

LEGEND

- LEGAL LOT BOUNDARY (CADASTRE) / PROPOSED DEVELOPMENT AREA
- ON-SITE BUILDING (LiDAR ORTHO)
- Structure (LiDAR Ortho / TRIM)
- EXISTING GRAVEL ROAD (LiDAR Ortho / TRIM)
- PROPOSED ACCESS ROAD / CATTLE GUARD (LiDAR ORTHO)
- EXISTING TRAIL (LiDAR Ortho / TRIM)
- BRIDGE / PROPOSED STEEL GATE (APPROXIMATE LOCATION)
- RIVER / LAKE (FTEN)
- CRUSHER LOCATION / DEVELOPMENT DIRECTION
- GPS TEST PIT LOCATION LABEL INDICATES SAMPLE YEAR - PIT #
- CROSS-SECTIONS
- OVERBURDEN & TOPSOIL STOCKPILE SITE
- PROCESSED AGGREGATE STOCKPILE
- SOIL WASTE AREA
- CONTOUR: INDEX (10m) / INTERMEDIATE (1m)
- DEVELOPMENT AREA PHASE 1

DRAWING NOTES:

- Base data provided from LiDAR received 2023Jan26, (1m Contours)
- Cadastre and Tantalus Lines were provided from online sources (Data BC).

PIT DEVELOPMENT NOTES:

- Pit development must be carried out in accordance with the Health, Safety, and Reclamation Code for Mines in BC, the current Standard Specifications for Highway Construction, and the Aggregate Operations Best Management Practices Handbook for BC and the Stantec Engineering Bastin Pit Agricultural Soils Assessment September 2023 report.
- Development Phases 1 and 2 require clearing of trees along the western edge as well as stripping and stockpiling of topsoil and overburden prior to mining.
- Pit excavations must not take place to within a minimum distance of 2m from the edge of clearing & stripped areas.
- When the contractor discontinues operations in the pit, all working pit faces and stockpiles must be trimmed to 1.5H to 1V slope. Working pit faces must be reshaped with native granular materials. All other permanent slopes must be reshaped to no steeper than 2H:1V.
- No dumping of debris or petroleum products is permitted. The pit must be left in a clean and safe condition.

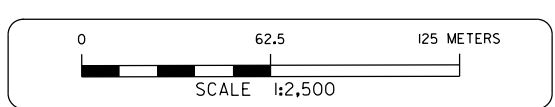


REVISIONS		Initial
Date	Description	
2023Apr30	Added 2023 Test Pits	KA
2023Nov07	PDP Edits	KA / PM

REVIEWED BY:	Initial	Date
APPROVED BY:	Initial	Date

DRAWN: KA
DATE: JAN. 30, 2023
AutoCAD: BASTIN

REVISED: KA/PM
DATE: Dec. 07, 2023
AutoCAD: K23-108



BASTIN PIT #1471
PIT DEVELOPMENT PLAN-Phase 1
FILE NO. Bastin_PDP_Ph1

FIGURE 2

Soundness of Aggregates by use of Magnesium Sulphate ASTM C88



Client: BC Ministry of Transportation Sampled by: Client
 Project Number: KX13866.100 Date Sampled: 15-Aug-2023
 Project Name: Bastin Creek Pit Date Tested: 25-Sep-2023
 Source: TP23-08 Tested by: WSP E&I Canada Limited Lab
 Depth: 0.1m - 4.6m

Size of Particles	Original Sieve Mass g	Original Percent Retained %	Mass of Test Fraction g	Mass of Test Fraction after 5 Cycles g	Test Fraction Loss %	Weighted Average Loss %
Mass of Sample (g)	8178.0					
25.0mm to 37.5mm	2141.8	26.2	1007.0	995.6	1.13	0.3
19.0mm to 25.0mm	1420.0	17.4	494.2	452.6	8.42	1.5
12.5mm to 19.0mm	2411.5	29.5	669.3	661.4	1.18	0.3
9.5mm to 12.5mm	1412.8	17.3	329.6	311.6	5.46	0.9
4.75mm to 9.5mm	2933.7	35.9	300.8	286.7	4.69	1.7
		100.0			Total:	4.7

Size of Aggregate	Number of rocks before test	Number of rocks after test	Visual Description
25.0mm to 37.5mm	17	17	0 rocks splitting 0 rocks crumbling 0 rocks cracking 0 rocks flaking
19.0mm to 25.0mm	23	21	0 rocks splitting 2 rocks crumbling 0 rocks cracking 0 rocks flaking

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction:
 - Section 202.04.03 for allowable percent loss
 - Section 211, Table 211-F for allowable percent loss.
 - A petrographic analysis may be required if material fails to meet these specifications.
 - A fresh solution of magnesium sulfate was prepared for testing of this material.

Reported by: *G Michaud*
 Glenda Michaud

Reviewed by: *Brian McLeod*
 Brian McLeod



Reporting of these test results constitutes a testing service only. Additional sample information available on request.
 Engineering interpretation or evaluation of the test results is provided only on written request.
 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Bulk Relative Density of Aggregates



Client: BC Ministry of Transportation Date Sampled: 15-Aug-23
 Project No.: KX13866.100 Sampled by: Client
 Project Name: Bastin Pit Coarse Tested by: B. McLeod
 Test Pit Number: TP23-08 Coarse Tested: 25-Sep-23
 Sample Number: 1
 Depth: 0.1m - 4.6m


Coarse Aggregate - ASTM C127

Retained on the 4.75mm sieve

Sample was oven dried, washed and soaked for 24 +/- 4 hrs

AVG

Mass of Pan in Air		391.7	397.2	390.8	
Sat. Surf. Dry Mass Agg. + Pan in Air		1505.9	1479.4	1554.0	
Sat. Surf. Dry Mass in Water	(C)	708.6	688.6	740.1	
Dry Mass Agg. + Pan in Air		1500.1	1473.7	1547.7	
Sat. Surf. Dry Mass Agg. in Air	(B)	1114.2	1082.2	1163.2	
Mass of Dry Agg. in Air	(A _c)	1108.4	1076.5	1156.9	
Diff. in SS Mass		405.6	393.6	423.1	
Mass Absorbed Water		702.8	682.9	733.8	
Bulk Relative Density (Oven-dried)	$A_c/(B-C)$	2.733	2.735	2.734	2.734
Bulk Relative Density (SSD)	$B/(B-C)$	2.747	2.749	2.749	2.749
Apparent Relative Density	$A_c/(B-C)$	2.733	2.735	2.734	2.734
Percent Water Absorption	$(B-A_c/A_c) * 100$	0.52	0.53	0.54	(C _{abs}) 0.53

Reported by: 
 Brian McLeod

Reviewed by: 
 Glenda Michaud



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-01

SAMPLED BY: Client

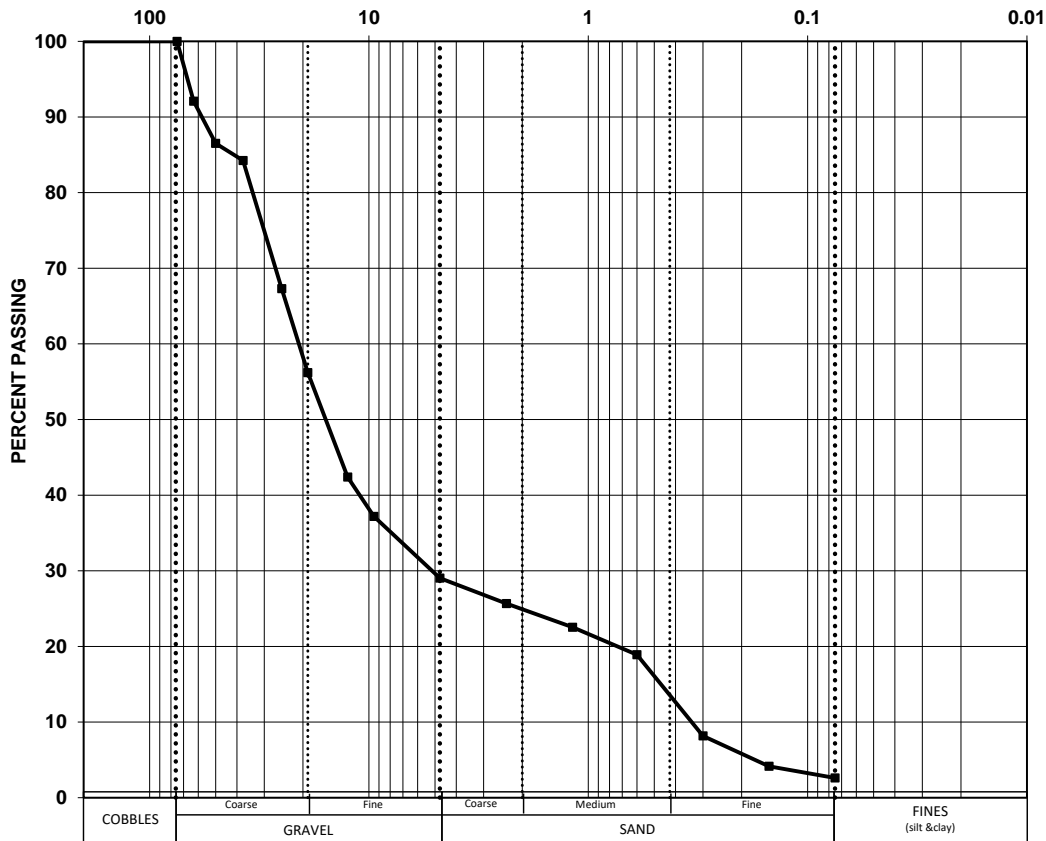
SAMPLE NUMBER: 1

DATE SAMPLED: 14-Aug-2023

DEPTH: 1.5m - 5.2m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	92.1
50.0	86.5
37.5	84.2
25.0	67.3
19.0	56.2
12.5	42.4
9.5	37.2
4.75	29.0
2.36	25.7
1.18	22.5
0.600	18.9
0.300	8.2
0.150	4.2
0.075	2.6

