REPORT

Cascadia Phase 4 - East Viterra Siding Expansion

Geotechnical Site Investigation Report

Submitted to:

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1.0 INTRODUCTION

Golder Associates Ltd. (Golder) has been retained by Canadian Pacific Railway (CP) to provide site investigation and consulting geotechnical engineering services to support Hatch with the design of the proposed track expansion for the Cascadia Phase 4 Viterra East Siding Expansion Program located in Burnaby, British Columbia (the Site). The purpose of the geotechnical drilling program was to investigate the subsurface conditions at the site to support the route option selection and preliminary design.

1.1 Terms of Reference

During the drilling investigation, the Phase 4 Viterra East Siding Expansion Program was in the route option selection and optimization phase, with 30% Design Progress and Class 3 Cost Estimate targeted for mid-October. The scope of work was developed following consultation with Hatch and CP, with the final scope set out in the Golder Desktop Study and Work Plan dated 27 August 2020 (Golder, 2020). The scope of work was conducted in accordance with the terms and conditions in the Supply of Services Agreement, Agreement No. 5600020102 executed 31 January 2018 and Purchase Order 4200021331 dated 1 June 2020.

1.2 Scope of Report

The investigation scope consisted of two drilling programs; an onshore drilling investigation within the footprint of the existing northern track and an intertidal drilling investigation on the shoreline along the eastern segment of the proposed track expansion. A key plan of the site area is shown in Figure 1.

It should be noted that the test hole locations were estimated using handheld GPS, and they were not accurately surveyed; as such, the locations and elevations are approximate. The methods used to determine the elevations are described in the report. Approximate test hole locations are presented in Figure 2 and tabulated in APPENDIX A.

The scope of this report is limited to the documentation of the factual results of the geotechnical investigation and does not include the testing or assessment of potential soil and/or groundwater contamination, archaeological, geophysical, biological or bio-environmental services for the project. This report contains only factual results of the geotechnical investigation program and, specifically, does not include site characterization, geotechnical or geological interpretation of factual data, nor engineering assessment/recommendations, which will be presented in a subsequent report.

This report should be read in conjunction with the “**Information and Limitations of This Report**” which is included following the text of this report. The reader’s attention is specifically drawn to this information, as it is essential that it is followed for the proper use and interpretation of this report.

2.0 PROPOSED ROUTE ALIGNMENTS

The original conceptual extension alignment options were presented to Golder through email correspondence and a project team meeting on 11 May 2020. Updated conceptual options and schematics were provided to Golder on 16 August 2020 (Hatch, 2020 (a)).

In general, the alignment options as described by Hatch are as follows:

- Option 1: North Alignment – Original Concept for proposed extension being completely to the north of the existing tracks
- Option 2: South-North Alignment – alignment extension starts south at Mile 123.3, and shifts to the north to the west of the Parkland Refinery near Mile 123.8
- Option 3: North-South-North Alignment – alignment extension starts north at Mile 123.3, then shifts south east of the Parkland Refinery near Mile 123.5, and switches back to North after passing the Parkland Refinery near Mile 123.8

This site investigation was prepared considering Option 1 (Hatch, 2020 (c)) as the preferred alignment on the 11 May 2020 drawings.

The proposed investigation for the Option 1 alignment was sent to CP for approval on 6 October 2020 and a plan drawing of the proposed alignment option was provided to Golder on 15 October 2020 (Hatch, 2020 (b)).

3.0 GEOTECHNICAL SITE INVESTIGATION

3.1 Field Mapping

Field mapping of the project area was carried out by two geotechnical engineering personnel from Golder on 2 June 2020. Weather was cloudy and cool with rain developing in the afternoon. Staff traversed the full length of the Site along the rail and foreshore beach below the rail line. The purpose of the mapping was to observe exposures of surficial materials and refine our understanding of the conditions at the site scale. The results of the field mapping are presented in Golder's Desktop Study and Work Plan technical memorandum dated 27 August 2020 (Golder, 2020).

3.2 Site Investigation Program

A total of eleven drilling locations (BH20-01 to -09, SH20-10 and -11) were conducted as part of the site investigation. The site investigation program consisted of nine onshore air-rotary test holes drilled between 23 June 2020 and 9 July 2020 and two intertidal test holes drilled on 27 July 2020 and 28 July 2020. Selected samples from the test holes and were subjected to a variety of laboratory testing to assist with classification and characterization of the subsurface strata. A summary of the test hole details is tabulated in APPENDIX A.

The site investigation included the following:

- Site reconnaissance and field mapping
- Non-intrusive utility locating in the vicinity of proposed test hole locations
- Drilling and sampling of soil within test holes, utilizing sonic and air-rotary drilling techniques
- Split-spoon sampling and penetration test observations
- Torque wrench shear vanes

3.3 Permits and Access Agreements

3.3.1 CP Access and Permissions

CP permissions, track protection and hi-rail access were coordinated for BH20-01 to BH20-09 through the CP project team and the operations and maintenance department. By necessity, the onshore test holes were drilled within the northern track between rail ties due to the requirement to maintain rail traffic on the southern track. Both “Rule 42” and Track Occupancy Permits (TOP) were utilized situationally along the northern track. After drilling activities were conducted, all equipment was taken offsite and the drilling locations were left in a similar condition as observed during the pre-work reconnaissance.

3.3.2 Vancouver Fraser Port Authority

A Vancouver Fraser Port Authority (VFPA) Project Permit was applied for and obtained by Hemmera Envirochem Inc. (Hemmera) on behalf of CP (Project Permit 20-067). A licence was obtained from the VFPA on 24 July 2020 as part of VFPA permit requirements. Golder submitted a marine construction and staging plan to the VFPA for review and received approval on 20 July 2020. Notifications were also sent to the Harbour Master, VFPA Environmental Programs and CCG Marine Communications and Traffic Services on 21 July 2020.

3.4 Health, Safety and Environment Plan

Golder created an investigation Health, Safety and Environment Plan (HASEP) procedures and template, which was updated with project specific contacts and information, and submitted for review by Hatch.

The HaSEP included the following:

- Roles and responsibilities of all personnel and sub-contractors including identification of Site Supervisor responsible for coordination and management of Health and Safety on the site and appropriate First Aid personnel and responsibilities
- Communication protocols
- Hazards and sensitive features related to investigative work and control measures to manage risk
- Minimum levels of personal protective equipment and other protection requirements
- Environmental Emergency Response Procedure
- Job Safety and Environmental Analysis (JSEA), and daily tailgate meetings

The HaSEP Revision for intertidal program included the following:

- Environmental Protection Plan (MudBay Drilling Ltd.)
- Standard operating procedures (MudBay Drilling Ltd.)
- Working on and around water

3.5 Utility Clearance

Prior to commencement of the subsurface investigations, underground utility and service information obtained from BC One Call, DigShaw and Metro Vancouver were reviewed. GeoScan Subsurface Surveys Inc. of Burnaby, BC was retained by Golder to locate underground utilities near the proposed hole locations. Locates were carried out using non-intrusive methods that included Electro-Magnetic (EM) locating and ground penetrating radar (GPR). For the intertidal investigation, larger areas were scanned for utilities to allow more flexibility to move the test hole locations based on access issues. Identified buried service locations were marked on the ground with spray paint, selected final hole locations were cleared, and approximate electronic drawings were provided to Golder.

3.6 Drilling Inspection and Test Hole Location Identification

The onshore air-rotary drilling program was conducted by Geotech Drilling Ltd. (Geotech) and the intertidal sonic drilling program was conducted by MudBay Drilling Ltd. (MudBay). Both programs were carried out under the full-time inspection of a member of Golder's geotechnical staff, who identified the test hole locations in the field, logged the subsurface conditions encountered, and collected soil samples and soil core for detailed examination and laboratory testing. A record of the soil conditions encountered, as well as test hole closure details, can be found in the Record of Sonic Hole and Record of Borehole sheets in APPENDIX B.

All test hole locations are approximate only and based on handheld GPS co-ordinates taken in the field combined with measured distances to identifiable site features such as rail tracks. Locations were planned and identified in the field before the investigation by both Golder and Hatch. No detailed survey locations or elevation measurements were established in the field following the drilling investigation. In this report, all depths are referenced to ground surface at the time of drilling.

Field identification and classification of soils was carried out in accordance with Golder's soil classification system (Golder, 2018) which is generally consistent with the concepts presented in ASTM International (ASTM) D2487 and D2488 and the Canadian Foundation Engineering Manual (CFEM, 2017), with some differences intended to improve the compatibility of the soil descriptions with the material geotechnical engineering behaviour. This system is generally consistent with the Unified Soil Classification System (USCS). Coarse-grained soils are classified based on USCS, and are described in terms of relative proportions of the mineral constituents; whereas, fine grained soils are classified with reference to Golder's soil classification system, and are based on plasticity (Atterberg limits testing) with reference to the ASTM D2487 plasticity chart. A summary of the key aspects of Golder's soil classification system is presented on the "Geotechnical Soil Description Terminology" fly sheets, which immediately precede the Record of Sonic Hole and Record of Borehole sheets in APPENDIX B.

3.7 Drilling Program

3.7.1 Data Presentation

The data collected during the 2020 drilling and laboratory testing program are summarized in the appendices:

- APPENDIX A: Summary Tables
- APPENDIX B: Record of Borehole and Record of Sonic Hole sheets
- APPENDIX C: Laboratory Testing Results
- APPENDIX D: Energy Measurements on Standard Penetration Test Hammer

3.7.2 ODEX Air-Rotary Drilling and Sampling

The nine ODEX air-rotary drilled test holes were put down using a Fraste track-mounted drill rig owned and operated by Geotech Drilling Services Ltd. of Delta, BC.

ODEX air-rotary drilling employed a two-piece system comprising casing and a downhole hammer driven by central rods. The hammer is inserted through the casing and the cutting head is exposed at the bottom of the casing. A small cam deploys a crescent-shaped bit that cuts ahead of the casing in order to reduce friction on the casing. Compressed air is cycled through the hammer, driving the percussion aspect of the hammer which breaks apart the overburden encountered during advancement. As the compressed air is cycled through the hammer out the tip, the cuttings at the bottom of the hole are brought up to ground surface by forced air. During advancement of the hammer, the casing is also driven with the head of the hammer. At selected intervals, the hammer is withdrawn from the casing to allow for intermittent sampling through the casing, such as using split-spoon samplers.

3.7.3 Sonic Drilling and Sampling

The two sonic cored test holes were conducted using a LS250 mini rubber tracked drilling rig with sonic drilling capabilities. The drilling rig was owned and operated by Mud Bay and drilling generally followed ASTM D6914 procedures.

Sonic drilling utilized both an open-faced bit and dual-cased single-tube core barrel system that employs high frequency mechanical vibration to advance the drill string and obtain continuous or near-continuous disturbed core samples of the soils, and in some cases, bedrock. The drilling technique involves vibrating the entire drill string at a frequency ranging between 50 and 150 cycles per second, adjusted during operation to suit the ground conditions encountered. The technique employs low-speed rotational motion, coupled with downward pressure, to advance the drill string. Sonic cored test hole advancement is achieved through the process of fracturing, shearing, and displacement depending on the type and consistency of the material encountered; given this process, the retrieved core is disturbed, sometimes with substantial changes to the original volume, and furthermore depths calculated from lengths of soil core may not be representative of logged feature locations.

During typical Sonic core drilling operations, the soil enters the 102 mm diameter inner core barrel. Upon completion of each drill run, the outer steel casing is advanced to the end of the run, the core barrel and drill rods are removed, and the sonic core sample is vibrated out of the core barrel directly into a plastic sample bag which is larger than the core diameter, before being transferred into wooden core boxes. Sonic vibration from the drilling method does cause some disturbance of the soil structure and can destroy secondary structure features of the strata in the core samples that are retrieved. In addition, heating of the core barrel during vibration and rotation may modify the in-situ moisture content of the core sample obtained. Both the core barrel and casing shoes have water jets to allow for cooling and lubrication of the bit, and to flush cuttings out of the hole. Where practical, advancement of the drill string during this investigation program was typically carried out without addition of fluid to prevent additional disturbance and washing of the soils. Advancement of the casing behind the core barrel was typically carried out with the assistance of drill fluids.

Soils can also be displaced if the core sampler barrel becomes blocked (e.g., by cobbles) during the advancement, causing displacement of the soils and poor recovery. In addition, as a result of the high frequency vibration, the sonic drilling method tends to pulverize (i.e., fragment) or core through boulders and large cobble-sized particles while advancing through the soil strata.

3.7.4 Standard Penetration Testing

Soil sampling was carried out at selected intervals using intermittent split-spoon sampling techniques with a 50 mm or 76 mm diameter split-soon sampling tube and a 63.6 kg, 760 mm drop safety hammer. The split-spoon sampler was threaded onto AWJ drill rods (35 mm OD diameter) or NWJ drill rods (67 mm OD diameter). Upon retrieval of the sampler, the split-tube was opened, and the recovered soil was classified, photographed, stored in labeled plastic bags, and transported to the Golder Burnaby laboratory facility for detailed examination and index testing of selected samples.

