

November 21, 2023

Waitabit Pit #1103

2023 Technical Information Report



Image 1: Oblique aerial view of Waitabit Pit map reserve (red) upslope of Waitabit Creek near Donald, B.C.

INTRODUCTION:

Sitkum Consulting Ltd. (SCL) was requested by the Ministry of Transportation & Infrastructure (MoTI) to re-evaluate Waitabit Pit as an ongoing suitable source of maintenance, construction, and paving aggregates for long term use along TransCanada Highway 1.

Waitabit Pit has been investigated in the past for potential suitability of various materials, including in 1999, 2009, 2013, and most recently in 2022 and 2023. It has been extensively used by MoTI for paving, maintenance & construction purposes. As a result of the extensive glaciofluvial terrace on which the map reserve is situated, there is significant opportunity to expand and investigate beyond the tested areas. Based on the 2022 and 2023 investigations, SCL has presented the feasibility of expanding the existing pit to the northeast for further development of viable aggregate, as well as presented two smaller areas within the existing pit floor for designated PAG.

- 2 -

LOCATION:

Waitabit Pit is located approximately 29 km north of Golden, B.C. (as the crow flies) near the community of Donald. Access is off Highway 1, Donald Road or Big Bend Highway, then Log Dump Road (aka Bush FSR); refer to Figures 1 and 2. Mapsheet no. 82N.055.

Geographic position: Latitude 51/502006 N / Longitude -117.179631W

UTM Zone11: 487456.78 m E / 5705833.27 m N

LEGAL DESCRIPTION:

The map reserve covers those portions of Sections 21 and 28 and that part of Legal Subdivision 14 of Section 21, Township 29, Range 23, West of the Fifth Meridian, together with that part of Section 28, Township 29, Range 23, West of the Fifth Meridian, and all un-surveyed Crown Land, Kootenay District for an area of \pm 35.35 ha. Lands File no. 0228188.

RESULTS:

A total of 41 samples from 35 test pits across the map reserve were submitted for laboratory analysis following the November 2022 field investigation by SCL. Field sampling and laboratory analysis indicate more than half of the area tested is suitable for further development; as a result, one suitability area is suggested (Area A). For sake of area and volume calculations, the suitability area includes Test Pits 22-01, -02, -03, -04, -05, -11, -12, -13, -14, -15, -16.

A further 10 test pits were dug in the central part of the map reserve in August 2023 by MoTI; samples from these test pits were put through laboratory testing and helped delineate a blending area described below.

Refer to the updated Pit Development Plan (Figure 2), Field Logs, and Laboratory Results in the Appendices.

SUITABILITY AREA A

Test Pits 22-01, -02, -03, -04, -05, -11, -12, -13, -14, -15, -16

<u>GRADATION</u> - Suitability Area A is considered the northeastern portion of the map reserve that has been harvested (including the 'LP Golden Cutblock'). The average and range of gradations for samples obtained from the suitability area identified from the selected 2022 Test Pits are as follows:

Laboratory Samples:

Classification	Average (%)	Range (%)
Gravel (4.75-75mm)	63	54 to 72
Sand (0.075-4.75mm)	32.5	25.5 to 43
Fines (<0.075mm)	4.6	2.2 to 11

Oversize Field Estimates:

Classification	Average (%)	Range (%)
Boulders (>375 mm)	0	0
Cobbles (150-375 mm)	0.9	0-2
Cobbles (75-150 mm)	2.7	1-3

The maximum size rock was 320 mm (in TP 22-14). Due to the low percentage of oversized observed, a primary crusher is not expected to be needed during development.

Aggregate Quality – Suitability Area A:

Quality laboratory tests were performed on an average sample(s) from test pits within the suitability area. A summary of aggregate quality tests performed on samples obtained from within the suitability area are as follows:

TEST	AVERAGE	RANGE		
Micro-Deval (combined) (% loss)	18.7	18.1 to 19.2		
Sand Equivalent	61.2	43.2 to 72.3		
Specific Gravity (coarse fraction)	2.625	2.612 to 2.648		
Specific Gravity (fine fraction)	2.619	2.587 to 2.639		
Absorption (coarse fraction)	1.44	1.23 to 1.56		
Absorption (fine fraction)	1.45	1.05 to 1.96		
TEST	Sample #	RESULT		
MgS04-coarse (% weighted mass loss)	22-02 and 22-08b	0.8		
MgS04-fine (% weighted mass loss)	22-02 and 22-08b	0.1		
Soluble sulphate content (% by mass)	22-11a	0.07		
Soluble chloride content (% by mass)	22-11a	0.0001		

The Micro-Deval had an average test result of 18.7% loss, so it meets standard specifications for Class 2 asphalt mix durability. The coarse absorption failed for Graded Aggregate Seal (>1.0%) but passed for the fine absorption (<1.5%), whereas the sand equivalent and specific gravity values meet standard specifications for some paving products, as shown below.

Suitability Area A products:

The following products are considered viable within this area based upon aggregate gradation and quality results:

- 1. Class 2 Asphalt Mix
- 2. 25 to 50 mm Well Graded Base (WGB) sand rejection may be required.
- 3. Selected Granular Sub-base (SGSB) sand rejection may be required.

GRANULAR VOLUME – Suitability Area A:

Minimum quantities of aggregate evaluated are based on average depth of aggregate (6.1 m) across Suitability Area A with 1.5H:1V pit faces and an approximate area of 47,700 m² (refer to PDP). For test pits 22-02, -05, and -12 only the top sample (a) was considered for these estimates, as deeper than 4.7 to 6 m (depending on the test pit & location; refer to stick logs in Appendix), materials were not considered suitable. However, these are likely isolated silt layers that likely have underlying aggregate of higher quality and will just need to be excavated and separated out. Based on topography, the mapped deposit, and the lower front pit face, a maximum aggregate depth of 13 m is estimated within Suitability Area A.

VOLUMES: SUITABILITY AREA A									
Minimum Evaluated Aggregate	292,400 m ³								
Maximum Estimated Aggregate	620,100 m ³								
Estimated Topsoil	14,500 m ³								

Overlying topsoil/overburden is an average of 0.3 m thick.

Designated PAG Blending Area B (0.9 ha)

Includes TPs 23-01, -02, -03, -04, -06, -07, and TPs 22-15, 22-16, and TP 09-12

<u>**GRADATION</u></u> – Designated PAG Blending Area B** is considered the triangular shaped area in the northeastern portion of the existing pit floor (mostly within Suitability Area A) with a relatively small volume of calcites that could be used to blend into the rest of the pit run material. Refer to neon polygon shown on Figure 2 - PDP.</u>

The average and range of gradations for samples obtained from the suitability area identified from the 2022 and 2023 Test Pits are as follows:

Laboratory Samples:

Classification	Average (%)	Range (%)
Gravel (4.75-75mm)	53.75	37-63
Sand (0.075-4.75mm)	47.6	32-58
Fines (<0.075mm)	4.22	1.8-6.3

GRANULAR VOLUME – Designated PAG Blending Area B:

Quantities of aggregate evaluated are based on average depth of aggregate (3.0 m) across *Designated PAG Blending Area B* with an approximate area of 9,000 m² / 0.9 ha (refer to PDP).

VOLUMES: DESIGNATED PAG BLENDING AREA B								
Evaluated Aggregate	27,000 m ³							

Designated PAG Blending Area A (0.27 ha) Includes TP 22-25 (SCL)

<u>**GRADATION</u></u> – Designated PAG Blending Area A** is considered the small area in the western portion of the existing pit floor which is covered in processed rock (refer to Images 1 and 2) with a volume of buried crush that could be used to blend into the rest of the pit run material.</u>



Image 1: view of material within Designated PAG Blending Area A (Aug. 2023)



Image 2: view of material within Designated PAG Blending Area A (TP 22-25, Nov. 2022)

The gradation for the single sample obtained from TP 22-05 within the Designated PAG Blending Area A is as follows:

Laboratory Samples:

Classification	Average (%)
Gravel (4.75-75mm)	54
Sand (0.075-4.75mm)	40
Fines (<0.075mm)	5.6

GRANULAR VOLUME – Designated PAG Blending Area A:

Quantity of aggregate evaluated is based on the measured depth of crushed material overlying buried OB in TP 22-25, which is approx. 5.5 m across Designated PAG Blending Area A with an approximate area of 2,700 m² / 0.27 ha (refer to PDP).

VOLUMES: Designated PAG Blending Area A							
Evaluated Aggregate	14,850 m ³						

 $\sim \sim \sim$

<u>PIT DEVELOPMENT DISCUSSION & RECOMMENDATIONS:</u>

The 2022 and 2023 investigations focused on assessing the material in the existing pit floors across the reserve, as well as towards the proposed development in the east. Refer to Test Pit Logs with lab results from wash sieves and quality testing, as well as the Pit Development Plan (PDP) and Stick Logs in the Appendices. Note: *the contour lines as shown on the PDP do not reflect the latest topography on site, as development has changed the profile of the pit floor since that data was collected*.

General Recommendations:

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 Operators Best Management Practices Handbook for BC.

2. The contractor must ensure that all materials passing through the 375 mm x 450 mm slotted openings shall be used in the production of the crushed aggregates.

3. Pit excavations must not take place to within a minimum of 2 m from the edge of clearing and stripped areas.

4. When the contractor discontinues operations in the pit, all working pit faces and stockpiles must be trimmed to 1.5H: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.

5. No dumping of debris or petroleum products is permitted. The pit must be left in a clean and safe condition.

Specific Recommendations:

- 1. Suitability Area A (which includes a portion of Designated PAG Blending Area B) has been partially cleared, but still needs to be grubbed and stripped; refer to Image 2. It is recommended to place stripped topsoil and overburden from the suitability area along the eastern boundary of Suitability Area A, adjacent to the private land (refer to PDP, Figure 2), reserved for reclamation. Development should commence from the existing pit face and be directed towards the northwest, north, and northeast.
- 2. There is a stockpile of overburden impeding development to the north of the existing pit face; this material will need to be relocated and is recommended to be stockpiled (along with the stripped overburden mentioned above) along the eastern boundary of Suitability Area A, adjacent to the private land (as shown on the PDP, Figure 2).
- 3. Private land is directly adjacent to the map reserve in the east, which must be avoided; a 5 m setback from the boundary is required to meet HSRC.
- 4. Some isolated silt layers may be encountered within the Suitability Area A material during development; these will need to be excavated and stockpiled separately.
- 5. **Designated PAG Blending Area A** does not require any clearing or stripping as it falls within the existing pit floor.

CLOSURE

Discussions and recommendations presented above are based on a field investigation, laboratory analysis, and on additional information provided by Ministry of Transportation & Infrastructure, which was reviewed at the time of this assessment. This report has been prepared for use by Ministry of Transportation & Infrastructure, which includes distribution as required for purposes for which the assessment was commissioned. The assessment has been carried out in accordance with generally accepted geotechnical practice. Geotechnical judgment has been applied in developing the recommendations in this report. No other warranty is made, either expressed or implied.

Sitkum trusts that the information presented above meets your current requirements. If you have any questions, or require further information, please do not hesitate to contact the undersigned.

Respectfully submitted,

Sitkum Consulting Ltd.

EGBC Permit to Practice no. 1000441

Prepared by:

Reviewed by:

1.

