Technical Summary

February 2024

Pit Name: Swift River

Provincial Pit Number: 1500

Location: The pit is located approximately 29.5km east of the Highway 97/26 junction in Quesnel, then 800 metres south of Highway 26 off of the east side of Ranch Road. (Figure 1).

Legal Land Description: The pit is legally described as That Part of District Lot 443 together with that tract of land in the vicinity of District Lot 433, Cariboo District. The pit is covered by a Crown Land Act Section 16 Map Reserve No. 5401199 in the name of the Ministry of Transportation and Infrastructure. The Map Reserve is 180.09 hectares, more or less. The geographical coordinates are Universal Transverse Mercator Grid Zone 10, 559773 Easting, 5875732 Northing. The layout of the Map Reserve boundary is shown in the pit plan (Figure 2).

Subsurface Investigation: Subsurface investigations at Swift River Pit were carried out in September 2023, November 2017 and August 2014 by the Ministry of Transportation & Infrastructure.

In 2023 sixteen (16) test pits were excavated to depths ranging from 1.5 to 5.4m, in 2017 two (2) test pits were excavated to depths of 4.5m, and in 2014, seventeen (17) test pits were excavated to depths ranging from 2.0m to 5.5m. During the test pitting, subsurface soil and groundwater conditions were logged and representative samples of the granular materials were collected for laboratory testing and future reference. Laboratory testing was carried out on all sixteen (16) 2023 samples and twelve (12) of the 2014 samples at WSP laboratories to assess the gradation and durability characteristics. The tests completed were wet sieve analysis, micro-deval, sand equivalent, relative density, and absorption.

Based on the results of the 2023 and 2014 investigations, a suitable granular area for mining has been defined (Figure 3). The detailed results of the subsurface testing are provided in the Test Pit Summaries and test pit locations are shown on the Pit Development Plan (Figure 3).

Material Gradation: Table 1 shows the gradation as a percentage by weight of the fines (silts and clays), sand and gravel components as well as the Unified Soil Classification (USC [included after test pit summary]) for the samples tested from 2023 and 2014.

Table 1: Pit Run Gradation

Test Pit	Depth (m)	Fines (%)* <0.075mm	Sand (%)* 0.075-4.75mm	Gravel (%)* 4.75-75mm	USC
2023					
23-01	0-2.2	2.4	50.6	47	SP
23-01A	3.1-5.4	9.4	72.9	17.7	SPSM
23-02	0.2-3.7	1.7	43.8	54.5	GP
23-03	0.1-3.2	3.3	41.8	59.4	GP
23-04	0-3.7	3.1	36.6	60.4	GP
23-05	0-2	2.1	30.9	67	GW
23-05A	2-3	13.1	71.1	15.8	SM1
23-06	1-4.8	75.3	23.9	0.9	FINE
23-07	1-5.2	71	29	0	FINE
23-08	0.2-2.4	8.4	34.6	57	GW-GM
23-09	0-4.8	1.8	38.4	59.8	GP
23-10	1.2-5.1	58	35.2	6.8	FINE
23-11	0.1-1.5	6.8	41.3	51.9	GW-GM
23-12	0.3-1.8	22.6	74	3.4	SM2
23-13	0.2-2.8	2.4	44.1	53.5	GP
23-14	0.12-2.9	2.4	43.2	54.4	GP
23-15	0-5	1.7	39.7	58.6	GP
23-16	0.1-1.4	1.7	36.8	61.5	GP
Average		**16**	**43.8**	**40.5**	**SM1**
2014					
14-01	0.4-3.5	5.5	36.7	57.8	GP-GM
14-04	0.1-5.2	2.3	30.6	67.1	GP
14-05	0.3-5.2	1.1	39	59.9	GP
14-06	0.4-5.2	1.8	38.1	60.1	GP
14-07	0.3-3.1	2	30.7	67.3	GW
14-10	0.3-5.2	1.5	35.8	62.7	GP
14-11	0.3-5.2	1.4	25.4	73.2	GW
14-12	0.3-5.2	2.2	33.4	64.4	GP
14-13	0.3-5.5	1.7	28.8	69.5	GW
14-14	0.3-5.2	1.1	31.6	67.3	GW
14-15	0.3-5.2	1.3	31.9	66.8	GW
14-16	0.3-4	1.8	30.5	67.7	GW
Average		**2**	**32.7**	**65.3**	**GP**

Oversize Field Estimates: Table 2 shows the estimated percent of oversize rock as noted in the field during exploration.

Table 2: Oversize Field Estimates

2023

Classification:	Average (%)	Range (%)
Boulders (>375mm)	0	0
Cobbles (150-375mm)	1.4	0-3
Cobbles (75-150mm)	4.4	1-12

Maximum rock size observed was 270mm.

2014

Classification:	Average (%)	Range (%)
Boulders (>375mm)	0	0
Cobbles (150-375mm)	4.7	0-10
Cobbles (75-150mm)	9.8	5-15

Maximum rock size observed was 350mm.

Material Durability: Table 3 shows the results of the durability tests as well as the specifications as required in the Standard Specifications for Highway Construction.

Table 3: Durability Test Results

Test Pit	Sand Equivalent	Micro Deval	Absorption		Relative Density	
		C/F	Coarse	Fine	Coarse	Fine
2023						
TP23-02	75					
TP23-13			1.33	1.83	2.595	2.694
TP23-15		10.4/15.1				
2014						
TP14-05	76	12.3/16.8				
TP14-06			1.74	1.91	2.595	2.565
TP12-14	77	10.7/17.5				
BC MoTI Specifications						

Sand Equivalent	≥40 for Base Course and fine aggregates for Asphalt Mix Aggregates ≥20 for Surfacing, Sub-Base and Bridge End Fill aggregates
Micro Deval	≤30% for Sub-Base and Bridge End Fill aggregates ≤25% for Surfacing & Base Course Aggregates ≤18% for Class 1 Pavement asphalt mix aggregates ≤20% for Class 2 Pavement asphalt mix aggregates
Absorption	<2.0% for coarse paving aggregates ≤1.0% for coarse and ≤1.5% for fine Graded Aggregate Seal Coat aggregates
Relative Density	~2.65 for all aggregate products

Material Suitability: Based on the 2023 investigation results, the material in the proposed suitability area is judged to be suitable for the following purposes:

Table 4: Suitability

	Pit Run	**Crush**
Swift River Suitability area	Bridge End Fill SGSB HFSA Winter Abrasive	25-50mm WGB Coarse & Medium Asphalt Mix Aggregates

The samples tested meet the gradation, sand equivalent, and micro-deval specifications for Base Course, SGSB, Bridge End Fill and Coarse/Fine Asphalt Mix Aggregate. Based on the absorption results the samples meet the specification for coarse paving aggregate.

Sulphate and Chloride Testing: Sulphate and Chloride testing was conducted in October 2023 by CARO Analytical Services with the results coming back as having a low/moderate (S3) degree of exposure.

Table 5: S/CL Results

General Parameters	**Result**	**RL (%)**
Sulfate, Water-Soluble	<0.050	0.050
Chloride, Water-Soluble	<0.002	0.002

Volume Estimates: Table 6 shows the volume estimates that can be expected for topsoil, overburden and gravel from the proposed suitability area. This is based

on the measured depths encountered during the subsurface investigation. The potential volumes of granular material were calculated by averaging the total thickness of granular material encountered in test pits and multiplying by the estimated surface area.

