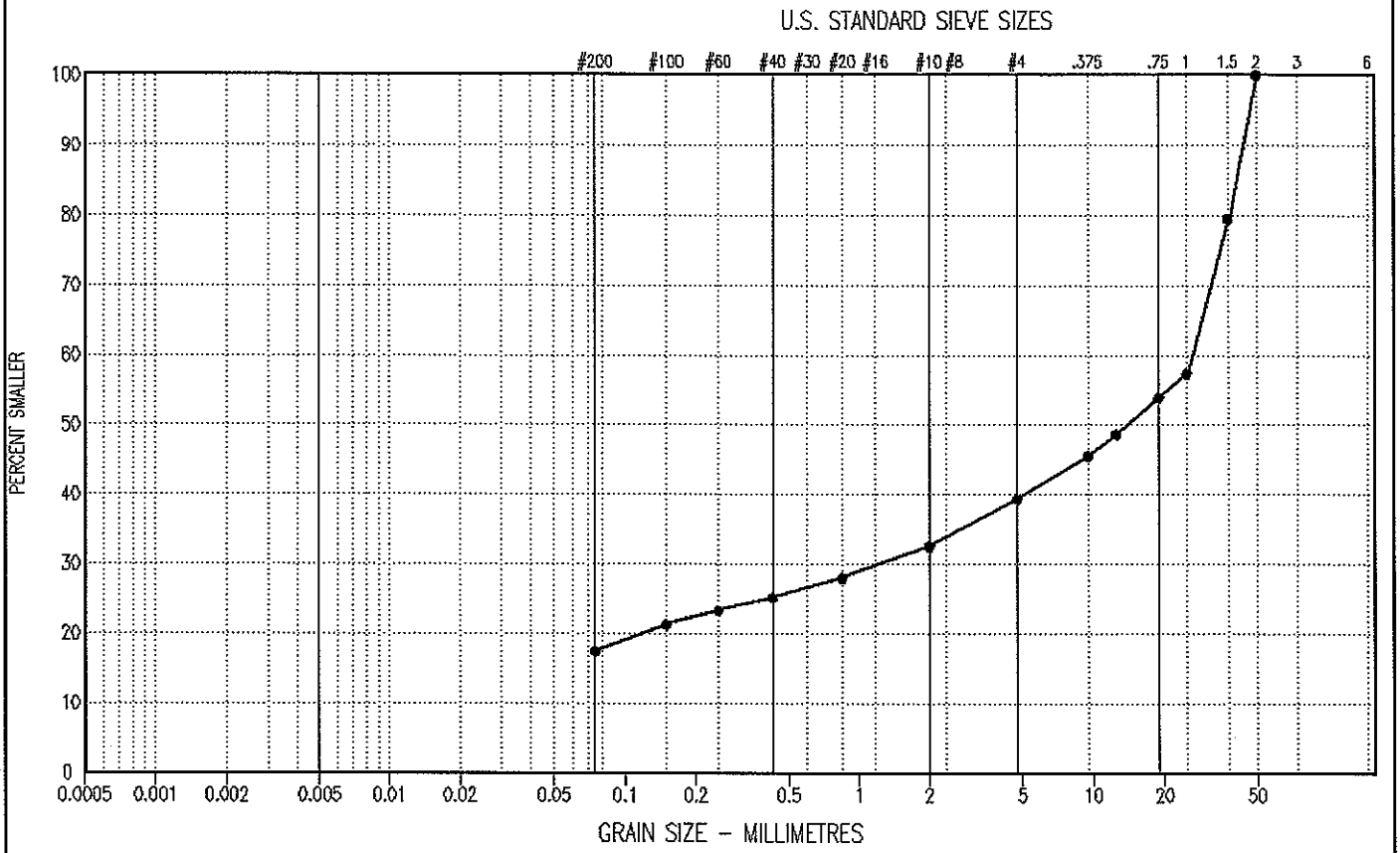
REVIEWED BY: JRT

COMPLETION DEPTH: 1.8 m
COMPLETE: 06/07/13

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●——●	1200197-TP74	1.30 – 1.50	---	17 ---	22	61	–	–	