Jennifer Sabean, P.Geo. Project Geoscientist Wayne Miller, P.Geo. P.L. Eng. Engineering Geologist - Principal

Appendix A

Figures









Appendix B

Test Pit Photographs



2022 INVESTIGATION PHOTOGRAPHS – SUITABILITY AREA A

(refer to Figure 2 – PDP for Test Pit locations)



Image 1: Aerial overview of Waitabit Pit Map Reserve (red) with 2022 test pit locations



Image 2: Test Pit 22-01



Image 3: Test Pit 22-01 material



Image 4: Test Pit 22-02



Image 5: Test Pit 22-02 material



Image 6: Test Pit 22-03 pit



Image 7: Test Pit 22-03 material



Image 8: Test Pit 22-04



Image 9: Test Pit 22-04 material



Image 10: Test Pit 22-05



Image 11: Test Pit 22-05 material

6



Image 12: Test Pit 22-11



Image 13: Test Pit 22-11 material

7



Image 14: Test Pit 22-12



Image 15: Test Pit 22-12 material



Image 16: Test Pit 22-13



Image 17: Test Pit 22-13 material



Image 16: Test Pit 22-14



Image 17: Test Pit 22-14 material



Image 16: Test Pit 22-15



Image 17: Test Pit 22-15 material



Image 16: Test Pit 22-16



Image 17: Test Pit 22-16 material

Appendix C

Field Test Pit Logs and Stick Log Diagrams (with Lab Results)



AGGREGATE LOG

PIT #: DISTRICT: ID3 Recky Mountain EXTMACK (John 2.Nov Th/ P DEPTH /m FROM Sold Cost Cast Cast Cast Cast Cast Cast Cast Ca	PROJECT: Waitabit Pit								5	SAMI	PLEC) BY:	WM/SCL		
DISTRUCT: Rocky Mountain STMATE 2-Nov TH / P DEPTH (m) SAMPLE CuSS ESTMATES ESTMATES SAMPLE CuSS SAMPLE CuSS SAMPLE	PI	IT #:		1103					-	I	METH	HOD:		EXCAVATOR (John Deere 345c)	
Image Der Same Same <t< th=""><th colspan="2">DISTRICT:</th><th></th><th colspan="6">Rocky Mountain</th><th colspan="4">DATE:</th><th>2-Nov</th></t<>	DISTRICT:			Rocky Mountain						DATE:				2-Nov	
RedTooBAO.ImageBooSolution <th colspan="2">TH / TP DEPT</th> <th>H (m)</th> <th>SAMPLE</th> <th>SOILS CLASS</th> <th>E</th> <th>STIMATI RADUAT</th> <th>ed Ion</th> <th>EST</th> <th>MATED</th> <th>ROCK</th> <th>75mm</th> <th>SAND TYPE</th> <th>REMARKS</th>	TH / TP DEPT		H (m)	SAMPLE	SOILS CLASS	E	STIMATI RADUAT	ed Ion	EST	MATED	ROCK	75mm	SAND TYPE	REMARKS	
W22-01 0.0 0.3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.3 6.2 W22-01a GP 51 45 4.2 10 0 10 0 10 W2402 0.0 0.3 GP GP 50 42 54 40 4	1	FROM	то	BAG No.		G	s	F	MAX SIZE	75mm - 150mm	150mm - 375mm	375mm	F M C		
0.3 6.2 W22-01a GP 51 45 4 210 3 1 0 M End Lab GW 603 25.3 4.3 1 0 M 1 W22-02 0.0 0.3 6.1 W22-02 GP-GM 50 45 5 150 2 0 0 M-C W22-02 0.0 6.1 6.1 W22-02b SM1 14 74 12 75 0 0 0 F sand with some silt W22-03 0.0 0.3 C SM1 14 74 12 75 0 0 0 F sand with some silt W22-03 0.0 0.3 C SM1 14 74 12 75 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <th< td=""><td>W22-01</td><td>0.0</td><td>0.3</td><td></td><td>OB</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	W22-01	0.0	0.3		OB										
Image: bodyImage: bo		0.3	6.2	W22-01a	GP	51	45	4	210	3	1	0	М		
Image: Book of the sector of the se				Lab:	GW	60.3	25.3	4.3							
W2202 0.0 0.3 0.1 0.8 0.7 <th0.7< th=""> <th0.7< td="" th<=""><td></td><td></td><td>End</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th0.7<></th0.7<>			End												
10.3 6.1 W22402 GP45M 80 45 15 12 0 0 M-C 1 1 1 1 14 74 12 75 0 0 0 F sand with some silt 1 1 1 1 14 74 12 75 0 0 0 F sand with some silt 1 1 1 1 14 74 12 75 0 0 0 F sand with some silt W22403 0.0 0.3 0.0 0.0 0 <td>W22-02</td> <td>0.0</td> <td>0.3</td> <td>14/00 00</td> <td>OB</td> <td></td> <td>45</td> <td>_</td> <td>450</td> <td></td> <td></td> <td></td> <td></td> <td></td>	W22-02	0.0	0.3	14/00 00	OB		45	_	450						
Image: Constraint of the set of		0.3	6.1	W22-02a	GP-GM	50	45	5	150	2	0	0	M-C		
Or.1 Or.1 Vir.2 God Vir.2 God Or.1 Vir.2 God Vir.2 Godd Vir.2 Go	<u> </u>	61	6.5	LaD.	GW SM1	70.4 1/	20.1	3.0 12	75	0	0	0	F	sand with some silt	
Image: book of the second of the se		0.1	0.5	VVZZ-020	SM1	24	56.3	19.7	15	0	0	0	1		
W22-03 0.0 0.3 6.2 W22-03a GP-GM 50 45 5 310 3 2 0 M calcite coatings 1 - Lab: GW 654 309 3.7 -			End	Lab.	OWIT	27	00.0	10.7							
0.3 6.2 W22-03a GP-GM 50 45 5 310 3 2 0 M calcite coatings 6.2 6.6 N.S SM3 5 75 20 0 0 0 F sitty sand W22-04 0.0 0.3 GP-GM 50 45 5 320 3 1 0 M calcite coatings & calcite W22-04 0.0 0.3 GP-GM 50 45 5 320 3 1 0 M calcite coatings & calcite W22-05 0.0 0.3 GW 71 25 2.8 -	W22-03	0.0	0.3		OB										
Image: Mark Mark Mark Mark Mark Mark Mark Mark		0.3	6.2	W22-03a	GP-GM	50	45	5	310	3	2	0	М	calcite coatings	
6.2 6.6 N.S SM3 5 75 20 0 0 0 F sitty sand W22-04 0.0 0.3 OB OB Image: Constraint of the second se	 †			Lab:	GW	65.4	30.9	3.7		1	1	1	1	Ĭ	
Image Image <		6.2	6.6	N.S	SM3	5	75	20	0	0	0	0	F	silty sand	
W22-04 0.0 0.3 0.6 0.6 0.7<			End												
0.3 6.4 W22-04a GP-GM 50 4.5 5 3.0 3 1 0 M calcite coatings & calcite r W2 End End M M N <	W22-04	0.0	0.3		OB										
Image: Mark and the set of the s		0.3	6.4	W22-04a	GP-GM	50	45	5	320	3	1	0	М	calcite coatings & calcite cement	
M22-05 0.0 0.3 0 0.8 0 0 0 0 0 0 0 0 0 0 0 0.3 1.1 N.S. SM3 0 0 0 1 0 M Sitty sand 1.1 5.3 0.5 W22-05a GP-GM 50 45 5 310 3 1 0 M sandy gravel with a trace 5.3 6.5 W22-05b SP-SM 40 53 7 150 2 0 0 F gravelly sand with some s W22-06 0.0 0.3 C M 53 7.5 V I V I V I V				Lab:	GW	71.7	25.5	2.8							
W22-05 0.0 0.3 0.3 0.8 0.8 0 0 0 0 0 0 silty sand 1.1 5.3 W22-05a GP-GM 50 45 5 310 3 1 0 M sandy gravel with a trace 5.3 6.5 W22-05a SP-SM 40 53 7 150 2 0 0 F gravely sand with some s 5.3 6.5 W22-05a SP-SM 40 53 7 150 2 0 0 F gravely sand with some s W22-06 0.0 0.3 W22-06a SM2 C			End												
0.3 1.1 N.S. SM3 Image: Constraint of the second se	W22-05	0.0	0.3	NIC	OB									- Status - energi	
1.1 3.3 W122-084 6F-CM 30 4.3 5 3.10 5 1 0 M selicity gravel with a lade 5.3 6.5 W22-056 SP-SM 40 5.3 7 150 2 0 0 F gravelly sand with some s W22-06 0.0 0.3 End - 7.5 - 1 0 F gravelly sand with some s W22-06 0.0 0.3 COB SN2 1 7.5 C 1 C 2 calicte coatings & calicte of W22-06 0.0 0.3 W22-06a SM2 I C I I I Interbeddel layers of san 0.3 W22-06a SM2 I I I I I Interbeddel layers of san 1 6.5 W22-06a SM2 I I I I I I I Interbeddel layers of san 1 End M22-06a SM2 <td></td> <td>0.3</td> <td>1.1</td> <td>N.S.</td> <td>SM3</td> <td>50</td> <td>45</td> <td>E</td> <td>210</td> <td>2</td> <td>1</td> <td>0</td> <td>N.4</td> <td>silty sand</td>		0.3	1.1	N.S.	SM3	50	45	E	210	2	1	0	N.4	silty sand	
Image: Second	<u> </u>	1.1	5.3	VV22-05a		50 61 6	40	5 58	310	3		0	IVI	sandy gravel with a trace to some slit	
1.00 0.00 0.00 0.00 1.00 <th< td=""><td></td><td>53</td><td>65</td><td>W22-05b</td><td>SP-SM</td><td>40</td><td>53</td><td><u> </u></td><td>150</td><td>2</td><td>0</td><td>0</td><td>F</td><td>gravelly sand with some silt</td></th<>		53	65	W22-05b	SP-SM	40	53	<u> </u>	150	2	0	0	F	gravelly sand with some silt	
Image: Note of the image: No		0.0	0.5	VVZZ-000	SP-SM	39.4	53 1	7.5	150	2	0	0	- '		
W22-06 0.0 0.3 W22-06a SM2 Image: Constraint of the state of the s			End	Lub.		00.4	00.1	7.0						calicte coatings & calcite cement	
0.3 W22-06a SM2 Image: SM2 <thimage: sm2<="" th=""> Image: SM2 <</thimage:>	W22-06	0.0	0.3		OB										
Image: Mark Mark Mark Mark Mark Mark Mark Mark		0.3		W22-06a	SM2									Interbedded layers of sand & gravel	
Image: second				W22-06a	GP				150					silty sand lenses - variable measuremer	
index6.5W22-06aSM2indexin			6.4	W22-06a	SP-SM										
Image: Mark Mark Mark Mark Mark Mark Mark Mark			6.5	W22-06a	SM2										
MedEndColCo				Lab:	SP-SM	30	60	10							
W22-07 0.0 0.3 C OB C <thc< th=""> C <thc< th=""> C C C</thc<></thc<>			End										ļ		
0.3 6.5 W22-07a GP-GM 50 45 5 210 2 0 0 M calicte coatings & calicte of 1 1 Lab: GW 65.9 30.1 4 1	W22-07	0.0	0.3	14/00 07	OB	50	45	_	040						
Image: Constraint of the constratex constratex constraint of the constraint of the constraint of		0.3	6.5	W22-07a	GP-GM	50	45	5	210	2	0	0	M	calicte coatings & calcite cement	
W22-08 0.0 0.3 Image: Construction of the set o	<u> </u>		End	Lap.	Gw	00.9	30.1	4						silty sand lenses below 6.1m	
MLL 00 0.0 <t< td=""><td>W22-08</td><td>0.0</td><td>0.3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	W22-08	0.0	0.3												
Image: Mode of the state Lab: GW 72.6 26.4 1 Image: Mode of the state Image: Mode of the state <td>1122 00</td> <td>0.3</td> <td>6.4</td> <td>W22-08a</td> <td>GP-GM</td> <td>50</td> <td>45</td> <td>5</td> <td>290</td> <td>2</td> <td>1</td> <td>0</td> <td>С</td> <td>gravelly sand with some silt</td>	1122 00	0.3	6.4	W22-08a	GP-GM	50	45	5	290	2	1	0	С	gravelly sand with some silt	
6.4 6.7 W22-08b SP-SM			-	Lab:	GW	72.6	26.4	1						5	
Image: Marking Set of the system of the s		6.4	6.7	W22-08b	SP-SM									calcite coatings	
End End OB Image: Constraint of the state of the				Lab:	SP	6.7	90.3	3							
W22-09 0.0 0.3 OB OB Image: Constraint of the cons			End												
0.3 6.2 W22-09a GP-GM 50 45 5 150 2 0 0 M-C calicte coatings & calcite of a calicte coatings & calcite c	W22-09	0.0	0.3		OB										
Lab: GW 62.8 34.4 2.8 Image: Constraint of the state	\square	0.3	6.2	W22-09a	GP-GM	50	45	5	150	2	0	0	M-C	calicte coatings & calcite cement	
End OB	+			Lab:	GW	62.8	34.4	2.8	ļ	 	ļ				
W22-10 0.0 0.3 OB CB Calicte coatings & calicte comer 0.3 4.1 W22-10a GP 55 42 3 100 2 0 0 M mixing. sandy gravel trace	14/00 40	0.0	End		05		<u> </u>	<u> </u>						a Pata a a Para de La Viene	
	vv22-10	0.0	0.3	10/00 40-	OB	55	40	2	100	0			N.A.	calicte coatings & calcite cement samples	
	-+	U.3	4.1 ເວ	VVZZ-10a		55 40	42	3 6	270	2	U 5	0	M	mixing, sandy gravel trace of silt	
43 0 370 7 3 0 C Sandy gravel some slit & C	<u> </u>	4.1	υ.Ζ	vvzz-iUa		49 66.2	40 31 1	0	370	<u> </u>	5	U		Sanuy yraver Some Sill & CODDIES	
W22-11 0.0 0.3	W22-11	0.0	0.3	LaD		00.Z	<u> </u>	2.1							
0.3 6.4 W22-11a GP 51 45 4 100 2 0 0 M-C cleaner & smanner gravel		0.3	6.4	W22-11a	GP	51	45	4	100	2	0	0	M-C	cleaner & smapper gravel	
Lab: GW 66.5 30.9 2.6		2.0		Lab:	GW	66.5	30.9	2.6		<u> </u>	Ť	Ť		I	
End Calicte coatings & calicte			End											calicte coatings & calcite cement	

