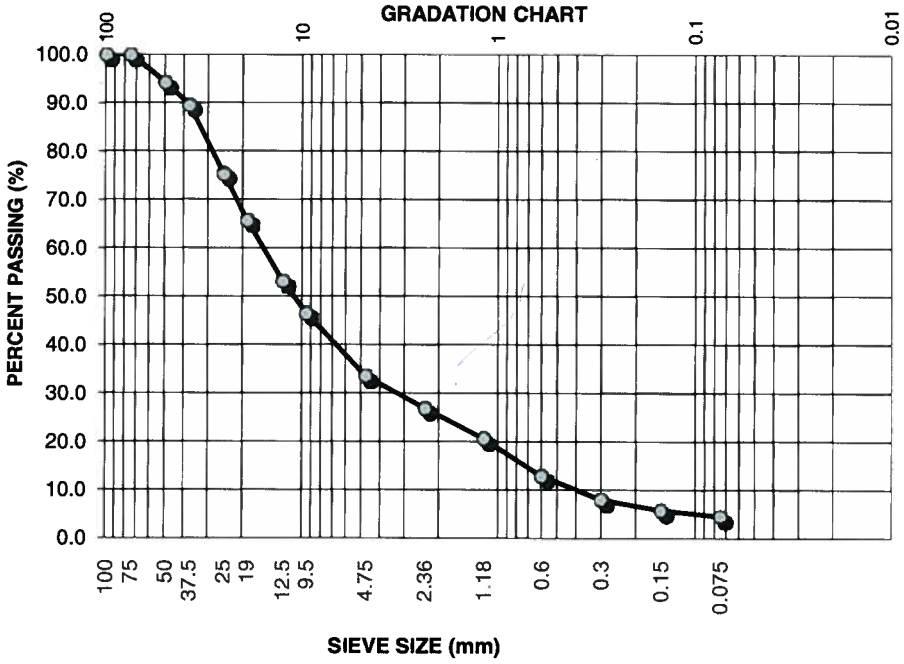
AMEC Environment & Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia
Canada, V4N 3P9
Tel: 604-295-8657
Fax: 604-295-8658

SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 11-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-1
Bag No.: 342
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	94	-	
37.5	90	-	
25	75	-	
19	66	-	
12.5	53	-	
9.5	47	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	34	-	
2.36	27	-	
1.18	21	-	
0.6	13	-	
0.3	8	-	
0.15	6	-	
0.075	4.5	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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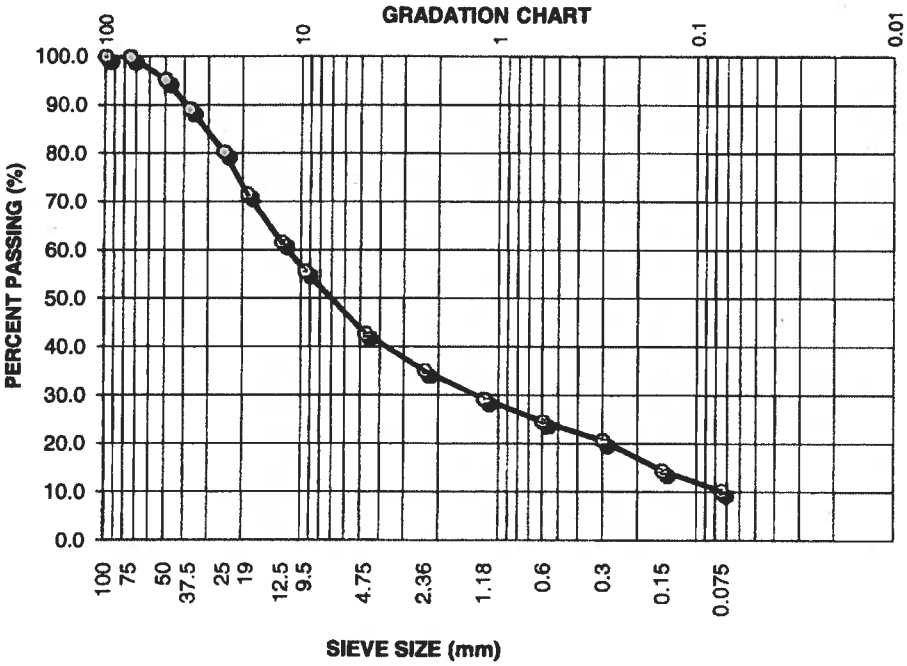
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 16-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-2
Bag No.: 343
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Gradation Limits Upper
100	100	-	
75	100	-	
50	95	-	
37.5	89	-	
25	80	-	
19	72	-	
12.5	62	-	
9.5	56	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Gradation Limits Upper
4.75	43	-	
2.36	35	-	
1.18	29	-	
0.6	25	-	
0.3	21	-	
0.15	15	-	
0.075	10	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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CLIENT: Ministry of Transportation & Infrastructure
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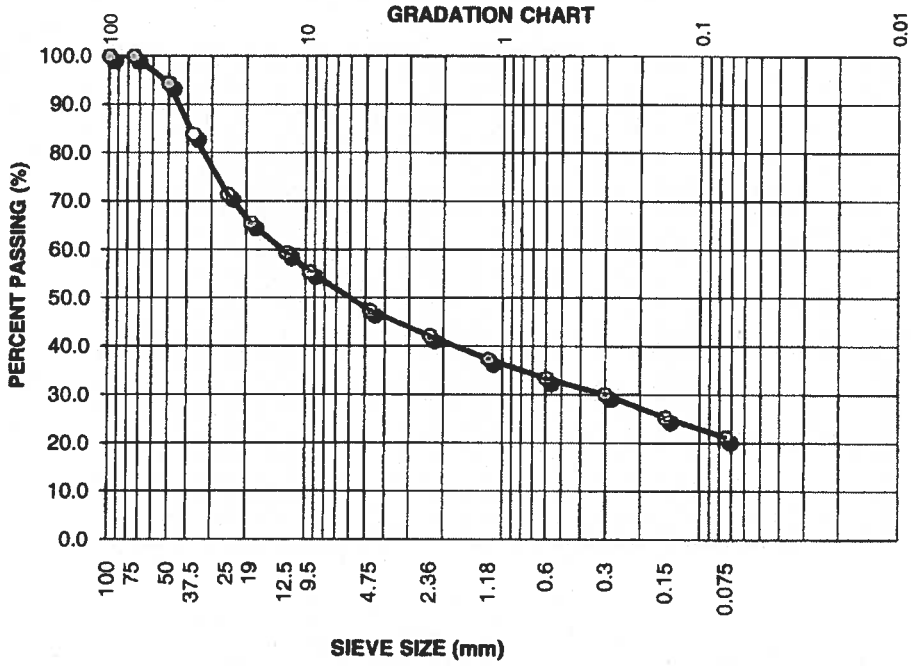
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-3
Bag No.: 344
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	94	-	
37.5	84	-	
25	72	-	
19	66	-	
12.5	59	-	
9.5	55	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	47	-	
2.36	42	-	
1.18	37	-	
0.6	33	-	
0.3	30	-	
0.15	25	-	
0.075	21	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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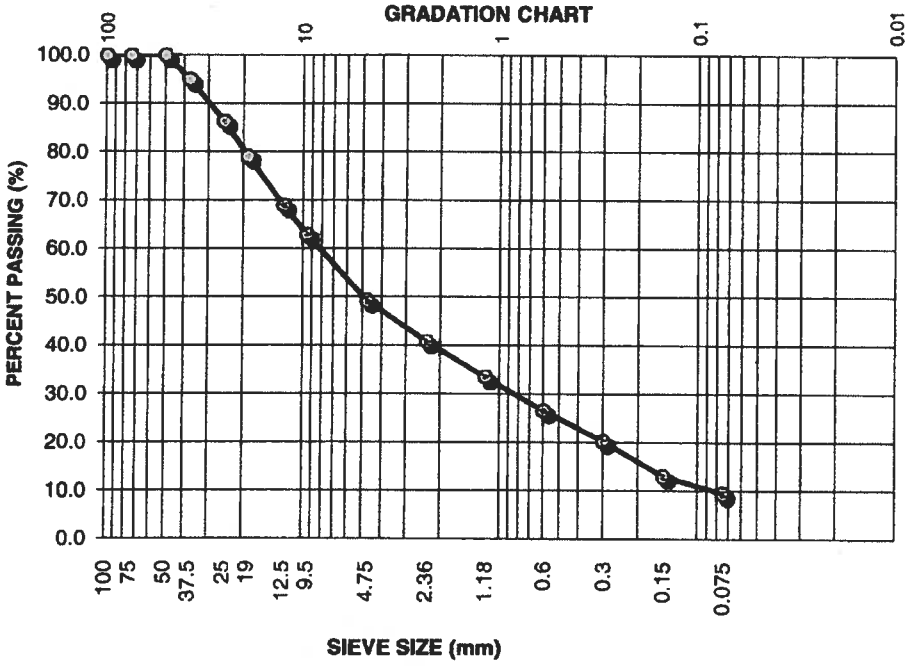
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 9-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-3
Bag No.: 345
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	95	-	
25	86	-	
19	79	-	
12.5	69	-	
9.5	63	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	49	-	
2.36	41	-	
1.18	34	-	
0.6	27	-	
0.3	20	-	
0.15	13	-	
0.075	10	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
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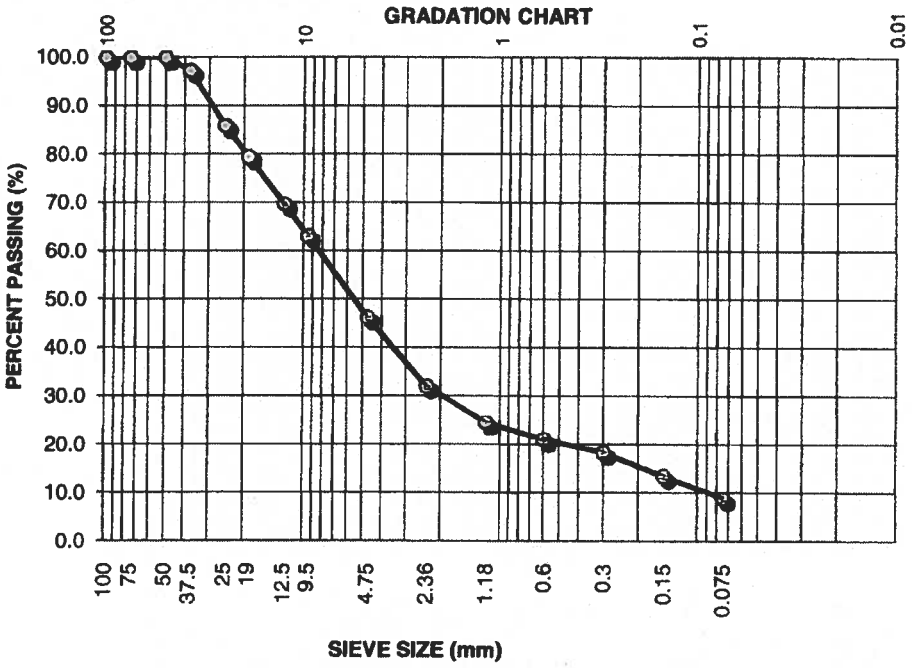
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-4
Bag No.: 346
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	97	-	
25	86	-	
19	79	-	
12.5	70	-	
9.5	63	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	46	-	
2.36	32	-	
1.18	25	-	
0.6	21	-	
0.3	18	-	
0.15	13	-	
0.075	9	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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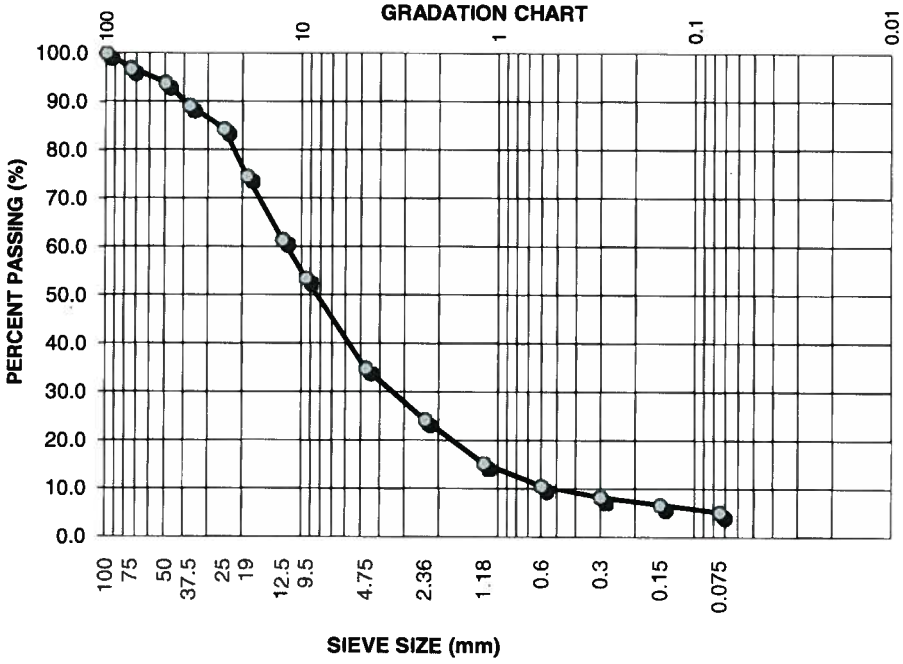
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 16-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-5
Bag No.: 347
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	97	-	
50	94	-	
37.5	89	-	
25	84	-	
19	75	-	
12.5	61	-	
9.5	53	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	35	-	
2.36	24	-	
1.18	15	-	
0.6	11	-	
0.3	8	-	
0.15	7	-	
0.075	5.1	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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Materials Engineer

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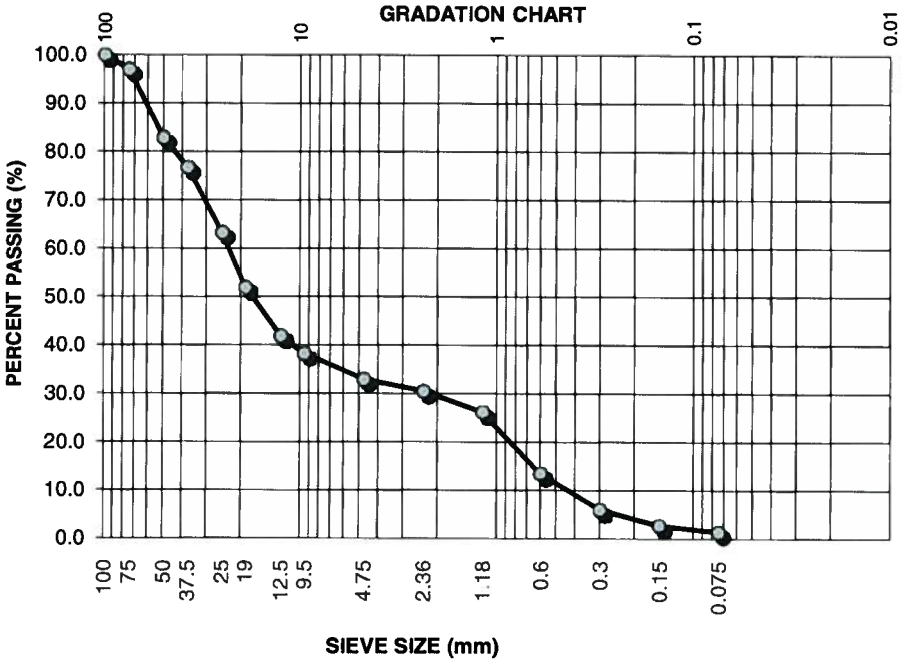
Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 11-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-6
Bag No.: 349
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	97	-	
50	83	-	
37.5	77	-	
25	63	-	
19	52	-	
12.5	42	-	
9.5	38	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	33	-	
2.36	31	-	
1.18	26	-	
0.6	13	-	
0.3	6	-	
0.15	3	-	
0.075	1.4	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
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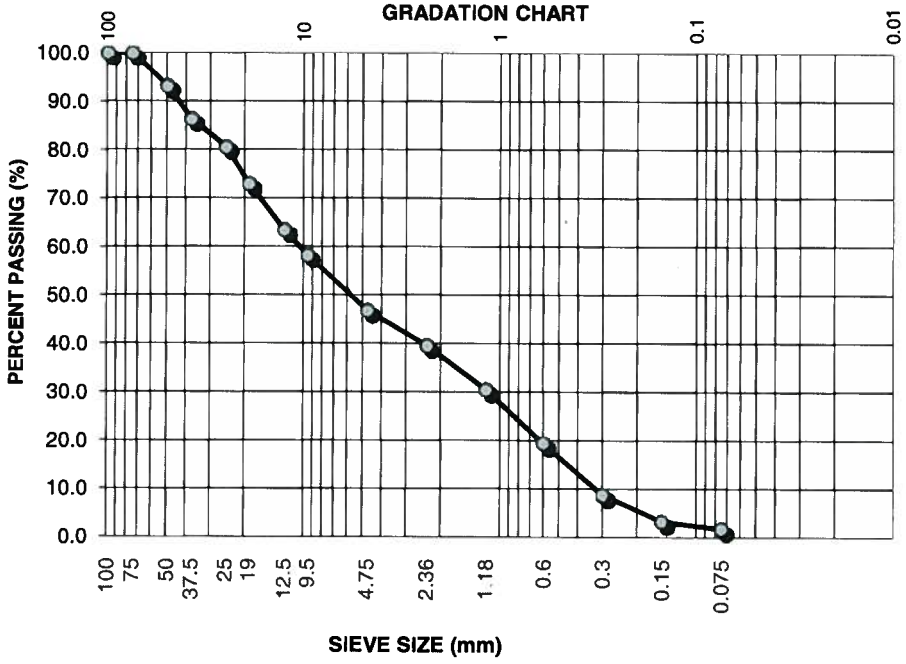
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 9-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-7
Bag No.: 360
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	93	-	
37.5	86	-	
25	81	-	
19	73	-	
12.5	63	-	
9.5	58	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	47	-	
2.36	40	-	
1.18	31	-	
0.6	19	-	
0.3	9	-	
0.15	3	-	
0.075	1.7	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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Materials Engineer