Project: 0201-1200197 Date Tested: 06/08/04 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP75
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6807834 E442996	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
						GRAVEL – sandy, silty, coarse grained angular gravel, well graded sand, compact, moist, grey – cobbles and boulders throughout			2.0
1.0									4.0
						END OF TESTPIT 1.4 m (REFUSAL)			6.0
2.0									8.0
3.0									10.0
									12.0
4.0									14.0

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COMPLETION DEPTH: 1.4 m
COMPLETE: 06/07/13

06/08/16 11:59AM (YUKONP04)

Geotechnical Investigation	CLIENT: Yukon Engineering Services	TEST PIT NO: 1200197-TP76
Proposed Access Road	EXCAVATOR: 320C TRACKED EXCAVATOR	PROJECT NO: 1200197
Wolverine Lake, YT	UTM ZONE: 8 N6808186 E442777	ELEVATION:

SAMPLE TYPE ■ GRAB SAMPLE ⊘ NO RECOVERY ⊠ STANDARD PEN. ▤ 75 mm SPOON ▥ CRREL BARREL

Depth(m)	SAMPLE TYPE	RUN NO	SPT(N)	USC	SOIL SYMBOL	SOIL DESCRIPTION	GROUND ICE DESCRIPTION	▲ PERCENT SILT OR FINES ▲ 20 40 60 80 / ■ PERCENT SAND ■ 20 40 60 80 / PLASTIC M.C. LIQUID 10 20 30 40	Depth(ft)
0.0						ORGANIC ROOT MAT	UNFROZEN		0.0
	■					GRAVEL – sandy, silty, well graded gravel and sand, angular, compact, moist, grey – cobbles and boulders throughout			2.0
1.0									4.0
						END OF TESTPIT 1.2 m (REFUSAL)			6.0
2.0									8.0
									10.0
3.0									12.0
									14.0
4.0									

EBA Engineering Consultants Ltd.
Whitehorse, Yukon

LOGGED BY: JSB
REVIEWED BY: JRT

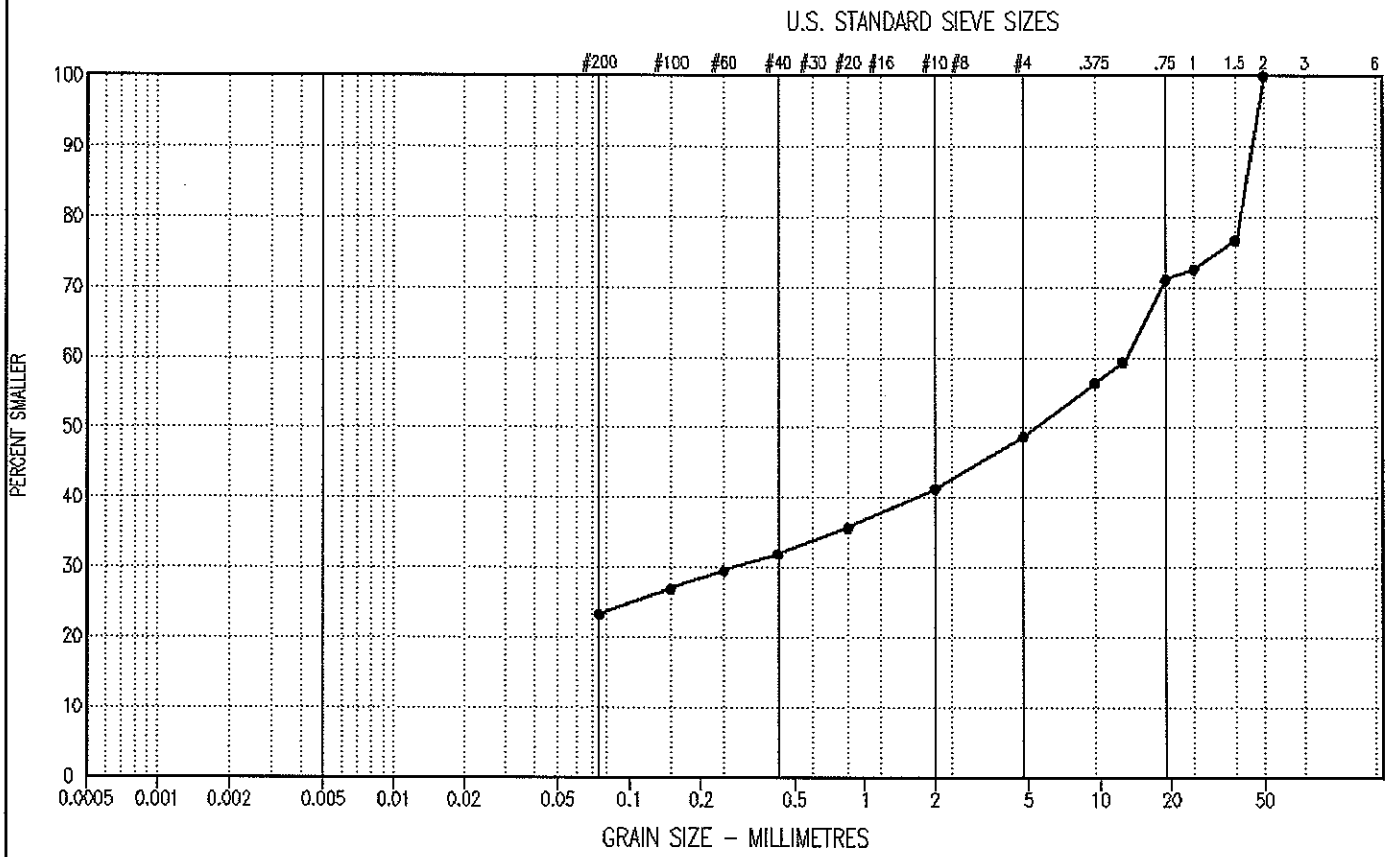
COMPLETION DEPTH: 1.2 m
COMPLETE: 06/07/13