AGGREGATE LOG

PROJ	ROJECT: Waitabit Pit SAMPL							AMPLED BY: WM/SCL							
F	PIT #: 1103							METHOD:					EXCAVATOR (John Deere 345c)		
DISTI	RICT:		Rocky Mo	ountain				-		D	ATE:		3-Nov		
TH / TP	DEPT	Ή (m)	SAMPLE	SOILS CLASS	E GF	STIMATI	ED ION	ESTIMATED ROCK 75mm		STIMATED ROCK 75mm		ED ROCK 75mm		SAND TYPE	REMARKS
	FROM	то	BAG No.		G	s	F	MAX SIZE	75mm - 150mm	150mm - 375mm	375mm	FМС			
W22-12	0.0	0.3		OB											
	0.3	4.7	W22-12a	GP	51	45	4	210	3	1	0	М	sandy gravel trace of silt		
			Lab:	GW-GM	<u>59.5</u>	32.2	8.2								
	4.7	6.6	W22-12b	SM1	12	70	18	0	0	0	0	F	silty sand		
		F . 1	Lab:	SM2	7.5	67.5	25								
10/00 10	0.0	End													
VVZZ-13	0.0	0.5	W22-13a	GP	55	42	3	120	2	0	0	M-C	interbedded lavers of sitly sand & clean		
	0.0		W22-13a	SP-SM	12	80	7	120	0	0	0	F	fine gravel (see photos)		
			W22-13a	GP	55	42	3	200	3	1	0	M-C	sample from all layers		
		6.7	W22-13a	SM1	12	70	18		0	0	0	F	calcite coatings		
			Lab:	GP-GM	54	35	10.9								
		End													
W22-14	0.0	0.3		OB											
	0.3	6.4	W22-14a	GP-GM	50	45	5	320	3	1	0	М	calcite coatings & calcite cement		
		E a d	Lab:	GW	64.7	33.1	2.2								
10/00 15	0.0			OP											
VVZZ-13	0.0	0.3	W22-15a	SP-SM	40	54	6	210	3	1	0	F-M	interbedded layers of sand and gravel		
	0.0	0.0	Lab:	GP	54.3	43.3	2.4	210	Ŭ		•	1 141			
		End			••								calcite coatings & calcite cement		
W22-16	0.0	6.5	W22-16a	SP-SM	40	54	6	210	3	1	0		gravelly sand with some silt		
			Lab:	GW	63.4	32.8	3.8								
		End											calcite coatings & calcite cement		
W22-17	0.0	6.8	W22-17a	GP	55	42	3	230	8	1	0	M-C			
			Lab:	GW	75.9	22.4	1.7								
14/00 40	0.0	End	14/00 40	00	50	47	0	4.40	7		0				
W22-18	0.0	6.8	W22-18a	GP SW	50	4/	্র ১০০	140	1	0	0	IVI	more sand than TPs 22-16 & 22-17		
		End	Lau.	500	47	43.1	0.0								
W22-19	0.0	0.4		OB											
	0.4	6.5	W22-19a	GP	55	42	3	190	5	1	0	M-C	clean GP depth estimated sloughing		
			Lab:	GW	66.4	30.6	3								
		End													
W22-20	0.0	0.4		OB											
	0.4	6.4	W22-20a	GP	55	42	3	210	6	1	0	M-C	Sloughing - depth estimated		
		F I	Lab:	GW	<u>59.5</u>	36.9	3.6								
10/00 01	0.0														
vv∠∠-∠ I	0.0	0.4 6.5	W22-21a	GP	55	42	3	150	7	0	Λ	M-C	water table @ 6.5m sloughing denth		
	. .т	0.0		GW	78.2	19.5	2.4	100	- '		- U	M-O			
		End								1			estimated		
W22-22	0.0	0.3		OB					L	L					
	0.3	6.2	W22-22a	GP	55	42	3	100	5	0	0	С	sloughing depth estimated		
			Lab:	GW	69.4	27	3.6								
		End								 			water at bottom		
W22-23	0.0	0.3	11/06	OB			-		-		-				
	0.3	6.6	W22-23a	GP	60	37	3	100	5	0	0	C	sloughing depth estimated		
		End	Lab:	GW	71.4	26.3	2.3						water table @6.5m		
\\/??_?/	0.0	65	\N/22_2/a	CD	55	⊿ว	2	150	7	0	n	M_C	thin laver of crush - on nit floor		
vv∠∠-∠4	0.0	0.0	ah:	GP	66.3	32.1	1.7	100				101-0			
		End	200.							1					
									L	L					

SAMPLED BY:

WM/SCL

PROJECT: PIT #:

DISTRICT:

1103

Waitabit Pit

Rocky Mountain

METHOD: DATE: EXCAVATOR (John Deere 345c)

4-Nov

TH / TP	DEPT	H (m)	SAMPLE	SOILS CLASS	E: GR	STIMATE ADUATI	D ON	ESTIMATED ROCK 75mm				SAND TYPE	REMARKS
	FROM	TO	BAG No.		G	s	F	MAX SIZE	75mm - 150mm	150mm - 375mm	375mm	FMC	
W22-25	0.0	5.5	W22-25a	Crush									perform lab test
	5.5	5.7	N.S	OB									
	5.7	6.1	N.S	GP									topsoil and natural ground profile
		End											
W22-26	0.0	6.8	W22-26a	GP	55	42	3	180	5	1	0	M-C	
			Lab:	GW	81.4	15.9	2.8						
		End											
W22-27	0.0	0.6		GP-GM									pit rum cap on overburden
	0.6	6.2	N.S.	OB									overburden woody debris roots and
		End											topsoil
W22-28	0.0	3.1	N.S.	OB									calcite coatings & calcite cement
	3.1	3.3	N.S.	GP-GM									calcite cemented gravel refusal end diggir
		End											
W22-29	0.0	6.3	W22-29a	GP-GM	55	42	3	220	6	1	0	M-C	sloughing - depth estimated
		End											calcite coatings & calcite cement
			Lab:	GW	81.5	17.7	0.7						
W22-30	0.0	0.8	N.S.	SM1	12	70	18	0	0	0	0	F	silty sand capping clean gravel
	0.8	4.5	W22-30a	GP	55	42	3	150	5	0	0	M-C	Clean gravel -end of hole sloughing
			Lab:	GW	81.3	18.2	0.5						
		End											
W22-31	0.0	1.1	W22-31a	SM1	12	70	18	0	0	0	0	F	silty sand capping clean gravel
			Lab:	SP-SM	20	74.3	5.7						
	1.1	5.5	W22-31b	GP	55	42	3	210	6	2	0	M-C	Clean gravel -end of hole sloughing
			Lab:	GW	69.4	29.3	1.3						
		End											
W22-32	0.0	0.3		OB									
	0.3	4.5	W22-32a	GP	50	45	5	190	5	1	0	M-C	sandy gravel with a trace to some silt
			Lab:	GW	62.2	34.7	3.1						
	4.5	6.5	W22-32b	SP-SM	25	67	8	100	3	0	0	F	gravelly sand with some silt
			Lab:	SP	44	51.2	4.7						
		End											
W22-33	0.0	0.3		OB									
	0.3	2.6	W22-33a	GP	55	42	3	160	5	1	0	M-C	sandy gravel with a trace of silt
			Lab:	GW	59.9	36	4						
	2.6	6.7	W22-33b	GP-GM	45	43	12	150	5	0	0	F-M	sand and gravel with some silt
			Lab:	GP-GM	52.8	41.8	5.4						
14/00 5 1		End											
W22-34	0.0	0.3	14/00 0 1	OB					_				
	0.3	6.7	W22-34a	GP	55	42	3	190	5	1	0	M-C	sloughing - depth estimated
		_ ·	Lab:	GW	/5.1	23	1.9						
14/00 07		End	14/00 07	05.011	40			4.40	-			 .	and the second
vv22-35	0.0	6.5	w22-35a	SP-SM	42	50	8	140	5	1	0	⊦-M	sandier and more silt
			Lab:	SP-SM	39.4	55.2	5.4						
		End											

3 OF 3



1:100

SOIL CLASSIFICATION LEGEND

SOIL TYPE

	LS L	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES
OILS	L ANG	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES
GRAINED SOILS COARSE GRAINED SOI	RAVE	GM*	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
AINE	GR G	GC*	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
GR/	s l	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
SE	AND	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES
COAI	SAND ANDY	SM*	SILTY SANDS SAND-SILT MIXTURES
0	N N	SC*	CLAYEY SANDS SAND-CLAY MIXTURES
NED SOILS	SILTS AND AYS WI <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
	C	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
GRAIN	AND >50	МН	INORGANIC SILTS, MICACEOUS OR DIATOM- ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS
ΠNΕ	YS W	СН	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
FINE GRA		ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
ORG SO	ANIC	Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS
TOP	SOIL	TS	TOPSOIL WITH ROOTS, ETC.
СОВ	BLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm
BOUL	.DERS	LB	BOULDERS, PARTICLE SIZE OVER 300mm
FOR S [*] GM1; GM2;	GC1; SI GC2; SI	VING 5 - M1; SC1; M2; SC2;	12% PASSING .075 SIEVE, USE DUAL SYMBOL 12 - 20% 20 - 30% PASSING .075mm SIEVE

MAJOR

DIVISIONS

SYMBOL

KEY

GM3; GC3; SM3; SC3; 30 - 40% GM4; GC4; SM4; SC4; 40 - 50%

REV. 89-07-17

LABORATORY SIEVE ANALYSIS :

58,36,6 G ,S, F

FIELD GRADATION ESTIMATE :

(G, S, F)

MAX. 600= MAX. ROCK SIZE IN mm. DEPTH IS IN METERS







1:100

SOIL CLASSIFICATION LEGEND

MAJ DIVIS	IOR IONS	SYMBOL	SOIL TYPE					
) ILS	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES					
OILS	- AND	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES					
S O	RAVEI WELL'	GM*	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES					
INE	GRI	GC*	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES					
GR4	(0	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES					
SE	SAND AND SANDY SOILS	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS. < 5% FINES					
OAR		SM*	SILTY SANDS SAND-SILT MIXTURES					
0		SC*	CLAYEY SANDS SAND-CLAY MIXTURES					
SOILS	4D <50	BAND-CLAI MILTORES INORGANIC SILTS AND VERY FINE ROCK FLOUR, SILTS AND VERY FINE OR CLAYEY SILTS WITH SLIGHT PI						
	SILTS AN AYS WI	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS					
LED	CL	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY					
GRAIN	ND >50	ΜН	INORGANIC SILTS, MICACEOUS OR DIATOM- ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS					
INE	YS W	СН	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS					
	S CLA	ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS					
ORG. SO	ANIC ILS	Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS					
TOP	SOIL	TS	TOPSOIL WITH ROOTS, ETC.					
СОВ	BLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm					
BOUL	DERS	LB	BOULDERS, PARTICLE SIZE OVER 300mm					
FOR S *GM1; GM2; GM3; GM4;	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%							

KEY

LABORATORY SIEVE ANALYSIS :

58,36,6 G ,S, F

FIELD GRADATION ESTIMATE :

(G, S, F)

MAX. 600= MAX. ROCK SIZE IN mm. DEPTH IS IN METERS







SOIL CLASSIFICATION LEGEND

MAJ DIVIS	IOR IONS	SYMBOL	SOIL TYPE						
(0)	U ILS	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES						
OILS	L AND	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES						
D	RAVE	GM*	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES						
AINE	GR C	GC*	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES						
GR/	S	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES						
SE	AND	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES						
COAF	SAND ANDY	SM*	SILTY SANDS SAND-SILT MIXTURES						
0	° S	SC*	CLAYEY SANDS SAND-CLAY MIXTURES						
	۷D <50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY						
SOILS	SILTS A AYS WI	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS						
١ED	C .	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY						
GRAIN	AND >50	MH	INORGANIC SILTS, MICACEOUS OR DIATOM- ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS						
INE	YS W	СН	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS						
Ŀ	CLA S	ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS						
ORG. SO	ANIC ILS	Ρt	PEAT AND OTHER HIGHLY ORGANIC SOILS						
TOP	SOIL	TS	TOPSOIL WITH ROOTS, ETC.						
COB	BLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm						
BOUL	DERS	LB	BOULDERS, PARTICLE SIZE OVER 300mm						
FOR S *GM1; GM2; GM3; GM4;	DOULDERS LD DOULDERS, PARIFICLE SIZE OVER SUMM FOR SOILS HAVING 5 - 12% PASSING .075 SIEVE, USE DUAL SYMBOL 'GM1; GC1; SM1; SC1; 12 - 20% 'GM2; GC2; SM2; SC2; 20 - 30%								

KEY

REV. 89-07-17

LABORATORY SIEVE ANALYSIS :

58,36,6 G ,S, F

FIELD GRADATION ESTIMATE :

(G, S, F)