GRAVEL = 71.0%
SAND = 26.4%
FINES = 2.6%

D10 = 0.34
D30 = 5.16
D60 = 20.87

Cu = 61.82
Cc = 3.78

Moisture = 0.9%

Tested Weight (g) = 11,694.3

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-02

SAMPLED BY: Client

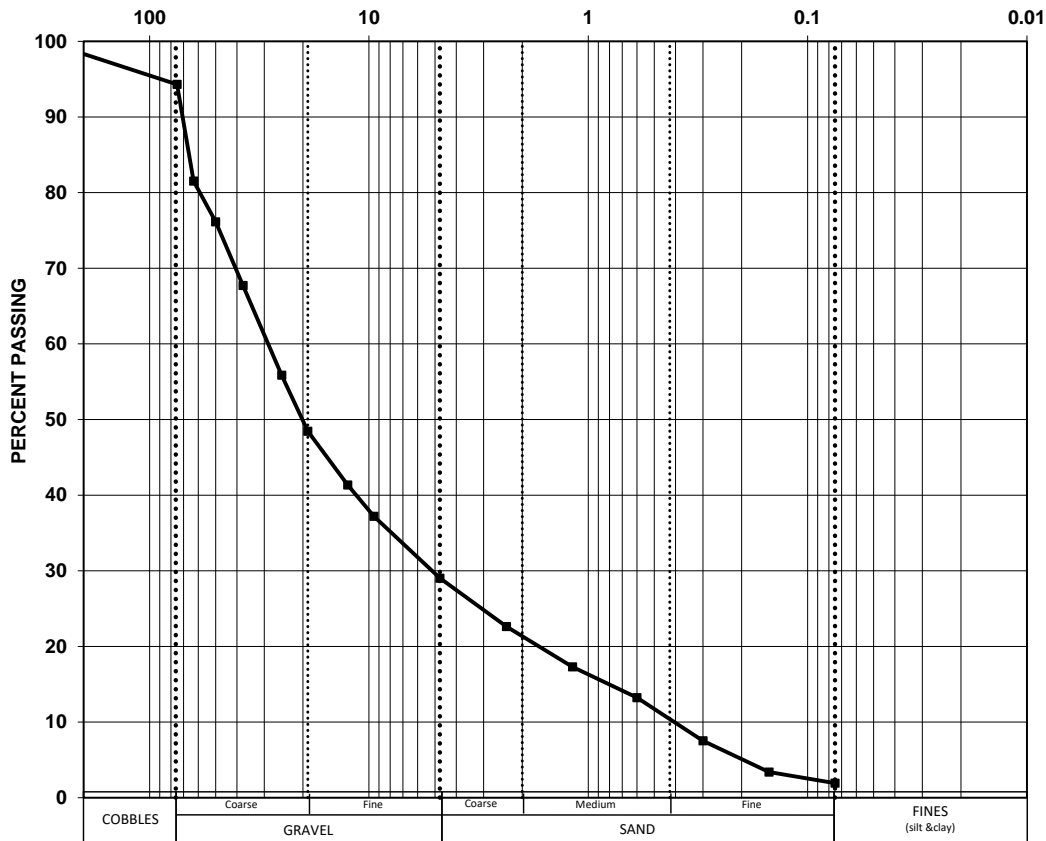
SAMPLE NUMBER: 1

DATE SAMPLED: 14-Aug-2023

DEPTH: 0.5m - 5.2m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	94.3
63.0	81.5
50.0	76.1
37.5	67.7
25.0	55.9
19.0	48.5
12.5	41.4
9.5	37.2
4.75	29.0
2.36	22.6
1.18	17.3
0.600	13.2
0.300	7.5
0.150	3.4
0.075	1.9

GRAVEL = 71.0%

SAND = 27.1%

FINES = 1.9%

D10 = 0.41

D30 = 5.16

D60 = 28.81

Cu = 71.06

Cc = 2.28

Moisture = 0.7%

Tested Weight (g) = 14,390.4

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-03

SAMPLED BY: Client

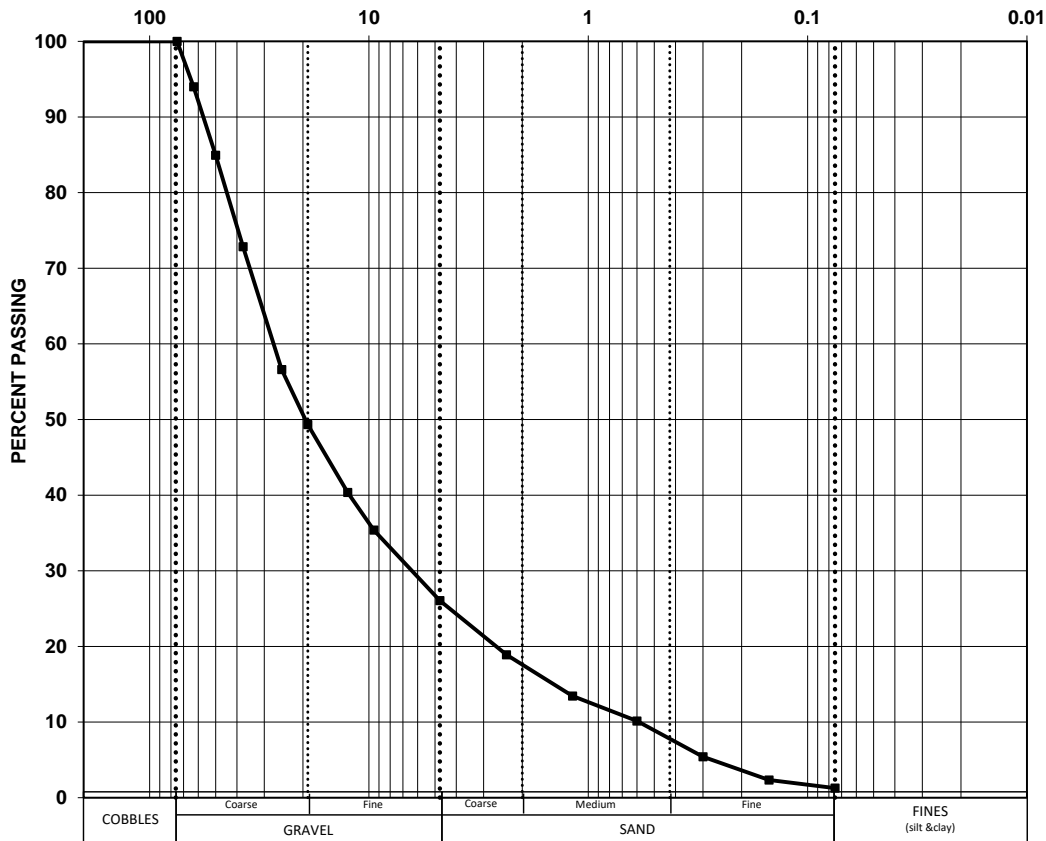
SAMPLE NUMBER: 1

DATE SAMPLED: 14-Aug-2023

DEPTH: 0.5m - 5.2m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	94.0
50.0	84.9
37.5	72.9
25.0	56.6
19.0	49.3
12.5	40.4
9.5	35.4
4.75	26.0
2.36	18.9
1.18	13.4
0.600	10.1
0.300	5.4
0.150	2.3
0.075	1.3

GRAVEL = 74.0%

SAND = 24.8%

FINES = 1.3%

D10 = 0.59

D30 = 6.37

D60 = 27.21

Cu = 46.27

Cc = 2.54

Moisture = 0.5%

Tested Weight (g) = 10,473.4

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-04

SAMPLED BY: Client

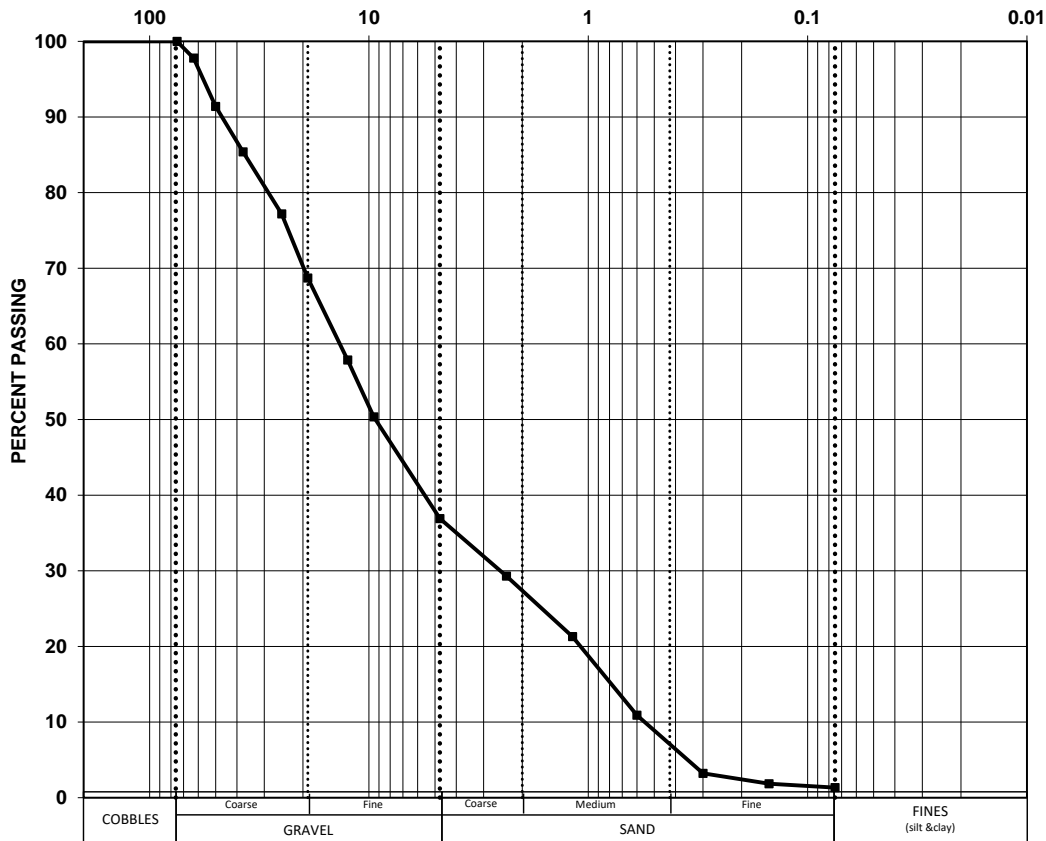
SAMPLE NUMBER: 1

DATE SAMPLED: 14-Aug-2023

DEPTH: 0.3m - 5.2m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	97.8
50.0	91.4
37.5	85.4
25.0	77.2
19.0	68.7
12.5	57.9
9.5	50.3
4.75	36.9
2.36	29.3
1.18	21.3
0.600	10.9
0.300	3.2
0.150	1.8
0.075	1.3

GRAVEL = 63.1%

SAND = 35.6%

FINES = 1.3%

D10 = 0.55

D30 = 2.52

D60 = 13.68

Cu = 24.73

Cc = 0.84

Moisture = 0.8%

Tested Weight (g) = 23,818.9

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-05

SAMPLED BY: Client

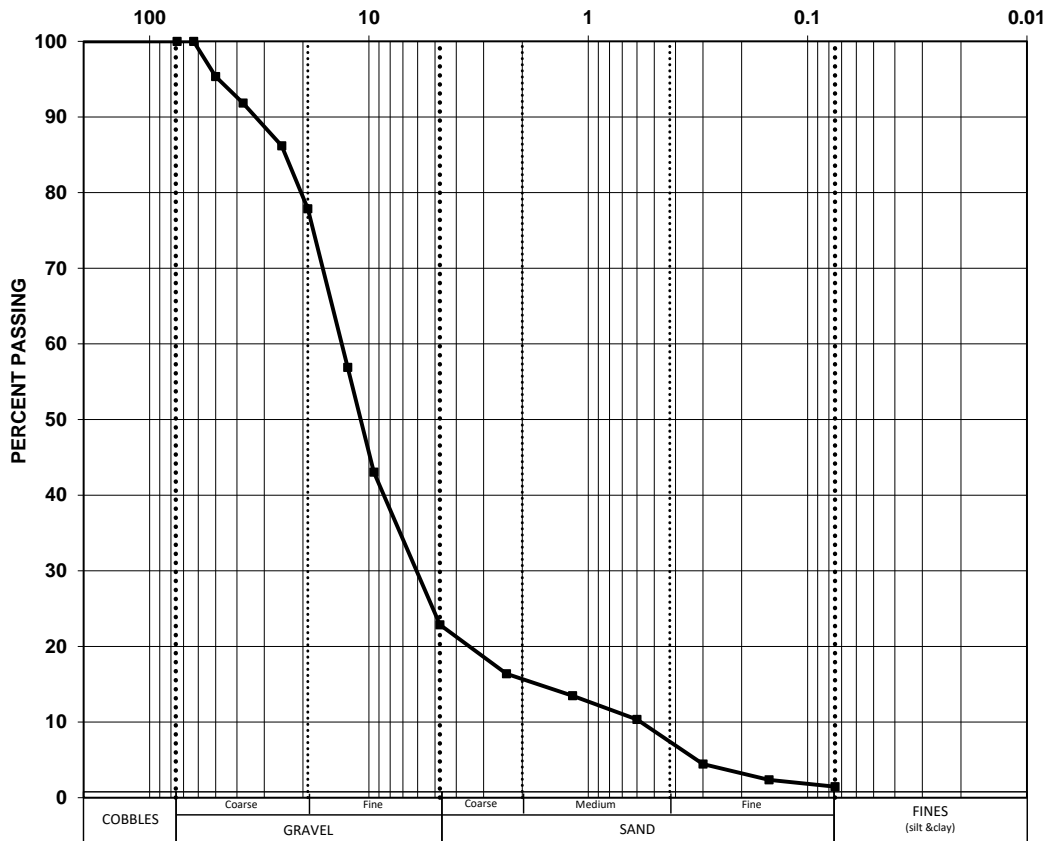
SAMPLE NUMBER: 1

DATE SAMPLED: 14-Aug-2023

DEPTH: 2.0m - 5.2m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	100.0
50.0	95.3
37.5	91.8
25.0	86.2
19.0	77.9
12.5	56.9
9.5	43.0
4.75	22.9
2.36	16.4
1.18	13.5
0.600	10.3
0.300	4.5
0.150	2.4
0.075	1.5

