Technical Summary

January 2024

Pit Name: Lemon Creek Pit

Provincial Pit Number: 0761

Location: Lemon Creek Pit is located 6.4 km south of Slocan City on the east side of Highway 6. The area is geographically located at 49° 42' 24" north latitude by 117° 28' 26" west longitude; UTM grid zone 11: 465786 m E, 5505910 m N. (Figure 1).

Legal Land Description: The site is currently a Section 16 Map Reserve (LF# 0214041) held by the British Columbia Ministry of Transportation and Infrastructure (BC MoTI). Lot 6, District Lot 382, Plan 819; Lot 2 DL 382, KD, Plan 7223, together with that part of Sublot 9, DL 382, KD, Plan 772, Kootenay District except parts included in Plans 819, 7223 and NEP 22577, containing +/-20.80 hectares" (Figure 2).

Subsurface Investigation: Subsurface investigations at Lemon Creek Pit were carried out in 2014 by Sitkum Consulting Ltd. Investigation results from a 1993 exploration program are also included.

In 2014 twenty-eight (28) test pits were excavated to depths ranging from 4.0 to 7.0 m. 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 twenty-one (21) of these samples 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 1993 and 2014 investigations, two (2) granular areas - Area A and Area B have been defined. 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 Area A and B. The remaining test pit data is available in the Test Pit Summaries section of this report.

Table 1: Pit Run Gradation

Test Pit	Depth (m)	Fines (%)* <0.075mm	Sand (%)* 0.075-4.75mm	Gravel (%)* 4.75-75mm	USC
Area A					
93-1	0.5-4.2	2	51	47	SP
	4.2-6.0	3	37	60	GP
93-4	0.3-5.0	1	32	67	GP
	5.0-6.7	2	51	47	SP
93-6	0.5-5.0	2	40	58	GP
	5.0-6.7	3	44	53	GP
93-10	0.3-4.9	4	40	56	GP
	4.9-6.6	2	32	66	GP
93-12	0.4-4.7	3	46	51	GP
	4.7-6.0	2	33	60	GP
93-13	0.2-4.5	2	46	52	GP
93-14	0.0-4.5	2	40	58	GP
	4.5-7.0	2	40	58	GP
93-17	0.0-4.9	2	38	60	GP
	4.9-6.0	3	44	53	GP
93-22	0.3-3.0	4	42	54	GP
	3.0-6.8	11	89	0	SM
Average – Area A		3	44	53	-
Area B					
14-01	0.3-5.5	2.0	38.0	60.0	GP
14-02A	0.3-3.7	3.4	41.8	54.8	GP
14-02B	3.7-7.0	2.3	47.3	50.4	GP
14-03	0.3-6.8	2.8	39.3	57.9	GP
14-04	0.4-3.5	1.4	47.4	51.2	GP
14-05	1-7.0	2.5	39.7	57.8	GP
14-06A	0.9-3.2	1.4	36.4	62.2	GP
14-06B	3.2-7.0	2.8	46.2	51.1	GP
14-07	1.0-6.8	2.8	39.3	57.9	GP
14-08A	1.0-3.2	2.8	34.4	62.8	GP
14-08B	3.2-6.5	1.9	63.4	34.7	SP
14-09	0.2-4.0	3.8	33.8	62.4	GP
14-10	0.7-4.0	2.6	32.1	65.3	GP
14-11A	0.8-2.5	2.4	34.6	63.1	GP
14-11B	2.5-6.9	1.5	48.8	49.7	GP
14-12A	0.8-2.5	4.8	21.3	74.0	GP
14-12B	2.5-7.0	2.0	65.8	32.2	SP
14-13	0.8-3.0	2.1	27.3	70.5	GW
14-17A	1.5-3.8	1.8	36.1	62.1	GP
14-17B	3.8-7.0	1.6	61.7	36.8	SP
14-18	1.0-7.0	4.9	35.3	59.8	GP
Average – Area B		2.5	41.4	56.0	

* 1993 values are rounded to the nearest whole number so may not add exactly to 100%

Tables 2 & 3 show the estimated percent of oversize rock as noted in the field during exploration.

Table 2: Oversize Field Estimates (Area A)

Oversize (field estimates):

Classification:	Average (%)	Range (%)
Boulders (>375 mm)	4	0-20
Cobbles (150-375 mm)	12	0-20
Cobbles (75-150 mm)	18	5-25

The maximum rock size observed was 1070 mm in TP93-15.

Table 3: Oversize Field Estimates (Area B)

Oversize Field Estimates:

Classification:	Average (%)	Range (%)
Boulders (>375 mm)	3.5	0-6
Cobbles (150-375 mm)	5	2-6
Cobbles (75-150 mm)	7	4-8

The maximum size rock was 800 mm in TP 14-05.

Aggregate Quality – Suitability Area: Tables 4 & 5 show the results of the durability tests as well as the specifications as required in the Standard Specifications for Highway Construction.

Table 4: Aggregate Quality – Area A

Quality laboratory tests were performed on a selection of aggregate samples from test pits within the suitability area, as summarized here:

TEST	AVERAGE	RANGE
Degradation	48.75	42-63
Sand Equivalent	79.75	71-87

Table 5: Aggregate Quality – Area B

Test Pit	Sand Equivalent	Micro Deval (% loss)	Absorption		Relative Density	
			Coarse	Fine	Coarse	Fine
Area B						
TP14-01	78	16				
TP14-03	83	15				
TP14-05	82	14				
TP14-07	71	14				
TP14-10	83	16				
TP14-12	78	15				
TP14-15	91	13				
TP14-18	82	17				
(Area B)			0.95	0.95	2.584	2.584
BC MoTI Specifications						
Sand Equivalent	≥40 for base coarse and fine asphalt mix aggregate ≥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 seals					
Relative Density	~2.65 for all aggregate products					

Material Suitability: Based on the 1993 and 2014 investigation results, the material in Areas A and B are judged to be suitable for the following purposes:

Table 6: Suitability

	Pit Run	Crush
Area A	SGSB*	25, 50, & 75mm WGB* Asphalt Mix Aggregates
Area B	SGSB*	25 & 50mm WGB* Asphalt Mix Aggregates

*Sand rejection may be required.

Volume Estimates: Tables 7 and 8 show the volume estimates that can be expected for gravel from Areas A and B. Area A has been previously developed but further grubbing and stripping will be required in the cleared area to the easy of the existing pit face; stripped topsoil can be placed along the map reserve boundary towards Ponderosa FSR, within the existing cleared area (but not encroaching on the 37.5 m setback). Area B has been partially developed. The volume estimates are 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. Estimated volumes shown may be reduced based on future development plans and slope reclamation requirements to meet Code.

Table 7: Volume Estimate – Area A

VOLUMES: Suitability Area A	
Minimum Evaluated Aggregate	147,000 m^3
Maximum Estimated Aggregate	276,000 m^3
Estimated Topsoil	2,000 m^3

Table 8: Volume Estimate – Area B

VOLUMES: Suitability Area B	
Minimum Evaluated Aggregate	260,100 m^3
Maximum Estimated Aggregate	434,000 m^3
Estimated Topsoil *(excluding existing pit floor)*	13,900 m^3

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.

- The water table was not encountered during the 2014 test pit sampling. Bedrock was encountered at Test Pits 14-09, 14-10 and 14-16 at 4.0 m, and at TP 14-14 at ~5.8 m.

- Processed aggregate may be stockpiled to the north of the suitability area, or in the northeast portion of the pit, where space permits. Existing processed aggregate stockpiles may have to be moved from the pit floor if they are impeding development.

- All trees, vegetation, and overburden are to be removed within 2m of the top of the pit faces.

- Development in Areas A should start from the existing pit faces and continue to the west, north, and east. Stockpiling space is available to the south of the proposed crusher setup location (Figure 3).

- Oversize material can be stockpiled in the southern part of the existing pit area to allow room for operations in the northern area.

- Existing processed aggregate stockpiles and waste material will have to be moved in Area B to facilitate future development. Clearing, grubbing, and stripping will be required for development towards the southwest.

- Appropriate signage should be clearly posted during pit activity as existing roads/trails adjacent to the map reserve boundary may be used by the public.

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

- 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:
Steven Lee
Sr. Aggregate Resource Specialist

Reviewed by:
Laura Courtenay
Sr. Aggregate Resource Specialist

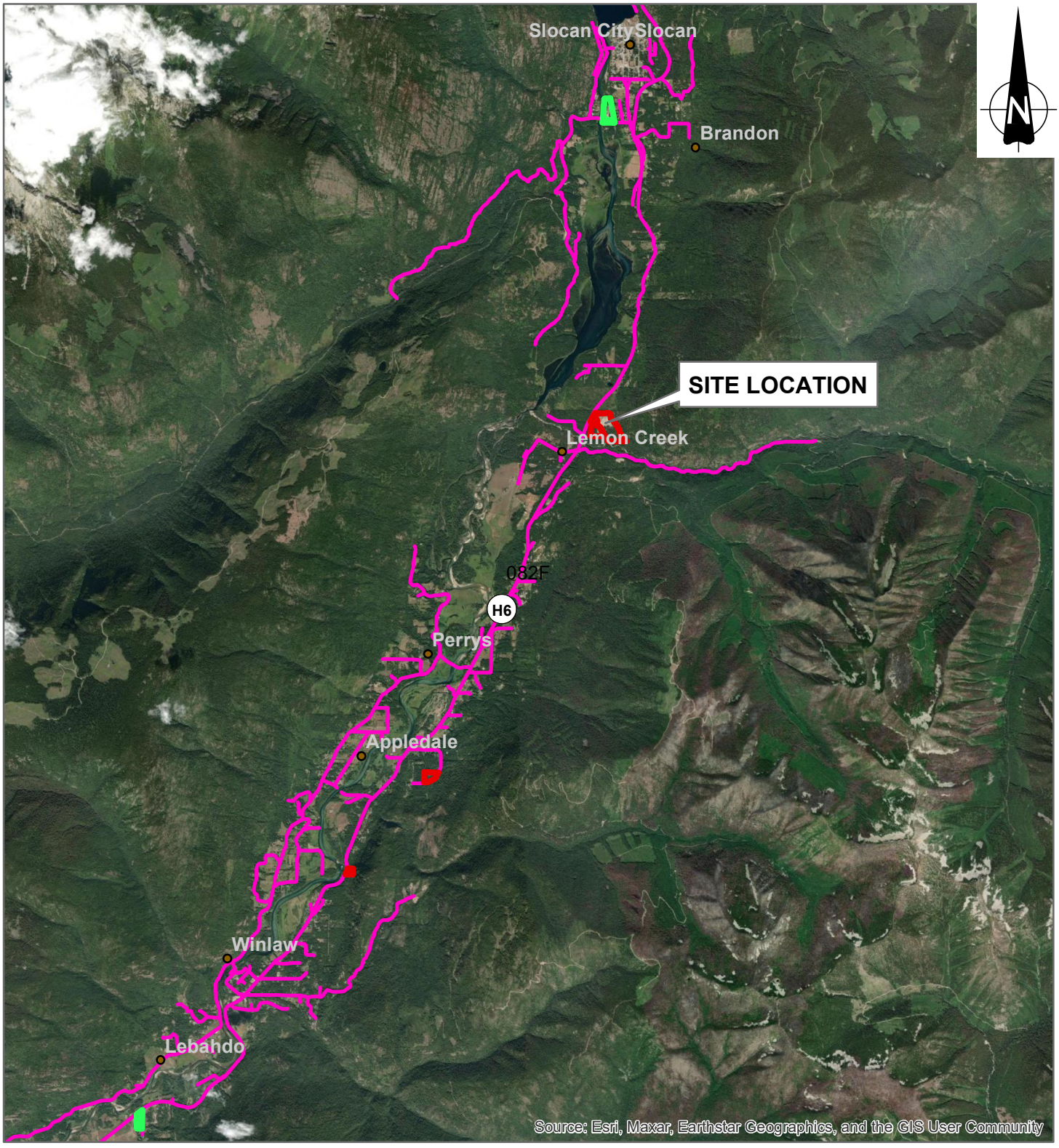
Enclosures

Figures:

- Figure 1 - Location Plan
- Figure 2 - Legal Plan
- Figure 3 - Pit Development Plan

Test Pit Summary, Wet Sieve Analysis Summary, Gradation Charts, Test Pit Logs
USC Legend
Photos

Figures



0 1 2 4 6 8 Kilometers

Scale 1:100,000

Ministry of Transportation and Infrastructure
Geotechnical and Materials Branch

LOCATION PLAN (2024)

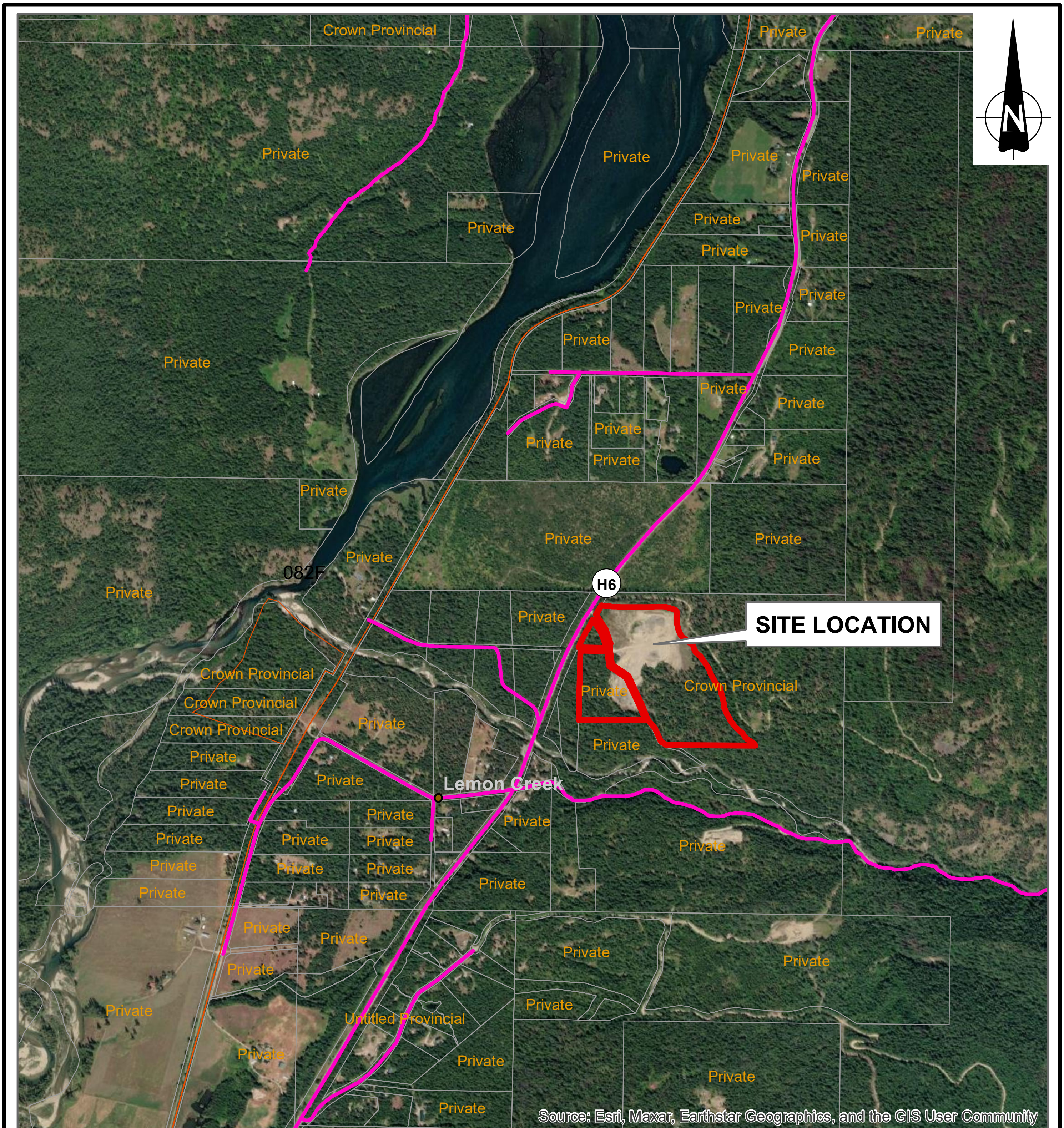
Lemon Creek Pit No. 0761

SA 10 - WEST KOOTENAY DISTRICT

DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 11N		SCALE: As Shown
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 11N		DATE: 2024-01-10
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No:	Reg: 2	Drawing No: **FIGURE 1**

Document Path: C:\Users\LACOURTE\Desktop\GISTemplate_Gravel_R2_2021-11-18.mxd

This drawing was originally produced in colour.



Ministry of Transportation and Infrastructure
Geotechnical and Materials Branch

LEGAL PLAN (2024)

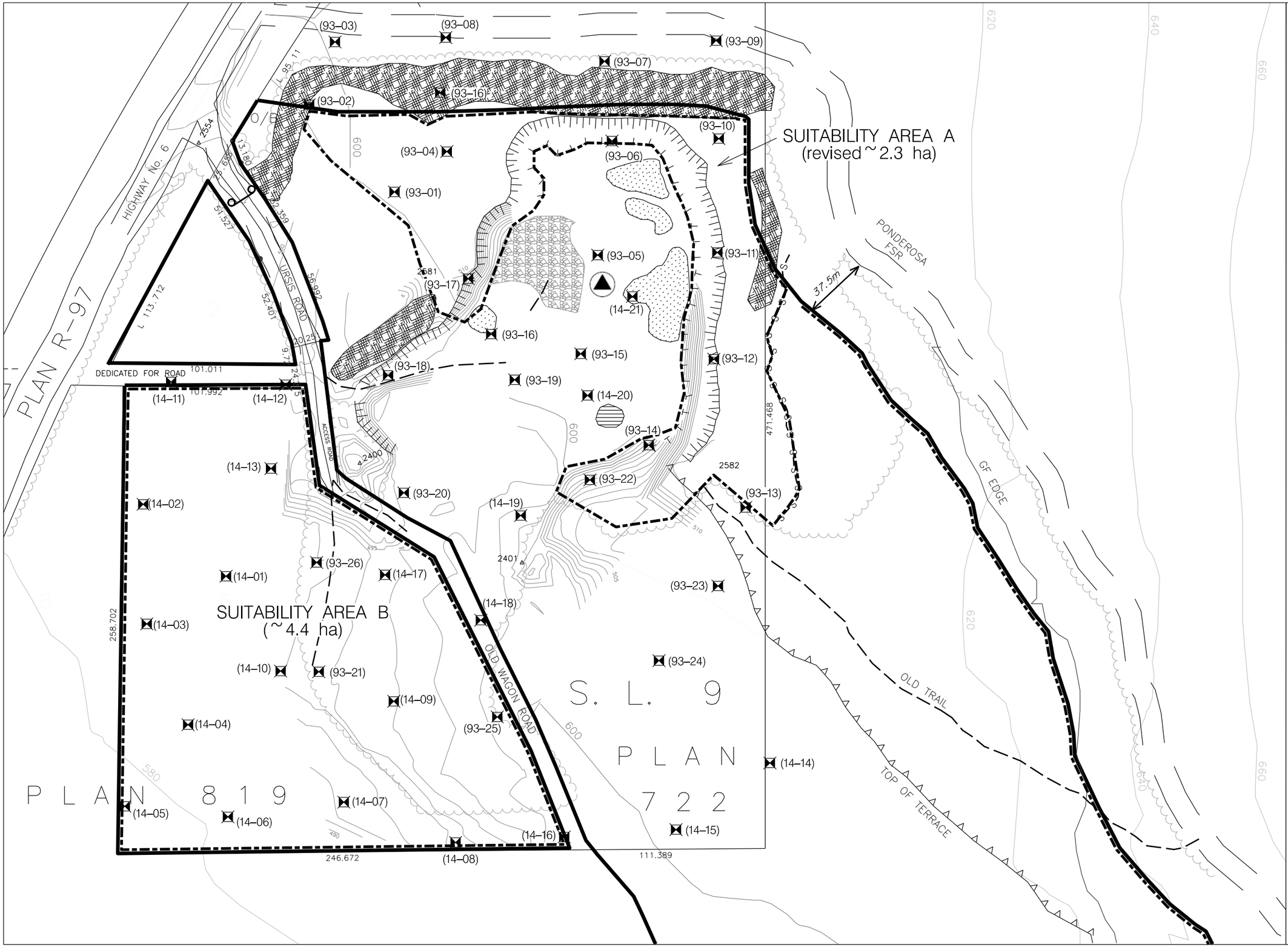
Lemon Creek Pit No. 0761

SA 10 - WEST KOOTENAY DISTRICT

DRAWN BY: LACOURTE	PROJECTION: NAD 1983 UTM Zone 11N		SCALE: As Shown
CHECKED BY: A.Mitchell	DATUM: NAD 1983 UTM Zone 11N		DATE: 2024-01-10
FileName: GISTemplate_Gravel_R2_2021-11-18	Geotech Project No:	Reg: 2	Drawing No: FIGURE 2

Document Path: C:\Users\LACOURTE\Desktop\GISTemplate_Gravel_R2_2021-11-18.mxd

This drawing was originally produced in colour.



LEGEND

- PROCESSING PLANT LOCATION
- DEVELOPMENT DIRECTION
- SUITABILITY BOUNDARY
- EXISTING GRAVEL RESERVE BOUNDARY
- EXISTING PIT FACE
- EXISTING PIT FLOOR
- (14–01) ESTIMATED TEST PIT LOCATION — LABEL INDICATES (SAMPLE YEAR – PIT #)
- ACCESS ROAD
- EXISTING TRAIL
- GATE
- PROCESSED AGGREGATE STOCKPILE AREA
- OVERBURDEN STOCKPILE SITE
- STOCKPILE SITE (OVERSIZE MATERIAL)
- WASTE STOCKPILE SITE
- EDGE OF STRIPPED LAND
- SLOPE BREAK
- TREED AREA
- CONTOURS 100 m / 20 m (TRIM)
- CONTOURS 5 m / 1 m (MoTI Survey~2008)

MINING NOTES

- All vegetation, topsoil and overburden is to be stripped a minimum of 2 metres back from active pit faces.
- Topsoil and overburden is to be stockpiled separately from other materials and not to impede future development directions. It must be seeded with an appropriate grass mix and reserved for reclamation; removal of this material from the site is not permitted.
- At the completion of mining activities, all pit faces are to be sloped to a minimum of 1½ to 1 with native granular material.
- For projects mining in excess of 1,000 cubic metres the Ministry of Energy and Mines (Mines Division) must be notified (approximately 14 days prior to the commencement of mining).
- All reject material, resulting from aggregate production, is to be placed in neat, easily accessible stockpiles free of deleterious material (i.e. wood waste).
- No dumping of Demolition, Land Clearing and Construction debris is permitted without prior written approval of the Ministry of Transportation and Infrastructure.