The split-spoon sampling was carried out in general accordance with ASTM D1586, Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils; however, it should be noted that conducting penetration testing within a test hole advanced with ODEX air-rotary or sonic methods does not strictly comply with ASTM standards due to the vibration and potential disturbance resulting from these methods.

The recorded blow counts for the individual penetration tests are presented on the Record of Borehole and Record of Sonic Hole sheets. The relative density or consistency reported in the logs were generally based on the measured blow counts. It should be noted that in certain strata (i.e., where gravel or cobble-sized particles were encountered), the recorded blow counts may not be representative of the relative density or stiffness of the soil matrix, and a combination of engineering judgement and laboratory testing is required to evaluate the compactness/consistency of the material. The reader is also cautioned to consider overburden and energy loss effects (as well as other correction factors) when interpreting raw penetration test results.

Caution and judgement should therefore be exercised in the interpretation of the recorded blow counts presented on the Record of Borehole and Record of Sonic Hole sheets and their correlation with standard or corrected "N" values.

3.7.4.1 Torque Wrench Shear Vanes

Torque wrench shear vane tests were conducted at selected intervals within fine-grained soils within test holes SH20-10 and 11. The Precision Instruments vane testing apparatus model No. D3F250FMP, serial No. 1011 was owned and operated by MudBay, and calibration record No. 510127 was completed by McCANN Equipment Ltd. The field vane consists of a type 2, 5 cm x 10 cm vane head. A summary of the depths and testing results are presented in APPENDIX A.

The shear vane tests were carried out in general accordance with ASTM D2573/D2573M; however, it should be noted that conducting shear vane testing within a test hole advanced with ODEX air-rotary or sonic methods does not strictly comply with ASTM standards, due to the vibration and disturbance caused from air rotary and sonic drilling **caution and judgement should be exercised in the interpretation of shear strength data presented on the test hole records.**

3.7.5 Energy Measurements on Penetration Test Hammer

Energy measurement documentation was obtained from Mud Bay for the hammer equipment that was utilized onsite during the intertidal drilling. The energy measurements were used to correlate a work efficiency of the hammer used during the drilling investigation. Using the hammer efficiency information, the observed blow counts can be converted into equivalent SPT N blow counts for use in engineering analyses and design.

No energy measurement documentation was obtained from Geotech Drilling for the hammer equipment that was utilized during the onshore investigation.

All energy measurement information was provided by drilling subcontractors, and not conducted by Golder during the investigation. Available energy measurements of the SPT hammer efficiencies are provided in APPENDIX C of this report.

3.7.6 Test Hole Closure

The test holes were sealed using bentonite chips in accordance with BC Water Sustainability Act requirements. The ground surface was restored with ballast for the onshore test holes and sand for the intertidal test holes. Hole completion details for all test holes are documented in APPENDIX B.

4.0 LABORATORY TESTING SUMMARY

Laboratory soil index testing was undertaken on selected soil samples obtained from grab samples and the split-spoon samples retrieved on site. Soil index testing was conducted at Golder's Burnaby laboratory and in accordance with ASTM standards as follows:

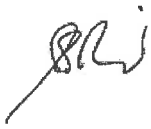
- ASTM D2216 Standard Test Method for Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D6913 Standard Test Method for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis
- ASTM D7928 Standard Test Method for Particle-Size Distribution (Gradation) of Fine-Grained Soils Using the Sedimentation (Hydrometer) Analysis
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Sample preparation was carried out in general conformance with ASTM D421. It is important to recognize that the sampling methods in the field limit the particle sizes that can be recovered from the test holes. As such, the laboratory gradation test results shown reflect samples that are entirely smaller than these maximum sizes, and may not be representative of boulder, cobble, or coarse gravel content. Laboratory soil index test results are included in APPENDIX D.

5.0 CLOSURE

We trust that the geotechnical data provided herein meets your present requirements. Should you have any questions regarding the above, please do not hesitate to contact us.

Golder Associates Ltd.



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IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Standard of Care: Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practising under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

Basis and Use of the Report: This report has been prepared for the specific site, design objective, development and purpose described to Golder by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. Any change of site conditions, purpose, development plans or if the project is not initiated within eighteen months of the date of the report may alter the validity of the report. Golder can not be responsible for use of this report, or portions thereof, unless Golder is requested to review and, if necessary, revise the report.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as all electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration, and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder's report or other work products.

The report is of a summary nature and is not intended to stand alone without reference to the instructions given to Golder by the Client, communications between Golder and the Client, and to any other reports prepared by Golder for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. Golder can not be responsible for use of portions of the report without reference to the entire report.

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project. The extent and detail of investigations, including the number of test holes, necessary to determine all of the relevant conditions which may affect construction costs would normally be greater than has been carried out for design purposes. Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.

Soil, Rock and Groundwater Conditions: Classification and identification of soils, rocks, and geologic units have been based on commonly accepted methods employed in the practice of geotechnical engineering and related disciplines. Classification and identification of the type and condition of these materials or units involves judgment, and boundaries between different soil, rock or geologic types or units may be transitional rather than abrupt. Accordingly, Golder does not warrant or guarantee the exactness of the descriptions.

Special risks occur whenever engineering or related disciplines are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions. The environmental, geologic, geotechnical, geochemical and hydrogeologic conditions that Golder interprets to exist between and beyond sampling points may differ from those that actually exist. In addition to soil variability, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. **The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report.** The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal, and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

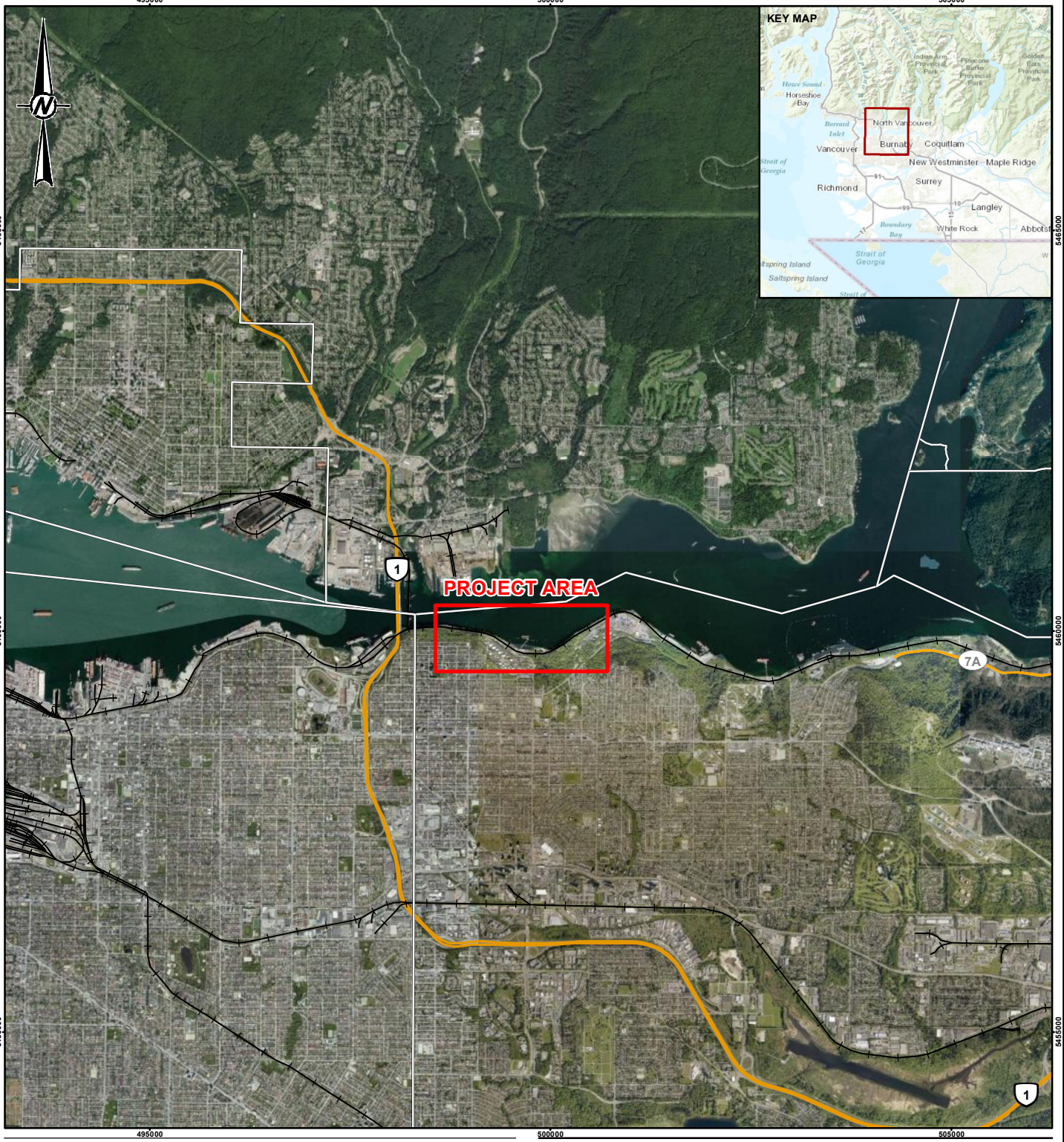
Sample Disposal: Golder will dispose of all uncontaminated soil and/or rock samples 90 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fills, or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

Follow-Up and Construction Services: All details of the design were not known at the time of submission of Golder's report. Golder should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of Golder's report.

During construction, Golder should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of Golder's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in Golder's report. Adequate field review, observation and testing during construction are necessary for Golder to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, Golder's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

Changed Conditions and Drainage: Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that Golder be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that Golder be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. Golder takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.



LEGEND

- PROJECT AREA
- RAILWAY
- SECONDARY HIGHWAY
- PRIMARY HIGHWAY
- MUNICIPAL BOUNDARY

0 1,400 2,800

1:70,000 METRES

REFERENCE(S)

1. BASEMAP OBTAINED FROM ESRI. USED UNDER LICENCE, ALL RIGHTS RESERVED.
2. NATIONAL ROAD NETWORK CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENCE – CANADA.
3. MUNICIPAL BOUNDARY LICENSED UNDER OPEN GOVERNMENT LICENSE - BRITISH COLUMBIA.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

CLIENT
CANADIAN PACIFIC RAILWAY

PROJECT
CASCADIA PHASE 4 - VITERRA EAST SIDING EXTENSION
BURNABY, B.C.

TITLE
KEY PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-11-19
DESIGNED	B. BRADY
PREPARED	L. HOLMES
REVIEWED	J. SOQUILA
APPROVED	J. RICHMOND

PROJECT NO.	CONTROL	REV.	FIGURE
20143647	3000	0	1

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI A

25mm

0

PATH: Y:\burnaby\CAD-GIS\Client\Canadian Pacific Railway\Burnaby BC\69 PROJECTS\20143647\02 PRODUCTION\3000\MXD\Report\20143647-3000_FIG_1_Key_Plan_RevA.mxd PRINTED ON: 2020-11-19 AT 2:59:53 PM

LEGEND

- PLANNED BOREHOLES
- APPROXIMATE MILE POST
- CANADIAN PACIFIC RAILWAY
- ARTERIAL / COLLECTOR ROAD
- WATERCOURSE

PROJECT ALIGNMENT

- CASCADIA WEST - PHASE 3
- CASCADIA EAST - PHASE 4

REFERENCE(S)

1. BASEMAP OBTAINED FROM ESRI. USED UNDER LICENCE, ALL RIGHTS RESERVED.
2. RAILWAY AND NATIONAL ROAD NETWORK LICENSED UNDER OPEN GOVERNMENT LICENSE - CANADA.
3. WATERCOURSE DIGITIZED FROM ESRI TOPOGRAPHIC BASEMAP DATED 2020/06/02.

COORDINATE SYSTEM: NAD 1983 UTM ZONE 10N

0 80 160

1:4,000 METRES

CLIENT
CANADIAN PACIFIC RAILWAY

PROJECT
CASCADIA PHASE 4 - VITERRA EAST SIDING EXTENSION
BURNABY, B.C.

