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BC Geological Survey Assessment Report 38151

Ministry of Energy and Mines
BC Geological Survey

Assessment Report
Title Page and Summary

TYPE OF REPORT [type of survey(s)]: Drilling/Surveying

TOTAL COST: $190,397.7

AUTHOR(S): Thurber Engineering Ltd.

SIGNATURE(S): Erik Stevenson, David Regehr

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S): MX-7-195

YEAR OF WORK: 2018

STATEMENT OF WORK - CASH PAYMENTS EVENT NUMBER(S)/DATE(S): 5727165

PROPERTY NAME: MCNAB

CLAIM NAME(S) (on which the work was done): MCNAB(1043996), SHALA(1038498)

COMMODITIES SOUGHT: Not known

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN:

MINING DIVISION: Vancouver

NTS/BCGS: 092G/11

LATITUDE: 49 ° 34 ' 18.1 " **LONGITUDE:** -123 ° 23 ' 34.7 " **(at centre of work)**

OWNER(S):

1) BURNCO Rock Products Ltd

2)

MAILING ADDRESS:

Main Floor, 155 Glendeer Circle SE, Box 1480, Station T,
Calgary, AB, Canada T2H2P9

OPERATOR(S) [who paid for the work]:

1) BURNCO Rock Products Ltd

2)

MAILING ADDRESS:

Main Floor, 155 Glendeer Circle SE, Box 1480, Station T,
Calgary, AB, Canada T2H2P9

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Sand and gravel

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS:

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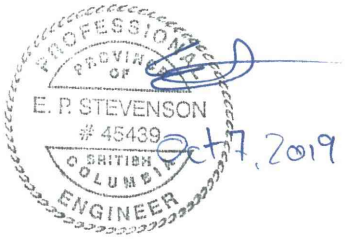
TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
GEOLOGICAL (scale, area)			
Ground, mapping			
Photo interpretation			
GEOPHYSICAL (line-kilometres)			
Ground			
Magnetic			
Electromagnetic			
Induced Polarization			
Radiometric			
Seismic			
Other			
Airborne			
GEOCHEMICAL (number of samples analysed for...)			
Soil			
Silt			
Rock			
Other			
DRILLING (total metres; number of holes, size)			
Core	245.4m; 3 drill holes	MCNAB,SHALA	$143,717.6
Non-core			
RELATED TECHNICAL			
Sampling/assaying	3 samples	MCNAB,SHALA	$43,464.70
Petrographic	1 sample	MCNAB,SHALA	$1,677.38
Mineralographic			
Metallurgic			
PROSPECTING (scale, area)			
PREPARATORY / PHYSICAL			
Line/grid (kilometres)			
Topographic/Photogrammetric (scale, area)			
Legal surveys (scale, area)			
Road, local access (kilometres)/trail	0.55KM	MCNAB,SHALA	$21,588.74
Trench (metres)			
Underground dev. (metres)			
Other		MCNAB,SHALA	$4,709.25
		TOTAL COST:	$215,157.67

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MCNAB CREEK GRAVEL EXPLORATION
SUNSHINE COAST, BC
AGGREGATE INVESTIGATION

McNab Claim (ID 1043996) and Shala Claim (1038498)
49.57°N, -123.39°W Vancouver Division
NTS Map Sheet: 92G/11
Owner of Claims: BURNCO Rock Products Ltd.
Operator: BURNCO Rock Products Ltd.

David Regehr, P.Eng.
Review Principal



Date Submitted: October 7, 2019
File: 23642

Erik Stevenson, P.Eng.
Project Engineer

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1. INTRODUCTION

We understand that BURNCO plans to complete an assessment of the volume and quality of sand and gravel aggregate at the proposed McNab Creek Valley site. The McNab Creek Valley is located on the west side of Howe Sound, approximately 16 km north-northeast of the Langdale Ferry Terminal.

As part of the assessment, BURNCO retained Omega Environmental Drilling Ltd. to complete three test holes to collect soil samples for aggregate quality testing. Thurber's scope of services was to collect soil samples and complete a suite of laboratory testing agreed upon with BURNCO to assess the proportions of grain size and quality of the aggregate at the site.

1.1 Location, Access, Infrastructure and Physiography

The McNab and Shala Claims are within the Lower McNab Valley, located on the west shore of Howe Sound, about 35 km northwest of Vancouver. The lease is located at the mouth of McNab Creek, which runs from the north at a relatively gentle slope to Howe Sound at the south. The creek valley is bounded on the east and west by mountains up to 1280 m high. The lease begins at sea level and has a maximum elevation of 240 m.

The site is accessed by boat with two boat launches present at the shoreline. The McNab Creek Forest Service Road enters the lease from the north and runs through the lease on the west side of the valley. Structures on the property include a marine dock, barge ramp, decommissioned fuel tanks and a maintenance shed. There is a BC Hydro right of way present at the south end of the site.

1.2 Site History

We understand that forestry and mining activities have occurred at the site since the early 1900s. A logging road was cut into the lease around 1946, and gravel extraction began around this time. Mining of a rock quarry for slate began in the 1950s.

Canfor acquired ownership in the 1970s, and until 2001, the site was a private managed forest, and a log dump and log storage were developed in the foreshore. Howe Sound Ltd. Partnership owned the site from 2001 to 2004. AJB Investments purchased the site with plans to extract the gravel but never received a mine permit. As such they harvested forest products until 2006, when they sold the property to Canadian Natural Investments, who never proceeded beyond planning. 0819042 BC Ltd. (a BURNCO sister company) purchased the property in April 2008. BURNCO's history of the claims are provided in Tables 1 and 2 below.

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Table 1 – McNab Claim History

Claim	Title No.	Size (Ha)	Issue – Good to Dates	Owner (%)
McNab	1043996	607.6	May 6, 2016 – 2026	BURNCO (100%)
Date	**Submitter**		**Event**	
2016-May-16	BURNCO Rock Products Ltd.		CEXT Claim Registration (Acquisition) (5602074)	
2017-Apr-7	BURNCO Rock Products Ltd.		CIL Payment Instead of Exploration and Development Work (5644852)	
2018-Apr-30	BURNCO Rock Products Ltd.		SOW Exploration and Development Work / Expiry Date Change (5695558)	
2018-Jul-27	BURNCO Rock Products Ltd.		SOWU Claim Exploration and Development Work (SOW) – Upload Report (5705520)	
2019-Jan-17	BURNCO Rock Products Ltd.		SOW Exploration and Development Work / Expiry Date Change (5727103) SOW Exploration and Development Work / Expiry Date Change (5727165)	
2019-Jan-31	BURNCO Rock Products Ltd.		TAME Amendment (5729978)	
2019-Feb-19	BURNCO Rock Products Ltd.		SOWU Claim Exploration and Development Work (SOW) – Upload Report (5731232)	

Table 2 – Shala Claim History

Claim	Title No.	Size (Ha)	Issue – Good to Dates	Owner (%)
Shala	1038498	20.96	September 11, 2015 – 2026	BURNCO (100%)
Date	**Submitter**		**Event**	
2015-Sep-11	BURNCO Rock Products Ltd.		CEXT Claim Registration (Acquisition) (5569862)	
2016-Sep-2	BURNCO Rock Products Ltd.		CIL Payment Instead of Exploration and Development Work (5617009)	
2017-Aug-17	BURNCO Rock Products Ltd.		CIL Payment Instead of Exploration and Development Work (5695558)	
2018-Apr-30	BURNCO Rock Products Ltd.		SOW Exploration and Development Work / Expiry Date Change (5695558)	
2018-Jul-27	BURNCO Rock Products Ltd.		SOWU Claim Exploration and Development Work (SOW) – Upload Report (5705520)	
2019-Jan-17	BURNCO Rock Products Ltd.		SOW Exploration and Development Work / Expiry Date Change (5727103) SOW Exploration and Development Work / Expiry Date Change (5727165)	
2019-Jan-31	BURNCO Rock Products Ltd.		TAME Amendment (5729978)	
2019-Feb-19	BURNCO Rock Products Ltd.		SOWU Claim Exploration and Development Work (SOW) – Upload Report (5731232)	

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2. GEOLOGICAL SETTING

The BC Geological Survey's 1957 Map for Squamish (Sheet 92G/11) suggests that the native soils at the site generally comprise gravelly fluvial fan or terrace deposits (gFf/gFt). The deposits are described as pebbles, cobbles and possible boulders in a sand matrix. A copy of this map is shown in Figure 23642-3.

Geoscience BC's Map 2013-NVI-1-1, *Northern Vancouver Island Geology*, indicates that the bedrock of the project site comprises lower Cretaceous, Conglomerate, sandstone, shale, argillite, minor limestone; basaltic andesite to rhyolite flows, crystal and lapilli tuff, tuffaceous sandstone, volcanic conglomerate and breccia; schist, graphitic schist. (lKGa). Near the northeast side of the valley, the map suggests that the bedrock comprises mid-Cretaceous Gabbro (mKgd). The bedrock limits for the site are shown in Figure 23642-4.

3. FIELD INVESTIGATION

Laboratory testing included a visual classification and the determination of the of the natural moisture content of all soil samples. Gradation, water soluble sulphate content, Atterberg Limit, bulk unit weight and unconfined compression tests were carried out on selected soil samples.

The results of the drilling and laboratory testing undertaken for this study are summarized on the test hole logs in Appendix B. An explanation of the symbols and terms used to describe the test hole logs, and a description of the Modified Unified Soils Classification system are also provided therein. Unconfined compression test, gradation analysis and Atterberg Limit test results are provided in Appendix C.

4. LABORATORY TESTING

Laboratory testing was completed in two stages: gradation testing on all granular, non-bulk samples, and aggregate quality testing on the bulk samples. The bulk samples were combined, such that there was one bulk sample comprising all the bulk samples from above 40 m depth from all three test holes and a second sample from all the bulk samples collected from below 40 m deep in all three test holes. The laboratory testing methods are described below.

4.1 Gradation Testing

All granular, non-bulk samples were subject to a gradation analysis in general accordance with ASTMs C117 and C138. It should be noted that the nature of sampling by sonic makes collecting the required sample size difficult, as ASTM standards need a 60 kg sample for a maximum particle diameter of 75 mm. As such, care was taken to obtain as representative of a sample as possible in the field. The detailed grainsize plots are provided in Appendix A, and the percentages of gravel and cobbles (particles greater than 4.75 mm diameter), sand (particles smaller than 4.75 mm diameter), and fines (particles smaller than 0.075 mm diameter) are shown on the test hole logs.

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4.2 Aggregate Quality Testing

Per BURNCO's request, a bulk sample of soil from depths 0 m to 40 m from all three holes and a sample from deeper than 40 m were collected for aggregate quality testing. Specifically, the two blended samples were subjected to the tests below.

- ASTM C117 – Gradation Analysis
- ASTM D2419 – Sand Equivalent Value
- ASTM D891 – Apparent Specific Gravity
- ASTM C88 – Soundness of Aggregate
- CSA A23.2-29A – Abrasion Loss by Micro Deval
- ASTM C131 – LA Abrasion Loss
- CSA A23.2-15A – Petrographic Analysis

A summary of the aggregate quality testing is below, and the relevant test reports are in Appendix B.

Table 3 – Summary of Aggregate Quality Testing

Test		Bulk Sample TH 18-1 through 18-3 (0 m to 40 m)		Bulk Sample TH 18-1 through 18-3 (> 40 m)	
		Coarse	Fine	Coarse	Fine
Gradation Analyses		See Appendix B			
Sand Equivalent Value ASTM D 2419		N/A Absence of plastic material	78	N/A Absence of plastic material	63
ASTM D891	Apparent Specific Gravity	2.761	N/A	2.753	N/A
	Bulk Specific Gravity	2.744	2.568	2.731	2.562
	Bulk Specific Gravity (Saturated Surface Dry)	2.755	2.635	2.739	2.626
	Absorption	0.12%	2.68%	0.3%	2.43%
Soundness of Aggregate		0.6% Loss by Weight	8.3% Loss by Weight	0.35% Loss by Weight	7.9% Loss by Weight
Abrasion Loss Micro Deval		10.2% Loss of Fines*		6.3% Loss of Fines*	
Abrasion Loss LA Machine		11% Loss after 1000 Revolutions*		14% Loss after 1000 Revolutions*	
Petrographic Number		119		121	

*Test completed on coarse particles only.

5. DISCUSSION

The results of our investigation indicate that the subsurface conditions at the site are consistent with surficial geology maps. The test hole logs provide complete detailed descriptions of the soil encountered and must be used in preference to the generalized descriptions below.

Subsurface conditions generally comprise gravel over sand, clay and till and bedrock. The gravel is about 40 m to 50 m thick and comprises dense to very dense, grey, sand and gravel to sandy gravel. The layer generally comprises up to 38% cobbles, 20% to 79% (average 56%) gravel,

13% to 64% (average 37%) sand and generally less than 5% fines. The gravel layer is thinnest in the western-most test hole, TH 18-3.

The sand layer comprises dense, grey, gravelly, medium to fine sand with some silt. The sand layer extended to depths of 76 m and 72 m in THs 18-1 and 18-2, respectively, and to a depth of 54 m in TH 18-3. The sand layer comprises between 0% and 68% (average 23%) gravel, between 17% and 93% (average 57%) sand, and between 0% and 63% (average 19%) fines.
Under the sand, sandy gravel till was encountered in THs 18-1 and 18-2 to depths of 93 m and 79 m, respectively. The silty clay in TH 18 3 was encountered to a depth of 60 m. Bedrock was encountered in THs 18-2 and 18-3.

The results of our petrographic testing suggest that about 90% of the aggregate is strong coarse-grained intrusive volcanics such as granite, diorite or gabbro and strong, slightly weathered volcanic rock, such as basalt and andesite. These rock types are considered “Good Aggregate” per CSA A23.2-15A. Further, the analysis suggests that 20% of the gravel particles contained at least 1 broken side, and that 2% to 3% of particles were flat or elongated. The samples contained less than 0.6% deleterious material.

6. STATEMENT OF COSTS

Thurber’s fees to complete the investigation including mobilization/demobilization, fieldwork, laboratory testing, analysis and reporting was $39,972.00.

7. STATEMENT OF QUALIFICATIONS

Thurber staff assigned to the project were qualified professionals and technologists with extensive relevant experience. The following Thurber staff were assigned to the investigation.

David Regehr, M.Eng., P.Eng.	Review Principal
Erik Stevenson, M.Eng., P.Eng.	Project Engineer
Sebastian Suckling, GIT	Field Geoscientist

David Regehr was the Review Principal for this project. David has been responsible for the completion of a wide range of geotechnical, geological and environmental engineering assignments throughout Western Canada. He has completed transportation, municipal infrastructure, land development, water resources and mining engineering projects. Further, he has managed and delivered projects that have included large geotechnical investigation programs, analysis, design, preparation of technical reports and construction inspection. His geological engineering background and experience has included field mapping, core logging, rock slope stability assessment and terrain analysis for infrastructure route selection and aggregate resource inventory assessment.

Erik Stevenson was the project manager for the investigation and provided direction and oversight of the fieldwork and reporting of results. He completed his undergraduate degree in Geological Engineering at UBC and since then, has over eight years of experience as a geotechnical

engineer. He has managed and conducted many geotechnical investigations in BC including aggregate resource assessments.

Sebastian Suckling was the field supervisor for the investigation and his tasks included logging the soil conditions encountered at the test hole locations and collection of samples for testing. He is a geoscientist with over 4 years of experience. He has provided professional geological services, including completing drilling investigations, for various projects in British Columbia and New Zealand.

8. CLOSURE

We trust that this information is sufficient for your needs. Should you require clarification of any item or additional information, please contact us at your convenience.

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STATEMENT OF LIMITATIONS AND CONDITIONS

1. STANDARD OF CARE

This Report has been prepared in accordance with generally accepted engineering or environmental consulting practices in the applicable jurisdiction. No other warranty, expressed or implied, is intended or made.

2. COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment are a part of the Report, which is of a summary nature and is not intended to stand alone without reference to the instructions given to Thurber by the Client, communications between Thurber and the Client, and any other reports, proposals or documents prepared by Thurber for the Client relative to the specific site described herein, all of which together constitute the Report.

IN ORDER TO PROPERLY UNDERSTAND THE SUGGESTIONS, RECOMMENDATIONS AND OPINIONS EXPRESSED HEREIN, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. THURBER IS NOT RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT.

3. BASIS OF REPORT

The Report has been prepared for the specific site, development, design objectives and purposes that were described to Thurber by the Client. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the Report, subject to the limitations provided herein, are only valid to the extent that the Report expressly addresses proposed development, design objectives and purposes, and then only to the extent that there has been no material alteration to or variation from any of the said descriptions provided to Thurber, unless Thurber is specifically requested by the Client to review and revise the Report in light of such alteration or variation.

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION THEREOF WITHOUT THURBER'S WRITTEN CONSENT AND SUCH USE SHALL BE ON SUCH TERMS AND CONDITIONS AS THURBER MAY EXPRESSLY APPROVE. Ownership in and copyright for the contents of the Report belong to Thurber. Any use which a third party makes of the Report, is the sole responsibility of such third party. Thurber accepts no responsibility whatsoever for damages suffered by any third party resulting from use of the Report without Thurber's express written permission.

5. INTERPRETATION OF THE REPORT

a) Nature and Exactness of Soil and Contaminant Description: Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors are judgmental in nature. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other persons making use of such documents or records with our express written consent should be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other persons. Some conditions are subject to change over time and those making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client should disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

b) Reliance on Provided Information: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to Thurber. Thurber has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, Thurber does not accept responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of misstatements, omissions, misrepresentations, or fraudulent acts of the Client or other persons providing information relied on by Thurber. Thurber is entitled to rely on such representations, information and instructions and is not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

c) Design Services: The Report may form part of design and construction documents for information purposes even though it may have been issued prior to final design being completed. Thurber should be retained to review final design, project plans and related documents prior to construction to confirm that they are consistent with the intent of the Report. Any differences that may exist between the Report's recommendations and the final design detailed in the contract documents should be reported to Thurber immediately so that Thurber can address potential conflicts.

d) Construction Services: During construction Thurber should be retained to provide field reviews. Field reviews consist of performing sufficient and timely observations of encountered conditions in order to confirm and document that the site conditions do not materially differ from those interpreted conditions considered in the preparation of the report. Adequate field reviews are necessary for Thurber to provide letters of assurance, in accordance with the requirements of many regulatory authorities.

6. RELEASE OF POLLUTANTS OR HAZARDOUS SUBSTANCES

Geotechnical engineering and environmental consulting projects often have the potential to encounter pollutants or hazardous substances and the potential to cause the escape, release or dispersal of those substances. Thurber shall have no liability to the Client under any circumstances, for the escape, release or dispersal of pollutants or hazardous substances, unless such pollutants or hazardous substances have been specifically and accurately identified to Thurber by the Client prior to the commencement of Thurber's professional services.

7. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or others who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes but is not limited to decisions made to develop, purchase or sell land.

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APPENDIX A: FIELD INVESTIGATION

Plotted: January 30, 2019



LEGEND:

TEST HOLE

NOTES:
1. BASE PLAN TAKEN FROM GOOGLE EARTH.
2. TEST HOLE LOCATIONS ARE APPROXIMATE.

THURBER ENGINEERING LTD.

CLIENT: BURNCO ROCK PRODUCTS LTD.

TEST HOLE LOCATION PLAN

McNAB CREEK GRAVEL EXPLORATION
GEOTECHNICAL INVESTIGATION
HOWE SOUND, B.C.

DESIGNED	DRAWN	APPROVED
EPS	MOM	DNR

DATE	SCALE
30/01/19	1:10,000

PROJECT No.	DWG. No.	REV.
23642	1	0

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CANCEL PRINTS BEARING EARLIER NUMBER

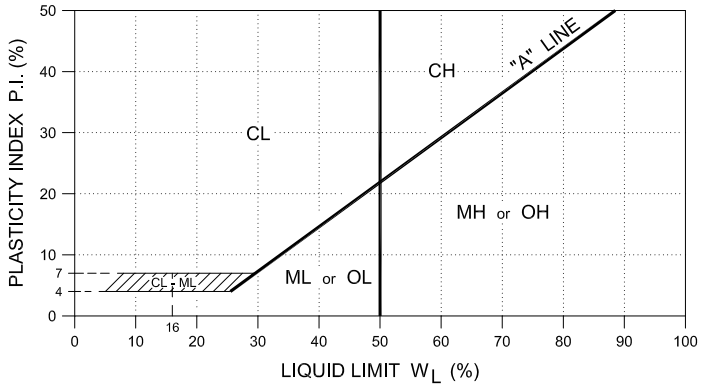
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UNIFIED CLASSIFICATION SYSTEM FOR SOILS (ASTM D2487)

MAJOR DIVISION			SYMBOLS GROUP	SYMBOLS GRAPH	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA
COARSE-GRAINED SOILS (MORE THAN 50% BY WEIGHT RETAINED ON No. 200 SIEVE)	GRAVELS MORE THAN 50% COARSE FRACTION RETAINED ON No. 4 SIEVE	CLEAN GRAVELS (< 5% FINES)	GW		WELL GRADED GRAVEL and WELL GRADED GRAVEL with SAND.	$C_U = \frac{D_{60}}{D_{10}} \geq 4 \quad C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$
			GP		POORLY GRADED GRAVEL and POORLY GRADED GRAVEL with SAND.	NOT MEETING ABOVE REQUIREMENTS
		GRAVELS WITH FINES (> 12% FINES)	GM		SILTY GRAVEL, GRAVEL - SAND - SILT MIXTURES.	FINES CLASSIFY AS ML or MH (3)
			GC		CLAYEY GRAVEL, GRAVEL - SAND - CLAY MIXTURES.	FINES CLASSIFY AS CL or CH (3)
	SANDS MORE THAN 50% COARSE FRACTION PASSES No. 4 SIEVE	CLEAN SANDS (< 5% FINES)	SW		WELL GRADED SAND and WELL GRADED SAND with GRAVEL	$C_U = \frac{D_{60}}{D_{10}} \geq 6 \quad C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$
			SP		POORLY GRADED SAND and POORLY GRADED SAND with GRAVEL.	NOT MEETING ABOVE REQUIREMENTS
		SANDS WITH FINES (> 12% FINES)	SM		SILTY SAND, SAND - SILT MIXTURES.	FINES CLASSIFY AS ML or MH (3)
			SC		CLAYEY SAND, SAND - CLAY MIXTURES.	FINES CLASSIFY AS CL or CH (3)
FINE-GRAINED SOILS (MORE THAN 50% BY WEIGHT PASSES No. 200 SIEVE)	SILTS BELOW "A" LINE NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	ML		INORGANIC SILTS, SILTS with SAND and SILTS with GRAVEL and SANDY or GRAVELLY SILTS.	P.I. < 4 or PLOTS BELOW THE "A" LINE
		W_L > 50%	MH		INORGANIC SILTS, SILTS with SAND & SILTS with GRAVEL & SANDY or GRAVELLY SILTS, FINE SANDY or SILTY SOILS.	P.I. PLOTS BELOW THE "A" LINE
	CLAYS ABOVE "A" LINE ON PLASTICITY CHART NEGLIGIBLE ORGANIC CONTENT	W_L < 50%	CL		INORGANIC CLAYS of LOW PLASTICITY, GRAVELLY, SANDY, or SILTY CLAYS, LEAN CLAYS.	P.I. > 7 and PLOTS ON OR ABOVE THE "A" LINE
		W_L near 50%	CL-CH		BORDERLINE INORGANIC CLAYS and SILTY CLAYS with LIQUID LIMITS NEAR 50%.	(only used for visual identification)
		W_L > 50%	CH		INORGANIC CLAYS of HIGH PLASTICITY, FAT CLAYS.	P.I. PLOTS ON OR ABOVE THE "A" LINE
	ORGANIC SILTS and CLAYS	W_L < 50%	OL		ORGANIC SILTS and ORGANIC SILTY CLAYS of LOW PLASTICITY.	$\frac{W_L \text{ (oven dried)}}{W_L \text{ (not dried)}} < 0.75$
		W_L > 50%	OH		ORGANIC CLAYS OF HIGH PLASTICITY.	$\frac{W_L \text{ (oven dried)}}{W_L \text{ (not dried)}} < 0.75$
HIGHLY ORGANIC SOILS			PT		PEAT and other HIGHLY ORGANIC SOILS.	STRONG COLOR OR ODOR, AND OFTEN FIBROUS TEXTURE.

PLASTICITY CHART FOR SOILS PASSING No. 40 SIEVE



NOTES:

1. ALL SIEVE SIZES ARE U.S. STANDARD, A.S.T.M. E11-04.
2. COARSE GRAINED SOILS WITH 5 TO 12% FINES REQUIRE DUAL SYMBOLS (GW-GM, GW-GC, GP-GM, GP-GC, SW-SM, SW-SC, SP-SM, SP-SC).
3. IF FINES CLASSIFY CL-ML USE DUAL SYMBOL (GC-GM or SC-SM).
4. WHERE TESTING IS NOT CARRIED OUT, THE IDENTIFICATIONS ARE DETERMINED BY VISUAL-MANUAL PROCEDURES DESCRIBED IN ASTM D2488-06.

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SYMBOLS AND TERMS USED ON TEST LOGS

1. PARTICLE SIZE CLASSIFICATION OF MINERAL SOILS

DESCRIPTION		APPARENT PARTICLE SIZE
BOULDERS		> 200 mm
COBBLES		75 mm to 200 mm
GRAVEL	coarse	19 mm to 75 mm
	fine	4.75 mm to 19 mm
SAND	coarse	2 mm to 4.75 mm
	medium	0.475 mm to 2 mm
	fine	0.075 mm to 0.475 mm
SILT		Non-plastic particles, not visible to the naked eye
CLAY		Plastic particles, not visible to the naked eye

NOTE: Metric Conversion is approximate only

2. TERMS DESCRIBING CONSISTENCY (Cohesive Soils Only)

DESCRIPTION	APPROXIMATE UNDRAINED SHEAR STRENGTH
Very Soft	Less than 10 kPa (250 psf)
Soft	10 to 25 kPa (250 - 500 psf)
Firm	25 to 50 kPa (500 - 1000 psf)
Stiff	50 to 100 kPa (1000 - 2000 psf)
Very Stiff	100 to 200 kPa (2000 - 4000 psf)
Hard	Greater than 200 kPa (4000 psf)

NOTE: Metric Conversion is approximate only

3. TERMS DESCRIBING DENSITY (Cohesionless Soils Only)

DESCRIPTION	STANDARD PENETRATION TEST Number of blows per foot (300 mm) *
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	over 50

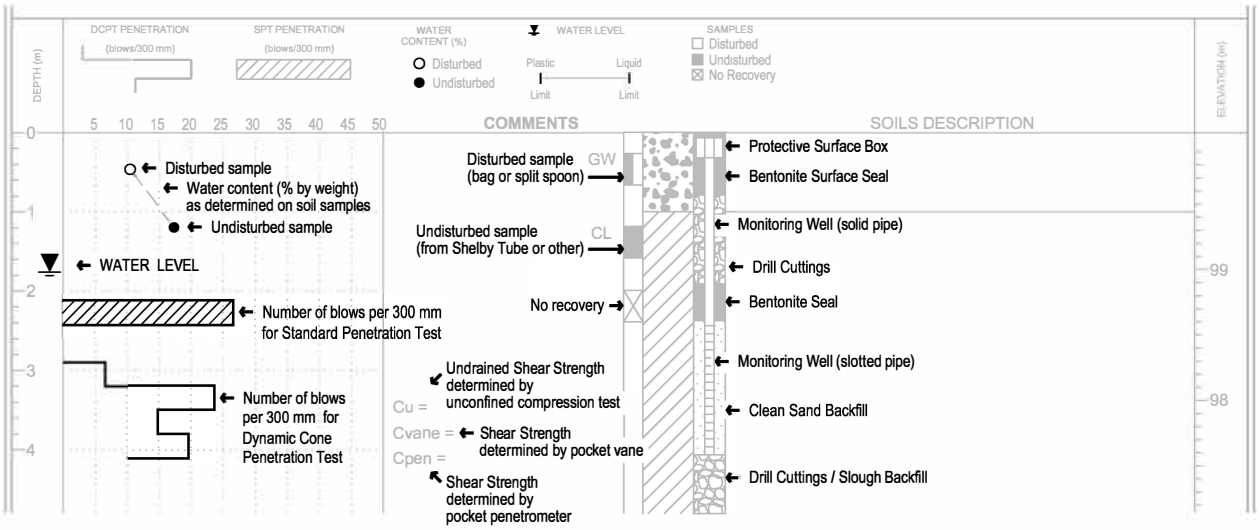
** Directly applicable to sands and, with interpretation, to gravels*

4. PROPORTION OF MINOR COMPONENTS BY WEIGHT

DESCRIPTION	PERCENT BY WEIGHT
and	35 to 50 %
y / ey	20 to 35 %
some	10 to 20 %
trace	less than 10 %

EXAMPLE: Silty SAND, trace of gravel = Sand with 20 to 35% silt and up to 10% gravel, by dry weight. (Percentages of secondary materials are estimates based on visual and tactile assessment of samples).

5. LEGEND FOR TEST HOLE LOGS *(Typical only showing commonly included elements)*



LOG OF TEST HOLE

TEST HOLE NO. **TH18-1**

LOCATION: See Figure No. 1
N 5490534 E 471715 (Approx.)

TOP OF HOLE ELEV: 16.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 23-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

COMMENTS		SOILS DESCRIPTION
Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles and boulders to 600 mm diameter	GP	Very dense, dry to moist, grey-brown, sandy GRAVEL; sub-angular to rounded
26 blows / 100 mm penetration; SPT bouncing.		
Approx. Water Level (22-Jul-2018)		
- contains cobbles to 150 mm diameter	SP	Compact, wet, grey SAND and GRAVEL; sub-angular to rounded

ELEVATION (m): 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1, -2, -3

DEPTH (m): 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-1**

LOCATION: See Figure No. 1
N 5490534 E 471715 (Approx.)

TOP OF HOLE ELEV: 16.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 23-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading, ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
-5	Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles to 150 mm diameter	GP/SP	Compact, wet, grey SAND and GRAVEL; sub-angular to rounded	21
-8		GP/SP		24
-11		GP	- sandy gravel below 27 m depth	27
-14		GP/SP		30
-17		GP/SP	- SAND and GRAVEL below 33 m depth	33
-20		GP/SP		36
-22			- dense below 38 m depth	38
-23		GP	- sandy gravel at 39.5 m depth	39
				40

LOG OF TEST HOLE

TEST HOLE NO. TH18-1

LOCATION: See Figure No. 1
N 5490534 E 471715 (Approx.)

TOP OF HOLE ELEV: 16.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 23-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): GASTECH reading, PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
-25	Core diameter: 200 mm Hole Inclination: Vertical - contains some cobbles to 150 mm diameter		Compact, wet, grey SAND and GRAVEL; sub-angular to rounded	41
-26				42
-27		GP		43
-28				44
-29				45
-30		GP/SP		46
-31				47
-32				48
-33		GP/SP		49
-34	20 blows / 25 mm penetration; SPT bouncing.			50
-35				51
-36		GP/SP	Dense, wet, grey SAND; some silt interbeds up to 100 mm thick	52
-37				53
-38				54
-39	- contains cobbles to 100 mm diameter	SM	Dense, wet, grey SAND; some silt interbeds up to 75 mm thick; trace gravel; trace organics	55
-40				56
-41				57
-42		SM	- silty sand at 57.5 m depth	58
-43				59
				60

LOG OF TEST HOLE

TEST HOLE NO. **TH18-1**

LOCATION: See Figure No. 1
N 5490534 E 471715 (Approx.)

TOP OF HOLE ELEV: 16.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 23-Jul-2018

FILE NO.: 23642

DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading, ⊠ PID reading

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS	SOILS DESCRIPTION	DEPTH (m)
-45	Core diameter: 200 mm Hole Inclination: Vertical	SM/ML Dense, wet, grey SAND; some silt interbeds up to 75 mm thick; trace organics	61
-46	- contains cobbles to 100 mm diameter		62
-47		No sample recovery	63
-48			64
-49			65
-50			66
-51		CL Wet, grey, sandy, silty CLAY; trace to some gravel; trace shell fragments	67
-52			68
-53			69
-54		Wet, grey, fine to medium SAND; trace gravel; trace silt	70
-55	- contains cobbles to 100 mm diameter		71
-56			72
-57			73
-58			74
-59			75
-60		Very dense, wet, grey GRAVEL (till-like); some sand; some clay	76
-61	- contains cobbles to 150 mm diameter		77
-62			78
-63			79
			80

LOG OF TEST HOLE

TEST HOLE NO. **TH18-1**

LOCATION: See Figure No. 1
N 5490534 E 471715 (Approx.)

TOP OF HOLE ELEV: 16.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 23-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS	SOILS DESCRIPTION	DEPTH (m)
-65	Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles to 150 mm diameter	Very dense, wet, grey GRAVEL (till-like); some sand; some clay	81
-66			82
-67			83
-68			84
-69			85
-70			86
-71			87
-72		No sample recovery	88
-73			89
-74			90
-75			91
-76			92
-77			93
-78		End of Hole at 93.3 m depth. Water encountered at approx. 11.0 m depth while drilling.	94
-79		Upon completion of drilling: Hole backfilled with bentonite 56.7 to 93.3 m depth. Backfilled with cuttings to surface.	95
-80			96
-81			97
-82			98
-83			99
			100

LOG OF TEST HOLE

TEST HOLE NO. **TH18-2**

LOCATION: See Figure No. 1
N 5490552 E 471811 (Approx.)

TOP OF HOLE ELEV: 19.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 22-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%) ○ Disturbed ● Undisturbed | WATER LEVEL Plastic Limit Liquid Limit | SAMPLES ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%) ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm) ✱ GASTECH reading ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

COMMENTS

Core diameter: 200 mm
Hole Inclination: Vertical

- contains cobbles and boulders to 600 mm diameter

Approx. Water Level (22-Jul-2018)

- contains cobbles to 150 mm diameter

SOILS DESCRIPTION

Moist, grey-brown GRAVEL; sub-rounded to rounded gravel; some sand to sandy

Wet, grey SAND and GRAVEL to sandy GRAVEL; sub-angular to rounded gravel

Depth (m)	Elevation (m)	Soil
0	18	GP
3	16	GP
6	13	GP
7	12	Approx. Water Level (22-Jul-2018)
9	10	GP/SP
12	7	GP
15	4	GP/SP
18	1	GP/SP
20	0	

LOG OF TEST HOLE

TEST HOLE NO. **TH18-2**

LOCATION: See Figure No. 1
N 5490552 E 471811 (Approx.)

TOP OF HOLE ELEV: 19.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 22-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

COMMENTS		SOILS DESCRIPTION
Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles to 150 mm diameter	SP GP/SP GP GP/SP GP GP GP/SP	Wet, grey SAND and GRAVEL to sandy GRAVEL; sub-angular to rounded gravel

-2 -3 -4 -5 -6 -7 -8 -9 -10 -11 -12 -13 -14 -15 -16 -17 -18 -19 -20

20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-2**

LOCATION: See Figure No. 1
N 5490552 E 471811 (Approx.)