GRAVEL = 77.1%

SAND = 21.4%

FINES = 1.5%

D10 = 0.58

D30 = 6.07

D60 = 13.31

Cu = 23.12

Cc = 4.80

Moisture = 0.6%

Tested Weight (g) = 10,928.1

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-06

SAMPLED BY: Client

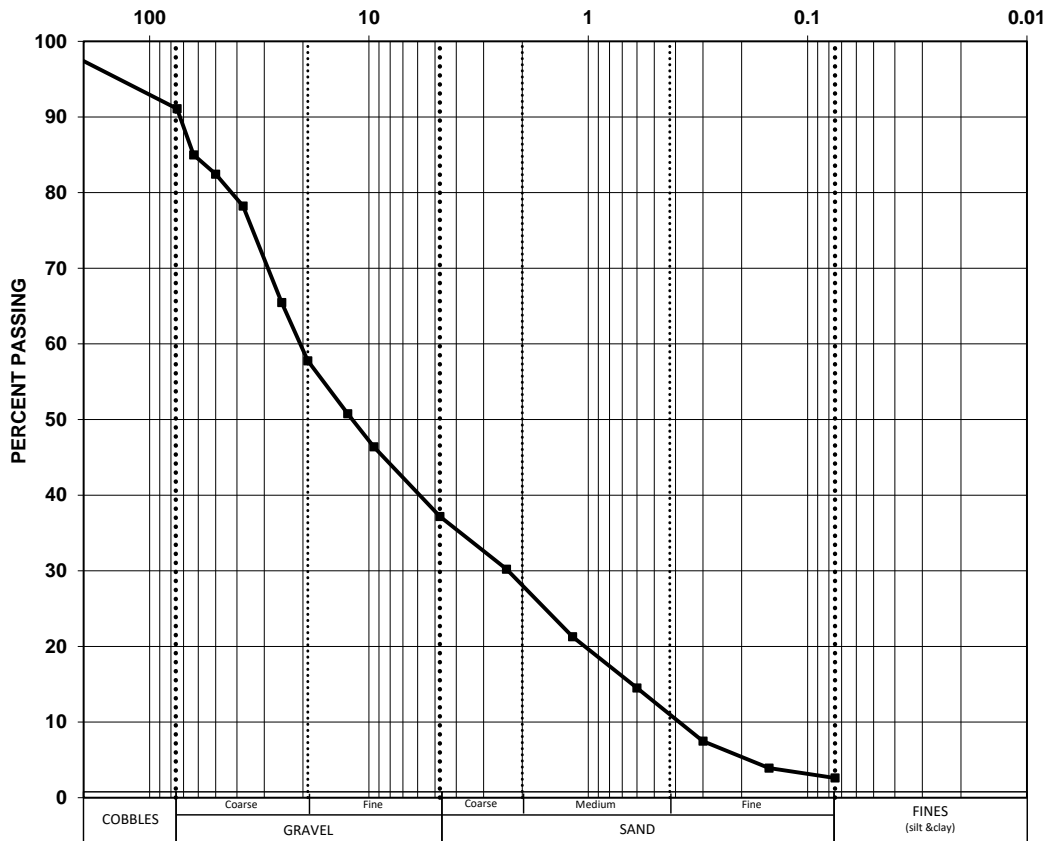
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.1m - 4.2m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	91.1
63.0	85.0
50.0	82.4
37.5	78.2
25.0	65.5
19.0	57.8
12.5	50.8
9.5	46.4
4.75	37.2
2.36	30.2
1.18	21.3
0.600	14.5
0.300	7.5
0.150	3.9
0.075	2.6

GRAVEL = 62.8%
SAND = 34.6%
FINES = 2.6%

D10 = 0.38
D30 = 2.32
D60 = 20.58

Cu = 53.48
Cc = 0.68

Moisture = 0.5%

Tested Weight (g) = 12,285.2

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-06

SAMPLED BY: Client

SAMPLE NUMBER: 2

DATE SAMPLED: 15-Aug-2023

DEPTH: 4.0m - 5.4m

DATE TESTED: 31-Aug-2023



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	100.0
50.0	96.0
37.5	96.0
25.0	96.0
19.0	93.4
12.5	92.5
9.5	91.3
4.75	88.7
2.36	86.3
1.18	82.6
0.600	75.3
0.300	49.5
0.150	18.5
0.075	6.2

GRAVEL = 11.3%

SAND = 82.5%

FINES = 6.2%

D10 = 0.09

D30 = 0.19

D60 = 0.40

Cu = 4.27

Cc = 1.02

Moisture = 1.2%

Tested Weight (g) = 7,494.7

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-07

SAMPLED BY: Client

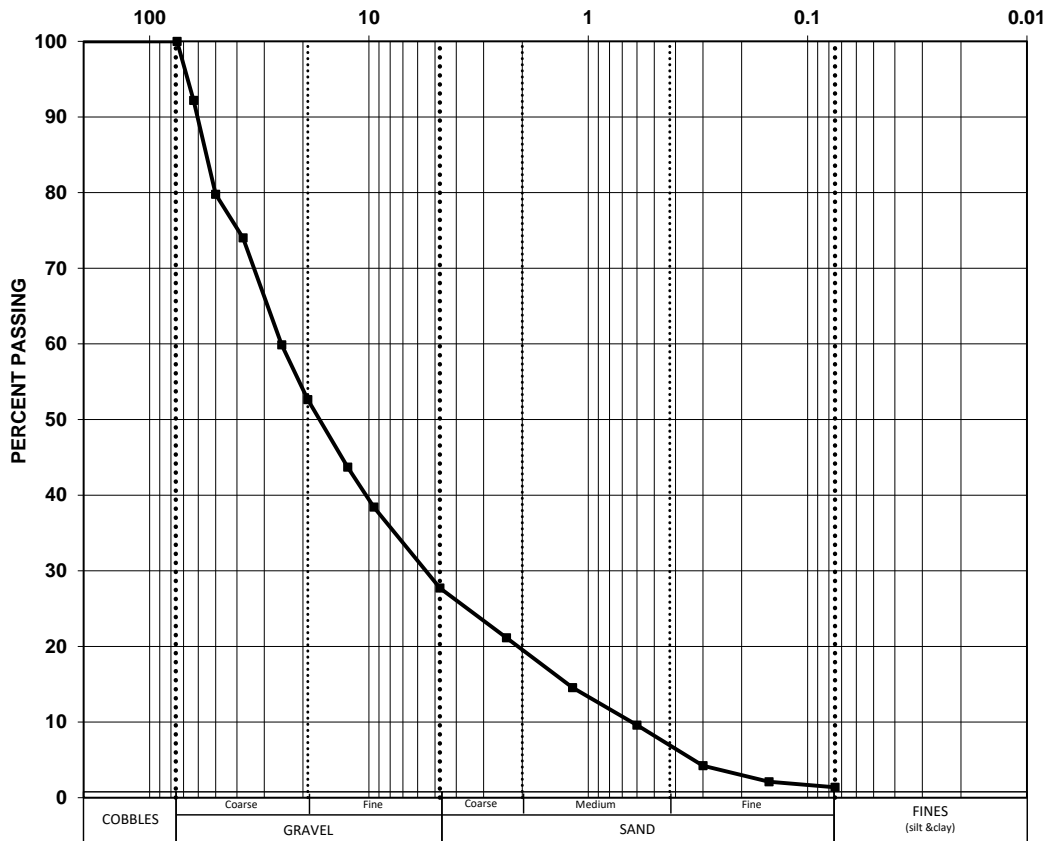
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.5m - 5.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	92.2
50.0	79.8
37.5	74.0
25.0	59.9
19.0	52.6
12.5	43.7
9.5	38.4
4.75	27.7
2.36	21.1
1.18	14.6
0.600	9.6
0.300	4.2
0.150	2.1
0.075	1.4

GRAVEL = 72.3%

SAND = 26.3%

FINES = 1.4%

D10 = 0.63

D30 = 5.51

D60 = 25.09

Cu = 39.58

Cc = 1.91

Moisture = 0.4%

Tested Weight (g) = 13,744.9

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-07

SAMPLED BY: Client

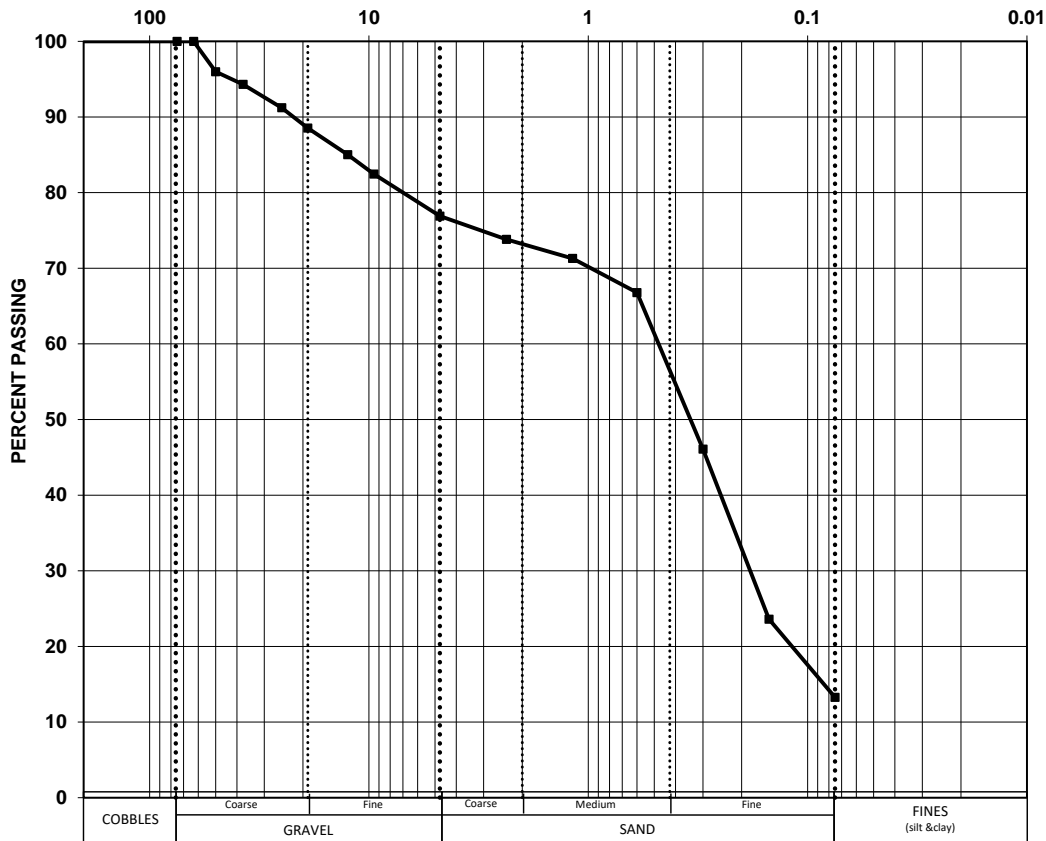
SAMPLE NUMBER: 2

DATE SAMPLED: 15-Aug-2023

DEPTH: 5.0m - 6.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	100.0
50.0	96.0
37.5	94.3
25.0	91.2
19.0	88.5
12.5	85.0
9.5	82.5
4.75	76.9
2.36	73.8
1.18	71.3
0.600	66.8
0.300	46.1
0.150	23.6
0.075	13.3