CONSULTANT
GOLDER

YYYY-MM-DD	2020-11-19
DESIGNED	B. HOLZMAN
PREPARED	L. HOLMES
REVIEWED	J. SOQUILA
APPROVED	J. RICHMOND

TITLE
SITE PLAN

PROJECT NO.	CONTROL	REV.	FIGURE
20143647	3000	0	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI B

0 25mm

PATH: Y:\burnaby\CAD-GIS\Client\Canadian_Pacific_Railway\Burnaby_BC\99_PROJECTS\20143647\02_PRODUCTION\3000\MXD\Report\20143647_3000_FIG_2_Site_Plan_RevA.mxd PRINTED ON: 2020-11-19 AT 3:00:15 PM

APPENDIX A

Summary Tables

Table 1: Summary of Geotechnical Test Holes
Phase 4 Vieterra East Siding Van Group

Test Hole ID	Drilling Date(s)	Planning Test Hole ID	Drilling Method	GPS Coordinates[1,2]		Approximate Elevation (m)[3]	Approximate mileage	Drilled depth (m)
				Northing (m)	Easting (m)			
BH20-01	June 25, 2020	B	ODEX	5459886	499380	5.8	123.89	4.98
BH20-02	June 27, 2020	D	ODEX	5459772	499538	5.8	123.75	6.55
BH20-03	June 27, 2020	F	ODEX	5459725	499767	5.8	123.62	5.13
BH20-04	June 28, 2020 to July 7, 2020	G	ODEX	5459741	499982	6.0	123.47	12.80
BH20-05	July 3, 2020	H	ODEX	5459831	500131	6.2	123.35	10.67
BH20-06	July 5, 2020	E	ODEX	5459739	499605	5.6	123.71	9.37
BH20-07	July 5, 2020	A	ODEX	5459974	499190	6.0	124.01	5.03
BH20-08	July 8, 2020	C	ODEX	5459810	499486	5.9	123.8	7.62
BH20-09	July 9, 2020	M	ODEX	5460031	500440	6.2	123.14	11.28
SH20-10	July 27, 2020	I	Sonic	5459739	499932	2.0	123.51	21.34
SH20-11	July 28, 2020	L	Sonic	5459844	500134	1.0	123.35	15.24

[1] All coordinates provided are referenced to UTM NAD83, Zone 10U.

[2] Coordinates were obtained using a hand-held GPS typically accurate to within 5 m.

[3] Elevations were estimated from surface profiles provided by Hatch.

Table 2: Summary of Torque Wrench Shear Vanes
Phase 4 Vieterra East Siding Van Group

Sonic Hole ID	Sample No.	Approximate Tip Depth (mbgs)	Vane Type	Measured Torque		Vane Shear Strength (kPa)	
				Peak (ft*lbs)	Remolded (ft*lbs)	Peak (kPa)	Remolded (kPa)
SH20-10	Vane 1	3.51	Type 2 - 5 cm x 10 cm	100	50	267.1	133.6
SH20-10	Vane 2	6.25	Type 2 - 5 cm x 10 cm	160	25	427.4	66.8
SH20-10	Vane 3	9.30	Type 2 - 5 cm x 10 cm	75	30	200.3	80.1
SH20-10	Vane 4	15.39	Type 2 - 5 cm x 10 cm	125	25	333.9	66.8
SH20-10	Vane 5	18.44	Type 2 - 5 cm x 10 cm	180	75	480.8	200.3
SH20-11	Vane 1	3.20	Type 2 - 5 cm x 10 cm	130	30	347.2	80.1
SH20-11	Vane 2	4.72	Type 2 - 5 cm x 10 cm	145	25	387.3	66.8
SH20-11	Vane 3	6.25	Type 2 - 5 cm x 10 cm	135	15	360.6	40.1
SH20-11	Vane 4	9.30	Type 2 - 5 cm x 10 cm	120	30	320.5	80.1

APPENDIX B

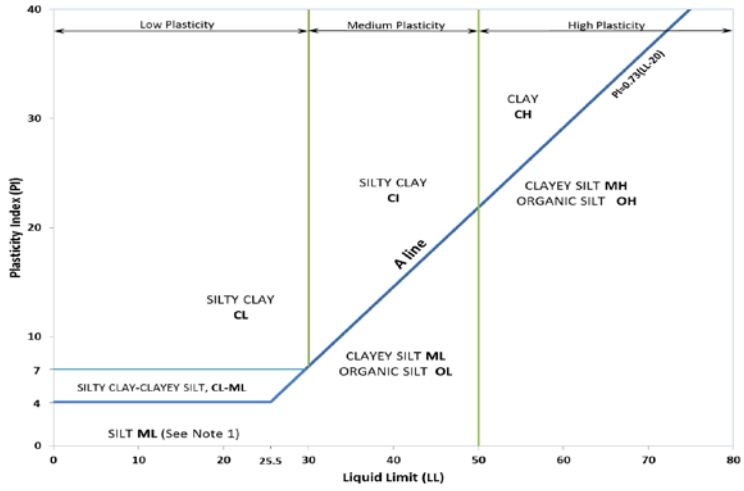
Record of Borehole and Record of Sonic Hole Sheets

METHOD OF SOIL CLASSIFICATION

The Golder Associates Ltd. Soil Classification System is based on the Unified Soil Classification System (USCS)

Organic or Inorganic	Soil Group	Type of Soil		Gradation or Plasticity	$Cu = \frac{D_{60}}{D_{10}}$	$Cc = \frac{(D_{30})^2}{D_{10} x D_{60}}$	Organic Content	USCS Group Symbol	Group Name
INORGANIC (Organic Content ≤30% by mass)	COARSE-GRAINED SOILS (>50% by mass is larger than 0.075 mm)	GRAVELS (>50% by mass of coarse fraction is larger than 4.75 mm)	Gravels with ≤12% fines (by mass)	Poorly Graded	<4	≤1 or ≥3	≤30%	GP	GRAVEL
				Well Graded	≥4	1 to 3		GW	GRAVEL
			Gravels with >12% fines (by mass)	Below A Line	n/a			GM	SILTY GRAVEL
				Above A Line	n/a			GC	CLAYEY GRAVEL
		SANDS (≥50% by mass of coarse fraction is smaller than 4.75 mm)	Sands with ≤12% fines (by mass)	Poorly Graded	<6	≤1 or ≥3		SP	SAND
				Well Graded	≥6	1 to 3		SW	SAND
			Sands with >12% fines (by mass)	Below A Line	n/a			SM	SILTY SAND
				Above A Line	n/a			SC	CLAYEY SAND

Organic or Inorganic	Soil Group	Type of Soil	Laboratory Tests	Field Indicators					Organic Content	USCS Group Symbol	Primary Name
				Dilatancy	Dry Strength	Shine Test	Thread Diameter	Toughness (of 3 mm thread)			
INORGANIC (Organic Content ≤30% by mass)	FINE-GRAINED SOILS (≥50% by mass is smaller than 0.075 mm)	SILTS (Non-Plastic or PI and LL plot below A-Line on Plasticity Chart below)	Liquid Limit <50	Rapid	None	None	>6 mm	N/A (can't roll 3 mm thread)	<5%	ML	SILT
				Slow	None to Low	Dull	3mm to 6 mm	None to low	<5%	ML	CLAYEY SILT
				Slow to very slow	Low to medium	Dull to slight	3mm to 6 mm	Low	5% to 30%	OL	ORGANIC SILT
			Liquid Limit ≥50	Slow to very slow	Low to medium	Slight	3mm to 6 mm	Low to medium	<5%	MH	CLAYEY SILT
				None	Medium to high	Dull to slight	1 mm to 3 mm	Medium to high	5% to 30%	OH	ORGANIC SILT
		CLAYS (PI and LL plot above A-Line on Plasticity Chart below)	Liquid Limit <30	None	Low to medium	Slight to shiny	~ 3 mm	Low to medium	0% to 30% **(see Note 2)**	CL	SILTY CLAY
			Liquid Limit 30 to 50	None	Medium to high	Slight to shiny	1 mm to 3 mm	Medium		CI	SILTY CLAY
			Liquid Limit ≥50	None	High	Shiny	<1 mm	High		CH	CLAY
HIGHLY ORGANIC SOILS (Organic Content >30% by mass)		Peat and mineral soil mixtures							30% to 75%	PT	SILTY PEAT, SANDY PEAT
		Predominantly peat, may contain some mineral soil, fibrous or amorphous peat							75% to 100%		PEAT



Note 1 – Fine grained materials with PI and LL that plot in this area are named (ML) SILT with slight plasticity. Fine-grained materials which are non-plastic (i.e. a PL cannot be measured) are named SILT.
Note 2 – For soils with <5% organic content, include the descriptor "trace organics" for soils with between 5% and 30% organic content include the prefix "organic" before the Primary name.

Dual Symbol — A dual symbol is two symbols separated by a hyphen, for example, GP-GM, SW-SC and CL-ML.
For non-cohesive soils, the dual symbols must be used when the soil has between 5% and 12% fines (i.e. to identify transitional material between "clean" and "dirty" sand or gravel.
For cohesive soils, the dual symbol must be used when the liquid limit and plasticity index values plot in the CL-ML area of the plasticity chart (see Plasticity Chart at left).

Borderline Symbol — A borderline symbol is two symbols separated by a slash, for example, CL/CI, GM/SM, CL/ML.
A borderline symbol should be used to indicate that the soil has been identified as having properties that are on the transition between similar materials. In addition, a borderline symbol may be used to indicate a range of similar soil types within a stratum.

ABBREVIATIONS AND TERMS USED ON RECORDS OF BOREHOLES AND TEST PITS

PARTICLE SIZES OF CONSTITUENTS

Soil Constituent	Particle Size Description	Millimetres	Inches (US Std. Sieve Size)
BOULDERS	Not Applicable	>300	>12
COBBLES	Not Applicable	75 to 300	3 to 12
GRAVEL	Coarse Fine	19 to 75 4.75 to 19	0.75 to 3 (4) to 0.75
SAND	Coarse Medium Fine	2.00 to 4.75 0.425 to 2.00 0.075 to 0.425	(10) to (4) (40) to (10) (200) to (40)
SILT/CLAY	Classified by plasticity	<0.075	< (200)

MODIFIERS FOR SECONDARY AND MINOR CONSTITUENTS

Percentage by Mass	Modifier
>35	Use 'and' to combine major constituents (*i.e.,* SAND and GRAVEL)
> 12 to 35	Primary soil name prefixed with "gravelly, sandy, SILTY, CLAYEY" as applicable
> 5 to 12	some
≤ 5	trace

PENETRATION RESISTANCE

Standard Penetration Resistance (SPT), N:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) required to drive a 50 mm (2 in.) split-spoon sampler for a distance of 300 mm (12 in.). Values reported are as recorded in the field and are uncorrected.

Cone Penetration Test (CPT)

An electronic cone penetrometer with a 60° conical tip and a project end area of 10 cm^2 pushed through ground at a penetration rate of 2 cm/s. Measurements of tip resistance (q_t), porewater pressure (u) and sleeve frictions are recorded electronically at 25 mm penetration intervals.

Dynamic Cone Penetration Resistance (DCPT); N_d:

The number of blows by a 63.5 kg (140 lb) hammer dropped 760 mm (30 in.) to drive uncased a 50 mm (2 in.) diameter, 60° cone attached to "A" size drill rods for a distance of 300 mm (12 in.).

PH: Sampler advanced by hydraulic pressure
PM: Sampler advanced by manual pressure
WH: Sampler advanced by static weight of hammer
WR: Sampler advanced by weight of sampler and rod

SAMPLES

AS	Auger sample
BS	Block sample
CS	Chunk sample
DD	Diamond Drilling
DO or DP	Seamless open ended, driven or pushed tube sampler – note size
DS	Denison type sample
GS	Grab Sample
MC	Modified California Samples
MS	Modified Shelby (for frozen soil)
RC	Rock core
SC	Soil core
SS	Split spoon sampler – note size
ST	Slotted tube
TO	Thin-walled, open – note size (Shelby tube)
TP	Thin-walled, piston – note size (Shelby tube)
WS	Wash sample

SOIL TESTS

w	water content
PL , w_p	plastic limit
LL , w_L	liquid limit
C	consolidation (oedometer) test
CHEM	chemical analysis (refer to text)
CID	consolidated isotropically drained triaxial test[1]
CIU	consolidated isotropically undrained triaxial test with porewater pressure measurement[1]
D_R	relative density (specific gravity, Gs)
DS	direct shear test
GS	specific gravity
M	sieve analysis for particle size
MH	combined sieve and hydrometer (H) analysis
MPC	Modified Proctor compaction test
SPC	Standard Proctor compaction test
OC	organic content test
SO_4	concentration of water-soluble sulphates
UC	unconfined compression test
UU	unconsolidated undrained triaxial test
V (FV)	field vane (LV-laboratory vane test)
γ	unit weight

1. Tests anisotropically consolidated prior to shear are shown as CAD, CAU.

NON-COHESIVE (COHESIONLESS) SOILS

Compactness[2]

Term	SPT 'N' (blows/0.3m)[1]
Very Loose	0 to 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Very Dense	>50

1. SPT 'N' in accordance with ASTM D1586, uncorrected for the effects of overburden pressure.
2. Definition of compactness terms are based on SPT 'N' ranges as provided in Terzaghi, Peck and Mesri (1996). Many factors affect the recorded SPT 'N' value, including hammer efficiency (which may be greater than 60% in automatic trip hammers), overburden pressure, groundwater conditions, and grainsize. As such, the recorded SPT 'N' value(s) should be considered only an approximate guide to the soil compactness. These factors need to be considered when evaluating the results, and the stated compactness terms should not be relied upon for design or construction.

Field Moisture Condition

Term	Description
Dry	Soil flows freely through fingers.
Moist	Soils are darker than in the dry condition and may feel cool.
Wet	As moist, but with free water forming on hands when handled.