TOP OF HOLE ELEV: 19.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 22-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): GASTECH reading, PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
-22	Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles to 150 mm diameter		Wet, grey SAND and GRAVEL to sandy GRAVEL; sub-angular to rounded gravel	41
-23				42
-24		GP/SP		43
-25				44
-26				45
-27		GP		46
-28				47
-29				48
-30		GP/SP		49
-31				50
-32				51
-33		GP/SP		52
-34				53
-35			Wet, grey, silty, medium to fine SAND to SAND with some silt; interbeds to 50 mm thick; trace fibrous organics	54
-36		SM		55
-37				56
-38				57
-39		SP-SM		58
-40				59
				60

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-2**

LOCATION: See Figure No. 1
N 5490552 E 471811 (Approx.)

TOP OF HOLE ELEV: 19.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 22-Jul-2018

FILE NO.: 23642

DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): GASTECH reading, PID reading

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
	Core diameter: 200 mm Hole Inclination: Vertical			60
-42		SP-SM	Wet, grey, silty, medium to fine SAND to SAND with some silt; interbeds to 50 mm thick; trace fibrous organics	61
-43				62
-44				63
-45				64
		GP-GM/SP-SM		
-46	- contains cobbles to 100 mm diameter		Wet, grey, silty, sandy GRAVEL; trace silt; occasional silt interbed up to 75 mm thick	65
-47				66
-48		GP		67
-49			Wet, grey, silty SAND with silt interbeds	68
-50				69
-51				70
-52	- contains cobbles to 150 mm diameter	GP	Wet, grey GRAVEL; some sand; trace silt	71
-53			Very dense, wet, grey, silty SAND and GRAVEL (till-like); some clay; sub-angular to angular gravel to 75 mm diameter	72
-54				73
-55				74
		SC		
-56				75
-57				76
-58				77
-59				78
-60				79
			Inferred BEDROCK (no recovery)	80

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-2**

LOCATION: See Figure No. 1
N 5490552 E 471811 (Approx.)

TOP OF HOLE ELEV: 19.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 22-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading ⊠ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS	SOILS DESCRIPTION	DEPTH (m)
-62	Core diameter: 200 mm Hole Inclination: Vertical	End of Hole at 80.2 m depth. Water encountered at approx. 7.6 m depth while drilling. Upon completion of drilling: Hole backfilled with bentonite 70.0 m depth. Backfilled with cuttings to surface.	81
-63			82
-64			83
-65			84
-66			85
-67			86
-68			87
-69			88
-70			89
-71			90
-72			91
-73			92
-74			93
-75			94
-76			95
-77			96
-78			97
-79			98
-80			99
			100

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-3**

LOCATION: See Figure No. 1
N 5490499 E 471599 (Approx.)

TOP OF HOLE ELEV: 18.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 25-Jul-2018

FILE NO.: 23642

ELEVATION (m) | DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%) ○ Disturbed ● Undisturbed | WATER LEVEL Plastic Limit Liquid Limit | SAMPLES ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%) ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm) ✱ GASTECH reading ⚂ PID reading | DEPTH (m)

10 20 30 40 50 60 70 80 90 100

COMMENTS		SOILS DESCRIPTION
Core diameter: 200 mm Hole Inclination: Vertical - contains cobbles and boulders to 600 mm diameter	GP-GM	Dry to moist, grey-brown, SAND and GRAVEL; sub-angular to rounded; trace silt
	GP-GM	
Approx. Water Level (25-Jul-2018)		
- contains cobbles to 150 mm diameter	SP	Wet, grey SAND
	GP	- sandy gravel below 15 m depth
	GP	

ELEVATION: 17, 16, 15, 14, 13, 12, 11, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1, 0, -1

DEPTH: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

LOG OF TEST HOLE

TEST HOLE NO. **TH18-3**

LOCATION: See Figure No. 1
N 5490499 E 471599 (Approx.)

TOP OF HOLE ELEV: 18.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 25-Jul-2018

FILE NO.: 23642

DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): GASTECH reading, PID reading

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
-3	Core diameter: 200 mm Hole Inclination: Vertical	GP/SP	Wet, grey SAND and GRAVEL; sub-angular to sub rounded gravel; trace silt	21
-4				22
-5				23
-6		GP/SP		24
-7				25
-8				26
-9		GP		27
-10				28
-11				29
-12		GP		30
-13				31
-14				32
-15		GP		33
-16				34
-17				35
-18				36
-19		SM/ML	SILT and SAND	37
-20				38
-21			SAND and GRAVEL	39
		GP/SP		40

LOG OF TEST HOLE

TEST HOLE NO. **TH18-3**

LOCATION: See Figure No. 1
N 5490499 E 471599 (Approx.)

TOP OF HOLE ELEV: 18.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

DATE: 25-Jul-2018

FILE NO.: 23642

DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL: Plastic Limit — Liquid Limit | SAMPLES: Disturbed, Undisturbed, No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve, △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): GASTECH reading, PID reading

10 20 30 40 50 60 70 80 90 100

ELEVATION (m)	COMMENTS		SOILS DESCRIPTION	DEPTH (m)
-23	Core diameter: 200 mm Hole Inclination: Vertical		SAND and GRAVEL	40 / 41
-24 / -25		SM/ML	Wet, grey SILT and SAND; trace fibrous organics	42 / 43
-26 / -27 / -28 / -29		SP-SM	Wet, grey SAND; trace silt; trace fibrous organics	44 / 45 / 46 / 47
-30 / -31 / -32 / -33 / -34 / -35		SM SM	Wet, grey, silty SAND; trace fibrous organics; contains interbeds of organic silt up to 75 mm thick	48 / 49 / 50 / 51 / 52 / 53
-36 / -37 / -38 / -39 / -40 / -41			Moist to wet, grey, silty CLAY; trace gravel to 50 mm diameter; trace sand	54 / 55 / 56 / 57 / 58 / 59 / 60

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB

LOG OF TEST HOLE

TEST HOLE NO. **TH18-3**

LOCATION: See Figure No. 1
N 5490499 E 471599 (Approx.)

TOP OF HOLE ELEV: 18.0 m (Approx. from Google Earth)

METHOD: Sonic

DRILLING CO.: Omega Environmental Drilling Ltd.

INSPECTOR: SWS

THURBER

CLIENT: Burnco Rock Products Ltd.

PROJECT: McNab Creek Gravel Exploration
Geotechnical Investigation

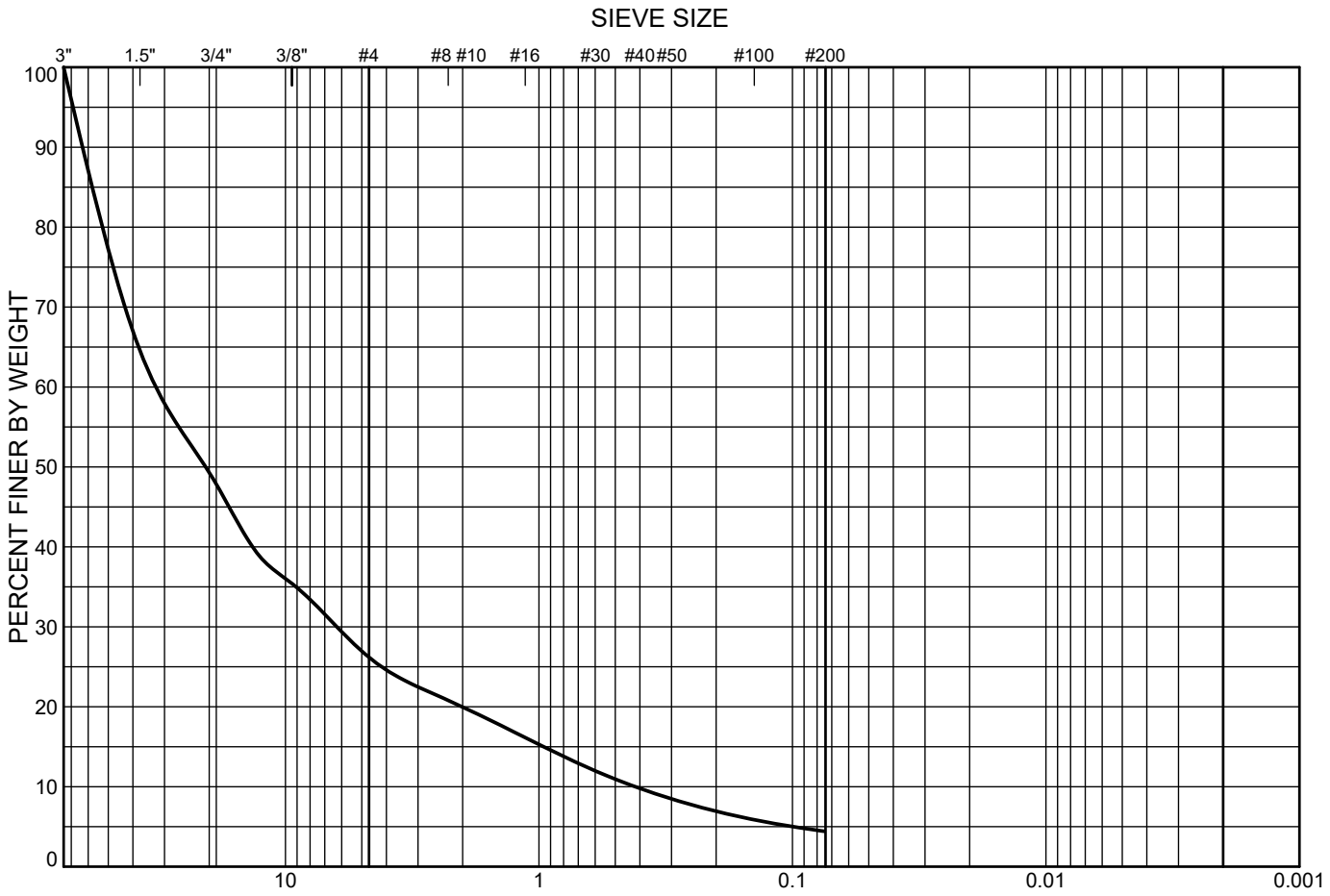
DATE: 25-Jul-2018

FILE NO.: 23642

DCPT PENETRATION (blows/300 mm) | SPT PENETRATION (blows/300 mm) | WATER CONTENT (%): ○ Disturbed ● Undisturbed | WATER LEVEL | Plastic Limit — Liquid Limit | SAMPLES: ◧ Disturbed ■ Undisturbed ☒ No Recovery | GRAIN SIZE (%): ▲ Passing #200 sieve △ Passing #4 sieve | SOIL HEADSPACE READING (ppm): ✱ GASTECH reading ⊠ PID reading

ELEVATION (m)	DEPTH (m)	COMMENTS	SOILS DESCRIPTION
	60	Core diameter: 200 mm Hole Inclination: Vertical	
-43	61		BEDROCK
-44	62		
-45	63		
-46	64		
-47	65		
-48	66		
-49	67		
-50	68		
-51	69		
-52	70		
-53	71		
-54	72		End of Hole at 71.9 m depth. Water encountered at approx. 7.6 m depth while drilling. Hole backfilled with bentonite to 53.0 m depth. Backfilled with cuttings to surface.
-55	73		
-56	74		
-57	75		
-58	76		
-59	77		
-60	78		
-61	79		
	80		

LOG OF TEST HOLE R RRS 23642_MCNAB CREEK_2018 TEST HOLE LOGS.GPJ THURBER BC.GDT 31/1/19- THURBER VICTORIA FEBRUARY 2012 REVERSE.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 1
Sample Depth: 1.5 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 28, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**73.7%**
Sand	**21.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**64.6**
0.75	19	**48.2**
0.375	9.5	**35.5**
#4	4.75	**26.3**
#8	2.36	**21.0**
#16	1.18	**16.4**
#30	0.6	**12.0**
#50	0.3	**8.5**
#100	0.15	**6.0**
#200	0.075	**4.4**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

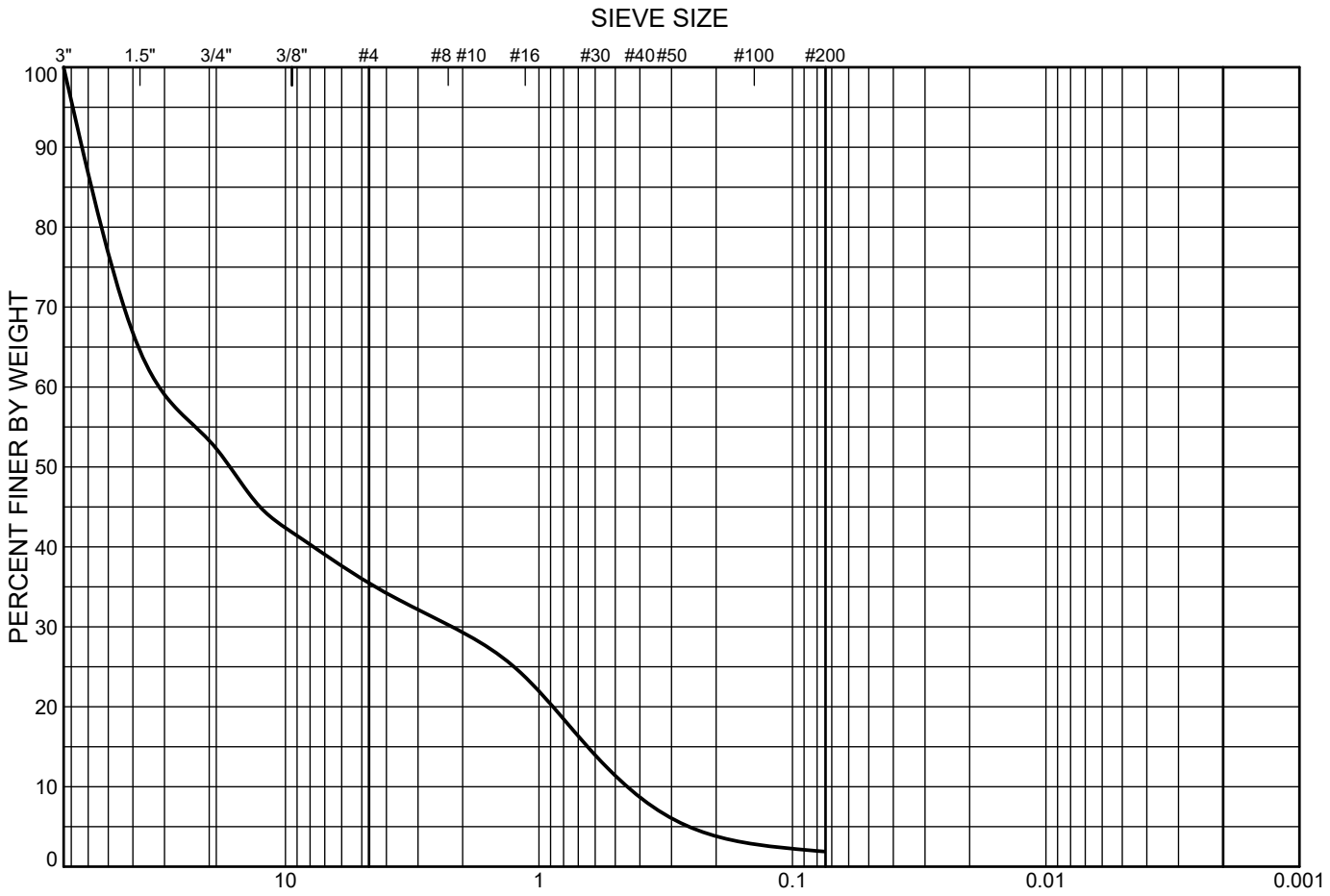
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 2
Sample Depth: 3.0 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 30, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**64.4%**
Sand	**33.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**64.5**
0.75	19	**52.5**
0.375	9.5	**41.9**
#4	4.75	**35.6**
#8	2.36	**30.5**
#16	1.18	**24.2**
#30	0.6	**13.9**
#50	0.3	**6.0**
#100	0.15	**2.9**
#200	0.075	**1.9**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

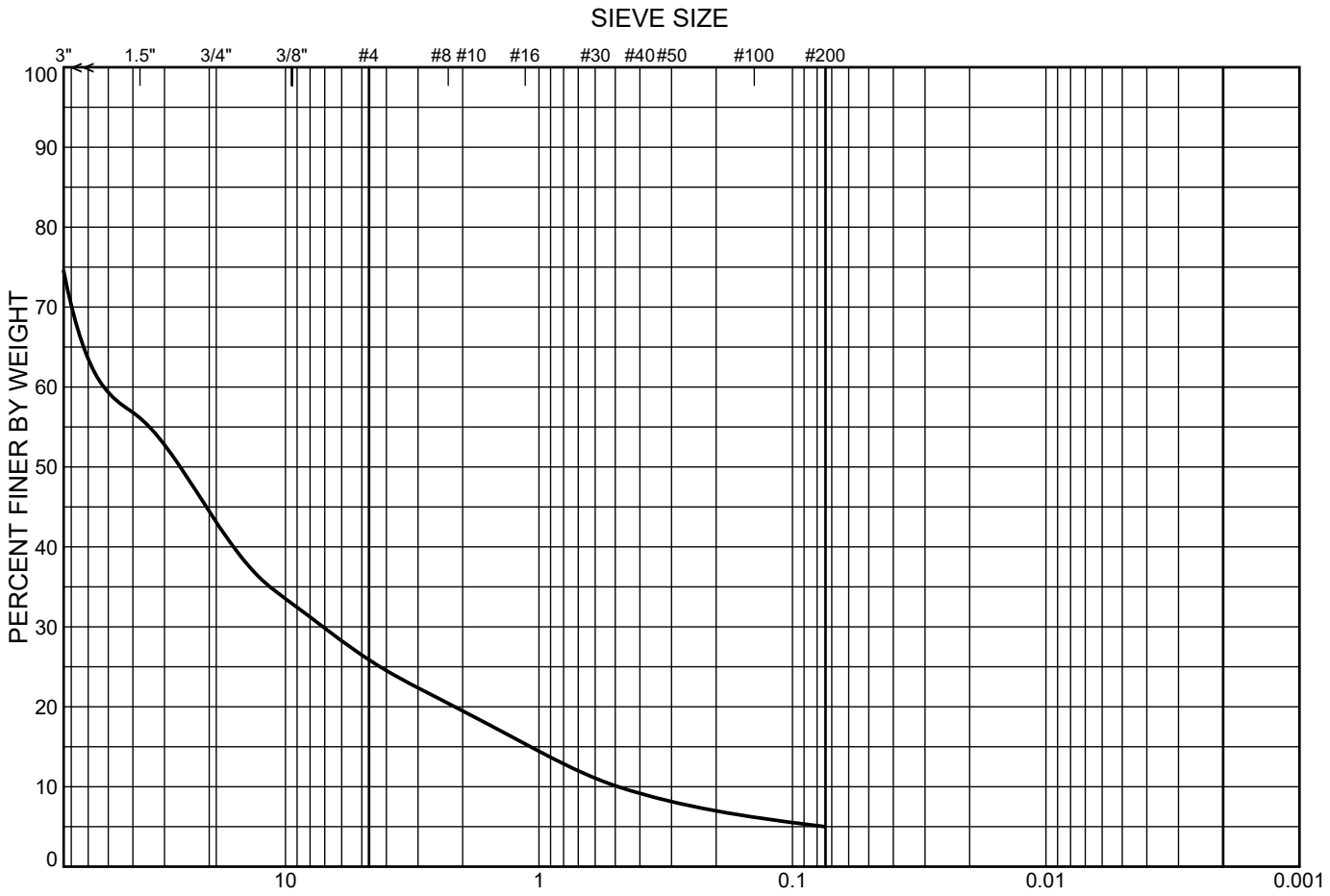
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 3
Sample Depth: 6.1 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 29, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**48.5%**
Sand	**21.0%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**74.5**
1.5	37.5	**56.1**
0.75	19	**43.4**
0.375	9.5	**33.0**
#4	4.75	**26.0**
#8	2.36	**20.7**
#16	1.18	**15.6**
#30	0.6	**11.1**
#50	0.3	**8.1**
#100	0.15	**6.3**
#200	0.075	**5.0**

Description: Sandy, cobbley GRAVEL, trace of silt (GW).

Comments:

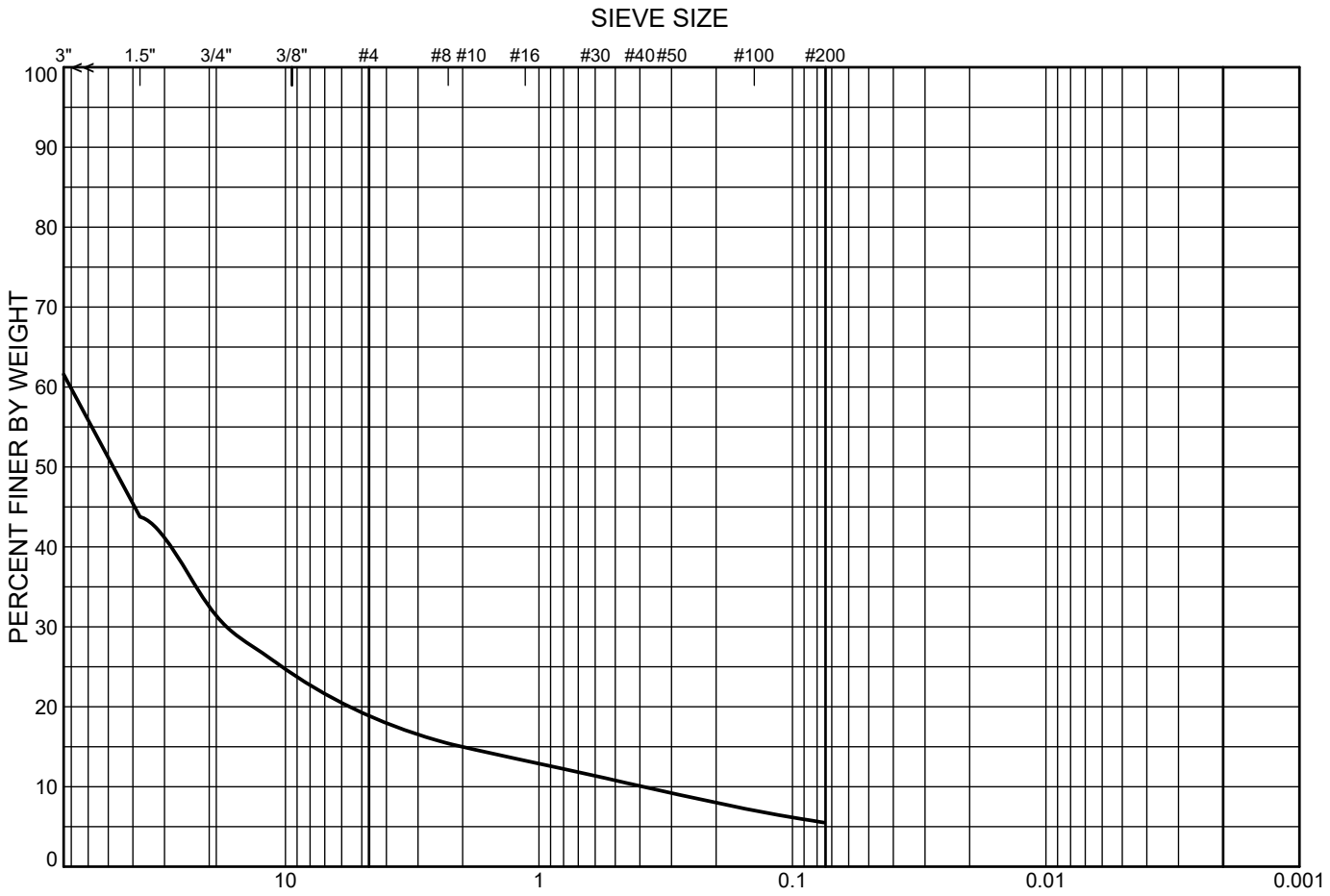
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 4
Sample Depth: 9.1 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 29, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**42.6%**
Sand	**13.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**61.6**
1.5	37.5	**43.8**
0.75	19	**31.6**
0.375	9.5	**24.2**
#4	4.75	**19.0**
#8	2.36	**15.5**
#16	1.18	**13.4**
#30	0.6	**11.3**
#50	0.3	**9.2**
#100	0.15	**7.2**
#200	0.075	**5.5**

Description: COBBLES and GRAVEL, some sand, trace silt (GP-GM).

Comments:

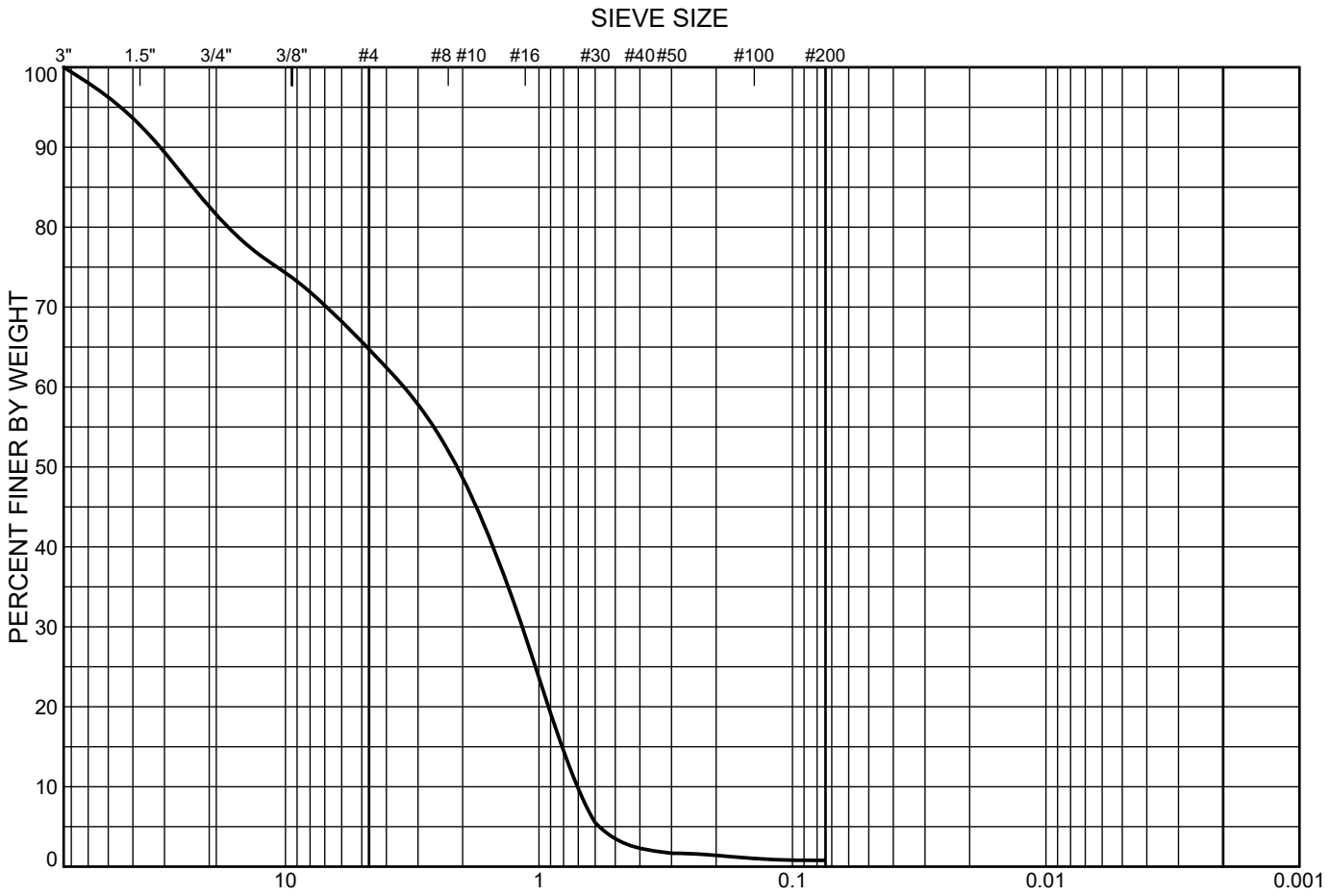
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 5
Sample Depth: 15.2 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 29, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**35.1%**
Sand	**64.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**92.8**
0.75	19	**81.8**
0.375	9.5	**73.8**
#4	4.75	**64.9**
#8	2.36	**52.9**
#16	1.18	**30.5**
#30	0.6	**5.5**
#50	0.3	**1.7**
#100	0.15	**1.1**
#200	0.075	**0.8**

Description: GRAVEL and SAND, trace of silt (GP/SP).

Comments:

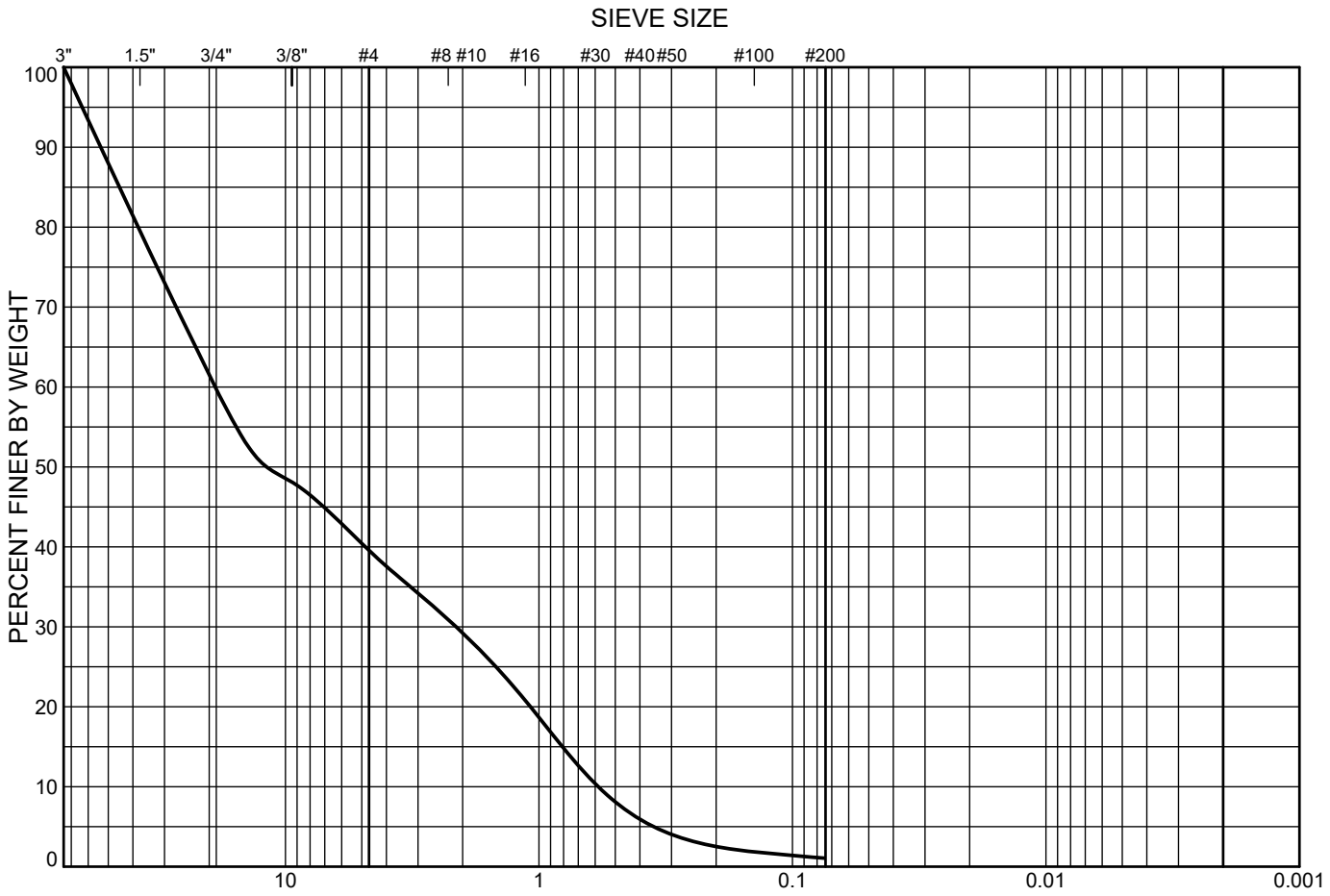
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 6
Sample Depth: 18.3 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 28, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**60.3%**
Sand	**38.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**79.5**
0.75	19	**60.1**
0.375	9.5	**48.2**
#4	4.75	**39.7**
#8	2.36	**31.3**
#16	1.18	**21.5**
#30	0.6	**10.4**
#50	0.3	**4.0**
#100	0.15	**1.9**
#200	0.075	**1.1**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



Sample Location: **18-1**
Sample: 7
Sample Depth: 21.3 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 29, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**52.1%**
Sand	**46.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**75.7**
0.75	19	**63.6**
0.375	9.5	**55.5**
#4	4.75	**47.9**
#8	2.36	**38.3**
#16	1.18	**29.9**
#30	0.6	**20.6**
#50	0.3	**10.0**
#100	0.15	**3.3**
#200	0.075	**1.4**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

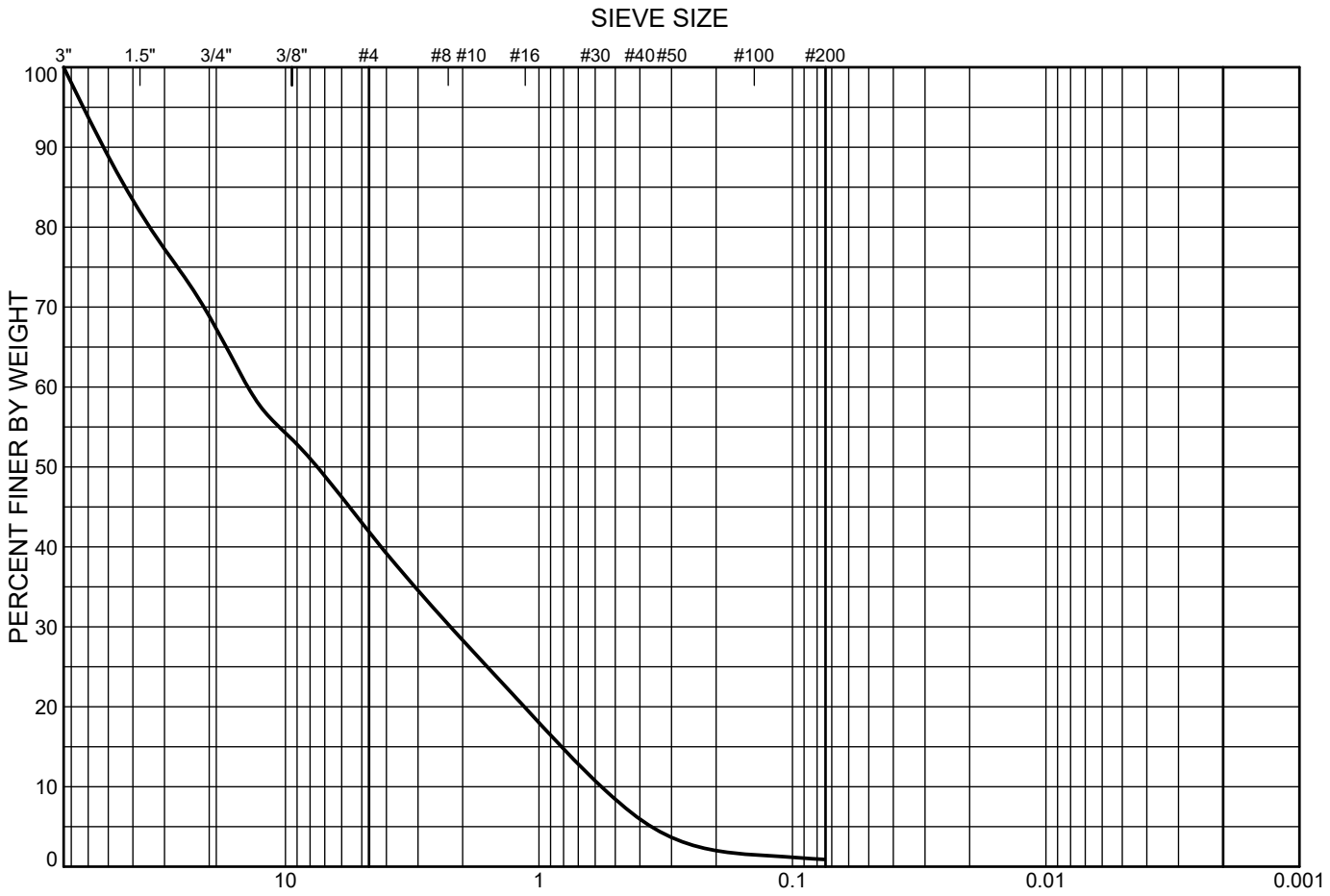
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 8
Sample Depth: 24.4 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 29, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**57.9%**
Sand	**41.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**81.9**
0.75	19	**67.7**
0.375	9.5	**53.6**
#4	4.75	**42.1**
#8	2.36	**30.8**
#16	1.18	**20.5**
#30	0.6	**10.7**
#50	0.3	**3.6**
#100	0.15	**1.6**
#200	0.075	**0.9**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