GRAVEL = 23.1%

SAND = 63.6%

FINES = 13.3%

D10 = N/A

D30 = 0.18

D60 = 0.48

Cu = N/A

Cc = N/A

Moisture = 2.8%

Tested Weight (g) = 7,431.1

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-08

SAMPLED BY: Client

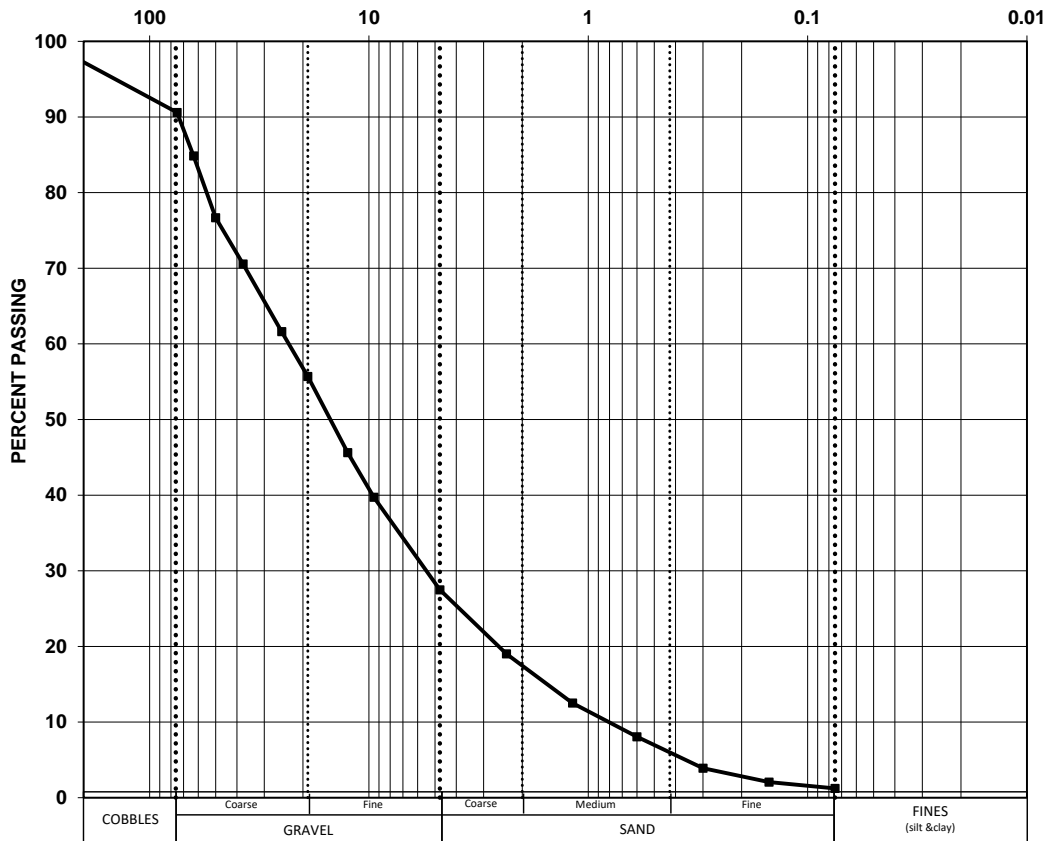
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.1m - 4.6m

DATE TESTED: 31-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	90.6
63.0	84.8
50.0	76.7
37.5	70.6
25.0	61.6
19.0	55.7
12.5	45.6
9.5	39.7
4.75	27.5
2.36	19.0
1.18	12.5
0.600	8.1
0.300	3.9
0.150	2.1
0.075	1.2

GRAVEL = 72.5%

SAND = 26.2%

FINES = 1.2%

D10 = 0.81

D30 = 5.48

D60 = 23.19

Cu = 28.77

Cc = 1.61

Moisture = 0.3%

Tested Weight (g) = 23,951.8

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-11

SAMPLED BY: Client

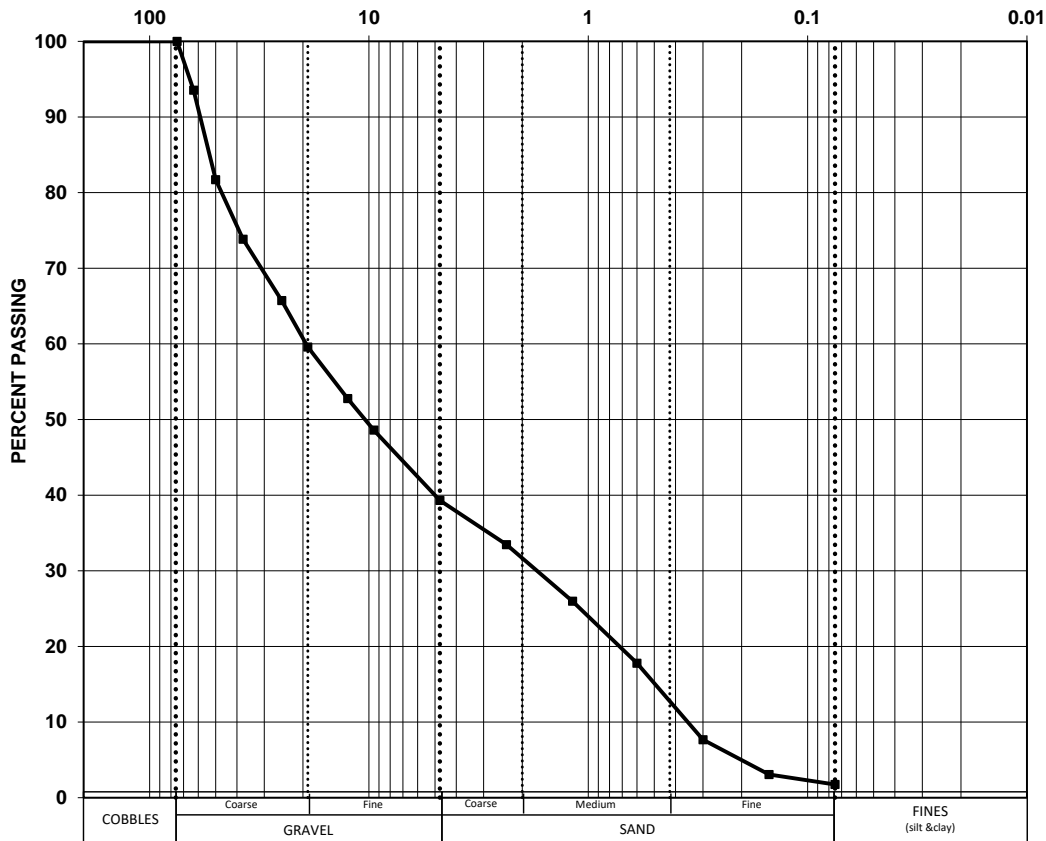
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 1.4m - 4.0m

DATE TESTED: 29-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	93.5
50.0	81.7
37.5	73.8
25.0	65.7
19.0	59.6
12.5	52.8
9.5	48.6
4.75	39.3
2.36	33.5
1.18	26.0
0.600	17.8
0.300	7.7
0.150	3.1
0.075	1.7

GRAVEL = 60.7%

SAND = 37.6%

FINES = 1.7%

D10 = 0.35

D30 = 1.71

D60 = 19.36

Cu = 55.00

Cc = 0.43

Moisture = 0.6%

Tested Weight (g) = 22,890.4

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.
Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-12

SAMPLED BY: Client

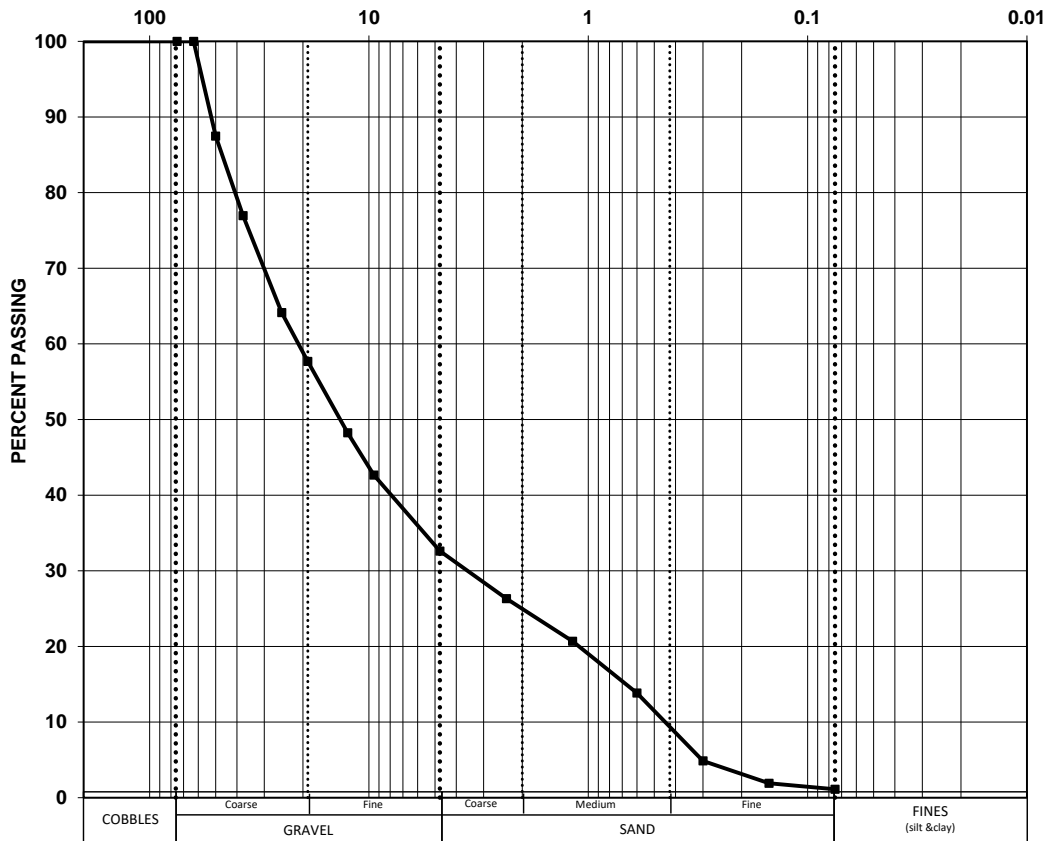
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.4m - 4.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	100.0
50.0	87.5
37.5	77.0
25.0	64.1
19.0	57.7
12.5	48.2
9.5	42.7
4.75	32.6
2.36	26.3
1.18	20.7
0.600	13.8
0.300	4.9
0.150	1.9
0.075	1.1