Table 6: Volume Estimates

Section 16 Area

Suitability Area ~1.6ha.	Topsoil	Asphalt (pit floor that has previously been paved)	Granular Material
Average Layer Thickness (m)	0.2	0.1	3.0
Volume (m^3)	2,740	1,370	47,900

Pit Development Notes

- All development must be carried out in accordance with the Health, Safety, and Reclamation Code for Mines in British Columbia, BC Ministry of Energy and Mines (2022, or later edition), the Standard Specifications for Highway Construction, BC Ministry of Transportation and Infrastructure (2020, or later edition) and the Aggregate Operators Best Management Practices Handbook for BC.

- All trees, vegetation, and overburden are to be removed within 2m of the top of the pit faces. Topsoil, overburden, and aggregate cannot be removed within five meters of the reserve boundary.

- The crusher is recommended to be located on the lower floor as identified on the Pit Development Plan (southwest of TP 23-02), with mining proceeding in a northern and northeastern direction.

- Processed aggregate may be stockpiled to the south of the production site, where space permits as indicated on the Pit Development Plan.

- No dumping of debris or petroleum products will be permitted, and the site must be left in a clean and safe condition.

- Some minor stripping may be required prior to mining and aggregate stockpiling. Ideally any overburden is stockpiled along the west side of the pit where previous overburden has been placed as a visual berm along Ranch Road. If additional development is required, it shall conform to the

requirements of the pit development plan or be completed as directed by the Ministry Representative.

- At the completion of the pit development operations, but prior to the depletion of the pit, the sides of the pit faces, waste piles, and overburden stockpiles must be trimmed to a 1.5H:1V slope. Active pit faces must be reshaped with native granular materials.

- Upon depletion of the pit, all disturbed areas are to be reclaimed. The minimum reclamation procedure should include re-sloping of the pit faces and waste piles to a 2H:1V slope, contouring the area for appropriate drainage, spreading of overburden followed by topsoil, and seeding.

- Should any of the above conditions conflict with the Health, Safety, and Reclamation Code for Mines in British Columbia, then the Code will prevail.

Closure

The findings of this report and the soil conditions noted above are inferred from the extrapolation of limited surface and subsurface data collected during the site investigation. It should be noted that different and possibly poorer soil conditions may exist between the test pit locations and volume estimates may vary from those reported in this report.

Prepared by:

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Reviewed by:

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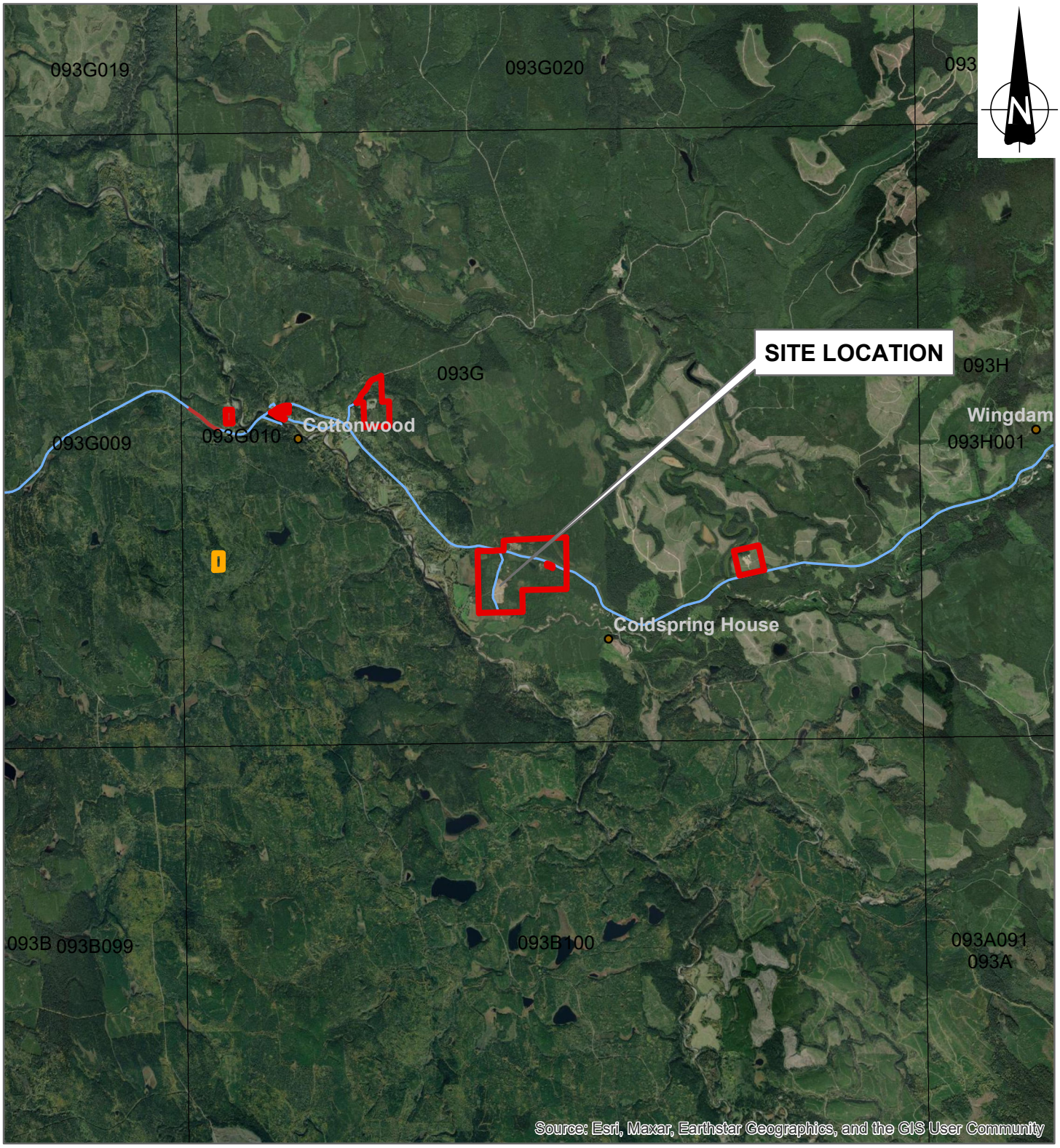
Enclosures

Figures:
- Figure 1 - Location Plan
- Figure 2 - Legal Plan
- Figure 3 - Development Plan

Test Pit Logs (2023, 2017 and 2014)
Wet Sieve Analysis Chart (2023)
Aggregate Gradation Charts (2023)
USC Legend
Photos

Figures



0 0.5 1 2 3 4 Kilometers

Scale 1:100,000

Ministry of Transportation and Infrastructure
Geotechnical and Materials Branch

LOCATION PLAN (2023)