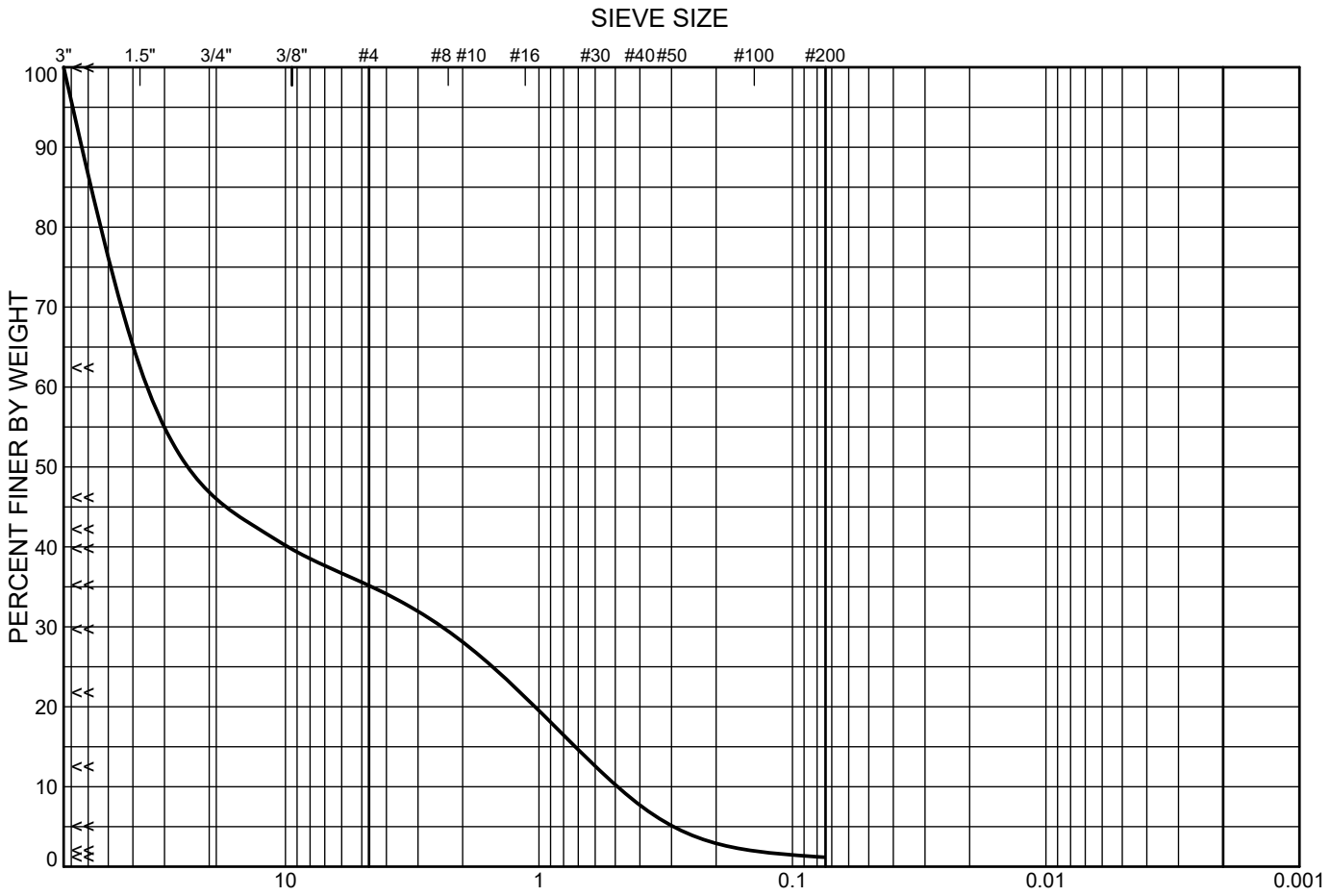
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 9
Sample Depth: 27.4 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 30, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**64.7%**
Sand	**34.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**62.5**
0.75	19	**46.2**
0.375	9.5	**39.8**
#4	4.75	**35.3**
#8	2.36	**29.8**
#16	1.18	**21.8**
#30	0.6	**12.6**
#50	0.3	**5.1**
#100	0.15	**2.1**
#200	0.075	**1.2**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

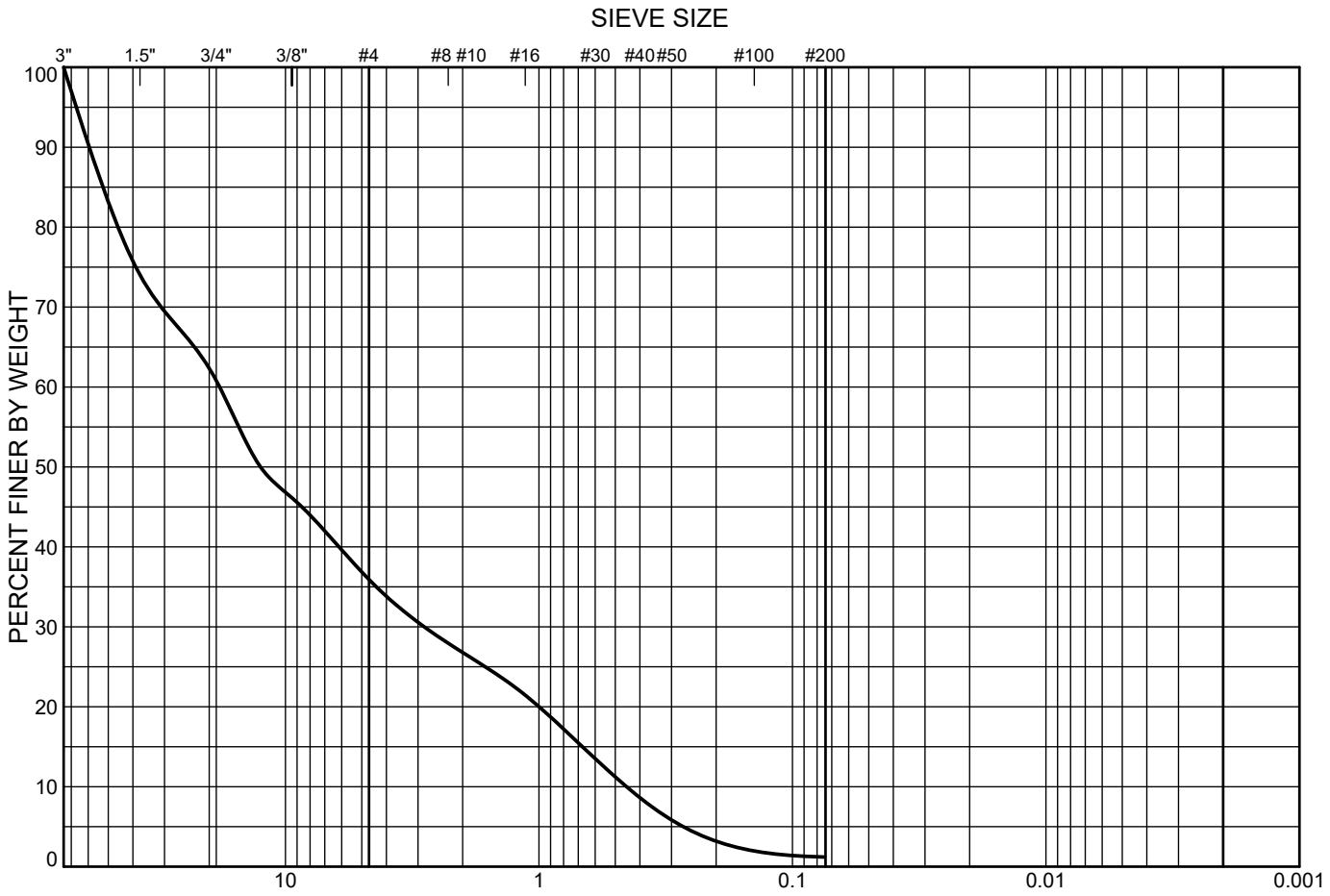
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 10
Sample Depth: 30.5 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 30, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**63.9%**
Sand	**34.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**74.0**
0.75	19	**61.1**
0.375	9.5	**46.2**
#4	4.75	**36.1**
#8	2.36	**28.3**
#16	1.18	**21.9**
#30	0.6	**13.5**
#50	0.3	**5.8**
#100	0.15	**2.1**
#200	0.075	**1.2**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

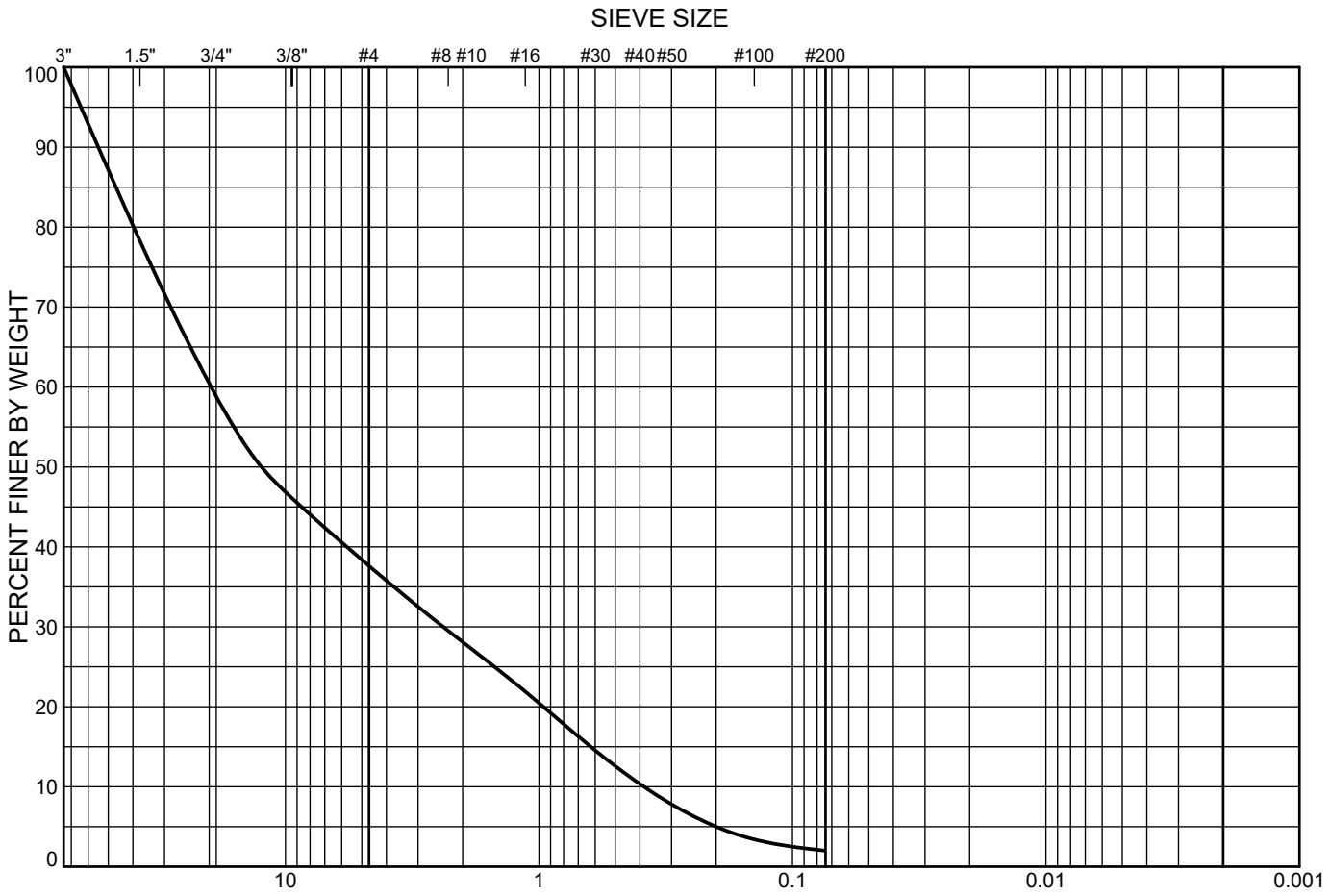
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



Sample Location: **18-1**
Sample: 11
Sample Depth: 33.5 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 30, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**62.2%**
Sand	**35.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**78.3**
0.75	19	**59.2**
0.375	9.5	**46.2**
#4	4.75	**37.8**
#8	2.36	**29.9**
#16	1.18	**22.4**
#30	0.6	**14.5**
#50	0.3	**7.8**
#100	0.15	**3.6**
#200	0.075	**2.0**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

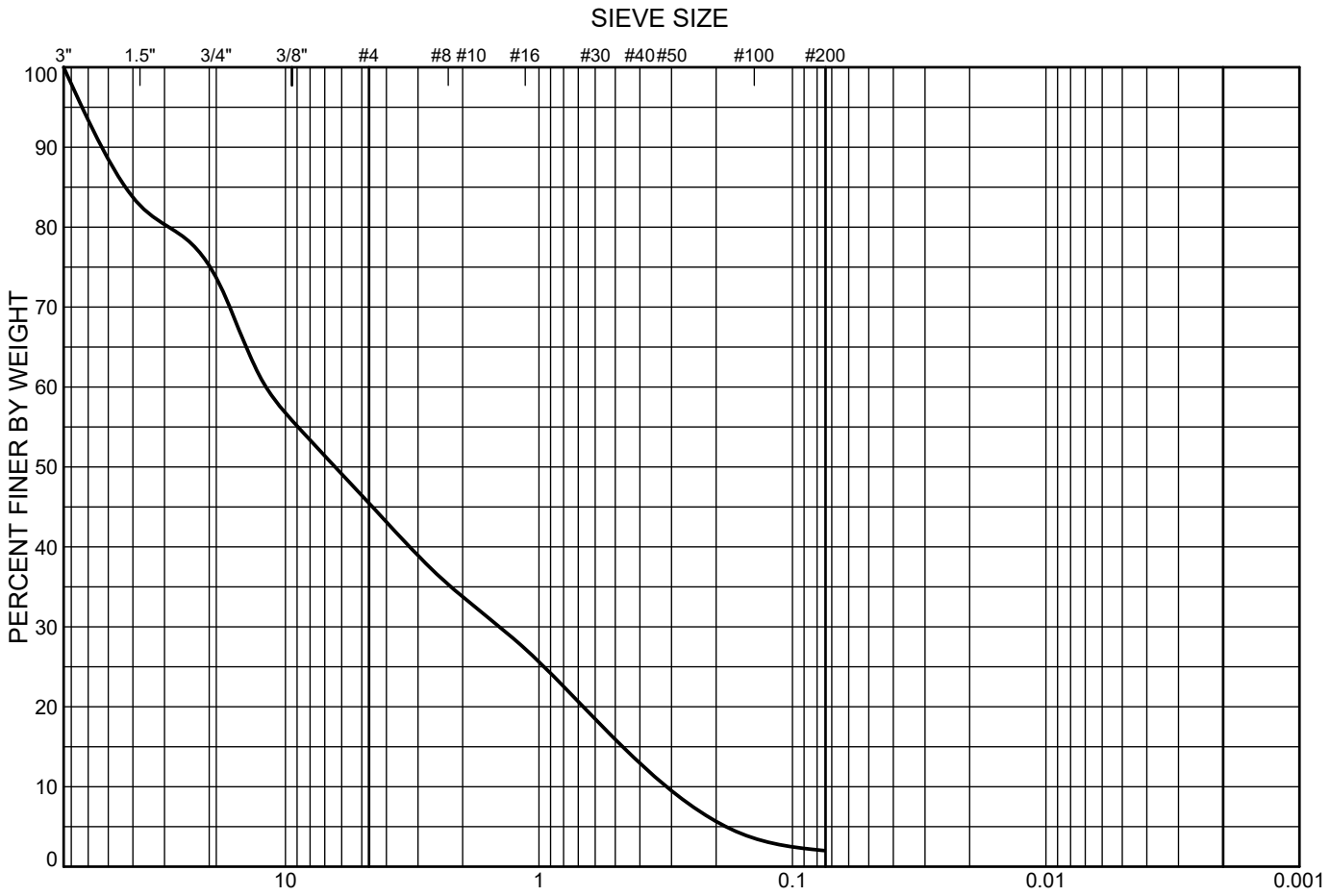
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 12
Sample Depth: 36.6 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 30, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**54.3%**
Sand	**43.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**82.7**
0.75	19	**74.0**
0.375	9.5	**56.0**
#4	4.75	**45.7**
#8	2.36	**35.7**
#16	1.18	**27.7**
#30	0.6	**18.5**
#50	0.3	**9.5**
#100	0.15	**3.8**
#200	0.075	**2.0**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

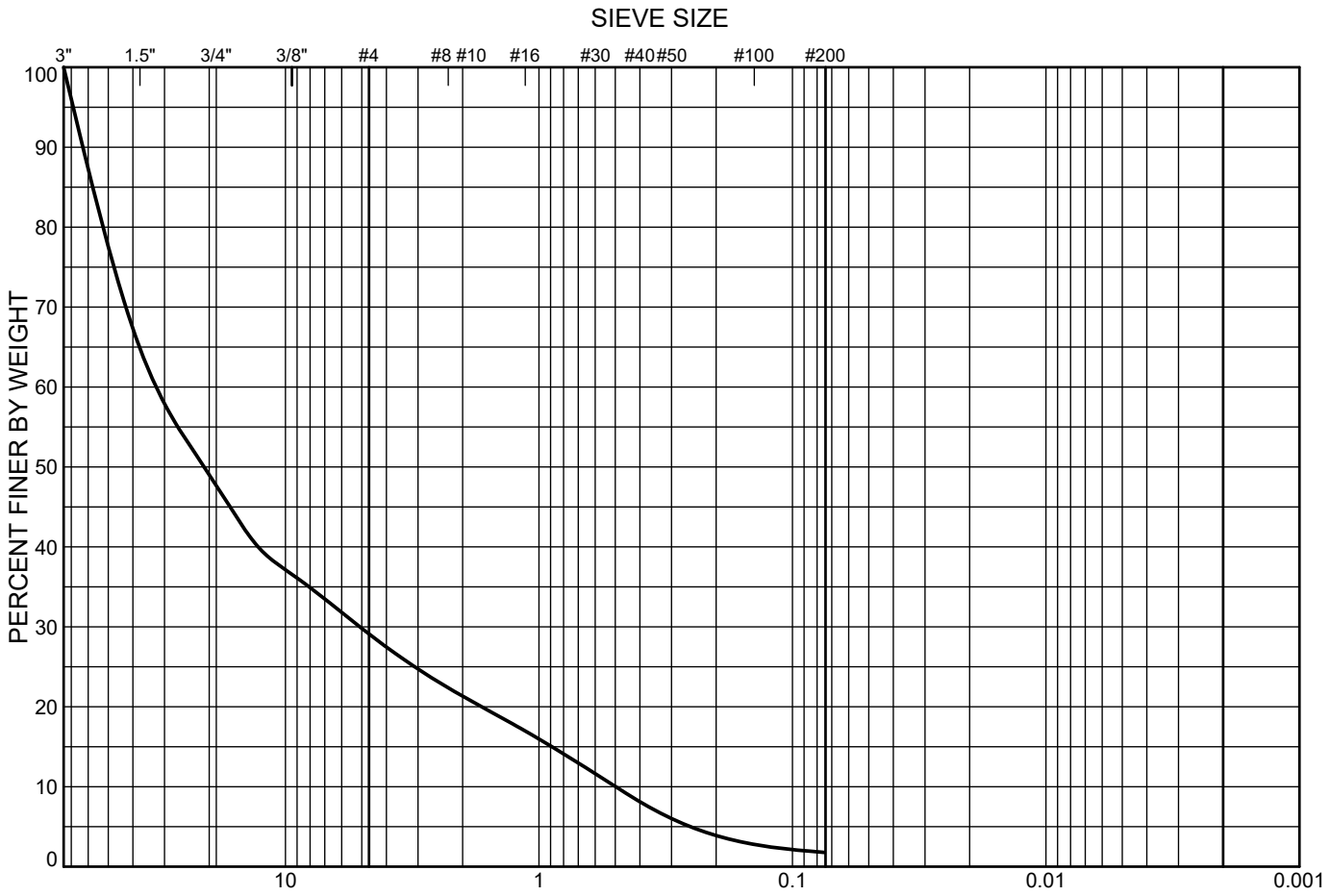
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 13
Sample Depth: 39.6 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**70.7%**
Sand	**27.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**64.8**
0.75	19	**48.0**
0.375	9.5	**36.6**
#4	4.75	**29.3**
#8	2.36	**22.6**
#16	1.18	**17.3**
#30	0.6	**11.6**
#50	0.3	**6.0**
#100	0.15	**2.9**
#200	0.075	**1.8**

Description: Sandy GRAVEL, trace of silt (GW).

Comments:

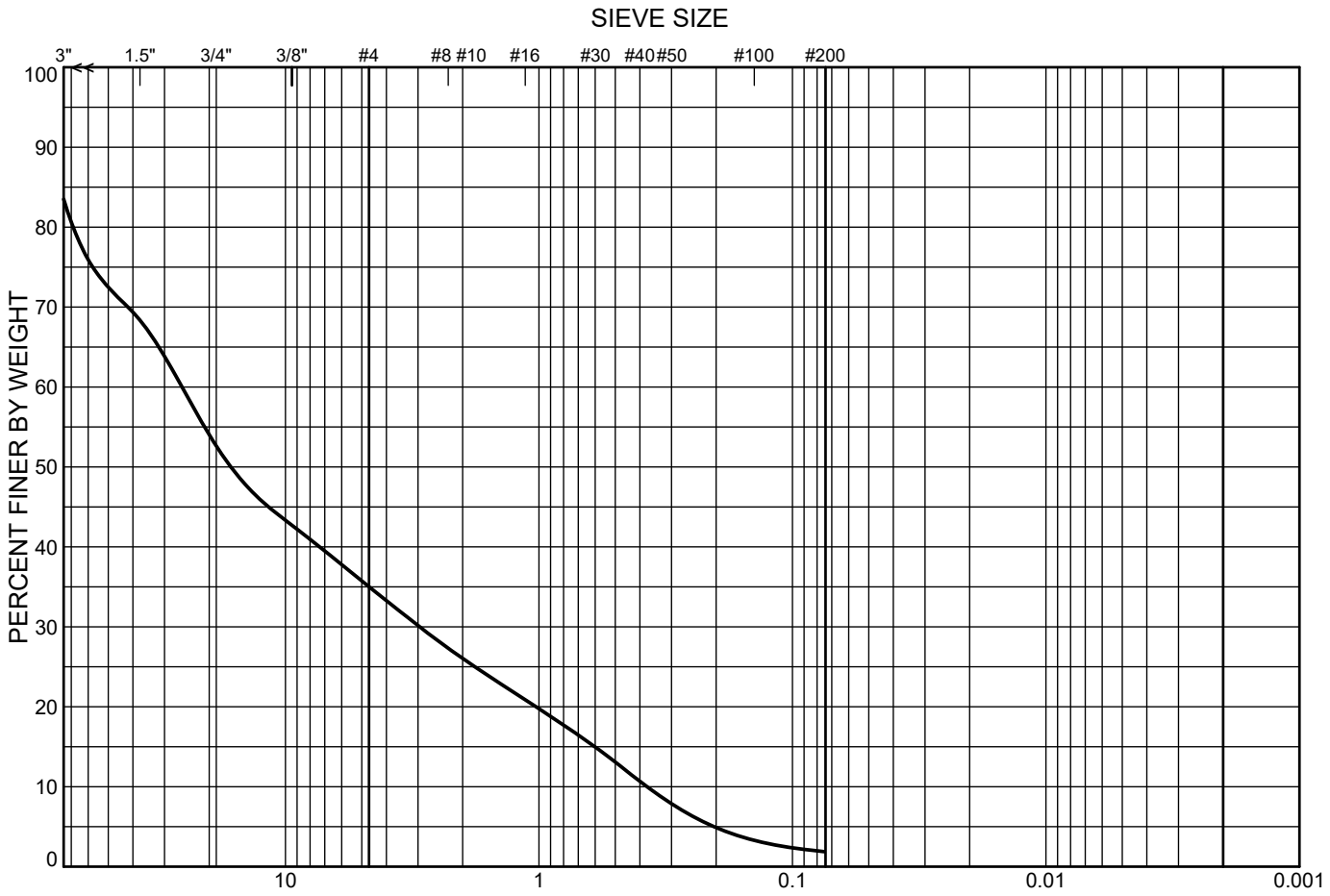
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 14
Sample Depth: 42.7 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**48.3%**
Sand	**33.3%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**83.5**
1.5	37.5	**68.4**
0.75	19	**52.9**
0.375	9.5	**42.8**
#4	4.75	**35.2**
#8	2.36	**27.7**
#16	1.18	**21.2**
#30	0.6	**15.0**
#50	0.3	**7.9**
#100	0.15	**3.5**
#200	0.075	**1.9**

Description: Sandy GRAVEL, some cobbles, trace of silt (GP).

Comments:

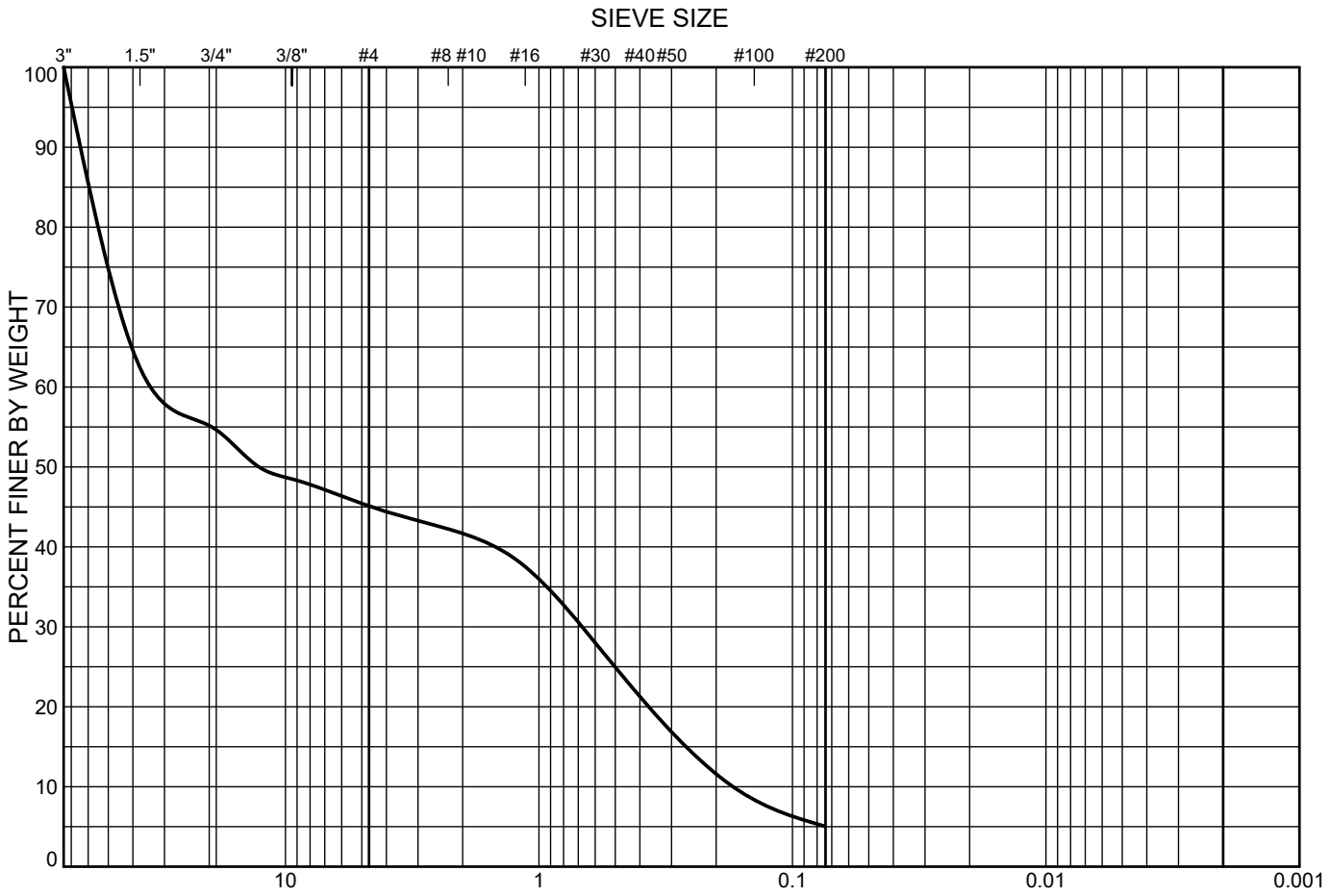
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 15
Sample Depth: 45.7 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**54.8%**
Sand	**40.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**62.4**
0.75	19	**54.8**
0.375	9.5	**48.5**
#4	4.75	**45.2**
#8	2.36	**42.4**
#16	1.18	**38.0**
#30	0.6	**28.0**
#50	0.3	**16.9**
#100	0.15	**8.8**
#200	0.075	**5.1**

Description: SAND and GRAVEL, trace of silt (SP-SM/GP-GM).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 16
Sample Depth: 48.8 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**48.1%**
Sand	**48.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**87.3**
0.75	19	**72.2**
0.375	9.5	**60.6**
#4	4.75	**51.9**
#8	2.36	**43.7**
#16	1.18	**35.8**
#30	0.6	**26.4**
#50	0.3	**14.8**
#100	0.15	**6.2**
#200	0.075	**3.3**

Description: GRAVEL and SAND, trace of silt (GP/SP).

Comments:

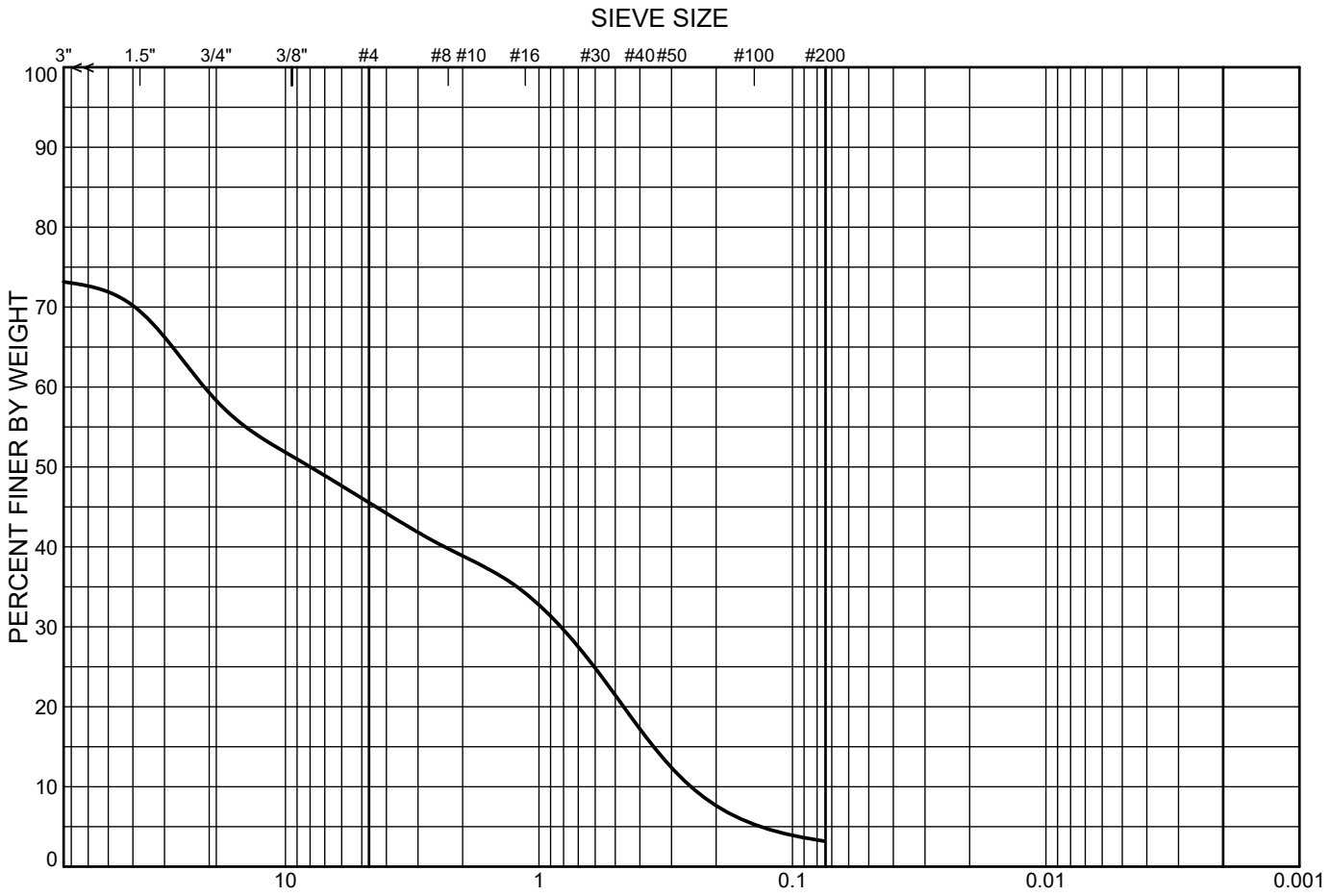
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 17
Sample Depth: 51.8 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**27.5%**
Sand	**42.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**73.2**
1.5	37.5	**69.5**
0.75	19	**58.5**
0.375	9.5	**51.4**
#4	4.75	**45.7**
#8	2.36	**40.0**
#16	1.18	**34.7**
#30	0.6	**24.8**
#50	0.3	**12.4**
#100	0.15	**5.6**
#200	0.075	**3.2**

Description: Cobbly, gravelly SAND, trace of silt (SP).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 18
Sample Depth: 54.9 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**15.8%**
Sand	**67.6%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**95.4**
0.75	19	**89.1**
0.375	9.5	**85.2**
#4	4.75	**84.2**
#8	2.36	**82.9**
#16	1.18	**80.9**
#30	0.6	**75.7**
#50	0.3	**62.6**
#100	0.15	**36.3**
#200	0.075	**16.6**

Description: SAND, some gravel and silt (SM).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 19
Sample Depth: 57.9 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**2.2%**
Sand	**75.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	**100.0**
0.75	19	**99.4**
0.375	9.5	**98.7**
#4	4.75	**97.8**
#8	2.36	**97.0**
#16	1.18	**95.7**
#30	0.6	**90.1**
#50	0.3	**71.2**
#100	0.15	**39.4**
#200	0.075	**22.0**

Description: Silty SAND (SM).