GRAVEL = 67.4%

SAND = 31.5%

FINES = 1.1%

D10 = 0.45

D30 = 3.55

D60 = 20.97

Cu = 47.00

Cc = 1.35

Moisture = 0.5%

Tested Weight (g) = 10,507.7

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-13

SAMPLED BY: Client

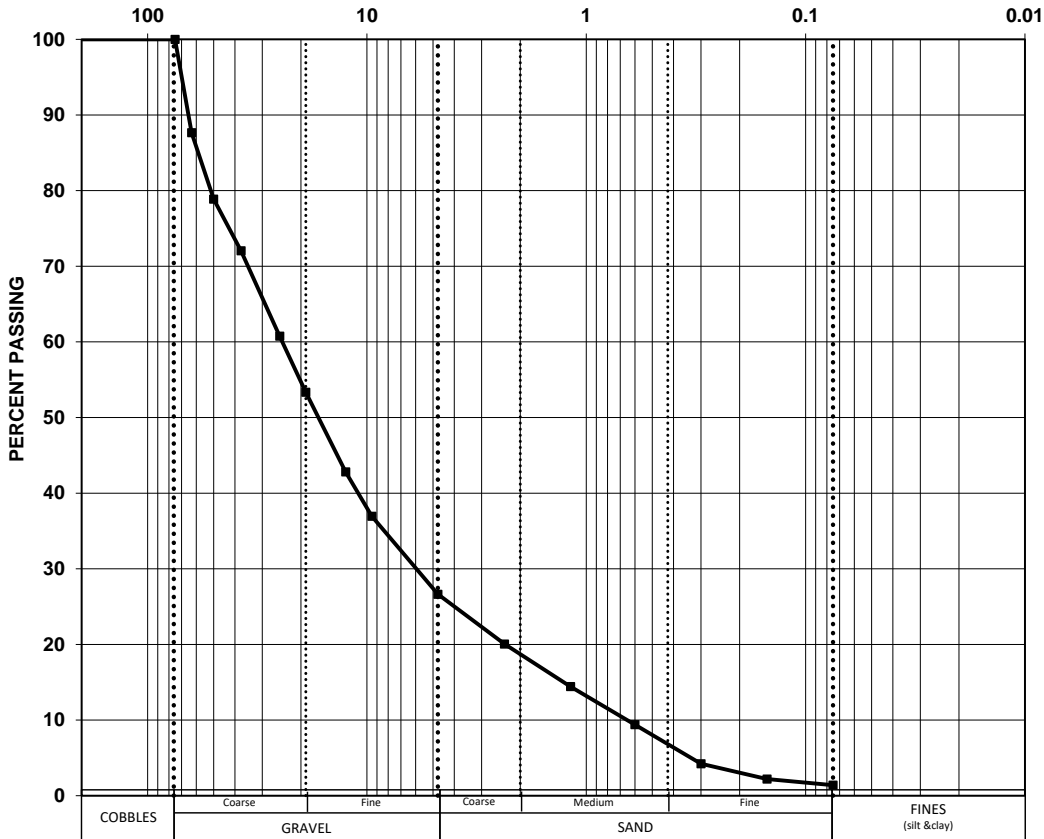
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.1m - 5.5m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	87.7
50.0	78.9
37.5	72.0
25.0	60.7
19.0	53.3
12.5	42.8
9.5	36.9
4.75	26.6
2.36	20.1
1.18	14.4
0.600	9.4
0.300	4.2
0.150	2.2
0.075	1.4

GRAVEL = 73.4%
SAND = 25.2%
FINES = 1.4%

D10 = 0.65
D30 = 5.96
D60 = 24.32

Cu = 37.33
Cc = 2.24

Moisture = 0.5%

Tested Weight (g) = 12,220.3

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-14

SAMPLED BY: Client

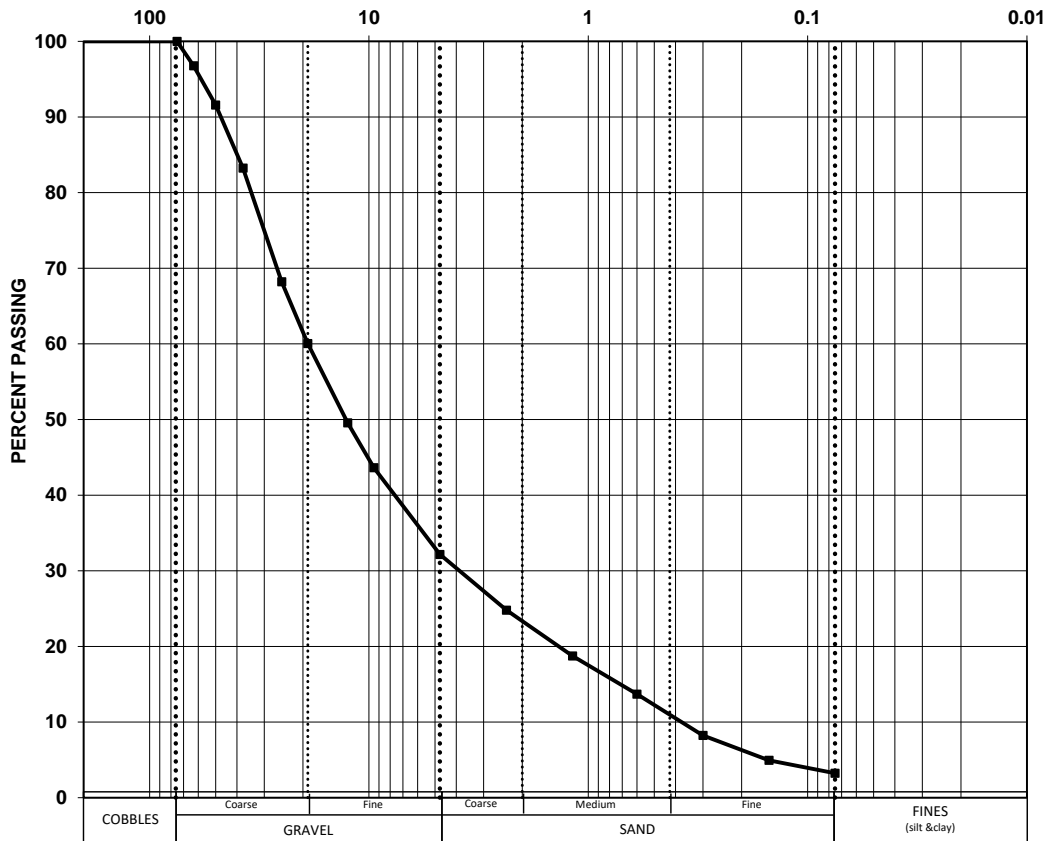
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.3m - 5.5m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	96.8
50.0	91.6
37.5	83.2
25.0	68.2
19.0	60.0
12.5	49.6
9.5	43.6
4.75	32.2
2.36	24.8
1.18	18.7
0.600	13.7
0.300	8.2
0.150	4.9
0.075	3.2

GRAVEL = 67.8%

SAND = 28.9%

FINES = 3.2%

D10 = 0.38

D30 = 3.87

D60 = 18.97

Cu = 50.52

Cc = 2.10

Moisture = 0.8%

Tested Weight (g) = 11,066.2

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-15

SAMPLED BY: Client

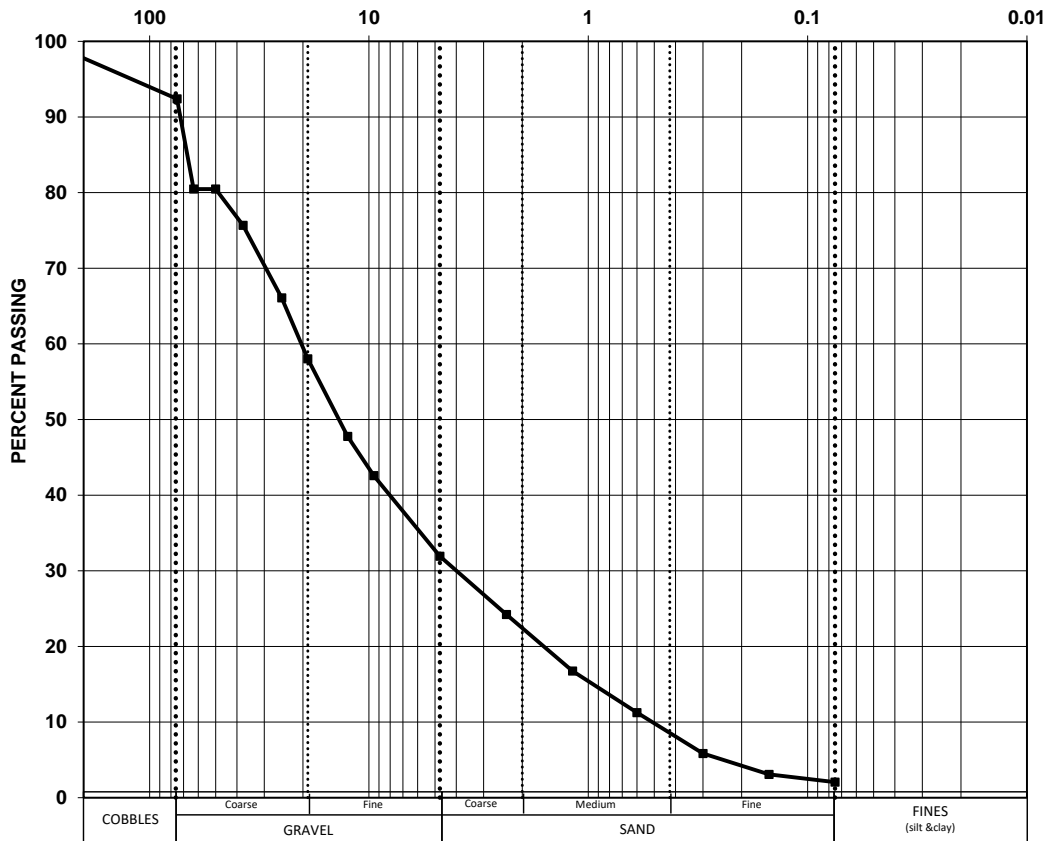
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.7m - 6.0m

DATE TESTED: 29-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	92.4
63.0	80.5
50.0	80.5
37.5	75.7
25.0	66.1
19.0	58.0
12.5	47.8
9.5	42.6
4.75	31.9
2.36	24.2
1.18	16.7
0.600	11.2
0.300	5.8
0.150	3.1
0.075	2.1

GRAVEL = 68.1%

SAND = 29.9%

FINES = 2.1%

D10 = 0.51

D30 = 3.99

D60 = 20.32

Cu = 39.76

Cc = 1.53

Moisture = 1.2%

Tested Weight (g) = 9,801.2

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 6-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-16

SAMPLED BY: Client

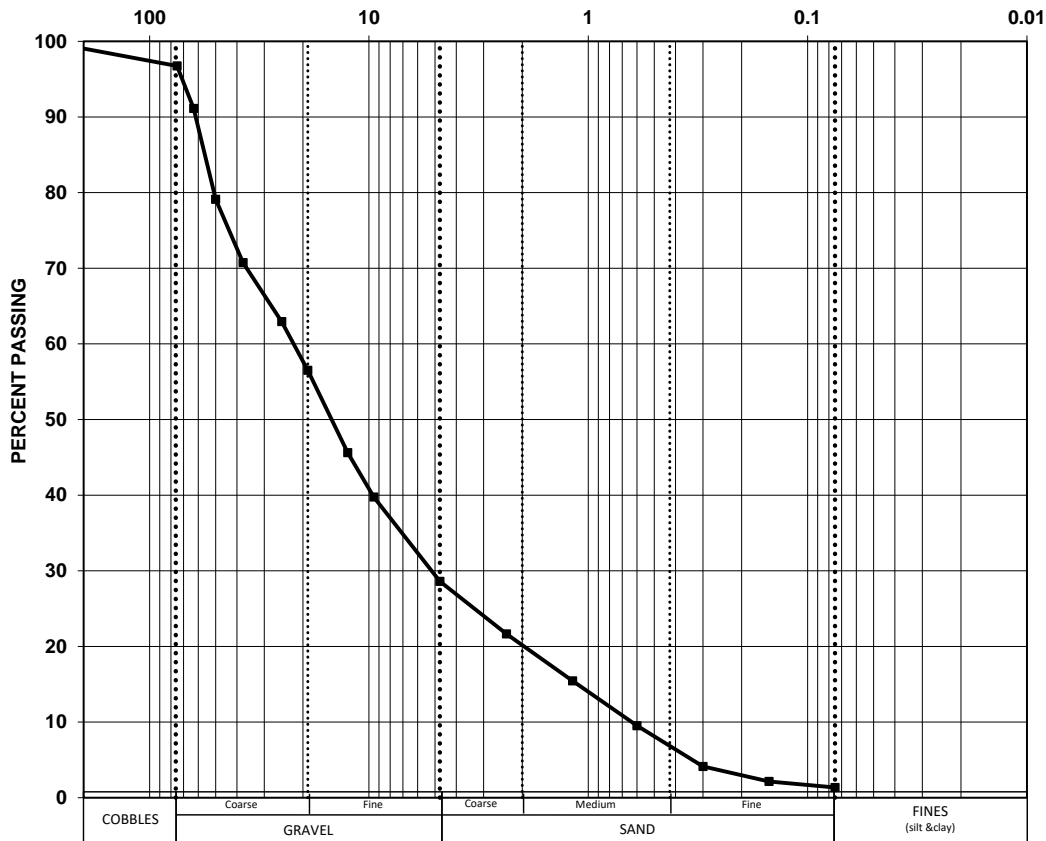
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.2m - 5.5m