RECLAMATION NOTES

- Remove debris.
- Slope to a minimum of 2 to 1.
- Replace topsoil.
- Seed reclaimed areas with an appropriate grass mixture.

Contours may not be representative of on site conditions.

"INFORMATION PROVIDED HEREIN IS INTENDED TO BE USED BY THE MINISTRY OF TRANSPORTATION & INFRASTRUCTURE WITH ALL OTHER DATA RELEVANT TO THE SITE. THE SOIL AND GROUND WATER CONDITIONS SHOWN ARE REPRESENTATIVE AT THE TESTHOLE LOCATIONS ON THE DATES INDICATED. CONDITIONS ARE SUBJECT TO CHANGE WITH TIME. THE MINISTRY OF TRANSPORTATION & INFRASTRUCTURE SHALL NOT BE HELD LIABLE FOR ANY CLAIMS OR ACTIONS ARISING FROM THE USE OR INTERPRETATION OF THE DATA HEREIN PROVIDED."

Province of British Columbia
Ministry of Transportation & Infrastructure
GEOTECHNICAL and MATERIALS ENGINEERING

REVISIONS	Initial
2023Sep05 2023 updates from field review.	KA
2023Oct17 2023 edits.	KA

REVIEWED BY: K.A. Date

APPROVED BY: W.M. Date

DRAWN: KA
DATE: March 19, 2014
AutoCAD: 14-922

REVISED: KA
DATE: Oct.17, 2023
AutoCAD: 23-992

0 50 100 METERS
SCALE 1:2,000

LEMON CREEK PIT #0761
PIT DEVELOPMENT PLAN
FILE NO. 23-922

FIGURE 3

Test Pit Summaries, Wet Sieve Analysis Summary, Gradation Charts

AGGREGATE LOG

PROJECT: Lemon Ck Pit **SAMPLED BY:** WM

PIT #: _0761 **METHOD:** Excavator

DISTRICT: West Kootenay **DATE:** 1993

TH / TP	DEPTH (m)		SAMPLE	SOILS CLASS	LABORATORY GRADATION			ESTIMATED ROCK >75mm			
	FROM	TO	BAG No.		G	S	F	MAX SIZE	75mm - 150mm	150mm - 375mm	>375mm
TP93-01	0.0	0.5		TS							
	0.5	4.2	669	SP	47	51	2	710	15	15	15
	4.2	6.0	670	GP	60	37	3		25	10	10
TP93-02	0.0	0.5		TS							
	0.5	3.6	671	GP	55	43	2	650	10	10	5
	3.6	6.7	672	GP	58	39	3		20	5	0
TP93-04	0.0	0.3		TS							
	0.3	5.0	675	GP	67	32	1		20	15	2
	5.0	6.7	676	SP	47	51	2		10	0	0
TP93-06	0.0	0.5		TS							
	0.5	5.0	679	GP	58	40	2	850	20	15	5
	5.0	6.7	680	GP	53	44	3		10	5	0
TP93-10	0.0	0.3		TS							
	0.3	4.9	687	GP	56	40	4	460	25	10	3
	4.9	6.6	688	GP	66	32	2		15	10	1
TP93-11	0.0	0.5		TS							
	0.5	5.0	689	GPGM	53	41	6	650	20	15	10
	5.0	6.2	690	GP	65	33	2		10	1	0
TP93-12	0.0	0.4		TS							
	0.4	4.7	129	GP	51	46	3	560	10	15	5
	4.7	6.0	130	GP	60	36	4		10	2	0
TP93-14	0.0	4.5	24043	GP	58	40	2		20	20	5
	4.5	7.0	780	GP	58	40	2		20	10	0
TP93-17	0.0	4.9	21638	GP	60	38	2	630	20	15	5
	4.9	6.0	452	GP	53	44	3		10	2	0

AGGREGATE LOG

PROJECT: Lemon Ck Pit **SAMPLED BY:**

PIT #: 761 **METHOD:** Excavator

DISTRICT: WKD **DATE:** Sept, Oct 1993

TH / TP	DEPTH		SAMPLE	SOILS CLASS	ESTIMATED GRADATION			ESTIMATED ROCK 75mm				SAND TYPE	REMARKS
	FROM	TO	BAG No.		G	S	F	MAX SIZE	75mm 150mm	150mm 375mm	375mm	F M C	
93-20	0	2	22641	GP	55	41	4		15	10	0	M - F	Sandy gravel **GP 58/39/3**
	2	6.4	X15649	GP	60	38	2		1	0	0	C	Well Rounded Gravel - 75mm **GP 68/30/2**
93-21	0	6.5	768	GP	60	36	4		20	15	5	C	Angular-subangular **GP 61/36/3**
93-22	0	0.3											
	0.3	3	28591	GP	55	41	4		10	20	5	M - F	Angular **GP 54/42/4**
	3	6.8	27232	SP	0	95	5		0	0	0	F	Dark Grey Sand **SP-SM 0/89/11**
93-25	0	4.8	146	GP	60	38	2		20	20	5	C	**GP 68/29/3**
	4.8	6.1	31115	SP	0	98	2		0	0	0	M	Clean sand **SP-SM 2/91/7**
	6.1	7	X14194	SP	30	68	2		2	0	0	M	Gravelly sand **SP-SM 22/71/7**
93-26	0	2.7	31036	GP	60	38	2		20	20	5	M	**GP 54/43/3**
	2.7	5	X18908	GP-SP	48	48	4		5	0	0	M	**SP 45/53/2**
	5	6.4	X19628	SP	20	78	2		0	0	0	M	**SP 27/71/2**

AGGREGATE LOG

PROJECT:	Lemon Creek Pit	**SAMPLED BY:**	JS / SCL
PIT #:	_0761	**METHOD:**	Excavator
DISTRICT:	West Kootenay	**DATE:**	16-Jul-14

TH / TP	DEPTH (m)		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	
14-01	0.0	0.3	NS	TS/OB								F	At edge of existing pit in forest
	0.3	5.5	14-01	GP	58	40	2	600	6	5	4	M	Lots of oversize; round to subround GP 60.0/38.0/2.0
	5.5	7.0	14-01	GP	55	42	3	300	5	3	0	M	Less bony with depth
		End											
14-02	0.0	0.3	NS	TS/OB								F	Near highway
	0.3	3.7	14-02A	GP	57	40	3	500	7	5	4	M	Lots of oversize GP 54.8/41.8/3.4
	3.7	7.0	14-02B	GP	52	45	3	300	5	2	0	M-C	Clear transition to no oversize
		End											
14-03	0.0	0.3	NS	TS/OB								F	Near break in slope down to draw
	0.3	6.8	14-03	GP	58	40	2	600	7	5	4	M	Lots of oversize, all the way down GP 57.9/39.3/2.8
		End											
14-04	0.0	0.4	NS	TS/OB								F	Near break in slope down to draw
	0.4	3.5		GP	58	49	2	500	7	5	4	M	Subtle transition to less cobbly/bony; GP 51.2/47.4/1.4
	3.5	7.0	14-04	GP/SP	48	49	3	200	4	2	0	M	difficult to sample upper layer (collapsing).
		End											
14-05	0.0	1.0	NS	TS/OB									At edge of slope, along bike trail
	1.0	5.0	14-05	GP	60	37	3	600	8	6	4	M	Collapsing walls, bony GP 57.8/39.7/2.5
	5.0	5.5	"	SP seam	45	53	2		4	0	0	M	Gravelly sand seam
	5.5	7.0	"	GP	58	40	2	800	6	5	4	M	
		End											
14-06	0.0	0.9	NS	TS/OB								F	Near boundary/break in slope/trail
	0.9	3.2	14-06A	GP	60	38	2	650	8	6	4	M	Bony; subtle transition to sandier gravel GP 62.2/36.4/1.4
	3.2	7.0	14-06B	GP	52	45	3	300	5	2	0	M	
		End											
14-07	0.0	1.0	NS	TS/OB								F	On higher ground again at pit edge
	1.0	6.8	14-07	GP	60	38	2	600	7	6	3	M	Bonier at top, collapsing walls GP 57.9/39.3/2.8

AGGREGATE LOG

PROJECT:	Lemon Ck Pit	**SAMPLED BY:**	JS/SCL
PIT #:	_0761	**METHOD:**	Excavator
DISTRICT:	West Kootenay	**DATE:**	July 16, 18, 2014

TH / TP	DEPTH (m)		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	
14-08	0.0	1.0	NS	TS/OB				600	2	4	5	F			Adjacent to pit towards creek
	1.0	3.2	14-08A	GP	60	38	2	600	7	6	3	M			Bony on top; large boulders. Badly **GP 62.8/34.4/2.8**
	3.2	6.5	14-08B	SP	45	53	2		4	1	0	M			collapsing walls to gravelly sand **SP 34.7/63.4/1.9**
		End													
14-09	0.0	0.2	NS	crush											Pit floor, south end
	0.2	4.0	14-09	GP	55	42	3	600	7	5	1	M			Hit **bedrock?** Couldn't dig deeper **GP 62.4/33.8/3.8**
		End													
14-10	0.0	0.3	NS	OB											Just insdie forest, similar elevation
	0.3	0.7	NS	GP/GM	55	35	10	550	2	3	5	F			Bony & fines layer
	0.7	4.0	14-10	GP	58	40	2	500	7	5	3	M			Cobbly gravel transitions to gravely **GP 65.3/32.1/2.6**
		End													sand. Hit bedrock @ bottom.
															Photos: 0031-0032
14-11	0.0	0.3	NS	OB											In forest at boundary
	0.3	0.8	NS	GP/GM	55	35	10	700	4	4	6	F			Bony & fines layer
	0.8	2.5	14-11A	GP	58	40	2	450	7	6	1	M			Cobbly gravel transitions to gravelly **GP 63.1/34.6/2.4**
	2.5	6.9	14-11B	GP/SP	55	42	3	200	7	4	0	M			sand. **GP 49.7/48.8/1.5**
		End													
14-12	0.0	0.2	NS	TS/OB											In forest at boundary
	0.2	0.8	NS	GP/GM	55	35	10	600	4	4	6	F			Bony fines layer
	0.8	2.5	14-12A	GP	60	46	4	500	6	5	3	M			Cobbly gravel transitions to sandy **GP 74.0/21.3/4.8**
	2.5	7.0	14-12B	GP/SP	48	50	2	150	4	0	0	M			gravel. **SP 32.2/65.8/2.0**
		End													
14-13	0.0	0.3	NS	TS/OB											In forest
	0.3	0.8	NS	GP/GM	55	35	10	550	4	4	6	F			Bony fines layer
	0.8	3.0	14-13A	GP	60	36	4	500	6	5	3	M			Cobbly gravel transitions to gravelly **GW 70.5/27.3/2.1**
	3.0	7.0	14-13B	GP/SP	50	48	2	100	4	0	0	M			sand/gravel. **SP 44.9/53.3/1.7**
		End													
14-14	0.0	0.3	NS	TS/OB											In south at toe of slope
	0.3	0.8	NS	GP/GM	60	36	4	700	4	4	6	F			Bony fines layer
	0.8	5.8	14-14	GP	55	42	3	600	6	5	1	M			**Bedrock?** Or very large boulder. **GPGM 49.7/44.0/6.2**
		End													