COHESIVE SOILS

Consistency

Term	Undrained Shear Strength (kPa)	SPT 'N'[1,2] (blows/0.3m)
Very Soft	<12	0 to 2
Soft	12 to 25	2 to 4
Firm	25 to 50	4 to 8
Stiff	50 to 100	8 to 15
Very Stiff	100 to 200	15 to 30
Hard	>200	>30

1. SPT 'N' in accordance with ASTM D1586, uncorrected for overburden pressure effects; approximate only.
2. SPT 'N' values should be considered ONLY an approximate guide to consistency; for sensitive clays (e.g., Champlain Sea clays), the N-value approximation for consistency terms does NOT apply. Rely on direct measurement of undrained shear strength or other manual observations.

Water Content

Term	Description
w < PL	Material is estimated to be drier than the Plastic Limit.
w ~ PL	Material is estimated to be close to the Plastic Limit.
w > PL	Material is estimated to be wetter than the Plastic Limit.

LIST OF SYMBOLS

Unless otherwise stated, the symbols employed in the report are as follows:

I. GENERAL

π	3.1416
ln x	natural logarithm of x
$\log_{10}$	x or log x, logarithm of x to base 10
g	acceleration due to gravity
t	time

II. STRESS AND STRAIN

γ	shear strain
Δ	change in, e.g. in stress: $\Delta\sigma$
ε	linear strain
ε_v	volumetric strain
η	coefficient of viscosity
υ	Poisson's ratio
σ	total stress
σ'	effective stress ($\sigma' = \sigma - u$)
σ'_{vo}	initial effective overburden stress
$\sigma_1, \sigma_2, \sigma_3$	principal stress (major, intermediate, minor)
σ_{oct}	mean stress or octahedral stress $= (\sigma_1 + \sigma_2 + \sigma_3)/3$
τ	shear stress
u	porewater pressure
E	modulus of deformation
G	shear modulus of deformation
K	bulk modulus of compressibility

III. SOIL PROPERTIES

(a) Index Properties

$\rho(\gamma)$	bulk density (bulk unit weight)*
$\rho_d(\gamma_d)$	dry density (dry unit weight)
$\rho_w(\gamma_w)$	density (unit weight) of water
$\rho_s(\gamma_s)$	density (unit weight) of solid particles
γ'	unit weight of submerged soil ($\gamma' = \gamma - \gamma_w$)
D_R	relative density (specific gravity) of solid particles ($D_R = \rho_s / \rho_w$) (formerly G_s)
e	void ratio
n	porosity
S	degree of saturation

* Density symbol is ρ. Unit weight symbol is γ where $\gamma = \rho g$ (i.e. mass density multiplied by acceleration due to gravity)

(a) Index Properties (continued)

w	water content
w_l or LL	liquid limit
w_p or PL	plastic limit
I_p or PI	plasticity index = $(w_l - w_p)$
NP	non-plastic
w_s	shrinkage limit
I_L	liquidity index = $(w - w_p) / I_p$
I_C	consistency index = $(w_l - w) / I_p$
e_{max}	void ratio in loosest state
e_{min}	void ratio in densest state
I_D	density index = $(e_{max} - e) / (e_{max} - e_{min})$ (formerly relative density)

(b) Hydraulic Properties

h	hydraulic head or potential
q	rate of flow
v	velocity of flow
i	hydraulic gradient
k	hydraulic conductivity (coefficient of permeability)
j	seepage force per unit volume

(c) Consolidation (one-dimensional)

C_c	compression index (normally consolidated range)
C_r	recompression index (over-consolidated range)
C_s	swelling index
C_α	secondary compression index
m_v	coefficient of volume change
c_v	coefficient of consolidation (vertical direction)
c_h	coefficient of consolidation (horizontal direction)
T_v	time factor (vertical direction)
U	degree of consolidation
σ'_p	pre-consolidation stress
OCR	over-consolidation ratio = σ'_p / σ'_{vo}

(d) Shear Strength

τ_p, τ_r	peak and residual shear strength
ϕ'	effective angle of internal friction
δ	angle of interface friction
μ	coefficient of friction = tan δ
c'	effective cohesion
c_u, s_u	undrained shear strength ($\phi = 0$ analysis)
p	mean total stress $(\sigma_1 + \sigma_3)/2$
p′	mean effective stress $(\sigma'_1 + \sigma'_3)/2$
q	$(\sigma_1 - \sigma_3)/2$ or $(\sigma'_1 - \sigma'_3)/2$
q_u	compressive strength $(\sigma_1 - \sigma_3)$
S_t	sensitivity

Notes: 1 $\tau = c' + \sigma' \tan \phi'$

2 shear strength = (compressive strength)/2

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-01

SHEET 1 OF 1

DATUM: Ground Surface

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.89
N: ~5459886 E: ~499380
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: June 25, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT: Wp, W, Wl, NP - Non-Plastic	SHEAR STRENGTH Cu, kPa: nat V. +, rem V. ⊕, Pocket Pen - ■; Q - ●, U - ◐	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
			Ground Surface																	
0	Fraste Mito Track Mounted Drill	Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00															Gravel
1			FILL - **(SM)** SILTY SAND, fine to coarse sand, some fine to coarse angular to sub-angular gravel; brown; grey; moist, loose to compact.		0.61	1	SS	50	24											
2						2A	SS	58	7											
			FILL - **(ML)** sandy SILT, low plasticity, fine to coarse sand; brown, with organics; w>PL, inferred soft.			2B					H O						2			
			FILL - **(SM)** SILTY SAND, fine to coarse sand, trace fine to coarse gravel; greyish brown; moist, dense to very dense.		2.13															
3						3A	SS	92	84											Bentonite Chips
			INFERRED BEDROCK - **(SM)** SAND and SILT, fine to coarse sand; grey; dry, very dense.		3.35	3B														
4						4	GS				O									
						5	SS	132	>100	O		0	51	49	37	12				
5			End of Borehole at target depth.		4.98															
6																				
7																				
8																				
9																				
10																				

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-02

SHEET 1 OF 1

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.75
N: ~5459772 E: ~499538
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DATUM: Ground Surface

DRILLING DATE: June 27, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	RECOVERY %	BLOWS/0.3m	WATER CONTENT PERCENT (Wp, W, Wl, NP - Non-Plastic; SHEAR STRENGTH Cu, kPa; nat V. +, rem V. ⊕, Pocket Pen -; Q -, U -)	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface																
0	Fraste Mito Track Mounted Drill, Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00														Gravel
1		FILL - **(SM)** gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; greyish brown, with iron oxide staining; moist, loose to compact.		0.61	1	SS	63	8		19	56	25						
2					2	SS	71	12										
3		FILL - **(SC)** gravelly CLAYEY SAND, fine to coarse sand, fine sub-angular gravel; brownish grey; moist, loose to compact.		2.13	3	SS	0	3		20	52	28			7			
4		- Log or root encountered from 4.1 to 4.3 m.			4	GS												Bentonite Chips
					5A	SS	46	32										
		INFERRED WEATHERED BEDROCK - **(SM)** SAND and SILT, fine to medium sand, trace gravel; grey; moist, dense.		4.27	5B					2	50	48	36	12				
5					6	SS	92	41										
6		INFERRED BEDROCK - **(SM)** SAND and SILT, fine to coarse sand; grey; dry, very dense.		5.49	7	SS	105	>100		0	58	42	32	10				
		End of Borehole at target depth.		6.55														
7																		
8																		
9																		
10																		

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

National IM Server:GINT_GAL_NATIONALIM Unique Project ID: Output Form:BC_BOREHOLE_GRADATION (AUTO) 2018 JSoquila 11/19/20

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-03

SHEET 1 OF 1

DATUM: Ground Surface

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.62
N: 5459725.00 E: 499767.00 GPS

DRILLING DATE: June 27, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT / SHEAR STRENGTH Cu, kPa	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface		5.80														
0	Fraste Mito Track Mounted Drill / Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00														Gravel
				5.19														
1		FILL - **(ML)** CLAYEY SILT, some fine to coarse sand, trace fine to coarse sub-angular to angular gravel; brownish grey, with organics; w>PL, firm to stiff.		0.61	1	SS	67	7							19			
2					2	SS	46	11										Water level observed in open hole during drilling
				3.36														
		INFERRED WEATHERED BEDROCK - **(ML)** SILT and SAND, fine to coarse sand; grey, with iron oxide staining; dry, dense.		2.44														
3					3A	SS	92	39		0	42	58	44	14				Bentonite Chips
				2.45														
		INFERRED BEDROCK - **(SM)** SAND and SILT, fine to coarse sand; grey; dry, very dense.		3.35	3B													
4																		
5				0.67	4	SS	0	>100										
		End of Borehole at target depth.		5.13														
6																		
7																		
8																		
9																		
10																		

WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic
SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen - ■

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.47
N: 5459741.00 E: 499982.00 GPS

RECORD OF BOREHOLE: BH20-04

SHEET 1 OF 2

DATUM: Ground Surface

DRILLING DATE: June 28, 29, and July 7 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY %	BLOWS/0.3m	WATER CONTENT PERCENT: Wp W Wl; NP - Non-Plastic; SHEAR STRENGTH Cu, kPa; nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen - ■	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface		6.00													
0		FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00													Gravel
				5.39													
		FILL - **(GP-SP)** GRAVEL and SAND, fine to coarse sub-angular to angular gravel, fine to coarse sand; brownish grey; dry, compact.		0.61													
1					1	SS	38	20									
					2A	SS	67	7									
		FILL - **(MH)** CLAYEY SILT, high plasticity; grey, with iron oxide staining and coal fragments up to 2 mm; w<PL, firm.		4.17 1.83	2B				51					19			
2																	
		FILL - **(SC)** gravelly SAND and CLAYEY SILT, fine to coarse sand, trace fine to coarse sub-angular to angular gravel; brownish grey, with organics; w~PL, stiff. - log encountered from 3.0 to 3.7 m.		3.56 2.44													
3					3	SS	25	45									
		- Driller notes no drilling resistance and possible void from 3.7 to 4.1 m.			4	GS											
4				1.43													Water level observed in open hole during drilling
		(ML) SILT to CLAYEY SILT; grey; wet, compact.		4.57	5	SS	55	23	H					1			
5	Fraste Mito Track Mounted Drill / Air Rotary																Bentonite Chips
6					6	SS	100	22		0	0	100	80	20			
				-0.71													
		(CI, CL and ML) CLAYEY SILT and SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff.		6.71													
7																	
8					7	SS	100	33		0	1	99	54	45	15		
9					8	SS	100	27									
10		*CONTINUED NEXT PAGE*															

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-04

SHEET 2 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.47
N: 5459741.00 E: 499982.00 GPS

DRILLING DATE: June 28, 29, and July 7 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

DATUM: Ground Surface

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY %	BLOWS/0.3m	WATER CONTENT PERCENT / SHEAR STRENGTH Cu, kPa	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10																		
11	Fraste Mito Track Mounted Drill / Air Rotary	**(Cl, CL and ML)** CLAYEY SILT and SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff. *(continued)*			9	SS	100	24		0	1	99	76	23	2			Bentonite Chips
12				-6.80	10	SS	100	36										
		End of Borehole at target depth.		12.80														
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic; scale 10 20 30 40

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen - ■; scale 20 40 60 80

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.35
N: 5459831.00 E: 500131.00 GPS

RECORD OF BOREHOLE: BH20-05

SHEET 1 OF 2

DATUM: Ground Surface

DRILLING DATE: July 3, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY %	BLOWS/0.3m	WATER CONTENT PERCENT: Wp, W, Wl, NP - Non-Plastic; SHEAR STRENGTH Cu, kPa: nat V. +, rem V. ⊕, Pocket Pen - ■; Q - ●, U - ◐	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
			Ground Surface		6.20													
0	Fraste Mito Track Mounted Drill	Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00													Gravel
					5.59													
1			FILL - **(SM)** gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-angular to angular gravel; brown; dry, compact.		0.61													
						1	SS	33	16									
2					4.07													
			FILL - **(CL)** sandy SILTY CLAY, fine to coarse sand, trace fine to coarse sub-angular to angular gravel; brownish grey, with wood debris; w>PL, stiff.		2.13													
3						2	SS	13	3									
4						3A	SS	54	8									Water level observed in open hole during drilling
					1.93													
			(Cl, CL and ML) CLAYEY SILT and SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL; w>PL, stiff to hard.		4.27	3B												
5						4	SS	50	11									Bentonite Chips
6						5	SS	100	14							5		
7																		
8						6	SS	100	22									
9																		
						7	SS	100	32									
10			*CONTINUED NEXT PAGE*															

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-05

SHEET 2 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.35
N: 5459831.00 E: 500131.00 GPS

DRILLING DATE: July 3, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

DATUM: Ground Surface

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT (Wp, W, Wl, NP - Non-Plastic; 10 20 30 40) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Pocket Pen -; Q - ●, U - ◐; 20 40 60 80)	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	Air Rotary	**(Cl, CL and ML)** CLAYEY SILT and SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL; w>PL, stiff to hard. *(continued)*		-4.47													Bentonite Chips
		End of Borehole at target depth.		10.67													
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-06