Comments: Mostly wood fragments above 1.18 mm

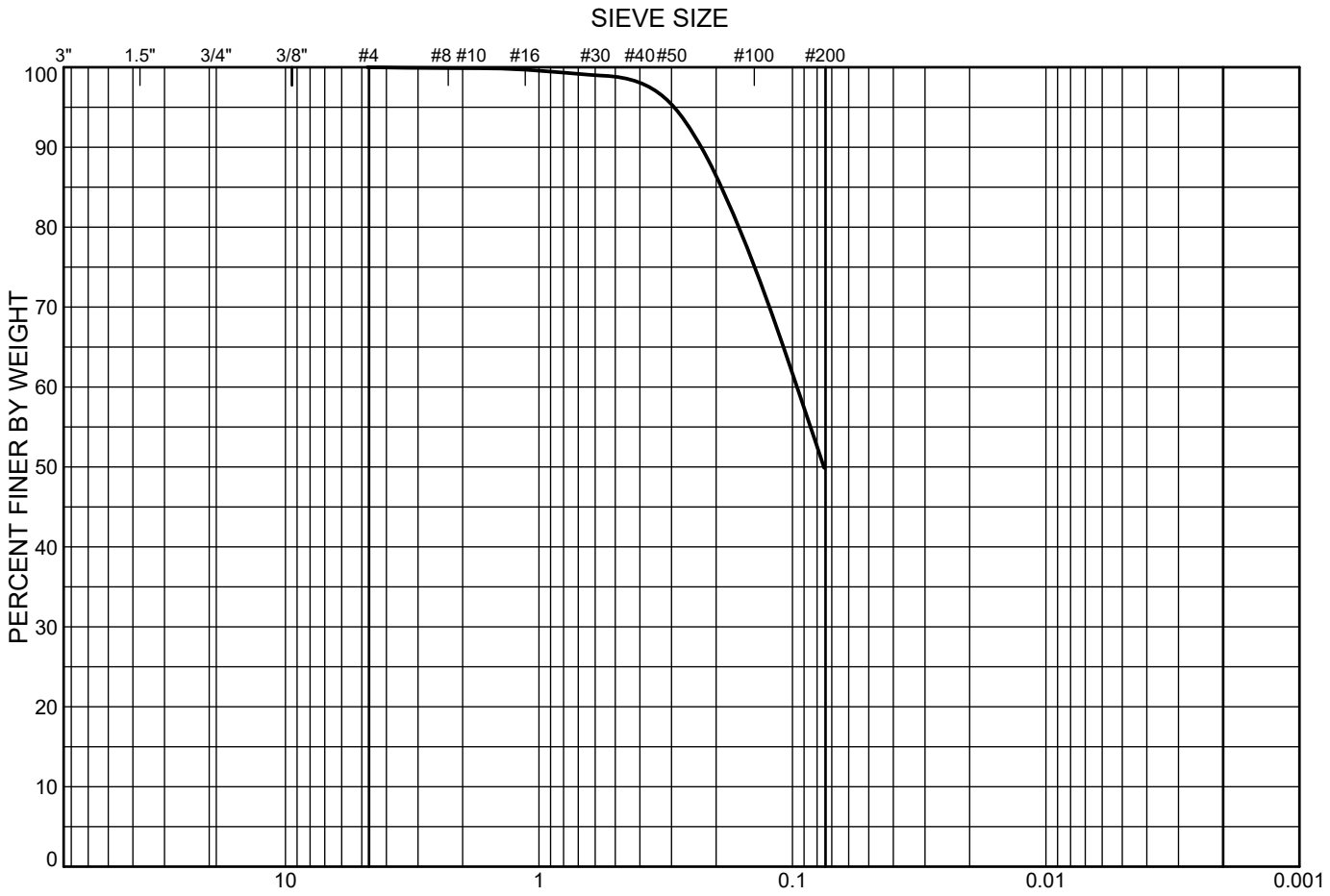
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 20
Sample Depth: 61.0 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 20, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**50.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**99.9**
#16	1.18	**99.7**
#30	0.6	**99.0**
#50	0.3	**95.3**
#100	0.15	**77.2**
#200	0.075	**49.9**

Description: SILT and SAND with some organics (ML/SM).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1**
Sample: 21
Sample Depth: 67.1 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 22, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**15.1%**
Sand	**22.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	**100.0**
0.75	19	**98.0**
0.375	9.5	**90.1**
#4	4.75	**84.9**
#8	2.36	**80.6**
#16	1.18	**77.7**
#30	0.6	**74.5**
#50	0.3	**71.8**
#100	0.15	**69.1**
#200	0.075	**62.7**

Description: Sandy SILT, some gravel (ML).

Comments:

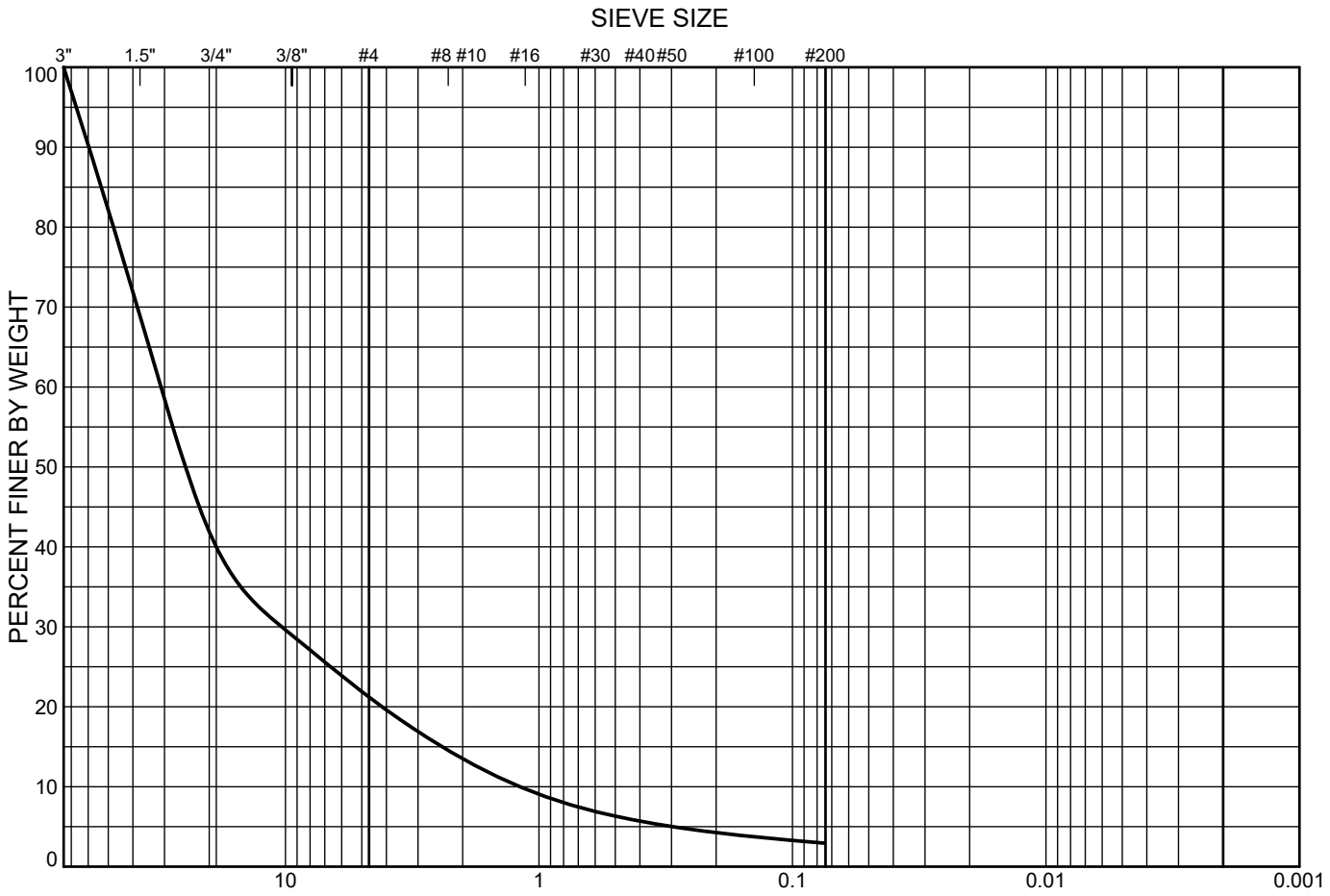
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 1
Sample Depth: 1.5 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**78.6%**
Sand	**18.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**68.9**
0.75	19	**40.4**
0.375	9.5	**29.0**
#4	4.75	**21.4**
#8	2.36	**14.8**
#16	1.18	**9.9**
#30	0.6	**6.9**
#50	0.3	**5.0**
#100	0.15	**3.8**
#200	0.075	**2.9**

Description: GRAVEL, some sand, trace of silt (GW),

Comments:

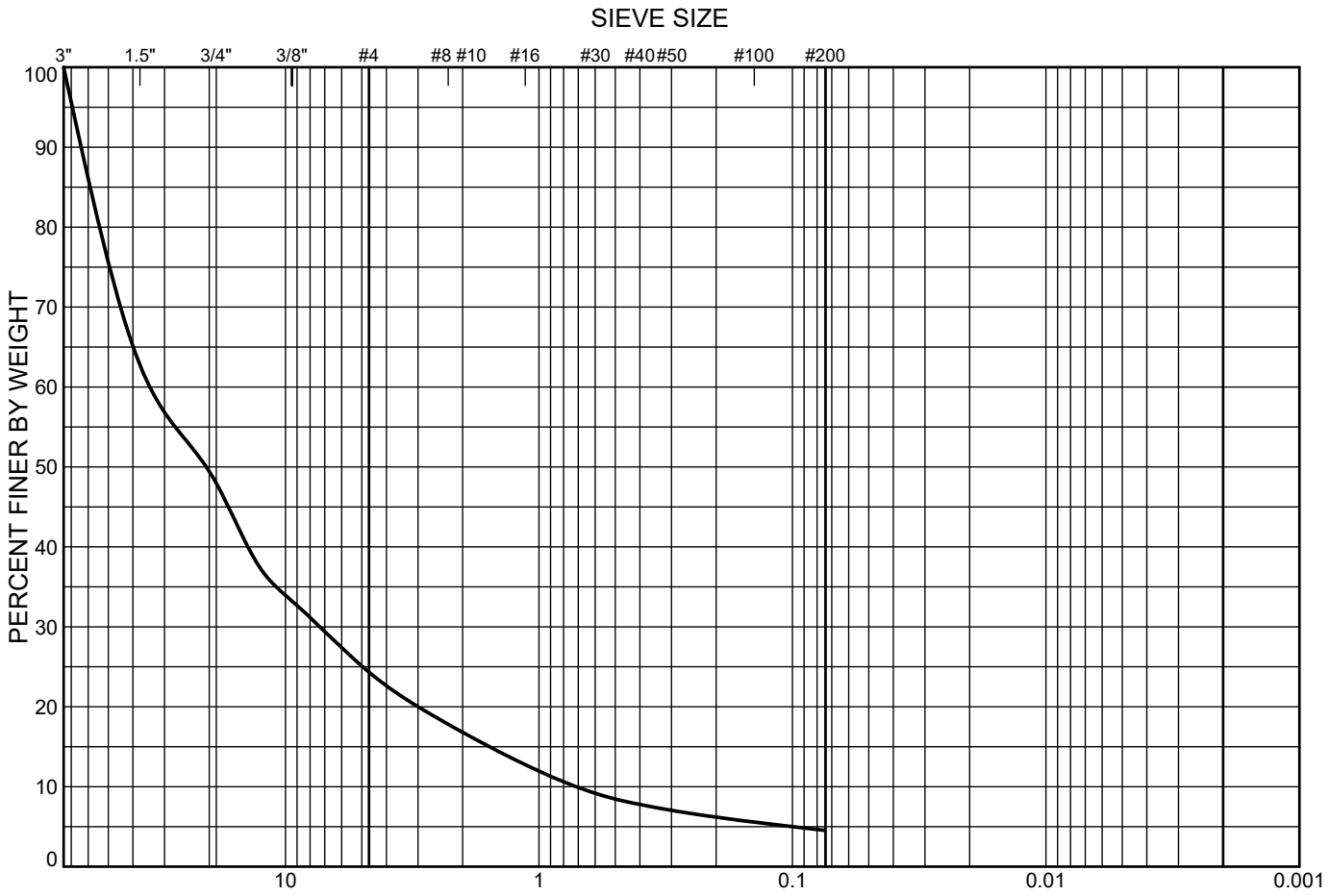
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 2
Sample Depth: 3.0 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 20, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**75.5%**
Sand	**19.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**62.7**
0.75	19	**48.3**
0.375	9.5	**33.3**
#4	4.75	**24.5**
#8	2.36	**18.1**
#16	1.18	**13.0**
#30	0.6	**9.2**
#50	0.3	**7.0**
#100	0.15	**5.7**
#200	0.075	**4.6**

Description: GRAVEL, some sand, trace of silt (GW),

Comments:

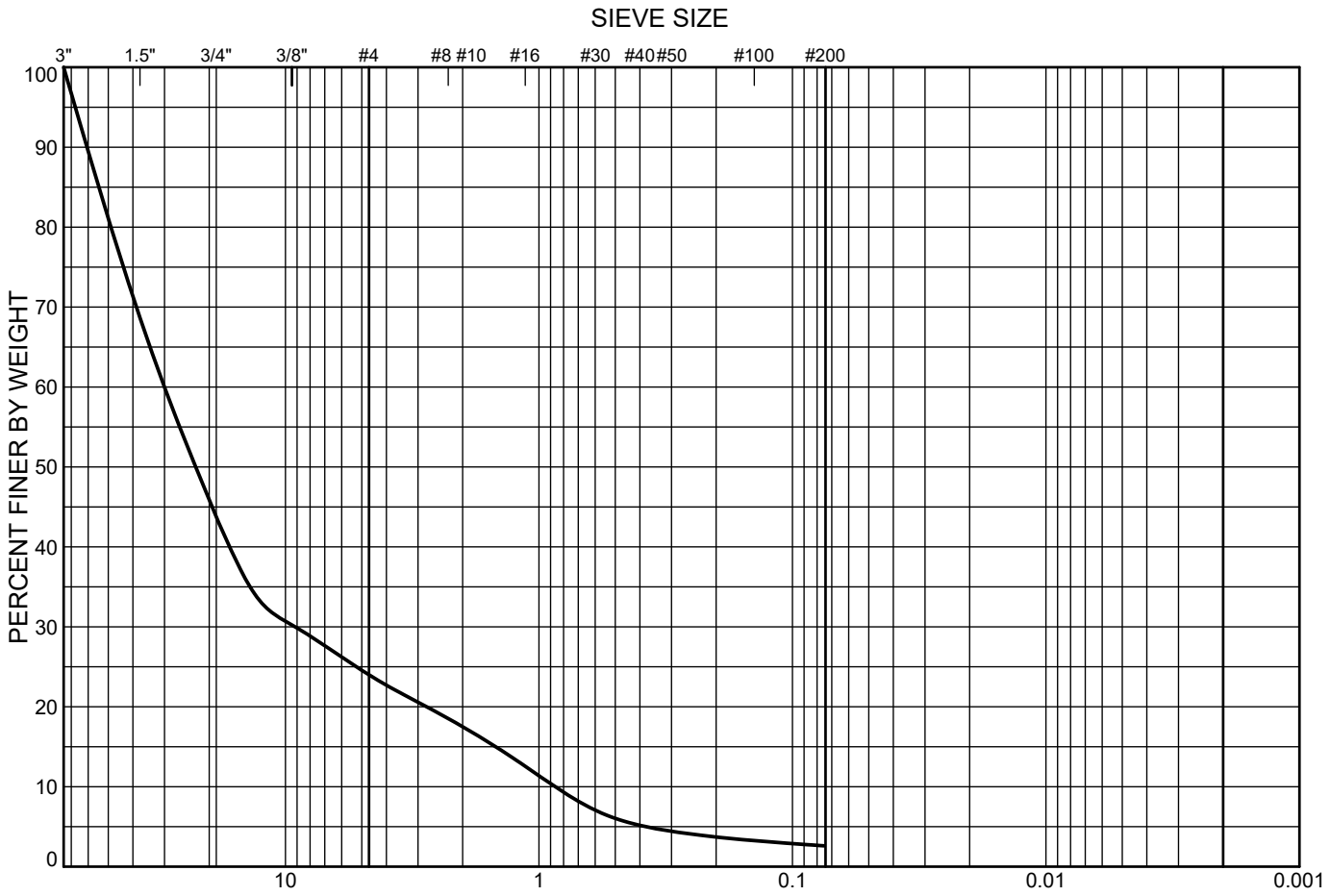
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 3
Sample Depth: 6.1 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 20, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**75.9%**
Sand	**21.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**68.7**
0.75	19	**44.2**
0.375	9.5	**30.3**
#4	4.75	**24.1**
#8	2.36	**18.8**
#16	1.18	**12.9**
#30	0.6	**7.1**
#50	0.3	**4.4**
#100	0.15	**3.3**
#200	0.075	**2.6**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

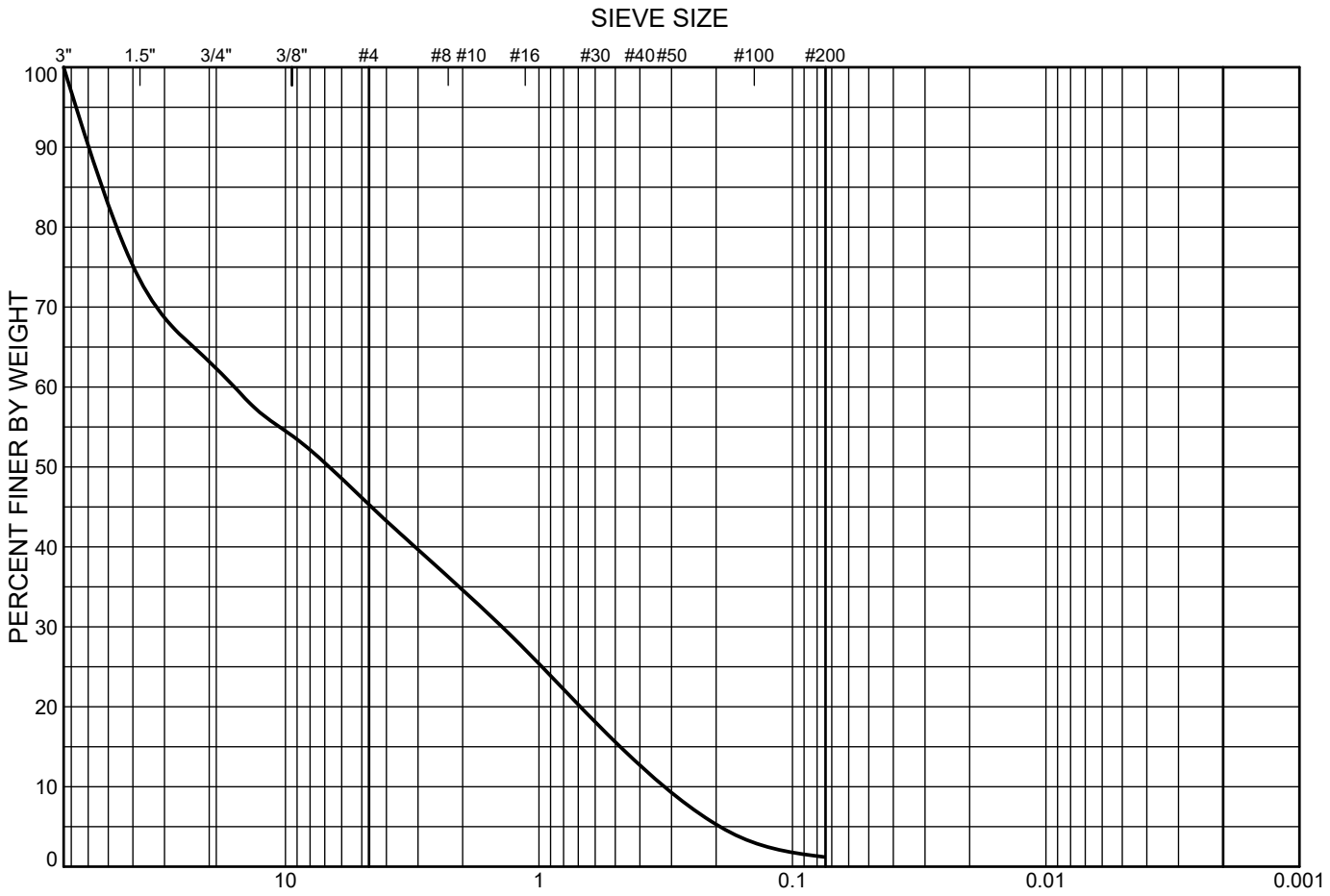
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 4
Sample Depth: 9.1 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 20, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**54.5%**
Sand	**44.3%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**73.4**
0.75	19	**62.5**
0.375	9.5	**54.0**
#4	4.75	**45.5**
#8	2.36	**36.7**
#16	1.18	**27.7**
#30	0.6	**18.1**
#50	0.3	**9.3**
#100	0.15	**3.3**
#200	0.075	**1.2**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

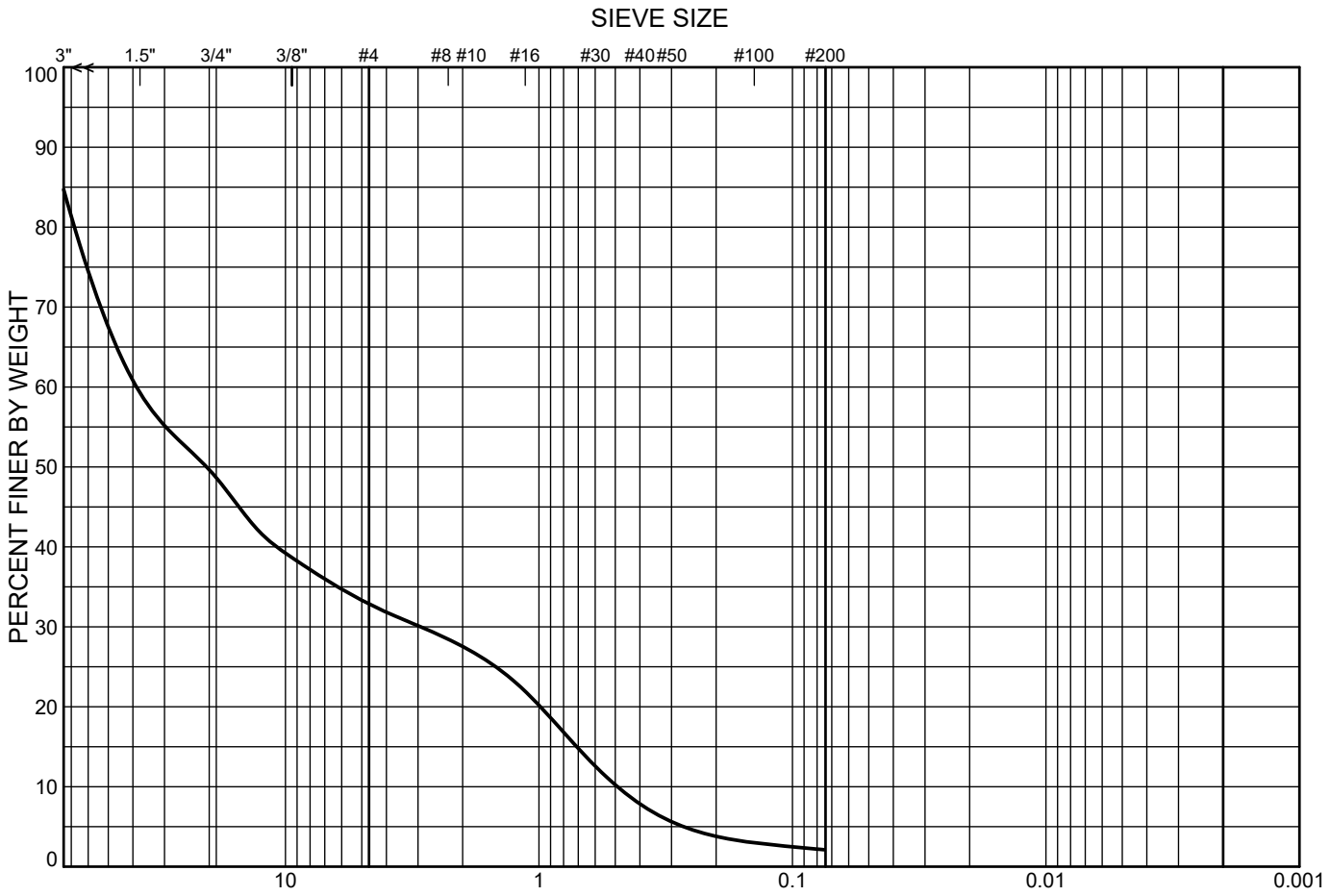
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 5
Sample Depth: 12.2 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 20, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**51.7%**
Sand	**30.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**84.7**
1.5	37.5	**59.3**
0.75	19	**48.9**
0.375	9.5	**38.7**
#4	4.75	**33.0**
#8	2.36	**28.7**
#16	1.18	**22.5**
#30	0.6	**12.6**
#50	0.3	**5.6**
#100	0.15	**3.1**
#200	0.075	**2.1**

Description: Sandy GRAVEL, some cobbles, trace of silt (GP).

Comments:

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 6
Sample Depth: 15.2 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**35.0%**
Sand	**64.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**86.1**
0.75	19	**76.8**
0.375	9.5	**70.7**
#4	4.75	**65.0**
#8	2.36	**57.6**
#16	1.18	**45.3**
#30	0.6	**20.9**
#50	0.3	**4.5**
#100	0.15	**1.5**
#200	0.075	**0.8**

Description: Gravelly SAND, trace of silt (SP).

Comments:

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THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 7
Sample Depth: 18.3 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**35.7%**
Sand	**46.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**82.3**
1.5	37.5	**69.7**
0.75	19	**64.7**
0.375	9.5	**56.3**
#4	4.75	**46.6**
#8	2.36	**37.5**
#16	1.18	**23.8**
#30	0.6	**5.4**
#50	0.3	**1.4**
#100	0.15	**0.8**
#200	0.075	**0.6**

Description: GRAVEL and SAND, some cobbles, trace of silt (GP/SP).

Comments:

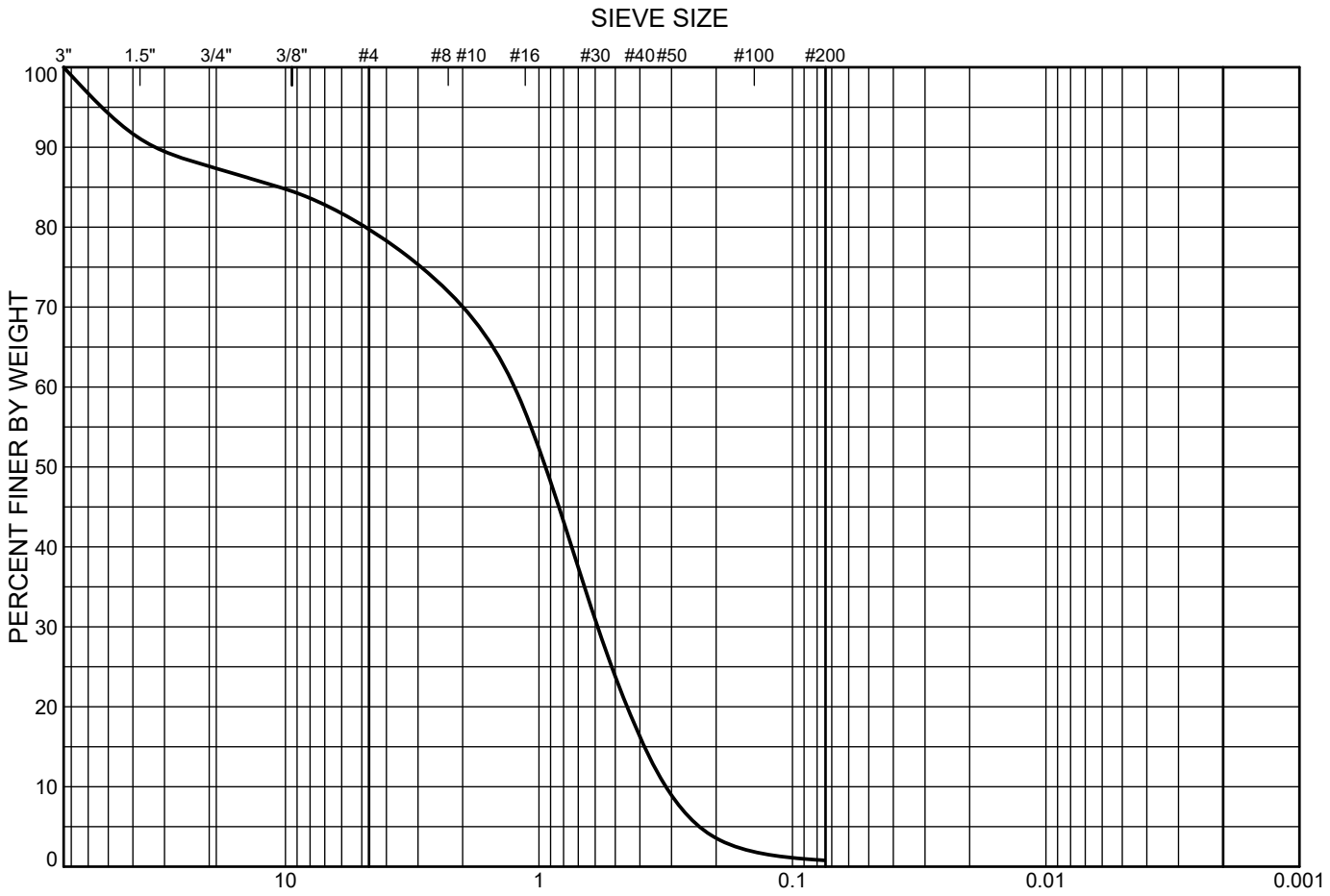
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 8
Sample Depth: 21.3 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**20.2%**
Sand	**79.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**91.1**
0.75	19	**87.4**
0.375	9.5	**84.5**
#4	4.75	**79.8**
#8	2.36	**72.4**
#16	1.18	**58.2**
#30	0.6	**30.9**
#50	0.3	**8.9**
#100	0.15	**2.0**
#200	0.075	**0.8**

Description: Gravelly SAND, trace of silt (SP).

Comments:

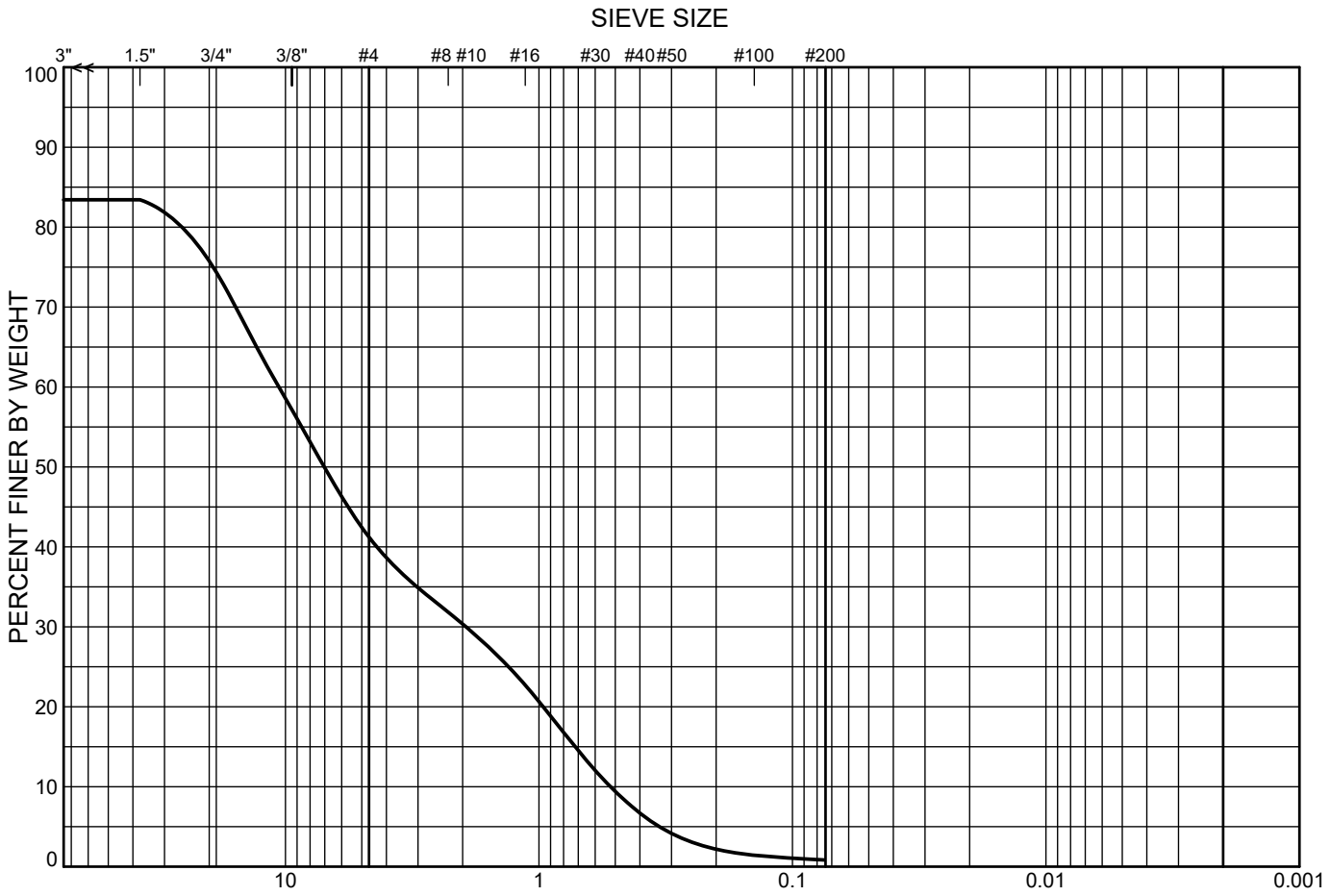
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 9
Sample Depth: 24.4 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**41.9%**
Sand	**40.6%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**83.4**
1.5	37.5	**83.4**
0.75	19	**74.7**
0.375	9.5	**57.3**
#4	4.75	**41.5**
#8	2.36	**32.2**
#16	1.18	**23.3**
#30	0.6	**12.0**
#50	0.3	**4.2**
#100	0.15	**1.5**
#200	0.075	**0.8**

Description: SAND and GRAVEL, some cobbles, trace of silt (SP/GP).