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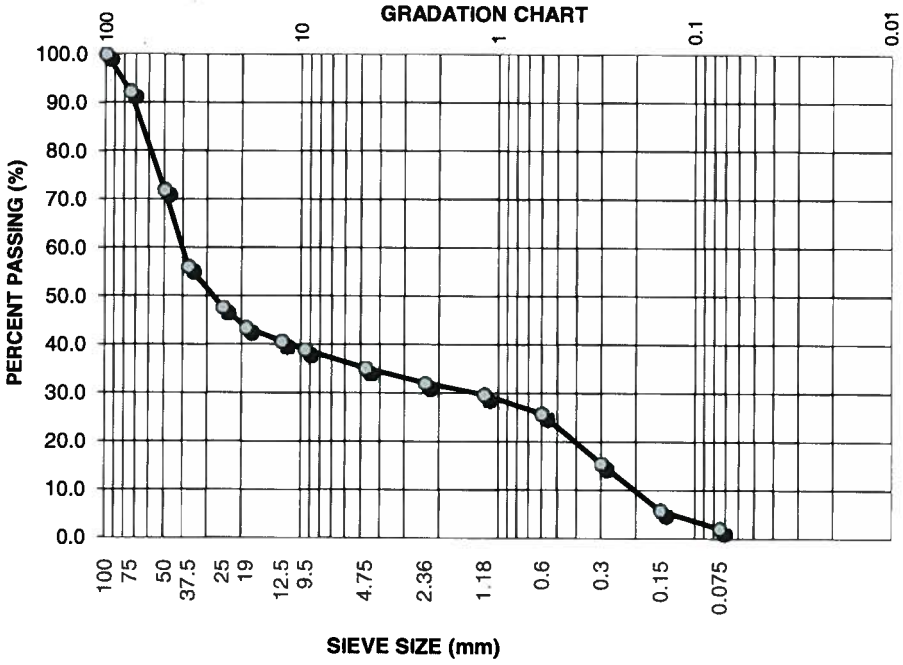
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-8
Bag No.: 348
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	92	-	
50	72	-	
37.5	56	-	
25	48	-	
19	43	-	
12.5	41	-	
9.5	39	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	35	-	
2.36	32	-	
1.18	30	-	
0.6	26	-	
0.3	15	-	
0.15	6	-	
0.075	2.0	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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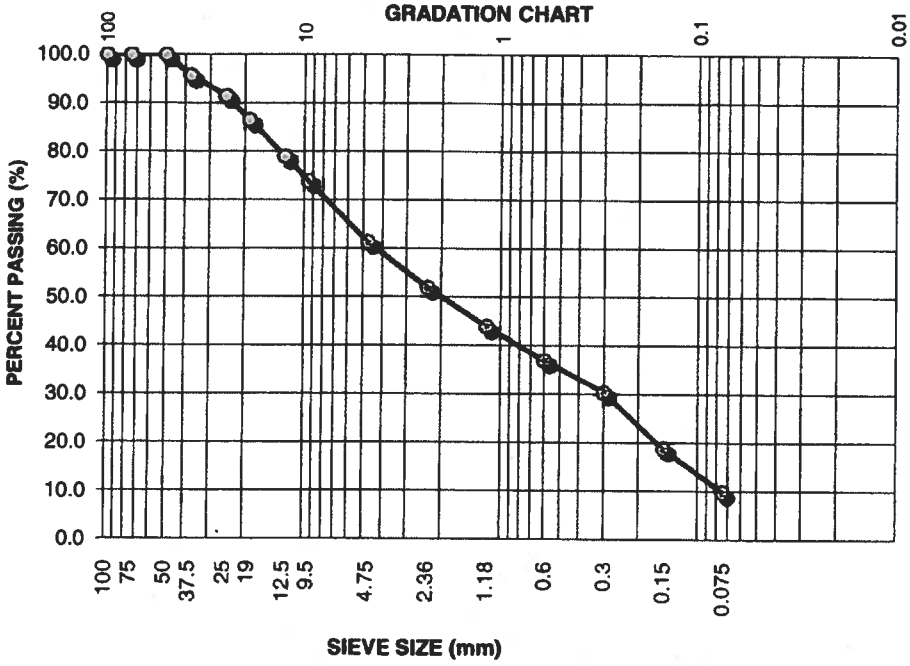
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-10
Bag No.: 393
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	96	-	
25	92	-	
19	87	-	
12.5	79	-	
9.5	74	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	61	-	
2.36	52	-	
1.18	44	-	
0.6	37	-	
0.3	30	-	
0.15	19	-	
0.075	10	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
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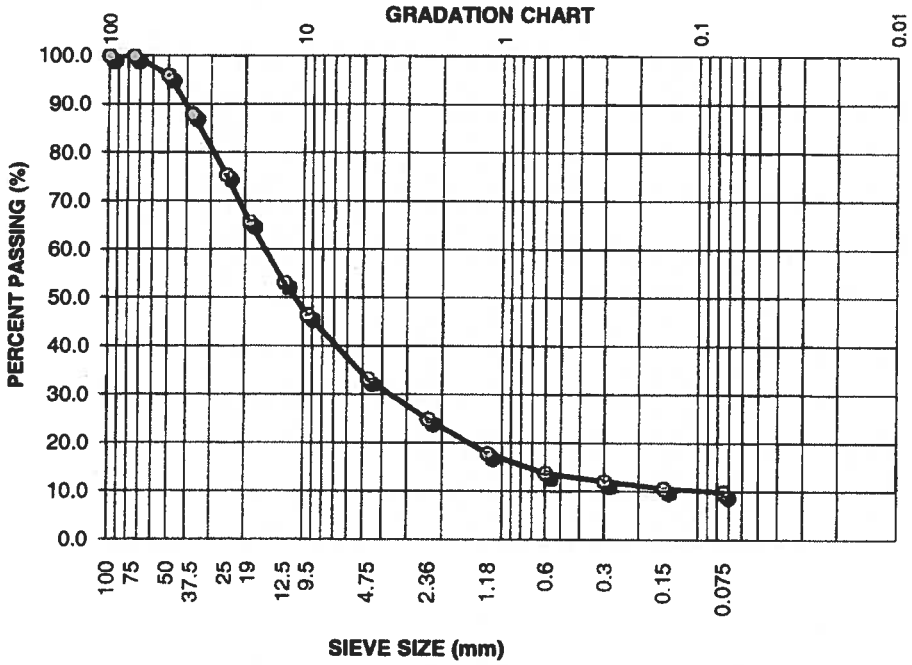
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 9-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-11
Bag No.: 392
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	96	-	
37.5	88	-	
25	75	-	
19	66	-	
12.5	53	-	
9.5	46	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	33	-	
2.36	25	-	
1.18	18	-	
0.6	14	-	
0.3	12	-	
0.15	11	-	
0.075	10	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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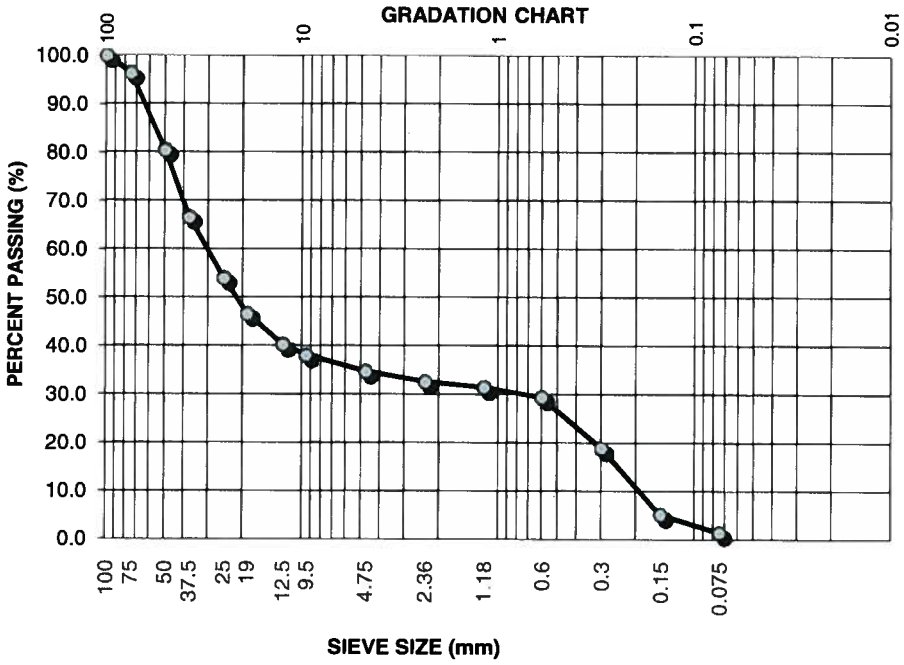
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-13
Bag No.: 395
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	96	-	
50	81	-	
37.5	67	-	
25	54	-	
19	47	-	
12.5	40	-	
9.5	38	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	35	-	
2.36	33	-	
1.18	31	-	
0.6	29	-	
0.3	19	-	
0.15	5	-	
0.075	1.4	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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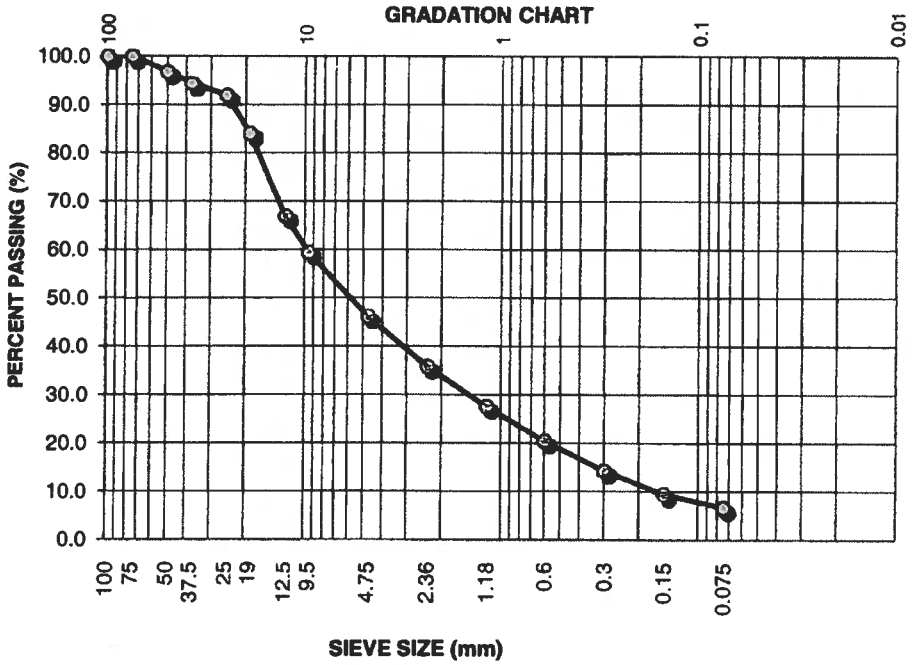
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 7-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-14
Bag No.: 359
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	97	-	
37.5	94	-	
25	92	-	
19	84	-	
12.5	67	-	
9.5	59	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	46	-	
2.36	36	-	
1.18	28	-	
0.6	20	-	
0.3	14	-	
0.15	10	-	
0.075	7	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
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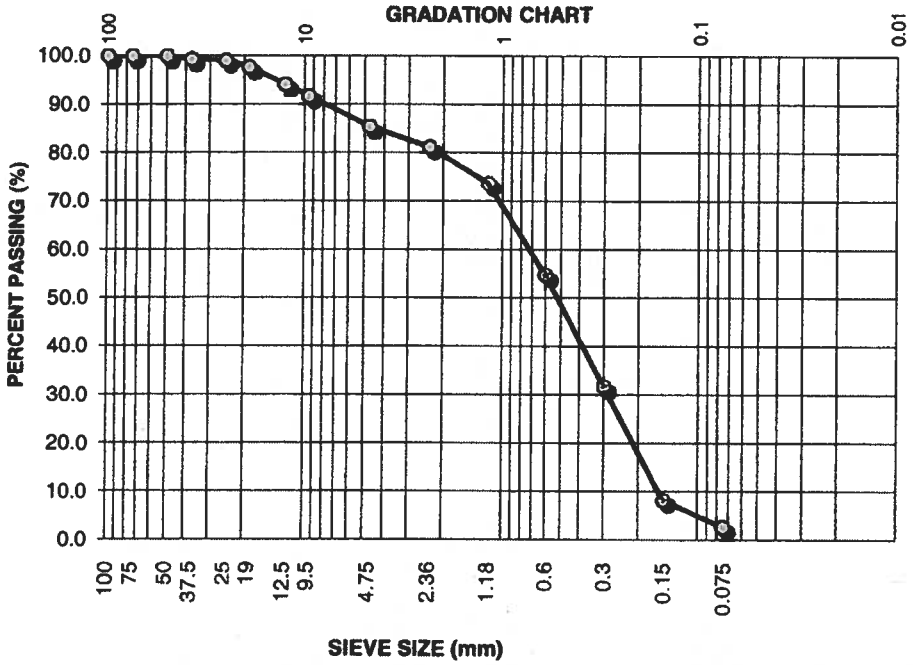
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 7-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-14
Bag No.: 357
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	99	-	
25	99	-	
19	98	-	
12.5	94	-	
9.5	92	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	85	-	
2.36	81	-	
1.18	74	-	
0.6	55	-	
0.3	32	-	
0.15	8	-	
0.075	3	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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Materials Engineer