AGGREGATE LOG

PROJECT:	Lemon Ck Pit	**SAMPLED BY:**	JS/SCL
PIT #:	_0761	**METHOD:**	Excavator
DISTRICT:	West Kootenay	**DATE:**	July 18,21 2014

TH / TP	DEPTH (m)		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	
14-15	0.0	0.3	NS	TS/OB								F	In forest (south)
	0.3	3.8	NS	GP	58	38	4	650	6	5	2	M	Some fines on top, collapsing walls
	3.8	7.0	14-15	SP	42	55	3		4	3	0	M	Gravelly sand, subtle transition **SP 43.0/53.8/3.2**
		End											
14-16	0.0	0.3	NS	TS/OB									Along wagon road
	0.3	4.0	14-16	GP	56	40	4	1100	5	5	6	F-M	HUGE oversize, Bedrock at depth? **GP 59.3/38.0/2.7**
		End											
14-17	0.0	1.5	NS	crush								M	Pit floor
	1.5	3.8	14-17A	GP	58	40	2	500	6	5	3	M	Layer of fill/crush, buried soils? **GP 62.1/36.1/1.8**
	3.8	7.0	14-17B	GP	55	42	3	150	4	0	0	M	Cobbly/bony gravel. Sandier gravel **SP 36.8/61.7/1.6**
		End											at depth.
14-18	0.0	1.0	NS	crush									Pit floor (buried broken pipe), crush
	1.0	3.7	14-18	GP	58	40	2	400	6	5	3	M	Collapsing walls; bony gravel
	3.7	7.0	14-18	GP	55	42	3	180	4	0	0	M	Sandier, less bony @ depth, mixed. **GP 59.8/35.3/4.9**
		End											
14-19	0.0	1.0	NS	crush								M	Pit floor; crush on top
	1.0	7.0	14-19	GP	55	42	3	120	4	0	0	M	Some cobbly layers near top **SP 29.8/67.3/2.9**
		End											then sandy gravel.
14-20	0.0	1.0	NS	crush				600			2	M	Pit floor - middle bench
	1.0	7.0	14-20	GP	55	42	3	200	5	2	0	M	Not in situ on top; metal gate @ 6ft **GP 51.8/47.0/1.2**
													Cobbly (small) gravel in middle
													Sandier towards bottom
14-21	0.0	7.0	14-21	SP	38	58	4	100	2	0	0	F-M	Pit floor @ toe of slope of upper bench **SP 19.6/77.9/2.5**
													May all be fill? Sandy, no oversize.

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

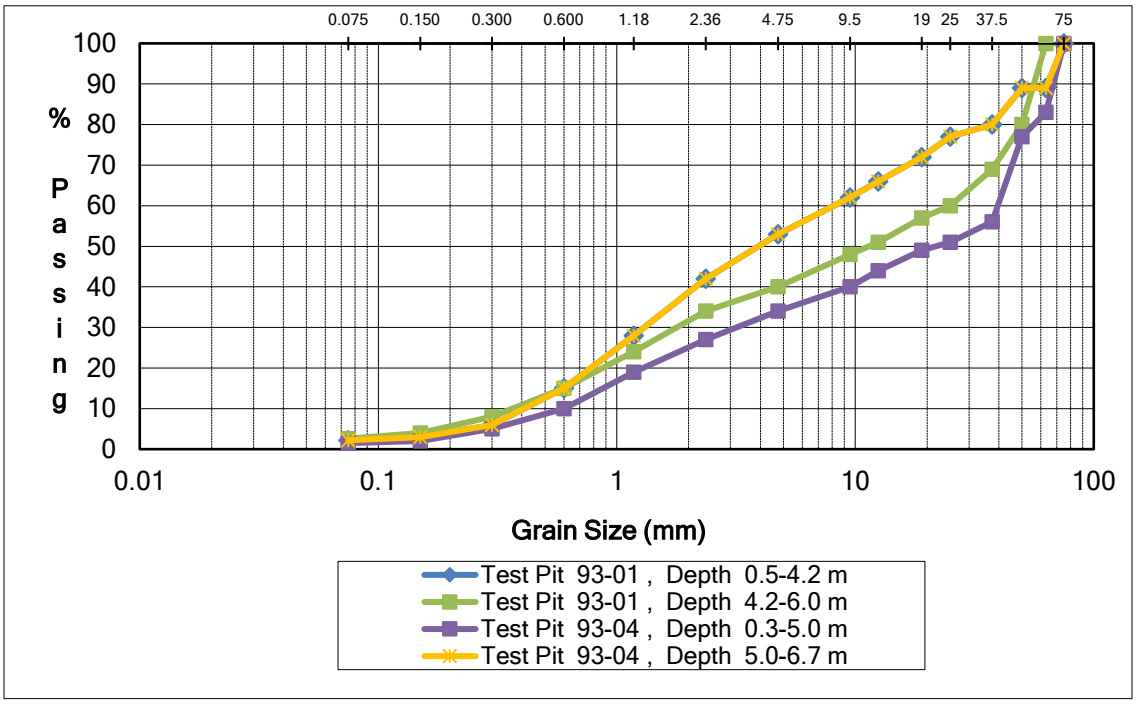
Project:	0	Project No.:	0
Sample Sc	0	Client:	0
Material:	PIT RUN	Date:	######

Test Pit	Percent Passing Pit Run Sieve Sizes (mm)														
	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
93-20	100.0	94.0	87.0	66.0	61.0	54.0	49.0	46.0	41.0	39.0	33.0	22.0	9.0	4.0	2.7
93-20	100.0	100.0	85.0	83.0	65.0	55.0	42.0	37.0	31.0	28.0	23.0	15.0	6.0	3.0	1.5
93-21	100.0	84.0	75.0	62.0	56.0	53.0	49.0	45.0	38.0	32.0	24.0	16.0	8.0	4.0	2.6
93-22	100.0	100.0	98.0	77.0	69.0	65.0	57.0	53.0	46.0	39.0	32.0	24.0	15.0	8.0	3.7
93-22	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	99.0	99.0	94.0	46.0	11.5
93-25	100.0	93.0	88.0	78.0	61.0	52.0	43.0	38.0	31.0	26.0	20.0	14.0	7.0	4.0	2.6
93-25	100.0	100.0	100.0	100.0	100.0	100.0	99.0	98.0	98.0	98.0	97.0	92.0	41.0	18.0	7.0
93-25	100.0	100.0	94.0	94.0	90.0	86.0	82.0	80.0	78.0	76.0	72.0	67.0	45.0	19.0	6.5
93-26	100.0	92.0	74.0	71.0	66.0	62.0	56.0	52.0	46.0	41.0	35.0	25.0	11.0	5.0	2.8
93-26	100.0	91.0	88.0	82.0	73.0	70.0	65.0	61.0	55.0	51.0	44.0	31.0	12.0	4.0	1.9
93-26	100.0	100.0	100.0	98.0	92.0	90.0	83.0	80.0	72.0	67.0	58.0	44.0	17.0	4.0	1.5
93-01	100.0	89.0	89.0	80.0	77.0	72.0	66.0	62.0	53.0	42.0	28.0	15.0	6.0	3.0	2.2
93-01	100.0	100.0	80.0	69.0	60.0	57.0	51.0	48.0	40.0	34.0	24.0	15.0	8.0	4.0	2.6
93-04	100.0	83.0	77.0	56.0	51.0	49.0	44.0	40.0	34.0	27.0	19.0	10.0	5.0	2.0	1.5
93-04	100.0	89.0	89.0	80.0	77.0	72.0	66.0	62.0	53.0	42.0	28.0	15.0	6.0	3.0	2.2
93-06	100.0	93.0	80.0	77.0	67.0	61.0	55.0	50.0	42.0	35.0	26.0	18.0	9.0	5.0	2.4
93-06	100.0	100.0	95.0	81.0	76.0	69.0	61.0	56.0	47.0	41.0	32.0	21.0	10.0	5.0	3.4
93-10	100.0	89.0	89.0	86.0	78.0	70.0	61.0	55.0	44.0	36.0	26.0	16.0	9.0	6.0	4.0
93-10	100.0	93.0	80.0	71.0	62.0	54.0	47.0	42.0	34.0	29.0	22.0	14.0	7.0	4.0	2.2
93-11	100.0	92.0	92.0	84.0	72.0	69.0	59.0	55.0	46.0	40.0	31.0	20.0	10.0	7.0	5.5
93-11	100.0	77.0	77.0	65.0	56.0	51.0	44.0	41.0	34.0	27.0	19.0	11.0	5.0	2.0	1.6
93-12	100.0	100.0	95.0	87.0	80.0	76.0	65.0	60.0	50.0	42.0	32.0	22.0	11.0	5.0	3.1
93-12	100.0	100.0	93.0	77.0	69.0	63.0	52.0	48.0	39.0	34.0	26.0	18.0	9.0	6.0	3.7
93-14	100.0	100.0	94.0	75.0	64.0	59.0	52.0	48.0	42.0	38.0	33.0	20.0	10.0	5.0	2.5
93-14	100.0	100.0	91.0	79.0	69.0	63.0	54.0	50.0	42.0	35.0	27.0	17.0	8.0	4.0	2.0
93-17	100.0	100.0	85.0	75.0	64.0	59.0	52.0	47.0	41.0	34.0	25.0	17.0	9.0	4.0	2.3
93-17	100.0	100.0	97.0	90.0	77.0	72.0	64.0	58.0	47.0	39.0	30.0	19.0	9.0	5.0	2.9

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

Project:	Lemon Creek Pit Investigation	Project No.:	SCL 14-992
Sample Source:	Lemon Cr. Pit No. 3115	Client:	MOT
Material:	PIT RUN	Date:	July 24/14