Comments:

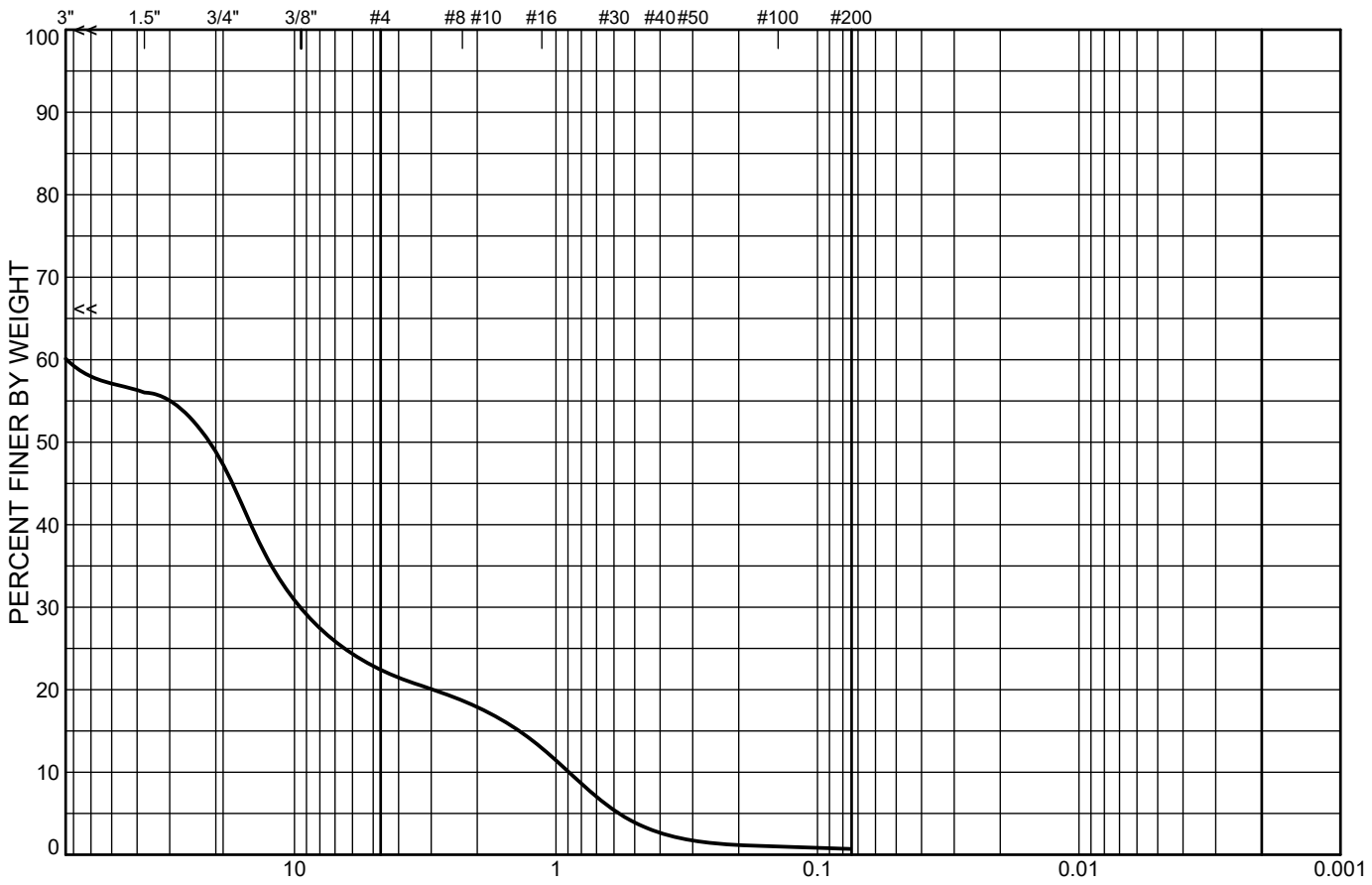
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 10
Sample Depth: 27.4 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**40.6%**
Sand	**21.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	**56.0**
0.75	19	**47.7**
0.375	9.5	**30.0**
#4	4.75	**22.5**
#8	2.36	**18.9**
#16	1.18	**13.4**
#30	0.6	**5.4**
#50	0.3	**1.7**
#100	0.15	**1.0**
#200	0.075	**0.7**

Description: Sandy COBBLES and GRAVEL, trace of silt (GW).

Comments:

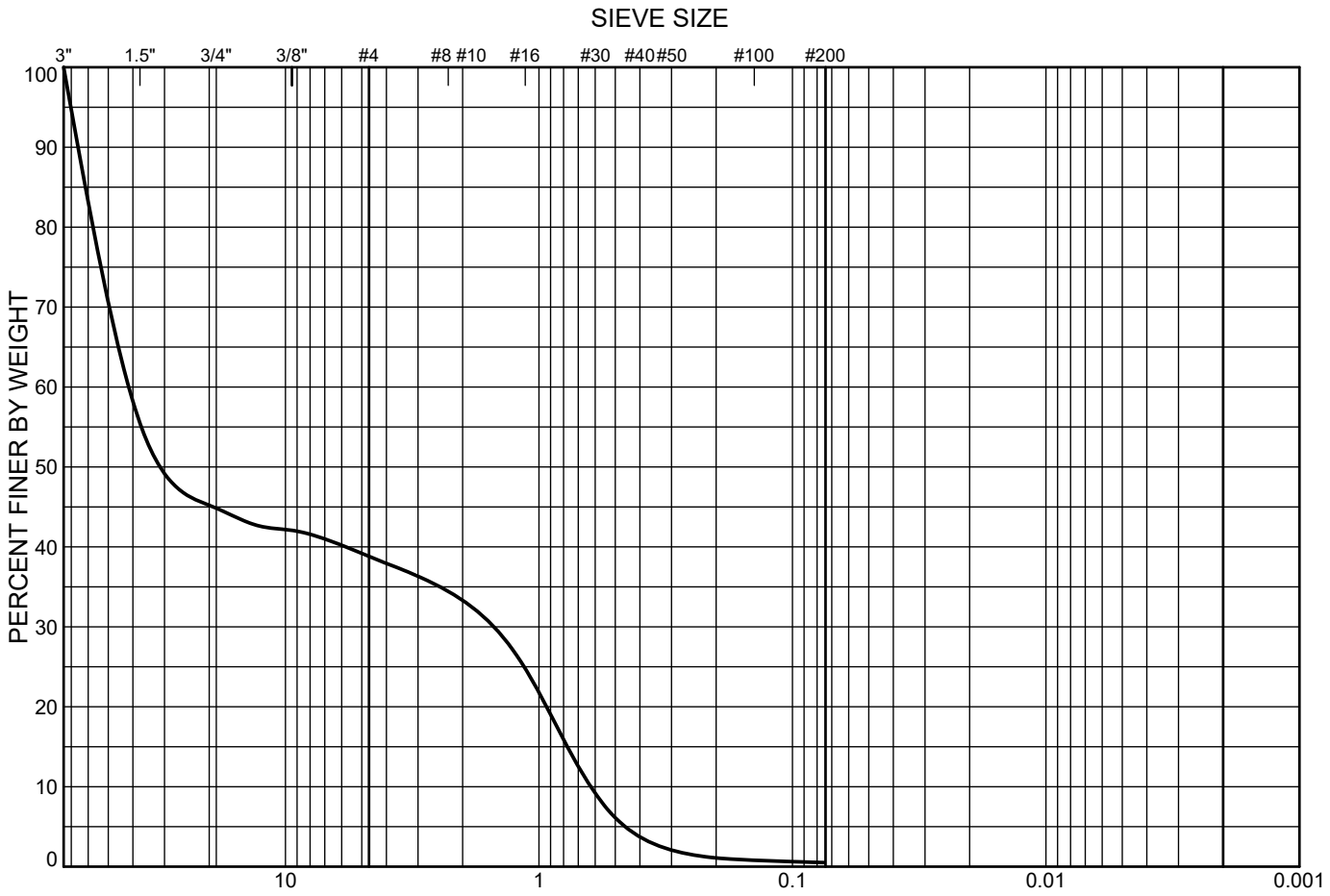
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 11
Sample Depth: 30.5 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**61.1%**
Sand	**38.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**55.5**
0.75	19	**44.9**
0.375	9.5	**42.1**
#4	4.75	**38.9**
#8	2.36	**34.7**
#16	1.18	**25.7**
#30	0.6	**9.1**
#50	0.3	**2.1**
#100	0.15	**0.8**
#200	0.075	**0.5**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

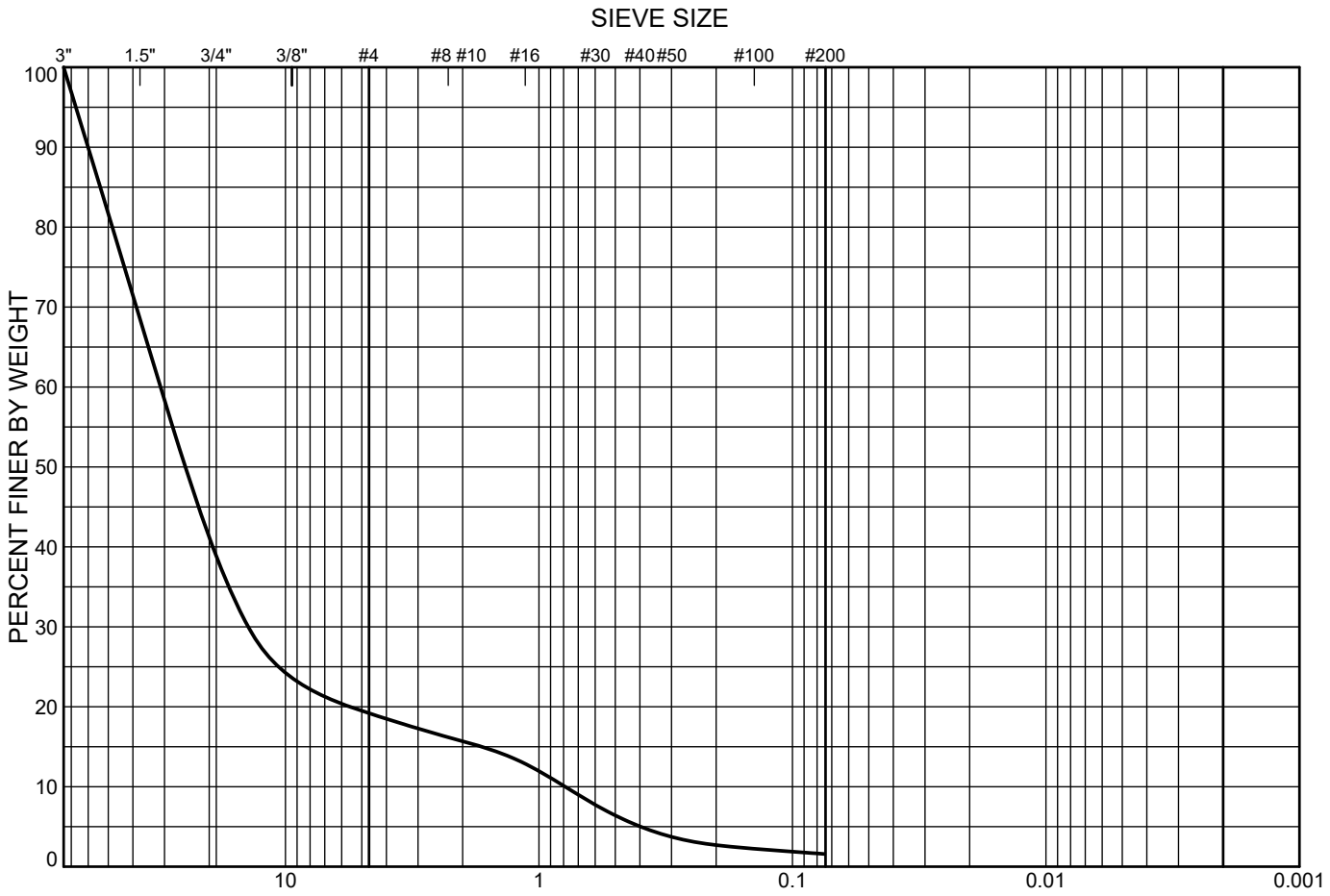
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 12
Sample Depth: 33.5 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**80.7%**
Sand	**17.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**68.5**
0.75	19	**39.3**
0.375	9.5	**23.7**
#4	4.75	**19.3**
#8	2.36	**16.3**
#16	1.18	**13.1**
#30	0.6	**7.7**
#50	0.3	**3.7**
#100	0.15	**2.3**
#200	0.075	**1.6**

Description: GRAVEL, some sand, trace of silt (GP),

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 13
Sample Depth: 36.6 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 31, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**69.9%**
Sand	**27.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**68.7**
0.75	19	**47.2**
0.375	9.5	**36.2**
#4	4.75	**30.1**
#8	2.36	**25.1**
#16	1.18	**20.2**
#30	0.6	**14.3**
#50	0.3	**9.2**
#100	0.15	**4.5**
#200	0.075	**2.2**

Description: Sandy GRAVEL, trace of silt (GW).

Comments:

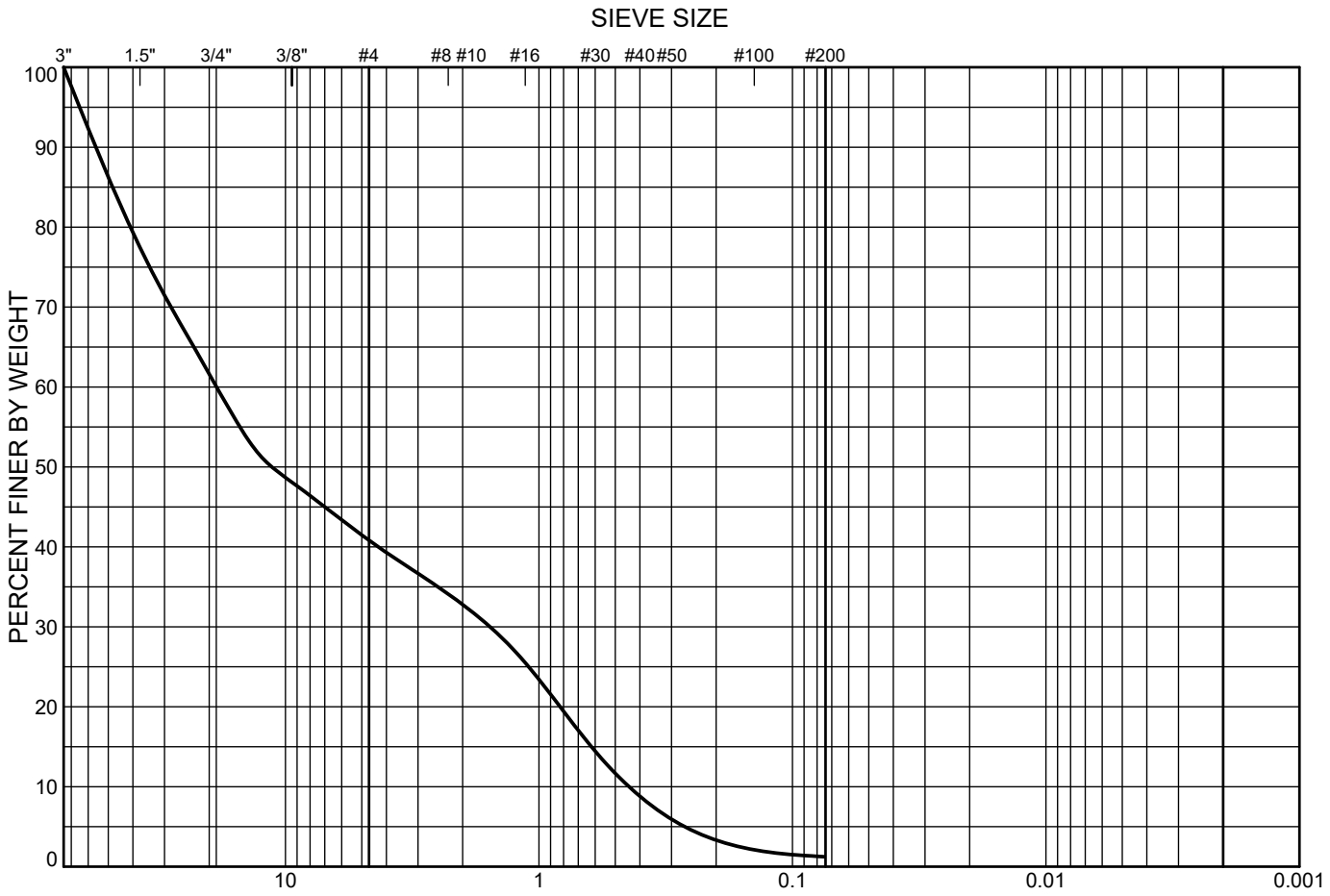
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 14
Sample Depth: 39.6 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**59.0%**
Sand	**39.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**77.5**
0.75	19	**60.4**
0.375	9.5	**48.2**
#4	4.75	**41.0**
#8	2.36	**34.4**
#16	1.18	**26.1**
#30	0.6	**14.4**
#50	0.3	**5.9**
#100	0.15	**2.3**
#200	0.075	**1.2**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 15
Sample Depth: 42.7 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**61.5%**
Sand	**35.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**76.3**
0.75	19	**58.9**
0.375	9.5	**46.7**
#4	4.75	**38.5**
#8	2.36	**32.1**
#16	1.18	**25.8**
#30	0.6	**17.2**
#50	0.3	**9.7**
#100	0.15	**5.2**
#200	0.075	**3.1**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

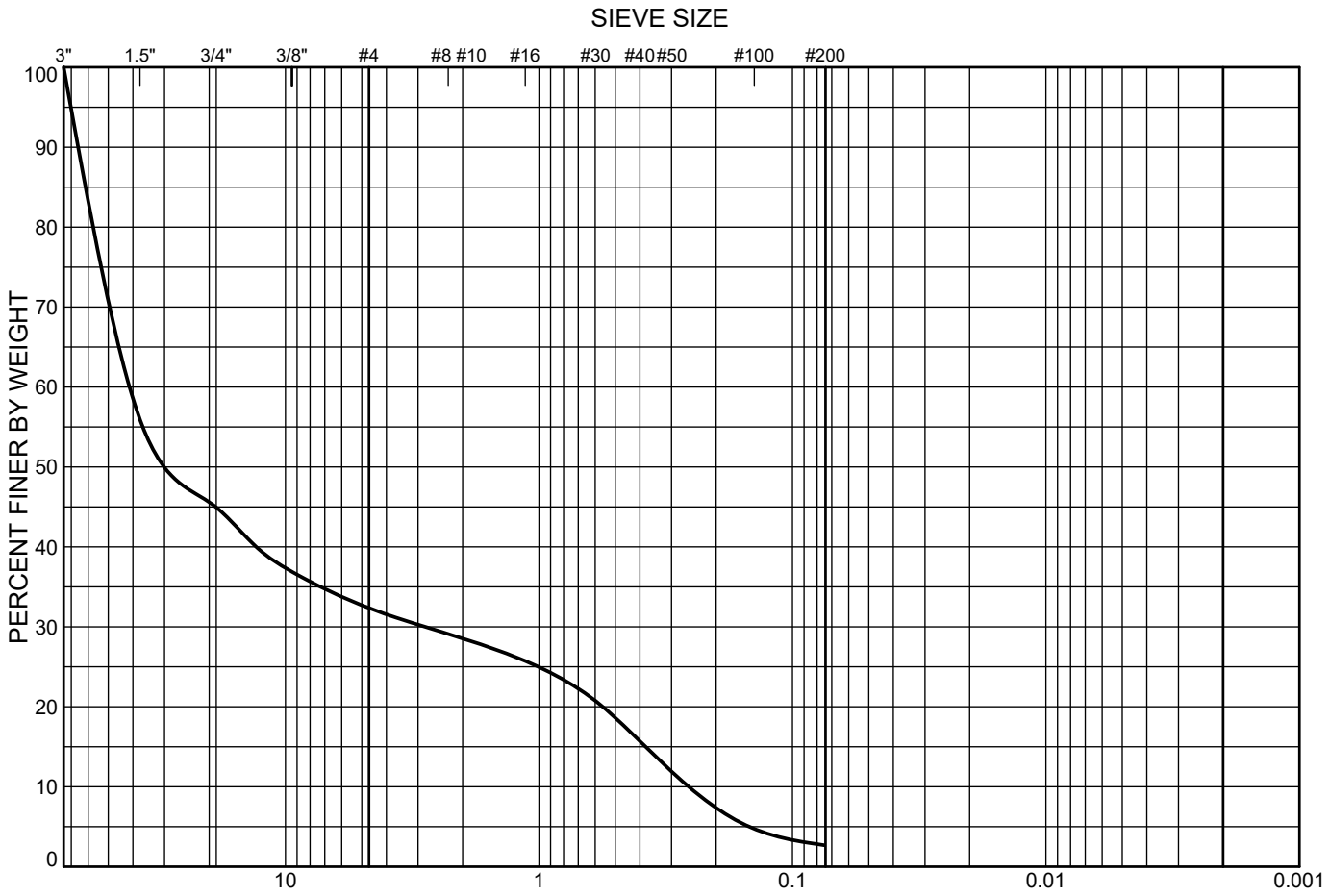
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 16
Sample Depth: 45.7 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**67.6%**
Sand	**29.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**55.9**
0.75	19	**45.1**
0.375	9.5	**37.0**
#4	4.75	**32.4**
#8	2.36	**29.3**
#16	1.18	**26.0**
#30	0.6	**20.7**
#50	0.3	**11.9**
#100	0.15	**5.1**
#200	0.075	**2.7**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 17
Sample Depth: 48.8 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 23, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**31.0%**
Sand	**46.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**80.9**
1.5	37.5	**59.6**
0.75	19	**52.5**
0.375	9.5	**51.3**
#4	4.75	**49.9**
#8	2.36	**47.9**
#16	1.18	**41.9**
#30	0.6	**28.8**
#50	0.3	**14.7**
#100	0.15	**5.9**
#200	0.075	**3.0**

Description: Gravelly SAND, some cobbles, trace of silt (SP).

Comments:

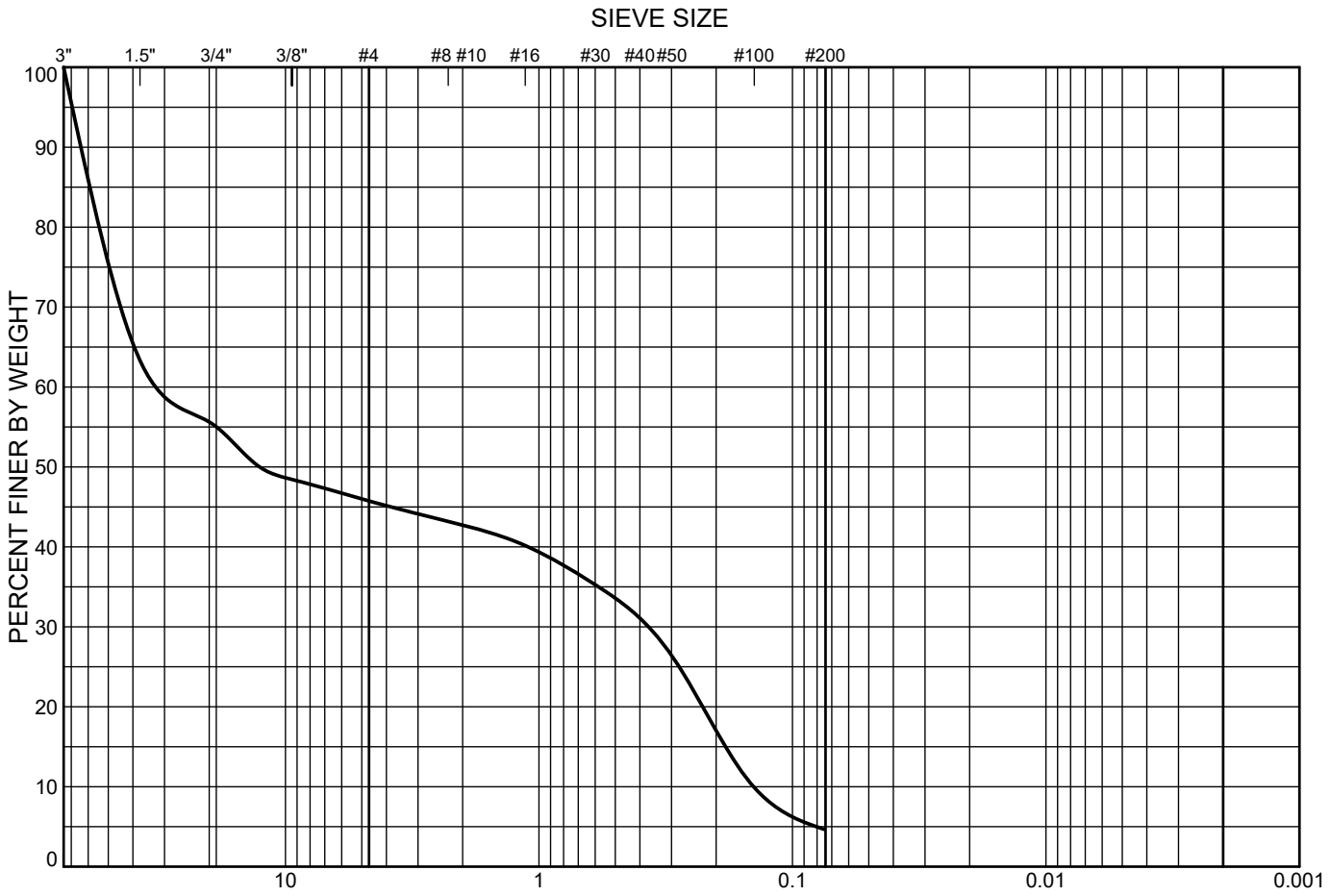
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 18
Sample Depth: 51.8 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**54.2%**
Sand	**41.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**63.3**
0.75	19	**55.2**
0.375	9.5	**48.5**
#4	4.75	**45.8**
#8	2.36	**43.3**
#16	1.18	**40.4**
#30	0.6	**35.3**
#50	0.3	**26.4**
#100	0.15	**10.9**
#200	0.075	**4.7**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 19
Sample Depth: 54.9 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 23, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**79.7%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**99.3**
#16	1.18	**97.8**
#30	0.6	**90.9**
#50	0.3	**74.2**
#100	0.15	**41.4**
#200	0.075	**20.3**

Description: Silty SAND (SM).

Comments: Mostly wood fragments above 2.36 mm

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 20
Sample Depth: 57.9 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 23, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.1%**
Sand	**88.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	**100.0**
#4	4.75	**99.9**
#8	2.36	**99.7**
#16	1.18	**98.6**
#30	0.6	**92.3**
#50	0.3	**66.9**
#100	0.15	**26.9**
#200	0.075	**11.1**

Description: SAND, some silt (SP-SM).

Comments: Some wood fragments above 1.18 mm

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 21
Sample Depth: 61.0 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 23, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**92.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**100.0**
#16	1.18	**99.8**
#30	0.6	**96.6**
#50	0.3	**68.0**
#100	0.15	**24.4**
#200	0.075	**7.5**

Description: SAND, trace of silt (SP-SM).

Comments: Mostly wood fragments above 1.18 mm

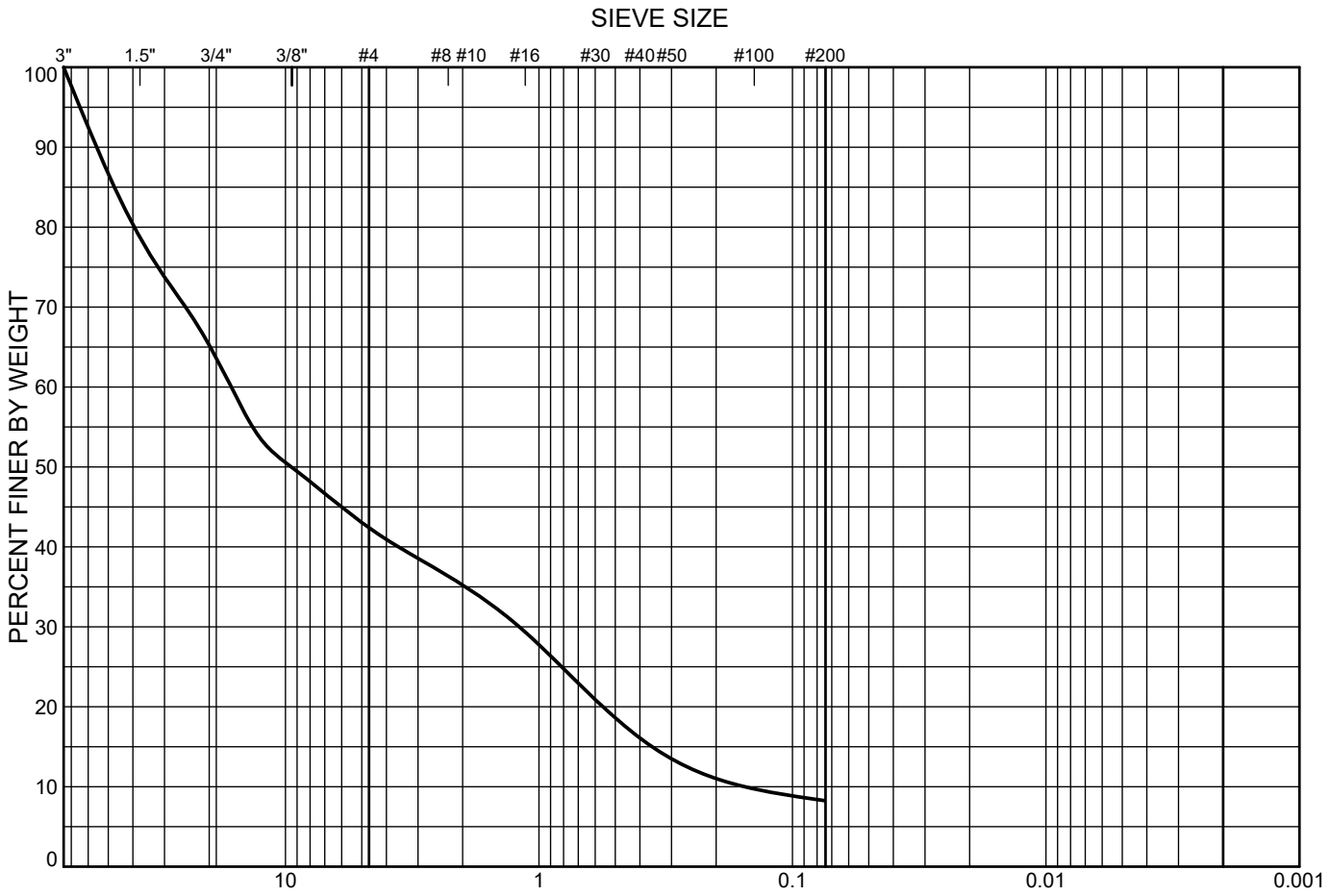
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 22
Sample Depth: 64.3 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**57.5%**
Sand	**34.3%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**78.7**
0.75	19	**64.0**
0.375	9.5	**50.0**
#4	4.75	**42.5**
#8	2.36	**36.6**
#16	1.18	**29.8**
#30	0.6	**20.9**
#50	0.3	**13.5**
#100	0.15	**9.9**
#200	0.075	**8.3**

Description: Sandy GRAVEL, trace of silt (GP-GM).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 23
Sample Depth: 67.1 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**67.5%**
Sand	**27.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**66.9**
0.75	19	**54.0**
0.375	9.5	**40.6**
#4	4.75	**32.5**
#8	2.36	**26.5**
#16	1.18	**20.7**
#30	0.6	**13.9**
#50	0.3	**9.3**
#100	0.15	**6.5**
#200	0.075	**4.6**

Description: Sandy GRAVEL, trace of silt (GW).

Comments:

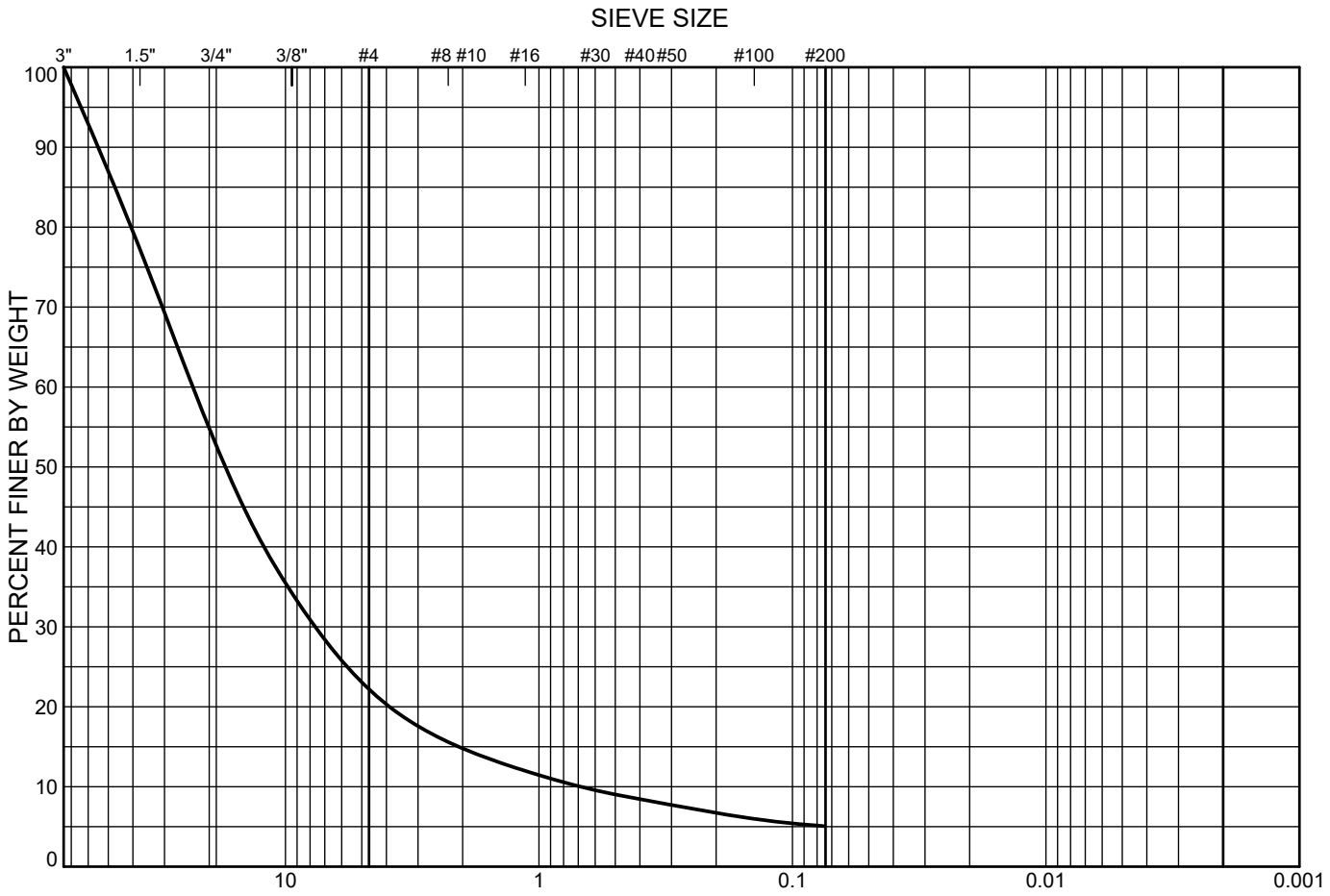
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 24
Sample Depth: 71.0 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**77.6%**
Sand	**17.3%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**77.2**
0.75	19	**53.1**
0.375	9.5	**34.4**
#4	4.75	**22.4**
#8	2.36	**15.8**
#16	1.18	**12.2**
#30	0.6	**9.6**
#50	0.3	**7.7**
#100	0.15	**6.1**
#200	0.075	**5.1**

Description: GRAVEL, some sand, trace of silt (GP-GM).