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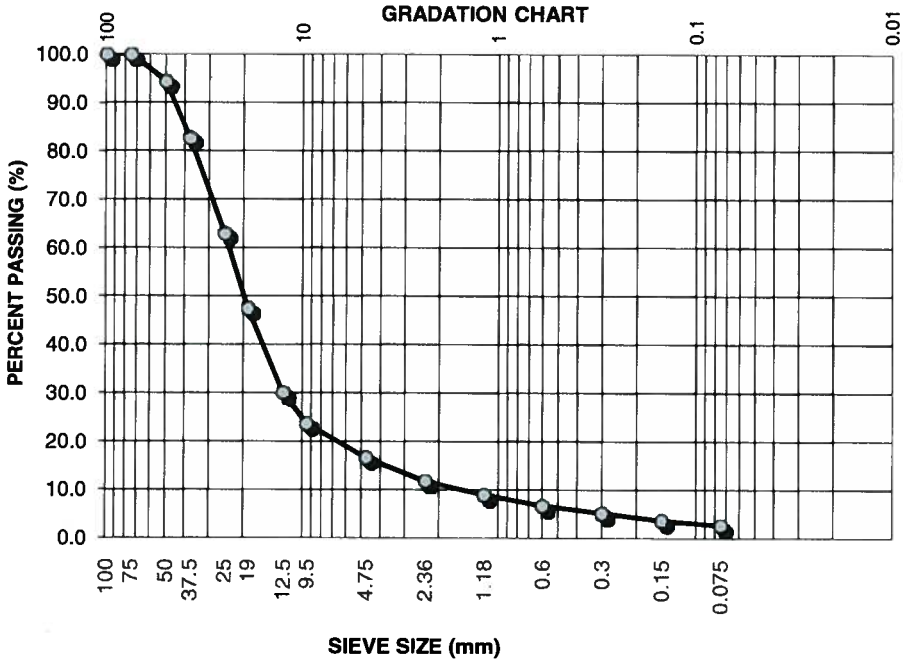
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-15
Bag No.: 356
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	94	-	
37.5	83	-	
25	63	-	
19	47	-	
12.5	30	-	
9.5	24	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	17	-	
2.36	12	-	
1.18	9	-	
0.6	7	-	
0.3	5	-	
0.15	4	-	
0.075	2.6	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
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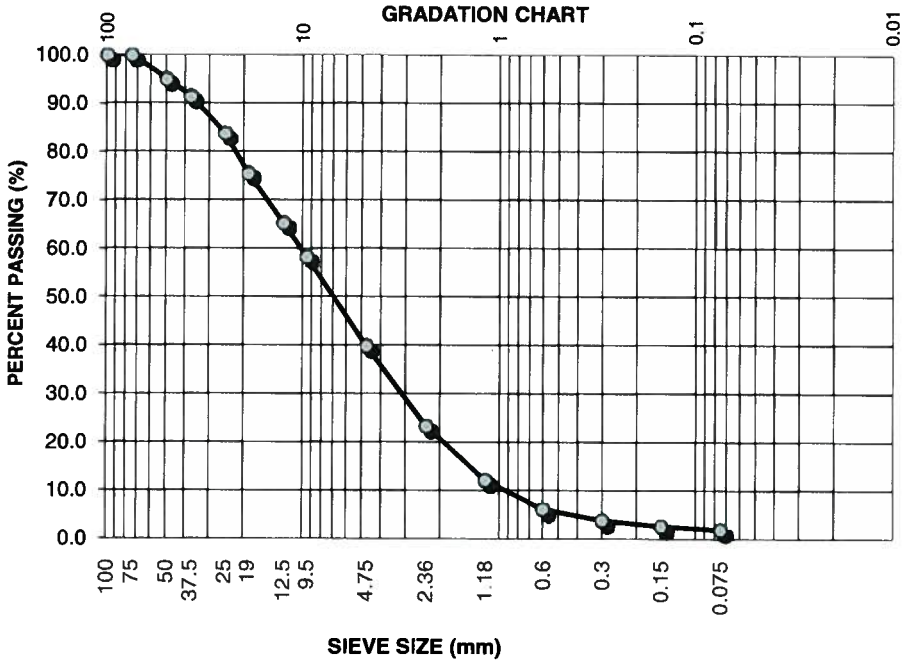
ATTN: Steve Likness

Project Number: VA06707-109
Date: 13-Sep-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4331

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 7-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-16
Bag No.: 358
Material Type: Pit Run

Gravel Sizes (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
100	100	-	
75	100	-	
50	95	-	
37.5	91	-	
25	84	-	
19	76	-	
12.5	65	-	
9.5	58	-	

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits	
		Lower	Upper
4.75	40	-	
2.36	23	-	
1.18	12	-	
0.6	6	-	
0.3	4	-	
0.15	3	-	
0.075	1.9	-	

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
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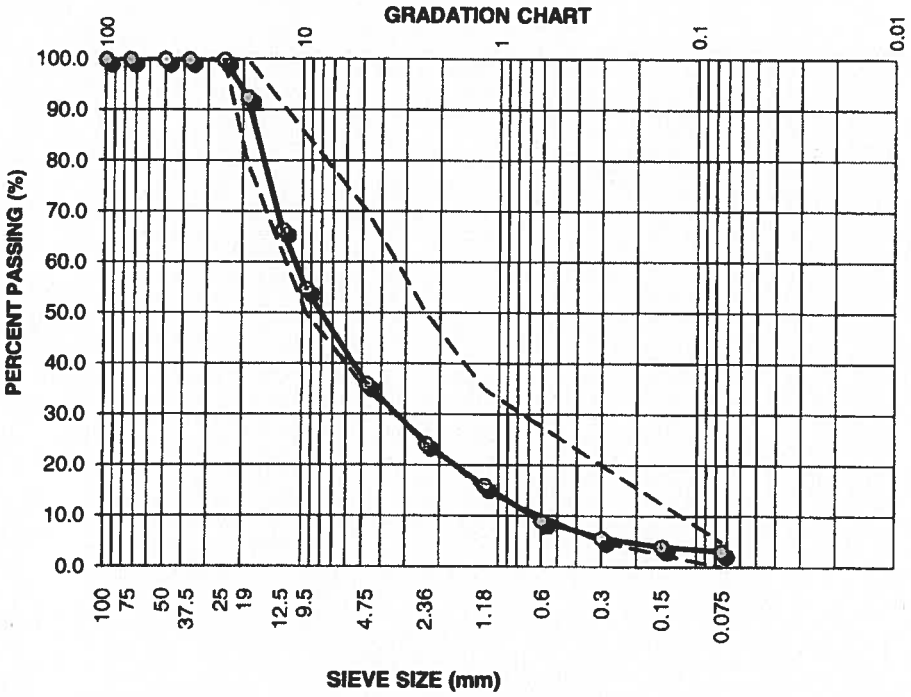
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-1
Bag No.: 342
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	93	80 -	100
12.5	66	-	
9.5	55	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	36	35 -	70
2.36	24	25 -	50
1.18	16	15 -	35
0.6	9	-	
0.3	6	5 -	20
0.15	4	-	
0.075	3.1	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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Materials Engineer

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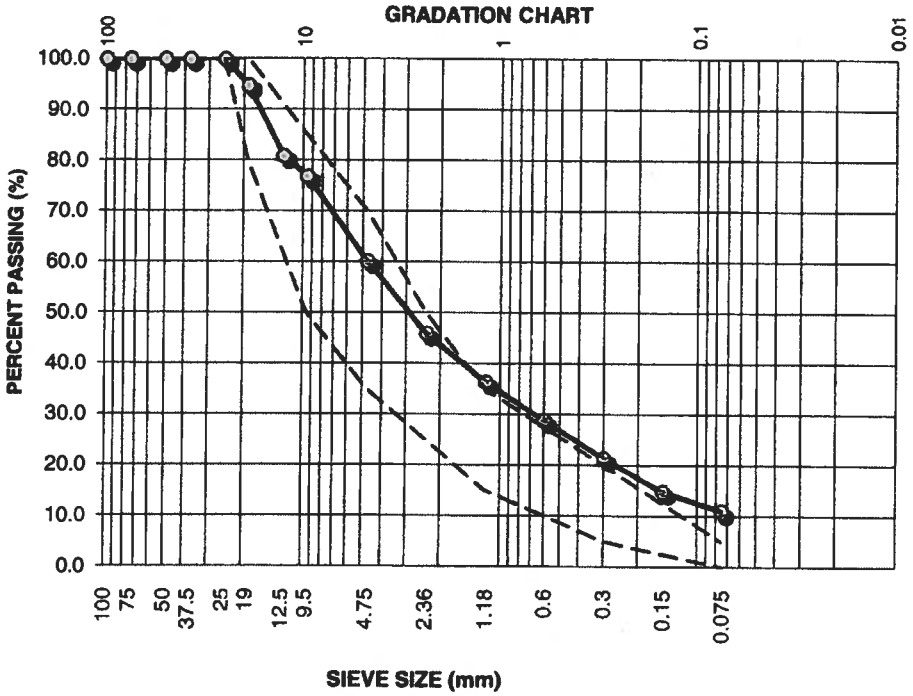
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-3
Bag No.: 345
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	95	80 -	100
12.5	81	-	
9.5	77	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	60	35 -	70
2.36	46	25 -	50
1.18	36	15 -	35
0.6	29	-	
0.3	21	5 -	20
0.15	15	-	
0.075	11.0	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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Materials Engineer

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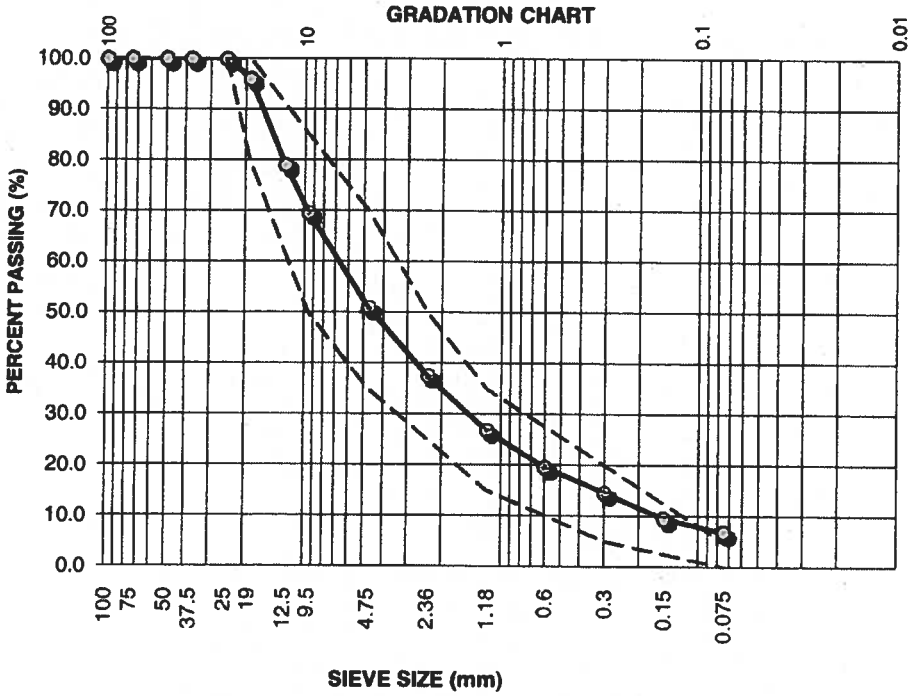
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-4
Bag No.: 346
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	96	80 -	100
12.5	79	-	
9.5	70	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	51	35 -	70
2.36	38	25 -	50
1.18	27	15 -	35
0.6	20	-	
0.3	15	5 -	20
0.15	10	-	
0.075	6.8	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
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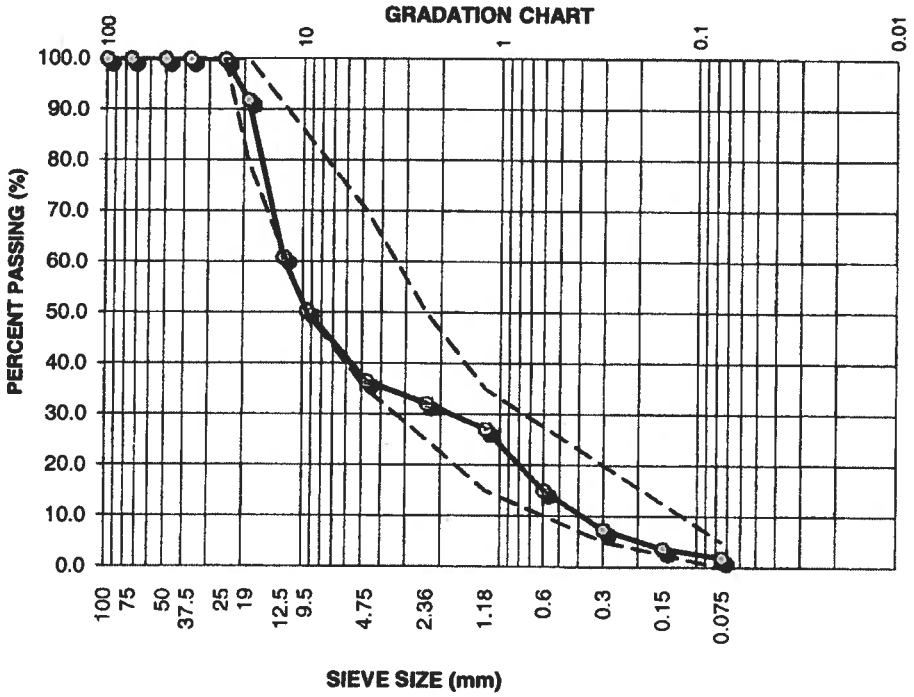
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-6
Bag No.: 349
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	92	80 -	100
12.5	61	-	
9.5	50	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	37	35 -	70
2.36	32	25 -	50
1.18	27	15 -	35
0.6	15	-	
0.3	7	5 -	20
0.15	4	-	
0.075	1.9	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
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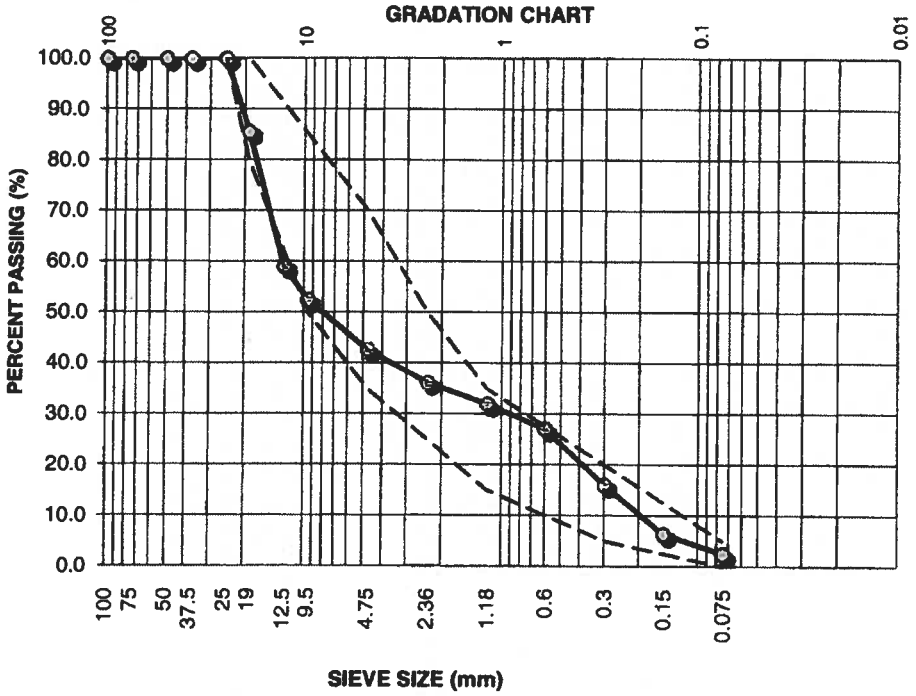
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-8
Bag No.: 348
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	86	80 -	100
12.5	59	-	
9.5	52	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	43	35 -	70
2.36	36	25 -	50
1.18	32	15 -	35
0.6	27	-	
0.3	16	5 -	20
0.15	6	-	
0.075	2.5	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
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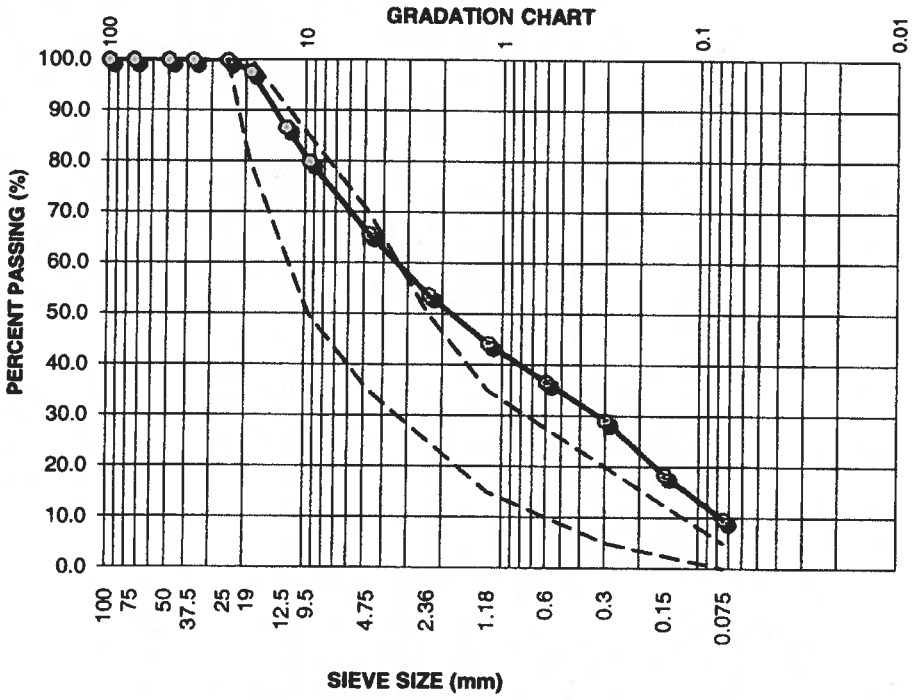
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-10
Bag No.: 393
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	98	80 -	100
12.5	87	-	
9.5	80	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	66	35 -	70
2.36	54	25 -	50
1.18	44	15 -	35
0.6	37	-	
0.3	29	5 -	20
0.15	18	-	
0.075	9.8	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
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SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
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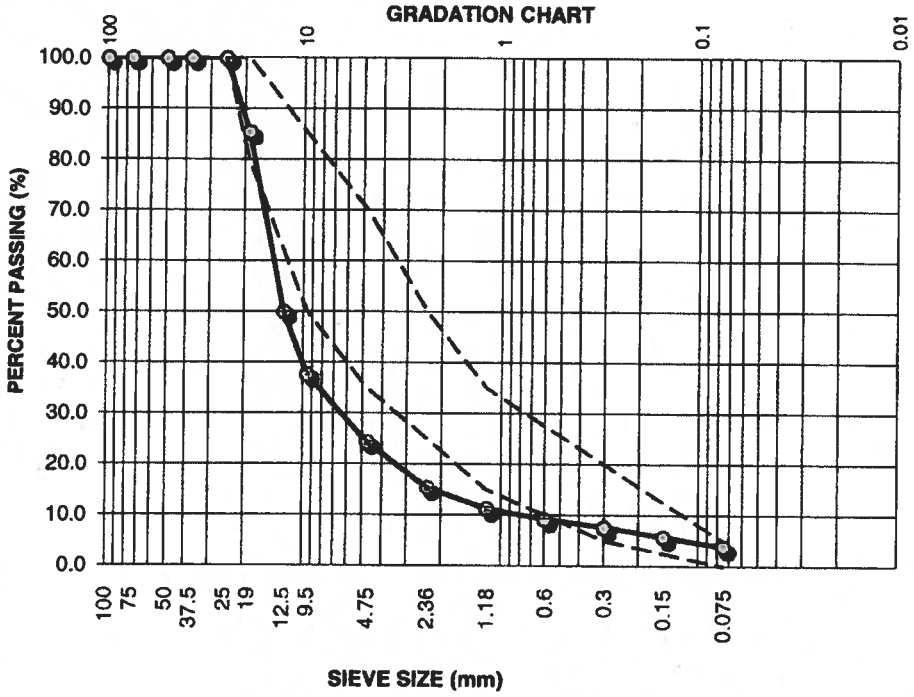
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-15
Bag No.: 356
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	85	80 -	100
12.5	50	-	
9.5	38	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	24	35 -	70
2.36	15	25 -	50
1.18	11	15 -	35
0.6	9	-	
0.3	8	5 -	20
0.15	6	-	
0.075	3.9	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
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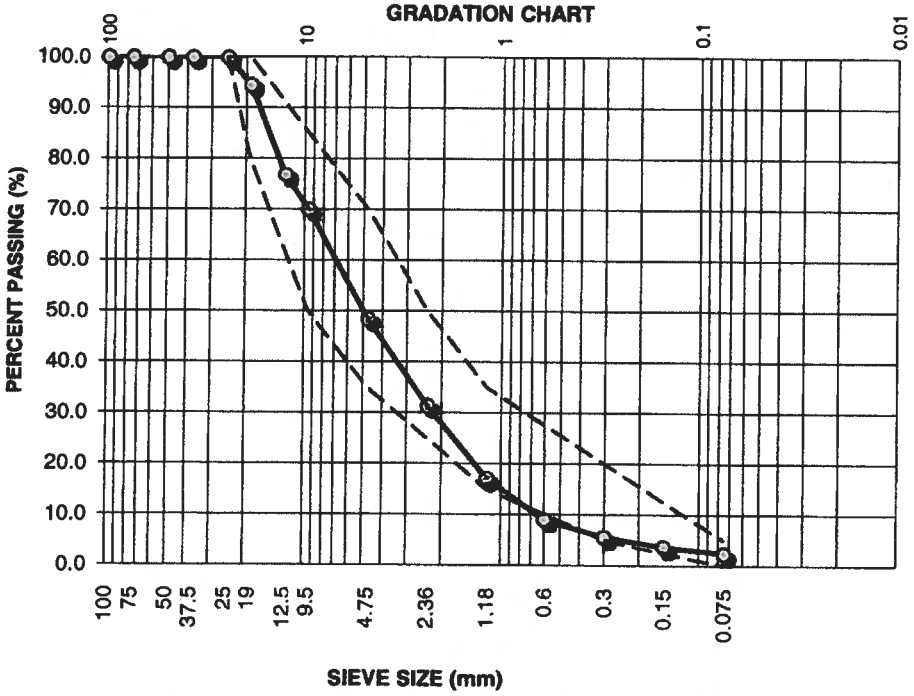
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 2-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4342