Sample Information			Percent Passing Pit Run Sieve Sizes (mm)														
Test Pit	Bag #	Depth (m)	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
14-01	14-01	0.3-5.5	100.0	100.0	95.4	87.1	70.2	61.7	52.8	48.5	40.0	33.2	24.9	15.1	6.6	3.2	2.0
14-02	14-02A	0.3-3.7	100.0	100.0	90.0	81.7	69.9	64.0	56.7	52.5	45.2	39.7	32.0	20.2	9.4	4.9	3.4
14-02	14-02B	3.7-7.0	100.0	97.3	95.6	87.6	75.6	69.0	61.5	57.6	49.6	43.2	34.2	21.5	8.7	3.6	2.3
14-03	14-03	0.3-6.8	96.5	96.5	96.5	88.6	74.9	67.7	57.3	51.6	42.1	34.3	24.8	14.7	7.1	4.1	2.8
14-04	14-04	0.4-3.5	100.0	96.9	93.8	85.7	75.5	68.8	61.0	56.9	48.8	41.8	33.7	22.1	8.6	2.9	1.4
14-05	14-05	1.0-7.0	100.0	100.0	89.7	78.0	66.2	61.2	52.9	49.3	42.2	36.4	28.6	18.3	8.2	3.9	2.5
14-06	14-06A	0.9-3.2	100.0	100.0	87.9	77.4	64.5	57.3	49.8	45.3	37.8	32.0	23.9	12.7	5.0	2.3	1.4
14-06	14-06B	3.2-7.0	100.0	96.9	96.9	89.5	79.2	72.1	62.7	57.3	48.9	42.4	33.8	21.3	9.1	4.3	2.8
14-07	14-07	1.0-6.8	100.0	97.3	97.3	92.8	78.2	68.0	56.9	51.7	42.1	35.1	27.1	16.8	8.2	4.1	2.8
14-08	14-08A	1.0-3.2	100.0	100.0	89.8	73.6	64.0	57.8	49.1	45.0	37.2	31.6	25.1	17.2	9.0	4.7	2.8
14-08	14-08B	3.2-6.5	100.0	100.0	92.5	89.7	86.4	83.2	76.6	72.9	65.3	58.2	49.3	35.4	17.1	5.4	1.9
14-09	14-09	0.2-4.0	100.0	97.2	90.6	78.2	66.5	58.5	49.2	44.8	37.6	32.4	26.4	17.3	8.8	5.2	3.8
14-10	14-10	0.7-4.0	100.0	93.8	88.2	78.8	60.8	54.2	46.2	42.2	34.7	29.1	22.5	13.6	6.6	3.7	2.6
14-11	14-11A	0.8-2.5	100.0	100.0	91.8	75.9	65.9	58.4	50.7	46.1	36.9	30.2	22.8	14.4	6.9	3.6	2.4
14-11	14-11B	2.5-6.9	94.2	94.2	94.2	84.2	76.7	70.8	63.1	58.6	50.3	44.3	36.5	22.2	7.8	2.7	1.5
14-12	14-12A	0.8-2.5	100.0	90.4	79.8	70.5	56.2	50.5	43.7	36.5	26.0	21.9	16.8	11.7	7.6	5.7	4.8
14-12	14-12B	2.5-7.0	100.0	100.0	95.4	91.6	85.8	82.3	76.7	73.9	67.8	63.2	56.3	39.2	13.6	4.0	2.0
14-13	14-13A	0.8-3.0	100.0	100.0	80.1	70.7	56.9	49.4	40.9	36.9	29.5	23.9	18.4	11.9	6.2	3.4	2.1
14-13	14-14B	3.0-7.0	100.0	100.0	100.0	98.6	87.8	80.5	71.8	66.2	55.1	46.4	35.2	20.0	7.9	3.2	1.7
14-14	14-14	0.8-5.8	100.0	100.0	91.3	87.1	75.3	69.5	62.5	58.2	50.3	42.1	31.8	22.4	14.0	9.1	6.2