Comments:

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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-2**
Sample: 25
Sample Depth: 74.7 m
Date Sampled: July 22, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 24, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**35.3%**
Sand	**42.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	**100.0**
0.75	19	**90.7**
0.375	9.5	**74.3**
#4	4.75	**64.7**
#8	2.36	**56.2**
#16	1.18	**48.6**
#30	0.6	**40.8**
#50	0.3	**33.7**
#100	0.15	**26.6**
#200	0.075	**21.9**

Description: Silty GRAVEL and SAND (GM/SM).

Comments:

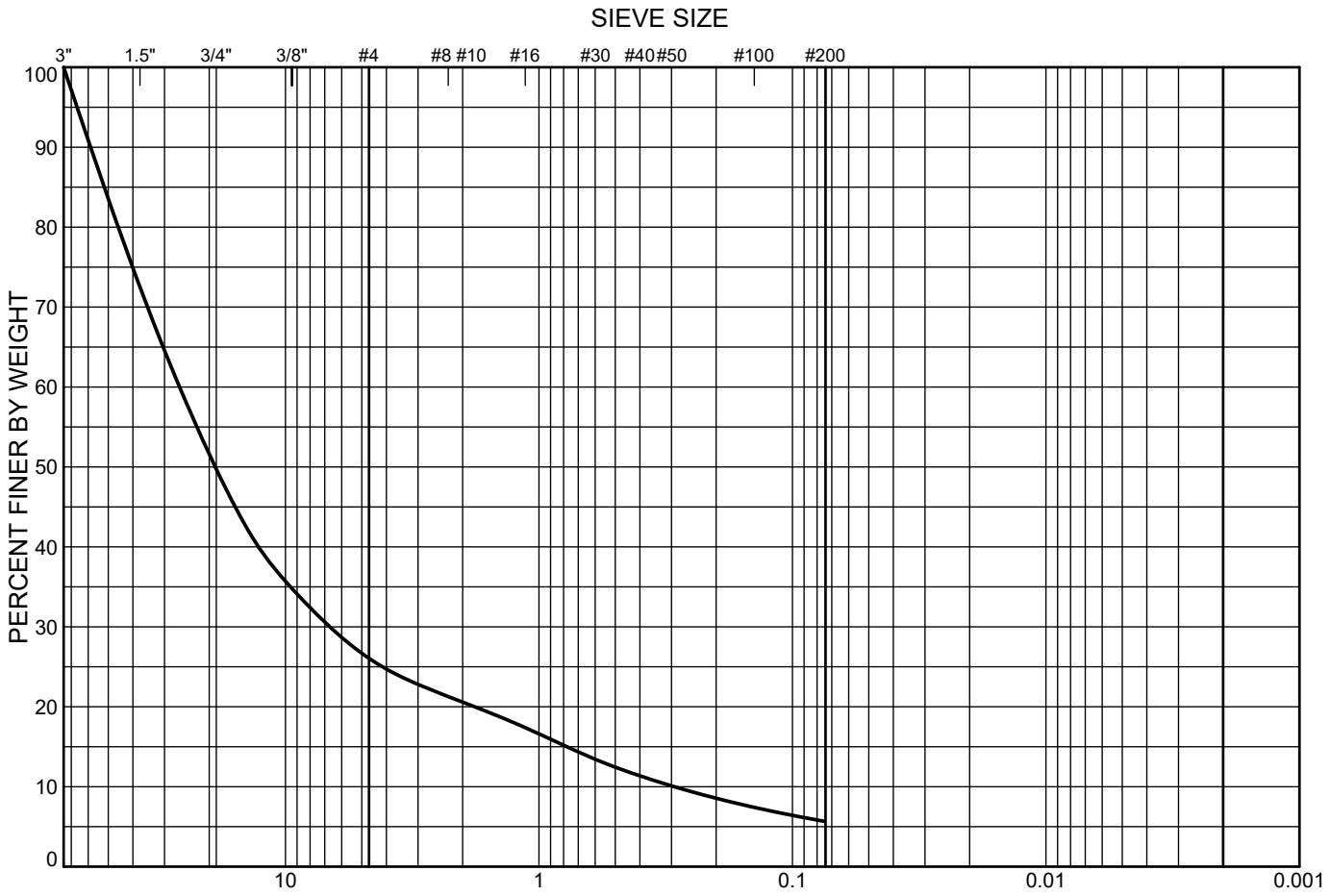
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-2
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 1
Sample Depth: 2.7 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**73.8%**
Sand	**20.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**72.5**
0.75	19	**50.1**
0.375	9.5	**34.9**
#4	4.75	**26.2**
#8	2.36	**21.5**
#16	1.18	**17.6**
#30	0.6	**13.4**
#50	0.3	**10.1**
#100	0.15	**7.6**
#200	0.075	**5.7**

Description: Sandy GRAVEL, trace of silt (GP-GM).

Comments:

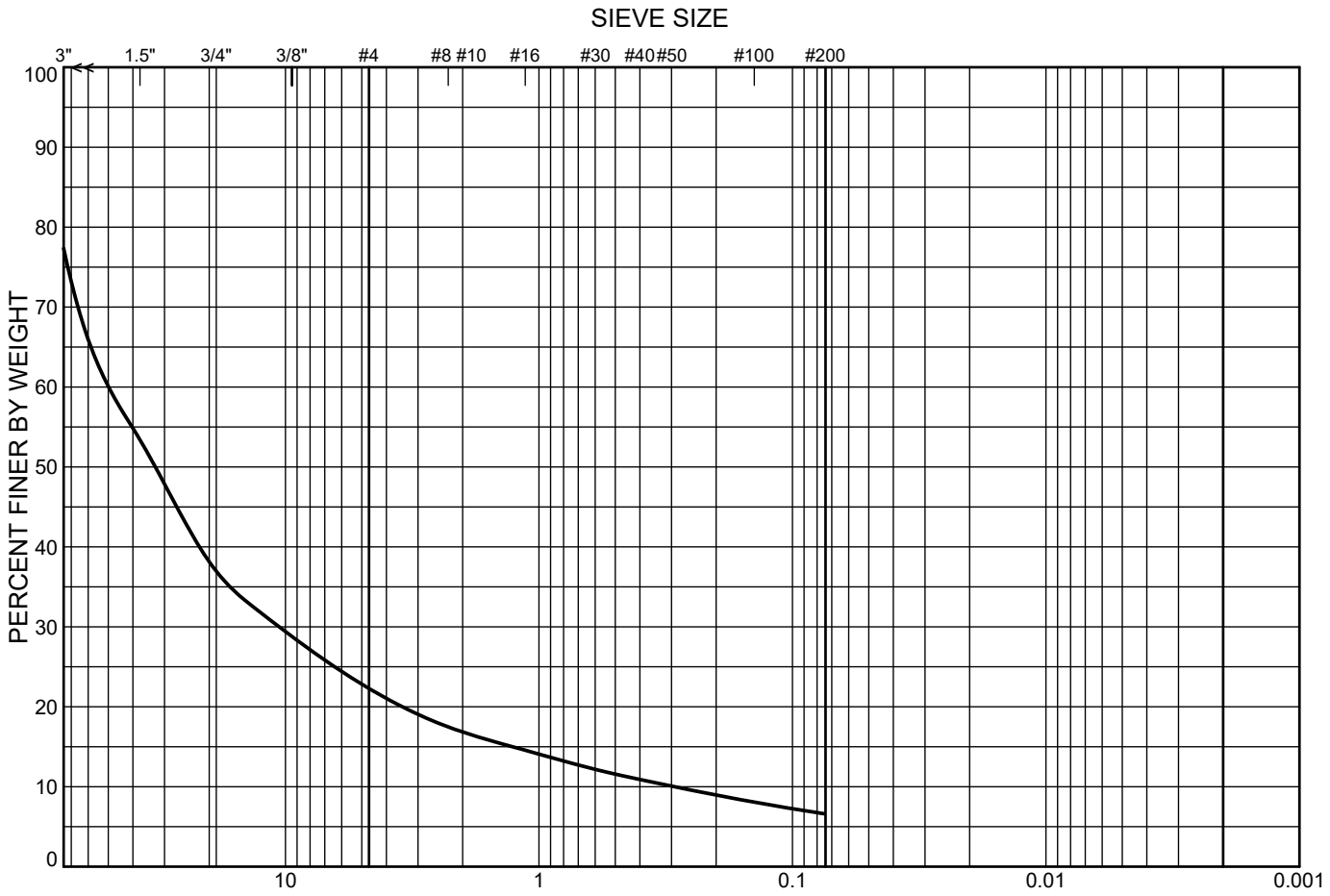
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 2
Sample Depth: 6.1 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**54.9%**
Sand	**15.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**77.3**
1.5	37.5	**53.4**
0.75	19	**37.2**
0.375	9.5	**28.9**
#4	4.75	**22.4**
#8	2.36	**17.7**
#16	1.18	**14.7**
#30	0.6	**12.2**
#50	0.3	**10.1**
#100	0.15	**8.2**
#200	0.075	**6.6**

Description: Cobbley GRAVEL, some sand, trace of silt (GP-GM).

Comments:

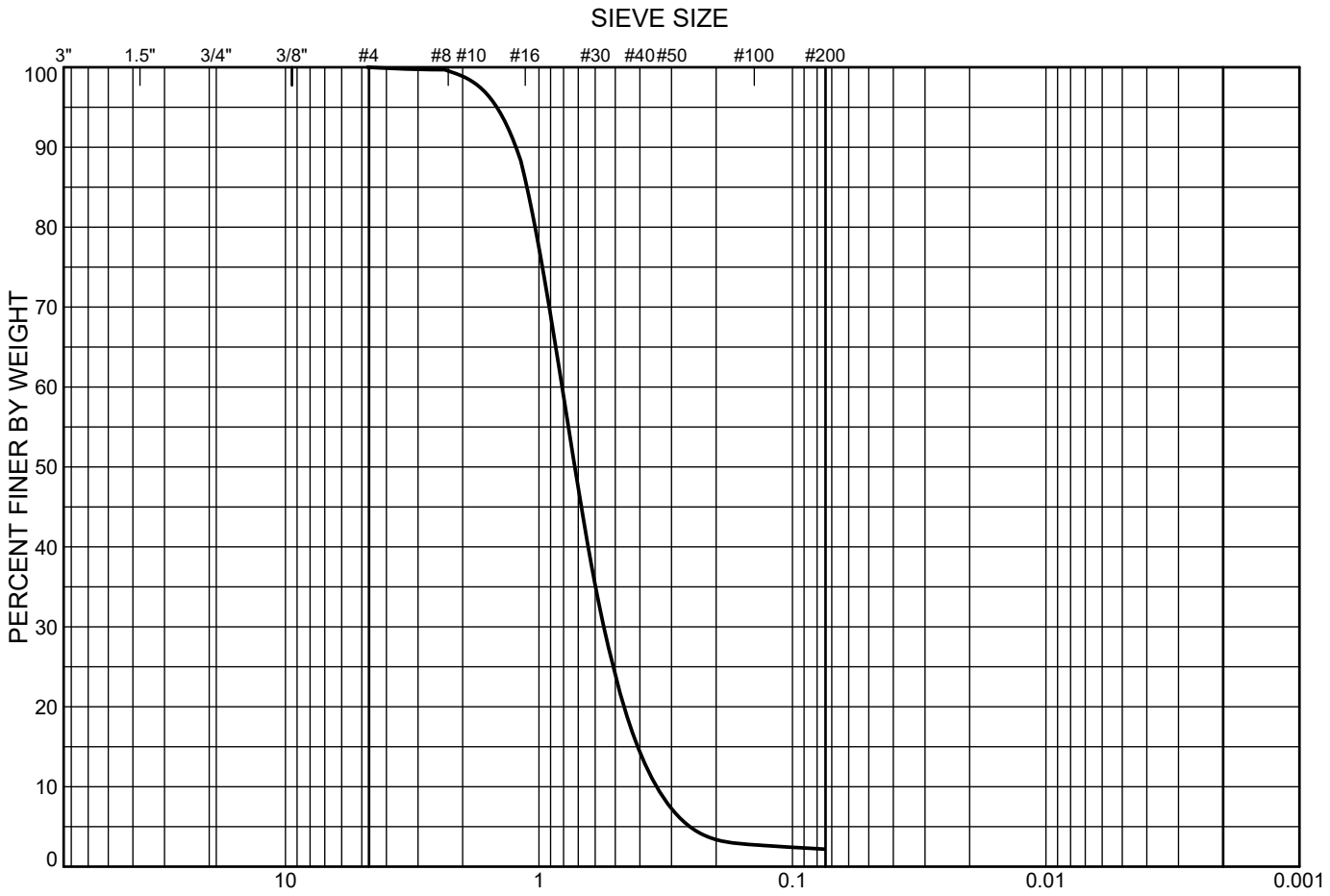
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 3
Sample Depth: 9.1 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 4, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**97.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**99.7**
#16	1.18	**88.3**
#30	0.6	**35.2**
#50	0.3	**7.2**
#100	0.15	**2.8**
#200	0.075	**2.2**

Description: SAND, trace of silt (SP).

Comments:

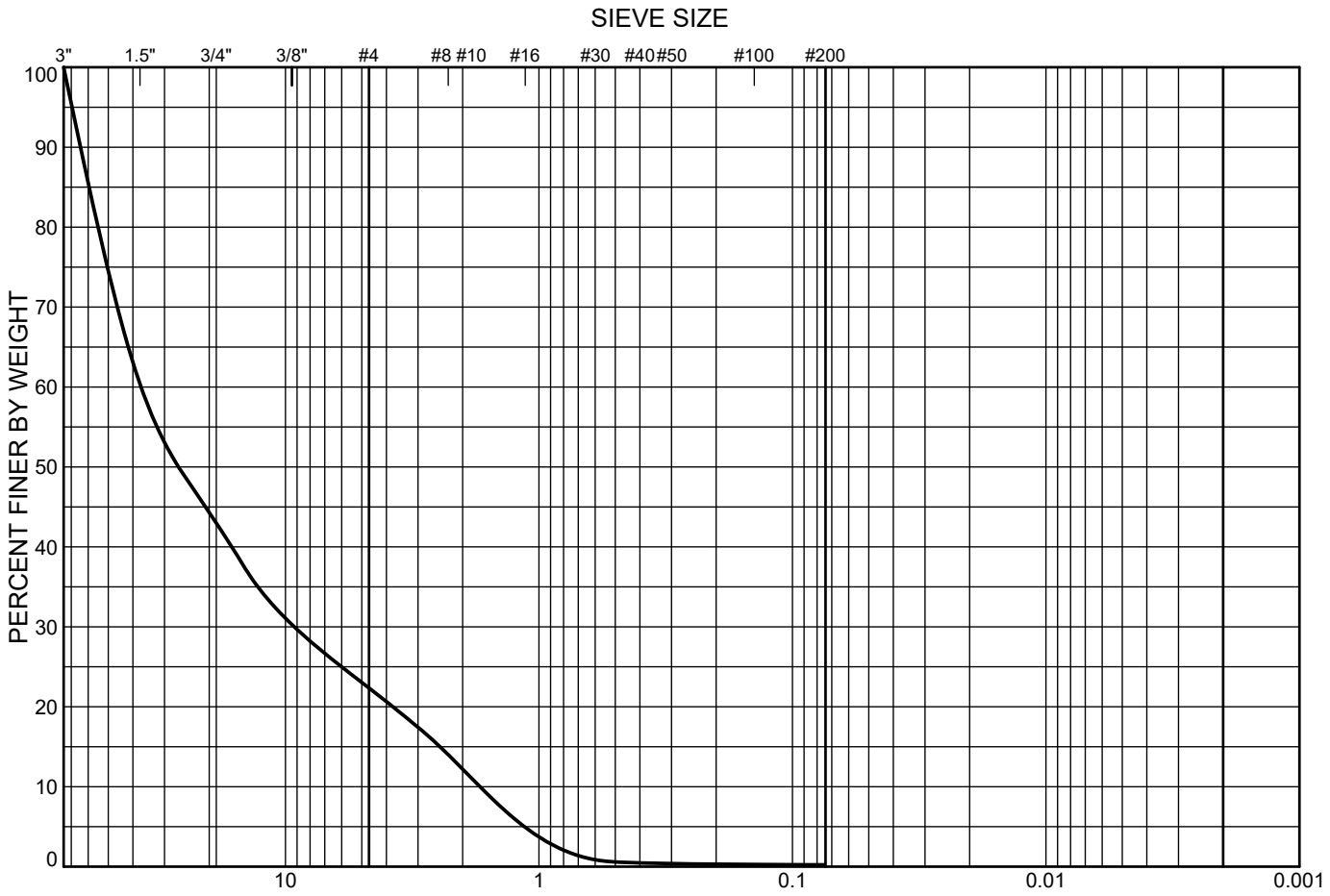
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 4
Sample Depth: 15.2 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**77.5%**
Sand	**22.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**60.4**
0.75	19	**43.3**
0.375	9.5	**30.4**
#4	4.75	**22.5**
#8	2.36	**14.5**
#16	1.18	**5.3**
#30	0.6	**0.8**
#50	0.3	**0.4**
#100	0.15	**0.3**
#200	0.075	**0.2**

Description: Sandy GRAVEL, trace of silt (GW).

Comments:

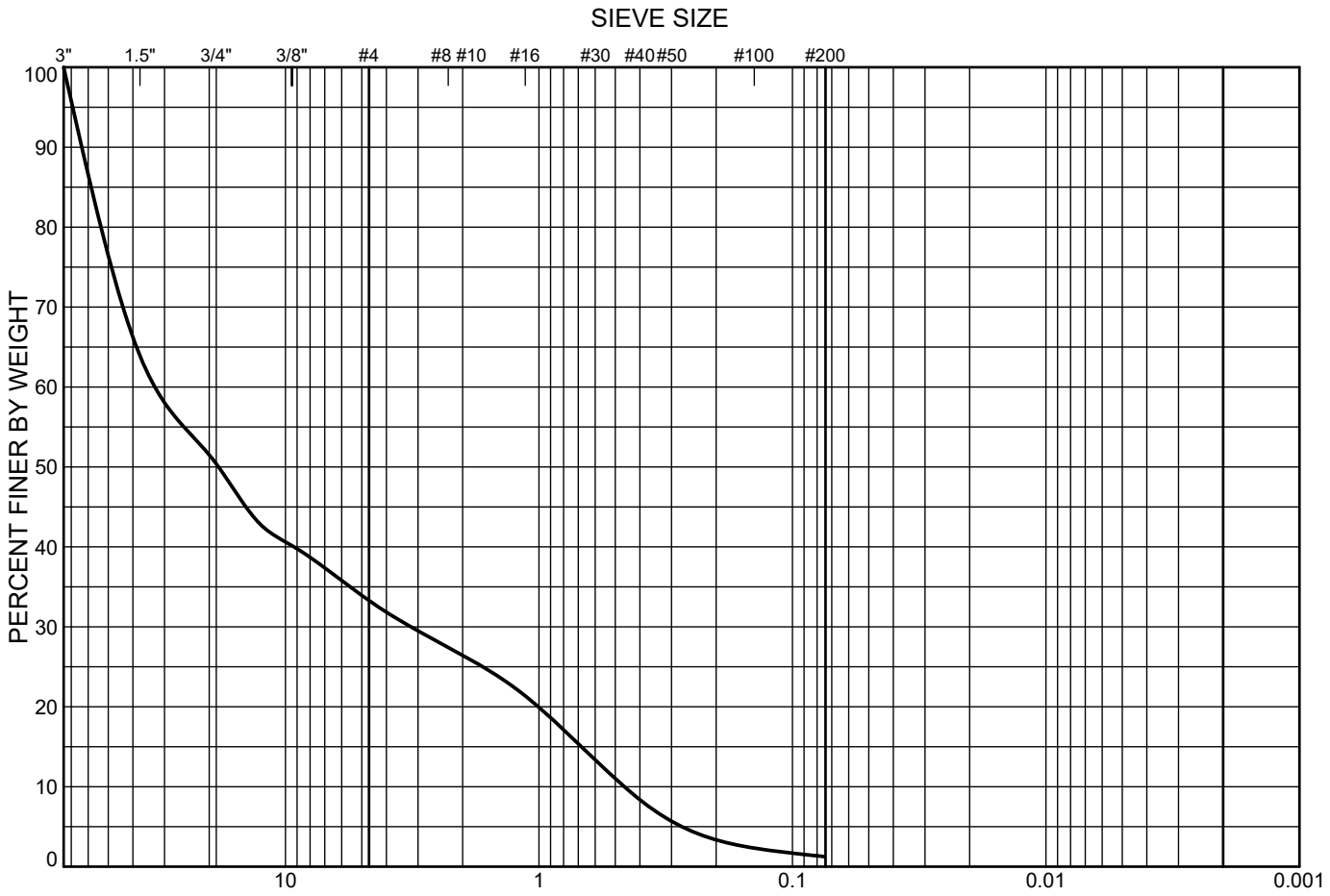
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 5
Sample Depth: 18.3 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**66.6%**
Sand	**32.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**63.9**
0.75	19	**50.6**
0.375	9.5	**40.2**
#4	4.75	**33.4**
#8	2.36	**27.7**
#16	1.18	**21.8**
#30	0.6	**13.4**
#50	0.3	**5.7**
#100	0.15	**2.5**
#200	0.075	**1.3**

Description: Sandy GRAVEL, trace of silt (GP).

Comments:

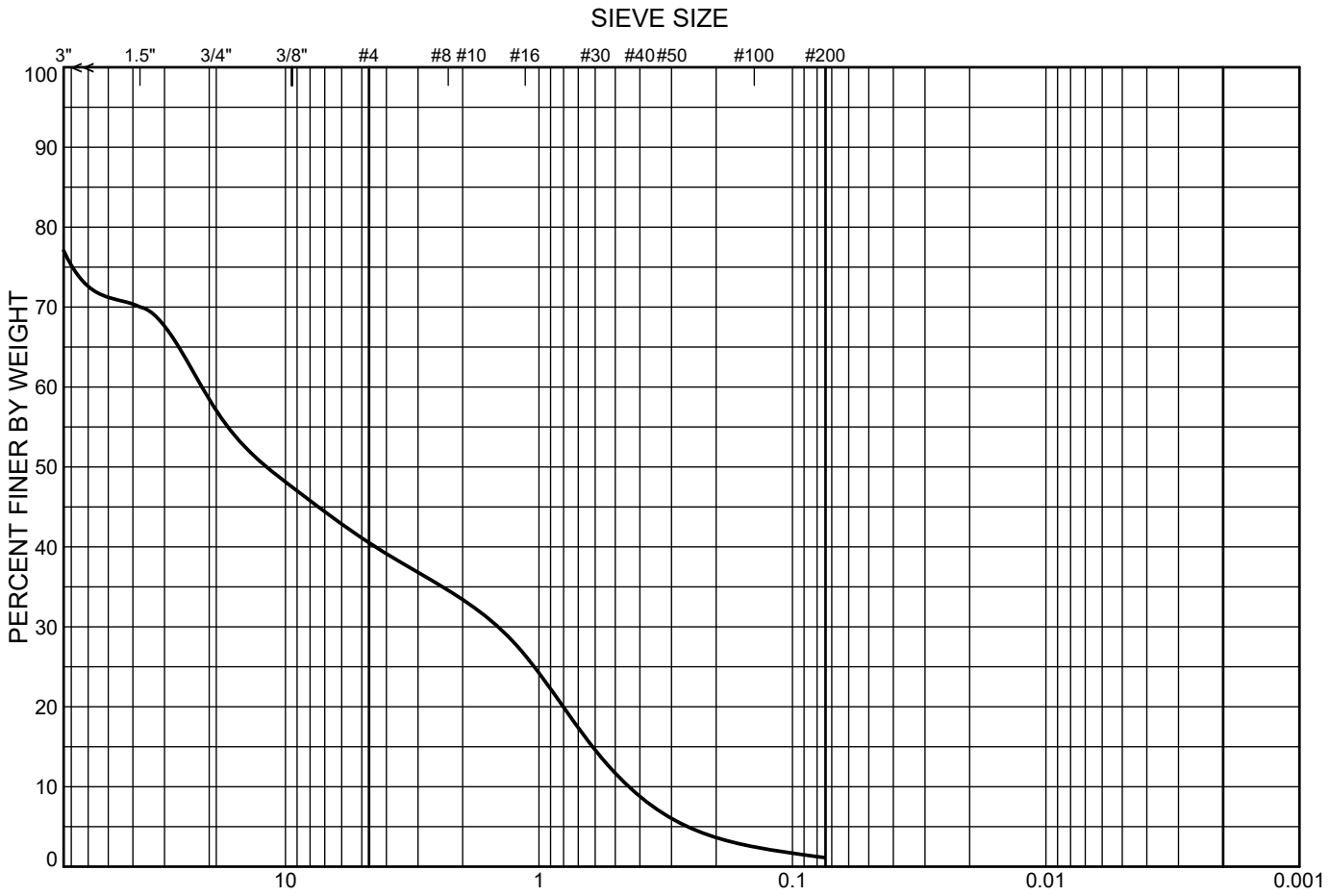
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 6
Sample Depth: 21.3 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**36.4%**
Sand	**39.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**77.1**
1.5	37.5	**70.0**
0.75	19	**57.3**
0.375	9.5	**47.6**
#4	4.75	**40.6**
#8	2.36	**34.9**
#16	1.18	**27.1**
#30	0.6	**14.6**
#50	0.3	**6.0**
#100	0.15	**2.6**
#200	0.075	**1.1**

Description: Cobbley GRAVEL and SAND, trace of silt (GP/SP).

Comments:

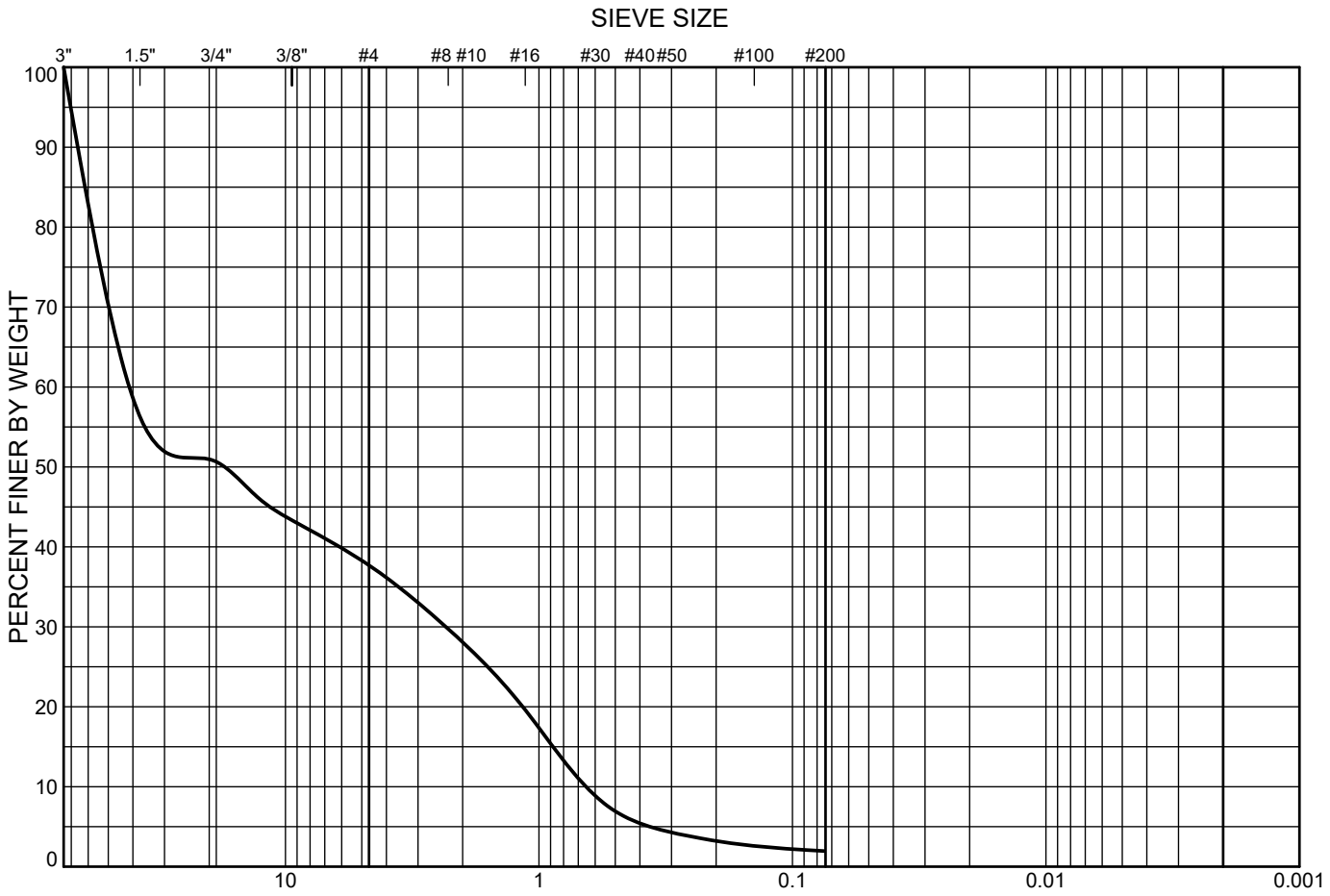
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 7
Sample Depth: 24.4 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**62.2%**
Sand	**35.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**56.3**
0.75	19	**50.7**
0.375	9.5	**43.4**
#4	4.75	**37.8**
#8	2.36	**30.2**
#16	1.18	**20.3**
#30	0.6	**8.8**
#50	0.3	**4.3**
#100	0.15	**2.7**
#200	0.075	**2.0**

Description: SAND and GRAVEL, trace of silt (SP/GP).

Comments:

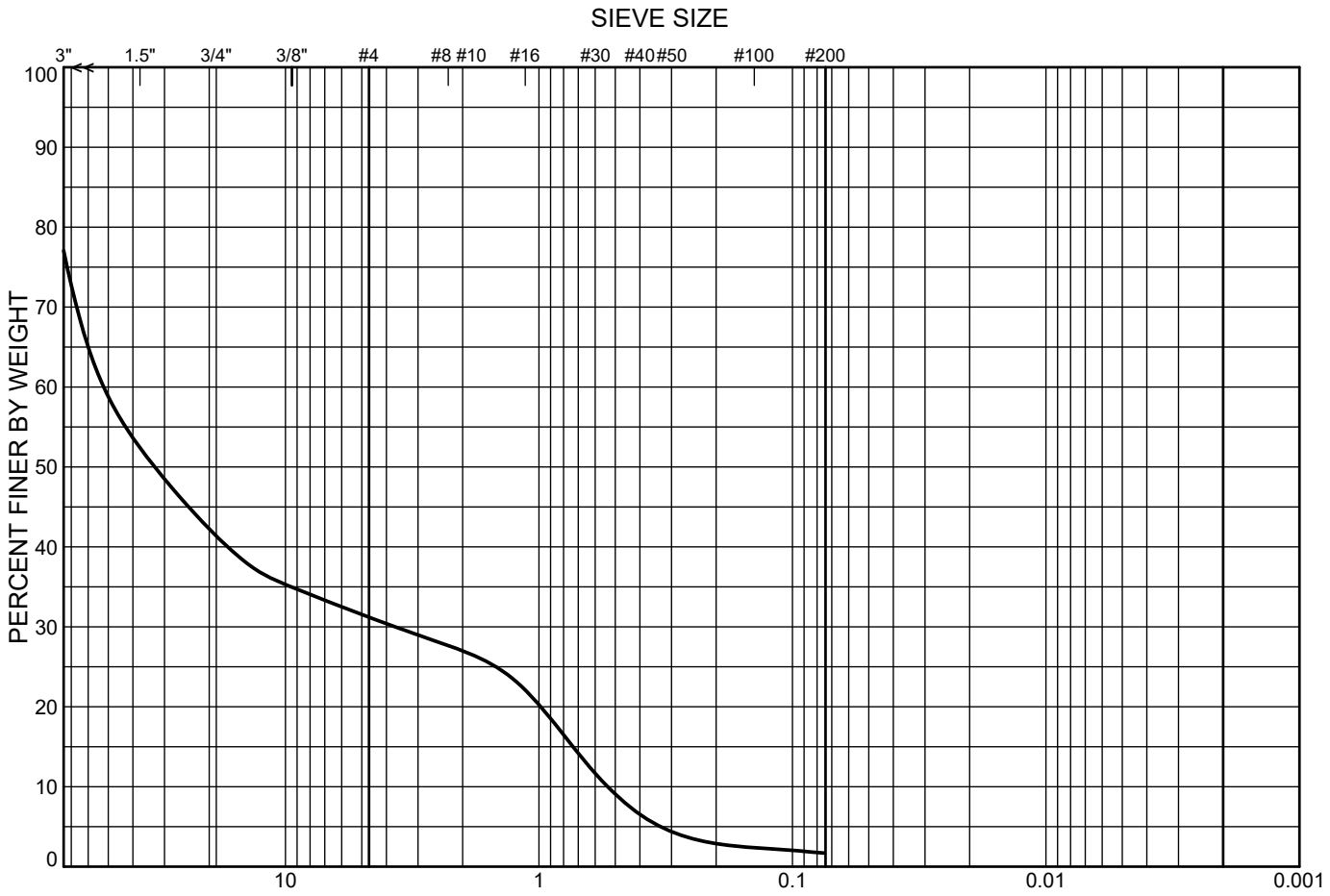
The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 8
Sample Depth: 27.4 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 5, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**45.8%**
Sand	**29.6%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**77.1**
1.5	37.5	**52.4**
0.75	19	**41.5**
0.375	9.5	**35.0**
#4	4.75	**31.3**
#8	2.36	**27.8**
#16	1.18	**22.6**
#30	0.6	**11.7**
#50	0.3	**4.4**
#100	0.15	**2.5**
#200	0.075	**1.7**

Description: Cobbley, sandy GRAVEL, trace of silt (GP).