SHEET 1 OF 1

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.71
N: 5459739.00 E: 499605.00 GPS

DATUM: Ground Surface

DRILLING DATE: July 5, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY %	BLOWS/0.3m	WATER CONTENT PERCENT: Wp / W / Wl; NP - Non-Plastic; SHEAR STRENGTH Cu, kPa: nat V. + Q - ●, rem V. ⊕ U - ◐, Pocket Pen - ■	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
		Ground Surface		5.60													
0	Fraste Mito Track Mounted Drill / Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00													Gravel
				4.99													
1		**(ML)** sandy CLAYEY SILT, medium to high plasticity, fine to coarse sand, some fine to coarse sub-angular to angular gravel; greyish brown, with iron oxide staining; w<PL to w~PL.		0.61													
					1	SS	58	11							19		
2																	
3					2	SS	42	11									
		- log or root encountered from 3.7 to 3.8 m.															Water level observed in open hole during drilling
4				1.33													
		(GP) sandy GRAVEL, fine to coarse sand, fine to coarse sub-angular to angular gravel; grey; wet.		4.27	3	SS	68	>100									
5																	Bentonite Chips
		- Driller notes no drilling resistance and possible void from 5.3 to 6.3 m.			4	SS	0	0		77	19	4					
6					5	GS											
					6	SS	17	19									
7				-2.02													
		INFERRED WEATHERED BEDROCK - **(ML)** sandy SILT, fine to coarse, low plasticity; blue grey; dry.		7.62	7	SS	83	78		0	23	77	64	13			
8																	
9				-3.54													
		INFERRED BEDROCK - **(ML)** sandy SILT, fine to coarse, low plasticity; blue grey; dry.		9.14 -3.77	8	SS	111	>100									
		End of Borehole at target depth.		9.37													
10																	

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-07

SHEET 1 OF 1

DATUM: Ground Surface

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 124.01
N: ~5459974 E: ~499190
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: July 5, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT (Wp, W, Wl, NP - Non-Plastic)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Pocket Pen -; Q - ●, U - ◐)	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
			Ground Surface																	
0			FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00															Gravel
1			FILL - **(SP/GP)** SAND and GRAVEL, fine to coarse sand, fine to coarse sub-angular to angular gravel; brown; dry.		0.61															
2	Fraste Mito Track Mounted Drill	Air Rotary	FILL - **(SM)** gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-rounded to sub-angular gravel, some plastic fines; orangish brown, with oxidation staining; moist, loose.		1.52	1	SS	63	4											
3			**(SM)** SILTY SAND, fine to coarse sand; orangish brown, with carbonaceous fragments; moist, loose.		2.44	2	SS	63	7			3	66	31	26	5				Bentonite Chips
4			INFERRED BEDROCK - **(CL)** SILTY CLAY, some fine to coarse sand; orange, with oxidation staining.		4.27	3A	SS	111	80											
5			INFERRED BEDROCK - **(ML)** SILT and SAND, fine to coarse sand; grey; dry.			3B					○	0	45	55	42	13				
			End of Borehole at target depth.		5.03															
6																				
7																				
8																				
9																				
10																				

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-08

SHEET 1 OF 1

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 122.8
N: ~5459810 E: ~499486
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DATUM: Ground Surface
DRILLING DATE: July 8, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.
SAMPLER HAMMER, 64kg; DROP, 762mm
INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES RECOVERY %	SAMPLES BLOWS/0.3m	WATER CONTENT PERCENT / SHEAR STRENGTH Cu, kPa	GRADATION % CLAY PARTICLE SIZE <= 0.002 GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
			Ground Surface																
0	Fraste Mito Track Mounted Drill	Air Rotary	FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00														Gravel
1			**(SM)** SILTY SAND and GRAVEL, fine to coarse sand, fine to coarse sub-angular to angular gravel; grey, with inferred cobbles; dry, very dense.		0.91														
2						1	SS	75	76		38	48	14						
			(ML) sandy SILT, fine to coarse sand, some gravel; dark grey; dry. - becomes gravelly at 2.4 m depth.		2.13														
3			**(SM)** gravelly SAND and SILT, fine to coarse sand, fine to coarse sub-angular to angular gravel; brownish grey; wet, dense.		3.05	2	SS	100	34		14	46	40	33	7	1			
4																			Bentonite Chips
			INFERRED BEDROCK - **(SM)** SILTY SAND, fine to coarse sand; grey; moist, very dense.		4.57	3	SS	198	>50										
5																			
6						4	SS	100	>50										
7						5	GS												
			End of Borehole at target depth.		7.62														
8																			
9																			
10																			

WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic; 10 20 30 40
SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen - ■; 20 40 60 80

DEPTH SCALE
1 : 50

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GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: NH
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-09

SHEET 1 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.14
N: ~5460031 E: ~500440
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: July 9, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

DATUM: Ground Surface

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT (Wp, W, Wl, NP - Non-Plastic) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Pocket Pen -; Q -, U -)	GRADATION % CLAY PARTICLE SIZE <= 0.002: GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
			Ground Surface															
0			FILL - **(GP)** GRAVEL, coarse, angular; grey; dry.		0.00													Gravel
1			**(SM)** gravelly SILTY SAND, fine to coarse sand, fine to coarse sub-rounded gravel; brown; dry, inferred loose to compact.		0.61	1A	SS	79	10									
2	Fraste Mito Track Mounted Drill	Air Rotary	**(CL-ML)** sandy gravelly SILTY CLAY to CLAYEY SILT, fine to coarse sand, fine to coarse sub-rounded to sub-angular gravel; greyish brown, with iron oxide staining; moist, very soft to soft.		1.83	1B					14	27	59	53	6	7		
3						2	SS	4	0									
4			- wood fibres encountered at approximately 3.7 m depth.															
5			**(GC)** sandy CLAYEY GRAVEL, fine to coarse gravel, fine to coarse sand; brownish grey, with iron oxide staining; wet, compact.		4.27	3	SS	67	24		39	31	30	21	9	4		
6			**(CI, CL and ML)** SILT and SILTY CLAY, low plasticity, some fine to medium sand; grey, with 1-10 mm thick light grey laminations; w>PL, inferred stiff to very stiff.		5.18													Bentonite Chips
7			INFERRED BEDROCK - **(SM)** SILTY SAND, fine to coarse sand, some fine to coarse sub-rounded to sub-angular gravel; grey; moist, dense to very dense		6.40	4A 4B	SS	100	47									
8						5	SS	58	40		44	36	20					
9						6	SS	17	>100									
10			*CONTINUED NEXT PAGE*															

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: NH
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF BOREHOLE: BH20-09

SHEET 2 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Mile 123.14
N: ~5460031 E: ~500440
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DATUM: Ground Surface

DRILLING DATE: July 9, 2020
DRILLING CONTRACTOR: Geotech Drilling Services Ltd.

SAMPLER HAMMER, 64kg; DROP, 762mm

INCLINATION: -90°

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: RECOVERY %	SAMPLES: BLOWS/0.3m	WATER CONTENT PERCENT / SHEAR STRENGTH Cu, kPa	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	PLASTICITY INDEX %	ORGANIC CONTENT %	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	Fraste Mito Track Mounted Drill / Air Rotary	INFERRED BEDROCK - **(SM)** SILTY SAND, fine to coarse sand, some fine to coarse sub-rounded to sub-angular gravel; grey; moist, dense to very dense *(continued)*																
11					7	SS	0	91										Bentonite Chips
		End of Borehole at target depth.		11.28														
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		

WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic; 10 20 30 40
SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen - ■; 20 40 60 80

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within air-rotary or sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: NH
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF SONIC HOLE: SH20-10

SHEET 1 OF 3

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Intertidal - Mile 123.51
N: ~5459739 E: ~499932
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: July 27, 2020
DRILLING CONTRACTOR: Mud Bay Drilling Co. Ltd.

DATUM: Ground Surface

INCLINATION: -90°

*SAMPLER HAMMER, 64kg; DROP, 762mm

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	SOIL CORE: RUN No.	RECOVERY %	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	SHEAR STRENGTH Cu, kPa / WATER CONTENT PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
0		Ground Surface															
		(SP) SAND, fine to coarse sand, some fine to medium sub-rounded to sub-angular gravel; light brown, with shells fragments; dry to moist.		0.00	1	GS		1									Filter Sand
1		- with inferred cobbles and/or boulders below 0.6 m depth.															
		- wood and fibrous organics encountered from approximately 1.1 to 1.2 m depth.			2	GS											
				1.22	3	GS				25	67	8					
		(SP-SM) gravelly SAND, fine to coarse sand, fine to coarse sub-rounded to sub-angular gravel, trace non-plastic fines; brown, with shell fragments; moist.		1.68	4	SS	15	2									
2		**(CI, CL and ML)** SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff to hard.															
3					5	SS	20	3							Su=267.1		
															Sr=133.6		
					6	GS				0	0	100	79	21			
4																	
	LS250 Track Mounted MiniSonic				7	SS	27	4									Bentonite Chips
5	Sonic																
					8	GS											
6															427.4		
					9	GS		5									
7																	
					10	SS	29										
8								6									
					11	GS											
9															200.3		
								7									
10					12	GS											

CONTINUED NEXT PAGE

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen ■; scale 20 40 60 80
WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic; scale 10 20 30 40

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within a sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF SONIC HOLE: SH20-10

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Intertidal - Mile 123.51
N: ~5459739 E: ~499932
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DATUM: Ground Surface
DRILLING DATE: July 27, 2020
DRILLING CONTRACTOR: Mud Bay Drilling Co. Ltd.
INCLINATION: -90°
*SAMPLER HAMMER, 64kg; DROP, 762mm

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	SOIL CORE: RUN No.	RECOVERY %	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	SHEAR STRENGTH Cu, kPa / WATER CONTENT PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	LS250 Track Mounted MiniSonic / Sonic	**(CI, CL and ML)** SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff to hard. *(continued)*															
11								7									
					13	GS				0	3	97	69	28			
12		- 50 mm sandstone clast with some gravel encountered at 11.9 m depth.			14	SS	39										
13					15	GS											
								8									
14																	
					16	GS											
15															333.9		Bentonite Chips
16					17	GS											
								9									
17																	
					18	GS											
18															Su=480.8		
															Sr=200.3		
19					19	GS		10									
20		*CONTINUED NEXT PAGE*															

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen ■; scale 20 40 60 80
WATER CONTENT PERCENT: Wp W Wl; NP - Non-Plastic; scale 10 20 30 40

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within a sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF SONIC HOLE: SH20-10

SHEET 3 OF 3

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Intertidal - Mile 123.51
N: ~5459739 E: ~499932
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: July 27, 2020
DRILLING CONTRACTOR: Mud Bay Drilling Co. Ltd.

DATUM: Ground Surface

INCLINATION: -90°

*SAMPLER HAMMER, 64kg; DROP, 762mm

DEPTH SCALE METRES	DRILLING RIG / DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	SOIL CORE: RUN No.	SOIL CORE: RECOVERY %	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ◐ / Pocket Pen ■) 20 40 60 80	WATER CONTENT PERCENT Wp W Wl NP - Non-Plastic 10 20 30 40	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
20	LS250 Track Mounted MiniSonic / Sonic	**(CI, CL and ML)** SILTY CLAY, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff to hard. *(continued)*			20	GS		10										Bentonite Chips
21																		
		End of Sonic Hole at target depth.		21.34														
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within a sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: BB
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF SONIC HOLE: SH20-11

SHEET 1 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Intertidal - Mile 123.35
N: ~5459844 E: ~500134
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DRILLING DATE: July 28, 2020
DRILLING CONTRACTOR: Mud Bay Drilling Co. Ltd.

DATUM: Ground Surface

INCLINATION: -90°

*SAMPLER HAMMER, 64kg; DROP, 762mm

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	SOIL PROFILE DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.3m	SOIL CORE RUN No.	SOIL CORE RECOVERY %	GRADATION % CLAY PARTICLE SIZE <= 0.002 GRAVEL	SAND	FINES	SILT	CLAY	SHEAR STRENGTH Cu, kPa / WATER CONTENT PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
0			Ground Surface															
			(GP) GRAVEL, fine to coarse sub-rounded to sub-angular gravel, some fine to coarse sand; brown, with shell fragments; non-cohesive, moist.		0.00	1	GS		1									Filter Sand
					0.30	2	GS				61	32	7					
			(GP-GM) sandy GRAVEL, fine to coarse sub-angular to sub-rounded gravel, fine to coarse sand, some fines; light brown to orange; non-cohesive, moist.		0.76	3	GS											
1			**(ML)** SILT, some fine to coarse sand, trace gravel; grey; non-cohesive, moist.		1.37													
			(Cl, CL and ML) SILTY CLAY and CLAYEY SILT, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff to hard.						2									
2						4	GS				0	0	100	80	20			
3																		
									3									
4						5	GS											
	LS250 Track Mounted MiniSonic	Sonic																
5			- sand layer encountered from 5.3 to 5.5 m depth.						4									Bentonite Chips
						6	GS											
6																		
									5									
7						7	GS											
8						8	GS											
9									6									
10						9	GS											

347.2
387.3
360.6
320.5

SHEAR STRENGTH: nat V. + Q - ● rem V. ⊕ U - ◐ Pocket Pen ■
20 40 60 80

WATER CONTENT PERCENT
Wp W Wl
NP - Non-Plastic
10 20 30 40

CONTINUED NEXT PAGE

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within a sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: JF
CHECKED: JDS

REV: 0

PROJECT No.: 20143647 / 2000

RECORD OF SONIC HOLE: SH20-11

SHEET 2 OF 2

CLIENT: CP Rail
PROJECT: Cascadia Phase 4 Viterra East
LOCATION: Intertidal - Mile 123.35
N: ~5459844 E: ~500134
Note: Northing and Easting Coordinates have been determined by GPS in the field and are approximate only.