14-15	14-15	3.8-7.0	100.0	96.1	94.1	90.2	78.1	73.6	66.6	63.4	57.0	50.5	41.8	29.0	15.4	6.9	3.2
14-16	14-16	0.3-4.0	100.0	95.8	89.6	75.4	65.9	60.0	51.9	48.2	40.7	34.9	27.5	17.4	8.5	4.4	2.7
14-17	14-17A	1.5-3.8	100.0	95.3	90.4	75.7	64.0	57.3	49.1	45.3	37.9	32.3	25.3	16.9	7.7	3.3	1.8
14-17	14-17B	3.8-7.0	100.0	100.0	97.3	93.6	86.7	81.0	75.0	71.4	63.2	56.6	47.7	33.8	14.0	3.8	1.6
14-18	14-18	1.0-7.0	100.0	100.0	86.9	75.7	63.5	56.9	49.3	46.1	40.2	35.2	28.8	20.5	11.5	6.5	4.9
14-19	14-19	1.0-7.0	100.0	100.0	100.0	99.2	94.7	90.8	84.1	79.4	70.2	62.1	51.9	31.6	12.9	5.2	2.9
14-20	14-20	1.0-7.0	100.0	100.0	95.8	89.2	73.9	68.0	59.8	55.9	48.2	42.8	36.1	24.7	9.3	2.8	1.2
14-21	14-21	0.0-7.0	100.0	100.0	97.3	95.6	94.5	92.8	88.9	86.5	80.4	74.4	65.4	50.1	18.3	6.8	2.5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25
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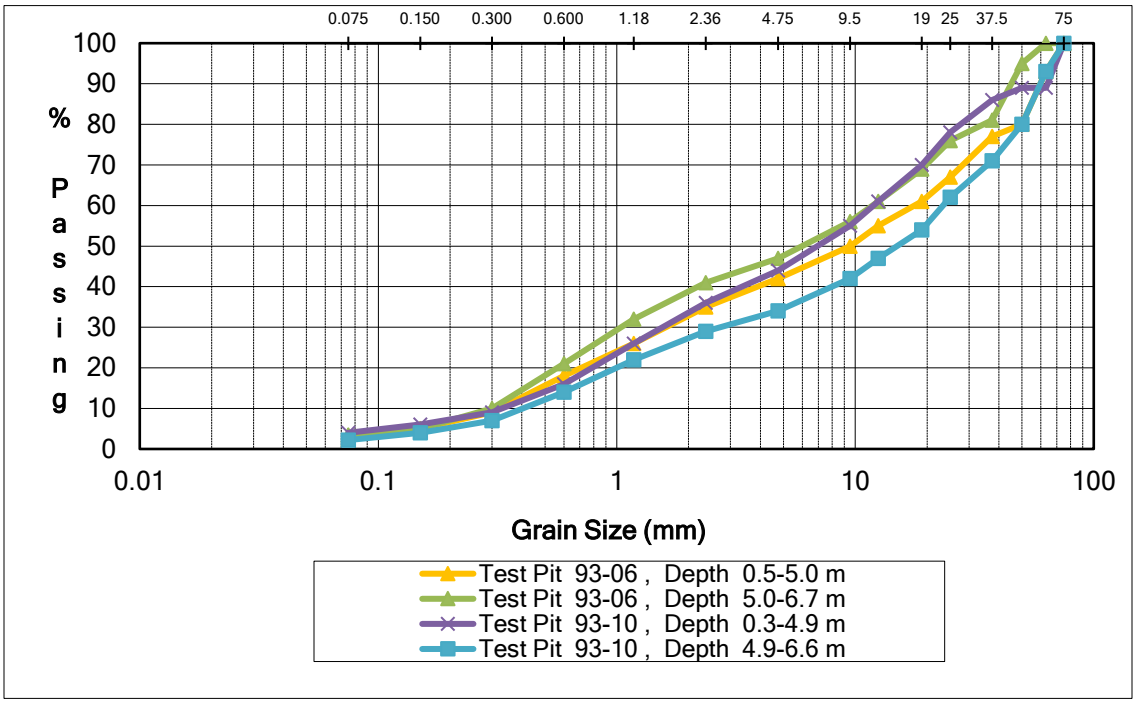
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-01 , Depth 0.5-4.2 m
Test Pit 93-01 , Depth 4.2-6.0 m
Test Pit 93-04 , Depth 0.3-5.0 m
Test Pit 93-04 , Depth 5.0-6.7 m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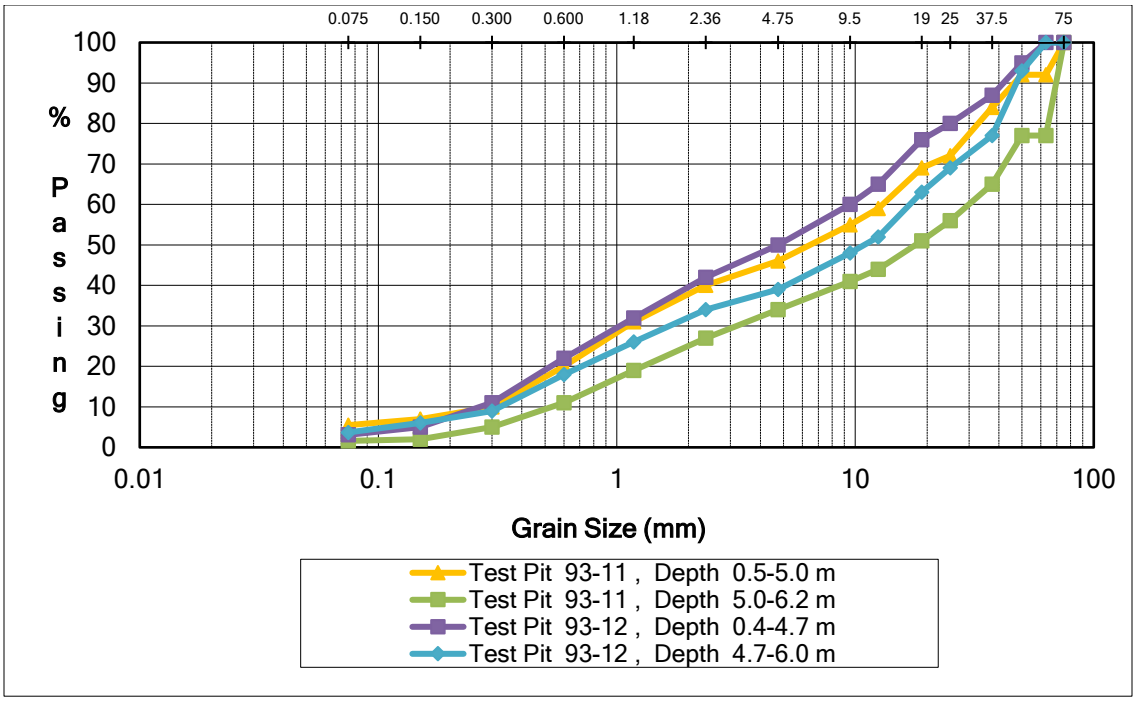
25
37.5
75
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-06 , Depth 0.5-5.0 m
Test Pit 93-06 , Depth 5.0-6.7 m
Test Pit 93-10 , Depth 0.3-4.9 m
Test Pit 93-10 , Depth 4.9-6.6 m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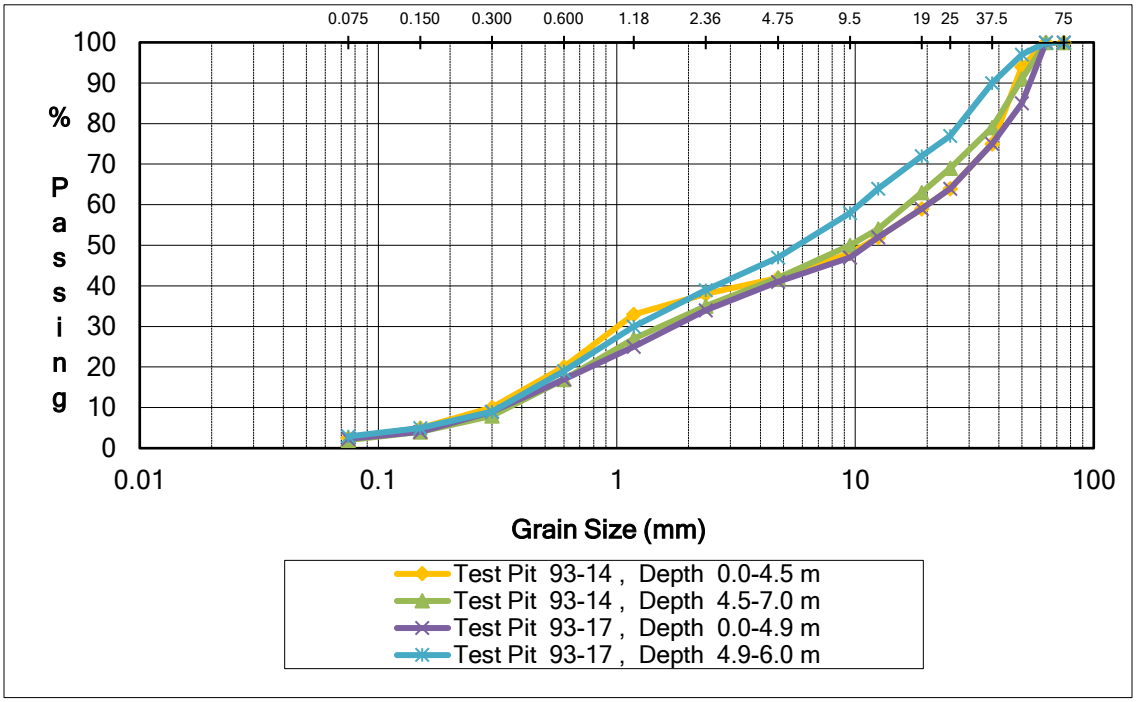
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-11 , Depth 0.5-5.0 m
Test Pit 93-11 , Depth 5.0-6.2 m
Test Pit 93-12 , Depth 0.4-4.7 m
Test Pit 93-12 , Depth 4.7-6.0 m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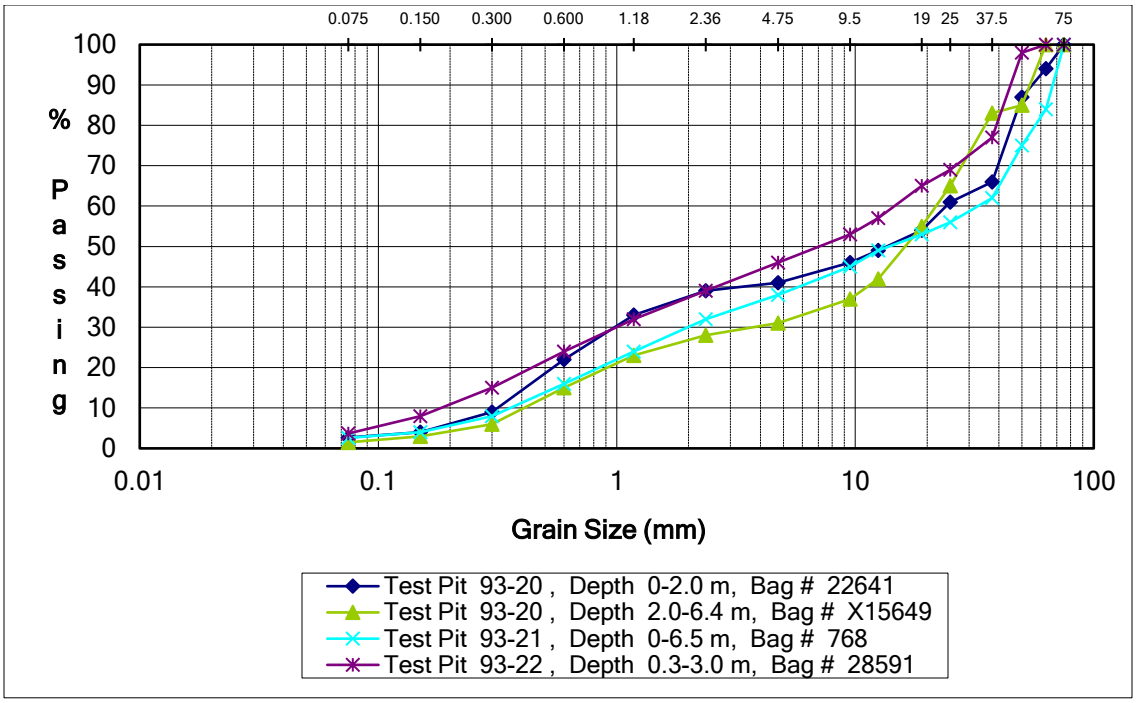
75
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-14 , Depth 0.0-4.5 m
Test Pit 93-14 , Depth 4.5-7.0 m
Test Pit 93-17 , Depth 0.0-4.9 m
Test Pit 93-17 , Depth 4.9-6.0 m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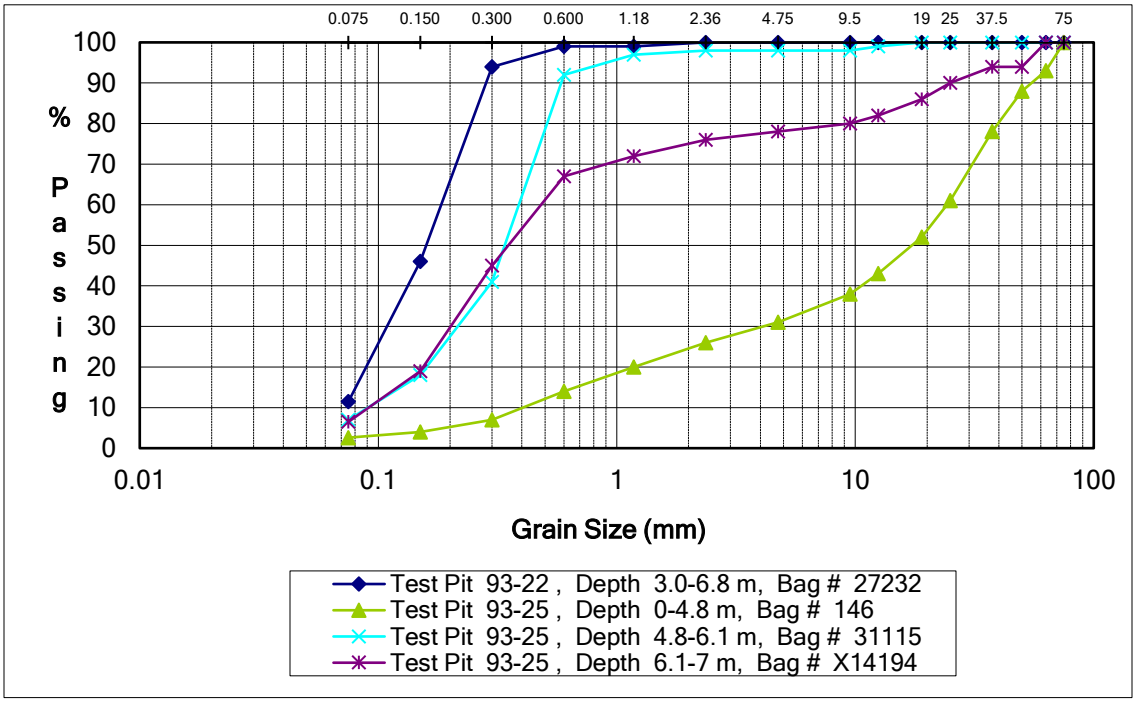
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-20 , Depth 0-2.0 m, Bag # 22641