06/08/16 11:59AM (YUKONP84)

EBA Engineering

PARTICLE SIZE – ANALYSIS OF SOILS

CLAY	SILT	SAND			GRAVEL	
		FINE	MEDIUM	COARSE	FINE	COARSE



SYMBOL	BOREHOLE NUMBER	DEPTH (m)	DESCRIPTION				Cu	Cc	U.S.C
			CLAY %	SILT %	SAND %	GRAVEL %			
●	1200197-TP76	0.50 – 0.70	--- 23 ---		25	52	–	–	

Project: 0201-1200197 Date Tested: 06/08/10 BY: PF

Tested in accordance with ASTM D422 unless otherwise noted.

STATION	EASTING	NORTHING	ASPECT	UPSLOPE GRADIENT	DOWNSLOPE GRADIENT	STATE	ICE	PRINCIPAL COMPONENT	PRINCIPAL COMPONENT MODIFIERS		USC SYMBOL	MATERIAL ORIGIN	TERRAIN SYMBOL	PIT DEPTH (m)	PARTICULARS
26JD-1	453428	6818645	NNW	26	22	unfrozen	-	SAND	gravelly	trace silt	GM-GP	colluvium bedrock	Cv/Ra		about 0.5m weathered rock and minor till overlying bedrock; bedrock outcrops common;uniform slope; dry; platy jointing meta-volcanics(?).
26JD-2	453230	6818265	SW	25	22	unfrozen	-	SAND	gravelly	trace silt	GM-GP	colluvium bedrock	Cx/R		about 0.5m weathered rock and minor till overlying bedrock; irregular slope: bedrock outcrops of narrow 3m relief ridges trending downslope; dry; platy jointing meta-volcanics(?); hardness 5-6; jointing is steeply dipping 55° South
26JD-3	453242	6818120	W	15	10	frozen below 0.33m	Nbn	GRAVEL	sandy		GP	colluvium bedrock	pOv/Rj		shallow, sidehill bog with 0.45 peat/organics overlying colluvium and bedrock; in area of 60m wide swale; uniform slope; permafrost
26JD-4	453026	6817753	W	18	0	frozen below 0.30m	Vs-20	SAND	some silt	trace gravel	SM	colluvium bedrock	pOv/gzsCvR		sidehill bog; uniform slope; benchy hillslope; ~20% visible ice, weakly stratified; ice crystals up to 12mm; permafrost
26JD-5	452928	6817361	W	10	10	Stream Crossing							pOv/C?/R?		channel width: 0.35m; depth: 0.07m; meandering; flowing within sidehill bog;
26JD-6	452882	6817321	W	12	10	frozen below 0.28m	Nbn	SAND	some silt		SM	colluvium bedrock	pOv/Cv/R		shallow, sidehill bog with 0.28 peat/organics overlying colluvium and (bedrock?); sidehill bog area; uniform slope; permafrost
26JD-7	452733	6816898	W	18	20	frozen below 0.28m	Nf	SAND	gravelly		GW	glaciofluvial	pOv/FGt		shallow sidehill boggy area with moss cover
27JD-8	451269	6814955	110° SE	20	14	frozen below 0.28m	Nbn	SAND	silty	some gravel	GM	till or colluvium	gzsCb		talus slope?
27JD-9	451094	6814689	103° E	10	8	unfrozen	-	SAND	gravelly	silty	GM	till or colluvium	[Mx]Cv		some sub-rounded clasts (till) mixed with colluvium (angular and sub-angular clasts); moist slope; talus slope?
27JD-10	451116	6814773		10	10	Stream Crossing									variable width and depth; average channel width: 0.8m; depth: 0.15m;