DATUM: Ground Surface
DRILLING DATE: July 28, 2020
DRILLING CONTRACTOR: Mud Bay Drilling Co. Ltd.
INCLINATION: -90°
*SAMPLER HAMMER, 64kg; DROP, 762mm

DEPTH SCALE METRES	DRILLING RIG	DRILLING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	SOIL CORE: RUN No.	RECOVERY %	GRADATION % (CLAY PARTICLE SIZE <= 0.002): GRAVEL	SAND	FINES	SILT	CLAY	SHEAR STRENGTH Cu, kPa / WATER CONTENT PERCENT	ADDITIONAL LAB. TESTING	PIEZOMETER, STANDPIPE OR THERMISTOR INSTALLATION
10	LS250 Track Mounted MiniSonic	Sonic	**(Cl, CL and ML)** SILTY CLAY and CLAYEY SILT, low to medium plasticity; grey, with 1-10 mm thick light grey laminations; w>PL, very stiff to hard. *(continued)*						6		0	0	100	91	9			Bentonite Chips
11						10	GS											
12									7									
13						11	GS											
14																		
15						12	GS											
			End of Sonic Hole at target depth.		15.24													
16																		
17																		
18																		
19																		
20																		

SHEAR STRENGTH Cu, kPa: nat V. + Q - ●; rem V. ⊕ U - ◐; Pocket Pen ■; 20 40 60 80
WATER CONTENT PERCENT: Wp — W — Wl; NP - Non-Plastic; 10 20 30 40

DEPTH SCALE
1 : 50

** Note: Split-Spoon sampling and recorded blow counts were completed within a sonic cored borehole, a method which does not strictly comply with ASTM standards. Caution and judgment should therefore be exercised in the interpretation of the measured blow counts and their correlation with standard "N" values.*

GOLDER

SOIL CLASSIFICATION SYSTEM: GACS
LOGGED: JF
CHECKED: JDS

REV: 0

APPENDIX C

Hammer Penetration Test Energy Measurement Results

Rig: C05-033
Hammer: GE09-028
Calibration Date: 10-Jul-2020

STANDARD PENETRATION TEST ENERGY HAMMER CALIBRATION RESULTS

Test Start Depth (ft)	Date	Instrumented Rod Type	Instrumented Rod Area (cm^2)	Rod String Type	Strain Gauge #1 Serial No.	Strain Gauge #2 Serial No.	Accelerometer #1 Serial No.	Accelerometer #2 Serial No.	Recorded Blow Counts 0"-6"	Recorded Blow Counts 6"-12"	Recorded Blow Counts 12"-18"	N[1] (Blow Counts)	Number of Blows Analyzed	Average Max Force (kN)	Average Max Energy (kN-m)	Average Energy Transfer Ratio (FV) (%)	Standard Deviation of ETR (%)	Refer to Notation Number
104.0	10-Jul-2020	NWJ	9.29	NWJ	515NWJ2	515NWJ1	K5741	K5742	48	83	>59	>142	142	263.9	0.4315	90.9	3.2	3
109.0	10-Jul-2020	NWJ	9.29	NWJ	515NWJ2	515NWJ1	K5741	K5742	23	69	113	182	182	268.7	0.4070	85.8	4.9	
114.0	10-Jul-2020	NWJ	9.29	NWJ	515NWJ2	515NWJ1	K5741	K5742	23	69	>100	>169	169	268.1	0.4134	87.1	5.1	4
Average[2]:														**266.9**	**0.417**	**87.9**		
Standard Deviation[2]:														**2.1**	**0.010**	**2.2**		

1. Blow counts from the first 6" were not included.
2. Average and standard deviation are calculated using averaged data from SPT hammer blows from the 6" to 18" interval (ie. N value) from all sampling depths tested.
3. Sampler refused at 15".
4. Sampler refused at 17".

APPENDIX D

Laboratory Testing

GOLDER

WATER CONTENT DETERMINATION

ASTM D 2216

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Lab Schedule No.:

Sample Location	Sample No.	Specimen No.	Depth Interval		Water Content (%)
			Depth (m)	Bottom (m)	
BH20-01	**Composite**	**2B**	1.98	2.13	**25.8**
BH20-01	**4**		3.96	4.57	**10.9**
BH20-01	**5**		4.57	5.18	**6.8**
BH20-02	**2**		1.52	2.13	**11.8**
BH20-02	**4**		3.05	3.66	**17.3**
BH20-02	**6**		4.27	4.42	**15.3**
BH20-02	**7**		6.10	6.71	**11.2**
BH20-03	**1**		0.76	1.37	**33.8**
BH20-03	**2**		1.52	2.13	**25.3**
BH20-03	**3**	**3A**	3.05	3.35	**15.5**
BH20-04	**Composite**	**2B**	1.83	2.13	**25.6**
BH20-04	**5**		4.57	5.18	**29.5**
BH20-04	**6**		6.10	6.71	**22.6**
BH20-04	**7**		7.62	8.23	**31.1**
BH20-04	**8**		9.14	9.75	**32.9**
BH20-04	**9**		10.67	11.28	**31.5**
BH20-04	**10**		12.19	12.80	**28.7**
BH20-05	**2**		3.05	3.66	**12.4**
BH20-05	**3**	**3A**	3.81	4.27	**34.4**
BH20-05	**3**	**3B**	4.27	4.42	**26.2**
BH20-05	**4**		4.57	5.18	**21.1**
BH20-05	**5**		6.10	6.71	**28.3**
BH20-05	**6**		7.62	8.23	**26.0**
BH20-05	**7**		9.14	9.75	**29.6**
BH20-06	**1**		1.52	2.13	**21.3**
BH20-06	**2**		3.05	3.66	**18.7**
BH20-06	**7**		7.62	8.23	**13.1**
BH20-06	**8**		9.14	9.75	**11.4**
BH20-07	**Composite**	**3B**	4.88	5.18	**9.2**
BH20-08	**2**		3.05	3.66	**10.6**
BH20-08	**4**		6.10	6.25	**21.5**
BH20-08	**5**		6.71	7.32	**12.4**
BH20-09	**1**	**1B**	1.83	2.13	**23.4**
BH20-09	**3**		4.57	5.18	**16.0**

SJ — Checked
7/22/2020 — Date

GOLDER

WATER CONTENT DETERMINATION

ASTM D 2216

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Lab Schedule No.:

Sample Location	Sample No.	Specimen No.	Depth Interval		Water Content (%)
			Depth (m)	Bottom (m)	
SH20-10	**6**		3.81	3.96	**27.1**
SH20-10	**9**		6.71	6.86	**27.7**
SH20-10	**13**		11.43	11.58	**26.0**
SH20-10	**18**		17.53	17.68	**27.7**
SH20-11	**3**		0.91	1.07	**19.7**
SH20-11	**4**		2.29	2.44	**27.3**
SH20-11	**6**		5.49	5.64	**31.1**
SH20-11	**9**		9.91	10.06	**27.0**

SJ — Checked
8/20/2020 — Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

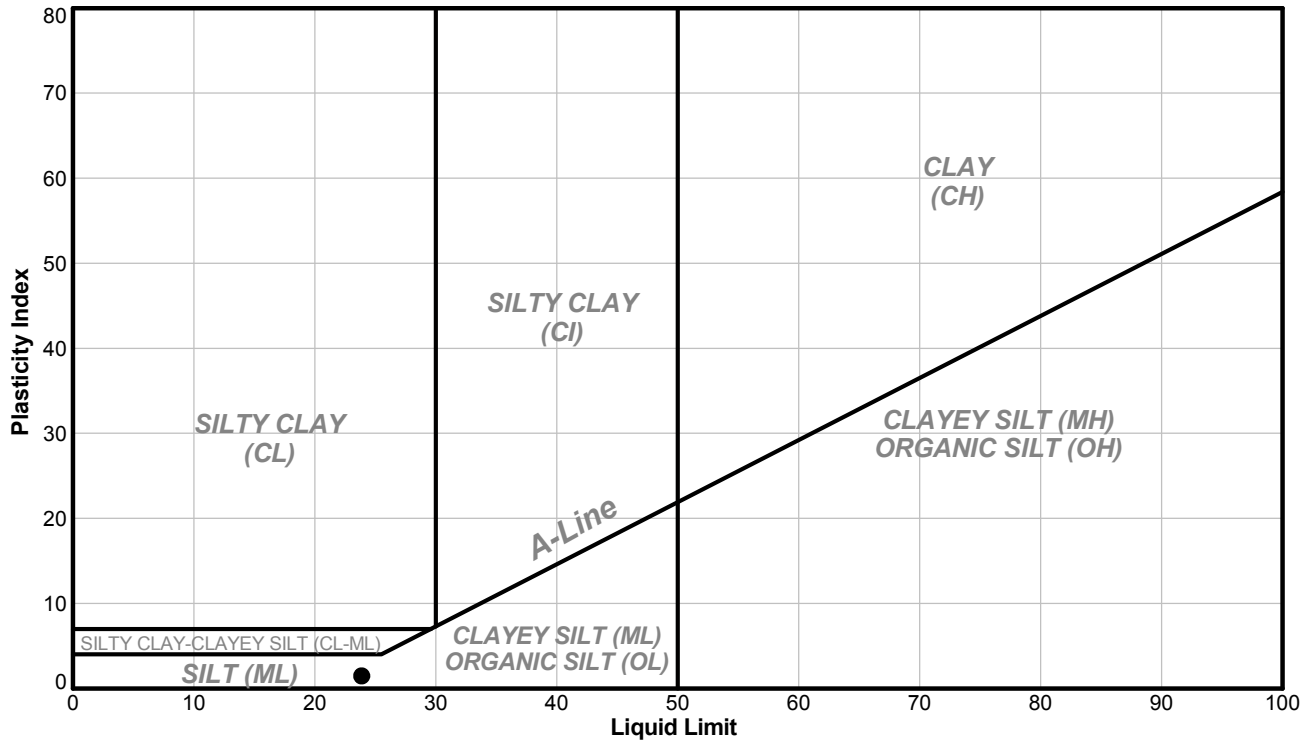
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-01**
Project:	Phase 4 Viterra	**Sample No.:**	**2** **Specimen:** 2B
Location:	Burnaby, BC	**Depth Interval (m):**	1.98 to 2.13
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-01	2B	1.98	2.13	ND	24	22	2.0	25.8	1.9

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	7/10/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