Test Pit 93-20 , Depth 2.0-6.4 m, Bag # X15649
Test Pit 93-21 , Depth 0-6.5 m, Bag # 768
Test Pit 93-22 , Depth 0.3-3.0 m, Bag # 28591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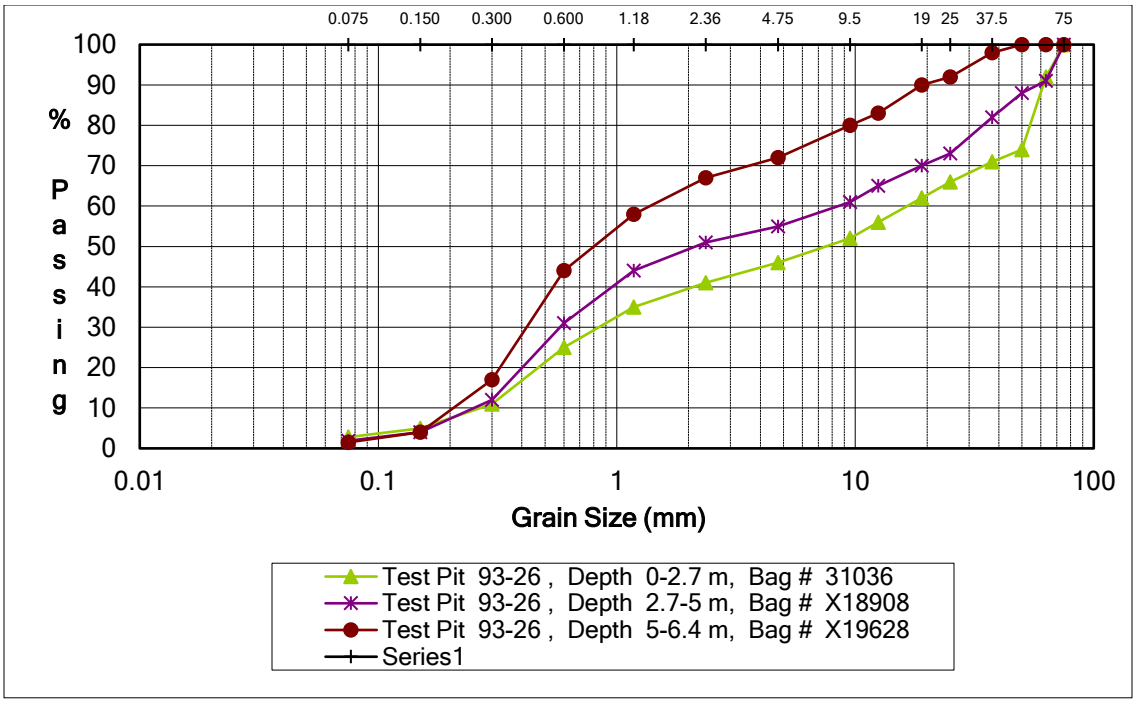
2.36
4.75
9.5
19
25
37.5
75
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-22 , Depth 3.0-6.8 m, Bag # 27232
Test Pit 93-25 , Depth 0-4.8 m, Bag # 146
Test Pit 93-25 , Depth 4.8-6.1 m, Bag # 31115
Test Pit 93-25 , Depth 6.1-7 m, Bag # X14194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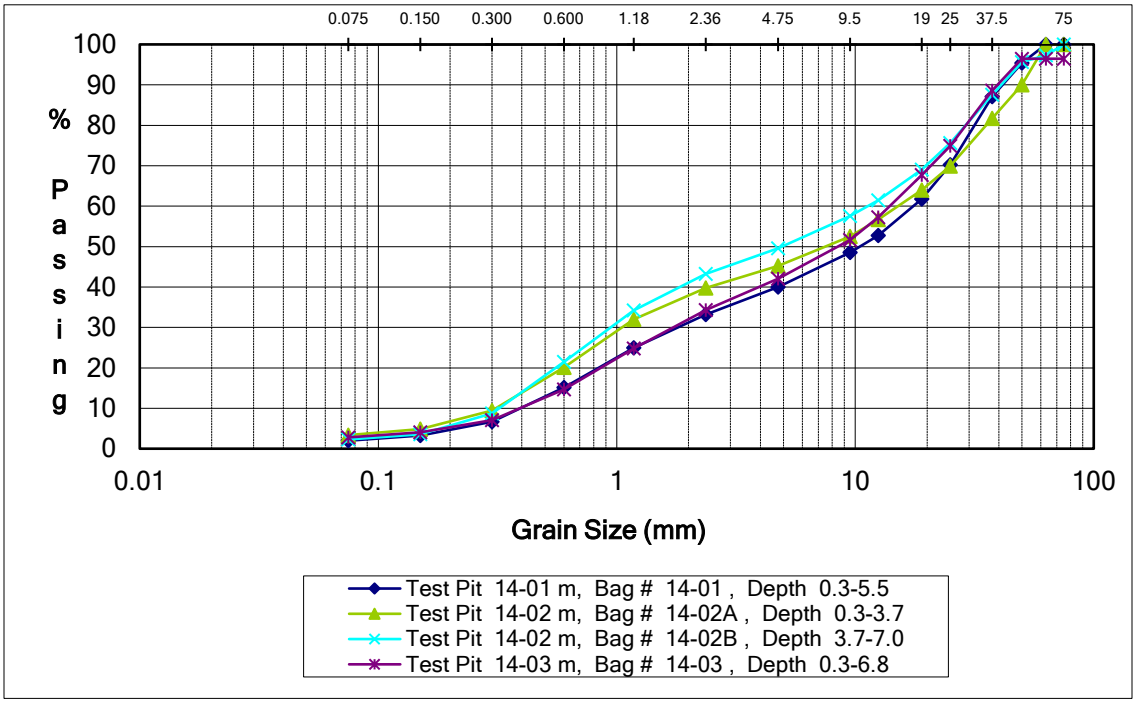
2.36
4.75
9.5
19
25
37.5
75
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 93-26 , Depth 0-2.7 m, Bag # 31036
Test Pit 93-26 , Depth 2.7-5 m, Bag # X18908
Test Pit 93-26 , Depth 5-6.4 m, Bag # X19628
Series1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0.600
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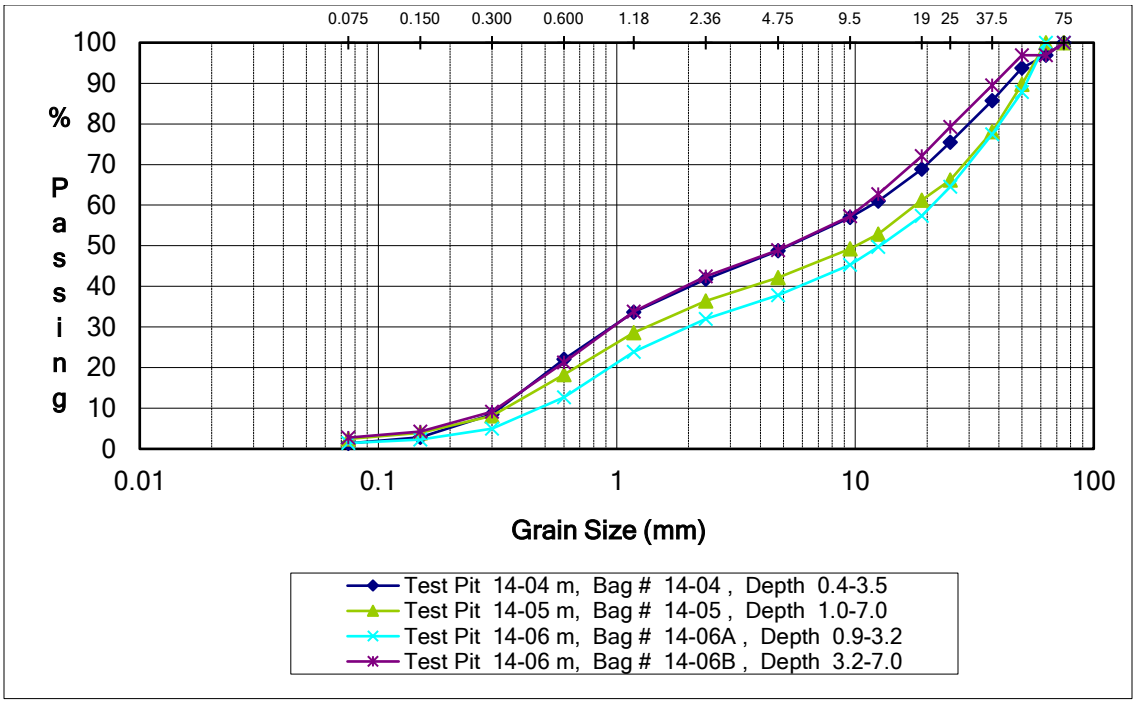
2.36
4.75
9.5
19
25
37.5
75
100
90
80
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 14-01 m, Bag # 14-01 , Depth 0.3-5.5
Test Pit 14-02 m, Bag # 14-02A , Depth 0.3-3.7
Test Pit 14-02 m, Bag # 14-02B , Depth 3.7-7.0
Test Pit 14-03 m, Bag # 14-03 , Depth 0.3-6.8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4.75
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% Passing
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0.1
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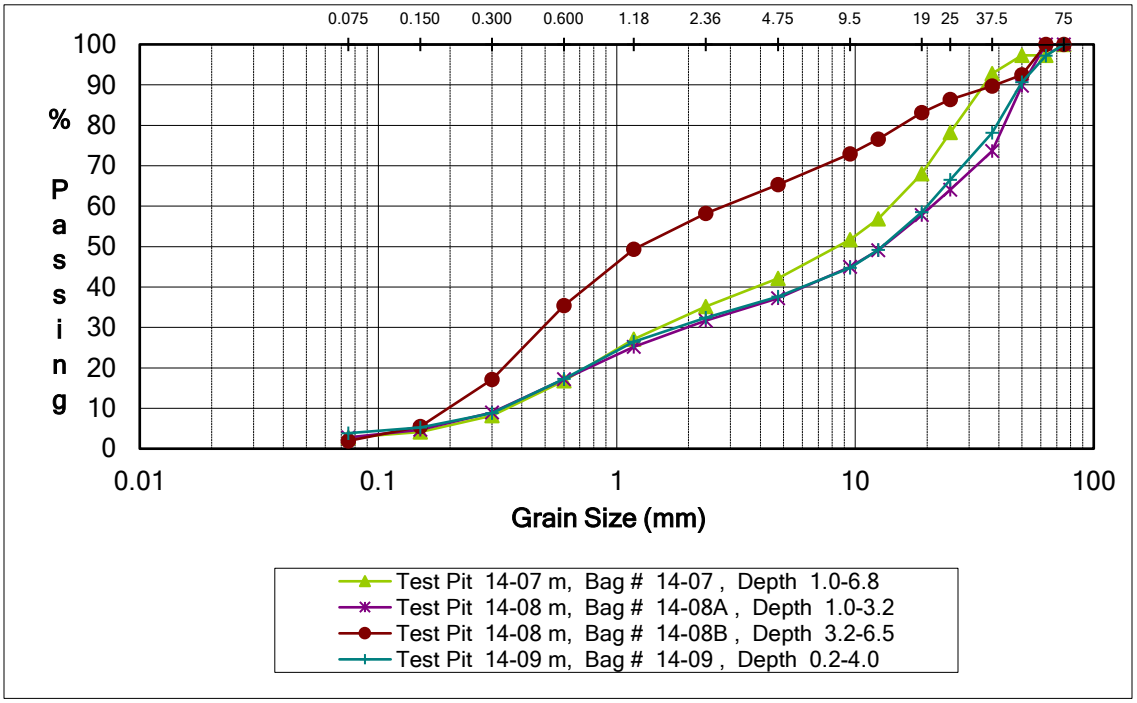
Grain Size (mm)
Test Pit 14-04 m, Bag # 14-04 , Depth 0.4-3.5
Test Pit 14-05 m, Bag # 14-05 , Depth 1.0-7.0
Test Pit 14-06 m, Bag # 14-06A , Depth 0.9-3.2
Test Pit 14-06 m, Bag # 14-06B , Depth 3.2-7.0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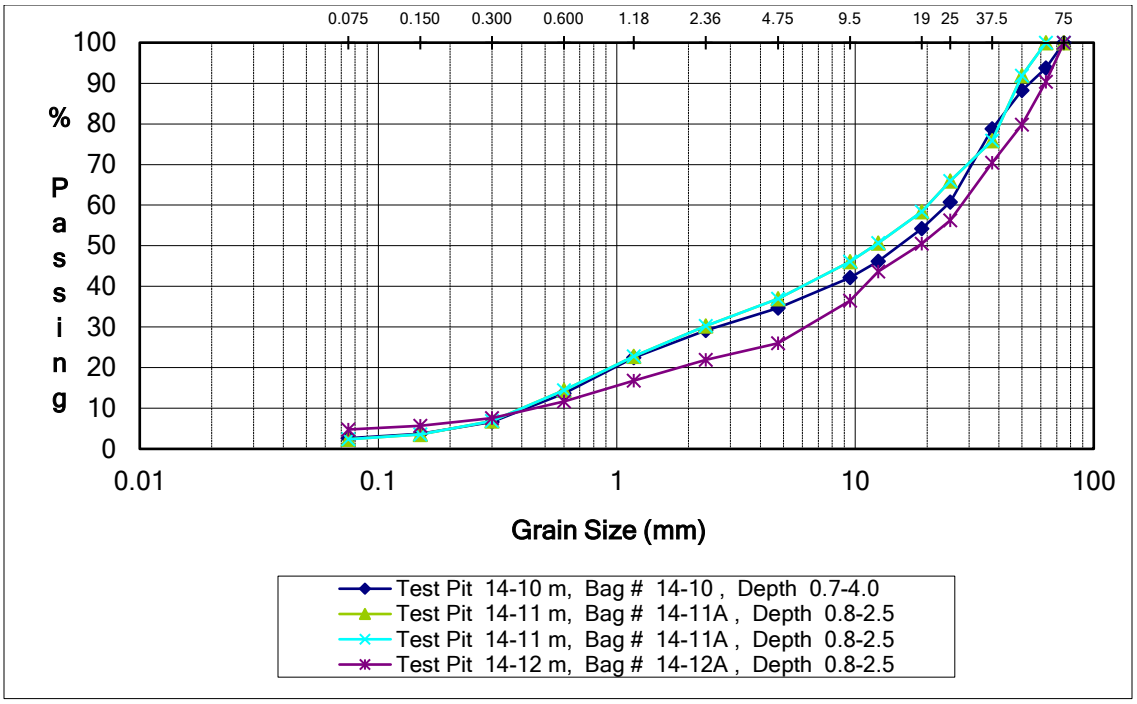
Grain Size (mm)
Test Pit 14-07 m, Bag # 14-07 , Depth 1.0-6.8
Test Pit 14-08 m, Bag # 14-08A , Depth 1.0-3.2
Test Pit 14-08 m, Bag # 14-08B , Depth 3.2-6.5
Test Pit 14-09 m, Bag # 14-09 , Depth 0.2-4.0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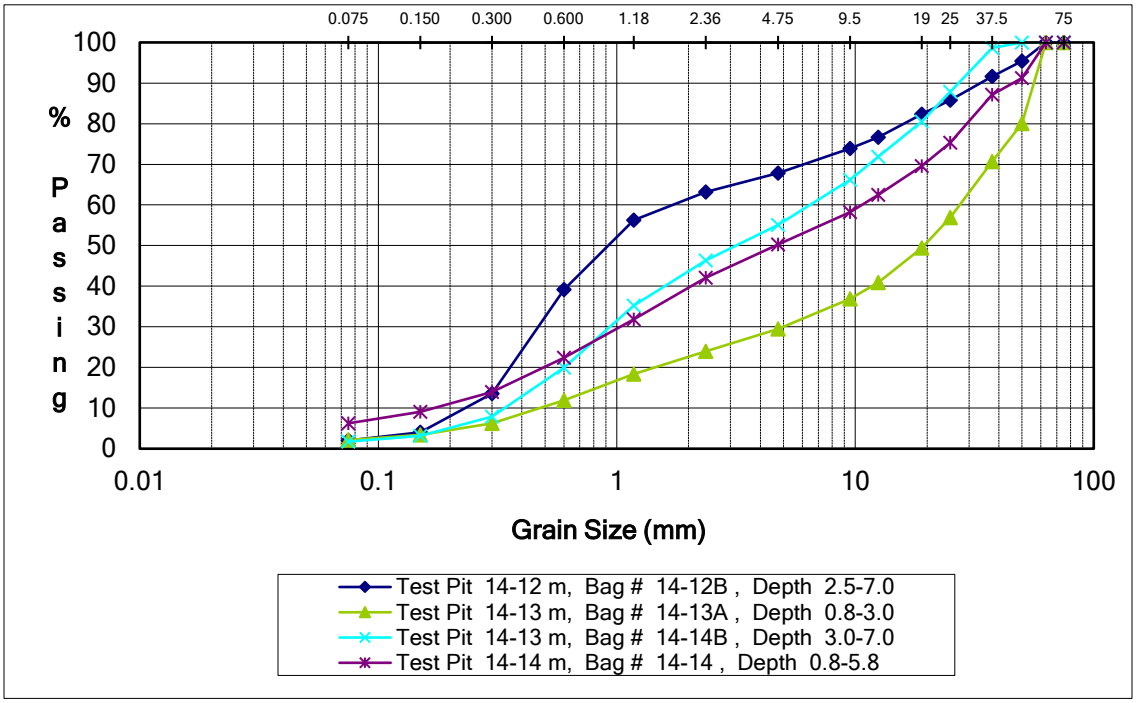