DATE TESTED: 30-Aug-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	96.7
63.0	91.1
50.0	79.1
37.5	70.7
25.0	62.9
19.0	56.5
12.5	45.6
9.5	39.7
4.75	28.6
2.36	21.7
1.18	15.4
0.600	9.5
0.300	4.1
0.150	2.1
0.075	1.4

GRAVEL = 71.4%

SAND = 27.2%

FINES = 1.4%

D10 = 0.63

D30 = 5.18

D60 = 22.05

Cu = 34.80

Cc = 1.92

Moisture = 0.7%

Tested Weight (g) = 23,305.6

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.
Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-17

SAMPLED BY: Client

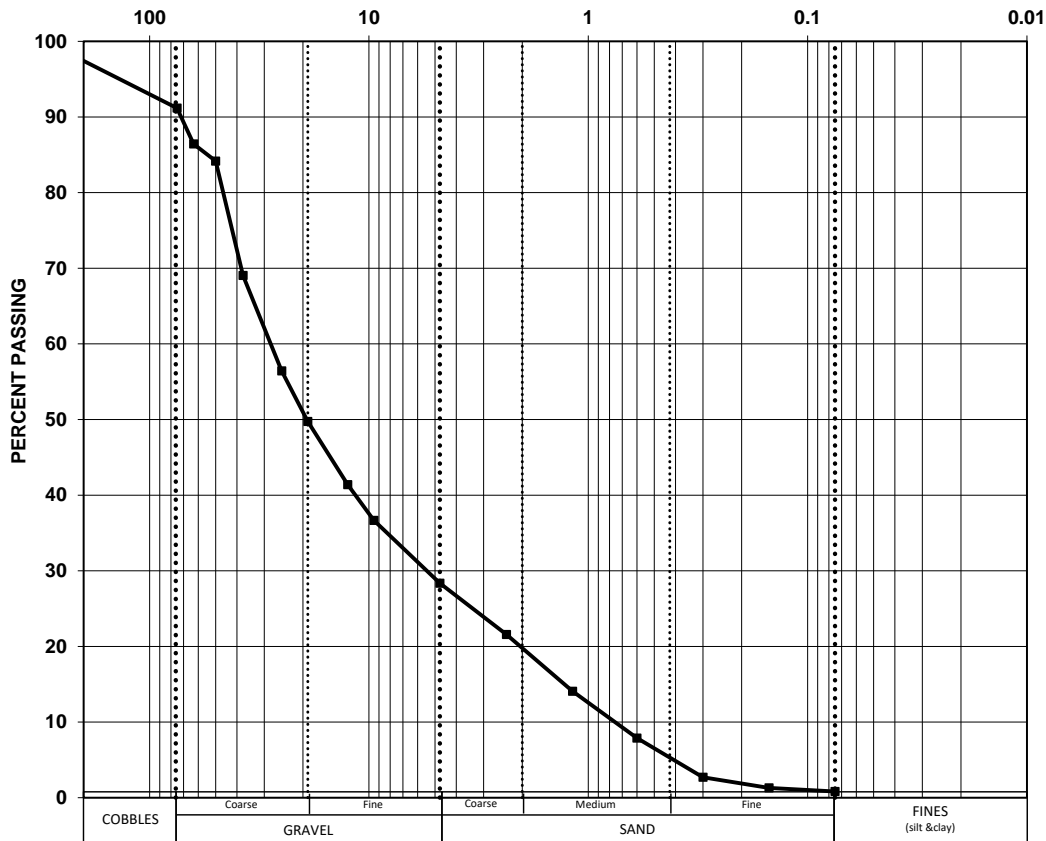
SAMPLE NUMBER: 1

DATE SAMPLED: 15-Aug-2023

DEPTH: 0.2m - 5.5m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	91.2
63.0	86.4
50.0	84.2
37.5	69.0
25.0	56.4
19.0	49.7
12.5	41.4
9.5	36.7
4.75	28.4
2.36	21.6
1.18	14.1
0.600	7.9
0.300	2.7
0.150	1.3
0.075	0.8

GRAVEL = 71.6%

SAND = 27.5%

FINES = 0.8%

D10 = 0.76

D30 = 5.45

D60 = 28.04

Cu = 37.10

Cc = 1.40

Moisture = 0.4%

Tested Weight (g) = 11,238.8

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-18

SAMPLED BY: Client

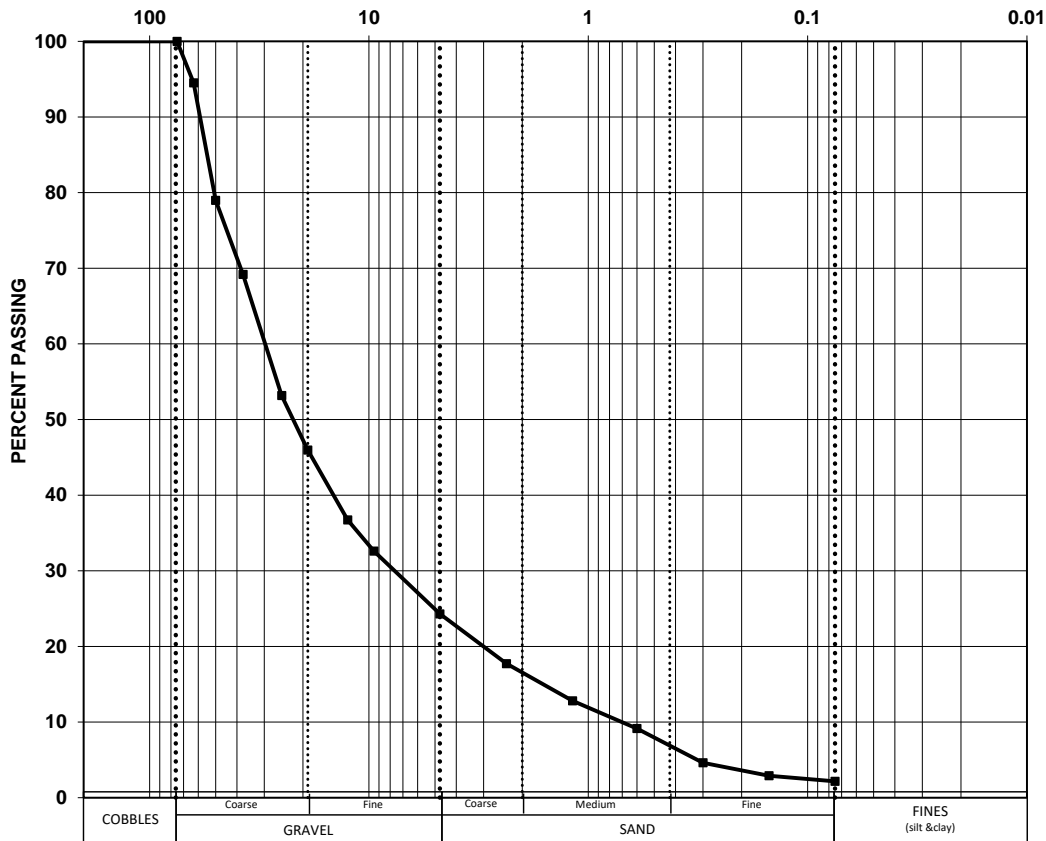
SAMPLE NUMBER: 1

DATE SAMPLED: 16-Aug-2023

DEPTH: 0.7m - 5.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	94.5
50.0	79.0
37.5	69.2
25.0	53.2
19.0	46.0
12.5	36.7
9.5	32.6
4.75	24.3
2.36	17.7
1.18	12.8
0.600	9.1
0.300	4.6
0.150	2.9
0.075	2.2

GRAVEL = 75.7%
SAND = 22.1%
FINES = 2.2%

D10 = 0.70
D30 = 7.64
D60 = 29.72

Cu = 42.27
Cc = 2.80

Moisture = 0.4%

Tested Weight (g) = 9,954.2

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-19

SAMPLED BY: Client

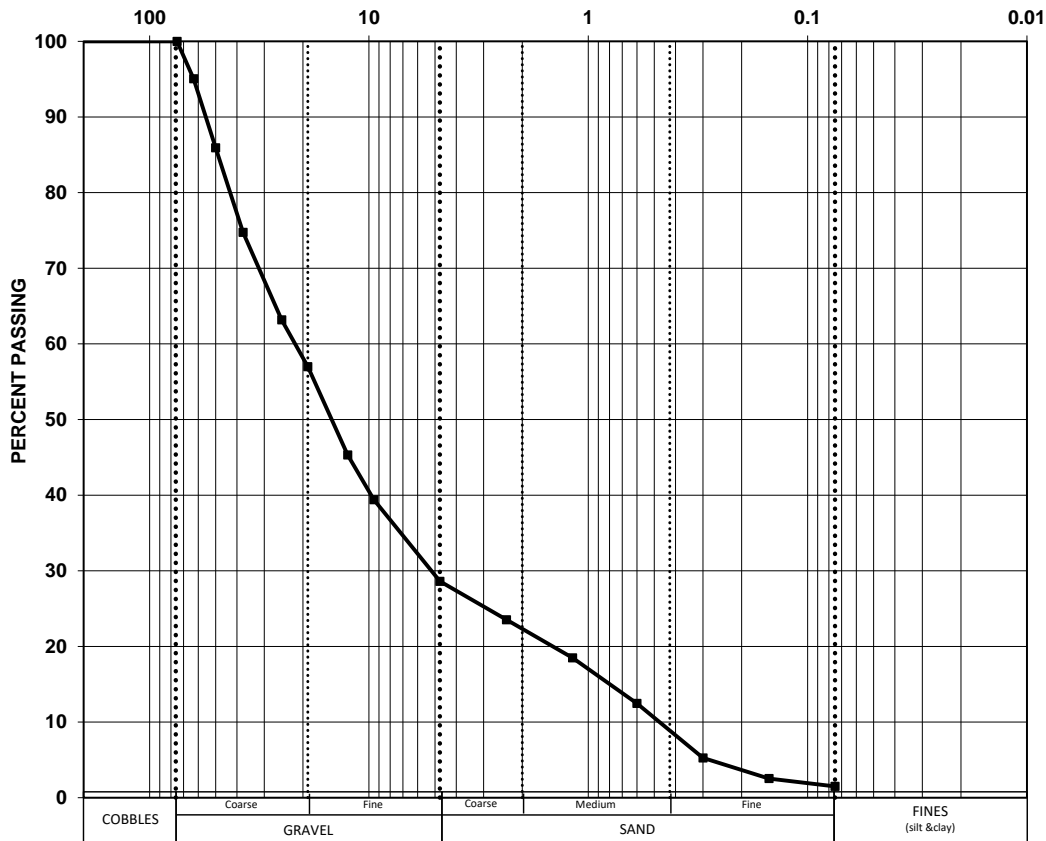
SAMPLE NUMBER: 1

DATE SAMPLED: 16-Aug-2023

DEPTH: 0.4m - 4.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	95.1
50.0	85.9
37.5	74.8
25.0	63.2
19.0	57.0
12.5	45.3
9.5	39.4
4.75	28.6
2.36	23.5
1.18	18.5
0.600	12.5
0.300	5.3
0.150	2.5
0.075	1.5