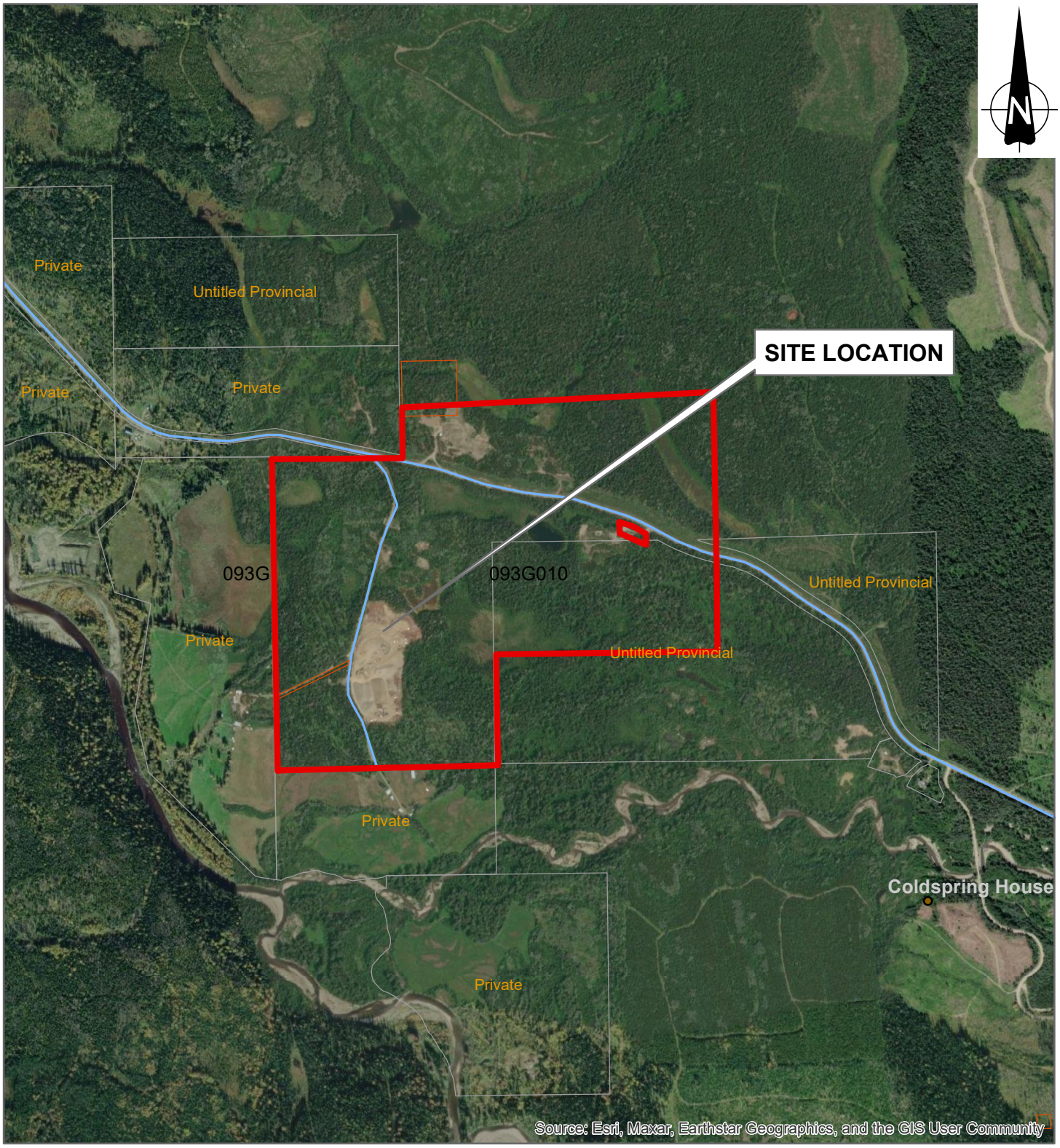
SWIFT RIVER PIT No. 1500

SA 18 - CARIBOO DISTRICT

DRAWN BY: SKINNIBU	PROJECTION: NAD 1983 UTM Zone 10N		SCALE: As Shown
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 10N		DATE: 2023-12-13
FileName: GISTemplate_Gravel_Provincial_2023-03-16	Geotech Project No:	Reg: 2	Drawing No: **FIGURE 1**

Document Path: Q:\GEOTECHNICAL\S.RUIZ_DESIGN\Reference\Gravel\GISTemplate_Gravel_Provincial_2023-03-16.mxd

This drawing was originally produced in colour.



0 0.125 0.25 0.5 0.75 1 Kilometers

Scale 1:20,000

Ministry of Transportation and Infrastructure
Geotechnical and Materials Branch

LEGAL PLAN (2023)