MAX. 600= MAX. ROCK SIZE IN mm. DEPTH IS IN METERS



5



1:100 \cap

SOIL CLASSIFICATION LEGEND

MAJ DIVIS	IOR IONS	SYMBOL	SOIL TYPE							
	LS ILS	GW	WELL GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES							
SOILS	L ANI	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, < 5% FINES							
	SRAVE	GM*	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES							
AINE	GR	GC*	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES							
GR	S	SW	WELL-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES							
RSE	SOIL	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, < 5% FINES							
COA	SAND	SM*	SILTY SANDS SAND-SILT MIXTURES							
		SC*	CLAYEY SANDS SAND-CLAY MIXTURES							
0	ND <50	ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY							
SOILS	SILTS A AYS WI	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS							
LED	CL	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY							
GRAIN	AND 1 >50	МН	INORGANIC SILTS, MICACEOUS OR DIATOM- ACEOUS FINE SANDY OR SILTY SOILS, PLASTIC SILTS							
INE.	ILTS YS W	СН	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS							
<u>ц</u>	CLA S	ОН	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS							
ORG. SO	ANIC ILS	Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS							
TOP	SOIL	TS	TOPSOIL WITH ROOTS, ETC.							
СОВ	BLES	SB	ROCK FRAGMENTS AND COBBLES, PARTICLE SIZE 75mm TO 300mm							
BOUL	DERS	LB	BOULDERS, PARTICLE SIZE OVER 300mm							
FOR S *GM1; GM2; GM3;	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% PASSING .075mm SIEVE									
GM4;	GC4; SI	M4; SC4;	40 - 50% J REV 89-07-17							

KEY

LABORATORY SIEVE ANALYSIS :

58,36,6 G ,S, F

FIELD GRADATION ESTIMATE :

(G, S, F)

MAX. 600= MAX. ROCK SIZE IN mm. DEPTH IS IN METERS



							AG	GRE	GA ⁻	ΤE	LO	G			
PROJ	ECT:		Wa	itabit P	it			S	SAMF	LED	BY:		Steven Lee		
F	PIT #:			1102					Ν	IETH	IOD:		Excavator		
DIST	RICT:		SA1	2 Selk	irk			•		D	ATE:		2-Aug-23		
								-							
	DEF	PTH			G			ESTIM	ATED RO	ED ROCK 75mm		SAND TYPE	REMARKS		
TEST PIT NO.	FROM	то	SAMPLE BAG NO.	SOILS CLASS	G	S	F	MAX SIZE	75mm - 150mm	150mm - 375mm	>375mm	FMC	Lab Sieve		
TP23-01	0 0.4	0.4 4.3		OB GP	55	40	5	600	3	2	1	M	Minor presence of calcites on oversize rock Sample 1 @ 1.2m; 42/52.5/5.5 Sample 2 @ 3.0m; 32.7/62.9/4.4		
TP23-02	0 0.5	0.5 4		OB GP	50	38	3	400	2	1	1	M	Calcites are not easily visible on the subsurface rock, but it is abundant on surface rock and exposed pit run Sample 1 @ 1.5m; 52.7/40.9/6.4 Sample 2 @ 3.0m; 50.3/45.1/4.6		
TP23-03	0 0.5	0.5 4		OB GP	50	47	3	300	1	1	0	M	Sample 1 @ 1.5m; 59.5/33.2/7.3 Sample 2 @ 3.5m; 50.3/45.5/4.3		
TP23-04	0 2.5 3.3	2.5 3.3 4.5		GP SM GP	52 10 52	44 82 44	4 8 4	100	1	0	0	М	Sample 1 @ 1.3m; 44.0/48.7/7.3 Sample 2 @ 3.5m; 62.6/34.2/3.2		
TP23-05	0	1 5		SP GP	40 60	54 38	6 2	320	5	3	0	М	Trace calcites visible in this layer		
TP23-06	0	3		GP	58	40	2	200	2	1	0	М	Dug in floor of toe of main pit face Sample 1 @ 1.0m; 55.1/42.4/2.5 Sample 2 @ 3.0m; 63.4/35.5/1.1		
TP23-07	0	2.9		GP	50	48	3	140	1	0	0	M	Sample 1 @ 1.0m; 49.0/48.5/2.5 Sample 2 @ 2.5m; 60.4/37.6/2.0		
TP23-08	0	0.4 4.2		OB GP	50	47	3	300	2	1	0	М	Sample 1 @ 1.0m; 51.2/44.1/4.7 Sample 2 @ 3.0m; 44.3/52.2/3.5		

Appendix D

Aggregate Gradation Charts & Laboratory Results



WAITABIT PIT -SUITABILITY AREA A

CLASSIFICATION

PROJECT REPORT OF							
SIEVE ANALYSIS SUMMARIES							

Project: Sample Source:	<u>Wait - a - B</u> Test Pits	it Pit Investig	ation		-			F	Project No.: Client:		<u>SCL - 22-66</u> MOT	
Material:		Pit Run								Date:		
Sample Inf Test Pit Bag	%	%	%	USCS	MICRO DEVAI	SAND	SPEC. GRAV	ABSOR	MAG SULF MaSO4]		

Test Pit	Bag #	Depth (m)	% GRAVEL	% SAND	% FINES	USCS CLASS	DEVAL	SAND EQUIV.	GRAV. C/F	ABSOR C/F	MgSO4 C/F
R22-01	W22-01a	0.3-6.2	60.3	35.3	4.3	GW	18.71	68.14	2.626	1.28	
22-02	W22-02a	0.3-6.1	70.4	26.1	3.6	GW					
22-02	W22-02b	6.1-6.5	24.0	56.3	19.7	SM1					
22-03	W22-03a	0.3-6.2	65.4	30.9	3.7	GW					
22-04	W22-04a	0.3-6.4	71.7	25.5	2.8	GW	19.18	43.17	2.599	1.76	
22-05	W22-05a	1.1-5.3	61.6	32.6	5.8	GW-GM					
22-05	W22-05b	5.3-6.5	39.4	53.1	7.5	SP-SM					
22-06	W22-06a	0.3-6.5	30.0	60.0	10.0	SP-SM					
22-07	W22-07a	0.3-6.5	65.9	30.1	4.0	GW	19.82	65.25	2.59	1.81	
22-08	W22-08a	0.3-6.4	72.6	26.4	1.0	GW					
22-08	W22-08b	6.4-6.7	6.7	90.3	3.0	SP					
22-09	W22-09a	0.3-6.2	62.8	34.4	2.8	GW					
22-10	W22-10a	0.3-4.1	66.2	31.1	2.7	GW	19.57	73.81	2.611	1.54	
22-11	W22-11a	0.3-6.4	66.5	30.9	2.6	GW					
22-12	W22-12a	0.3-4.7	59.5	32.2	8.2	GW-GM					
22-12	W22-12b	4.7-6.6	7.5	67.5	25.0	SM2					
22-13	W22-13a	6.1-6.5	54.0	35.0	10.9	GP-GM	18.13	72.3	2.64	1.28	
22-14	W22-14a	0.3-6.4	64.7	33.1	2.2	GW					
22-15	W22-15a	0.3-6.6	54.3	43.3	2.4	GP					
22-16	W22-16a	0.0-6.5	63.4	32.8	3.8	GW					
22-17	W22-17a	0.0-6.8	75.9	22.4	1.7	GW	16.28	73.81	2.614	1.51	
22-18	W22-18a	0.0-6.8	47.0	49.7	3.3	SW					
22-19	W22-19a	0.4-6.5	66.4	30.6	3.0	GW					
22-20	W22-20a	0.4-6.4	59.5	36.9	3.6	GW					
22-21	W22-21a	0.4-6.4	78.2	19.5	2.4	GW	19.5	60.61	2.595	1.82	
22-22	W22-22a	0.3-6.2	69.4	27.0	3.6	GW					
22-23	W22-23a	0.3-6.6	71.4	26.3	2.3	GW					
22-24	W22-24a	0.0-6.5	66.3	32.1	1.7	GP	20.05	65.56	2.616	1.44	
	MAX		78.2	90.3	25.0		20.1	73.8			
	MEAN		57.2	37.6	5.3	GW-GM	18.9	43.Z 65.3			
						- · · • · · ·					

PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES

CLASSIFICATION

Project:	Wait -a- Bit Pit Investigation	Project No.:
Sample Source:	Test Hole	Client:
Material:	Pit Run	Date:

Sa	ample Informati	on						SPEC.			MAG SULF
Test Pit	Bag #	Depth	%	%	%	USCS	DEG	SAND	GRAV.	ABSOR	MgSO4
		(m)	GRAVEL	SAND	FINES	CLASS		EQUIV.	C/F	C/F	C/F
22-26	W22-26a	0.0-6.8	81.4	15.9	2.8	GW					
22-29	W22-29a	0.0-6.3	81.5	17.7	0.7	GW					
22-30	W22-30a	0.8-4.5	81.3	18.2	0.5	GW					
22-31	W22-31a	0.0-1.1	20.0	74.3	5.7	SP-SM					
22-31	W22-31b	1.1-5.5	69.4	29.3	1.3	GW					
22-32	W22-32a	0.3-4.5	62.2	34.7	3.1	GW					
22-32	W22-32b	4.5-6.5	44.0	51.2	4.7	SP					
22-33	W22-33a	0.3-2.6	59.9	36.0	4.0	GW					
22-33	W22-33b	2.6-6.7	52.8	41.8	5.4	GP-GM					
22-34	W22-34a	0.3-6.7	75.1	23.0	1.9	GW					
22-35	W22-35a	0.3-6.5	39.4	55.2	5.4	SP-SM					
	MAX		81.5	74.3	5.7		0.0	0.0			
	MIN		20.0	15.9	0.5		0.0	0.0			
	MEAN		60.6	36.1	3.2	GW	#DIV/0!	#DIV/0!			

WAITABIT PIT -SUITABILITY AREA A

PROJECT REPORT OF SIEVE ANALYSIS SUMMARIES

CLASSIFICATION

Project:	Wait - a - Bit Pit Investigation	Project No.:
Sample Source:	Test Pits	Client:
Material:	Pit Run	Date:

Sa	Sample Information						MICRO		SPEC.		MAG SULF
Test Pit	Bag #	Depth	%	%	%	USCS	DEVAL	SAND	GRAV.	ABSOR	MgSO4
		(m)	GRAVEL	SAND	FINES	CLASS		EQUIV.	C/F	C/F	C/F
22-01	W22-01a	0.3-6.2	60.3	35.3	4.3	GW	18.71	68.14	2.626	1.28	
22-02	W22-02a	0.3-6.1	70.4	26.1	3.6	GW					
22-03	W22-03a	0.3-6.2	65.4	30.9	3.7	GW					
22-04	W22-04a	0.3-6.4	71.7	25.5	2.8	GW	19.18	43.17	2.599	1.76	
22-05	W22-05a	1.1-5.3	61.6	32.6	5.8	GW-GM					
22-11	W22-11a	0.3-6.4	66.5	30.9	2.6	GW					
22-12	W22-12a	0.3-4.7	59.5	32.2	8.2	GW-GM					
22-13	W22-13a	6.1-6.5	54.0	35.0	10.9	GP-GM	18.13	72.3	2.64	1.28	
22-14	W22-14a	0.3-6.4	64.7	33.1	2.2	GW					
22-15	W22-15a	0.3-6.6	54.3	43.3	2.4	GP					
22-16	W22-16a	0.0-6.5	63.4	32.8	3.8	GW					
	MAX		71.7	43.3	10.9		19.2	72.3			
	MIN		54.0	25.5	2.2		18.1	43.2			
	MEAN		62.9	32.5	4.6	GW	18.7	61.2			





Test Pits 22-04, -05 0.075 0.150 0.300 0.600 1.18 4.75 9.5 19 25 37.5 2.36 75 100 90 % 80 70 Ρ 60 а 50 s 40 S i 30 n 20 g 10 0 0.01 0.1 1 10 100 Grain Size (mm) Test Pit 22-05 Bag # W22-05b Depth (m) 5.3-6.5