Date Sampled: Sampled by MoTI
Date Received: 20-Aug-12
Date Tested: 27-Sep-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TP12-16
Bag No.: 358
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	95	80 -	100
12.5	77	-	
9.5	70	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	49	35 -	70
2.36	31	25 -	50
1.18	17	15 -	35
0.6	9	-	
0.3	6	5 -	20
0.15	4	-	
0.075	2.5	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By: _____
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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS0670
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-1 Bag No. 342**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0	122	98	24	8.6	80.3	6.9
19.0 to 12.5	272	184	88	19.1	67.6	12.9
12.5 to 9.5	449	279	170	31.6	62.1	19.6
9.5 to 4.75	580	409	171	40.8	70.5	28.7
Totals	1423	970		100.0		**68**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS067
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-1 Bag No. 342**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0	1667	1077.5	589.7	36.5	23.6
19.0 to 12.5	1592	878.2	713.5	34.9	19.2
12.5 to 9.5	1004	551.8	452.2	22.0	12.1
9.5 to 4.75	303	189.4	113.9	6.6	4.1
Totals	4566	2696.9	1869.3	100	**59**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS0670
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-4 Bag No. 346**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0	63	50	13	4.6	79.4	3.7
19.0 to 12.5	274	192	82	20.2	70.1	14.1
12.5 to 9.5	478	362	116	35.2	75.7	26.6
9.5 to 4.75	544	466	78	40.0	85.7	34.3
Totals	1359	1070		100.0		**79**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS067
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-4 Bag No. 346**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0	807	446.9	359.8	22.1	12.2
19.0 to 12.5	1531	883.5	647.2	41.9	24.2
12.5 to 9.5	1016	615.9	400.3	27.8	16.8
9.5 to 4.75	303	230.7	72.2	8.3	6.3
Totals	3657	2177	1479.5	100	**60**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS0670
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-8 Bag No. 348**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0	143	135	8	7.5	94.4	7.1
19.0 to 12.5	357	335	22	18.8	93.8	17.6
12.5 to 9.5	507	438	69	26.7	86.4	23.0
9.5 to 4.75	894	536	358	47.0	60.0	28.2
Totals	1901	1444		100.0		**76**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS067
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-8 Bag No. 348**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0	2002	1760.2	241.8	41.4	36.4
19.0 to 12.5	1519	1325.6	193.5	31.4	27.4
12.5 to 9.5	1005	782.2	222.4	20.8	16.2
9.5 to 4.75	307	206	100.6	6.3	4.3
Totals	4832	4074	758.3	100	**84**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS0670
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-15 Bag No. 356**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0	151	124	27	11.0	82.1	9.0
19.0 to 12.5	279	197	82	20.3	70.6	14.3
12.5 to 9.5	464	332	132	33.7	71.6	24.1
9.5 to 4.75	481	354	127	35.0	73.6	25.7
Totals	1375	1007		100.0		**73**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: October 11, 2012
Client P.O.: 156CS067
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-15 Bag No. 356**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0	2012	1162.6	849.4	41.3	23.9
19.0 to 12.5	1554	744.6	808.9	31.9	15.3
12.5 to 9.5	1001	555.5	445.8	20.6	11.4
9.5 to 4.75	302	187.4	114.6	6.2	3.8
Totals	4869	2650.1	2218.7	100	**54**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 03-Oct-12
Client P.O.: 156CS0670
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-16 Bag No. 358**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0	82	63	19	5.5	76.8	4.2
19.0 to 12.5	267	228	39	17.8	85.4	15.2
12.5 to 9.5	504	444	60	33.7	88.1	29.7
9.5 to 4.75	643	616	27	43.0	95.8	41.2
Totals	1496	1351		100.0		**90**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 03-Oct-12
Client P.O.: 156CS067
Lab No.: 4342

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TP12-16 Bag No. 358**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0	1141	600	541	28.9	15.2
19.0 to 12.5	1506	1050	456	38.1	26.6
12.5 to 9.5	1003	784.4	219	25.4	19.8
9.5 to 4.75	302	279	23.4	7.7	7.1
Totals	3953	2713.4	1239.4	100	**69**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: Rodrigo Lauricio
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-110
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 20-Aug-12
Date Tested: 13-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-1	-	-	-	-	-	-
Fine	Bag # 342	-	2	500.3	363.2	137.1	27.4

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 20-Aug-12
Date Tested: 13-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-3	-	1	1501.3	1102.8	398.5	26.5
Fine	Bag # 345	-	2	500.2	364.1	136.1	27.2

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: MoTI
Date Received: 20-Aug-12
Date Tested: 13-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-8	-	1	1498.1	1287.5	210.6	14.1
Fine	Bag # 348	-	2	501.7	372.8	128.9	25.7

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 20-Aug-12
Date Tested: 12-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-13	-	1	1500.3	1258.9	241.4	16.1
Fine	Bag # 395	-	2	501.8	401.9	99.9	19.9

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 20-Aug-12
Date Tested: 14-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-14	-	1	1500.7	1259.6	241.1	16.1
Fine	Bag # 359	-	2	500.9	432.3	68.6	13.7

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 20-Aug-12
Date Tested 14-Sep-12
Lab No.: L4331

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TP 12-16	-	1	1500.3	1178.8	321.6	21.4
Fine	Bag # 358	-	2	500.1	397.0	103.1	20.6

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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SOUNDNESS OF AGGREGATE

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 29-Oct-2012
Lab No.: L4331

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source: TP12-7
Sample No.: Bag # 360- coarse

Sieve Size (mm)	Original Weight (g)	Grading of Original Sample (%)	Wt. Of Test Fraction Before test (g)	Wt. Of Test Fraction After test (g)	Percentage passing designated Sieve after Test	Weighted Percentage Loss
37.5 to 19	0.0	0.0				
19 to 12.5	2178.4	36.5	649.4	638.5	1.7	0.6
12.5 to 9.5	1185.6	19.9	330.2	318.1	3.7	0.7
9.5 to 4.75	2600.6	43.6	300.1	290.8	3.1	1.4
Totals						**3**

Sample No.: Bag # 360- Fine

Sieve Size (mm)	Original Weight (g)	Grading of Original Sample (%)	Wt. Of Test Fraction Before test (g)	Wt. Of Test Fraction After test (g)	Percentage passing designated Sieve after Test	Weighted Percentage Loss
4.75 to 2.36	71.0	19.0	100.1	90.7	9.4	1.8
2.36 to1.18	88.7	23.8	100.1	93.8	6.3	1.5
1.18 to 0.6	109.2	29.3	100.1	96.0	4.1	1.2
0.6 to 0.3	103.9	27.9	100.0	96.2	3.8	1.1
Totals						**6**

Comments: Soundness of aggregate by use of Magnesium Sulfate tests were conducted in accordance with ASTM C88

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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RELATIVE DENSITY AND ABSORBTION OF AGGREGATE REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 10-Sep-12
Client P.O.: 39100-20-Forestry
Lab No : L4331

PROJECT: Forestry Pit

File No.: 156CS0670

Sample Number &Type		Relative density (Oven Dry)	Apparent Relative Density	Relative density (SSD)	Absorption %
TP 12-4 Bag # 346	Coarse	2.57	2.75	2.63	2.6
	Fine	2.59	2.74	2.64	2.1

Comments: - Relative density and absorption of coarse and fine aggregate was conducted according to ASTM C127,C128

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Pavement and Materials Engineer

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RELATIVE DENSITY AND ABSORBTION OF AGGREGATE REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 10-Sep-12
Client P.O.: 39100-20-Forestry
Lab No : L4331

PROJECT: Forestry Pit

File No.: 156CS0670

Sample Number &Type		Relative density (Oven Dry)	Apparent Relative Density	Relative density (SSD)	Absorption %
TP 12-10 Bag # 393	Coarse	2.56	2.68	2.60	1.8
	Fine	2.53	2.74	2.61	3.1

Comments: - Relative density and absorption of coarse and fine aggregate was conducted according to ASTM C127,C128

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Pavement and Materials Engineer

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RELATIVE DENSITY AND ABSORBTION OF AGGREGATE REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 10-Sep-12
Client P.O.: 39100-20-Forestry
Lab No : L4331

PROJECT: Forestry Pit

File No.: 156CS0670

Sample Number &Type		Relative density (Oven Dry)	Apparent Relative Density	Relative density (SSD)	Absorption %
TP 12-15 Bag # 356	Coarse	2.57	2.75	2.63	2.6
	Fine	2.53	2.72	2.60	2.8

Comments: - Relative density and absorption of coarse and fine aggregate was conducted according to ASTM C127,C128

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Pavement and Materials Engineer

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Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

PROJECT: Forestry Pit

Project Number: VA06707-109
Date: 19-Sep-12
Client P.O.: 156CS0670-Forestry Pit
Lab No.: L4331
File No.: 156CS0670

Sample type and No.: TP12-3, Bag # 345

Sample Source: Sampled and Submitted by MOTI

Trial #	1	2
Sand Height, mm	84.0	84.0
Clay Height , mm	287.0	287.0
Sand Equivalent Value= 100*Sand Height/Clay Hieght	29.3	29.3
Average Sand Equivalent	**29**	

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

PROJECT: Forestry Pit

Project Number: VA06707-109
Date: 19-Sep-12
Client P.O.: 156CS0670-Forestry Pit
Lab No.: L4331
File No.: 156CS0670

Sample type and No.: TP12-8, Bag # 348

Sample Source: Sampled and Submitted by MOTI

Trial #	1	2
Sand Height, mm	101.0	101
Clay Height , mm	132.0	134.6
Sand Equivalent Value= 100*Sand Height/Clay Hieght	76.5	75.0
Average Sand Equivalent	**76**	