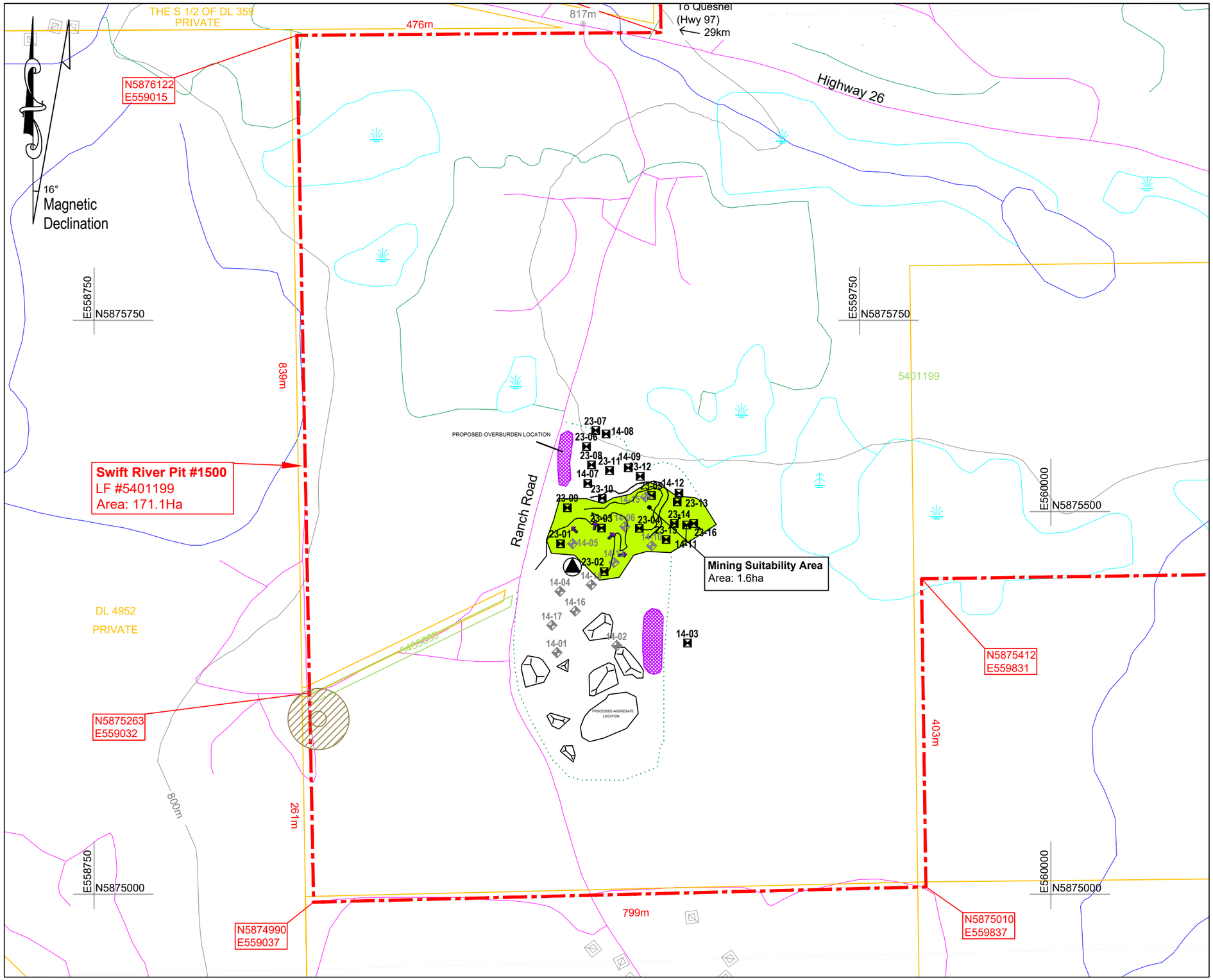
SWIFT RIVER PIT No. 1500

SA 18 - CARIBOO DISTRICT

DRAWN BY: SKINNIBU	PROJECTION: NAD 1983 UTM Zone 10N		SCALE: As Shown
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 10N		DATE: 2023-12-13
FileName: GISTemplate_Gravel_Provincial_2023-03-16	Geotech Project No:	Reg: 2	Drawing No: **FIGURE 2**

Document Path: Q:\GEOTECHNICAL\S.RUIZ_DESIGN\Reference\Gravel\GISTemplate_Gravel_Provincial_2023-03-16.mxd

This drawing was originally produced in colour.



PIT DEVELOPMENT LEGEND

- NATURAL EMBANKMENT
- PIT FACE
- TEST PIT
- TEST HOLE
- TEST PIT (DEPLETED)
- ROAD
- CREEK
- TRAIL
- CADASTRE
- TANTALIS
- GRAVEL RESERVE BOUNDARY
- PROPOSED GRAVEL RESERVE BOUNDARY
- TREELINE
- CONTOURS
- BUILDING (symbolic)
- IRON PIN
- SWAMP
- STOCKPILE
- NO DISTURBANCE
- DEVELOPMENT DIRECTION
- OVERBURDEN STOCKPILE
- MINING SUITABILITY AREA
- CRUSHER LOCATION

TRIM NOTE:

1. Contour Interval 20 metres
2. Base Map derived from Trim Map 93G010.

LEGAL NOTE:

District Lot Lines are derived from digital Crown Cadastral reference mapping supplied by CROWN LAND REGISTRY,Victoria

DRAWING NOTES:

1. Some testpits and/or testholes may not be representative of current conditions due to development and excavation done after testing was conducted.
2. Some extraction may have occurred since the last GPS survey of the pit was undertaken, therefore pit faces and stockpiles may not be representative of current conditions.

PIT DEVELOPMENT NOTES:

1. Pit development must be carried out in accordance with the Health, Safety, and Reclamation Code for Mines in BC, the current Standard Specifications for Highway Construction, and the Aggregate Operations Best Management Practices Handbook for BC.
2. Crusher set up is recommended to be located at the base of the slope west of TP 23-02 with mining proceeding in a north/northeast direction.
3. Processed aggregate may be stockpiled south of the crusher location where space permits around existing stockpiles.
4. The contractor must ensure that all materials passing through 375mm x 450mm slotted openings shall be used in the production of the crushed aggregates.
5. Pit excavations must not take place to within a minimum distance of 2m from the edge of clearing & stripped areas.
6. When the contractor discontinues operations in the pit, all working pit faces and stockpiles must be trimmed to 1.5H to 1V slope. Working pit faces must be reshaped with native granular materials. All other permanent slopes must be re-sloped to no steeper than 2H:1V.
7. No dumping of debris or petroleum products is permitted. The pit must be left in a clean and safe condition.

0m 50 100 150 200

1 : 5000

Ministry of Transportation and Infrastructure
Southern Interior Region
Geotechnical and Materials Branch

PIT DEVELOPMENT PLAN (2024)
SWIFT RIVER PIT #1500
SA18 - CARIBOO DISTRICT

DRAWN BY: S.Ruiz	PROJECTION: UTM Zone 10	SCALE: AS SHOWN
CHECKED BY: A.Mitchell	DATUM: NAD83	DATE: 27 FEBRUARY 2024
FILE NAME: f3p_1500_2024.dwg	REG. SIR	DRAWING NUMBER: FIGURE 3

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This drawing was originally produced in colour.

Test Pit Summaries

2023

AGGREGATE LOG

PROJECT: 86004 - Swift River
PIT #: 1500
DISTRICT: 18 - Cariboo
SAMPLED BY: Samantha Kinniburgh
METHOD: Excavator
DATE: Sept 21 2023

TEST PIT NO.	DEPTH FROM	DEPTH TO	SAMPLE BAG NO.	SOILS CLASS	ESTIMATED GRADATION G	S	F	ESTIMATED ROCK 75mm MAX SIZE	75mm - 150mm	150mm 375mm	>375mm	SAND TYPE F M C	REMARKS / Lab Sieve
23-01	0	0.2		Floor									
	0.2	2	23-01	GP	60	37	3						Packed pit floor on top, sloughing
				SP	**47**	**50.6**	**2.4**						immediately underneath and hit
	2	2.2		SP	33	63	4	160	3	2	0	M	water at 4.8m. Layered gravel and
	2.2	3.1		GP	60	37	3						sands.
	3.1	5.4	23-01A	SP	34	60	6						**SP - G47/ S 50.6/ F 2.4**
				SPSM	**17.7**	**72.9**	**9.4**						**SPSM - G17.7/ S72.9/ F9.4**
23-02	0	0.2		Floor									
	0.2	3.7	23-02	GP	62	35	3	200	3	2	0	M-C	Hit blue clay below 3.7m, sloughing
				GP	**54.5**	**43.8**	**1.7**						below 0.5m, consistent coarse sandy
	3.7	4.8		ML	62	35	3						gravel, not a lot of OS
													GP - G54.5/ S43.8/ F1.7
23-03	0	0.1		Floor									
	0.1	3.2	23-03	GP	65	32	3	170	3	1	0	M-C	Consistent GP below floor, coarse
				GP	**54.9**	**41.8**	**3.3**						sandy gravel, with blue clay at bottom
	3.2	4.8		ML									**GP - G54.9/ S41.8/ F3.3**
23-04	0	3.7	23-04	GP	65	30	5	120	5	0	0	M-C	Wet gravel, seems dirty with mud,
				GP	**60.4**	**36.6**	**3.1**						sloughing within 1m in depth
	3.7	5		ML									
													GP - G60.4/ S 36.6/ F3.1
23-05	0	2	23-05	GP	65	32	3						Wet gravel and rock in top 2m,
				GP	**67**	**30.9**	**2.1**						then beach sand then same blue clay.
	2	3	23-05A	SP	35	60	5	140	5	0	0	M-C	then beach sand then same blue clay.
				SM1	**15.8**	**71.1**	**13.1**						**GP - G67/ S30.9/ F2.1**
	3	4.8		ML									**SM1 - G15.8/ S71.1/ F13.1**
23-06	0	0.1		OB									
	0.1	1		SP	40	55	5						1m of dirty rock and sand, no sloughing
	1	4.8	23-06	SM1	1	84	15	160	2	1	0	M-F	then clumpy beach sand to the end
				ML	**0.9**	**23.9**	**75.3**						**ML - G 0.9/ S 23.9/ F 75.3**
23-07	0	0.2		OB									
	0.2	1		SP	42	53	5						Same as TP 23-06, no sloughing,
	1	5.2	23-07	SM1	2	82	16	210	1	1	0	M-F	clumping sand all the way down
				ML	**0**	**29**	**71**						**ML - G0/ S 29/ F71**
23-08	0	0.2		OB									Thicker layer of sandy rock and
	0.2	2.4	23-08	SP	46	48	6						gravel, then same SM1 as previous.
				GM	**57**	**34.6**	**8.4**						No sloughing.
	2.4	5		SM1	2	82	16	230	3	2	0	M-F	**GM - G57/ S34.6/ F8.4**