Test Pits 22-13, -14, -15, -16

WALGREN SOILS TESTING

BULK RELATIVE DENSITY OF AGGREGATE

		Tested by		WST		i.
ait a Bit Pit Investigation		Performed	l by	WST		
ootenay		Date	Dec. 13 -	31/22		
<mark>2 - 01</mark>						
			Ν	No. of Tes	st	Avg
REGATE (RETAINED ON	4.75mm SIEVE)		1	2	3	
ry mass in air		(A_c)	748.5	723.3	740.8	g
aturated surface dry in air		(B)	758.9	734.1	753.3	g
aturated surface dry mass in wa	iter	(C)	472.3	457.4	470.0	g
ulk relative density =	A _c		2.612	2.614	2.615	2.614
-	B-C					
absorption = $B-A_c$	x 100		1.39	1.49	1.69	1.52
A _c						
			١	No. of Tes	st	
GATE (PASSING 4.75mm SI	EVE)		1	2	3	
lass of water required to calibra	ate flask	(W _c)	499.4	499.3	498.7	g
lass of flask		(X)	172.0	163.4	151.2	g
lass of flask & saturated surface	e dry aggregate & water	(Z)	962.6	975.2	932.6	g
lass of flask plus saturated surfa	ace dry aggregate	(Y)	637.8	663.3	603.6	g
lass of added water (Z-Y)		(W _a)	324.8	311.9	329.0	g
lass of oven dry aggregate in ai	r	(A_f)	461.3	494.9	447.2	g
ulk relative density =	A _f		2.642	2.641	2.635	2.639
-	W _c - W _a					
water absorption =	Y - X - A _f x 100		0.98	1.01	1.16	1.05
water absorption	1			-		
-	A _f	l				
	ait a Bit Pit Investigation potenay 2 - 01 REGATE (RETAINED ON ry mass in air aturated surface dry in air aturated surface dry mass in wa alk relative density = absorption = $B-A_c$ A _c GATE (PASSING 4.75mm SI ass of water required to calibra ass of flask ass of added water (Z- Y) ass of oven dry aggregate in ai ass of oven dry aggregate in ai	ait a Bit Pit Investigation ootenay 2-01 REGATE (RETAINED ON 4.75mm SIEVE) ry mass in air turated surface dry in air turated surface dry mass in water alk relative density = A_c absorption = $B-A_c$ x 100 A_c GATE (PASSING 4.75mm SIEVE) ass of water required to calibrate flask ass of flask ass of flask ass of flask ass of flask plus saturated surface dry aggregate & water ass of oven dry aggregate in air ass of oven dry aggregate in air A _f A_f	Tested byait a Bit Pit InvestigationPerformedpotenayDate2 - 01DateREGATE (RETAINED ON 4.75mm SIEVE)ry mass in air(Ac)trurated surface dry in air(B)aturated surface dry mass in water(C)alk relative density = A_c A_c B-Acx 100 A_c GATE (PASSING 4.75mm SIEVE)ass of water required to calibrate flask(Wc)ass of flasksaturated surface dry aggregate & water(Z)ass of flask bus saturated surface dry aggregate(Y)ass of oven dry aggregate in air(Af)Wc - Wa	Tested by Performed by Dateait a Bit Pit Investigation potenayPerformed by DateDateDec. 1301IREGATE (RETAINED ON 4.75mm SIEVE) ry mass in air tturated surface dry in air tturated surface dry mass in water(Ac)748.5iturated surface dry mass in water(C)472.3ilk relative density = A_c B-CIabsorption =B-A_cx 1001.39AcIGATE (PASSING 4.75mm SIEVE) ass of flask ass of flask & saturated surface dry aggregate & water ass of flask & saturated surface dry aggregate ass of flask buls saturated surface dry aggregate ass of flask plus saturated surface dry aggregate ass of oven dry aggregate in air Wc - Wa(Ar)461.3 Uk relative density =Ar A_c	Tested byWSTait a Bit Pit InvestigationPerformed byWSTpotenayDateDec. 13 - 31/22:-01DateDec. 13 - 31/22REGATE (RETAINED ON 4.75mm SIEVE)ry mass in air(Ac)748.5ry mass in air(Ac)748.5rurated surface dry in air(B)758.9rutated surface dry mass in water(C)472.3alk relative density = A_c 2.612 A_c 2.6122.614 $B-C$ 12absorption = $B-A_c$ x 100 A_c 1.391.49AcSATE (PASSING 4.75mm SIEVE)ass of water required to calibrate flask(Wc)499.4499.3ass of flask(X)172.0ass of flask saturated surface dry aggregate(Y)ass of flask plus saturated surface dry aggregate(Y)ass of oven dry aggregate in air(Ac) $M_c - W_a$ 2.642 $M_c - W_a$ 2.642 $M_c - W_a$ 2.642	Tested byWSTait a Bit Pit Investigationperformed byWSTDateDec. $13 - 31/22$ -01REGATE (RETAINED ON 4.75mm SIEVE)IN. of TestREGATE (RETAINED ON 4.75mm SIEVE)IN Colspan="2">IN Colspan="2">OTESTREGATE (RETAINED ON 4.75mm SIEVE)IN Colspan="2">IN Colspan="2">OTESTry mass in air(A _c)748.5723.3748.5723.3748.5723.3748.5723.3748.5723.3748.5723.3748.5723.3740.8Tested byWST120.6122.6142.6122.6142.6122.6142.6122.6142.6122.6142.615B-A _c x 1001.391.491.491.423State (PASSING 4.75mm SIEVE)

Average Bulk Relative Density

Let $M_1 =$	per cent by mass of aggregate retained on 4.75mm sieve.
Let $M_2 =$	per cent by mass of aggregate passing 4.75mm sieve.
Let $M_3 =$	per cent by mass of blend aggregate
Let $RD_1 =$	bulk relative density of aggregate retained on 4.75 mm sieve
Let $RD_2 =$	bulk relative density of aggregate passing 4.75mm sieve.
Let $RD_3 =$	bulk relative density of blend aggregate

Average bulk relative density

$$\frac{100}{(M_1/RD_1) + (M_2/RD_2)} = \frac{\#\#\#\#\#\#}{(M_1/RD_1) + (M_2/RD_2)}$$

WALGREN SOILS TESTING

BULK RELATIVE DENSITY OF AGGREGATE

Contract No.			Tested by		WST		i.
Pit Name	Wait a Bit Pit Investigation		Performed	l by	WST		
Location	Kootenay		Date	Dec. 13 -	31/22		
Test Hole	<mark>22 - 04</mark>						
				Ν	lo. of Tes	st	Avg
COARSE A	GGREGATE (RETAINED ON	4.75mm SIEVE)		1	2	3	
	Dry mass in air		(A_c)	735.6	724.1	707.9	g
	Saturated surface dry in air		(B)	746.5	735.3	719.5	g
	Saturated surface dry mass in w	ater	(C)	465.4	458.0	448.0	g
	Bulk relative density =	A _c		2.617	2.611	2.607	2.612
		B-C					
	% absorption = $B-A_c$	x 100		1.48	1.55	1.64	1.56
	A _c						
				Ν	lo. of Tes	st	
FINE AGGI	REGATE (PASSING 4.75mm S	IEVE)		5	6	7	
	Mass of water required to calibrate	rate flask	(W _c)	498.6	499.1	499.3	g
	Mass of flask		(X)	150.1	168.6	176.2	g
	Mass of flask & saturated surface	ce dry aggregate & water	(Z)	969.3	949.0	952.6	g
	Mass of flask plus saturated sur	face dry aggregate	(Y)	666.3	622.3	622.1	g
	Mass of added water (Z-Y)		(W _a)	303.0	326.7	330.5	g
	Mass of oven dry aggregate in a	air	(A_f)	506.5	444.8	437.3	g
	Bulk relative density =	A _f		2.589	2.580	2.591	2.587
		W _c - W _a					
	% water absorption =	Y - X - A _f x 100		1.92	2.00	1.97	1.96
		A _f					

Average Bulk Relative Density

Let $M_1 =$	per cent by mass of aggregate retained on 4.75mm sieve.
Let $M_2 =$	per cent by mass of aggregate passing 4.75mm sieve.
Let $M_3 =$	per cent by mass of blend aggregate
Let $RD_1 =$	bulk relative density of aggregate retained on 4.75 mm sieve
Let $RD_2 =$	bulk relative density of aggregate passing 4.75mm sieve.
Let $RD_3 =$	bulk relative density of blend aggregate

Average bulk relative density

$$\frac{100}{(M_1/RD_1) + (M_2/RD_2)} = \frac{\#\#\#\#\#\#}{(M_1/RD_1) + (M_2/RD_2)}$$

WALGREN SOILS TESTING

BULK RELATIVE DENSITY OF AGGREGATE

Contract No.			Tested by		WST		i
Pit Name	Wait a Bit Pit Investigation		Performed	l by	WST		
Location	Kootenay		Date	Dec. 13 -	31/22		
Test Hole	<mark>22 - 13</mark>						
				Ν	lo. of Tes	st	Avg
COARSE A	GGREGATE (RETAINED ON	4.75mm SIEVE)		1	2	3	
	Dry mass in air		(A _c)	732.6	727.0	727.4	g
	Saturated surface dry in air		(B)	744.3	733.2	736.5	g
	Saturated surface dry mass in w	/ater	(C)	468.8	458.8	460.4	g
	Bulk relative density =	A _c		2.659	2.649	2.635	2.648
		B-C					
	% absorption = $B-A_c$	x 100		1.60	0.85	1.25	1.23
	A _c						
				١	lo. of Tes	st	
FINE AGG	REGATE (PASSING 4.75mm S	SIEVE)		1	2	3	
	Mass of water required to calib	rate flask	(W _c)	499.4	499.3	498.7	g
	Mass of flask		(X)	172.0	163.4	151.2	g
	Mass of flask & saturated surfa	ce dry aggregate & water	(Z)	964.0	960.5	956.0	g
	Mass of flask plus saturated sur	face dry aggregate	(Y)	640.9	639.4	640.5	g
	Mass of added water (Z-Y)		(W _a)	323.1	321.1	315.5	g
	Mass of oven dry aggregate in a	air	(A _f)	462.9	469.6	482.9	g
	Bulk relative density =	$\mathrm{A_{f}}$		2.626	2.635	2.636	2.632
		W _c - W _a					
	% water absorption =	Y - X - A _f x 100		1.30	1.36	1.33	1.33
	-	A _f					
		-					

Average Bulk Relative Density

Let $M_1 =$	per cent by mass of aggregate retained on 4.75mm sieve.
Let $M_2 =$	per cent by mass of aggregate passing 4.75mm sieve.
Let $M_3 =$	per cent by mass of blend aggregate
Let $RD_1 =$	bulk relative density of aggregate retained on 4.75 mm sieve
Let $RD_2 =$	bulk relative density of aggregate passing 4.75mm sieve.
Let $RD_3 =$	bulk relative density of blend aggregate

Average bulk relative density

$$\frac{100}{(M_1/RD_1) + (M_2/RD_2)} = \frac{\#\#\#\#\#\#}{(M_1/RD_1) + (M_2/RD_2)}$$

Sand Equivalent / Micro Deval Testing District: S. Koot. Project: Wait a bit Pit Investigation Pit: Wait a bit Tested by: WST Date Tested: Dec-22 Sampled by: WM Date Sampled: Nov. 2022 **Test Hole** 22 - 01a Sample #: Depth: 0.3 - 6.2 1 Sand Equivalent **Micro - Deval Test** Trial # 2 Retained 1 3 Before After 16.0 mm 374.8 329.9 Reading 20 min 20 min Ht. Clay 45.00 46.00 12.5 mm 376.4 340 Ht. Sand 31.00 31.00 9.5 mm 750.3 550.7 S.E. 68.89 67.39 1220.59 1501.5 **68.14** 18.71 % Ave. **Test Hole** 22 - 04a Sample #: 1 Depth: 0.3 - 6.4 Sand Equivalent **Micro - Deval Test** Trial # 2 3 Retained 1 Before After 16.0 mm Reading 20 min 20 min 376.4 320.2 Ht. Clay 69.00 70.00 12.5 mm 374.8 279.1 30.00 30.00 614.1 Ht. Sand 9.5 mm 750.1 1213.4 S.E. 43.48 42.86 Totals 1501.3 19.18 % 43.17 Ave. 22 - 7a **Test Hole** Sample #: 1 Depth: 0.3 - 6.5 Sand Equivalent **Micro - Deval Test** Trial # 2 3 Retained 1 Before After 16.0 mm 377 Reading 20 min 20 min 318.8 47.00 Ht. Clay 45.00 12.5 mm 375.1 230.8 Ht. Sand 30.00 30.00 9.5 mm 751.8 656.2 1503.9 1205.8 S.E. 63.83 66.67 65.25 19.82 % Ave. 0.3 - 4.1 **Test Hole** 22 - 10a Sample #: 1 Depth: Sand Equivalent **Micro - Deval Test** 2 Trial # Retained 1 3 Before After 20 min 16.0 mm 377 328.5 Reading 20 min Ht. Clay 42.00 42.00 12.5 mm 375.9 267.6 Ht. Sand 31.00 31.00 749.5 9.5 mm 612.3 73.81 1208.4 S.E. 73.81 1502.4 73.81 19.57 % Ave. **Test Hole** 22 - 13a Sample #: 1 Depth: 6.1 - 6.5 Sand Equivalent **Micro - Deval Test** 2 Trial # 3 Retained Before 1 After 20 min 16.0 mm 375.1 Reading 20 min 309.1 Ht. Clay 42.00 41.00 12.5 mm 375.0 283.1 Ht. Sand 749.7 30.00 30.00 9.5 mm 635.7 1227.9 71.43 73.17 1499.8 S.E. 72.30 18.13 % Ave. 73.81 19.82 Maximum Maximum 42.86 Minimum 18.13 Minimum 64.53 19.08 Average Average

Walgren Soils Testing Ltd.