Comments:

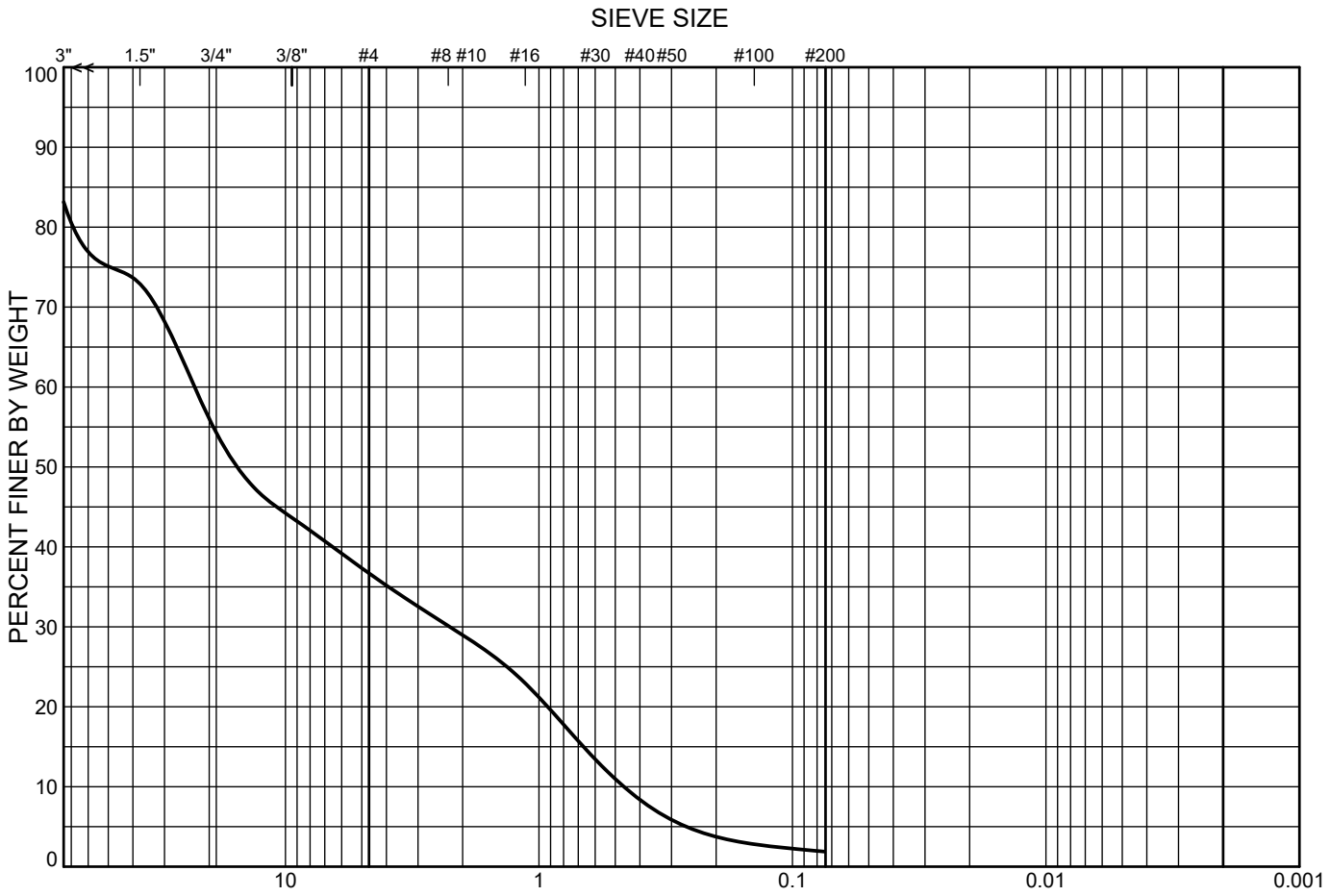
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THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 9
Sample Depth: 30.5 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**46.3%**
Sand	**34.9%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**83.1**
1.5	37.5	**72.9**
0.75	19	**54.6**
0.375	9.5	**43.7**
#4	4.75	**36.8**
#8	2.36	**30.4**
#16	1.18	**23.5**
#30	0.6	**13.4**
#50	0.3	**5.9**
#100	0.15	**2.9**
#200	0.075	**1.9**

Description: Sandy GRAVEL, some cobbles, trace of silt (GP).

Comments:

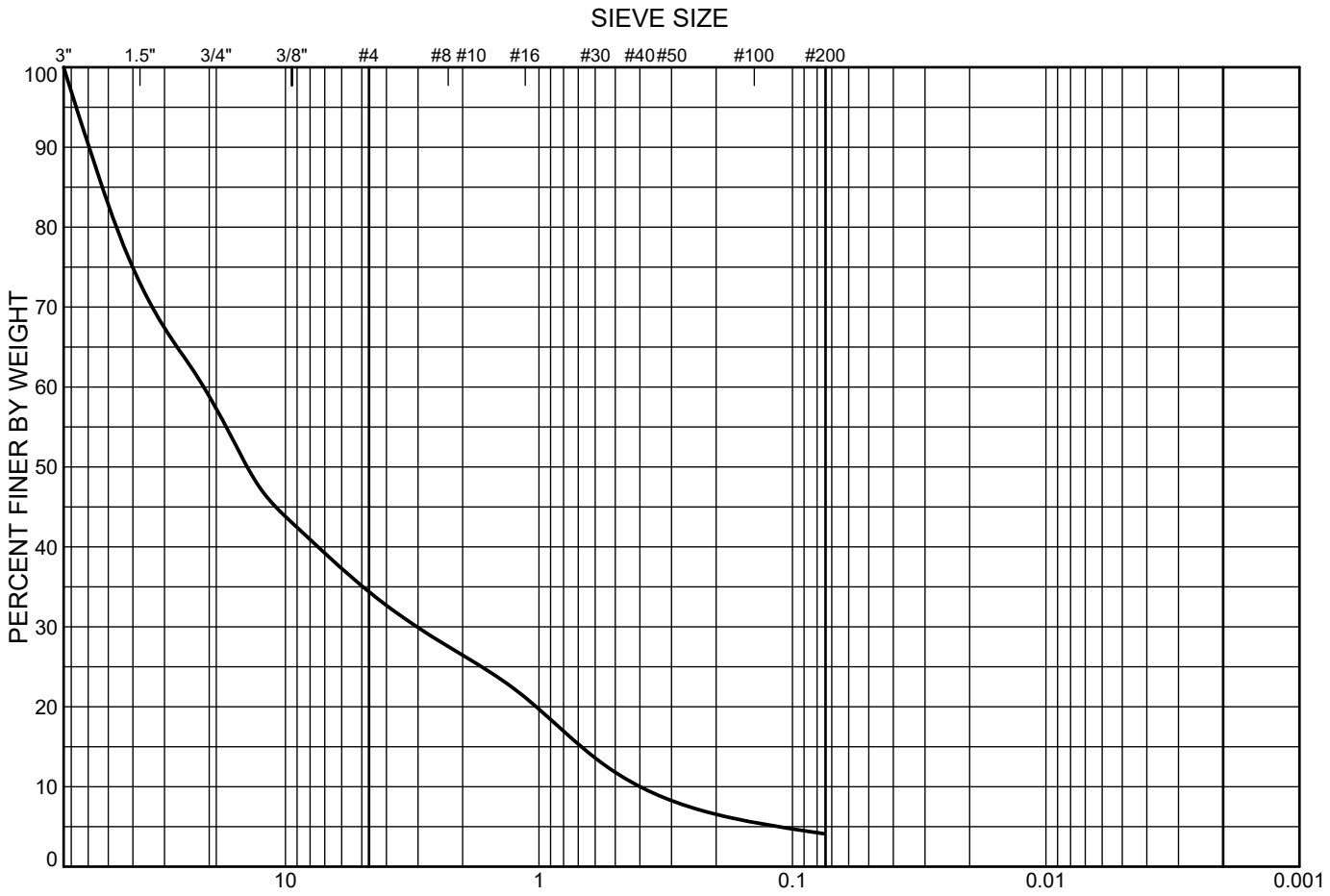
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THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 10
Sample Depth: 33.5 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 6, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**65.5%**
Sand	**30.4%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**73.0**
0.75	19	**57.7**
0.375	9.5	**43.1**
#4	4.75	**34.5**
#8	2.36	**27.8**
#16	1.18	**21.6**
#30	0.6	**13.6**
#50	0.3	**8.3**
#100	0.15	**5.7**
#200	0.075	**4.1**

Description: Sandy GRAVEL, trace of silt (GW).

Comments:

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 11
Sample Depth: 36.6 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: September 5, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**1.7%**
Sand	**60.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	**100.0**
0.375	9.5	**99.0**
#4	4.75	**98.3**
#8	2.36	**97.7**
#16	1.18	**96.7**
#30	0.6	**93.2**
#50	0.3	**83.1**
#100	0.15	**63.1**
#200	0.075	**38.1**

Description: SILT and SAND, trace of gravel (ML/SM).

Comments:

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 12
Sample Depth: 39.6 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 27, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**38.6%**
Sand	**56.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**100.0**
1.5	37.5	**84.8**
0.75	19	**72.7**
0.375	9.5	**66.6**
#4	4.75	**61.4**
#8	2.36	**57.5**
#16	1.18	**52.0**
#30	0.6	**34.6**
#50	0.3	**14.8**
#100	0.15	**7.6**
#200	0.075	**4.9**

Description: GRAVEL and SAND, trace of silt (GP/SP).

Comments:

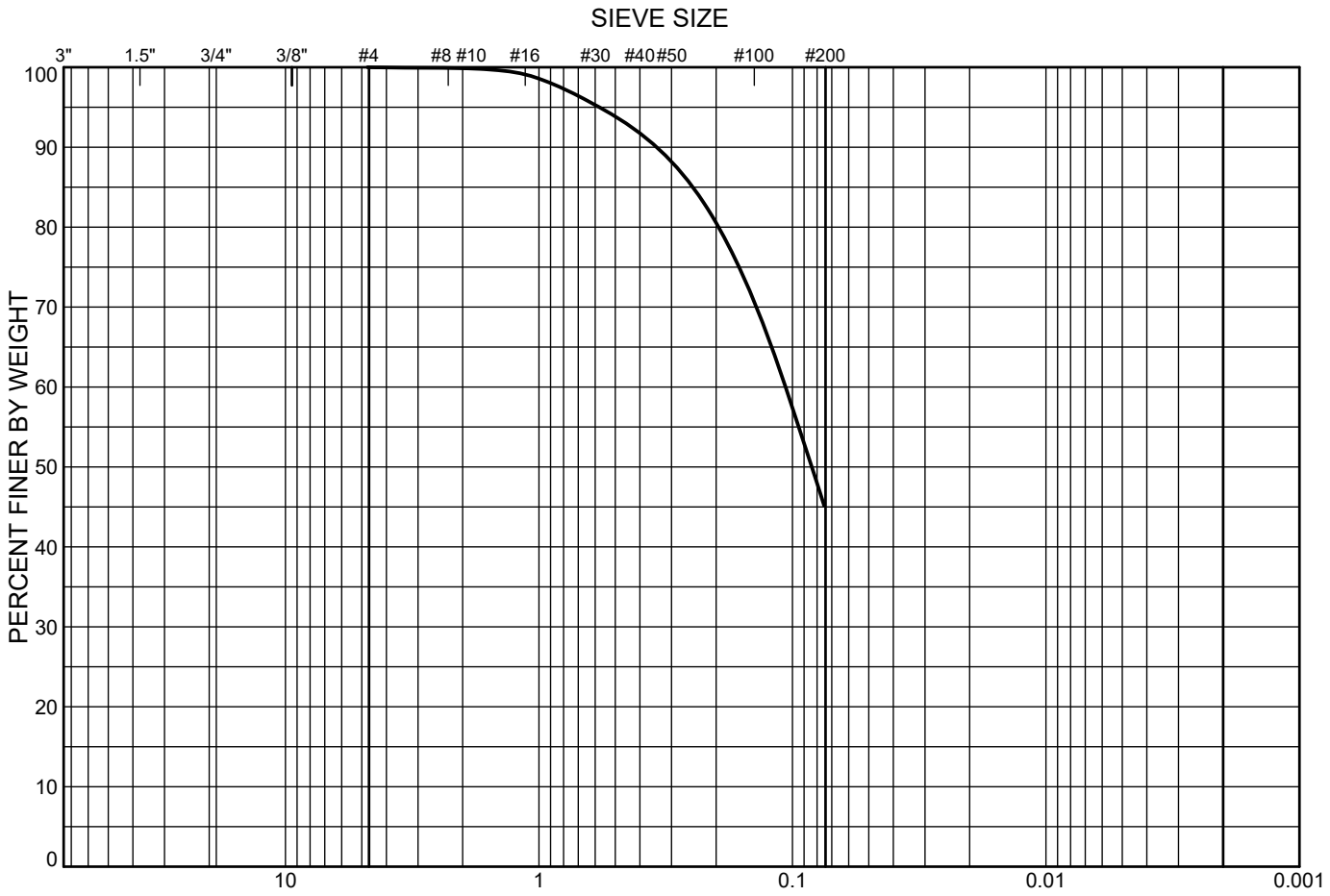
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 13
Sample Depth: 42.7 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 27, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**54.8%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**99.9**
#16	1.18	**99.2**
#30	0.6	**95.3**
#50	0.3	**88.2**
#100	0.15	**72.6**
#200	0.075	**45.2**

Description: SILT and SAND (ML/SM).

Comments: Mostly wood fragments above 2.36 mm

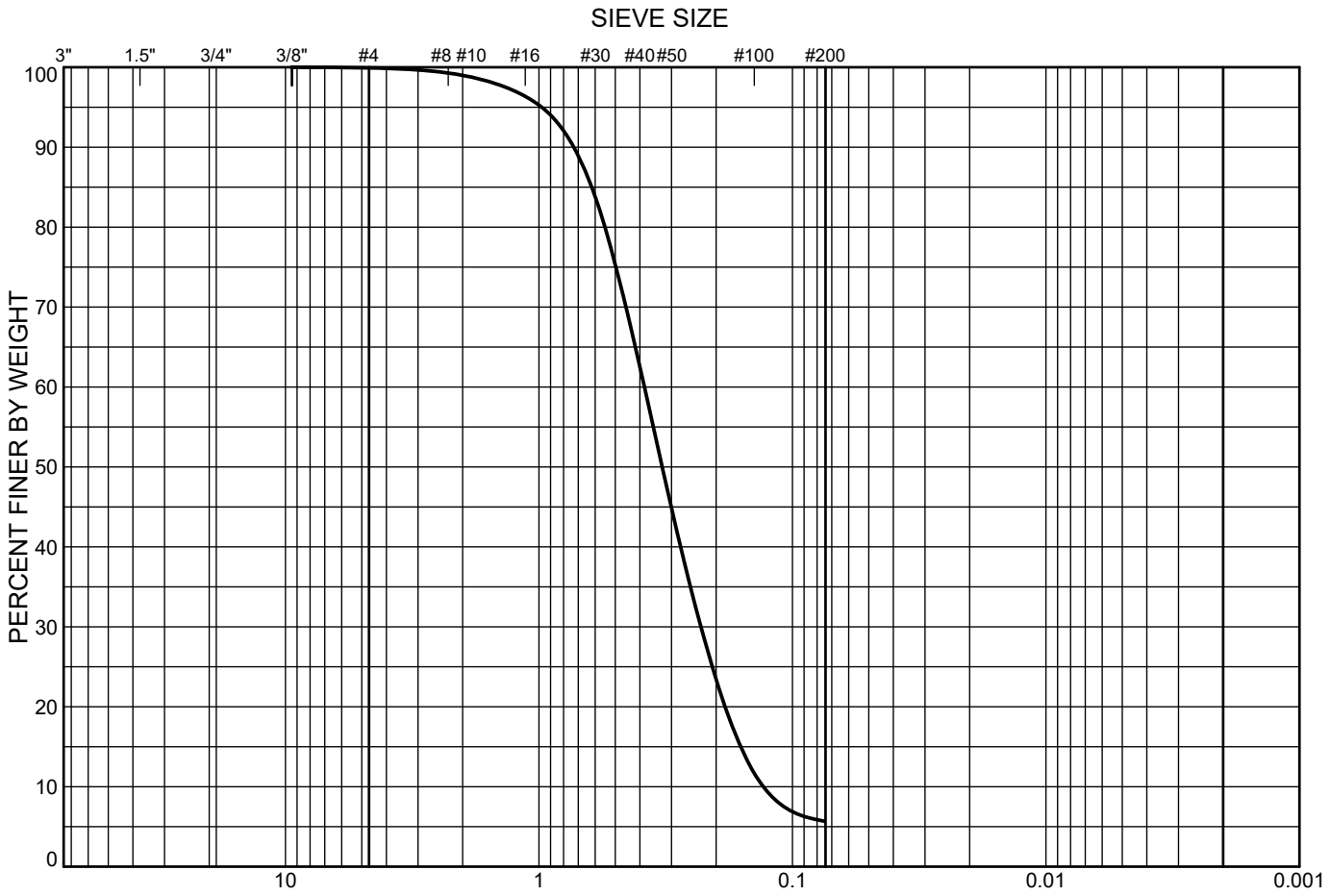
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 14
Sample Depth: 45.7 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 27, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.1%**
Sand	**94.2%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	**100.0**
#4	4.75	**99.9**
#8	2.36	**99.3**
#16	1.18	**96.7**
#30	0.6	**83.8**
#50	0.3	**44.8**
#100	0.15	**13.1**
#200	0.075	**5.7**

Description: SAND, trace of silt (SP-SM).

Comments: Wood above 4.75 mm.

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 15
Sample Depth: 48.8 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 27, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.0%**
Sand	**73.6%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	
#4	4.75	**100.0**
#8	2.36	**99.9**
#16	1.18	**99.6**
#30	0.6	**97.4**
#50	0.3	**84.9**
#100	0.15	**50.0**
#200	0.075	**26.4**

Description: Silty SAND (SM).

Comments: Mostly wood fragments above 1.18 mm

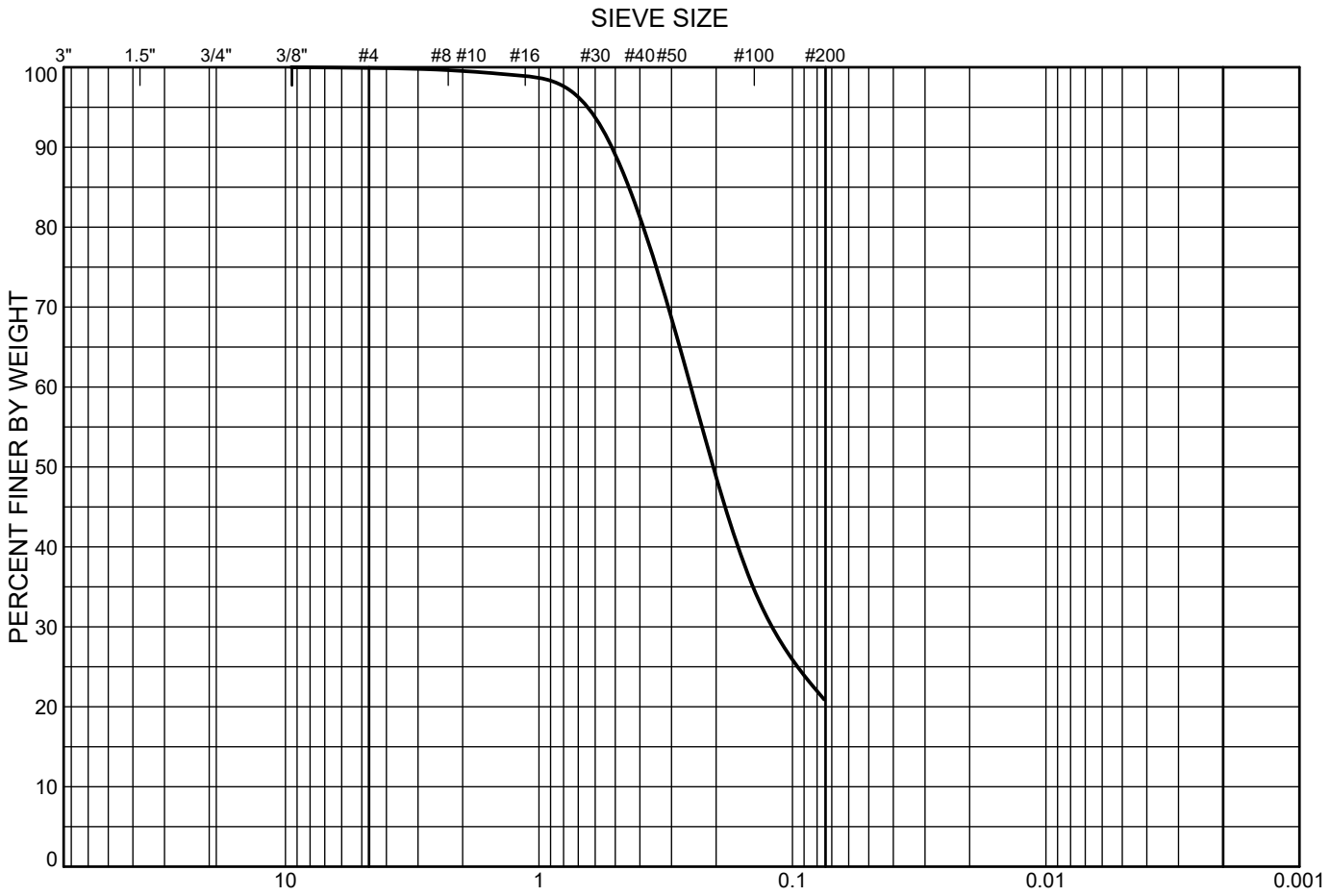
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GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-3**
Sample: 16
Sample Depth: 51.8 m
Date Sampled: July 25, 2018
Sampled By: SWS
Date Received: July 30, 2018
Date Tested: August 27, 2018
Tested By: KM
Test Method:
Specification:

Gravel	**0.1%**
Sand	**79.0%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	
1.5	37.5	
0.75	19	
0.375	9.5	**100.0**
#4	4.75	**99.9**
#8	2.36	**99.7**
#16	1.18	**99.0**
#30	0.6	**93.7**
#50	0.3	**68.6**
#100	0.15	**36.6**
#200	0.075	**20.9**

Description: Silty SAND (SM).

Comments: Mostly wood fragments above 1.18 mm

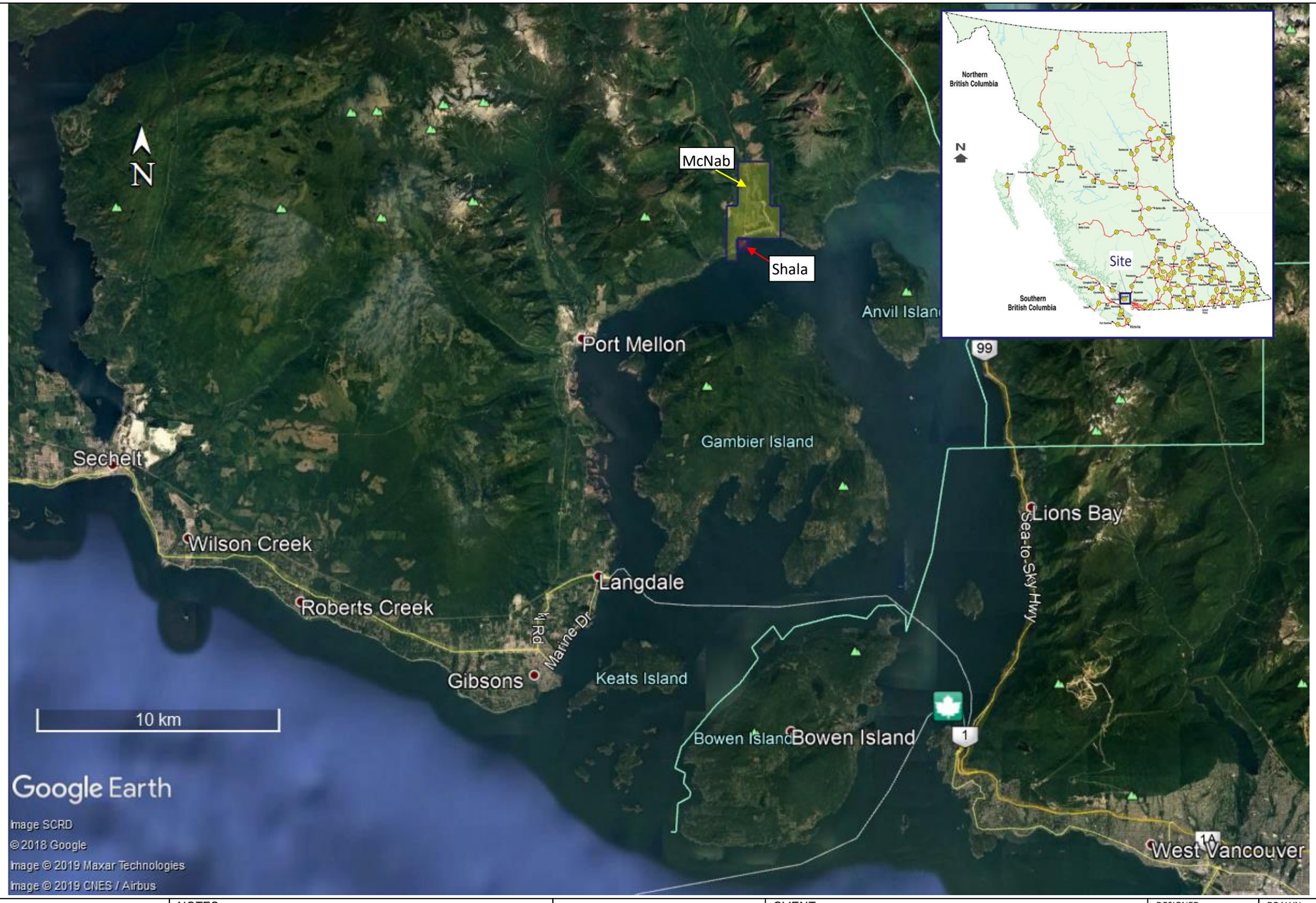
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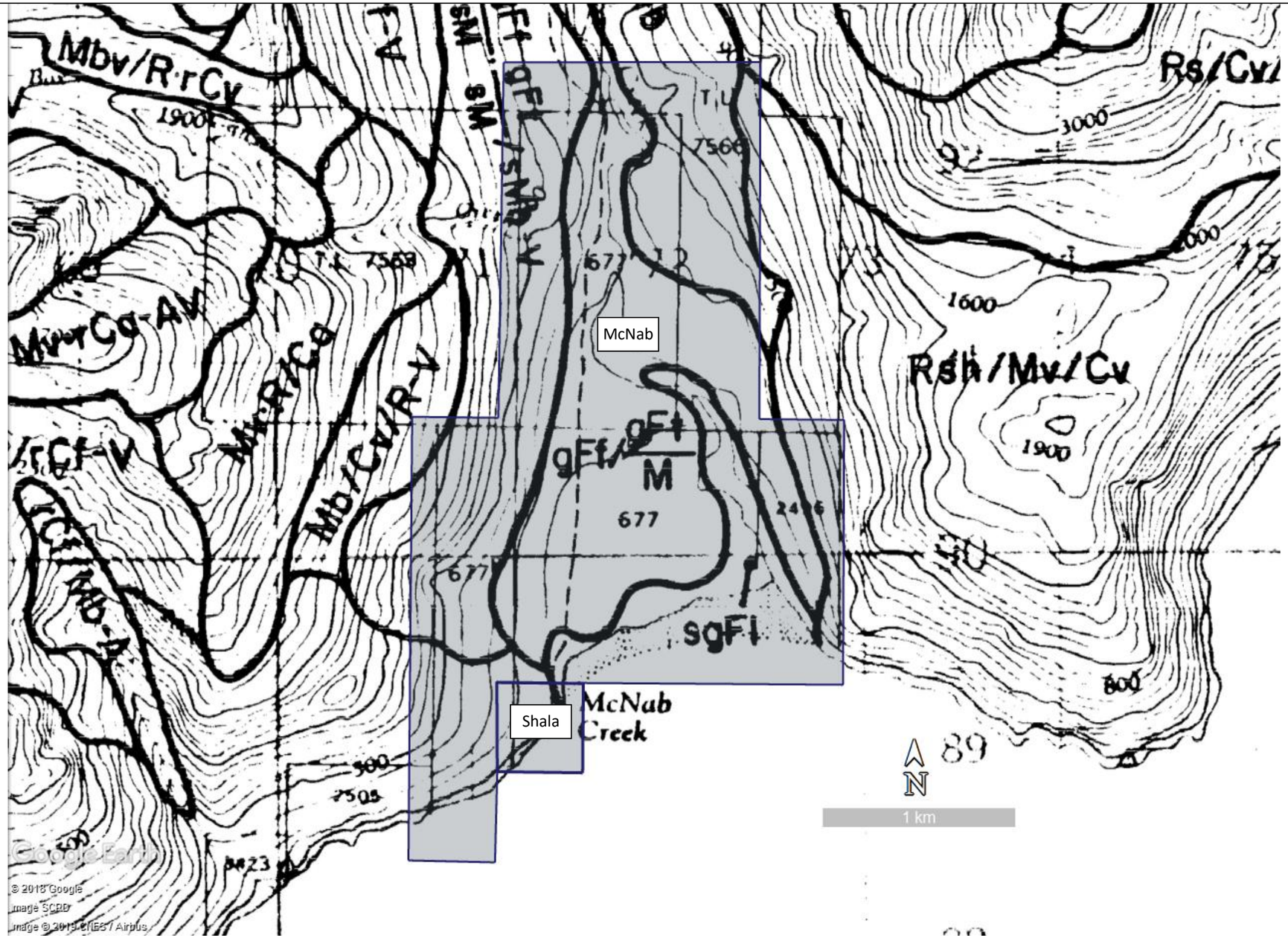
GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-3
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



LEGEND:	NOTES: • Base map taken from Google Earth	THURBER ENGINEERING LTD.	CLIENT: BURNCO Rock Products Ltd.	DESIGNED: EPS	DRAWN: EPS	APPROVED: DNR
			CLAIM LOCATION MAP McNAB GRAVEL EXPLORATION — SUNSHINE COAST REGIONAL DISTRICT, BC	DATE: October 2, 2019	SCALE: AS SHOWN	
				PROJECT No.: 23642	FIGURE No.: 2	REV:



LEGEND:

McNab Claim Boundary

NOTES:

- Base map taken from BC Geological Survey's 1957 Map for Squamish (Sheet 92G/11).
- Surficial Geology descriptions available in text of report

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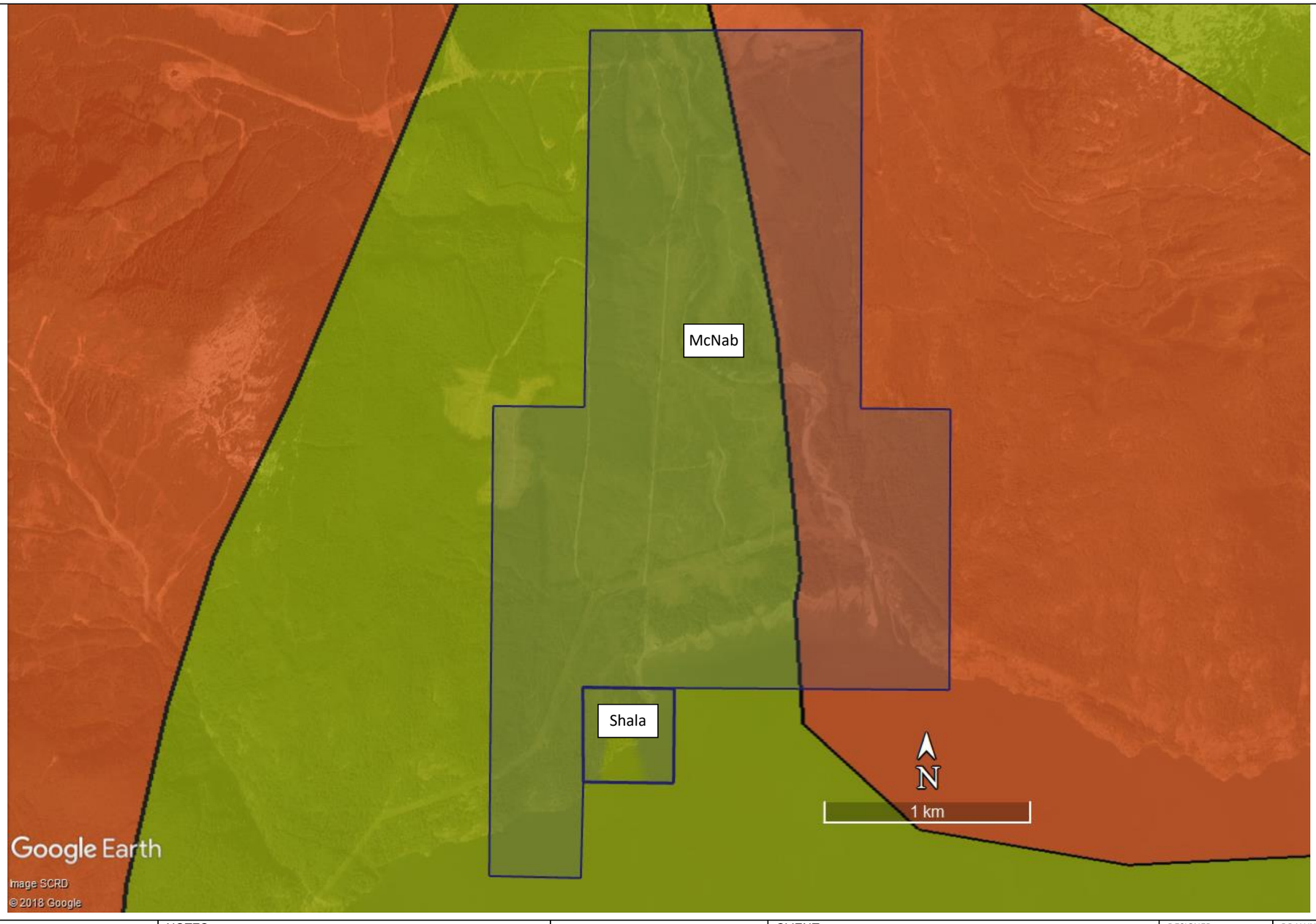
CLIENT: BURNCO Rock Products Ltd.

DESIGNED:	DRAWN:	APPROVED:
EPS	EPS	DNR

SURFICIAL GEOLOGY MAP

McNAB GRAVEL EXPLORATION — SUNSHINE COAST REGIONAL DISTRICT, BC

DATE:	SCALE:	
October 2, 2019	AS SHOWN	
PROJECT No.:	FIGURE No.:	REV:
23642	3	



LEGEND:

- McNab Claim Boundary
- IKGa – Conglomerate
- mKgd - Gabbro

NOTES:

- Base map taken from Google Earth.
- Geology Data obtained from: P. Erdmer and Y. Cui, 2009. British Columbia digital geology. British Columbia Ministry of Energy, Mines and Petroleum Resources, British Columbia Geological Survey Open File 2009-1.

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CLIENT: BURNCO Rock Products Ltd.