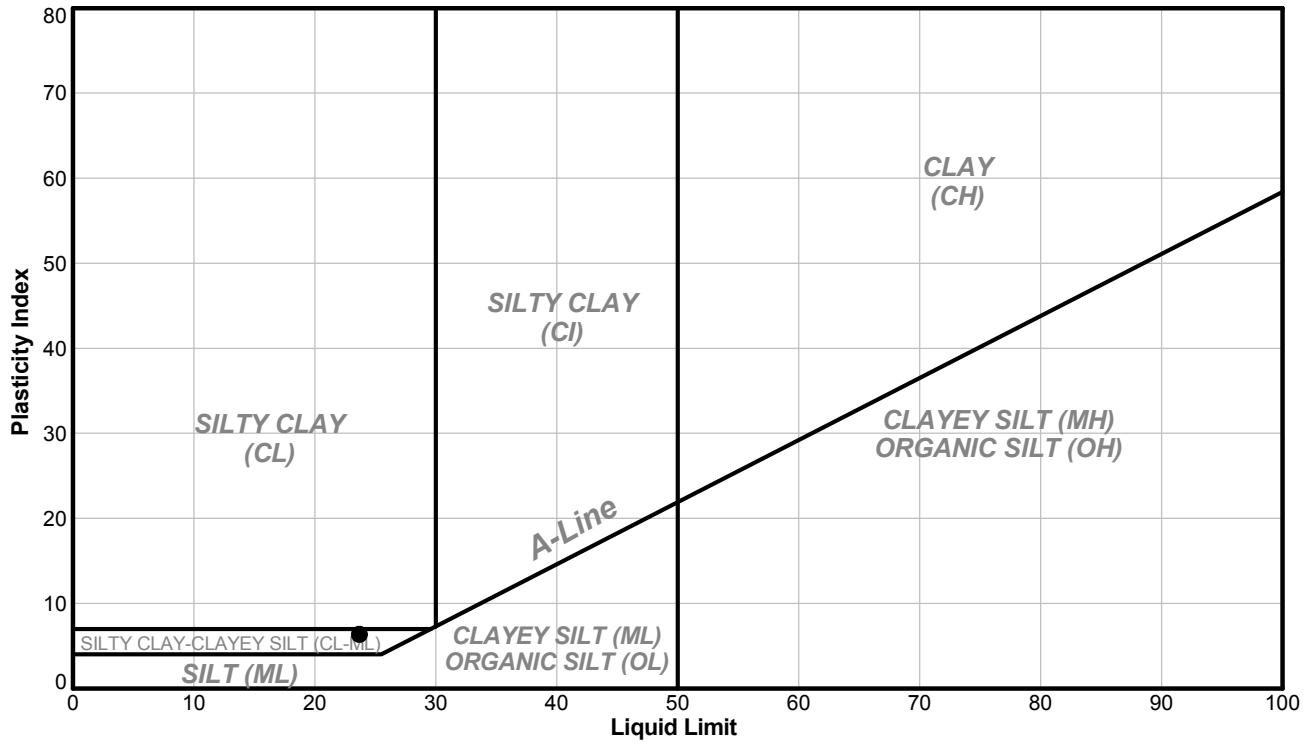
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-02**
Project:	Phase 4 Viterra	**Sample No.:**	**4**
Location:	Burnaby, BC	**Depth Interval (m):**	3.05 to 3.66
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-02	4	3.05	3.66	44	24	17	7.0	17.3	0.0

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	7/10/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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Tel: 604-296-4200 Fax: 604-298-5253 www.golder.com

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

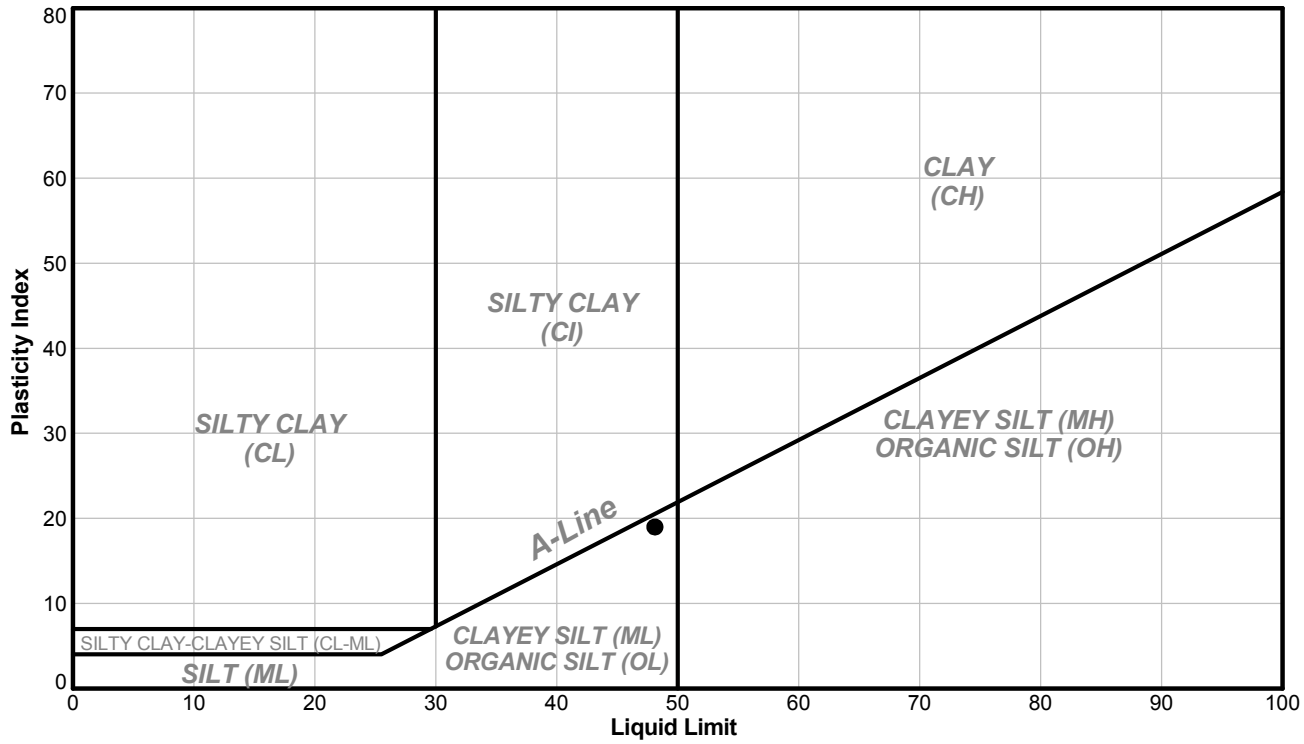
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-03**
Project:	Phase 4 Viterra	**Sample No.:**	**1**
Location:	Burnaby, BC	**Depth Interval (m):**	0.76 to 1.37
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-03	1	0.76	1.37	ND	48	29	19.0	33.8	0.3

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	7/10/2020	SJ	7/21/2020
Tech	Date	Checked	Date

Golder Associates Ltd.
2nd Floor 2920 Virtual Way Vancouver, British Columbia, Canada
Tel: 604-296-4200 Fax: 604-298-5253 www.golder.com

LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

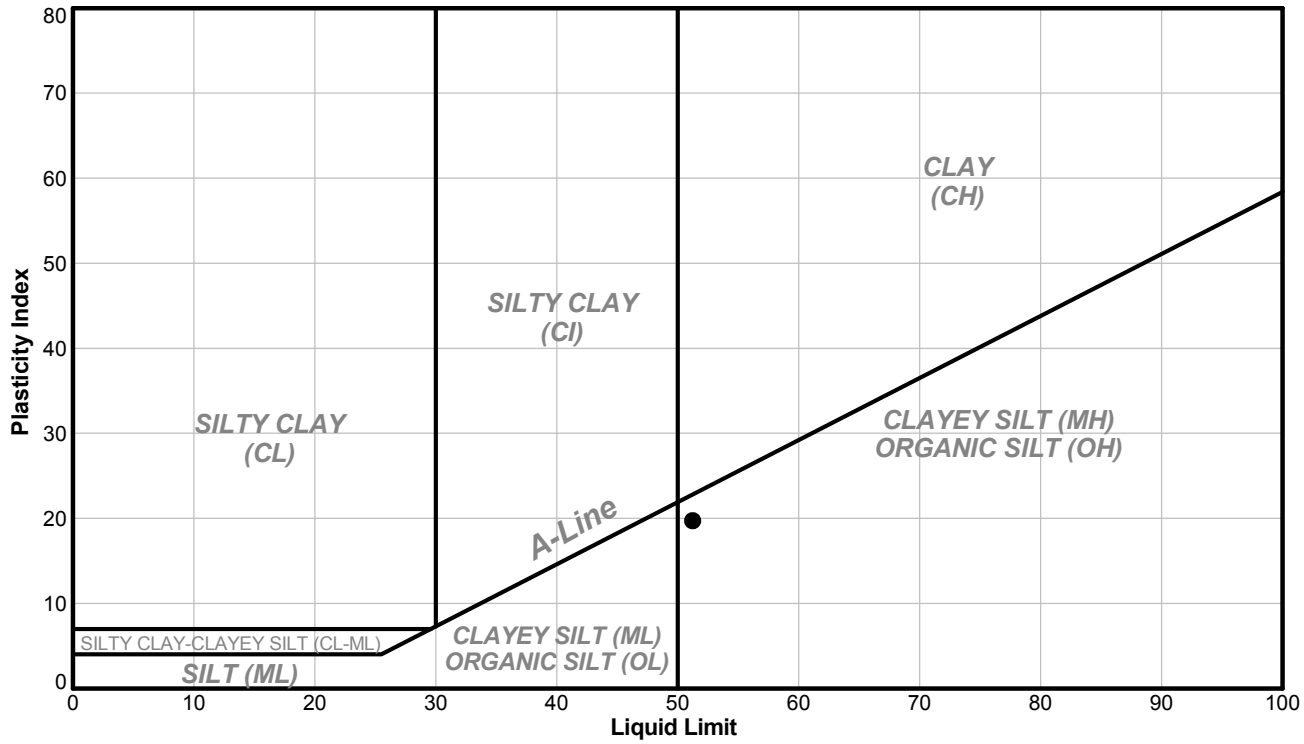
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-04**
Project:	Phase 4 Viterra	**Sample No.:**	**2** **Specimen:** 2B
Location:	Burnaby, BC	**Depth Interval (m):**	1.83 to 2.13
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-04	2B	1.83	2.13	ND	51	32	19.0	25.6	-0.3

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

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Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

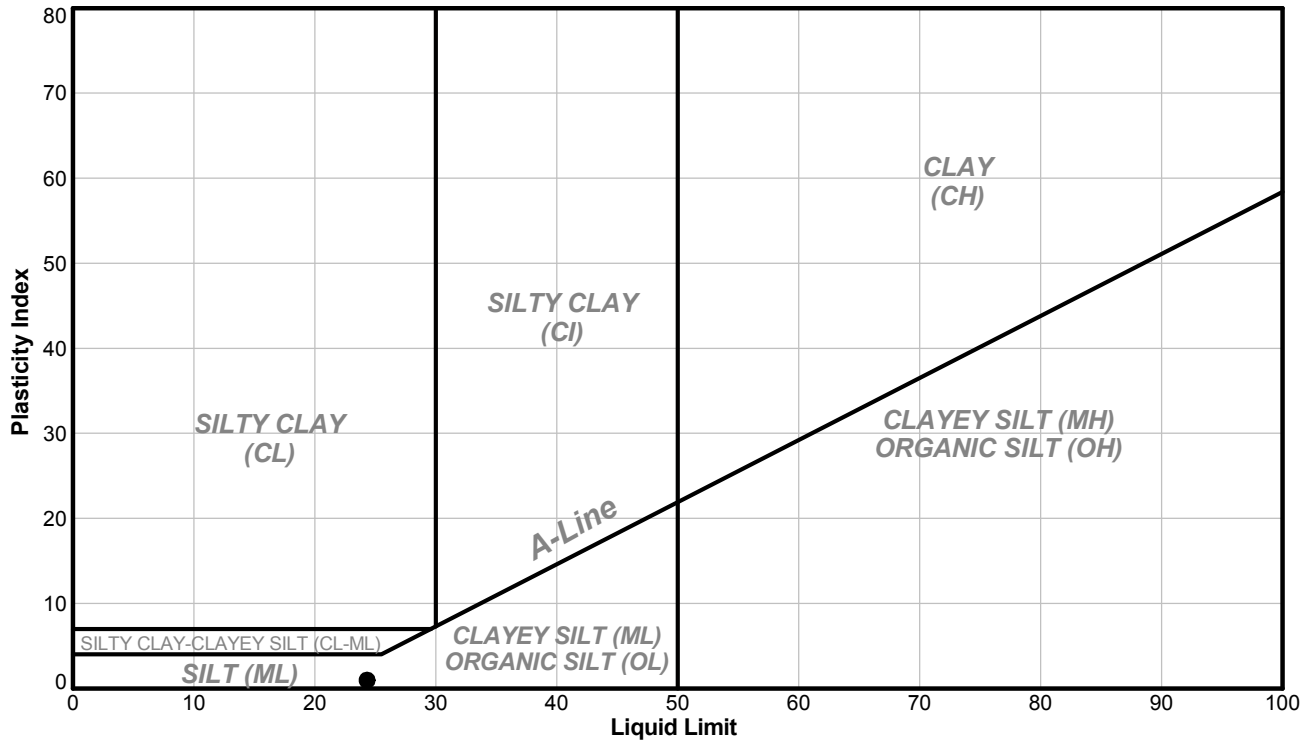
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-04**
Project:	Phase 4 Viterra	**Sample No.:**	**5**
Location:	Burnaby, BC	**Depth Interval (m):**	4.57 to 5.18
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-04	5	4.57	5.18	ND	24	23	1.0	29.5	6.5

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	7/21/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