Walgren Soils Testing

ASTM C88

Soundness of Aggregates

Project:	Wait a Bit Pit		Test Hole	22-02	Tested by:	WST
District:			Sample #	<mark>22-02a</mark>	Date Tested	Mar. 27 - April 4/23
Date San	npled	22-Dec	Depth:	0.3 - 6.1 m	-	
Aggregat	e Size:	37.5 mm			-	

Soundness Test of Coarse Aggregate										
Sieve Size Grading of Mass Before After 5 Cycles Weight									Weighted	
Passing	Origio	onal %	Orgnl Sm	ıpl (%)	Test	(g)	Mass	Loss	% Mass loss	
	Reta	ained					Remaining	(%)		
	37.5	0	0.0	0.0						
37.5	25.0	1021.1	36.0	54.1	1535.6	1536	1512.6	1.50	0.8	
25.0	19.0	514.5	18.1							
19.0	12.5	670	23.6	35.3	1003	1003	1018.2	-1.5	-0.5	
12.5	9.5	333	11.7							
9.5	4.75	300	10.6	10.6	300	300	298.2	0.6	0.1	
	Total	2838.6	Total:	100				Total:	0.3	
			Sound	Inoco Too	t of Eine	Agar	ogoto			
0.5	1 75		Sound	11622 162		e Aggr	eyale	0		
9.5	4.75	100	16.7		100		100	0	0.0	
4.75	2.30	100	16.7		100		00.8	02	0.0	
2.30	0.600	100	16.7		100		99.0	0.2	0.0	
0.600	0.000	100	16.7		100		100	0.0	0.1	
0.000	0.000	100	16.7		100		100	0	0.0	
0.000	Pan	100 0	16.7		100		100	0	0.0	
0.100	Total	600	100		100		100	Total:	0.0	

This fraction is not used when sample contains both Coarse and Fine Portions, % of initial sample passing the 4.75 mm Sieve = 29.7 %

Walgren Soils Testing

ASTM C88

Soundness of Aggregates

Project: Wait a B	Bit Pit Te	est Hole	22-08	Tested by:	WST
District:	Sa	ample # <mark>_</mark>	22-08b	Date Tested	Mar. 27 - April 4/23
Date Sampled	22-Dec De	epth:	6.4 - 6.7 m		
Aggregate Size:	37.5 mm	-			

Soundness Test of Coarse Aggregate										
Sieve Size Grading of Mass Before After 5 Cycles								ycles	Weighted	
Passing	Origio	onal %	Orgnl Sm	ıpl (%)	Test	(g)	Mass	Loss	% Mass loss	
	Reta	ained					Remaining	(%)		
	37.5	0	0.0	0.0						
37.5	25.0	1019.5	36.0	53.9	1525.3	1525	1505.9	1.27	0.7	
25.0	19.0	505.8	17.9							
19.0	12.5	672.1	23.8	35.5	1004	1004	1001.3	0.2	0.1	
12.5	9.5	331.4	11.7							
9.5	4.75	300.1	10.6	10.6	300.1	300	299.7	0.1	0.0	
	Total	2828.9	Total:	100				Total:	0.8	
			Sound	nose Tos	t of Fine	Aaar	orato			
9.5	4 75		Cound	11033 103		, 7991	cyate	0		
4.75	2.36	100	16.7		100		99.9	0.1	0.0	
2.36	1.18	100	16.7		100		99.8	0.2	0.0	
1.18	0.600	100	16.7		100		99.4	0.6	0.1	
0.600	0.300	100	16.7		100		100	0	0.0	
0.300	0.150	100	16.7		100		100	0	0.0	
0.150	Pan	100.0	16.7		100		100	0	0.0	
	Total	600	100					Total:	0.1	

This fraction is not used when sample contains both Coarse and FinePortions, % of initial sample passing the 4.75 mm Sieve =%

SOLUBLE SULPHATE ION CONTENT OF SOIL

(CSA Designation A23.2-2B & A23.2-3B)

Project:	2023 Materials Te	esting		Date Tested	d: Ap	ril 12,	2023	
Project No.:	704-ENG.CMCS)3044-01		Tested By:	EN	1		
Client:	Walgren Soils Testing			Sample Source: 22-01				
Location:	cation: <u>Wait-a-Bit Pit</u>			Laboratory: 110, 140 Quarry Pa Calgary, AB T2C 3G		140 Quarry Park ary, AB T2C 3G3	Blvd. S.E.,	
Sample Nun	nber	L-1						
Borehole Nu	ımber	22-01						
Depth (m)		-						
Total Soluble Su	ulphate Content, %	0.07						
Degree of E	xposure (Class)	Negligible (neg)						

Class of exposure	Degree of exposure	Water-soluble sulphate (SO ₄)† in soil sample, %	Sulphate (SO ₄) in groundwater samples, mg/L‡	Water soluble sulphate (SO ₄) in recycled aggregate sample, %	Cementing materials to be used§
S-1	Very severe	> 2.0	> 10 000	> 2.0	HS or HSb
S-2	Severe	0.20-2.0	1500-10 000	0.60-2.0	HS or HSb
S-3	Moderate	0.100.20	1501500	0.20-0.60	MS, MSb, LH, HS, or HSb

*For sea water exposure, see Clause 4.1.1.5.

†In accordance with CSA A23.2-3B.

‡In accordance with CSA A23.2-2B.

§Cementing material combinations with equivalent performance may be used (see Clauses 4.2.1.2, 4.2.1.3, and 4.2.1.4). Type HS cement shall not be used in reinforced concrete exposed to both chlorides and sulphates. Refer to Clause 4.1.1.6.3.

Limitations:

i) The degree of exposure class included herein are valid only if drainage and weeping systems

meet the requirements of the site conditions.

ii) The degree exposure class should be re-verified if backfill soils for foundation walls originate

from an unknown source.

Reviewed By:

P.Eng.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech will provide it upon written request.



WATER SOLUBLE CHLORIDE ION CONTENT IN CONCRETE

CSA Designation A23.2-4B (Clause 5.2.A-Direct Measurement Method)

Project:	2023 Materials Testing	Date Tested:	April 12, 2023 By: EM
Project No.:	704-ENG.EMCS03044-01	Date Received:	April 3, 2023
Client:	Walgren Soils Testing	Laboratory:	Suite 110, 140 Quarry Park Blvd. S.E., Calgary, AB T2G 3G3

Sample No.	L	1 (Clien	t Sa #11a	ı)	Sample No.						
Sample Location	v	/ait a-Bit-	•Pit (22-0 ⁻	1)	Sample Location						
Depth (mm):	-	-			Depth (mm):						
Chloride Content (ppm by Mass of Sample)	14				Chloride Content (ppm by Mass of Sample)						
Chloride Content (% by Mass of Sample)	0.001				Chloride Content (% by Mass of Sample)						

Sample No.			Sample No.		
Sample Location			Sample Location		
Depth (mm):			Depth (mm):		
Chloride Content (ppm by Mass of Sample)			Chloride Content (ppm by Mass of Sample)		
Chloride Content (% by Mass of Sample)			Chloride Content (% by Mass of Sample)		

Sample No.					Sample No.		
Sample Location					Sample Location		
Depth (mm):					Depth (mm):		
Chloride Content (ppm by Mass of Sample)					Chloride Content (ppm by Mass of Sample)		
Chloride Content (% by Mass of Sample)					Chloride Content (% by Mass of Sample)		

Remarks:

Reviewed By:

P.Eng.

Data presented hereon is for the sole use of the stipulated client. Tetra Tech is not responsible, nor can be held liable, for use made of this report by any other party, with or without the knowledge of Tetra Tech. The testing services reported herein have been performed to recognized industry standards, unless noted. No other warranty is made. These data do not include or represent any interpretation or opinion of specification compliance or material suitability. Should engineering interpretation be required, Tetra Tech will provide it upon written request.



NSD

PARTICLE SIZE DISTRIBUTION ASTM C136 Method B

Test Request # Client: Project Name: Source:	K23- Minis Wait Wait	121 stry of Transportation and abit Pit abit Pit	I Infrastructure				Project Nu Project Lo Sample Lo Sample N	umber: cation: ocation: o.:	KX13866.1 TP23-01 1	00		
Soil Description:							Type: Depth (m)		GS 1 20		_	
Specimen Referer	nce NA		Spec	imen Depth (m):	NA		Date of Test		28 Ai	ug 2023		
Specimen Descrip	DTION NA											
Grain Size Distribution (%)		42.0	52.5			5.5			Sieve		Material Sp	ecification
BOULDERS	COBBLES	GRAVEL	SAND) Eine		FINES (Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100		Coarse Fille		Fine			`	2"	50	100.0		
								1 1/2"	37.5	95.4		
90		· · · ` ₹						1"	25	90.4		ļ!
								3/4"	19	85.4		
80		X						1/2" 2/8"	12.5	79.3		
70		N N						3/8 #A	9.J 4.75	73.0 58.0		İ
s								#8	2 36	43.0		
Š 60		N						#16	1.18	30.0		1
Δ Δ			N					#30	0.6	18.1		1
.ug 50								#50	0.3	9.0		
ass								#100	0.15	6.6		
% 40								#140	0.106	6.1		
								#200	0.075	5.5		
30												
20												
20												
10												
		40				0.01		D60	D30	D10	Сп	Cc
1000	100	10	1	0.1		0.01	0.001	5.19	1.18	0.32	16.00	0.83
			Particle Size n	h		Sieve			-			
Notes:	1Sin sh	Dete: 00 Aug 000	2 Chacked by:	ISingh	Dis The with use rega	aboratory testing service the recognized standard of WSP's client, relates rrding specification comp	es reported herein have ls indicated in this repo only to the sample(s) to iliance or materials sui Boyiourod bur	e been performed ort, or local indust ested and does n tability for any sp	d in accordance try practice. Thi not represent ar pecific purpose.	with the terms of s laboratory test any (actual or imp	of a contract with ing services repor lied) interpretation	WSP's client, and t is for the sole n or opinion
rested by.	Joingn	Date: 28 Aug 202	S Checked by:	Joingn	Date.	00 Sep 2023	itevieweu by:	JSIOIZ		Dale.	uo Sep 2023	
			590 McKay	WS Avenue, Suite 30	P Canada 0 Kelowna Canada	Inc. a, British Columbia,	V1Y 5A8					
				[+1] (2	50) 860 8	424				R	ev42-18082023	

[+1] (250) 860 8424

Test Red	quest #	K23	-121								Project Nu	imber:	KX13866.1	00		
Client:	lama	Mini	stry of Tran	nsportation and	Infrastructure						Project Lo	cation:	TD02.04			
Source	varne.	Wai	tabit Pit								Sample Lo		2			
0											Type:		GS			
Soil Des	cription:										Depth (m)	:	3.00		-	
Specime	en Reference	NA				Specimen [Depth (m):	NA			Date of Test		28 A	ug 2023		
Specime	en Descriptior	n NA														
															Material S	pecification
Grain S Distribu	ize tion (%)		:	32.7		62.9			4.4				Sieve			
BO	ULDERS	COBBLES	GI	RAVEL	Coarse M	SAND	Fine		FINES (Silt,	Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100 -	·····			Tille								2"	50	100.0		
				∽ a								1 1/2"	37.5	99.2		
90 -												1"	25	95.9		
												3/4"	19	94.3		
80 -												1/2"	12.5	88.4		
												3/8	9.5	83.7 67.2		
۰ ۲0 ي					X III							#4 #9	4.75	07.3		
Ma Ka												#0 #16	2.30	32.8		
l yd												#10	0.6	18.7		
19 - 50 -					\							#50	0.3	8.6		
ass												#100	0.15	5.5		
° 40 -												#140	0.106	4.8		
01												#200	0.075	4.4		
30 -						N										
20 -																
10 -						n de la companya de l										
0 -		100		10		1	0 1		0.01		0.001	D60	D30	D10	Cu	Сс
	00	100		10	Particle S	i ize mm	0.1		-Sieve		0.001	3.57	1.03	0.33	11.00	0.90
								-	0.010			-				
Notes:	Gravels v	were cemen	ted togeth	er.				Dis	sclaimer:							
								The with use	a laboratory testing the recognized s of WSP's client,	services tandards i relates on	reported herein have indicated in this repo ly to the sample(s) to	e been performed ort, or local indust ested and does n	l in accordance try practice. Th tot represent an	e with the terms is laboratory test ny (actual or imp	of a contract with ting services repor lied) interpretation	WSP's client, and rt is for the sole n or opinion
Tested	by: JSir	ngh	Date:	28 Aug 2023	3 Checked	by: JSing	gh	Date:	06 Sep 202	23 I	Reviewed by:	JStotz	come purpose.	Date:	06 Sep 2023	
							WSF	^{>} Canada	Inc.		0/540					
					590	McKay Avenu	ue, Suite 300) Kelowna Canada	a, British Colu 1	mbia, V	1Y 5A8					
							[+1] (25	50) 860 8	424					R	ev42-18082023	