GRAVEL = 71.4%

SAND = 27.1%

FINES = 1.5%

D10 = 0.47

D30 = 5.19

D60 = 21.71

Cu = 45.87

Cc = 2.63

Moisture = 0.4%

Tested Weight (g) = 11,515.4

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-23

SAMPLED BY: Client

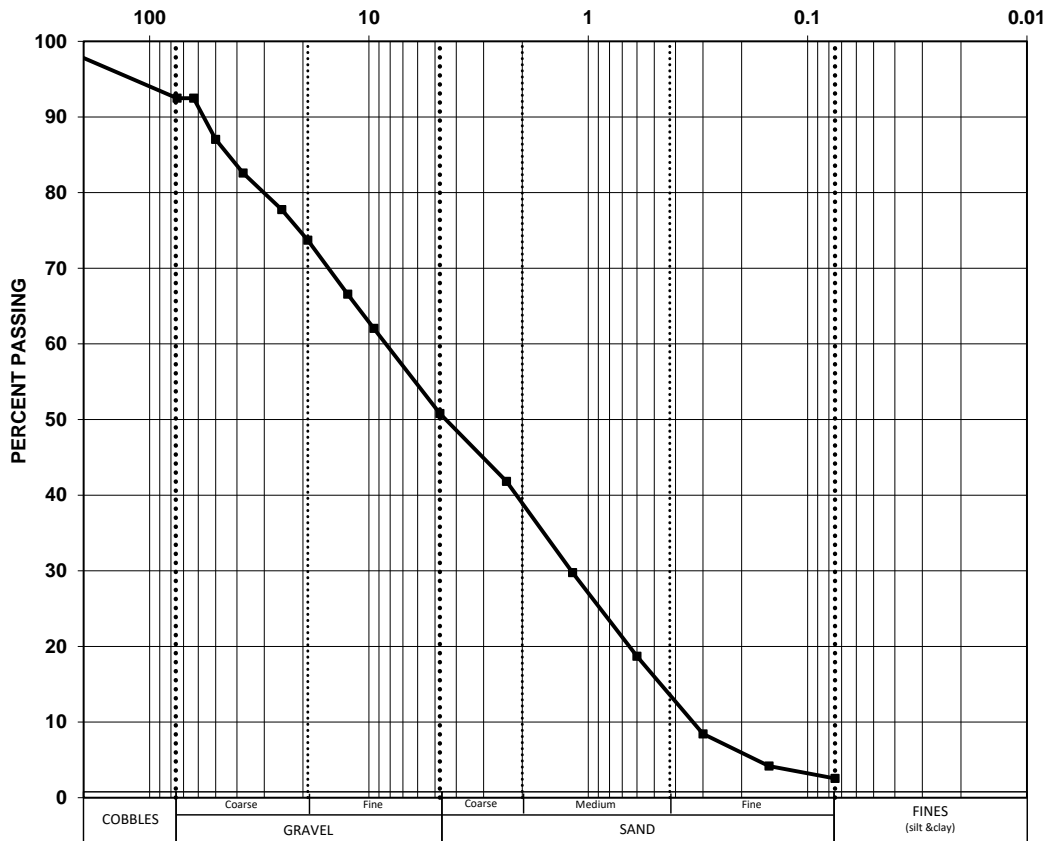
SAMPLE NUMBER: 1

DATE SAMPLED: 16-Aug-2023

DEPTH: 0.0m - 5.0m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	92.5
63.0	92.5
50.0	87.0
37.5	82.6
25.0	77.8
19.0	73.7
12.5	66.6
9.5	62.0
4.75	50.8
2.36	41.8
1.18	29.8
0.600	18.7
0.300	8.4
0.150	4.2
0.075	2.5

GRAVEL = 49.2%
SAND = 48.2%
FINES = 2.5%

D10 = 0.33
D30 = 1.20
D60 = 8.38

Cu = 25.13
Cc = 0.51

Moisture = 0.7%

Tested Weight (g) = 10,655.6

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

GRAIN SIZE DISTRIBUTION

ASTM C136/ ASTM C117



BC Ministry of Transportation

PROJECT: KX13866.100

OFFICE: Prince George, BC

TECHNICIAN: WSP E&I Canada Limited Lab

DATE: 7-Sep-2023

PROJECT NAME: Bastin Creek

TEST PIT NUMBER: TP23-24

SAMPLED BY: Client

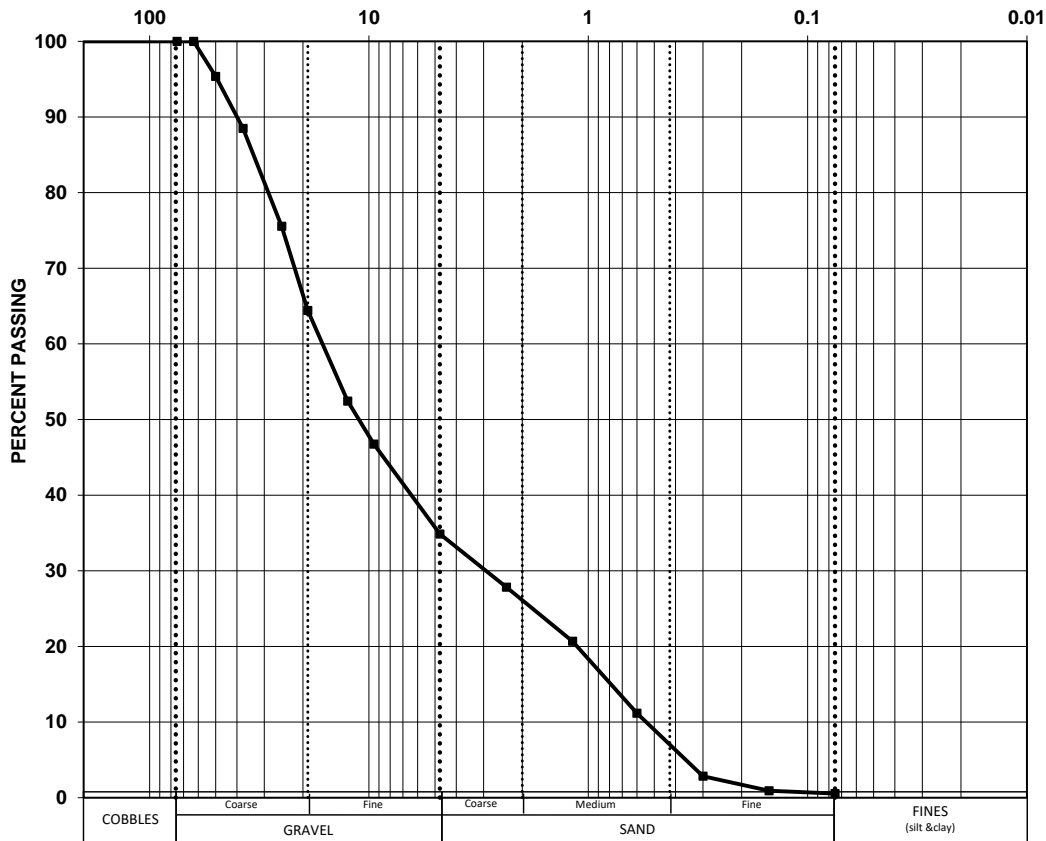
SAMPLE NUMBER: 1

DATE SAMPLED: 16-Aug-2023

DEPTH: 0.9m - 5.5m

DATE TESTED: 5-Sep-2023

GRAIN SIZE IN MILLIMETERS



SUMMARY

Grain size (mm)	Passing (%)
300.0	100.0
75.0	100.0
63.0	100.0
50.0	95.4
37.5	88.5
25.0	75.5
19.0	64.4
12.5	52.4
9.5	46.8
4.75	34.9
2.36	27.8
1.18	20.7
0.600	11.2
0.300	2.8
0.150	0.9
0.075	0.5

GRAVEL = 65.1%

SAND = 34.3%

FINES = 0.5%

D10 = 0.54

D30 = 2.93

D60 = 15.98

Cu = 29.34

Cc = 0.99

Moisture = 0.4%

Tested Weight (g) = 11,515.8

COMMENTS:

Reported by: Brian McLeod

Reviewed by: Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Bulk Relative Density of Aggregates



Client: BC Ministry of Transportation Date Sampled: 14-Aug-23
 Project No.: KX13866.100 Sampled by: Client
 Project Name: Bastin Pit Coarse Tested by: B. McLeod
 Test Pit Number: TP23-04 Coarse Tested: 06-Sep-23
 Sample Number: NA Fine Tested by: G. Michaud
 Depth: 0.3m - 5.2m Fine Tested: 12-Sep-23

Coarse Aggregate - ASTM C127

Retained on the 4.75mm sieve

Sample was oven dried, washed and soaked for 24 +/- 4 hrs

AVG

Mass of Pan in Air		392.5	389.0	397.3	
Sat. Surf. Dry Mass Agg. + Pan in Air		1841.7	1907.6	1830.5	
Sat. Surf. Dry Mass in Water	(C)	911.0	954.3	902.1	
Dry Mass Agg. + Pan in Air		1824.0	1889.9	1813.5	
Sat. Surf. Dry Mass Agg. in Air	(B)	1449.2	1518.6	1433.2	
Mass of Dry Agg. in Air	(A _c)	1431.5	1500.9	1416.2	
Diff. in SS Mass		538.2	564.3	531.1	
Mass Absorbed Water		893.3	936.6	885.1	
Bulk Relative Density (Oven-dried)	$A_c/(B-C)$	2.660	2.660	2.667	2.662
Bulk Relative Density (SSD)	$B/(B-C)$	2.693	2.691	2.699	2.694
Apparent Relative Density	$A_c/(B-C)$	2.660	2.660	2.667	2.662
Percent Water Absorption	$(B-A_c/A_c) * 100$	1.24	1.18	1.20	(C _{abs}) 1.21

Fine Aggregate - ASTM C128

Passing the 4.75mm sieve

Sample was oven dried, washed and soaked for 24 +/- 4

AVG

Mass of Water to Calibrate Flask	(W _c)	499.45	499.37	
Mass of Flask	(X)	168.94	176.91	
Mass of Flask & Water		258.03	272.74	
Mass of SS Dry Aggregate	(Y)	492.16	505.13	
Mass of Flask + SS Dry Agg. + Water	(Z)	975.59	991.89	
Mass of Pan in Air		411.21	412.39	
Mass of Dry Agg. + Pan in Air		896.07	910.19	
Mass of Added Water	(Z - Y)	(W _a) 314.49	309.85	
Mass of Dry Agg. in Air	(A _f)	484.86	497.80	
Diff. in Water Mass	(W _c -W _a)	184.96	189.52	
Mass Absorbed Water	(Y-X-A _f)	7.30	7.33	
Bulk Relative Density (Oven-dried)	$A_f/(W_c - W_a)$	2.621	2.627	2.624
Bulk Relative Density (SSD)	$Y/(W_c - W_a)$	2.661	2.665	2.663
Apparent Relative Density	$A_f/(A_f+W_c+X-Z)$	2.729	2.732	2.731
Percent Water Absorption	$(Y-X-A_f)/A_f * 100$	1.51	1.47	(F _{abs}) 1.49

Reported by:

Brian McLeod

Reviewed by:

Bradley Jackman



Reporting of these test results constitutes a testing service only. Additional sample information available on request.