BEDROCK GEOLOGY MAP

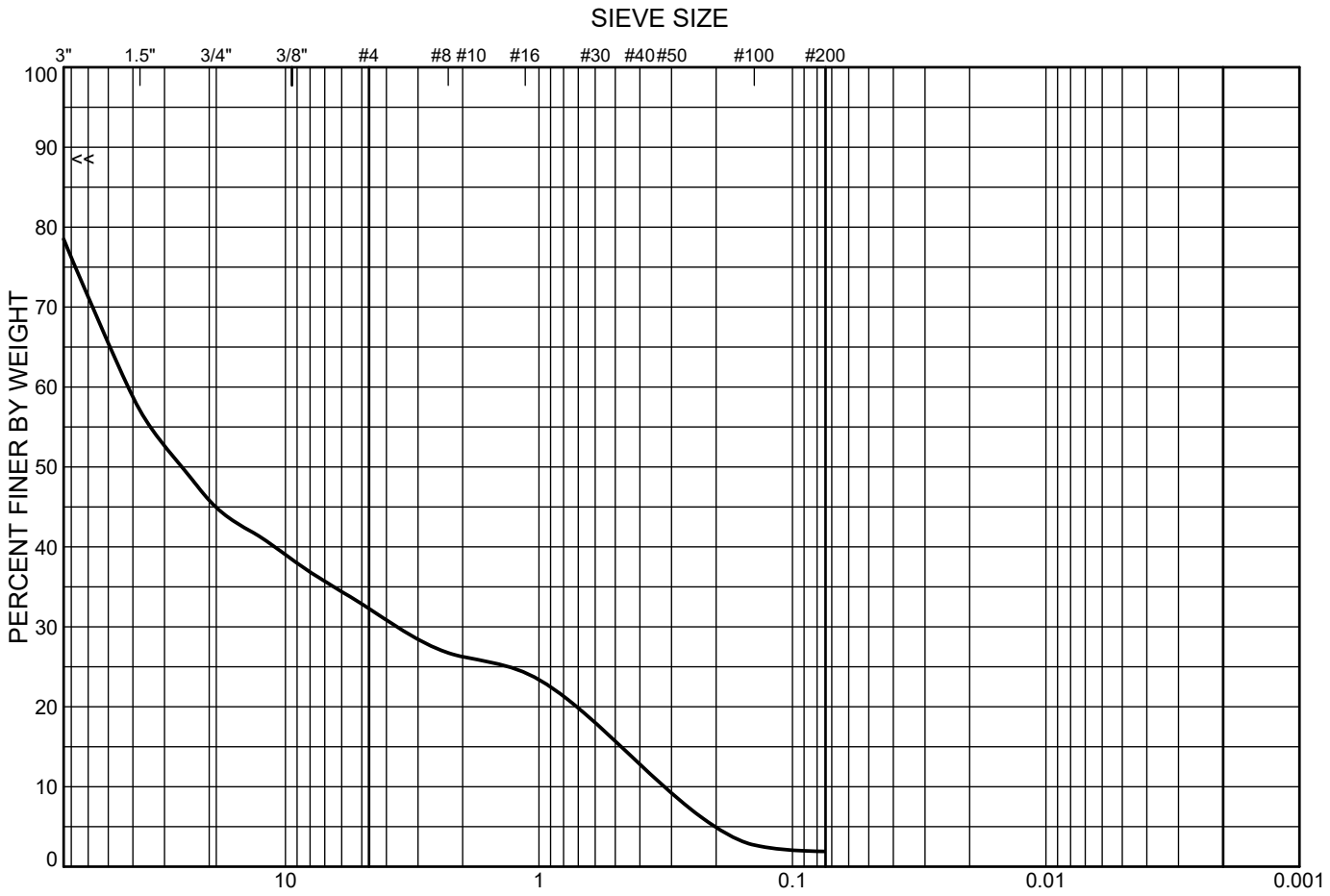
McNAB GRAVEL EXPLORATION — SUNSHINE COAST REGIONAL DISTRICT, BC

DESIGNED:	DRAWN:	APPROVED:
EPS	EPS	DNR

DATE:	SCALE:	
October 2, 2019	AS SHOWN	
PROJECT No.:	FIGURE No.:	REV:
23642	4	

THURBER

APPENDIX B: BULK SAMPLE LABORATORY TESTING



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1 TO 18-3**
Sample: **BLENDED (0m TO -40m)**
Sample Depth: 0.0 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: August 8, 2018
Date Tested: August 10, 2018
Tested By: RDM
Test Method:
Specification:

Gravel	**46.1%**
Sand	**30.5%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**78.5**
1.5	37.5	**57.1**
0.75	19	**45.1**
0.375	9.5	**38.5**
#4	4.75	**32.4**
#8	2.36	**26.9**
#16	1.18	**24.5**
#30	0.6	**18.0**
#50	0.3	**9.2**
#100	0.15	**2.9**
#200	0.075	**1.9**

Description: Cobbly Sandy GRAVEL (GP), trace fines

Comments:

The results are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any interpretation or opinion regarding the specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1 TO 18-3 BLENDED (0 TO -40)
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB



GRAVEL		SAND			SILT	CLAY
coarse	fine	coarse	medium	fine		

Sample Location: **18-1 TO 18-3**
Sample: **BLENDED (40 m +)**
Sample Depth: >40 m
Date Sampled: July 23, 2018
Sampled By: SWS
Date Received: August 8, 2018
Date Tested: August 10, 2018
Tested By: RDM
Test Method:
Specification:

Gravel	**41.4%**
Sand	**46.1%**
Silt	**%**
Clay	**%**
Moisture Content	**%**

LL	
PL	
PI	

Sieve Size		Percent Passing
inches	mm	
3	75	**93.0**
1.5	37.5	**71.5**
0.75	19	**61.0**
0.375	9.5	**55.7**
#4	4.75	**51.6**
#8	2.36	**48.1**
#16	1.18	**43.6**
#30	0.6	**35.6**
#50	0.3	**21.8**
#100	0.15	**10.4**
#200	0.075	**5.5**

Description: Sandy GRAVEL (GP), trace to some fines

Comments:

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THURBER ENGINEERING LTD.

GRAIN SIZE DISTRIBUTION

CLIENT: Burnco Rock Products Ltd.
TEST HOLE: 18-1 TO 18-3 BLENDED (40 +)
PROJECT: McNab Creek Gravel Exploration
FILE NO.: 23642

AWST_GRAIN SIZE_W HYD 23642-SIEVE ANALYSIS.GPJ PRACTICE MARLON.GDT 26/9/18- THURBER BC 2017.GLB

THURBER ENGINEERING LTD.

4127 Roper Road
Edmonton, Alberta T6B 3S5
P: 780 438 1460 F: 780 437 7125

TEST REPORT

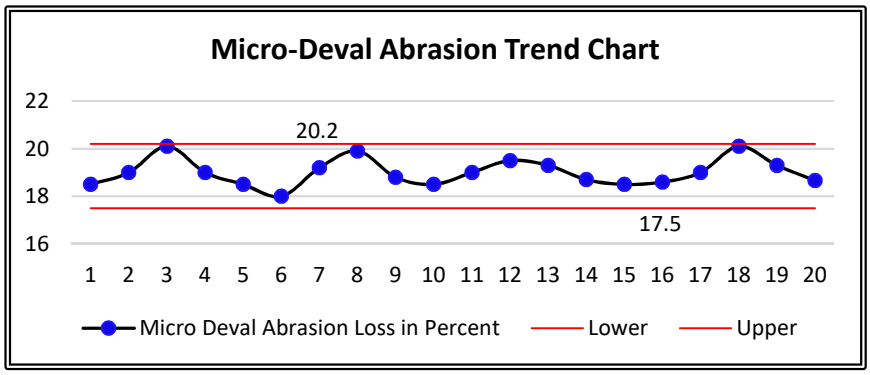
Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus

Client :	Burnco Rock Products Ltd	Sampling Date :	August 21, 2018
Project :	McNabb Creek Gravel Pit	Receiving Date :	August 24, 2018
Project No :	23642	Testing Date :	August 26, 2018
Series No :	670	Source :	TH 18.1-18.3 Combined 0-40m
Material Type :	75 mm Gravel	Standard :	ASTM D6928

Sample Test Report	
Description	Result
Grading Used	**8.2**
% Loss of Fines	**10.2**

Calibration Aggregate Test Report	
Description	Result
% Loss of Fines	**18.7**
% Mean Loss	**19.0**

Sample : Reference Material (Brechin Quarry No. 2)



Comments :

Tested By : ERC

Reviewed By:

Note: The testing servicesare for the sole use of the designated client only. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

4127 Roper Road
Edmonton, Alberta T6B 3S5
P: 780 438 1460 F: 780 437 7125

TEST REPORT

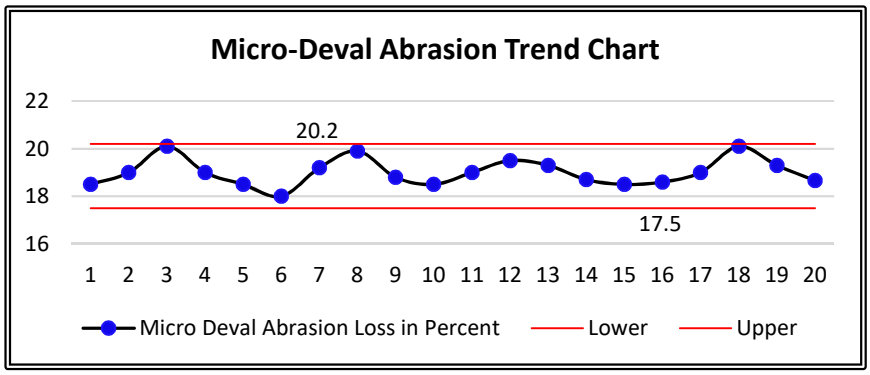
Resistance of Coarse Aggregate to Degradation by Abrasion in the Micro-Deval Apparatus

Client :	Burnco Rock Products Ltd	Sampling Date :	N/A
Project :	McNabb Creek Gravel Pit	Receiving Date :	September 4, 2018
Project No :	23642	Testing Date :	September 6, 2018
Series No :	723	Source :	TH 18.1-18.3 Combined >40m
Material Type :	+20 Gravel	Standard :	ASTM D6928

Sample Test Report	
Description	Result
Grading Used	**8.2**
% Loss of Fines	**6.3**

Calibration Aggregate Test Report	
Description	Result
% Loss of Fines	**18.7**
% Mean Loss	**19.0**

Sample : Reference Material (Brechin Quarry No. 2)



Comments :

Tested By : ERC

Reviewed By:

Note: The testing servicesare for the sole use of the designated client only. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

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Edmonton, Alberta T6B 3S5
P: 780 438 1460 F: 780 437 7125

TEST REPORT

Resistance to Degradation of Large-Size Coarse Aggregate By Abrasion and Impact in the Los Angeles Machine

Client :	Burnco Rock Products Ltd	Sampling Date :	August 21, 2018
Project :	McNabb Creek Gravel Pit	Receiving Date :	August 24, 2018
Project No :	23642	Testing Date :	August 26, 2018
Series No :	669	Source :	TH 18.1-18.3 Combined 0-40m
Material Type :	75 mm Gravel	Standard :	ASTM C535

Sieve Sizes (mm)		*Grading*			**Retained (%)**	**Mass, (g)**
Passing	***Retained***	***1***	***2***	***3***		
75	*63*	*2500 ± 50*	-	-		0
63.0	*50*	*2500 ± 50*	-	-		5005
50.0	*37.5*	*5000 ± 50*	*5000 ± 50*	-		5014
37.5	*25*	-	*5000 ± 25*	*5000 ± 25*		0
25.0	*19*	-	-	*5000 ± 25*		
Total		***10 000 ± 100***	***10 000 ± 75***	***10 000 ± 50***	**0.0**	**10019**

Grading	2	**1.7 mm Material @ 1000 Rev. Test (g)**	**8918**
Number of Spheres	12		
Number of Revolutions	1000		
Mass of Spheres (g) 5000 ± 25 g	5014	**Loss at 1000 Revolutions After Test**	**11%**
1.8 mm Material @ 200 Rev. After Test	**-**		
Loss @ 200 Rev. After Test	**-**		

Comments :

Tested By : ERC

Reviewed By :

Note: The testing services here are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

4127 Roper Road
Edmonton, Alberta T6B 3S5
P: 780 438 1460 F: 780 437 7125

TEST REPORT

Resistance to Degradation of Large-Size Coarse Aggregate By Abrasion and Impact in the Los Angeles Machine

Client :	Burnco Rock Products Ltd	Sampling Date :	N/A
Project :	McNabb Creek Gravel Pit	Receiving Date :	September 4, 2018
Project No :	23642	Testing Date :	September 6, 2018
Series No :	722	Source :	TH 18.1-18.3 Combined >40m
Material Type :	+40mm Gravel	Standard :	ASTM C535

Sieve Sizes (mm)		***Grading***			**Retained (%)**	**Mass, (g)**
Passing	***Retained***	***1***	***2***	***3***		
75	*63*	*2500 ± 50*	-	-		
63.0	*50*	*2500 ± 50*	-	-		
50.0	*37.5*	*5000 ± 50*	*5000 ± 50*	-		5035
37.5	*25*	-	*5000 ± 25*	*5000 ± 25*		5003
25.0	*19*	-	-	*5000 ± 25*		
Total		***10 000 ± 100***	***10 000 ± 75***	***10 000 ± 50***	**0.0**	**10038**

Grading	2	**1.7 mm Material @ 1000 Rev. Test (g)**	**8656**
Number of Spheres	12		
Number of Revolutions	1000		
Mass of Spheres (g) 5000 ± 25 g	5014	**Loss at 1000 Revolutions After Test**	**14%**
1.8 mm Material @ 200 Rev. After Test	**-**		
Loss @ 200 Rev. After Test	**-**		

Comments :

Tested By : ERC

Reviewed By :

Note: The testing services here are for the sole use of the designated client only. This report constitutes a testing service only and does not represent any results interpretation or opinion regarding specification compliance or material suitability. Engineering interpretation will be provided by Thurber upon request.

THURBER ENGINEERING LTD.

August 23, 2018 File: 23642

Burnco Rock Products Ltd.
20395 – 102B Avenue
Vancouver, B.C. V1M 3H1

Attention: Derek Holmes

PETROGRAPHIC ANALYSIS
MCNAB CREEK GRAVEL PROSPECT

Dear Mr. Holmes:

This report presents the results of a petrographic analysis that was completed on the coarse gravel fractions (19 mm to 37.5 mm) of two composite samples of aggregate obtained from the McNab Creek gravel assessment site during drilling investigations conducted by Thurber Engineering Ltd. (Thurber) on July 23, 2018.

It is a condition of this memo that Thurber's performance of its professional services is subject to the attached Statement of Limitations and Conditions.

1. METHODOLOGY

The procedure used to carry out the petrographic analysis generally followed CSA A23.2.14.

The aggregate samples assessed were obtained by compositing a large number of samples of granular soil obtained from different depths in three sonic boreholes drilled at the site. One sample was composed of grab samples obtained from between 0 m and 40 m depth in the three boreholes, while the second sample was composed of samples obtained from greater than 40 m depth in the three boreholes. The maximum depth of the investigation in the three test holes was 93 m. Each sample was screened to produce approximately 4000 g of the 19 mm to 37.5 mm grain size fraction assessed.

The petrographic assessment procedure assigns a relative "aggregate quality type" for each lithologic category identified. The assessment consisted of sorting the individual clasts in each sample by lithology and rock quality. The total mass of each sorted category contained within the sample was then determined. Weighted correction factors are then applied to the relative percentage of each quality type in the sample to determine the sample's Petrographic Number (PN). A copy of the analysis summary for each sample is attached.

2. RESULTS

The clast lithologies making up both samples were similar and dominated by two main rock types including:

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- Competent and hard, dark grey to light grey, fine and medium grained volcanic-extrusive lithologies including basalt and andesite clasts averaging about 50% of the mass of both samples.

- Competent and hard, light grey, coarse grained volcanic-intrusive lithologies including granodiorite clasts averaging more than 45% of the mass of both samples.

- The remainder of the rock types included small percentage of hard quartzite (both sedimentary and vein-quartz clasts and more felsic volcanic extrusive lithologies (possible rhyolite).

Most of the clasts were hard and relatively unweathered and therefore classified as "good quality aggregate" although a few weaker weathered volcanic and granodioritic clasts (rated as fair, poor and deleterious quality aggregate) were also observed in the samples.

The table below shows the calculated PN's for the gravel samples assessed.

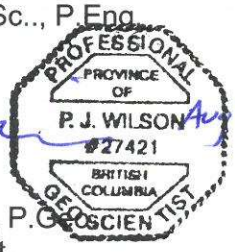
	McNab Creek Composite Samples (19 mm – 37.5 mm)	
	0 m – 40 m depth	>40 m depth
Petrographic Number	119	121

The petrographic analysis also determined that approximately 20% of all of the particles in the sample were broken, containing at least one fractured (non-rounded) side, and that approximately 2% to 3% of the clasts in the samples were classified as either "flats" or "elongated" (mostly flats).

3. CLOSURE

We trust this report addresses your current needs. If you have any questions concerning this report or require any further information, please do not hesitate to contact us.

Yours truly,
Thurber Engineering Ltd.
Jay McIntyre, M.A.Sc., P.Eng.
Review Engineer



Aug 23/18

Paul Wilson, M.Sc., P.Geo.
Project Geoscientist.

Attachments Petrographic Number Summary Sheets

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COARSE AGGREGATE PETROGRAPHIC ANALYSIS

Pit Name:	McNab Creek - 0 m to 40 m Depth	Analyst:	PJW	File:	23642
Fraction:	19 mm to 37.5 mm	Date:	21-Aug-18		

Type No.	Type	Mass (g)	%	Notes
1	CARBONATES (hard)		0.0	
20	CARBONATES (slightly weathered)		0.0	
2	CARBONATES (sandy, hard)		0.0	
21	CARBONATES (sandy, medium hard)		0.0	
23	CARBONATES Crystaline (hard)		0.0	
3	SANDSTONE (hard)		0.0	
22	SANDSTONE (medium hard)		0.0	
4	GNEISS - SCHIST (hard)		0.0	
5	QUARTZITE (coarse and fine grained)	36.42	0.9	vein quartz and quarzite sandstone
6	GREYWACKE-ARKOSE (hard and medium hard)		0.0	
7	VOLCANIC (hard)	1945.2	48.2	mostly basalt and similar fine volanics
8	GRANITE - DIORITE - GABBRO	1829.7	45.4	range of coarse-grained volcanic intrusive
	TOTAL GOOD AGGREGATE	3811.32	94.5	
24	CARBONATES Crystaline (slightly weathered)		0.0	
40	CARBONATES (soft, slightly shaley)		0.0	
41	CARBONATES (sandy, soft and soft pitted)		0.0	
42	CARBONATES (deeply weathered)		0.0	
25	GNEISS (soft) SCHIST (medium hard)		0.0	
26	CHERT - CHERTY CARBONATES		0.0	
27	GRANITE - DIORITE - GABBRO (brittle)	148.03	3.7	slightly weathered
28	VOLCANIC (soft)		0.0	
52	ENCRUSTATION		0.0	
29	ARGILLITE/SANDSTONE (soft)		0.0	
	TOTAL FAIR AGGREGATE	148.03	3.7	
43	CARBONATES (shaley or clayey)		0.0	
44	CARBONATES (ochreous)		0.0	
45	CHERT - CHERTY CARBONATES (leached)		0.0	
46	SANDSTONE (soft friable)		0.0	
48	VOLCANIC (very soft, porous)	46.5	1.2	soft, brittle basalt
49	CARBONATES CRYSTALLINE (soft)		0.0	
50	GNEISS (friable)		0.0	
51	GRANITE - DIORITE - GABBRO (friable)		0.0	
53	CEMENTATIONS		0.0	
54	CEMENTATIONS (total)		0.0	
55	SCHIST (soft)		0.0	
56	SILTSTONE		0.0	
	TOTAL POOR AGGREGATE	46.5	1.2	
60	OCHRE		0.0	
61	SHALE/SANDSTONE (friable)		0.0	
62	CLAY		0.0	
63	VOLCANIC OR SCHIST (decomposed)	26.08	0.6	friable volcanic (heavily weathered) with clay coating
	TOTAL DELETERIOUS AGGREGATE	26.08	0.6	
	TOTALS:	4031.93	100.0%	

% GOOD	94.5	x1	94.5
% FAIR	3.7	x3	11.0
% POOR	1.2	x6	6.9
% DEL.	0.6	x10	6.5

EST. PERCENT BROKEN:	20%	**PETROGRAPHIC NUMBER**	**119**
EST. PERCENT FLATS AND ELONGATED:	3%		

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COARSE AGGREGATE PETROGRAPHIC ANALYSIS

Pit Name:	McNab Creek - +40 m Depth	Analyst:	PJW	File:	23642
Fraction:	19 mm to 37.5 mm	Date:	21-Aug-18		

Type No.	Type	Mass (g)	%	Notes
1	CARBONATES (hard)		0.0	
20	CARBONATES (slightly weathered)		0.0	
2	CARBONATES (sandy, hard)		0.0	
21	CARBONATES (sandy, medium hard)		0.0	
23	CARBONATES Crystaline (hard)		0.0	
3	SANDSTONE (hard)		0.0	
22	SANDSTONE (medium hard)		0.0	
4	GNEISS - SCHIST (hard)		0.0	
5	QUARTZITE (coarse and fine grained)		0.0	
6	GREYWACKE-ARKOSE (hard and medium hard)		0.0	
7	VOLCANIC (hard)	1957.34	53.9	mostly basalt and similar volcanic
8	GRANITE - DIORITE - GABBRO	1296.21	35.7	range of coarse-grained volcanic intrusive
	TOTAL GOOD AGGREGATE	3253.55	89.5	
24	CARBONATES Crystaline (slightly weathered)		0.0	
40	CARBONATES (soft, slightly shaley)		0.0	
41	CARBONATES (sandy, soft and soft pitted)		0.0	
42	CARBONATES (deeply weathered)		0.0	
25	GNEISS (soft) SCHIST (medium hard)		0.0	
26	CHERT - CHERTY CARBONATES		0.0	
27	GRANITE - DIORITE - GABBRO (brittle)	346.2	9.5	slightly weathered
28	VOLCANIC (soft)	33.83	0.9	slightly weathered.
52	ENCRUSTATION		0.0	
29	ARGILLITE/SANDSTONE (soft)		0.0	
	TOTAL FAIR AGGREGATE	380.03	10.5	
43	CARBONATES (shaley or clayey)		0.0	
44	CARBONATES (ochreous)		0.0	
45	CHERT - CHERTY CARBONATES (leached)		0.0	
46	SANDSTONE (soft friable)		0.0	
48	VOLCANIC (very soft, porous)		0.0	
49	CARBONATES CRYSTALLINE (soft)		0.0	
50	GNEISS (friable)		0.0	
51	GRANITE - DIORITE - GABBRO (friable)		0.0	
53	CEMENTATIONS		0.0	
54	CEMENTATIONS (total)		0.0	
55	SCHIST (soft)		0.0	
56	SILTSTONE		0.0	
	TOTAL POOR AGGREGATE	0	0.0	
60	OCHRE		0.0	
61	SHALE/SANDSTONE (friable)		0.0	
62	CLAY		0.0	
63	VOLCANIC OR SCHIST (decomposed)		0.0	
	TOTAL DELETERIOUS AGGREGATE	0	0.0	
	TOTALS:	3633.58	100.0%	

% GOOD	89.5	x1	89.5
% FAIR	10.5	x3	31.4
% POOR	0.0	x6	0.0
% DEL.	0.0	x10	0.0

EST. PERCENT BROKEN:	20%	**PETROGRAPHIC NUMBER**	**121**
EST. PERCENT FLATS AND ELONGATED:	2%		

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APPENDIX C: RESUMES OF PERSONNEL

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DAVID REGEHR, P.Eng, (BC, SK)
Senior Geotechnical Engineer and Principal

B.A.Sc. Geological Engineering, University of British Columbia, 1999
M.Eng. Geotechnical Engineering, University of Alberta, 2003

PROFILE

Mr. Regehr has been responsible for the completion of a wide range of geotechnical, geological and environmental engineering assignments throughout Western Canada. He has completed transportation, municipal infrastructure, land development, water resources and mining engineering projects. Further, he has managed and delivered projects that have included large geotechnical investigation programs, analysis, design, preparation of technical reports and construction inspection. He has expertise in assessment and design of retaining walls as well as natural, excavated and embankment slopes. His geological engineering background and experience has included field mapping, core logging, rock slope stability assessment and terrain analysis for infrastructure route selection and aggregate resource inventory assessment. A partial listing of his experience is presented below.

Geotechnical Engineering

- Project Principal responsible for the land and marine based geotechnical investigation, laboratory testing and reporting for the Annacis Watermain Crossing project. The project comprises a tunnel crossing under the Fraser River between New Westminster and Surrey.
- Project Manager for the investigation of the Mount Polley Tailings Storage Facility Breach, he liaised with the Independent Panel on technical and project management issues and directed Thurber's involvement in the investigation. He was involved in the site investigation program including assisting with the selection of undisturbed sampling methods to obtain samples of the glaciolacustrine material.
- Responsible for the geotechnical aspects of the operations and maintenance of the Sea to Sky Highway from Horseshoe Bay to Whistler. Work includes rock slope monitoring by survey and remotely monitored instrumentation, emergency response to rock fall and debris flow events, and planning for the ongoing slope stabilization program.
- Geotechnical investigation and design services for multiple BC provincial highway sites in northern BC for bridges, natural slopes and embankments.
- Geotechnical investigation for site servicing and development of residential and academic buildings Quest University in Squamish. Work included slope stability assessment, recommendations for foundations, geogrid reinforced retaining wall design and rock slope stabilization.
- Assessment of rock slope stability at Porteau Bluffs on Highway 99 following the approximately 15,000 m^3 rockslide that occurred in July 2008. Provided recommendations for temporary stabilization of the slope including drilling and blasting to remove approximately 2,000 m^3 of additional unstable rock along the crest of the slope and installation of rock anchors.
- Design of soil and rock anchors for multiple cellular communications towers throughout the Lower Mainland and Sea to Sky corridor.
- Design and testing of rock anchors for stabilization of the north abutment of the Emperor Bridge over the Fraser River at Mt. Robson.
- Site Engineer for the reconstruction of a highway embankment failure including the design, optimization and installation of compacted stone columns to stabilize part of an existing landslide for Alberta Transportation.
- Foundation design for bridge crossings at multiple locations in northern Alberta for Alberta Transportation.

- Assessment of the results of Becker Penetration Tests to determine extent of potentially liquefiable granular soils along the shoreline of a proposed residential development on Howe Sound.
- Inspection of temporary shoring and anchoring for remediation of a landslide in Whistler.
- Design of retaining walls for static and dynamic loading conditions.
- Site Engineer responsible for inspection and acceptance testing of seismic anchors for the Canada Place Cruise Ship Terminal expansion in Vancouver.
- Design and preparation of cost estimates for installation of wick drains and construction of preload for commercial development sites in Richmond.
- Design of geogrid reinforced retaining walls on steep slopes at a proposed development site in West Vancouver. Design required optimization of both wall height and location to minimize costs while maintaining a stable configuration. Monitored construction of walls to assess conformance with design requirements.

Engineering Geology

- Provision of geotechnical and hydrogeological input for a watershed management study for the City of Port Moody.
- Aggregate study for BC Ministry of Transportation in the Squamish to Pemberton corridor. Aggregated resources and quality were assessed by means of site investigation, sampling, laboratory testing and reporting on the suitability of the material for different end products.
- Debris flow hazard assessment for the Wolverine Coal Project in Tumbler Ridge. Assessment included creek basin inspection, estimates of debris loading in creek channels and estimates of return periods for debris events of various magnitudes.
- Site hazard and risk assessment for planned subdivision developments in Furry Creek.
- Rockfall hazard and risk assessment for Horseshoe Bay Ferry Terminal Expansion.
- Assessment of potential haul road alignments for a mine in northern BC using air photos and available topographic mapping.
- Field mapping to assess slope stability hazards in an urban ravine system in Surrey.
- Field mapping and assessment of the stability of steep bluffs around the perimeter of Savary Island.
- Stability analysis of natural and engineered slopes for transportation and development projects.
- Stability assessment of temporary and permanent rock excavations and provision of recommendations for rock slope support.
- Gravel resource investigation for proposed gravel pit near Port Hardy on Vancouver Island using airphoto analysis and surface sampling to determine the extent and quality of the resource.

EMPLOYMENT HISTORY

2011 - Present	Principal – Thurber Engineering Ltd., Vancouver, BC
2000 - 2010	Geotechnical Engineer – Thurber Engineering Ltd., Vancouver, BC
1999 - 2000	Geotechnical Engineer – AGRA Earth and Environmental Ltd., Vancouver, BC

APPOINTMENTS AND RECOGNITION

Principal and Director of Thurber Engineering Ltd., 2011 – present
Manager of Vancouver Office of Thurber Engineering, 2007 – 2014
Associate of Thurber Engineering Ltd., 2006 – 2010
Chair of the Vancouver Geotechnical Society, 2008 – 2009
Recipient of the Murray Harris Memorial Scholarship in Geotechnical Engineering, University of Alberta, 2003.

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ERIK P. STEVENSON, P.Eng., (BC)
Geotechnical Engineer

B.A.Sc. Geological Engineering, University of British Columbia, 2010
M.Eng. Civil Engineering, Queens University, 2015

PROFILE

Erik Stevenson is a geotechnical engineer with experience in a wide range of geotechnical projects throughout Western Canada including industrial, mining and civil infrastructure. Erik's areas of specialty include foundations, seismic response, pavement, retaining walls and slope stability. A selection of Erik's experience is below.

Pavement Engineering

Pavement condition assessments including non-destructive, FWD and GPR testing, high-speed visual data acquisition, as well as subsurface investigations for highways, and municipal arterial and low volume roads. Design of new flexible pavement, assessment, and design of existing pavement for rehabilitation and life-cycle cost analyses.

- Northeast False Creek Area Project, Vancouver, BC
- BCMEA Gantry Crane and Container Handling Training Facility, Richmond, BC
- Vancouver Airport Park and Ride – Templeton Skytrain Station, Richmond, BC
- False Creek Flats, Vancouver, BC
- George Massey Tunnel Replacement Project, Delta and Richmond, BC
- Deltaport Terminal Road and Rail Improvement Project, Delta, BC
- Highway 13 Widening, 0 Avenue to 8 Avenue, Langley, BC
- Highway 97 Intersection Improvements, Quesnel, BC
- 104 Street, Delta, BC

Foundation Engineering

Geotechnical investigations, design of deep and shallow foundations, and construction inspections for a wide range of projects including bridges, and residential, commercial, and industrial infrastructure. Design, analysis and static load testing of piles, micropiles, and screw piles including steel and concrete. Seismic analysis, assessment, design, and settlement mitigation.

- Mission Creek and Thames Creek Debris Flow Barriers, North Vancouver, BC
- Northeast False Creek Area Project, Vancouver, BC
- Mackay Creek Dike Improvements, North Vancouver, BC
- Seymour River Crossings, North Vancouver, BC
- George Massey Tunnel Replacement Project, Richmond and Delta, BC
- The Landing at Portage Station, Pemberton, BC
- Tsilhqot'in Solar Farm, Hanceville, BC
- Hook Brook Pump Station, Surrey, BC
- Joslyn North Mine Waste Dump, Fort MacKay, AB
- Metro Vancouver South Shore Corridor Project, Vancouver, BC
- Joslyn North Mine Pile Testing, Fort MacKay, AB
- CNRL Horizon Mine, Fort MacKay, AB
- Port Mann Highway 1 Expansion Project, Vancouver, Burnaby, Surrey, BC
- Oakridge Centre Redevelopment, Vancouver, BC

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Retaining Structures and Slope Stability

Investigations, instrumentation monitoring, design and inspection of slopes and retaining walls for highways, dikes, mine tailings embankments, landfills, residential developments and bridge abutments. Forensic investigations and assessments of failed retaining walls, and embankments.

- Skwah First Nations Residential Bridge, near Chilliwack BC
- Residential Retaining Wall Failure, West Vancouver, BC
- Partington Creek Neighbourhood Retaining Wall Redesign, Coquitlam, BC
- Edmonton Transfer Station, Edmonton AB
- Knudson Road, Delta, BC
- Turcot Interchange, Montreal, QC
- Skway Landfill, near Chilliwack, BC
- Highland Valley Copper Crusher Pad, Logan Lake, BC
- Joslyn North Mine, Fort McKay, BC
- 32nd Street/Highway 2 Underpass, Edmonton, AB
- CNRL's Horizon Mine, Fort McKay, AB

Geotechnical Research and Investigation

Planning and completing investigations to quantify and assess borrow pits. Investigations using non-standard methods including photogrammetry and instrumented penetrometer. Research involving the use of digital image acquisition to analyze landslide behaviour during impact of a water body and deposition morphology. Sampling and testing of dewatering technologies for enhanced consolidation of mature fine tailings.

- Southlands Irrigation and Conveyance System, Delta, BC
- Nelson Island Gravel Exploration, Sunshine Coast, BC
- Queens University Landslide Flume, Kingston, ON
- CNRL Horizon Mine, Fort MacKay, AB
- Coquitlam Reservoir Gravel Investigation, Coquitlam, BC
- Syncrude Mildred Lake Settling Basin, Fort MacKay, AB

EMPLOYMENT HISTORY

2010 - Present	Thurber Engineering Ltd.
2008	BGC Engineering Inc.
2007	Thurber Engineering Ltd.

Licensed to Practice in British Columbia
Member of Association of Consulting Engineering Companies and the Vancouver Geotechnical Society.

PUBLICATIONS

W.A. Take, R.P. Mulligan, E.P. Stevenson, G.S. Miller, *Physical modelling of landslides into reservoirs: effect of capillarity on rheology of granular landslide at impact*, 12th International Symposium on Landslides (ISL2016) June 12th-19th June in Naples, Italy, Vol.3, 2016, pp. 1889-1896

THURBER

SEBASTIAN W. SUCKLING
Geoscientist

B.Sc. Geology, Victoria University of Wellington, New Zealand, 2013
PGD, Engineering Geology, University of Canterbury, New Zealand, 2015

PROFILE

Mr. Suckling is a geoscientist with over 4 years and has provided professional geological services for various projects in British Columbia and New Zealand. His experience includes, planning and undertaking geotechnical investigations, logging drill core, liquefaction assessments, contaminated land assessments, geological and geomorphological mapping, cross sections development, construction supervision and writing geotechnical reports.

Project Experience

- Cowichan Lake Road Gravel Pit Re-Development, Duncan BC. Onsite earthworks supervision.
- Admirals McKenzie Interchange, Victoria BC. Supervisor of geotechnical instrumentation installation, including vibrating wire piezometers and slope inclinometers.
- Highway 4 Summit Upgrade, Port Alberni BC. Supervisor for multiphase geotechnical investigation in carriageway on Highway 4, including utility clearance, traffic control, and drill supervision.
- University of Victoria Student Residences, Victoria BC. Drill supervisor for investigation in high pedestrian traffic areas.
- Clover Forcemain, Victoria BC. Site supervision of geotechnical investigation, including utility clearance, hydro excavation and traffic management. Drill supervision for investigations in the carriageway and in high profile pedestrian areas.
- Bruhn Bridge, Sicamous BC. Site supervision of multiphase geotechnical investigation including drill supervision on land and over water, and coordination with barge operator, traffic control, paramedic, archeologists and local First Nations.
- Lhtako Kiln Mill, Quesnel, BC. Air photo interpretation and terrain hazard assessment for ancient landslide.
- Matakohe Bridge Replacement, Northland, New Zealand. Supervisor of multiphase geotechnical investigation on land and over water.
- Northern Corridor Improvements Auckland, New Zealand. Site investigation coordinator responsible for planning and running the multi million-dollar site investigation. The geotechnical investigation comprised 75 boreholes, 70 cone penetration tests, 26 test pits and 37 hand augers, and a large amount of laboratory testing. The investigations were undertaken across a wide range of places including the live motorway corridor, central and local government owned land, parks and reserves and private property.

EMPLOYMENT HISTORY

2017 – Present	Geoscientist - Thurber Engineering Ltd., Victoria, BC
2015 – 2017	Engineering Geologist - Aurecon, Auckland, New Zealand
2013 – 2015	Engineering Geologist - Aurecon, Christchurch, New Zealand