AGGREGATE LOG

PROJECT: 86004 - Swift River
PIT #: 1500
DISTRICT: 18 - Cariboo
SAMPLED BY: Samantha Kinniburgh
METHOD: Excavator
DATE: Sept 21 2023

TEST PIT NO.	DEPTH FROM	DEPTH TO	SAMPLE BAG NO.	SOILS CLASS	ESTIMATED GRADATION G	S	F	ESTIMATED ROCK 75mm MAX SIZE	75mm - 150mm	150mm 375mm	>375mm	SAND TYPE F M C	REMARKS / Lab Sieve
23-09	0	4.8	23-09	GP	53	42	5	100	5	0	0	M-C	Lots of sloughing immediately, sandy gravels.
				GP	59.8	38.4	1.8						GP - G59.8/ S38.4/ F1.8
23-10	0	0.2		OB									
	0.2	1.2		SP	40	53	7						Some OS in top layer, no sloughing,
	1.2	5.1	23-10	SM1	2	85	13	200	2	1	0	M-F	clumping sand underneath, same as previous 3 TPs.
				ML	6.8	35.2	58						ML - G6.8/ S 35.2/ F58
23-11	0	0.1		Floor									
	0.1	1.5	23-11	SP	48	48	4	220	3	1	0	M	No OS in lower 1.5m, no
	1.5	4.8		SM1	3	83	13						sloughing, sandy with OS in top 1.5m
				GPGM	51.9	41.3	6.8						GPGM - G51.9/S41.3/F6.8
23-12	0	0.3		OB									
	0.3	1.8	23-12	SPSM	38	55	7	80	1	0	0	M-F	No real OS, sandy layer then SM-ML,
	1.8	5.2		ML									thick clay layers in spoil pile
				SM2	3.4	74	22.6						SM2 - G3.4/ S74/F22.6
23-13	0	0.2		OB									
	0.2	2.8	23-13	GP	55	42	3	270	7	3	0	M-C	Lots of sloughing below OB, finer
	2.8	5.2		SP	38	58	4						gravels and sand, more gravelly in top 3m, more OS here
				GP	53.5	44.1	2.4						GP - G53.5/S44.1/F2.4
23-14	0	0.12		OB									
	0.12	2.9	23-14	GP	60	36	4						Sloughing after 1m, sandy gravel,
	2.9	5		SP	40	56	4	220	8	2	0	M-C	finer layer under coarser layer
				GP	54.4	43.2	2.4						GP - G54.4/ S43.2/ F2.4
23-15	0	5	23-15	GP	60	36	4	250	8	3	0	M-C	Uniform with some sandier bands,
				GP	58.6	39.7	1.7						lots of sloughing, most OS yet
													GP - G58.6/ S39.7/ F1.7
23-16	0	0.1		OB									
	0.1	4	23-16	GP	66	31	3						Lots of OS, gets finer with depth,
	4	5		SP	46	50	4	270	12	3	0	M-C	gravelly sand below 4m
				GP	61.5	36.8	1.7						GP - G61.5/ S36.8/ F1.7

2017

1 OF 1

AGGREGATE LOG

PROJECT:	Swift River Pit	SAMPLED BY:	Bryan James
PIT #:	1500	METHOD:	Excavator
DISTRICT:	Cariboo	DATE:	November18, 2017

TP	DEPTH		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS
	FROM	TO	BAG No.		G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	>375mm	F M C	
17-01	0	0.3		TS									
	0.3	4.5		GP	55	43	2	200	10	5	0	MC	Hole Sluffing in
17-02	0	0.3		TS									
	0.3	4.5		GP	55	43	2	200	10	5	0	MC	Hole Sluffing in

2014

AGGREGATE LOG

PROJECT:	Swift River Pit	SAMPLED BY:	Bryan James
PIT #:	1500	METHOD:	Excavator
DISTRICT:	Cariboo	DATE:	August 11, 12, 2014

TP	DEPTH		SAMPLE	SOILS CLASS	ESTIMATED GRADUATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS
	FROM	TO	BAG No.		G	S	F	MAX SIZE	75mm - 150mm	150mm - 375mm	>375mm	F M C	Lab Sieve
14-01	0	0.4		TS									
	0.4	3.5	12	GPGM	55	40	5	200	5	5	0	C	GPGM (G 57.8, S 36.7, F 5.5)
													Water at 3.5m
14-02	0	0.7		TS									
	0.7	1.1		GPGM	50	45	5	200	5	5	0	C	
	1.1	2.8		CL	0	0	100						Blue Clay, water at 2.3m
14-03	0	1.1		TS									
	1.1	2.0		GM1	60	25	15	200	5	5	0	C	Blue fines, water at 2.0m
14-04	0	0.1		TS									
	0.1	5.2	1	GP	60	38	2	150	5	0	0	FMC	GP (G 67.1, S 30.6, F 2.3)
14-05	0	0.3		TS									
	0.3	5.2	491	GP	58	41	2	350	10	5	0	C	GP (G 59.9, S 39.0, F 1.1)
14-06	0	0.4		TS									
	0.4	5.2	481	GP	55	43	2	200	10	5	0	MC	GP (G 60.1, S 38.1, F 1.8)
14-07	0	0.3		TS									
	0.3	3.1	708	GP	60	38	2	350	15	10	0	C	GP (G 67.3, S 30.7, F 2.0)
	3.1	4.5		SM3	0	70	30						

1 OF 2

AGGREGATE LOG

PROJECT:	Swift River Pit							SAMPLED BY:				Bryan James
PIT #:	1500							METHOD:				Excavator
DISTRICT:	Cariboo							DATE:				August 11, 12, 2014
14-08	0	0.3		TS								
	0.3	1.0		GP	60	38	2	250	10	10	0	C	
	1.0	3.9		SM3	0	70	30						
14-09	0	0.3		TS								
	0.3	2.0		GP	60	38	2	250	10	10	0	C	
	2	3		SM3	0	70	30						Water at 2.0m
14-10	0	0.3		TS								
	0.3	5.2	389	GP	60	38	2	200	10	5	0	C	GP (G 62.7, S 35.8, F 1.5)
14-11	0	0.3		TS								
	0.3	5.2	288	GP	60	38	2	250	10	5	0	C	GP (G 73.2, S 25.4, F 1.4)
14-12	0	0.3		TS								
	0.3	5.2	555	GP	60	38	2	250	10	5	0	C	GP (G 64.4, S 33.4, S 2.2)
14-13	0	0.3		TS								
	0.3	5.5	294	GP	60	38	2	250	15	5	0	C	GP (G 69.5, S 28.8, F 1.7)
14-14	0	0.3		TS								
	0.3	5.2	856	GP	60	38	2	250	10	5	0	C	GP (67.3, S 31.6, F 1.1)
14-15	0	0.3		TS								
	0.3	5.2	410	GP	60	38	2	250	10	5	0	C	GP (G 66.8, S 31.9, F 1.3)
14-16	0	0.3		TS								
	0.3	4	S2243	GP	60	38	2	250	3	0	0	C	GP (G 67.7, S 30.5, F 1.8)
14-17	0	0.3		TS								
	0.3	1.5		SP	45	53	2	50				M	
	1.5	2.7		SM3	0	70	30						