27JD-11	451393	6815193	105° E	13	12	unfrozen	-	SAND	gravelly	trace silt	GM-GP	till or colluvium	gsCb		trace rounded gravel (till)
27JD-12	451543	6815491	E	20	14	Stream Crossing									channel width: 0.8m; depth: 0.11m; uniform slope; within shallow, wide swale
27JD-13	451562	6815548	130° SE	20	24	unfrozen	-	SAND	gravelly	some silt	GM	till or colluvium	gsCb//Mx		some sub-rounded clasts (till) with sub-angular clasts (colluvium)
27JD-14	451757	6815863	130° SE	30	35	unfrozen	-	SAND	gravelly		GW	till or colluvium	gsCb		dry slope; talus? Slope
	451757	6815843				Stream Crossing									located 20m south of 27JD14; similar in size to 27JD12
27JD-15	451967	6816200	115° SE	20	12	frozen below 0.30m	Nbn	SAND	silty	organics	-	till or colluvium + organics	pOx/C		shallow sidehill bog area with moss cover; C and O mixed within seasonally active layer.
27JD-16	452079	6816434	E	12	0	Stream Crossing									channel width: 0.60m; depth: 0.10m; flowing within sidehill bog; flows into flat wetland at this location.
27JD-17	452146	6816555	E	6	15	frozen below 0.32m	Nbn	-	-	-	-	organic	pOv/[C]	0.59	"refusal" in frozen organics at 0.59m; mostly non-visible ice, but a shallow peat layer included a discontinuous 20mm thick strata of 50% visible stratified ice.
27JD-18	452274	6816294	0	5	0	unfrozen	-	SAND	some silt	some gravel	GM	alluvium	zgsAp	0.40	
27JD-19	452322	6816348				Stream Crossing: Light Creek									estimated present channel width: 1.4m; depth: 0.25m; estimated full bank width: 5.0m; estimated full bank depth: 0.5m.
27JD-20	452399	6816394	0			unfrozen	-	SAND	gravelly		GW	glaciofluvial	gsFGt	0.64	on flat-topped, low relief ridge between Light Creek and Pitch Creek; eroded FG terrace; sloughing on gully sideslopes noted 30m NE of this site
27JD-21	452454	6816441				Stream Crossing: Pitch Creek									estimated present channel width: 1.1m; depth: 0.1m; estimated full bank width: 4.5m; estimated full bank depth: 1.6m.
27JD-22	452563	6816470	0			unfrozen	-	SAND and	GRAVEL				gsFGr	0.60	eroded glaciofluvial terrace
27JD-23	452741	6816688	270° W	20	15	frozen below 0.32m	Nbn	-	-	-	-	organic	pOv/[C?]	0.45	sidehill bog; uniform slope; "refusal" within frozen organics at 0.45m; same terrain polygon back to 50m N of 27JD22.
27JD-24	453747	6818790	0			unfrozen	-	GRAVEL	some sand			bedrock	sgCx/R	0.70	south side cutslope at Robert Campbell Highway; on crest of broad, rounded low-relief ridge oriented SW-NE;
27JD-25	453916	6818763	0			unfrozen	-	GRAVEL	and SAND			glaciofluvial	sgFGt	4	gravel borrow pit on Robert Campbell Highway 200m east of access road; glaciofluvial terrace; ~10% oversize (>75mm)