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
#110 - 18568 - 96th Avenue
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Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

PROJECT: Forestry Pit

Project Number: VA06707-109
Date: 19-Sep-12
Client P.O.: 156CS0670-Forestry Pit
Lab No.: L4331
File No.: 156CS0670

Sample type and No.: TP12-13, Bag # 395

Sample Source: Sampled and Submitted by MOTI

Trial #	1	2
Sand Height, mm	99.0	101.0
Clay Height , mm	132.0	134.0
Sand Equivalent Value= 100*Sand Height/Clay Hieght	75.0	75.4
Average Sand Equivalent	**75**	

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
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Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

PROJECT: Forestry Pit

Project Number: VA06707-109
Date: 19-Sep-12
Client P.O.: 156CS0670-Fprestry Pit
Lab No.: L4331
File No.: 156CS0670

Sample type and No.: TP12-14, Bag # 359

Sample Source: Sampled and Submitted by MOTI

Trial #	1	2
Sand Height, mm	99.0	96.5
Clay Height , mm	216.0	218.5
Sand Equivalent Value= 100*Sand Height/Clay Hieght	45.8	44.2
Average Sand Equivalent	**45**	

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

PROJECT: Forestry Pit

Project Number: VA06707-109
Date: 19-Sep-12
Client P.O.: 156CS0670-Forestry Pit
Lab No.: L4331
File No.: 156CS0670

Sample type and No.: TP12-16, Bag # 358

Sample Source: Sampled and Submitted by MOTI

Trial #	1	2
Sand Height, mm	104.0	107.0
Clay Height , mm	129.5	134.6
Sand Equivalent Value= 100*Sand Height/Clay Hieght	80.3	79.5
Average Sand Equivalent	**80**	

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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MINISTRY OF TRANSPORTATION
Laboratory Schedule of Tests

Project: Forestry Pit **Location:** Lower Mainland District
Date: Sept 25, 2012

TP/TH No.	Bag No.	Sample No.	PR Wash Sieve	25mm Crush and Wash Sieve	Fracture Count		Micro Duval		MgSO4		Specific Gravity		Absorption		Sand Equivalent	Petro Analysis	Petro No.	Petro for ARD/ML		
					A	B	C	F	C	F	C	F	C	F						
TH12-2	77	1	x																	
	78	2	x	x	x	x											x			
	79	3	x												x					
	443	4	x				x	x												
	444	5	x				x	x			x	x	x	x						

Comments: Amec
Use SGSB spec fpr pit run sieves & 25mm WGB spec for crushes

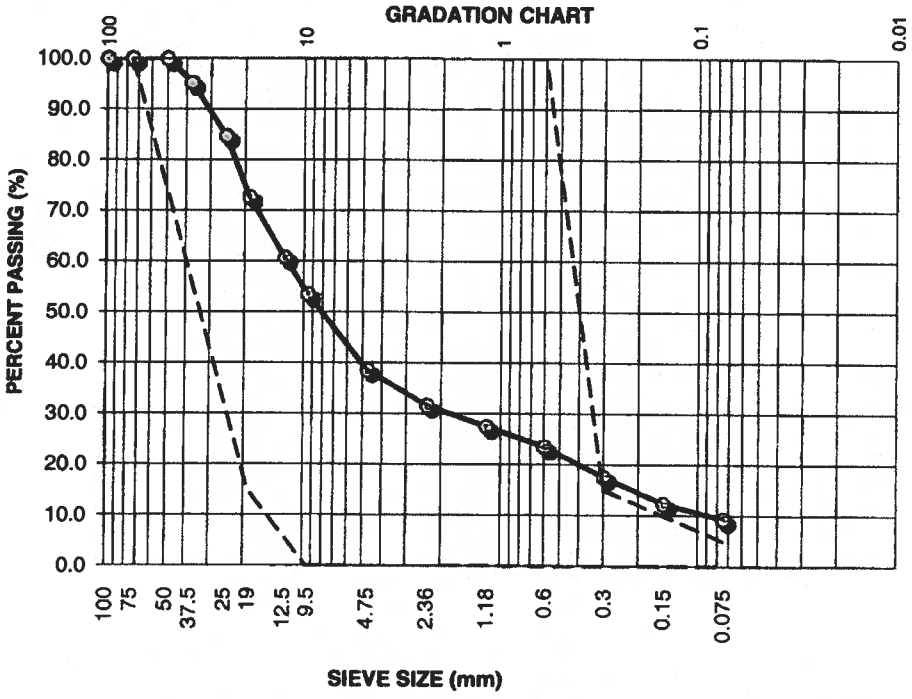
AMEC Environment & Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia
Canada, V4N 3P9
Tel: 604-295-8657
Fax: 604-295-8658

SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 25-Sep-12
Date Tested: 12-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH 12-2
Bag No.: 77 ✓
Material Type: Pit Run
Sample No.: SA 1

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	100	-	
37.5	95	-	
25	85	-	
19	73	15 -	100
12.5	61	-	
9.5	54	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	39	-	
2.36	32	-	
1.18	28	-	
0.6	24	0 -	100
0.3	18	0 -	15
0.15	12	-	
0.075	9.4	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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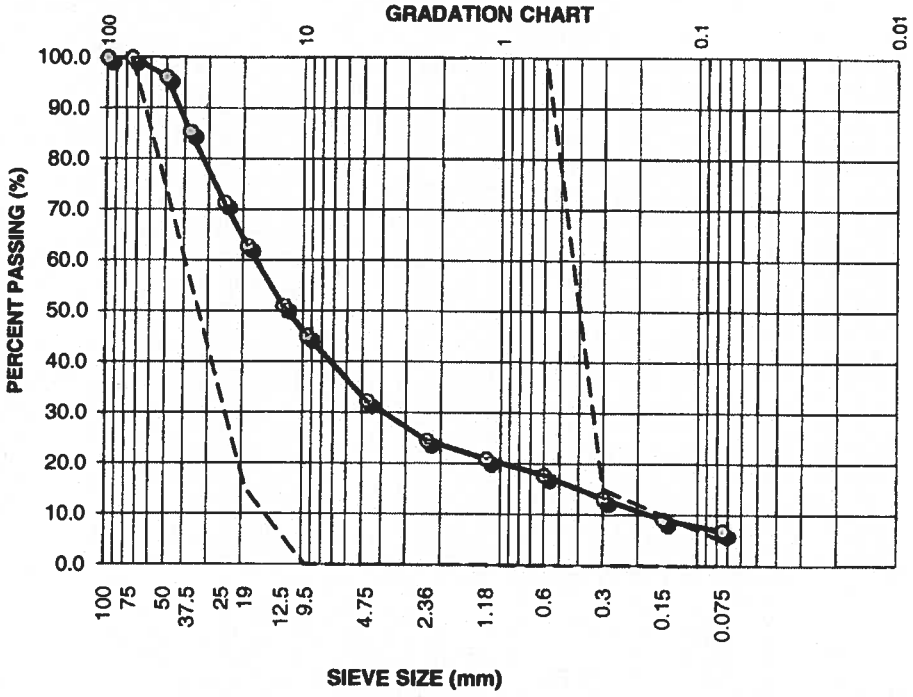
Fax: 604-295-8658

SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 25-Sep-12
Date Tested: 12-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH 12-2
Bag No.: 78
Material Type: Pit Run
SampleNo.: SA 2

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	96	-	
37.5	85	-	
25	71	-	
19	63	15 -	100
12.5	51	-	
9.5	45	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	32	-	
2.36	25	-	
1.18	21	-	
0.6	18	0 -	100
0.3	13	0 -	15
0.15	9	-	
0.075	6.8	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
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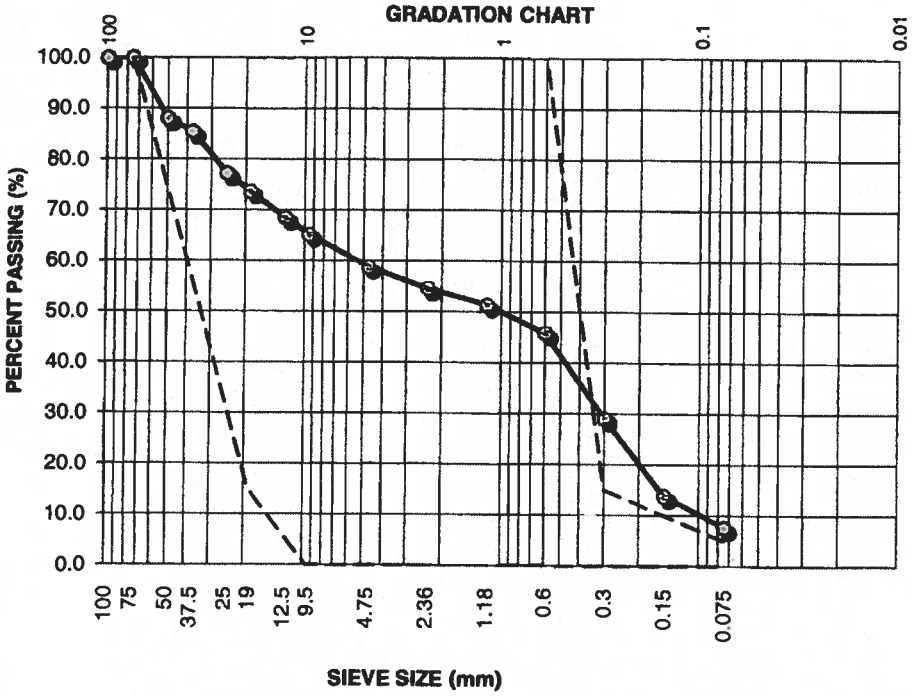
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 25-Sep-12
Date Tested: 12-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH 12-2
Bag No.: 79
Material Type: Pit Run
Sample No.: SA 3

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100	100
50	88	-	
37.5	86	-	
25	77	-	
19	74	15	100
12.5	69	-	
9.5	65	0	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	59	-	
2.36	55	-	
1.18	51	-	
0.6	46	0	100
0.3	29	0	15
0.15	14	-	
0.075	7.7	0	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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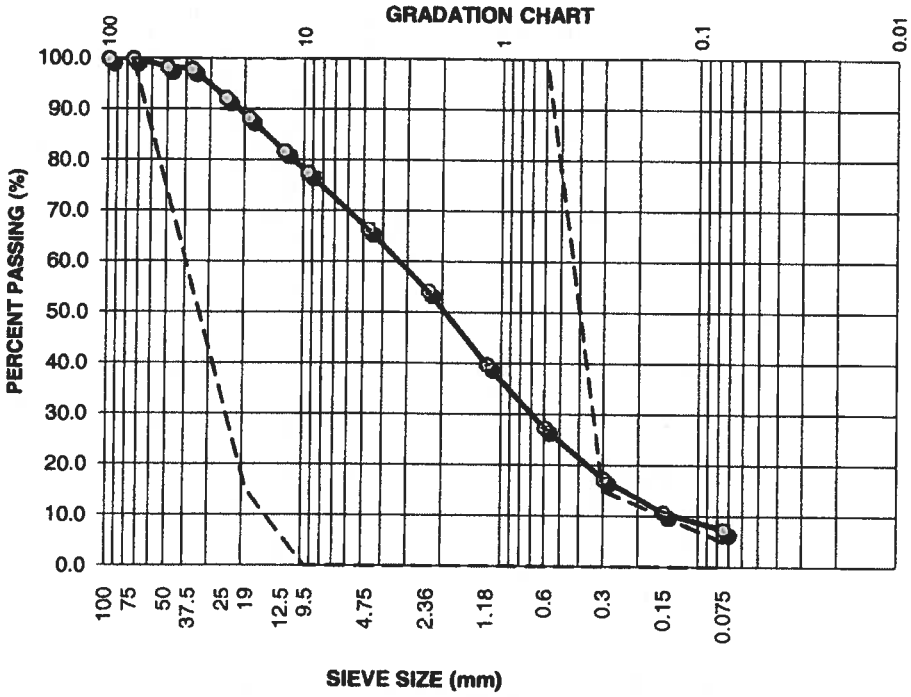
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 25-Sep-12
Date Tested: 12-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH 12-2
Bag No.: 443
Material Type: Pit Run
Sample No.: SA 4

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	98	-	
37.5	98	-	
25	92	-	
19	88	15 -	100
12.5	82	-	
9.5	78	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	66	-	
2.36	54	-	
1.18	40	-	
0.6	27	0 -	100
0.3	17	0 -	15
0.15	11	-	
0.075	7.4	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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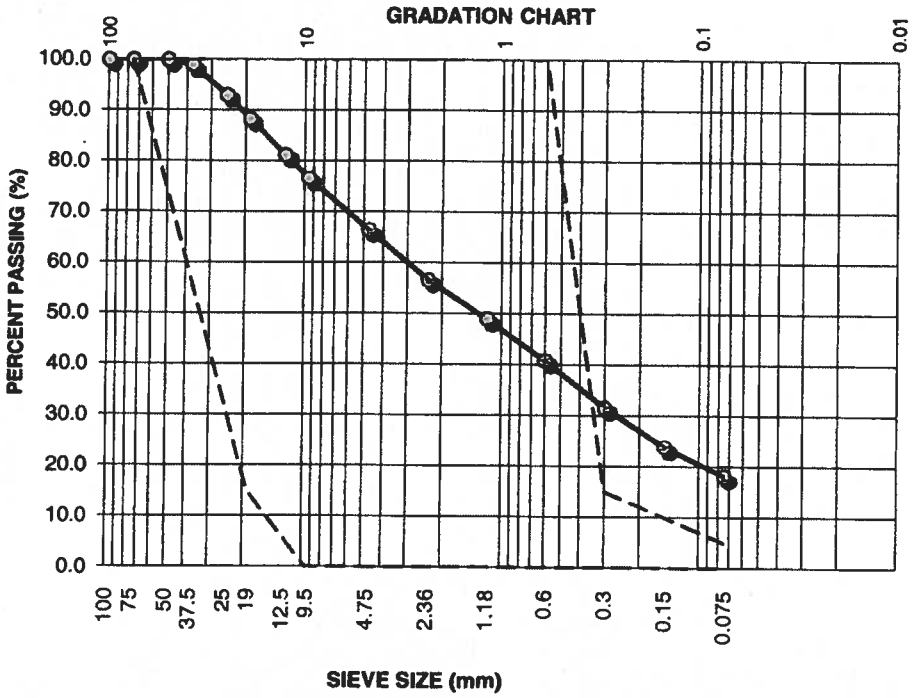
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 25-Sep-12
Date Tested: 12-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH 12-2
Bag No.: 444
Material Type: Pit Run
Sample No.: SA 5

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	100	-	
37.5	99	-	
25	93	-	
19	88	15 -	100
12.5	81	-	
9.5	77	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	66	-	
2.36	57	-	
1.18	49	-	
0.6	41	0 -	100
0.3	32	0 -	15
0.15	24	-	
0.075	18	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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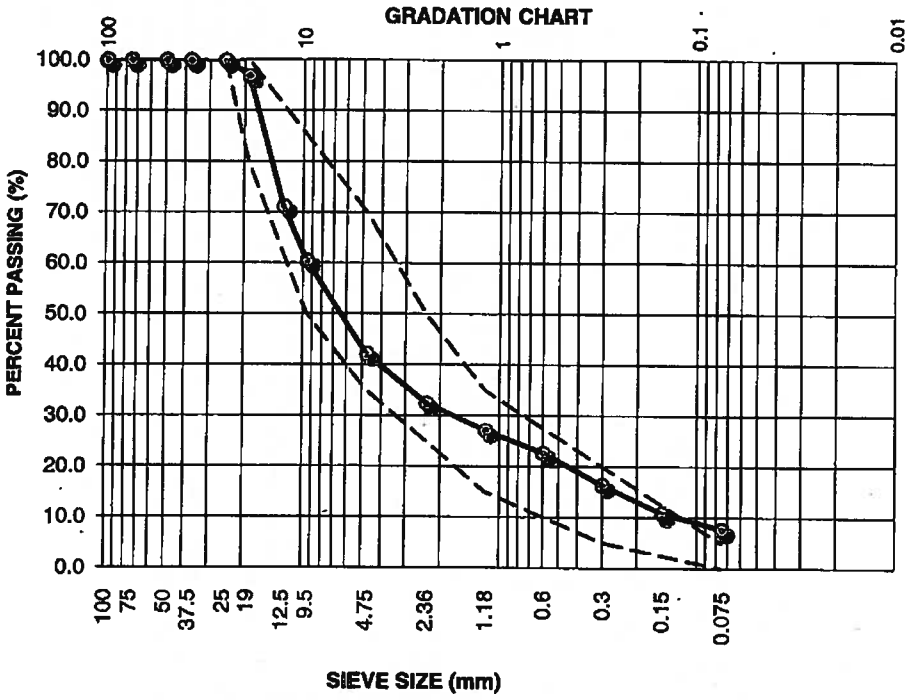
Fax: 604-295-8658

SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 9-Nov-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4346

Date Sampled: Sampled by MoTI
Date Received: 19-Sep-12
Date Tested: 7-Nov-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: TH12-2
Bag No.: 78
Material Type: Crushed
Specification: 2012- MoTI- 25 mm WGB
Test Method: Washed

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	-	
50	100	-	
37.5	100	-	
25	100	100 -	100
19	97	80 -	100
12.5	71	-	
9.5	60	50 -	85

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	42	35 -	70
2.36	33	25 -	50
1.18	27	15 -	35
0.6	23	-	
0.3	16	5 -	20
0.15	11	-	
0.075	7.8	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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Infrastructure
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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: November 9, 2012
Client P.O.: 156CS0670
Lab No.: L4346

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TH12-2 SA # 2 Bag # 78**

Sieve Size (mm)	Total No. of Rocks	No. of Fractured particles	No. of non francured particles	% Fraction per Sieve (of Total Sample)	% Fracture per Sieve	Total % Fracture
50 to 37.5						
37.5 to 25.0						
25.0 to 19.0						
19.0 to 12.5	282	240	42	20.6	85.1	17.5
12.5 to 9.5	505	412	93	36.8	81.6	30.1
9.5 to 4.75	584	476	108	42.6	81.5	34.7
Totals	1371	1128		100		**82**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method A

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment &
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FRACTURED COUNT FOR COARSE AGGREGATE RESULT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 09-Nov-12
Client P.O.: 156CS067
Lab No.: L4346

PROJECT: **Forestry Pit**
File No.: 156CS0670

Sample Source & ID: **TH12-2 SA # 2 Bag # 78**

Sieve Size (mm)	Original Weight (g)	Fractured particles (g)	Non-fractured particles (g)	% Fraction per Sieve (of total Sample)	% Fracture
50 to 37.5					
37.5 to 25.0					
25.0 to 19.0					
19.0 to 12.5	1498	1190.8	307.6	53.5	42.5
12.5 to 9.5	1001	746.3	254.5	35.7	26.7
9.5 to 4.75	301	223.1	77.4	10.7	8.0
Totals	2800	2160.2	639.5	100	**77**

Comments: - Fractured Particles in Coarse Aggregate tests were conducted in accordance with BCH 1-13 Method B

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: Sampled By MoTI
Date Received: 25-Sep-12
Date Tested: 29-Oct-12
Lab No.: L4346

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TH12-2 SA#4 Bag #443	-	1	1501.5	1307.5	194.0	12.9
Fine		-	2	503.6	459.5	44.1	8.8

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC - Environment and Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia, V4N 3P9

Project No.: VA06707-109
Project Name.: Forestry Pit
Source:
Type of Sample: Test Pit Aggregates

ATTN Steve Likness

Client: **Ministry of Transportation & Infrastructure**
Date sampled: MoTI
Date Received: 25-Sep-12
Date Tested: 05-Nov-12
Lab No.: L4346

MICRO-DEVAL TESTING

ASTM D6928 (Coarse) ASTM D7428 (Fine)

Coarse and Fine Aggregate

Grading	Sample ID	Pans	Mic-Dev Jar No	Init Mass of Sample (g) A	Final Mass of Sample (g) B	Loss of Mass (g) A - B	% Loss (A-B)*100/A
Coarse	TH 12-2 SA # 5 Bag # 444	-	1	1504.9	1387.9	117.0	7.8
Fine		-	2	501.6	445.1	56.5	11.3

Comments:

MOTI Standard:
Maximum acceptable value of any base material is 25 or less
Maximum acceptable value of any Sub-base material is 30 or less

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia
Canada, V4N 3P9
Tell: 604-295-8657
Fax: 604-295-8658

RELATIVE DENSITY AND ABSORBTION OF AGGREGATE REPORT

CLIENT: Ministry of Transporation & Infrastructu
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 29-Oct-12
Client P.O.: 156CS0670
Lab No.: L4346

PROJECT: **Forestry Pit**

File No.: 156CS0670

Sample Number &Type		Relative density (Oven Dry)	Apparent Relative Density	Relative density (SSD)	Absorption %
TH12-2 Bag 444	Coarse	2.66	2.71	2.68	0.7
	Fine	2.54	2.75	2.62	2.9

Comments: - Relative density and absorption of coarse and fine aggregate was conducted according to ASTM C127,C128

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

AMEC Environment & Infrastructure
#110 - 18568 - 96th Avenue
Surrey British Columbia
Canada, V4N 3P9
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Fax: 604-295-8658

Sand Equivalent Value of Soils and Fine Aggregate

CLIENT: Ministry of Transporation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 26-Oct-12
Client P.O.: 156CS0670
Lab No.: L4346

PROJECT: Forestry Pit

File No.: 156CS0670

Sample type and No.: TH12-2, Bag # 79

Sample Source: Sampled and Submitted by MOTI

Lab No.: L4346

Trial #	1	2			
Sand Height, mm	94	96.5			
Clay Height, mm	216	218.5			
Sand Equivalent Value= 100*Sand Height/Clay Hieght	44	44			

Comments: - Sand Equivalent tests were conducted in accordance with ASTM D2419

Tested By: **Rodrigo Lauricio**
Materials Technologist

Reviewed By: Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

30 November 2012
File: VA06707.109

BC Ministry of Transportation and Infrastructure
7818 6th St
Burnaby, British Columbia
V3N 4N8

Attention: Mr. Steve Likness

RE: AGGREGATE TESTING – FORESTRY PIT
19mm COARSE AGGREGATE (TH12-2 Bag #78)
LOWER MAINLAND DISTRICT, BRITISH COLUMBIA

We are pleased to present results of laboratory testing conducted on a sample of 19mm coarse aggregate received in our AMEC Hamilton laboratory on 12 November 2012.

The proposed 19mm coarse aggregate was from the Forestry Pit, located on Lower Mainland District, British Columbia. It is understood that a representative of MOTI collected the sample on 25 September 2012 from the Forestry Pit. The gradation analysis for this product was conducted and supplied by AMEC Burnaby.

Testing of this 19mm coarse aggregate was limited to Petrographic Number (PN) determination on the -19mm+9.5mm sieve fraction using test method *LS-609, Procedure for the Petrographic Analysis of Coarse Aggregate*. The fraction provided for testing represented 100% of the whole sample. The sample has a PN of 105. The PN report is presented in Enclosure 1.

It should be noted the sample contained 2.2g of fine material that came off during soaking of the sample. If included in this petrographic analysis, the resulting PN value would be 107.

Should you have any questions, please contact our office.

Respectfully yours,

AMEC Environment & Infrastructure
A Division of AMEC Americas Limited

Jesse Stickles, G-I-T
Geoscientist-In-Training

Reviewed by,

Amy McCulloch, P.Geo.
Staff Geoscientist

js;AM
Enclosure (1)
Cc: Riyad Islam, P.Eng., AMEC Burnaby

AMEC Environment & Infrastructure
A division of AMEC Americas Limited
505 Woodward Avenue, Unit #1
Hamilton, Ontario
Canada L8H 6N6
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Fax +1 (905) 312-0771
www.amec.com

Petrographic Analysis Of Coarse Aggregate
MTO LS-609

Enclosure: 1
Project: VA06707.109

Client:	MOTI	**Date Sampled:**	25 September 2012
AMEC Lab No.:	S408-12 (TH12-2 Bag #78)	**Sampled By:**	Representative of MOTI
Sample Type:	19mm Coarse Aggregate	**Date Received:**	12 November 2012
Source:	Forestry Pit, Lower Mainland District	**Date Tested:**	27 November 2012
MTO Project No:	156CS0670	**Test Fraction:**	- 19.0 + 9.5 mm

Petrographic Number of **105** for fraction (-19.0 + 9.5 mm)
Weighted Petrographic Number for the Entire Sample is **105**

Rock Types	QUALITY (%)			
	Good	Fair	Poor	Deleterious
Conglomerate-Sandstone-Arkose (hard)	79.7			
Granite-Diorite-Gabbro (hard)	7.2			
Volcanic (hard, slightly magnetic)	4.6			
Basalt (hard)	3.4			
Quartzite (hard)	1.5			
Gneiss-Amphibole-Schist (hard)	0.9			
Quartz (vein or pegmatitic)	0.2			
Conglomerate-Sandstone-Arkose (brittle)		2.5		
	97.5	2.5	0.0	0.0

TESTED BY: Jesse Stickles, GIT

REVIEWED BY: Amy McCulloch, P.Geo.

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MINISTRY OF TRANSPORTATION
Laboratory Schedule of Tests

Project: Forestry Pit **Location:** Lower Mainland Dis
Date: Oct 22, 2012

TP/TH No.	Bag No.	Sample No.	PR Wash Sieve	25mm Crush and Wash Sieve	Fracture Count		Micro Duval		MgSO4		Specific Gravity		Absorption		Sand Equivalent	Petro Analysis	Petro No.	Petro for ARD/ML	
					A	B	C	F	C	F	C	F	C	F					
Stockpile	791	1	x																
Stockpile	19	1	x																
Stockpile	20	1	x																

Comments: Amec
Use SGSB spec fpr pit run sieves & 25mm WGB spec for crushes

AMEC Environment & Infrastructure
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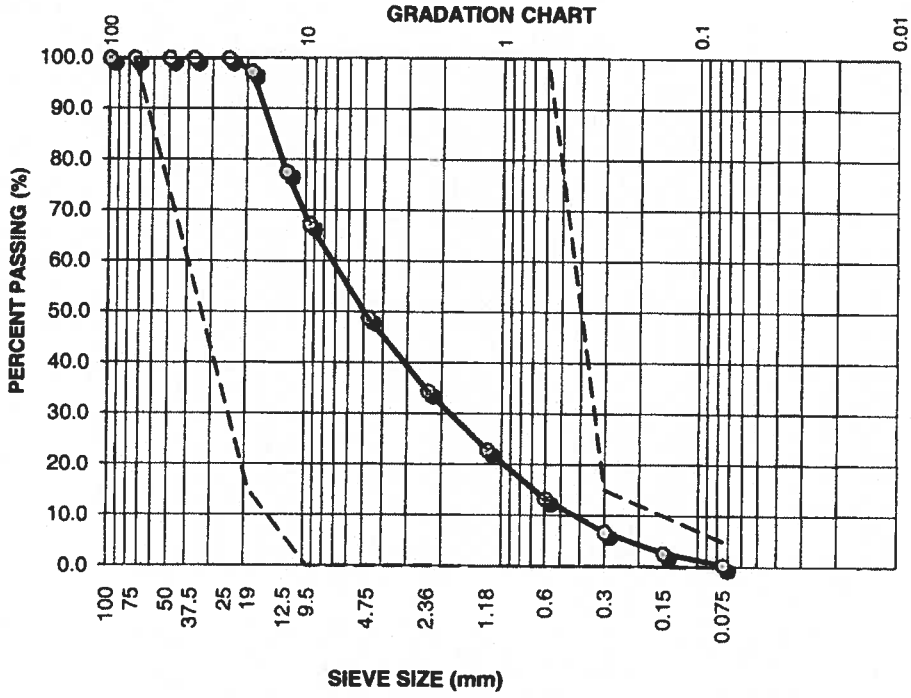
Surrey British Columbia
Canada, V4N 3P9
Tel: 604-295-8657
Fax: 604-295-8658

SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4359

Date Sampled: Sampled by MoTI
Date Received: 22-Oct-12
Date Tested: 25-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: Stockplie✓
Bag No.: 791✓
Material Type: Pit Run
Sample No.: SA 1

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	100	-	
37.5	100	-	
25	100	-	
19	97	15 -	100
12.5	78	-	
9.5	67	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	49	-	
2.36	35	-	
1.18	23	-	
0.6	13	0 -	100
0.3	7	0 -	15
0.15	3	-	
0.075	0	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By:
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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#110 - 18568 - 96th Avenue
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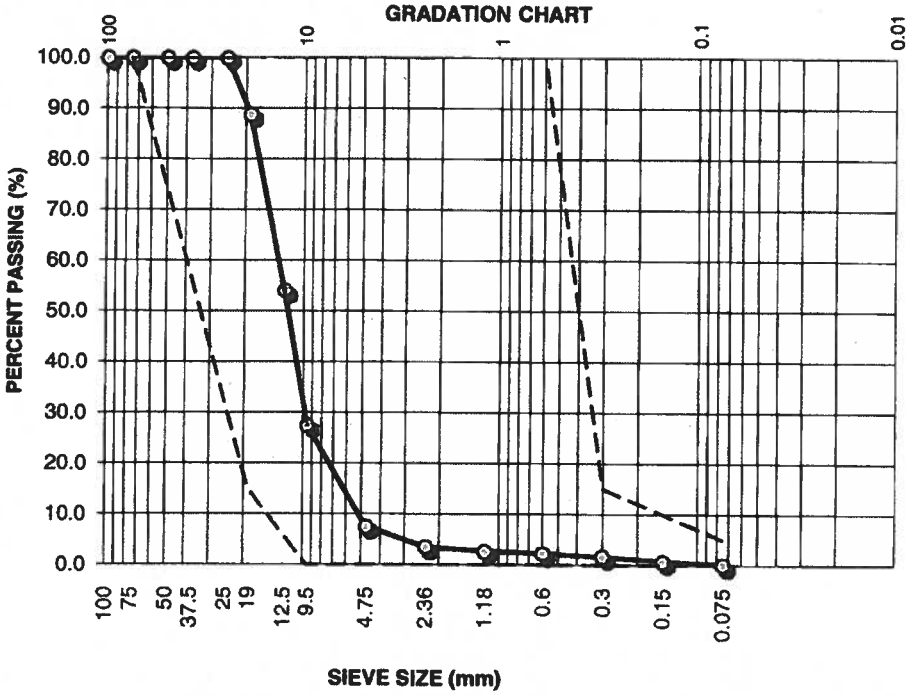
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4359

Date Sampled: Sampled by MoTI
Date Received: 22-Oct-12
Date Tested: 25-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: Stockplie ✓
Bag No.: 19 ✓
Material Type: Pit Run
Sample No.: SA 1

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	100	-	
37.5	100	-	
25	100	-	
19	89	15 -	100
12.5	54	-	
9.5	28	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	8	-	
2.36	4	-	
1.18	3	-	
0.6	2	0 -	100
0.3	2	0 -	15
0.15	1	-	
0.075	0	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