Wet Sieve Analysis

2023

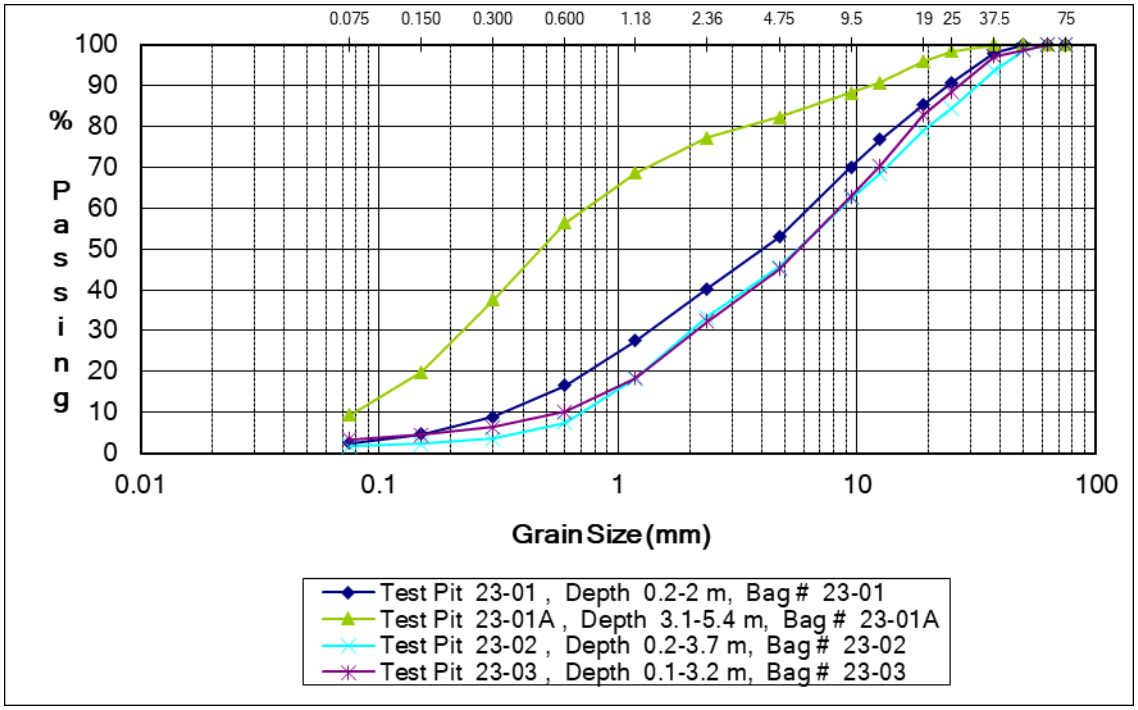
PROJECT REPORT OF
SIEVE ANALYSIS SUMMARIES **PERCENT PASSING**

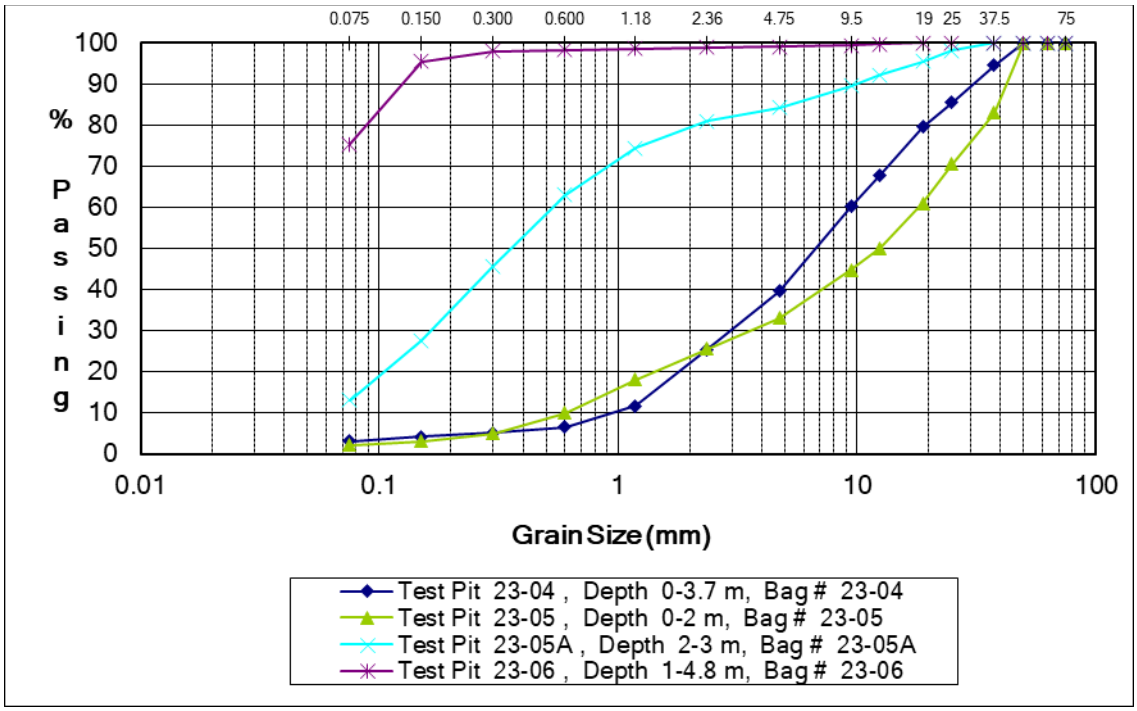
Project:		0								Project No.:		86004					
Sample Source:		Swift River								Client:		MoTI					
Material:		PIT RUN								Date:		Sept 21 2023					