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 14-10 m, Bag # 14-10 , Depth 0.7-4.0
Test Pit 14-11 m, Bag # 14-11A , Depth 0.8-2.5
Test Pit 14-11 m, Bag # 14-11A , Depth 0.8-2.5
Test Pit 14-12 m, Bag # 14-12A , Depth 0.8-2.5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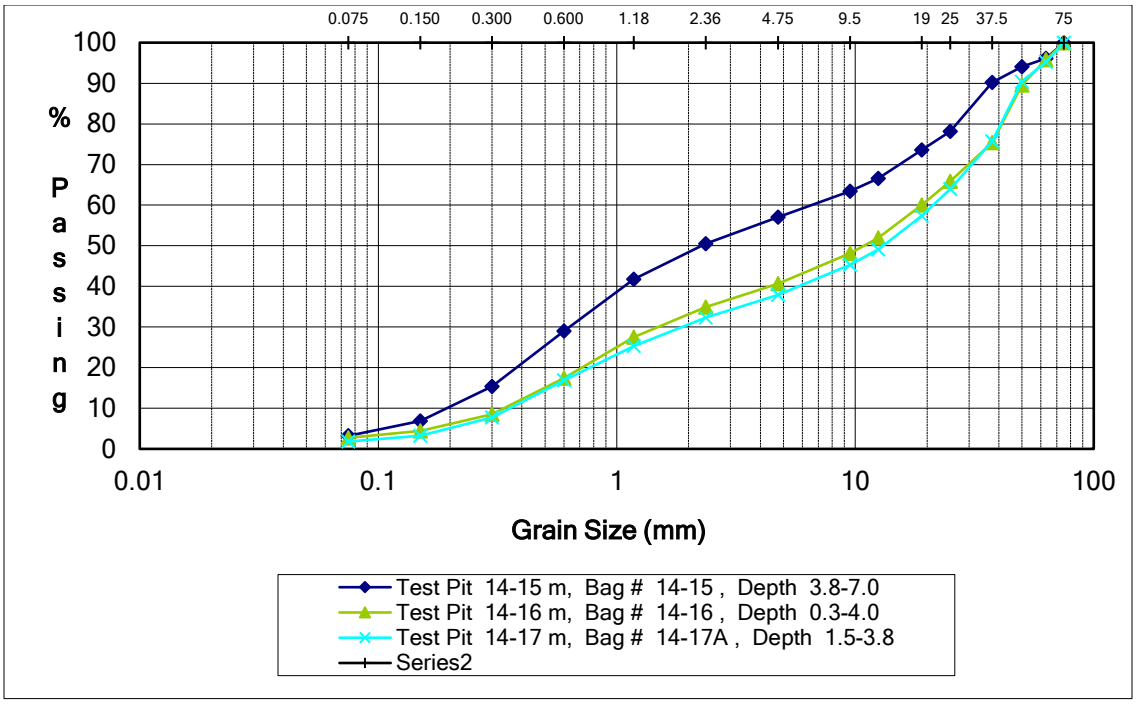
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 14-12 m, Bag # 14-12B , Depth 2.5-7.0
Test Pit 14-13 m, Bag # 14-13A , Depth 0.8-3.0
Test Pit 14-13 m, Bag # 14-14B , Depth 3.0-7.0
Test Pit 14-14 m, Bag # 14-14 , Depth 0.8-5.8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0
% Passing
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0.1
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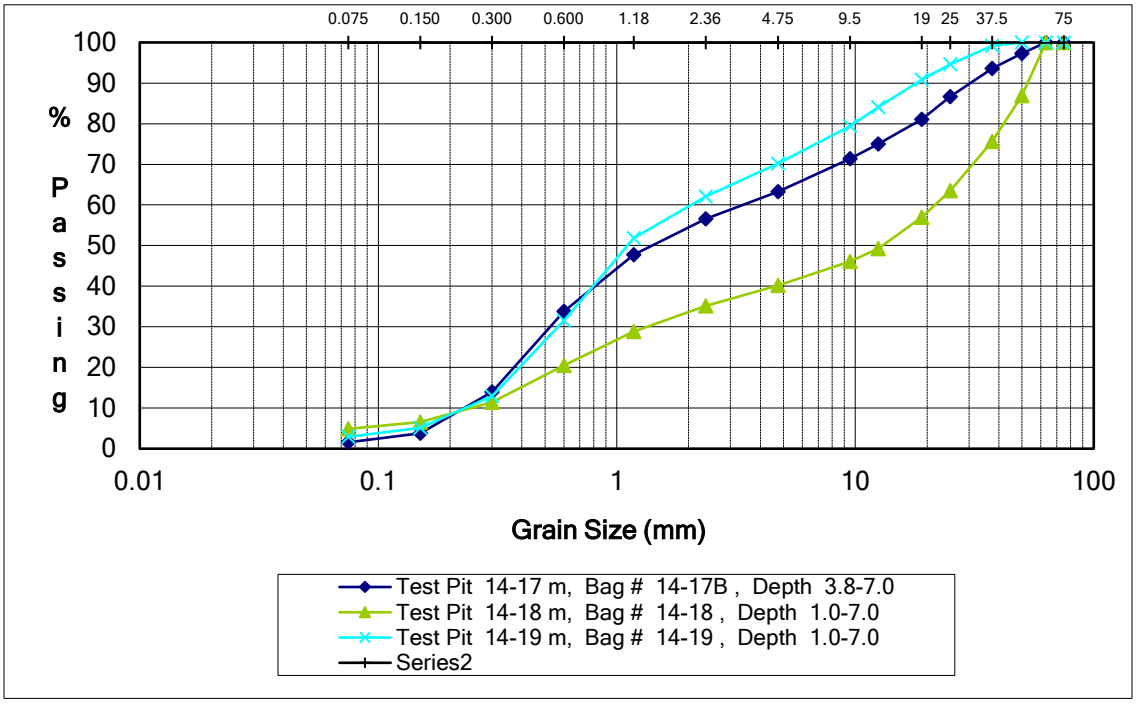
10
100
Grain Size (mm)
Test Pit 14-15 m, Bag # 14-15 , Depth 3.8-7.0
Test Pit 14-16 m, Bag # 14-16 , Depth 0.3-4.0
Test Pit 14-17 m, Bag # 14-17A , Depth 1.5-3.8
Series2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37.5
75
100
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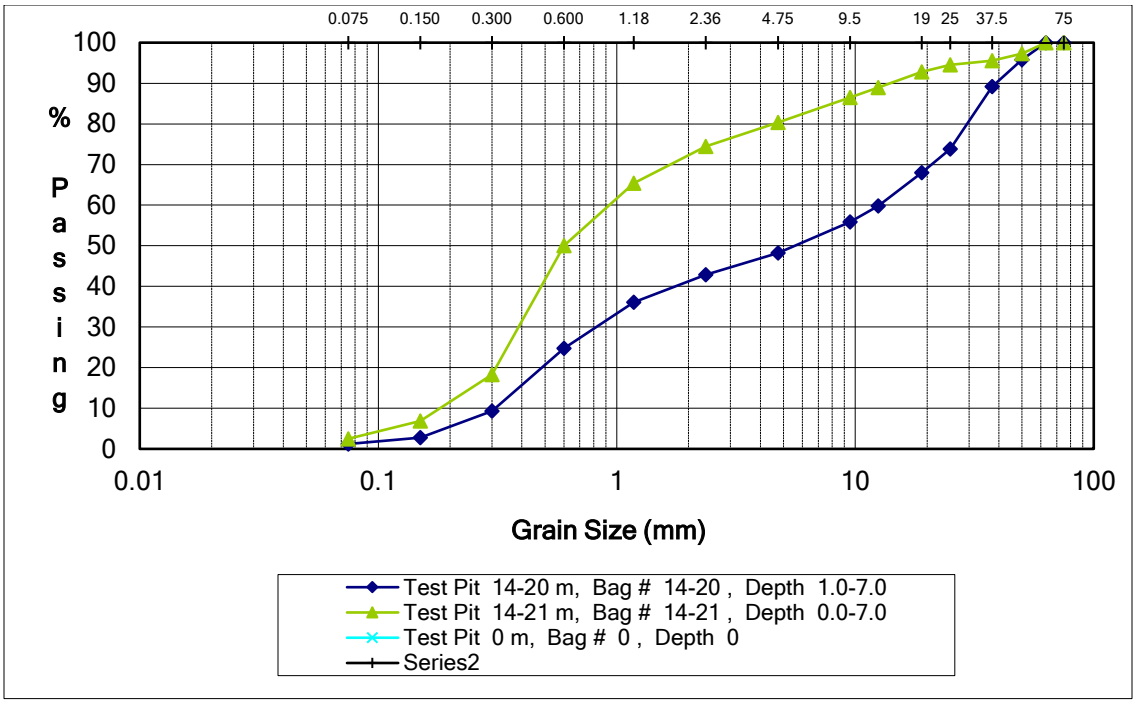
70
60
50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 14-17 m, Bag # 14-17B , Depth 3.8-7.0
Test Pit 14-18 m, Bag # 14-18 , Depth 1.0-7.0
Test Pit 14-19 m, Bag # 14-19 , Depth 1.0-7.0
Series2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50
40
30
20
10
0
% Passing
0.01
0.1
1
10
100
Grain Size (mm)
Test Pit 14-20 m, Bag # 14-20 , Depth 1.0-7.0
Test Pit 14-21 m, Bag # 14-21 , Depth 0.0-7.0
Test Pit 0 m, Bag # 0 , Depth 0
Series2

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

Photos

View of northern portion of map reserve (existing pit floor and Area A).

Area A pit face

Cleared and partially grubbed/stripped in eastern portion of Area A (near TP93-12)

Facing southwest from Area A toward access road (2023).

TP14-01

TP14-04

TP14-06 spoil material

TP14-10 spoil material

TP14-12 spoil material

TP14-17 - note layer of material presumed to be asphalt

TP14-18 - note material near top of hole may be buried posts or other construction waste material