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 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.

3.0 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.

4.0 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.

5.0 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 judgmental 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.

6.0 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.

7.0 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.

8.0 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.

9.0 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.

10.0 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.

11.0 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.

12.0 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.

13.0 STANDARD OF CARE

Services performed by EBA for this report have been conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practising under similar conditions in the jurisdiction in which the services are provided. Engineering judgement has been applied in developing the conclusions and/or recommendations provided in this report. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of this report.

14.0 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.

15.0 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), the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding. The hard copy versions submitted by EBA shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancies, the hard copy versions shall govern over the electronic versions. Furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed version archived by EBA shall be deemed to be the overall original for the Project.

The Client agrees that 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. The Client warrants that EBA's instruments of professional service will be used only and exactly as submitted by EBA.

The Client recognizes and agrees that 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.

Appendix C

Draft Geotechnical Evaluation, Granular and Borrow Investigation Wolverine Access Road

EBA Engineering Consultants Ltd
October 2006

YUKON ENGINEERING SERVICES LTD.
YUKON ZINC CORP.

DRAFT GEOTECHNICAL EVALUATION
GRANULAR AND BORROW INVESTIGATION
WOLVERINE LAKE MINE ACCESS ROAD
km 190 ROBERT CAMPBELL HIGHWAY
YUKON

EBA File: 1200197

October 2006

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

TABLE OF CONTENTS

Forthcoming with Final Report:

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1.0 INTRODUCTION

EBA Engineering Consultants Ltd. (EBA) was retained to conduct a geotechnical evaluation of the proposed access road to the Yukon Zinc mining property at Wolverine Lake, Yukon. The work was requested by Yukon Engineering Services Ltd. (YES) of Whitehorse on behalf of Yukon Zinc Corp (YZC). The objective of the evaluation is to provide geotechnical recommendations for the construction of the access road.

The scope of work for this project was presented in a proposal and budget prepared by EBA and submitted to Robert Harvey, P.Eng. of YES in June 2006. During the first phase of the work in July 2006, 76 test pits were completed on the access road alignment between kilometre post (KP) 5 and KP 24 (Geotechnical Evaluation, Wolverine Lake Mine Access Road, EBA, August 2006). This report presents the results of the second phase, which assessed six borrow targets between KP 0 and KP 24, and completed testpits from KP 0 to KP 3.3 on the road alignment.

2.0 PROJECT BACKGROUND

The study area includes 24 km of a proposed access road that starts at km 190 on the Robert Campbell Highway (Yukon Highway 4) and is initially aligned south and southwest, following the valley of Light Creek past the divide at km 8 and across Bunker Creek at km 10. The alignment follows Chip Creek to km 19, where it turns northwest to eventually cross the Hawkowl Creek tributary of Money Creek, maintaining a northwest bearing to Wolverine Lake. The access road route is covered on NTS map sheets 105H/5 and 105G/8.

Part of the access road, from about km 24.5 to the Wolverine Lake Mine Site and camp at approximately km 27.5 and km 28.5 respectively, is developed as an access road to the airstrip and was not evaluated as part of this study.