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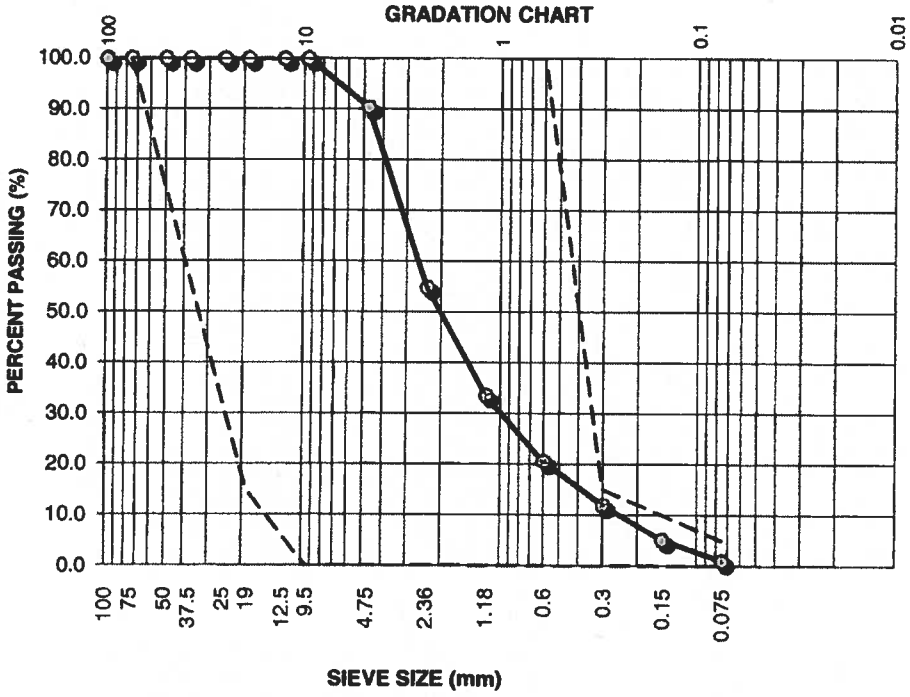
SIEVE ANALYSIS REPORT

CLIENT: Ministry of Transportation & Infrastructure
7818 - 6th Street
Burnaby, B.C., V3N 4N8
ATTN: Steve Likness

Project Number: VA06707-109
Date: 17-Oct-12
Client P.O.: 156CS0670
File No.: 156CS0670

PROJECT: Forestry Pit



Lab Number: L4359

Date Sampled: Sampled by MoTI
Date Received: 22-Oct-12
Date Tested: 25-Oct-12
Sampled By: MOTI
Tested By: Rodrigo Lauricio

TP/TH No.: Stockplie ✓
Bag No.: 20 ✓
Material Type: Pit Run
Sample No.: SA 1

Gravel Sizes (mm)	Percent Passing	Gradation Limits Lower	Upper
100	100	-	
75	100	100 -	100
50	100	-	
37.5	100	-	
25	100	-	
19	100	15 -	100
12.5	100	-	
9.5	100	0 -	100

Sand Sizes And Fines (mm)	Percent Passing	Gradation Limits Lower	Upper
4.75	90	-	
2.36	55	-	
1.18	34	-	
0.6	21	0 -	100
0.3	12	0 -	15
0.15	5	-	
0.075	1	0 -	5

Comments: Sieve analysis test was conducted in accordance with ASTM C136 and C117
Plotted to Table 202-C SGSB gradation specification

Reviewed By: _____
Riyad Islam, M.A.Sc, P.Eng
Materials Engineer

GRADATION SUMMARY

GROUP 1

PIT: Forestry Pit
NOT CORRECTED FOR OVERSIZE

TH	SA	CLASS	FACT	+225	+150	+75	GRAV	SAND	FINE	75.0	63.0	50.0	37.5	25.0	19.0	12.5	9.50	4.75	2.36	1.18	.600	.300	.150	.075
97-06	1	GP	1.000	0	0	0	56	40	4	100	88	83	73	63	58	54	51	45	35	23	11	6	5	4.2
97-07	1	GP	1.000	0	0	0	83	13	4	100	100	91	76	57	48	38	30	17	12	10	9	7	5	4.0
97-08	1	GW	1.000	0	0	0	62	34	4	100	100	100	97	88	78	67	58	38	25	16	11	7	6	4.3
97-09	1	GP	1.000	0	0	0	77	19	4	100	97	89	84	67	56	43	35	23	21	19	18	13	7	4.1
97-10	1	GW	1.000	0	0	0	76	21	3	100	100	99	94	82	71	55	45	24	13	9	7	5	4	2.7
97-12	1	SP	1.000	0	0	0	39	57	4	100	100	98	96	94	90	84	77	61	47	35	25	12	5	3.6
97-15	1	SP	1.000	0	0	0	47	50	3	100	100	97	95	86	79	72	65	53	44	35	26	14	5	3.0
97-16	1	GW	1.000	0	0	0	52	46	2	100	93	91	88	81	76	69	64	48	32	21	11	6	3	1.9
97-17	1	GP	1.000	0	0	0	53	45	2	100	100	100	95	85	77	66	59	47	38	29	17	7	3	2.0
97-21	1	GW	1.000	0	0	0	64	33	3	100	100	94	88	75	67	57	51	36	25	17	11	6	4	3.3
97-23	1	GW	1.000	0	0	0	56	39	5	100	100	100	95	82	75	65	59	44	31	21	14	9	6	4.7
97-29	1	GP GM	1.000	0	0	0	64	31	5	100	100	90	83	72	64	55	49	36	24	17	12	8	6	5.2
97-32	1	GP	1.000	0	0	0	58	38	4	100	100	88	83	73	67	59	53	42	30	20	12	7	5	4.2
97-34	1	GW	1.000	0	0	0	49	47	4	100	100	100	98	86	81	73	67	50	33	22	13	6	4	3.7
97-37	1	GP GM	1.000	0	0	0	61	31	8	100	100	95	93	83	74	64	56	39	26	20	16	13	10	8.1
97-38	1	GP GM	1.000	0	0	0	71	23	6	100	97	95	92	79	67	54	46	29	20	15	12	10	7	5.7
97-39	1	GW	1.000	0	0	0	72	24	4	100	100	96	94	80	72	58	49	28	16	10	8	6	6	4.4
97-40	1	GW	1.000	0	0	0	68	29	3	100	100	96	95	87	77	65	54	32	16	9	6	5	4	3.0
97-42	1	GW	1.000	0	0	0	71	26	3	100	100	91	82	76	70	59	51	29	17	10	6	4	4	2.8
97-43	1	GP	1.000	0	0	0	57	41	2	100	100	92	85	79	72	64	57	43	33	24	15	6	3	2.1
97-44	1	GW	1.000	0	0	0	73	25	2	100	97	94	85	74	64	52	44	27	17	9	6	4	3	2.4
AVERAGE		GW		0	0	0	62	34	4	100	99	94	89	78	71	61	53	38	26	19	13	8	5	3.8

GRADATION SUMMARY

GROUP 2

PIT: Forestry Pit
NOT CORRECTED FOR OVERSIZE

TH	SA	CLASS	FACT	+225	+150	+75	GRAV	SAND	FINE	75.0	63.0	50.0	37.5	25.0	19.0	12.5	9.50	4.75	2.36	1.18	.600	.300	.150	.075
97-06	2	GP	1.000	0	0	0	50	46	4	100	100	100	100	100	92	73	63	51	40	27	14	8	6	4.4
97-08	2	GW	1.000	0	0	0	58	38	4	100	100	100	100	100	94	78	65	42	27	17	11	7	6	4.4
97-09	2	GP	1.000	0	0	0	67	28	5	100	100	100	100	100	93	65	51	32	25	21	19	13	8	4.7
97-10	2	GW	1.000	0	0	0	73	24	3	100	100	100	100	100	92	67	51	27	14	10	8	6	4	2.8
97-12	2	SP	1.000	0	0	0	37	59	4	100	100	100	100	100	98	89	81	63	49	37	26	12	6	3.7
97-16	2	SW	1.000	0	0	0	49	49	2	100	100	100	100	99	94	79	70	51	34	22	12	6	3	2.1
97-17	2	GP	1.000	0	0	0	50	48	2	100	100	100	100	100	94	77	66	51	42	33	20	9	4	2.3
97-21	2	GW	1.000	0	0	0	58	38	4	100	100	100	100	100	94	73	61	42	30	20	12	7	5	3.6
97-29	2	GP GM	1.000	0	0	0	57	37	6	100	100	100	100	100	94	73	61	43	30	21	14	9	7	5.6
97-34	2	SW	1.000	0	0	0	47	49	4	100	100	100	100	100	96	80	71	53	35	22	13	7	5	3.9
97-37	2	GP GM	1.000	0	0	0	58	34	8	100	100	100	100	100	94	76	64	43	28	21	17	13	11	8.3
97-38	2	GP GM	1.000	0	0	0	65	29	6	100	100	100	100	100	92	70	57	35	22	16	12	10	8	6.1
97-39	2	GW	1.000	0	0	0	65	30	5	100	100	100	100	99	93	73	59	35	18	11	9	7	6	4.8
97-40	2	GW	1.000	0	0	0	62	35	3	100	100	100	100	100	96	77	64	38	22	12	8	6	5	3.4
97-42	2	GW	1.000	0	0	0	66	31	3	100	100	100	100	99	92	72	59	34	19	11	8	5	4	3.1
97-43	2	GP	1.000	0	0	0	53	45	2	100	100	100	100	99	96	77	66	48	35	26	17	7	4	2.4
97-44	2	GW	1.000	0	0	0	65	32	3	100	100	100	100	99	93	71	57	35	19	11	7	5	4	2.8
AVERAGE		GW		0	0	0	58	38	4	100	100	100	100	100	94	75	63	43	29	20	13	8	5	4.0

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL & MATERIALS BRANCH

DEGRADATION TEST

Project Forestry Pit
Sta or T.H. _____ Sample # _____
Depth _____
Cost Code _____ Date 10-23-97
Technician BW

TRIAL #	1	2	3	4
Sediment Height (H) mm	200	212	322	308
Degradation Factor (D)	24.76	22.47	6.25	7.93
	97-15	97-43		
	✓ 97-15	✓ 97-43	✓ 97-9	✓ 97-6
	37829	37931	37832	37835

CALCULATIONS

$$D = \frac{381 - H}{381 + 1.75\ H} \times 100$$

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL & MATERIALS BRANCH

DEGRADATION TEST

Project Forestry Pit

Sta or T.H. _____ Sample # _____

Depth _____

Cost Code _____ Date 97-11-07

Technician T.W.

TRIAL #	1	2	3	4
Sediment Height (H) mm	170	270	300	290
Degradation Factor (D)	31.10	13.01	8.94	10.24
	37828	37831	37936	37935
	97-16 ✓	97-10 ✓	97-37	97-38 ✓

CALCULATIONS

$$D = \frac{381 - H}{381 + 1.75\ H} \times 100$$

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL & MATERIALS BRANCH

DEGRADATION TEST

Project FORESTRY Pit

Sta or T.H. _____ Sample # _____

Depth _____

Cost Code _____ Date NOV. 27/97

Technician J.Q

TRIAL #	1	2	3	4
Sediment Height (H) mm	210	178	338	258
Degradation Factor (D)	22.45	29.31	4.42	15.08
	97-34 37937	97-29 37939	#37930 9744	#37827 97-17

CALCULATIONS

$$D = \frac{381 - H}{381 + 1.75\ H} \times 100$$

2/6 min

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL & MATERIALS BRANCH

DEGRADATION TEST

Project Forestry Pit
Sta or T.H. _____ Sample # _____
Depth _____
Cost Code _____ Date Nov. 28/97
Technician J.D.

TRIAL #	1	2	3	4
Sediment Height (H) mm	374	324	196	
Degradation Factor (D)	0.68	6.01	25.55	
	#37934	37933	37826	
	97-39 ✓	97-40	97-21 ✓	

CALCULATIONS

$$D = \frac{381 - H}{381 + 1.75\ H} \times 100$$

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL AND MATERIALS BRANCH

SAND EQUIVALENT TEST

Project FORESTRY PIT
Sta. or T.H. _____ Sample # _____
Depth _____
Cost Code _____ Date 10-23-97
Technician BW.

TRIAL #	1	2	3	4
Clay Height mm	127	134	212	280
Sediment Period	20	20	20	20
Sand Height mm	100	102	82	82
	✓ 97-15	✓ 97-43	✓ 97-9	97-6
Sand Equivalent (SE)	78.7	76.1	37.7	29.3 ✓
	37829	37931	37832	37935

INTERPRETATION OF RESULTS

SE	50	40	30	20	
	absence of plastic material		possible plastic material		plastic material

REMARKS:

CALCULATIONS:

$$\text{Sand Equivalent (SE)} = \frac{\text{Sand Height}}{\text{Clay Height}} \times 100$$

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL AND MATERIALS BRANCH

SAND EQUIVALENT TEST

Project FORESTRY PIT
Sta. or T.H. _____ Sample # _____
Depth _____
Cost Code _____ Date 10·28·97
Technician BW

TRIAL #	1	2	3	4
Clay Height mm	131	160	198	130
Sediment Period	20	20	20	20
Sand Height mm	82	80	88	102
	✓ 97-37	✓ 97-10	✓ 97-38	✓ 97-16
Sand Equivalent (SE)	62.6	50.0	44.4	78.5
	37936	37831	37835	37828

INTERPRETATION OF RESULTS

SE	50	40	30	20
	absence of plastic material		possible plastic material	plastic material

REMARKS:

CALCULATIONS:

$$\text{Sand Equivalent (SE)} = \frac{\text{Sand Height}}{\text{Clay Height}} \times 100$$

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL AND MATERIALS BRANCH

SAND EQUIVALENT TEST

Project FORESTRY PIT
Sta. or T.H. _____ Sample # _____
Depth 1997 PIT DEVEL.
Cost Code _____ Date 97-11-18
Technician B.W.

TRIAL #	1	2	3	4
Clay Height mm	338	256	130	134
Sediment Period	20	20	20	20
Sand Height mm	84	80	98	90
Sand Equivalent (SE)	97-24 24.9 37939	97-21 31.3 37826	97-17 75.4 37827	97-44 67.2 37930

INTERPRETATION OF RESULTS

SE	50	40	30	20	
	absence of plastic material		possible plastic material		plastic material

REMARKS:

CALCULATIONS:

$$\text{Sand Equivalent (SE)} = \frac{\text{Sand Height}}{\text{Clay Height}} \times 100$$

2 5m

PROVINCE OF BRITISH COLUMBIA
MINISTRY OF TRANSPORTATION & HIGHWAYS
GEOTECHNICAL AND MATERIALS BRANCH

SAND EQUIVALENT TEST

Project FORESTRY PIT

Sta. or T.H. ~~1997 PIT~~ Sample # _____

Depth 1997 PIT DEVEL.

Cost Code _____ Date 97-11-18

Technician J.D.

TRIAL #	1	2	3	4
Clay Height mm	190	262	328	
Sediment Period	20	20	20	
Sand Height mm	92	80	84	
	~~37935~~			
	✓	✓	✓	
	97-40	97-39	97-34	
Sand Equivalent (SE)	48.4	30.5	25.6	
	# 37933	37934	37937	

INTERPRETATION OF RESULTS

SE	50	40	30	20	
	absence of plastic material		possible plastic material		plastic material

REMARKS:

CALCULATIONS:

$$\text{Sand Equivalent (SE)} = \frac{\text{Sand Height}}{\text{Clay Height}} \times 100$$

3 13"

H371 81/02

Ministry of Transportation and Highways
GEOTECHNICAL AND MATERIALS BRANCH

PROJECT FORESTRY PIT
Station or T.H. 97-8 Sample No. 1
Depth 37833 Cost Code
Date OCT. 27/97
Technician BW.

SOUNDNESS TEST (A.S.T.M. C88)

Sieve Size Passing	Sieve Size Retained	Grading of Original Sample (%)	Mass of Test Fractions Before Test (g)	After 5 Cycles: Mass Remaining (g)	After 5 Cycles: Loss (%)	Weighted Percentage Mass Loss (%)
SOUNDNESS TEST OF COARSE AGGREGATE						
63 mm	50 mm					
50 mm	37.5 mm					
37.5 mm	25.0 mm					
25.0 mm	19.0 mm					
19.0 mm	12.5 mm	56.3	670.7	871.1	13.1	7.4
			332.0			
12.5 mm	9.5 mm					
9.5 mm	4.75 mm	43.7	300.0	230.5	23.2	10.1
TOTALS		100.0				17.5
SOUNDNESS TEST OF FINE AGGREGATE						
★9.5 mm	4.75 mm					
4.75 mm	2.36 mm	44.0	100.0	59.5	40.5	17.8
2.36 mm	1.18 mm	29.6	100.0	55.2	44.8	13.3
1.18 mm	.600 mm	16.2	100.0	57.2	42.8	6.9
.600 mm	.300 mm	10.2	100.0	65.9	34.1	3.5
.300 mm	.150 mm					
.150 mm	PAN					
TOTALS		100.0				41.5

★ This Fraction is not used When Sample Contains Both Coarse and Fine Portions

% Of Initial Sample Passing 4.75 mm Sieve = _____ %

REMARKS:-

Ministry of Transportation and Highways
GEOTECHNICAL AND MATERIALS BRANCH

PROJECT FORESTRY PIT
Station or T.H. 97-42 Sample No. 1
Depth 37932 Cost Code
Date Oct 27/97
Technician BW.