Test Req	uest#	K23 Mini	-121 atry of Trop	aportation on	d Infraatruct						Project N	umber:	KX13866.1	00		
Project N	ame:	Wai	tabit Pit	isportation an		ne					Sample L	ocation:	TP23-02			
Source:		Wai	tabit Pit								Sample N	0.:	2			
Soil Desc	rintion.										Type:		GS			
	прион.										Depth (m)):	0.00		-	
Specime	n Reference	NA				Spe	cimen Dep	oth (m): NA			Date of Test		28 Ai	ug 2023		
Specime	n Descriptior	n NA														
															Material Sp	pecification
Grain Si Distribut	ze ion (%)			50.3		45.1	1		4.	6			Sieve			
BOL	JLDERS	COBBLES	G	RAVEL	Coarse	SAN	D	ino	FINES	(Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100 -			Coarse	Tille	Coarse	Wealdin						3"	75	100.0		
100												2"	50	93.4		
90 -												1 1/2"	37.5	87.5		
												1"	25	81.3		ļ
80 -			<u> </u>									3/4"	19	77.0		
												1/2"	12.5	69.9		
70 -				- ` \								3/8"	9.5	64.2		
ass												#4	4.75	49.7		
≥ 60 -												#8	2.36	37.9		
d d												#16	1.18	29.1		
. <u>.</u> 50												#30	0.6	20.3		
Pas												#50	0.3	10.1		
[−] ⁴⁰					<u> </u>							#100	0.15	5.9		
20												#140	0.106	5.0		
30 -						N						#200	0.075	4.6		
20																<u> </u>
20 1																
10																
10																
0																
100	00	100		10		1		0.1	0	01	0.001	D60	D30	D10	Cu	Cc
					Partic	le Size	mm		→ Sieve			7.77	1.27	0.30	26.00	0.70
Notes: Tested b	Gravels v y: JSir	were cemen	ted togeth Date:	er. 28 Aug 20	23 Chec	ked by: 590 McKa	JSingh ay Avenue,	Da WSP C Suite 300 Ke C	Disclaimer: The laboratory i with the records use of WSP's or regarding speci ee: 06 Se anada Inc. downa, British anada	esting servic zed standard lient, relates fication com o 2023 Columbia,	es reported herein hav ds indicated in this rep only to the sample(s) t Diance or materials su Reviewed by: V1Y 5A8	e been performed ort, or local indust ested and does n itability for any sp JStotz	l in accordance try practice. Thi tot represent ar ecific purpose.	e with the terms is laboratory test is laboratory test ny (actual or imp Date:	of a contract with ing services repor lied) interpretation 06 Sep 2023	WSP's client, and t is for the sole t or opinion
								[+1] (250)	860 8424					R	ev42-18082023	

Test Rec	luest #	K23- Mini	-121 strv of Tran	sportation and	Infrastructure	2					Project Nu Project Lo	imber: cation:	KX13866.1	00		
Project N	lame:	Wai	tabit Pit								Sample Lo	ocation:	TP23-02			
Source:		Wai	tabit Pit								Sample No	o.:	1			
Soil Dese	cription:										Туре:		GS			
Specime	n Reference	ΝΑ				Specim	en Denth (m):	ΝΑ			Depth (m)	:	1.50 28 A	ug 2023	-	
Specime						Opecini	en Depti (iii).				Date of Test		20 A	ug 2020		
Specime	n Description	I NA														
															Material S	pecification
Grain Si Distribu	ze tion (%)		:	52.7		40.9			6.4				Sieve			
BO	JLDERS	COBBLES	GI	RAVEL		SAND			FINES (Silt, 0	Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100	•		Coarse	Fine	Coarse	Medium	Fine					3"	75	100.0		
100 -												2"	50	95.6		1
90 -			<u>\</u>									1 1/2"	37.5	91.8		
00			$ \rangle$									1"	25	83.2		
80 -			्									3/4"	19	76.9		
												1/2"	12.5	68.8		
70 -												3/8"	9.5	62.3		
ass												#4	4.75	47.3		
≥ 60												#8	2.36	36.1		
d b												#16	1.18	26.1		
Lig 50				\								#30	0.6	17.1		
Pas												#50	0.3	10.2		
» ⁴⁰												#100	0.15	7.7		
20												#140	0.106	7.0		
30 -						x						#200	0.075	6.4		
20 -						N										
20																
10 -																
								-•								Į
0 -												Deo	D20	D10	Cu	
10	00	100		10		1	0.1		0.01		0.001	8.54	1 55	0.28	30.00	0.99
					Particle	Size mm	ı	-	— Sieve			0.54	1.55	0.20	30.00	0.33
Notos	Gravels v	vere cemen	ted togeth	er)isclaimor:							
Notes.			3					T V U	he laboratory testing ith the recognized st se of WSP's client, n egarding specification	services n andards in elates only n compliar	eported herein have dicated in this repo to the sample(s) to ce or materials sui	e been performed ort, or local indust ested and does n tability for any sp	l in accordance try practice. Th tot represent an ecific purpose.	e with the terms is laboratory test ny (actual or imp	of a contract with ting services report lied) interpretation	WSP's client, and rt is for the sole n or opinion
Tested b	y: JSin	ngh	Date:	28 Aug 2023	3 Checke	ed by: J:	Singh	Date:	06 Sep 202	23 R	eviewed by:	JStotz		Date:	06 Sep 2023	
					59	90 McKay A	W venue, Suite 3	SP Cana 00 Kelow	da Inc. na, British Colun	nbia, V1	Y 5A8					
							[+1] (Cana (250) 860	da 8424					R	ev42-18082023	

Test Request #	K23-121					Project Nu	umber:	KX13866.1	00		
Client:	Ministry of Tra	nsportation and	Infrastructure			Project Lo	cation:				
Project Name:	Waitabit Pit					Sample Lo	ocation:	TP23-03			
Source:	Waitabit Pit					Sample N	0.:	1			
Soil Description:						i ype: Depth (m)	:	1.50		-	
Specimen Reference	NA		Specimer	n Depth (m): NA		Date of Test		28 A	ug 2023		
Specimen Description	n NA										
										Material Sp	pecification
Grain Size Distribution (%)		59.5	33.2		7.3			Sieve			
BOULDERS	COBBLES G	GRAVEL	SAND		FINES (Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100	Coarse	Fine	Coarse Medium	Fine			3"	75	100.0		
							2"	50	90.9		
90	\						1 1/2"	37.5	79.5		
							1"	25	70.0		
80	\						3/4"	19	64.9		
							1/2"	12.5	57.1		
<i>7</i> 0	`	•					3/8"	9.5	52.4		
Jass							#4	4.75	40.5		
≥ 60 ≥		<u>\</u>					#8	2.36	31.6		
							#16	1.18	25.0		
SS.							#30	0.6	19.3		
a 40							#50	0.3	13.0		
8 40							#100	0.15	9.2		
30							#140	0.100	0.2		
							#200	0.075	1.3		
20											
10											
0	100	10	1	0.1	0.01		D60	D30	D10	Cu	Сс
1000	100	10		0.1	0.01	0.001	14.60	1.99	0.17	84.00	1.60
			Particle Size mm	-	Sieve				••••	0.100	
Notes: Gravels v	were cemented togeth	her.			Disclaimer:						
	Ū				The laboratory testing services with the recognized standards use of WSP's client, relates o	s reported herein have indicated in this repo nly to the sample(s) to	e been performed ort, or local indust ested and does n	l in accordance try practice. Th not represent ar	e with the terms is laboratory test ny (actual or imp	of a contract with ing services repor lied) interpretatior	WSP's client, and t is for the sole o or opinion
Tested by: JSir	ngh Date:	28 Aug 2023	3 Checked by: JSi	ngh Date	regarding specification compli 06 Sep 2023	ance or materials sui Reviewed by:	tability for any sp JStotz	ecific purpose.	Date:	06 Sep 2023	
		5		- WSP Car	ada Inc	2					
			590 McKay Ave	nue, Suite 300 Kelo Car	owna, British Columbia, \ nada	/1Y 5A8					
				[+1] (250) 8	60 8424				R	ev42-18082023	

2023 M % Passing I 100.0	laterial Specific	cation
2023 M % Passing I 100.0	laterial Specific	cation
- 2023 M K Passing I 100.0	laterial Specific	cation
y 2023 M % Passing I 100.0	laterial Specific	cation
% Passing I 100.0	laterial Specific	cation
% Passing I 100.0	laterial Specific	cation
% Passing I	Lower U	
% Passing	Lower U	,
100.0		pper
97.8		
94.1		
86.1		
81.5		
70.3		
63.4		
49.7		
38.3		
28.0		
17.7		
8.8		
5.4		
4.6		
4.2		
D10	Cu	Cc
0.33	24.00 0).69
	81.5 70.3 63.4 49.7 38.3 28.0 17.7 8.8 5.4 4.6 4.2 0	81.5 70.3 63.4 49.7 38.3 28.0 17.7 8.8 5.4 4.6 4.2 0 0.33 24.00 (0 0.33 24.00 (1) Cu 0.33 24.00 (1) Cu 0.33 24.00 0

Test Re Client: Project	quest # Name:	K23 Mini Wai	-121 stry of Transportation tabit Pit tabit Pit	and Infrastructu	re			Project Nu Project Lo Sample Lo	umber: cation: ocation:	KX13866.1 TP23-04	00		
Soil Do	orintion:	vvai						Туре:	0	GS			
Soli Des	сприоп.							Depth (m)	:	1.30		-	
Specim	en Reference	NA			Specimen De	epth (m): NA		Date of Test		28 Ai	ug 2023		
Specim	en Descriptior	n NA											
												Material Sp	pecification
Grain S Distrib	ize ution (%)		44.0		48.7		7.3			Sieve			
BC	ULDERS	COBBLES	GRAVEL Coarse Fine	Coarse	SAND	Fine	FINES (Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100		·							3"	75	100.0		
									2"	50	97.9		
90									1 1/2"	37.5	95.7		
									1" 2/4"	25	87.9		
80									3/4	12.5	03.4 75.6		
70									3/8"	9.5	69.2		<u> </u>
s s									3/0 #4	4.75	56.0		<u> </u>
8 00 ≚				N					#8	2.36	46.5		
λq									#16	1.18	38.7		
				<u> </u>					#30	0.6	29.7		
ass				N N					#50	0.3	19.1		
ط <u>4</u> 0									#100	0.15	11.2		
0					N				#140	0.106	8.5		
30									#200	0.075	7.3		
20													
10													
0													
1		100	10		1	0.1	0.01	0.001	D60	D30	D10	Cu	Сс
				Partic	le Size mm	_	- Sieve		5.86	0.61	0.13	46.00	0.50
Notes:	Gravels v	vere cemen	ted together.				Disclaimer:						
							The laboratory testing services with the recognized standards use of WSP's client, relates or egarding specification compli	reported herein have indicated in this repo nly to the sample(s) to ance or materials sui	e been performed ort, or local indust ested and does n tability for any sp	l in accordance try practice. Thi lot represent ar lecific purpose.	with the terms of solutions in the second seco	of a contract with ing services repor lied) interpretatior	WSP's client, and rt is for the sole ı or opinion
Tested	by: JSir	ngh	Date: 28 Aug	2023 Check	ked by: JSingh	Date:	06 Sep 2023	Reviewed by:	JStotz		Date:	06 Sep 2023	
					590 McKay Avenue	WSP Cana , Suite 300 Kelov Cana	da Inc. <i>(</i> na, British Columbia, V da	'1Y 5A8					
						[+1] (250) 860) 8424				Re	ev42-18082023	

Test Request #	K23-121 Pro								Project Nu Project Lo	Number: KX13866.100						
Project Name:	Waitabit Pit San										_ocation: TP23-04					
Source:	Wait	abit Pit								Sample No	D.:	2				
Soil Description:										Туре:		GS				
										Depth (m)	:	3.50		-		
Specimen Reference	NA				Specimen Dept	:n (m): I	NA			Date of Test		28 A	ug 2023			
Specimen Description	n NA															
														Material Sp	pecification	
Grain Size Distribution (%)		62	2.6		34.2			3.2			Sieve					
BOULDERS	COBBLES	GR/	AVEL		SAND			EINES (Silt (Clav)		Sieve No.	Particle	% Passing	Lower	Upper	
	00000000	Coarse	arse Fine Coarse Me		edium Fine					3"	75	100.0				
100											2"	50	98.3			
00											1 1/2"	37.5	97.1			
90		\									1"	25	86.4			
80											3/4"	19	77.0			
			\								1/2"	12.5	63.2			
70			\rightarrow								3/8"	9.5	54.6			
ass											#4	4.75	37.4			
≥ 60			$-\lambda$				++				#8	2.36	26.9			
a D			NII								#16	1.18	20.5			
. <u>Li</u> 50											#30	0.6	14.2			
La La											#50	0.3	8.5			
° ⁴⁰				N							#100	0.15	5.3		ļ	
30											#140	0.106	4.2		 	
											#200	0.075	3.2			
20																
10																
						╼╼┥┥										
1000	100		10		<u>,</u>	01		0.01		0.001	D60	D30	D10	Cu	Cc	
1000	100		10	Particle S	size mm	0.1		- Sieve		0.001	11.30	2.90	0.36	31.00	2.10	
								0.010			L.					
Notes:							Di	isclaimer:								
							Th wit us reg	e laboratory testing th the recognized st e of WSP's client, re garding specificatior	services r andards ir elates onl n compliar	reported herein have ndicated in this report ly to the sample(s) to nce or materials sui	e been performed ort, or local indust ested and does n tability for any sp	l in accordance try practice. Th ot represent ar ecific purpose.	with the terms of solutions in the second seco	of a contract with ing services repor lied) interpretatior	WSP's client, and t is for the sole t or opinion	
Tested by: JSin	ngh	Date:	28 Aug 202	3 Checked	by: JSingh	I	Date:	06 Sep 202	23 F	Reviewed by:	JStotz		Date:	06 Sep 2023		
				E00	Makay Avenue C	WSP	Canad	a Inc.	nhia V							
				590	workay Avenue, S	Suite SUU	Canad	a, dhush Colun a	nuia, V	II JAO						
						[+1] (25	0) 860 8	8424					R	ev42-18082023		