3.0 RESULTS AND DISCUSSION

A trail was pioneered from km 190 on the Robert Campbell Highway to KP 3.2 on the Wolverine Lake Mine Access Road using a Hitachi EX150 excavator provided by Twilite Services Ltd. of Watson Lake. R. Harvey, P.Eng. of YES, Whitehorse supervised the trail construction. A Caterpillar 320C excavator provided by Yukon Zinc was used to excavate testpits to evaluate potential borrow sources between KP 10 and KP 24. J. Dennett, P.Geo.(BC) of EBA supervised testpit excavation for geotechnical evaluation from KP 0 to KP 3.2 and at and at the following borrow targets:

- Primary 1, KP 0.5
- Secondary 3, KP 3
- Primary 2, KP 10.5
- Secondary 7, KP 15.6
- Primary 4, KP 17.5
- Primary 3, KP 24

Figures with borrow locations are provided in Figure 1 of the YES submission.

Seventy-eight samples were collected in 29 testpits from October 3 to 7, 2006 to evaluate the access road and borrow sites. Moisture and grain size analysis was carried out at EBA's Whitehorse geotechnical laboratory on samples recovered during the excavator-supported test-pitting program. Testpit logs with the results of lab analysis used to provide recommendations for construction are appended.

4.0 BORROW SOURCES

Nine potential borrow sources were selected for possible evaluation, including three primary sites and six secondary sites. Secondary sites were identified for evaluation if the primary targets proved inadequate in terms of quantity or quality. For the program described herein, testing and evaluation of borrow sources was completed at six sites. Four of the tested sites, Primary 1, Primary 2, Primary 3 and Secondary 3, were identified as potential borrow source targets by YES in previous reports. Two additional sites tested, Primary 4 (centred about KP 17.5) and Secondary 7 (at KP 15.6), were identified during the field program as favourable borrow sources.

Primary 1

Primary 1 Borrow Site is located along the west side of the access road between KP 0 and KP 1 near the Robert Campbell Highway. Four test pits completed at the Primary 1 site intersected a blanket of gravelly sand. The proposed borrow area is on a glaciofluvial terrace about 11 ha in area. A short slope separates the tested terrace from a western extension of the terrace with an additional 13 ha. The texture and thickness of granular material is consistent. With an average depth of 3.0 m, the 11 ha terrace could yield a prospective volume of over 0.4 million m^3 of granular fill. Testpit results are summarized in Table 6.1.

Table 6.1 Primary 1 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
JD-10-4-1	SAND, gravelly, trace silt (7%)	3 – 9.8	3.4	massive, well-graded [till]
JD-10-4-2	SAND, gravelly, trace silt	9 – 13.3	3.0	massive, well-graded [till]
JD-10-4-3	SAND, gravelly, trace silt	4.6 - 8	3.1	[till] refusal at bedrock
JD-10-4-4	SAND, gravelly, trace silt	5.8 – 9.4	3.3	[till] refusal at bedrock

Primary 2

Primary 2 Borrow Site is located along the west side of the access road between about KP10.2 and KP11.7. Sand with variable gravel was observed in the six test pits excavated in the area. Relic channels, stepped terraces and ridges of a large glaciofluvial deposit shape the topography. The area covers over 40 ha and no lower limit to the thickness of granular material was intersected. Grain size analysis completed at the EBA materials testing laboratory in Whitehorse indicates that the material in Testpit JD-10-5-3 is suitable for use as concrete aggregate. Similar granular textures were intersected in other testpits in this area. Testpit results are summarized in Table 6.2.

Table 6.2 Primary 2 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
JD-10-4-5	SAND, gravelly, trace silt to silty	7.2 – 9.6	3.9	massive, well-graded [till]
JD-10-4-6	SAND, trace gravel	2.2 – 8.1	5.4	bedded, poorly-graded [FG]
JD-10-5-1	SAND and GRAVEL (0 – 0.8m)	5.9	5.3	bedded, poorly-graded [FG]
	SAND, some gravel (0.8m-end)	2.1 – 3.6		
JD-10-5-2	SAND and GRAVEL	5.3	4.8	bedded, poorly-graded [FG]
	SAND, trace gravel	3.7 – 10.6		
JD-10-5-3	GRAVEL and SAND, trace boulders	1.8 – 8.7	5.1	bedded, well-graded [FG]
JD-10-5-4	SAND, gravelly, trace boulders	3.5 – 9.5	4.5	bedded, well-graded [FG]