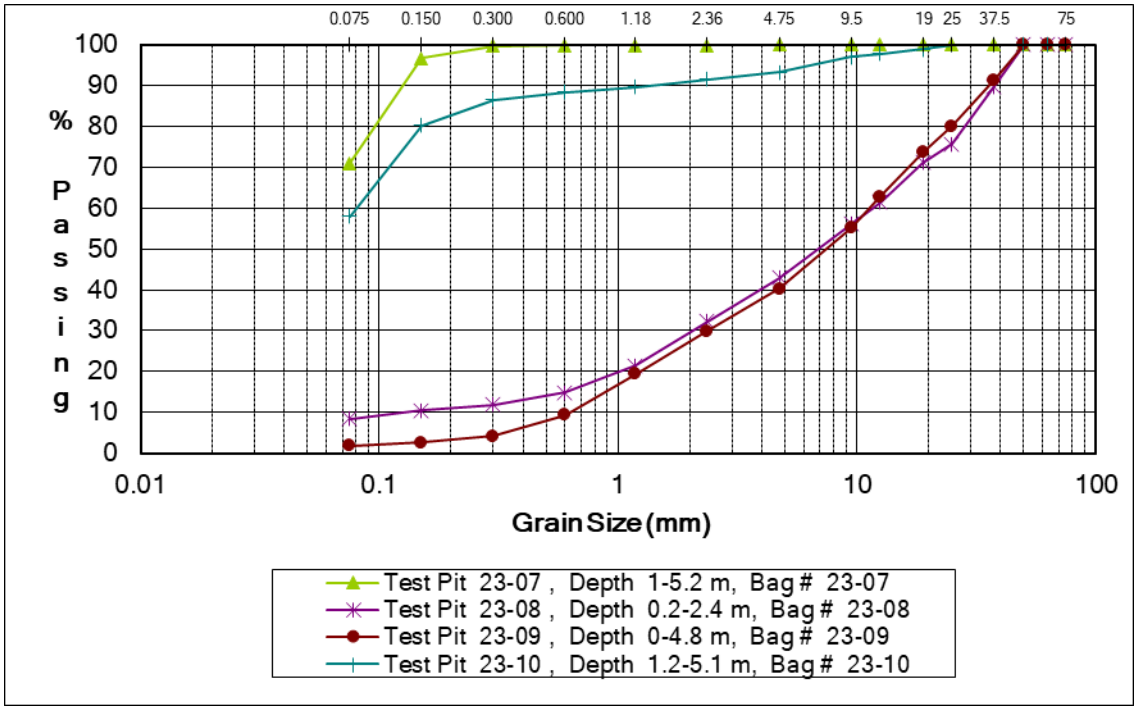
Sample Information			Percent Passing Pit Run Sieve Sizes (mm)														
Test Pit	Depth (m)	Bag #	75	63	50	37.5	25	19	12.5	9.5	4.75	2.36	1.18	0.6	0.3	0.15	0.075
23-01	0.2-2	23-01	100.0	100.0	100.0	98.0	90.8	85.3	76.8	70.1	53.0	40.2	27.5	16.5	8.9	4.6	2.4
23-01A	3.1-5.4	23-01A	100.0	100.0	100.0	100.0	98.4	95.9	90.7	88.2	82.3	77.3	68.6	56.4	37.5	19.8	9.4
23-02	0.2-3.7	23-02	100.0	100.0	98.7	93.7	84.4	78.8	68.4	62.3	45.5	33.3	18.2	7.5	3.5	2.3	1.7
23-03	0.1-3.2	23-03	100.0	100.0	98.7	97.2	88.5	82.7	70.3	62.9	45.1	32.3	18.4	10.1	6.3	4.5	3.3
23-04	0-3.7	23-04	100.0	100.0	100.0	94.5	85.4	79.6	67.9	60.2	39.6	25.3	11.7	6.5	5.1	4.1	3.1
23-05	0-2	23-05	100.0	100.0	100.0	83.0	70.5	61.0	50.1	44.8	33.0	25.5	18.0	9.9	4.9	3.0	2.1
23-05A	2-3	23-05A	100.0	100.0	100.0	100.0	98.1	95.5	92.1	89.5	84.2	80.9	74.4	63.0	45.7	27.6	13.1
23-06	1-4.8	23-06	100.0	100.0	100.0	100.0	100.0	100.0	99.7	99.4	99.1	98.9	98.6	98.2	97.9	95.5	75.3
23-07	1-5.2	23-07	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.9	99.9	99.9	99.7	96.7	71.0
23-08	0.2-2.4	23-08	100.0	100.0	100.0	89.9	75.7	71.1	61.4	56.1	43.0	32.3	21.4	14.9	11.8	10.5	8.4
23-09	0-4.8	23-09	100.0	100.0	100.0	91.4	80.1	73.6	62.8	55.1	40.2	29.9	19.4	9.4	4.2	2.6	1.8
23-10	1.2-5.1	23-10	100.0	100.0	100.0	100.0	100.0	98.9	97.9	97.0	93.2	91.5	89.6	88.4	86.5	80.2	58.0
23-11	0.1-1.5	23-11	100.0	100.0	100.0	100.0	88.4	79.4	68.9	62.5	48.1	37.0	24.3	15.7	10.7	8.2	6.8
23-12	0.3-1.8	23-12	100.0	100.0	100.0	100.0	100.0	98.2	97.3	96.8	96.6	96.4	95.6	86.4	64.5	39.2	22.6
23-13	0.2-2.8	23-13	100.0	100.0	97.9	93.7	84.4	78.7	68.5	61.8	46.5	35.0	21.9	11.4	5.3	3.3	2.4
23-14	0.12-2.9	23-14	100.0	100.0	94.9	88.5	83.4	78.3	67.2	61.1	45.6	33.7	18.5	9.0	4.6	3.3	2.4
23-15	0-5	23-15	100.0	100.0	93.9	91.0	77.4	70.5	59.6	54.1	41.4	31.7	19.1	8.6	3.8	2.4	1.7
23-16	0.1-4	23-16	100.0	100.0	93.5	80.0	68.9	62.8	54.6	49.8	38.5	30.3	17.6	7.9	3.8	2.4	1.7