Test Request #	K23-121 Ministry of Transportation and	ofrastructure		Project Nu Project Lor	mber:	KX13866.1	00		
Project Name:	Waitabit Pit	Innastructure		Sample Lo	cation:	TP23-06			
Source:	Waitabit Pit			Sample No	o.:	1			
Soil Description:				Type:		GS			
				Depth (m):		1.00		-	
Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test		29 Au	ug 2023		
Specimen Description	NA								
								Material Sp	pecification
Grain Size Distribution (%)	55.1	42.4	2.5			Sieve			
BOULDERS C	COBBLES GRAVEL	SAND Coarse Medium Eine	FINES (Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100					2"	50	100.0		
					1 1/2"	37.5	98.8		
90					1"	25	89.0		
					3/4"	19	83.1		
80					3/8"	9.5	64.9		
70	▶ २ २				#4	4.75	44.9		
<u>s</u>					#8	2.36	28.2		
[∞] ₆₀	N				#16	1.18	17.7		
fd by					#30	0.6	10.1		
.iji 50					#50	0.3	5.3		
Las Las		N			#100	0.15	3.4		
» ⁴⁰					#140	0.106	2.9		
30					#200	0.075	2.5		
20									
10									
		│	•						
1000	100 10	1 01	0.01	0.001	D60	D30	D10	Cu	Сс
		Particle Size mm	Sieve		8.02	2.54	0.59	14.00	1.40
Notes:			Disclaimer:						
			The laboratory testing services with the recognized standards use of WSP's client, relates or regarding specification compli	reported herein have indicated in this repo nly to the sample(s) te ance or materials suit	been performed rt, or local indus sted and does n ability for any sp	d in accordance try practice. Thi not represent ar pecific purpose.	with the terms is laboratory test ny (actual or imp	of a contract with ing services repor lied) interpretatior	WSP's client, and t is for the sole n or opinion
Tested by: JSingh	Date: 29 Aug 2023	Checked by: JSingh	Date: 06 Sep 2023	Reviewed by:	JStotz		Date:	06 Sep 2023	
		WS 590 McKay Avenue, Suite 30	SP Canada Inc.)0 Kelowna, British Columbia, V Canada	/1Y 5A8					

Test Request #	K23	-121					Project Nu	umber:	KX13866.1	00		
Client:	Mini	stry of Transportation an	d Infrastructure				Project Lo	cation:	TD00 00			
Project Name:	Wai	tabit Pit tabit Pit					Sample Lo	ocation:	1P23-06			
Source.	vv ai						Type	0	GS			
Soil Description:							Depth (m)	:	3.00		-	
Specimen Reference	NA			Specimen Depth (m)	: NA		Date of Test		29 A	ug 2023		
Specimen Description	n NA											
											Material Sp	pecification
Grain Size Distribution (%)		63.4		35.5		1.1			Sieve			
BOULDERS	COBBLES	GRAVEL	Coorpo Ma	SAND		FINES (Silt, Clay)		Sieve No.	Particle Size mm	% Passing	Lower	Upper
100		Coarse Fine	Coarse			<u> </u>			75	100.0		
								2"	50	96.4		
90		\						1 1/2"	37.5	90.5		
								1"	25	81.3		
80		₹						3/4"	19	74.0		
								1/2"	12.5	63.0		
70					+++++++++++++++++++++++++++++++++++++++			3/8"	9.5	55.1		
ass		▶ \						#4	4.75	36.6		
≥ 60								#8	2.36	20.9		
מ		N N						#16	1.18	10.8		
. <u></u>								#30	0.6	5.4		
La La								#50	0.3	2.6		
° 40			N. I					#100	0.15	1.5		
20								#140	0.106	1.3		
30								#200	0.075	1.1		
20												
20												
10												
0					<u></u>			D 00	Daa	5.40		
1000	100	10	1	0.	1	0.01	0.001	D60	D30	D10	Cu	Cc
			Particle S	ize mm	_	- Sieve		11.30	3.54	1.07	11.00	1.00
Notes:						Disclaimer:						
						The laboratory testing services with the recognized standards use of WSP's client, relates on egarding specification compli	reported herein have indicated in this repo nly to the sample(s) t ance or materials sui	e been performed ort, or local indust ested and does n itability for any sp	d in accordance try practice. Th not represent an pecific purpose.	with the terms is laboratory test ny (actual or imp	of a contract with ing services repor lied) interpretatior	WSP's client, and rt is for the sole n or opinion
Tested by: JSir	ngh	Date: 29 Aug 20	23 Checked	by: JSingh	Date:	06 Sep 2023	Reviewed by:	JStotz		Date:	06 Sep 2023	
			590	M McKay Avenue, Suite	/SP Cana 300 Kelov	da Inc. /na. British Columbia M	/1Y 5A8					
					Cana	da						
				[+1]	(250) 860	8424				R	ev42-18082023	

PARTICLE SIZE DISTRIBUTION ASTM C136 Method B

Clent mint of Transportant medinfastructure Program Manuel Program Manuel Manue	Test Request #	K23-121			Project Nu	mber:	KX13866.1	00		
Prieze Mathe Pi Source: Wathe Pi Source: Source: The Source Source Source Source Source Source: The Source S	Client:	Ministry of Transportation and	Infrastructure		Project Loc	cation:				
Saure: Watabil PRI Sail Description: Description: Specimen Reference NA Specimen Deph (m): NA Deter of Test Specimen Deph (m): NA Deter of Specimen Deph (m): NA Deter of Test Specimen Deph (m): NA Deter of Test	Project Name:	Waitabit Pit			Sample Lo	cation:	TP23-07			
Sult Description: Upt: CS Specimen Reference NA Specimen Ductription: NA Specimen Description: NA Date of Test 29 Aug 2023 Specimen Description: NA Specimen Description: NA Series Control	Source:	Waitabit Pit			Sample No	D.:	1			
Depth (m) 1.00 - Specimen Reference NA Specimen Depth (m): NA Date of Test 29 Aug 2023 Specimen Depeription NA	Soil Description:				Type:		GS			
Specime Reference NA Specime Depth (m): NA Date of test 29 Aug 2023 Specime Description NA					Depth (m):		1.00		-	
Specimen Deceription NA	Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test		29 Au	ug 2023		
Single for the second secon	Specimen Description	NA								
Single 40 4.5 2.5 Image: Single in the second of the second									Material Sp	pecification
Distribution (%) 49.0 48.5 2.5 iount constraints GRAVEL Constraints SAND Fine Fine Site min % Passing Lower Upper iount constraints Constraint Fine Constraints Fine Site min % Passing Lower Upper iount constraints Constraints Fine Fine Site min % Passing Lower Upper iount constraints Fine Constraints Medium Fine Fine Site min % Passing Lower Upper iount constraints Fine Constraints Fine Site min % Passing Lower Upper iount constraints Fine Fine Site min % Passing Lower Upper iount constraints Fine Site min % Passing Lower Upper iount constraints Fine Site min % Passing Lower Upper iount constraints Fine Site min Site min % Site min Site min iount constre Fine Site min	Grain Size	10.0					Sieve			
BOULDERS COBBLES GRAVEL SAND FINES (Sit, Clay) 100 Coarse Fine Coarse Medium Fine Fines (Sit, Clay) 100 00	Distribution (%)	49.0	48.5	2.5						
BOULDERS Coarse Fine		GRAVEL	SAND			Sieve No	Particle	% Passing	lower	Upper
100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 100 1	BOULDERS C	Coarse Fine	Coarse Medium Fine	FINES (Silt, Clay)			Size mm	/or dooring	Lonor	oppor
Image: constraint of the second se	100					2"	50	100.0		
90 0						11/2	37.5	92.0		
and and an analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis and analysis bit is an analysis bit is an analysis bit is an analysis analysis bit is an analysis bit is an analysis bit is an analysis analysis bit is an analysis bit is an analysis bit is an analysis analysis bit is an analysis bit is an analysis bit is an analysis analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is an analysis bit is ananalysis bit is an analysis bit is a	90					3/4"	23 19	84.2		
a a b	00					1/2"	12.5	76.1		
and and a set of the set	00					3/8"	9.5	69.5		
set	70					#4	4.75	51.0		
^w of	S. S					#8	2.36	34.1		
Image: second	₿ 60					#16	1.18	19.9		
^o gend ^o gend 	λq f					#30	0.6	11.6		
$\frac{1}{9} \frac{1}{9} \frac{1}$.üg 50					#50	0.3	6.3		
a a b a b a b a b a b a b a b a b a b a b a b a a b a	Pas					#100	0.15	3.6		
30 420 0.075 2.5	~ 40					#140	0.106	3.0		
30 40 <td< td=""><td>20</td><td></td><td></td><td></td><td></td><td>#200</td><td>0.075</td><td>2.5</td><td></td><td></td></td<>	20					#200	0.075	2.5		
20 0	30									
10 10 1 0.1 0.0	20									
10 10 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></td<>										
0 100 10 1 0.1 0.01<	10									
0 100 10 1 0.1 0.01 0.01 0.01 1000 100 10 1 0.1 0.01			│							
1000 100 10 1 0.1 0.01 0.01 0.001	0			0.01		D60	D30	D10	Сц	Сс
Notes: Notes: Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8	1000	100 10	1 0.1	0.01	0.001	6.65	1.93	0.49	14.00	1.20
Notes: Disclaimer: The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose. Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. S90 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8			Particle Size mm			l				
Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8 Sep 2023 Concode	Notes:			Disclaimer:						
with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose. Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8				The laboratory testing services	reported herein have	been performed	d in accordance	with the terms	of a contract with	WSP's client, and
regarding specification compliance or materials suitability for any specific purpose. Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8				with the recognized standards use of WSP's client, relates or	indicated in this report nly to the sample(s) te	rt, or local indus ested and does r	try practice. Thi not represent ar	s laboratory test	ing services repor lied) interpretatior	t is for the sole or opinion
Tested by: JSingh Date: 29 Aug 2023 Checked by: JSingh Date: 06 Sep 2023 Reviewed by: JStotz Date: 06 Sep 2023 WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8				regarding specification complia	ance or materials suit	ability for any sp	pecific purpose.	, (, o,p	-,	
WSP Canada Inc. 590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8	Tested by: JSingh	Date: 29 Aug 2023	Checked by: JSingh	Date: 06 Sep 2023	Reviewed by:	JStotz		Date:	06 Sep 2023	
590 McKay Avenue, Suite 300 Kelowna, British Columbia, V1Y 5A8			WS	P Canada Inc.						
Canada			590 McKay Avenue, Suite 30	0 Kelowna, British Columbia, V	′1Y 5A8					
Canada				Canada						

[+1] (250) 860 8424

Test Request # Client [.]	K23-121 Ministry of Transportation and Infrastructure							Project Number: KX13866.100 Project Location:					
Project Name:	Waitat	pit Pit					Sample Lo	cation:	TP23-07				
Source:	Waitat	oit Pit					Sample No	D.:	2				
Soil Description:							Туре:		GS				
							Depth (m)	:	2.50		-		
Specimen Reference	NA		Specin	en Depth (m):	NA		Date of Test		29 Ai	ug 2023			
Specimen Description	n NA												
											Material S	pecification	
Grain Size Distribution (%)		60.4	37.6			2.0			Sieve				
BOULDERS	COBBLES -	GRAVEL	SAND			FINES (Silt. Clav)		Sieve No.	Particle Size mm	% Passing	Lower	Upper	
		Coarse Fine	Coarse Medium	Fine				3"	75	100.0		<u> </u>	
100								2"	50	98.5			
90								1 1/2"	37.5	95.0			
30		∖ \						1"	25	85.9			
80								3/4"	19	80.0			
								1/2"	12.5	68.1			
70								3/8"	9.5	60.2			
ass								#4	4.75	39.6			
≥ 60								#8	2.36	25.4			
מ								#16	1.18	16.4			
. <u></u>		X						#30	0.6	10.2			
La L		N						#50	0.3	5.6			
» ⁴⁰								#100	0.15	3.0			
20								#140	0.106	2.3			
30								#200	0.075	2.0			
20													
20													
10													
				∽									
0													
1000	100	10	1	0.1		0.01	0.001	D60	D30	D10	Cu	Cc	
			Particle Size mn	ı	-•	Sieve		9.44	2.96	0.58	16.00	1.60	
Notes:					Dis	claimer:							
					The with use of rega	aboratory testing servic the recognized standar of WSP's client, relates rding specification com	es reported herein have ds indicated in this report only to the sample(s) to pliance or materials suit	been performed rt, or local indus ested and does r tability for any sr	d in accordance try practice. Thi not represent ar pecific purpose	with the terms is laboratory test ny (actual or imp	of a contract with ting services repo lied) interpretation	WSP's client, and rt is for the sole n or opinion	
Tested by: JSin	ngh I	Date: 29 Aug 2023	Checked by: J	Singh	Date:	06 Sep 2023	Reviewed by:	JStotz	a.p	Date:	06 Sep 2023		
	-	-	590 McKay A	WSF venue, Suite 300	P Canada) Kelowna Canada	Inc. , British Columbia,	V1Y 5A8						