FG = glaciofluvial

Primary 3

Primary 3 Borrow Site is located along the west side of the access road between about KP24 and the Wolverine Lake airstrip. Two test pits excavated in the area intersected a blanket of gravelly sand till that should provide good quality fill for road construction. The testpits were located next to the access road on a low relief ridge. There is considerable potential for a large quantity of this material in the area, but further exploration and testing is required to prove volumes. Testpit results are summarized in Table 6.3.

Relic glaciofluvial meltwater channels were observed in this area and to the southeast along the access road. If a granular source is required in this area, the prospect of glaciofluvial granular deposits is good and further exploration is warranted.

Table 6.3 Primary 3 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
JD-10-7-1	SAND and GRAVEL, trace silt	2.6 – 8.6	4.3	massive, well-graded [till]
JD-10-7-2	SAND, gravelly, trace silt	5.3 – 7.7	2.2	massive, well-graded [till]

Primary 4

Primary 4 Borrow Site is located along the west side of the access road between about KP16.6 and KP18. Eight test pits excavated in the area indicate that a veneer to blanket of glaciofluvial sand and gravel covers an irregular surface of underlying bedrock. The area tested is on a broad terrace about 80 ha in area. Thickness of granular material is variable. Test pits intersected from 1.2 m to greater than 3.6 m of mainly gravel and sand. With an average depth of 2.0 m, the overall terrace area could yield a prospective volume of over 1.0 million m^3 of granular fill. Testpit results are summarized in Table 6.4.

Table 6.4 Primary 4 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
TP 43 (KP15.650)	GRAVEL, some sand, trace silt	4.5	2.2	FG blanket (>2.2 m thick);
TP 44 (KP15.925)	GRAVEL and SAND, trace silt	4.5	1.1	FG veneer (>1.1 m thick);
TP 46 (KP16.775)	GRAVEL and SAND, trace silt	8	1.2	FG veneer over bedrock
TP 47 (KP16.950)	SAND and GRAVEL, trace silt	8	1.5	FG blanket (>1.5 m thick)
	SAND, some silt (0.8m to end)	19		
TP 48 (KP17.250)	GRAVEL, some sand, trace silt	4.5	2.0	FG blanket (>2.0 m thick)
	SAND, silty, gravelly	7.5		
TP 49 (KP17.525)	GRAVEL, sandy, trace silt	4.5	2.2	FG blanket (>2.2 m thick)
JD-10-6-10 (50m NW of KP17.5	GRAVEL, some sand	3.3 – 4.9	3.6	well-bedded moderately graded [FG]
	GRAVEL, some silt, some sand	10.2		
	GRAVEL, sandy, some silt	10.8		
	sub-crop (greenstone bedrock)	'-		
TP 50 (KP17.750)	SAND, silty, trace gravel		1.3	refusal in bedrock
	0.4m SAND, gravelly, silty	6.5		

Secondary 3

Secondary 3 Borrow Site is located at the confluence of two streams and is bisected by the road alignment between KP2.7 and KP3.0. Six test pits excavated in the area indicate that a blanket of glaciofluvial sand and gravel forms the two small ridges crossed by the road alignment in this area. North of the road alignment the ridges are well-drained and the granular sub-surface material is unfrozen. South of the road alignment the terrain is flat to gentle and the soils are frozen. This area appears to be a source of good quality granular material, however the extent of the deposit is limited and development may be constrained by close proximity to streams and a perched aquifer near KP 2.8. Assuming a 35 m riparian protection zone, borrow pits may be developed next to the road within two areas of about 1.3 ha and 1.9 ha respectively. At an average thickness of 2 m, this area represents over 50,000 m^3 of granular borrow material. The developable area may need to be reduced to avoid drainage issues from the perched aquifer identified near KP 2.8. Test pit results are summarized in Table 6.5.