SOUNDNESS TEST (A.S.T.M. C88)

Sieve Size Passing	Sieve Size Retained	Grading of Original Sample (%)	Mass of Test Fractions Before Test (g)		After 5 Cycles: Mass Remaining (g)	After 5 Cycles: Loss (%)	Weighted Percentage Mass Loss (%)
SOUNDNESS TEST OF COARSE AGGREGATE							
63 mm	50 mm						
50 mm	37.5 mm						
37.5 mm	25.0 mm						
25.0 mm	19.0 mm						
19.0 mm	12.5 mm	57.7	669.3	1001.7	852.2	17.6	10.1
12.5 mm	9.5 mm		332.4				
9.5 mm	4.75 mm	42.3		300.2	215.1	28.4	12.0
TOTALS		100.0					22.1
SOUNDNESS TEST OF FINE AGGREGATE							
★9.5 mm	4.75 mm						
4.75 mm	2.36 mm	51.2		100.1	54.1	46.0	23.5
2.36 mm	1.18 mm	27.6		100.0	47.3	52.7	14.6
1.18 mm	.600 mm	13.5		100.0	46.3	53.7	7.3
.600 mm	.300 mm	7.7		100.0	55.4	44.6	3.4
.300 mm	.150 mm						
.150 mm	PAN						
TOTALS		100.0					48.8

★ This Fraction is not used When Sample Contains Both Coarse and Fine Portions

% Of Initial Sample Passing 4.75 mm Sieve = _____ %

REMARKS:-

Project # FORESTRY PIT
Bag # 37828
Technician : JD.

Testhole # _____
Date : Nov. 20/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	5	
Retained	19.0 mm	Fractured	5	50.0 % (19.0mm)
Passing	19.0mm	Unfractured	18	
Retained	12.5 mm	Fractured	54	75.0 % (12.5mm)
Passing	12.5mm	Unfractured	74	
Retained	9.5 mm	Fractured	85	53.5 % (9.5mm)
Passing	9.5mm	Unfractured	565	
Retained	4.75mm	Fractured	704	55.5 % (4.75mm)
TOTAL		Unfractured	662	
		Fractured	848	56.2 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry Pit
Bag # 37835
Technician : J.G.

Testhole # _____
Date : Nov. 20/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	2	
Retained	19.0 mm	Fractured	12	85.7 % (19.0mm)
Passing	19.0mm	Unfractured	10	
Retained	12.5 mm	Fractured	86	89.6 % (12.5mm)
Passing	12.5mm	Unfractured	13	
Retained	9.5 mm	Fractured	100	88.5 % (9.5mm)
Passing	9.5mm	Unfractured	88	
Retained	4.75mm	Fractured	538	85.9 % (4.75mm)
TOTAL		Unfractured	113	
		Fractured	734	86.7 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry Pit
Bag # 37833
Technician : J.Q.

Testhole #
Date : Nov. 20 / 97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	10	
Retained	19.0 mm	Fractured	19	65.5 % (19.0mm)
Passing	19.0mm	Unfractured	26	
Retained	12.5 mm	Fractured	55	67.9 % (12.5mm)
Passing	12.5mm	Unfractured	77	
Retained	9.5 mm	Fractured	120	60.9 % (9.5mm)
Passing	9.5mm	Unfractured	276	
Retained	4.75mm	Fractured	556	66.8 % (4.75mm)
TOTAL		Unfractured	389	
		Fractured	750	65.9 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry Pit
Bag # 37831
Technician : J.Q.

97-10

Testhole # _____
Date : Nov. 20/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	3	
Retained	19.0 mm	Fractured	8	72.7 % (19.0mm)
Passing	19.0mm	Unfractured	40	
Retained	12.5 mm	Fractured	67	62.6 % (12.5mm)
Passing	12.5mm	Unfractured	66	
Retained	9.5 mm	Fractured	131	66.5 % (9.5mm)
Passing	9.5mm	Unfractured	296	
Retained	4.75mm	Fractured	800	73.0 % (4.75mm)
TOTAL		Unfractured	405	
		Fractured	1006	71.3 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry 97-17 Testhole #
Bag # 37827 Date : Nov. 28/97
Technician :

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	5	
Retained	19.0 mm	Fractured	22	81.5 % (19.0mm)
Passing	19.0mm	Unfractured	30	
Retained	12.5 mm	Fractured	77	72.0 % (12.5mm)
Passing	12.5mm	Unfractured	92	
Retained	9.5 mm	Fractured	136	59.7 % (9.5mm)
Passing	9.5mm	Unfractured	308	
Retained	4.75mm	Fractured	420	57.7 % (4.75mm)
TOTAL		Unfractured	435	
		Fractured	755	63.5 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # FORESTRY 97-34 Testhole # 97-34
Bag # 37937 Date : Nov. 23/97
Technician :

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	6	
Retained	19.0 mm	Fractured	15	71.4 % (19.0mm)
Passing	19.0mm	Unfractured	31	
Retained	12.5 mm	Fractured	54	63.5 % (12.5mm)
Passing	12.5mm	Unfractured	97	
Retained	9.5 mm	Fractured	101	51.0 % (9.5mm)
Passing	9.5mm	Unfractured	322	
Retained	4.75mm	Fractured	584	64.5 % (4.75mm)
TOTAL		Unfractured	456	
		Fractured	754	62.3 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry Pit
Bag # 37934
Technician : J.O.

Testhole #
Date : Nov. 28/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	5	
Retained	19.0 mm	Fractured	19	84.9 % (19.0mm)
Passing	19.0mm	Unfractured	28	
Retained	12.5 mm	Fractured	97	77.6 % (12.5mm)
Passing	12.5mm	Unfractured	80	
Retained	9.5 mm	Fractured	204	71.8 % (9.5mm)
Passing	9.5mm	Unfractured	224	
Retained	4.75mm	Fractured	1176	84.0 % (4.75mm)
TOTAL		Unfractured	337	
		Fractured	1496	81.6 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # Forestry Pit 97-21
Bag # 37826
Technician : J.D.

Testhole # _____
Date : Nov. 28/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured	_____	
Retained	25.0 mm	Fractured	_____	_____ % (25mm)
Passing	25.0mm	Unfractured	2	
Retained	19.0 mm	Fractured	16	88.9 % (19.0mm)
Passing	19.0mm	Unfractured	19	
Retained	12.5 mm	Fractured	78	80.4 % (12.5mm)
Passing	12.5mm	Unfractured	56	
Retained	9.5 mm	Fractured	152	73.1 % (9.5mm)
Passing	9.5mm	Unfractured	196	
Retained	4.75mm	Fractured	460	70.1 % (4.75mm)
TOTAL		Unfractured	273	
		Fractured	706	72.1 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured	_____	
Retained	12.5 mm	Fractured	_____	_____ % (12.5mm)
Passing	12.5mm	Unfractured	_____	
Retained	9.5 mm	Fractured	_____	_____ % (9.5mm)
Passing	9.5mm	Unfractured	_____	
Retained	4.75mm	Fractured	_____	_____ % (4.75mm)
Arithmatic Average		Unfractured	_____	
		Fractured	_____	_____ % Fracture B

Project # Forestry Pit 97-29
Bag # 37939
Technician : J. D.

Testhole # 97-29
Date : Nov. 25/97

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	5	
Retained	19.0 mm	Fractured	17	77.3 % (19.0mm)
Passing	19.0mm	Unfractured	24	
Retained	12.5 mm	Fractured	61	71.8 % (12.5mm)
Passing	12.5mm	Unfractured	49	
Retained	9.5 mm	Fractured	118	70.7 % (9.5mm)
Passing	9.5mm	Unfractured	192	
Retained	4.75mm	Fractured	560	74.5 % (4.75mm)
TOTAL		Unfractured	270	
		Fractured	756	73.7 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # FORESTRY
Bag # 37930
Technician : B.W.

97-12

Testhole # 97-44
Date : 97-12-1

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	2	
Retained	19.0 mm	Fractured	22	92 % (19.0mm)
Passing	19.0mm	Unfractured	21	
Retained	12.5 mm	Fractured	96	82 % (12.5mm)
Passing	12.5mm	Unfractured	34	
Retained	9.5 mm	Fractured	113	77 % (9.5mm)
Passing	9.5mm	Unfractured	128	
Retained	4.75mm	Fractured	535	80 % (4.75mm)
TOTAL		Unfractured	185	
		Fractured	766	80 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Project # FORESTRY 97-#44
Bag # 37933
Technician : B.W.

Testhole # 97-40
Date : 97-12-1

METHOD "A" METHOD "B"		For Crushed granular Surfacing and Base Aggregates For Crushed Paving Aggregates		
Method A (Count)				
Passing	37.5mm	Unfractured		
Retained	25.0 mm	Fractured		% (25mm)
Passing	25.0mm	Unfractured	1	
Retained	19.0 mm	Fractured	11	92 % (19.0mm)
Passing	19.0mm	Unfractured	21	
Retained	12.5 mm	Fractured	82	80 % (12.5mm)
Passing	12.5mm	Unfractured	28	
Retained	9.5 mm	Fractured	90	76 % (9.5mm)
Passing	9.5mm	Unfractured	127	
Retained	4.75mm	Fractured	826	87 % (4.75mm)
TOTAL		Unfractured	177	
		Fractured	1009	85 % Fracture A
METHOD (MASS)				
Passing	19.0mm	Unfractured		
Retained	12.5 mm	Fractured		% (12.5mm)
Passing	12.5mm	Unfractured		
Retained	9.5 mm	Fractured		% (9.5mm)
Passing	9.5mm	Unfractured		
Retained	4.75mm	Fractured		% (4.75mm)
Arithmatic Average		Unfractured		
		Fractured		% Fracture B

Quality Control Report

Legend:

Limit	ALS Control Limit (Data Quality Objectives)
DUP	Duplicate
RPD	Relative Percent Difference
N/A	Not Available
LCS	Laboratory Control Sample
SRM	Standard Reference Material
MS	Matrix Spike
MSD	Matrix Spike Duplicate
ADE	Average Desorption Efficiency
MB	Method Blank
IRM	Internal Reference Material
CRM	Certified Reference Material
CCV	Continuing Calibration Verification
CVS	Calibration Verification Standard
LCSD	Laboratory Control Sample Duplicate

Sample Parameter Qualifier Definitions:

Qualifier	Description
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

All test results reported with this submission were conducted within ALS recommended hold times.

ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where available). For more information, please contact ALS.

The ALS Quality Control Report is provided to ALS clients upon request. ALS includes comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against pre-determined data quality objectives to provide confidence in the accuracy of associated test results.

Please note that this report may contain QC results from anonymous Sample Duplicates and Matrix Spikes that do not originate from this Work Order.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2492300-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report	Report Format / Distribution	Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply
Company:	Wood	Select Report Format: ☑ PDF ☐ EXCEL ☐ EDD (DIGITAL)	Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply
Contact:	Giti Ghorbanian,	Quality Control (QC) Report with Report ☐ YES ☐ NO	PRIORITY (Business Days): 4 day [P4] ☐ / 3 day [P3] ☐ / 2 day [P2] ☐ — EMERGENCY: 1 Business day [E1] ☐ / Same Day, Weekend or Statutory holiday [E0] ☐
Phone:	giti.ghorbanian@woodplc.com	☐ Compare Results to Criteria on Report - provide details below if box checked	
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm
Street:	Unit 110 - 18568 96th Avenue,	Email 1 or Fax giti.ghorbanian@woodplc.com	For tests that can not be performed according to the service level selected, you will be contacted.
City/Province:	Surrey/BC	Email 2	
Postal Code:	V4N 3P9	Email 3	
Invoice To	Same as Report To ☑ YES ☐ NO	**Invoice Distribution**	**Analysis Request**
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
Company:	Wood	Email 1 or Fax giti.ghorbanian@woodplc.com	
Contact:		Email 2	

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:		AFE/Cost Center:	PO#
Job #:	KA21172.1400	Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	VA20B2873	ALS Contact:	Sampler:

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Sulphide/Chloride	Number of Containers
1	Forestry Pit (Bag 1019)	1-Aug-20			✓	

Environmental Division
Vancouver
Work Order Reference
VA20B2873

Telephone : +1 604 253 4188

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	ATTN: Selam
Are samples for human drinking water use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			24		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
							Aug 17	9:14

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Wood Environmental & Infrastructure Solutions
ATTN: Giti Ghorbanian
600 - 4445 Lougheed Hwy
Burnaby BC V5C 0E4

Date Received: 17-AUG-20
Report Date: 27-AUG-20 17:11 (MT)
Version: FINAL

Client Phone: --

Certificate of Analysis

Lab Work Order #: L2492300

Project P.O. #: NOT SUBMITTED
Job Reference: KA21172.1400
C of C Numbers:
Legal Site Desc:

Selam Worku
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2492300-1				
	Description					
	Sampled Date	01-AUG-20				
	Sampled Time					
	Client ID	FORESTRY PIT (BAG 1019)				
Grouping	**Analyte**					
SOIL						
Inorganic Parameters	Water-Soluble Chloride Ion Content (%)	0.0075				
	Total Sulphate Ion Content (%)	<0.050				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CL-S-CSA-A23-ED	Soil	Water-Soluble Chloride Ion Content	CSA INTERNATIONAL A23.2

Water-soluble chloride content is determined by mixing soil with water then digesting by boiling in an autoclave for 15 minutes. After filtration of the hot digest, analysis by ion chromatography proceeds.

SO4-T-CSA-A23-ED	Soil	Total Sulphate Ion Content	CSA INTERNATIONAL A23.2-3B

Total sulphate content is determined by mixing soil with water then hydrochloric acid, and digesting just below boiling point, for 15 minutes. Analysis by ion chromatography follows.
NOTE: the CSA-A23 method states that for a total sulphate ion content greater than 0.2%, soluble sulphate ion content shall be determined on the basis of a water extraction. This water extraction requires the total sulphate ion content result to calculate the correct ratio for the water extraction.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
ED	ALS ENVIRONMENTAL - EDMONTON, ALBERTA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

Quality Control Report

Client: Wood Environmental & Infrastructure Solutions
600 - 4445 Lougheed Hwy
Burnaby BC V5C 0E4
Contact: Giti Ghorbanian

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CL-S-CSA-A23-ED	**Soil**							
Batch R5203000								
WG3392515-3 DUP		**L2492300-1**						
Water-Soluble Chloride Ion Content		0.0075	0.0074		%	1.0	30	27-AUG-20
WG3392515-2 LCS								
Water-Soluble Chloride Ion Content			105.8		%		70-130	27-AUG-20
WG3392515-1 MB								
Water-Soluble Chloride Ion Content			<0.0025		%		0.0025	27-AUG-20
SO4-T-CSA-A23-ED	**Soil**							
Batch R5202780								
WG3392361-3 CRM		**ED-634A_CEMENT**						
Total Sulphate Ion Content			83.2		%		80-120	27-AUG-20
WG3392361-4 DUP		**L2492300-1**						
Total Sulphate Ion Content		<0.050	<0.050	RPD-NA	%	N/A	30	27-AUG-20
WG3392361-2 LCS								
Total Sulphate Ion Content			101.4		%		70-130	27-AUG-20
WG3392361-1 MB								
Total Sulphate Ion Content			<0.050		%		0.05	27-AUG-20