Engineering interpretation or evaluation of the test results is provided only on written request.

WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Bulk Relative Density of Aggregates



Client: BC Ministry of Transportation Date Sampled: 15-Aug-23
 Project No.: KX13866.100 Sampled by: Client
 Project Name: Bastin Pit Coarse Tested by: B. McLeod
 Test Pit Number: TP23-15 Coarse Tested: 06-Sep-23
 Sample Number: NA Fine Tested by: G. Michaud
 Depth: 0.7m - 6.0m Fine Tested: 12-Sep-23

Coarse Aggregate - ASTM C127

Retained on the 4.75mm sieve

Sample was oven dried, washed and soaked for 24 +/- 4 hrs

AVG

Mass of Pan in Air		391.0	398.7	399.9	
Sat. Surf. Dry Mass Agg. + Pan in Air		1222.7	1283.3	1227.8	
Sat. Surf. Dry Mass in Water	(C)	517.2	549.7	517.0	
Dry Mass Agg. + Pan in Air		1206.2	1265.2	1212.4	
Sat. Surf. Dry Mass Agg. in Air	(B)	831.7	884.6	827.9	
Mass of Dry Agg. in Air	(A _c)	815.2	866.5	812.5	
Diff. in SS Mass		314.5	334.9	310.9	
Mass Absorbed Water		500.7	531.6	501.6	
Bulk Relative Density (Oven-dried)	$A_c/(B-C)$	2.592	2.587	2.613	2.598
Bulk Relative Density (SSD)	$B/(B-C)$	2.645	2.641	2.663	2.650
Apparent Relative Density	$A_c/(B-C)$	2.592	2.587	2.613	2.598
Percent Water Absorption	$(B-A_c/A_c) * 100$	2.02	2.09	1.90	(C _{abs}) 2.00

Fine Aggregate - ASTM C128

Passing the 4.75mm sieve

Sample was oven dried, washed and soaked for 24 +/- 4

AVG

Mass of Water to Calibrate Flask	(W _c)	499.42	499.75	
Mass of Flask	(X)	171.89	174.01	
Mass of Flask & Water		269.83	311.32	
Mass of SS Dry Aggregate	(Y)	506.86	498.76	
Mass of Flask + SS Dry Agg. + Water	(Z)	985.18	982.35	
Mass of Pan in Air		379.29	271.09	
Mass of Dry Agg. + Pan in Air		875.29	759.17	
Mass of Added Water	(Z - Y)	(W _a) 306.43	309.58	
Mass of Dry Agg. in Air	(A _f)	496.00	488.08	
Diff. in Water Mass	(W _c -W _a)	192.99	190.17	
Mass Absorbed Water	(Y-X-A _f)	10.86	10.68	
Bulk Relative Density (Oven-dried)	$A_f/(W_c - W_a)$	2.570	2.567	2.568
Bulk Relative Density (SSD)	$Y/(W_c - W_a)$	2.626	2.623	2.625
Apparent Relative Density	$A_f/(A_f+W_c+X-Z)$	2.723	2.719	2.721
Percent Water Absorption	$(Y-X-A_f)/A_f * 100$	2.19	2.19	(F _{abs}) 2.19

Reported by:

Brian McLeod

Reviewed by:

Bradley Jackman



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WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Sand Equivalent Test
ASTM D2419



Client: BCMOTI
 Project No.: KX13866.100
 Project Name: Bastin Pit
 Source: TP23-04
 Depth: 0.3m - 5.2m
 Type of Sample: Sand

Date Sampled: 14-Aug-2023
 Sampled By: Client
 Date Tested: 6-Sep-2023
 Tested by: B. McLeod

Trial #	1	2	Average
Clay Height (mm):	5.4	5.5	
Sediment Period:	20 mins	20 mins	
Sand Height (mm):	3.5	3.8	
Sand Equivalent:	65	70	68

Calculation: Sand Equivalent (SE) = (Sand Height / Clay Height) x 100

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction;
 - Section 202, Table 202-B for acceptable values for :
 - any base course is 40 or greater
 - HFSA, SGSB, IGSB, OGSB and BEF is 20 or greater
 - Section 502.06.05 for acceptable values of:
 -not less than 40 for regular paving aggregates
 -not less than 45 for Superpave mixes
 - A petrographic analysis may be required if material fails to meet these specifications.

Reported by: 
 Glenda Michaud

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Sand Equivalent Test
ASTM D2419



Client: BCMOTI
 Project No.: KX13866.100
 Project Name: Bastin Pit
 Source: TP23-11
 Depth: 1.4m - 4.0m
 Type of Sample: Sand


Date Sampled: 15-Aug-2023
 Sampled By: Client
 Date Tested: 6-Sep-2023
 Tested by: B. McLeod

Trial #	1	2	Average
Clay Height (mm):	5.7	5.7	
Sediment Period:	20 mins	20 mins	
Sand Height (mm):	4.2	4.1	
Sand Equivalent:	74	72	73

Calculation: Sand Equivalent (SE) = (Sand Height / Clay Height) x 100

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction;
 - Section 202, Table 202-B for acceptable values for :
 - any base course is 40 or greater
 - HFSA, SGSB, IGSB, OGSB and BEF is 20 or greater
 - Section 502.06.05 for acceptable values of:
 -not less than 40 for regular paving aggregates
 -not less than 45 for Superpave mixes
 - A petrographic analysis may be required if material fails to meet these specifications.

Reported by: 
 Glenda Michaud

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Sand Equivalent Test
ASTM D2419



Client: BCMOTI
 Project No.: KX13866.100
 Project Name: Bastin Pit
 Source: TP23-16
 Depth: 0.2m - 5.5m
 Type of Sample: Sand

Date Sampled: 15-Aug-2023
 Sampled By: Client
 Date Tested: 1-Sep-2023
 Tested by: B. McLeod

Trial #	1	2	Average
Clay Height (mm):	5.6	5.5	
Sediment Period:	20 mins	20 mins	
Sand Height (mm):	3.5	3.6	
Sand Equivalent:	63	66	65

Calculation: Sand Equivalent (SE) = (Sand Height / Clay Height) x 100

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction;
 - Section 202, Table 202-B for acceptable values for :
 - any base course is 40 or greater
 - HFSA, SGSB, IGSB, OGSB and BEF is 20 or greater
 - Section 502.06.05 for acceptable values of:
 -not less than 40 for regular paving aggregates
 -not less than 45 for Superpave mixes
 - A petrographic analysis may be required if material fails to meet these specifications.

Reported by: 
 Glenda Michaud

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9

Coarse Aggregate Micro-Deval Abrasion
ASTM D6928




Client: BCMOTI
 Project No.: KX13866.100
 Project Name: Bastin Creek
 Max Aggregate Size: 19mm


Date Sampled: August 14 - August 15, 2023
 Sampled By: Client
 Date Tested: B. McLeod
 Tested by: Aug. 31 - Sept 12, 2023

Grading	Sample ID	Initial Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	DM (CA) % Loss (A-B)*100/A
8.2	TP23-04	1500.9	1398.5	102.4	6.8
8.2	TP23-11	1499.8	1402.6	97.2	6.5
8.2	TP23-16	1501.4	1403.7	97.7	6.5
8.2	Control	1499.9	1297.1	202.8	13.5

Average Loss of Drain Brothers Control Sample is 13.1%. The acceptable range is 11.4% to 14.8%.

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction;
 - Section 202, Table 202-B for acceptable values of coarse aggregate for :
 - HFSA, 25mm and 50mm base course, IGSB and OGSB is 25 or less
 - SGSB and BEF is 30 or less
 - 75mm base course is 17 or less
 - Section 502, Table 502-B for acceptable value of coarse aggregate for :
 -Superpave and Class 1 aggregates is 18 or less
 -Class 2 aggregates is 20 or less.
 - A petrographic analysis may be required if material fails to meet these specifications.

Reported by: 
 Brian McLeod

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9


**Clay Lumps in Natural Aggregate
ASTM C142**




Client:	BCMOTI	Sampled by:	Client
Project No.:	KX13866.100	Date Sampled:	14-Aug-2023
Project Name:	Bastin Pit	Date Tested:	7-Sep-2023
Source:	TP23-02	Tested by:	S. Chen
Depth:	0.5m - 5.2m		

Size of Particles	Original Sieve Mass g	Original Percent Retained %	Mass of Fraction g	Mass After Removal of Clay g	Clay Lumps %	Weighted Average Clay Lumps %
Coarse Aggregate						
Mass of Sample (g) 5568.4						
19mm to 37.5mm	2771.9	49.8	2766.9	2763.9	0.11	0.1
9.5mm to 19.0mm	1619	29.1	1615.1	1611.7	0.21	0.1
4.75mm to 9.5mm	1177.5	21.1	993.2	990.7	0.25	0.1
		100.0			Total:	0.2

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction:
 - Section 211, Table 211-F for allowable percent loss.
 - Section 502, Table 502-B for allowable percent loss.
 Refer to CSA A23.1 2019 Concrete Materials and Methods of Concrete Construction:
 - Table 12 for allowable percent loss.

Reported by: 
 Brian McLeod

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9


Clay Lumps in Natural Aggregate
ASTM C142




Client:	BCMOTI	Sampled by:	Client
Project No.:	KX13866.100	Date Sampled:	15-Aug-2023
Project Name:	Bastin Pit	Date Tested:	7-Sep-2023
Source:	TP23-08	Tested by:	S. Chen
Depth:	0.1m - 4.6m		

Size of Particles	Original Sieve Mass g	Original Percent Retained %	Mass of Fraction g	Mass After Removal of Clay g	Clay Lumps %	Weighted Average Clay Lumps %
Coarse Aggregate						
Mass of Sample (g) 10319.8						
19mm to 37.5mm	3561.8	34.5	3019.9	3016.3	0.12	0.0
9.5mm to 19.0mm	3824.3	37.1	1999.7	1990.7	0.45	0.2
4.75mm to 9.5mm	2933.7	28.4	992.7	990.4	0.23	0.1
		100.0			Total:	0.3

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction:
 - Section 211, Table 211-F for allowable percent loss.
 - Section 502, Table 502-B for allowable percent loss.
 Refer to CSA A23.1 2019 Concrete Materials and Methods of Concrete Construction:
 - Table 12 for allowable percent loss.

Reported by: 
 Brian McLeod

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9


Clay Lumps in Natural Aggregate
ASTM C142




Client:	BCMOTI	Sampled by:	Client
Project No.:	KX13866.100	Date Sampled:	15-Aug-2023
Project Name:	Bastin Pit	Date Tested:	7-Sep-2023
Source:	TP23-16	Tested by:	S. Chen
Depth:	0.2m - 5.5m		

Size of Particles	Original Sieve Mass g	Original Percent Retained %	Mass of Fraction g	Mass After Removal of Clay g	Clay Lumps %	Weighted Average Clay Lumps %
Coarse Aggregate						
Mass of Sample (g) 8775.0						
19mm to 37.5mm	3318.3	37.8	2998.1	2994.7	0.11	0.0
9.5mm to 19.0mm	2858.5	32.6	2002.4	1996.3	0.30	0.1
4.75mm to 9.5mm	2598.2	29.6	1002.3	999.3	0.30	0.1
		100.0			Total:	0.2

Comments: Refer to BCMoT 2020 Standard Specifications for Highway Construction:
 - Section 211, Table 211-F for allowable percent loss.
 - Section 502, Table 502-B for allowable percent loss.
 Refer to CSA A23.1 2019 Concrete Materials and Methods of Concrete Construction:
 - Table 12 for allowable percent loss.

Reported by: 
 Brian McLeod

Reviewed by: 
 Bradley Jackman



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 WSP E&I Canada Limited 3456 Opie Crescent Prince George, BC V2N 2P9