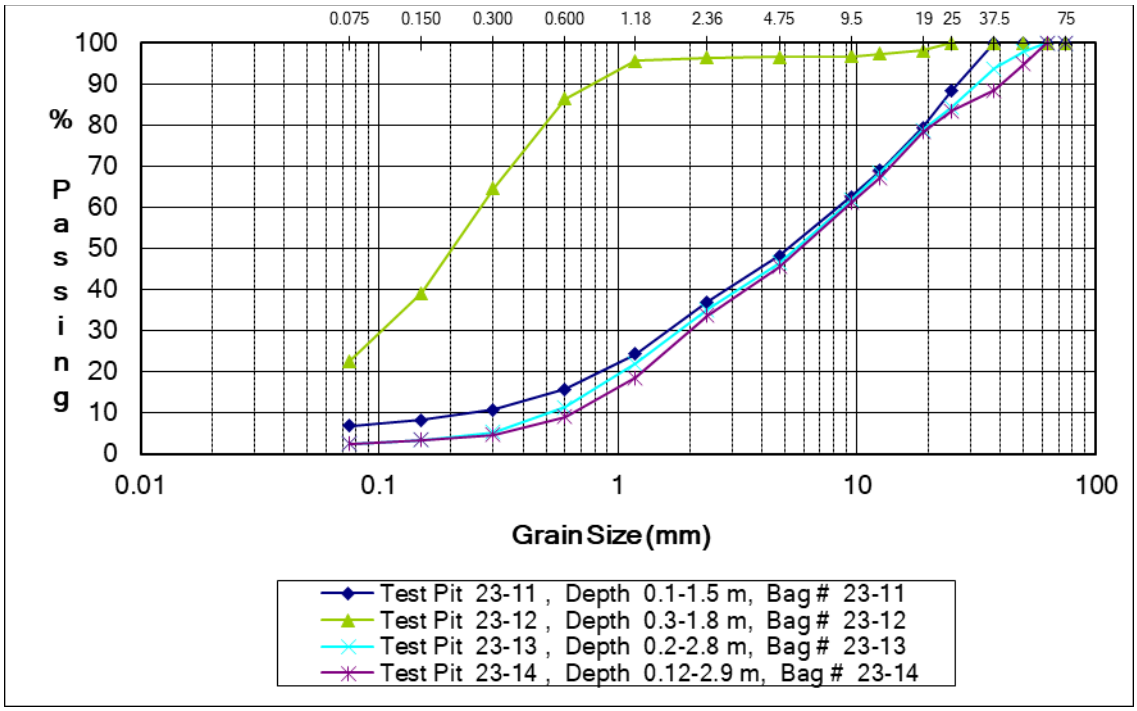
Aggregate Gradation Charts

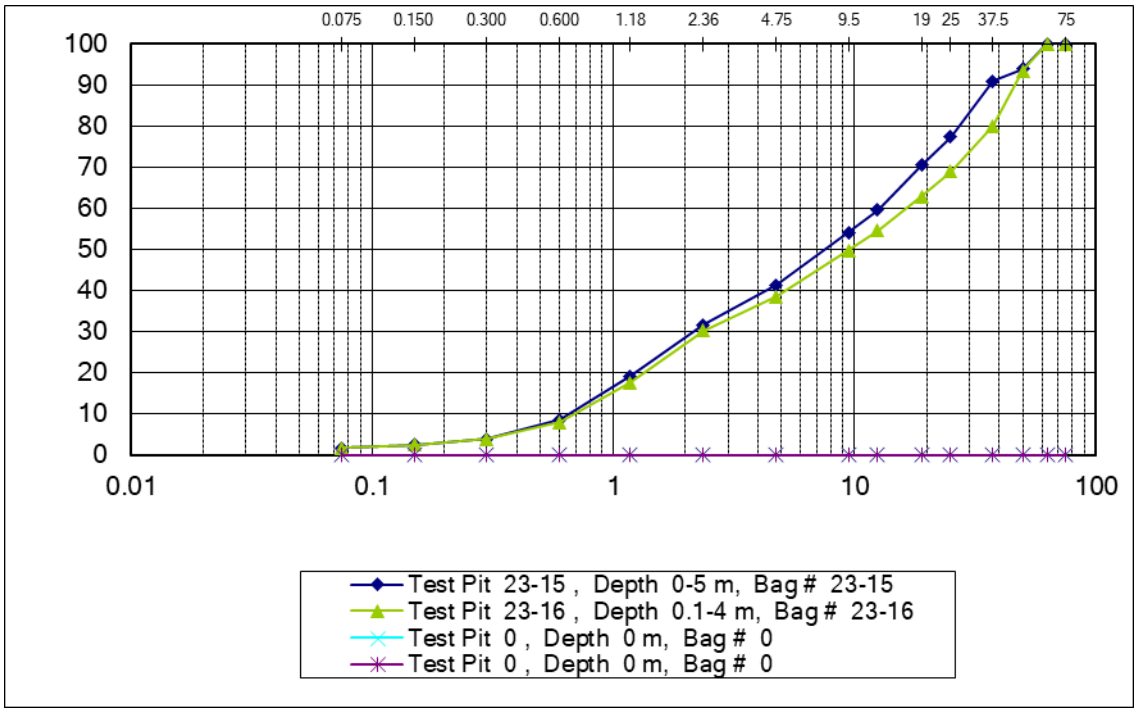
2023




0.075 0.150 0.300 0.600 1.18 2.36 4.75 9.5 19 25 37.5 75
100 90 80 70 60 50 40 30 20 10 0
% Passing
0.01 0.1 1 10 100
Grain Size (mm)
Test Pit 23-04 , Depth 0-3.7 m, Bag # 23-04
Test Pit 23-05 , Depth 0-2 m, Bag # 23-05
Test Pit 23-05A , Depth 2-3 m, Bag # 23-05A
Test Pit 23-06 , Depth 1-4.8 m, Bag # 23-06


0.075 0.150 0.300 0.600 1.18 2.36 4.75 9.5 19 25 37.5 75
100 90 80 70 60 50 40 30 20 10 0
% Passing
0.01 0.1 1 10 100
Grain Size (mm)
Test Pit 23-07 , Depth 1-5.2 m, Bag # 23-07
Test Pit 23-08 , Depth 0.2-2.4 m, Bag # 23-08
Test Pit 23-09 , Depth 0-4.8 m, Bag # 23-09
Test Pit 23-10 , Depth 1.2-5.1 m, Bag # 23-10


0.075 0.150 0.300 0.600 1.18 2.36 4.75 9.5 19 25 37.5 75
100 90 80 70 60 50 40 30 20 10 0
% Passing
0.01 0.1 1 10 100
Grain Size (mm)
Test Pit 23-11 , Depth 0.1-1.5 m, Bag # 23-11
Test Pit 23-12 , Depth 0.3-1.8 m, Bag # 23-12
Test Pit 23-13 , Depth 0.2-2.8 m, Bag # 23-13
Test Pit 23-14 , Depth 0.12-2.9 m, Bag # 23-14


0.075 0.150 0.300 0.600 1.18 2.36 4.75 9.5 19 25 37.5 75
100 90 80 70 60 50 40 30 20 10 0
0.01 0.1 1 10 100
Test Pit 23-15 , Depth 0-5 m, Bag # 23-15
Test Pit 23-16 , Depth 0.1-4 m, Bag # 23-16
Test Pit 0 , Depth 0 m, Bag # 0
Test Pit 0 , Depth 0 m, Bag # 0

USC Legend

MATERIALS CLASSIFICATION LEGEND

MAJOR DIVISIONS		SYMBOL	SOIL TYPE
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	GW	WELL GRADED GRAVELS OR GRAVEL–SAND MIXTURES, < 5% FINES
		GP	POORLY–GRADED GRAVELS OR GRAVEL–SAND MIXTURES, < 5% FINES
		GM*	SILTY GRAVELS, GRAVEL–SAND–SILT MIXTURES
		GC*	CLAYEY GRAVELS, GRAVEL–SAND–CLAY MIXTURES
	SAND AND SANDY SOILS	SW	WELL–GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
		SP	POORLY–GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
		SM*	SILTY SANDS SAND–SILT MIXTURES
		SC*	CLAYEY SANDS SAND–CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS w_L <50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS AND ORGANIC SILT–CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS w_L >50	MH	INORGANIC SILTS, MICACEOUS OR DIATOM–ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ORGANIC SOILS		Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS
TOPSOIL		TS	TOPSOIL WITH ROOTS, ETC.
COBBLES		SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm
LARGE BOULDERS		LB	BOULDERS, PARTICLE SIZE OVER 300mm
BEDROCK		BR	BEDROCK

FOR SOILS HAVING 5 – 12% PASSING .075 SIEVE, USE DUAL SYMBOL

*GM1; GC1; SM1; SC1; 12 – 20%
GM2; GC2; SM2; SC2; 20 – 30%
GM3; GC3; SM3; SC3; 30 – 40%
GM4; GC4; SM4; SC4; 40 – 50%

} PASSING .075mm SIEVE

REV. 90–04–26

PROVINCE of BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
Geotechnical & Materials Engineering

UNIFIED SOIL CLASSIFICATION LEGEND

Drawn: LU	Date: JULY'97	Scale:
File No.:		ACAD File: ACADSTDS C:\ACADSTDS\SOIL-APP

Photos

Looking southwest over potential crusher set up area, October 2023.

West-looking view of potential crusher set up area, October 2023.

TP 23-02, October 2023.

TP 23-04 Spoil pile, October 2023.

TP 23-09, October 2023.

TP 23-13, October 2023.

TP 23-15, October 2023.

TP 23-16, October 2023.