Table 6.5 Secondary 3 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
JD-10-6-1	SAND, gravelly, trace silt	5.0 – 6.6	3.3	massive, moderately-graded [FG]
	SAND, gravelly	6.0		
JD-10-6-2	SILT, trace gravel, trace sand	29	1.2	frozen cryoturbidic organic soil; possibly overlying frozen granular.
JD-10-6-4	SAND and GRAVEL	4.9 – 6.2	2.3	massive, well-graded [FG]; perched water table at 0.7m
JD-10-6-5	SAND, some gravel, trace silt	4.6 – 6.7	2.7	bedded, well-graded [FG]
JD-10-6-6	SILT, trace gravel, trace sand;	–	1.0	frozen cryoturbidic organic soil;
JD-10-6-7	silty organic soil	–	0.6	frozen

Secondary 7

Secondary 7 Borrow Source is located adjacent to the road alignment in the area of about KP 14 to KP 15.6. Five test pits completed along the Secondary 7 area indicate a thick blanket of sandy gravel colluvium. In this area the road alignment traverses a moderate gradient slope. It may be practical to develop borrow pits to exploit this material within the road right-of-way. Testpit results are summarized in Table 6.6.

Table 6.6 Secondary 7 Borrow Source - Summary of Test Results

TESTPIT	TEXTURE (field estimate)	MOISTURE (%)	PIT DEPTH (m)	DESCRIPTION
TP38	GRAVEL, sandy, silty		2.5	(KP14.600)
TP39	GRAVEL, sandy, some silt		2.5	(KP14.825)
TP40	GRAVEL, sandy, some silt		2.0	(KP15.075)
TP41	GRAVEL, sandy, silty		2.5	bedrock at 1.8m; (KP15.325)
JD-10-6-9 (50m west of KP15.600)	SAND, gravelly, some silt	3.9	3.3	massive, well-graded [till]
	GRAVEL and SAND, some silt	6.5 - 7.3		massive, well-graded [colluvium]
	bedrock	'-		
TP43 (KP15.650)	GRAVEL, some sand, trace silt		2.2	probably ends in bedrock

Appendix D

Borrow Site ABA Testing and Project Granular Material Requirements

Acid Base Accounting Results for Borrow Sites Materials Located near the Airstrip

Parameter	Unit	TP05-72	TP05-75	TP05-78	TP05-81
Paste pH	-	8.45	8.80	7.89	7.62
Rinse pH	-	5.88	7.54	6.12	5.7
Total Sulphur	%S	0.06	0.08	0.09	0.02
Sulphate Sulphur	%S	0.005	0.005	0.005	0.005
Sulphide Sulphur	%S	0.005	0.005	0.005	0.005
Insoluble Sulphur	%S	0.06	0.08	0.09	0.02
AP	kg CaCO3/t	0.15	0.15	0.15	0.15
Modified Sobek NP	kg CaCO3/t	3.1	5.1	2.6	0.2
Total Carbon	% C	0.14	0.21	0.43	0.25
Total Inorganic Carbon	% C	*0.005*	*0.005*	*0.005*	*0.005*
Carb NP	kg CaCO3/t	*0.4*	*0.4*	*0.4*	*0.4*
Net Sobek NP	kg CaCO3/t	3.1	5.1	2.6	0.2
Sobek NPR	-	20.67	34.00	17.33	1.33
Carb NPR	-	2.67	2.67	2.67	2.67

Note: Values in *italics* were reported by the laboratory as less than their detection limit and are shown here at one-half the detection limit.

Quantities of Granular Material Required for Construction and Maintenance Activities

Description	Manufactured Product	Raw Material
Granular Surfacing for Road Construction	50,000 m^3	60,000 m^3
Granular Surfacing for Road Maintenance	20,000 m^3	25,000 m^3
Culvert Bedding and Backfill	8,000 m^3	10,000 m^3
Common Borrow for Construction	50,000 m^3	50,000 m^3
Concrete Aggregate (Industrial Complex)	2,000 m^3	5,000 m^3
Totals	**130,000 m^3**	**150,000 m^3**