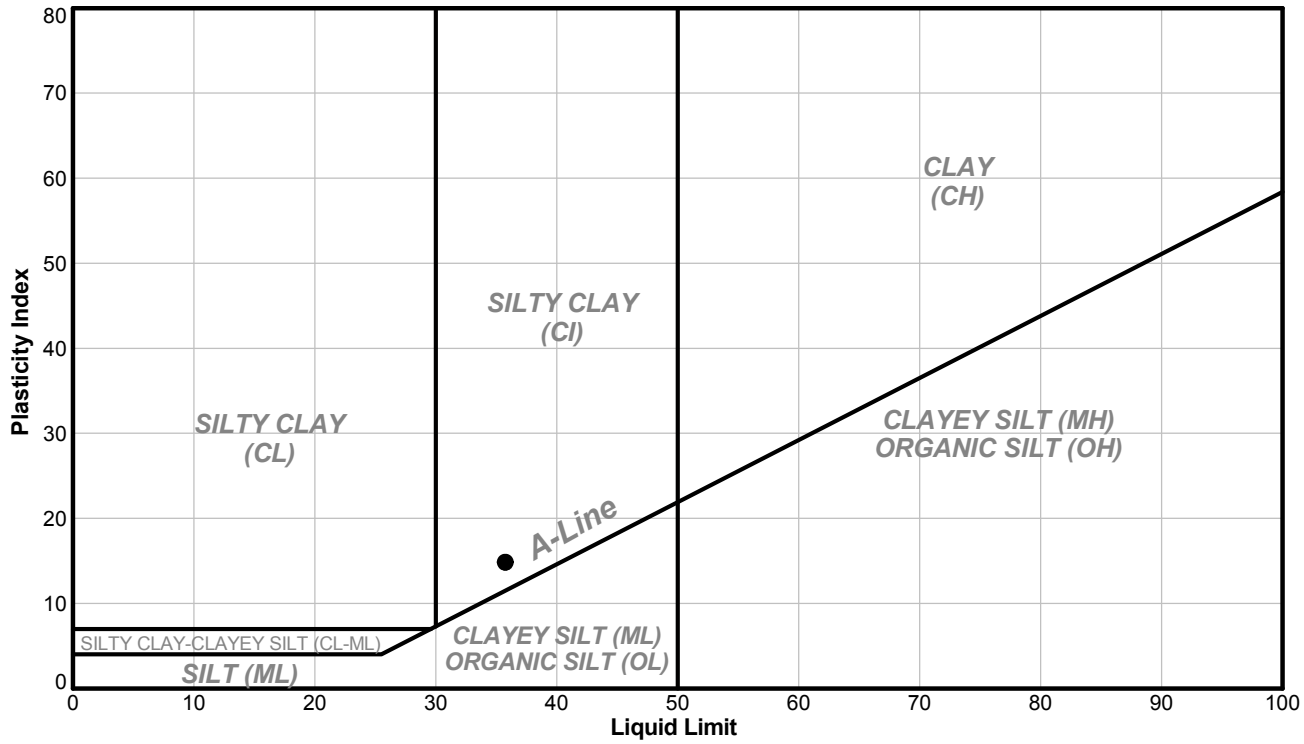
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-04**
Project:	Phase 4 Viterra	**Sample No.:**	**7**
Location:	Burnaby, BC	**Depth Interval (m):**	7.62 to 8.23
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-04	7	7.62	8.23	100	36	21	15.0	31.1	0.7

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	7/21/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

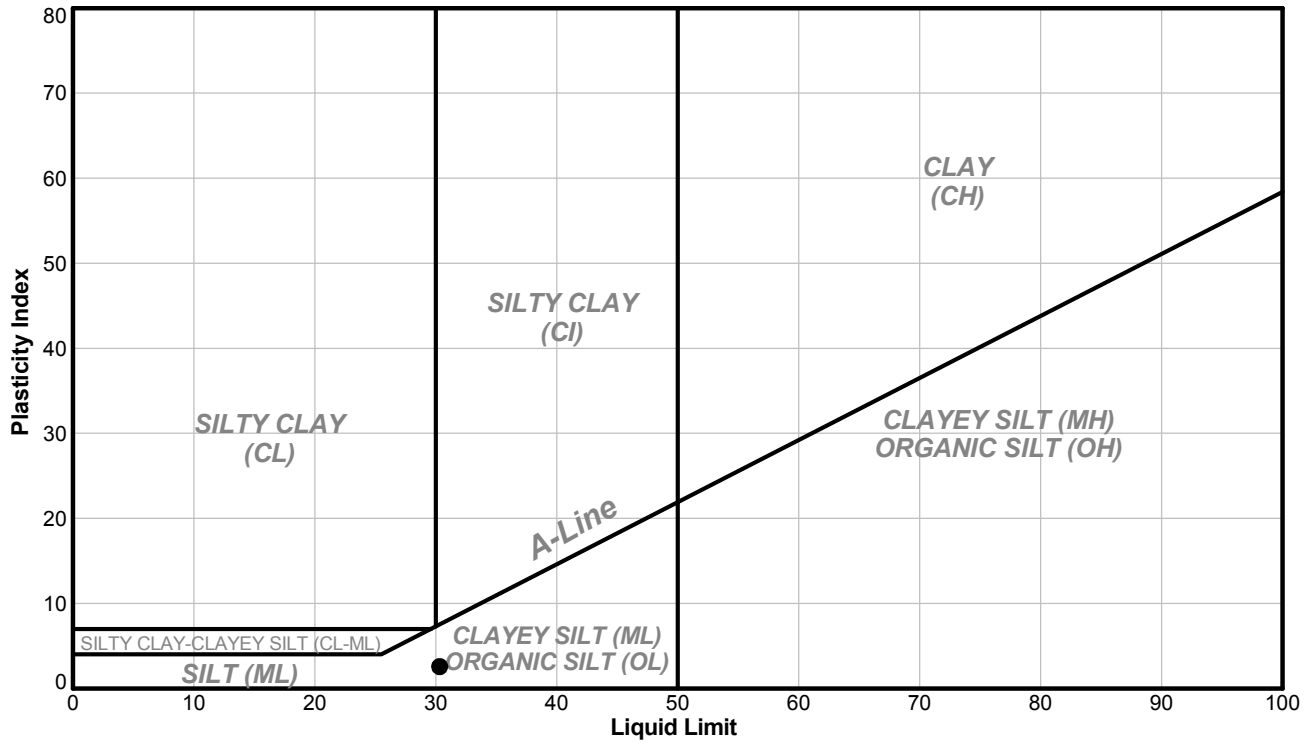
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-04**
Project:	Phase 4 Viterra	**Sample No.:**	**9**
Location:	Burnaby, BC	**Depth Interval (m):**	10.67 to 11.28
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-04	9	10.67	11.28	100	30	28	2.0	31.5	1.8

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	**7/20/2020**	**SJ**	**7/22/2020**
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

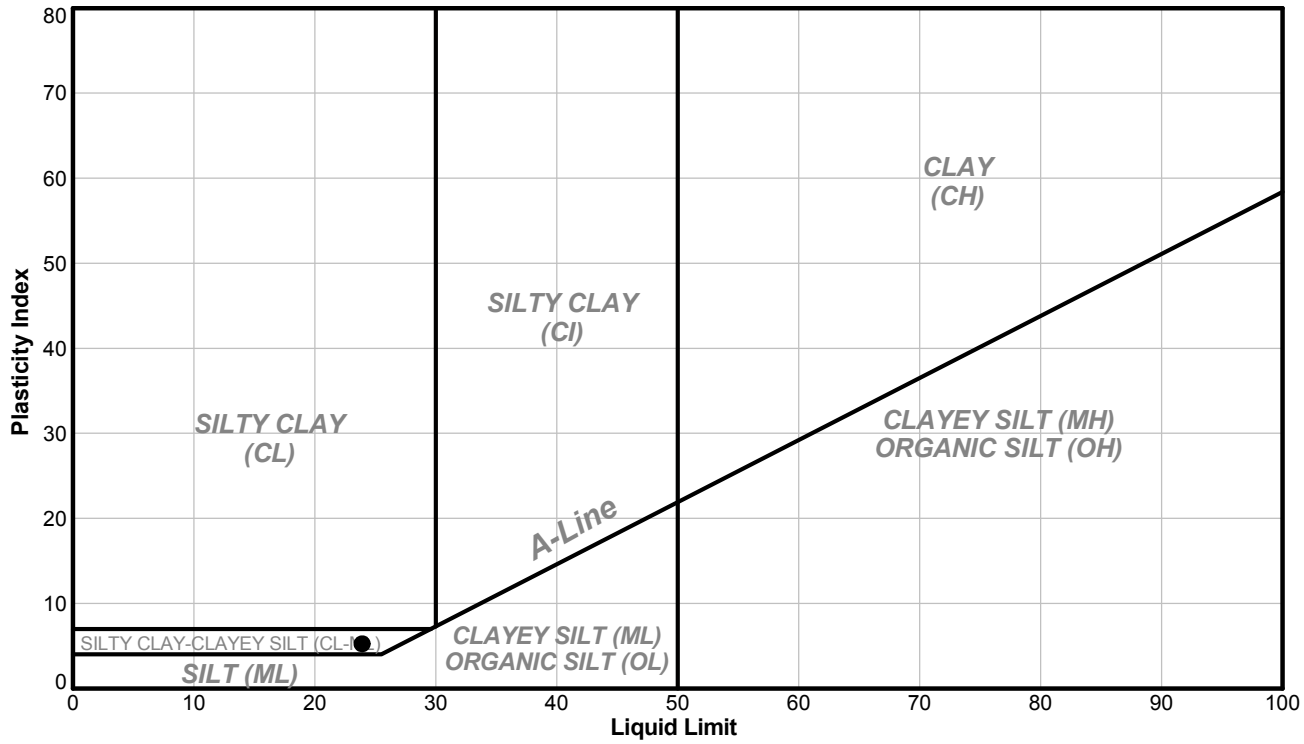
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-05**
Project:	Phase 4 Viterra	**Sample No.:**	**5**
Location:	Burnaby, BC	**Depth Interval (m):**	6.10 to 6.71
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-05	5	6.10	6.71	ND	24	19	5.0	28.3	1.9

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF/DC	**7/9/2020**	**SJ**	**7/21/2020**
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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

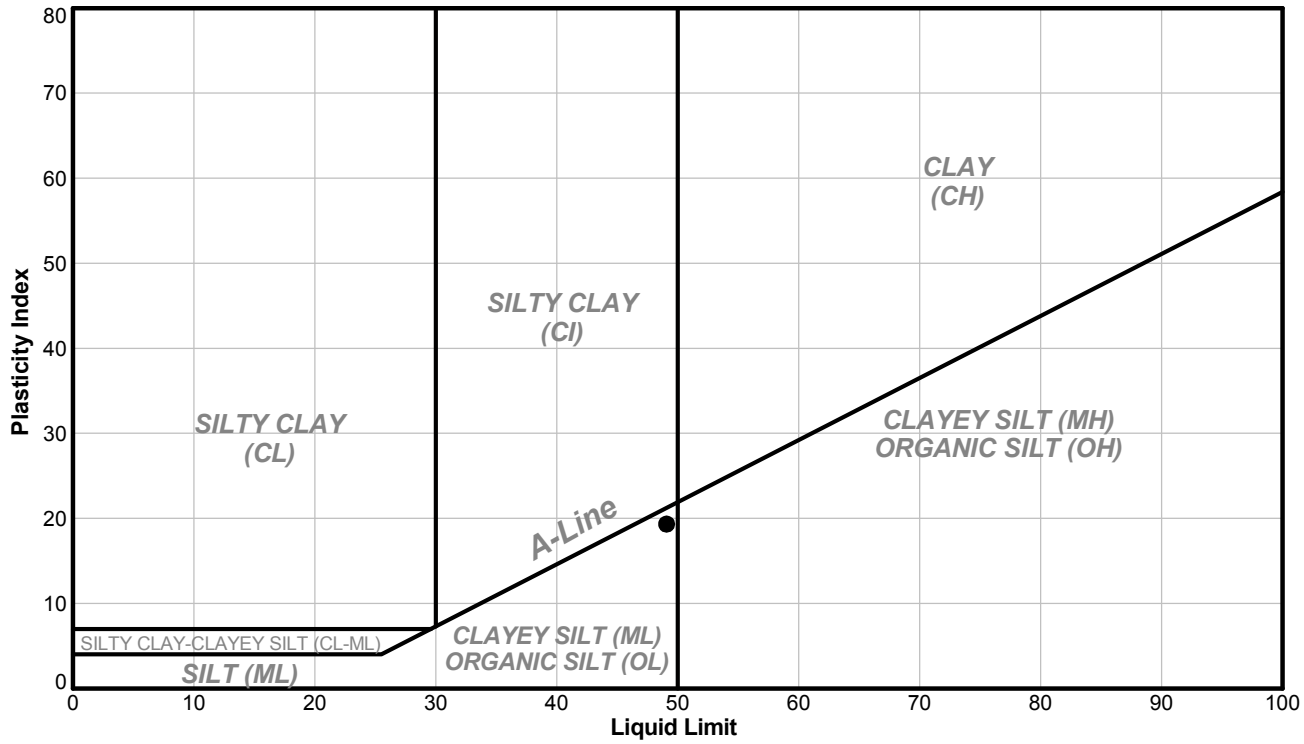
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-06**
Project:	Phase 4 Viterra	**Sample No.:**	**1**
Location:	Burnaby, BC	**Depth Interval (m):**	1.52 to 2.13
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-06	1	1.52	2.13	ND	49	30	19.0	21.3	-0.5

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

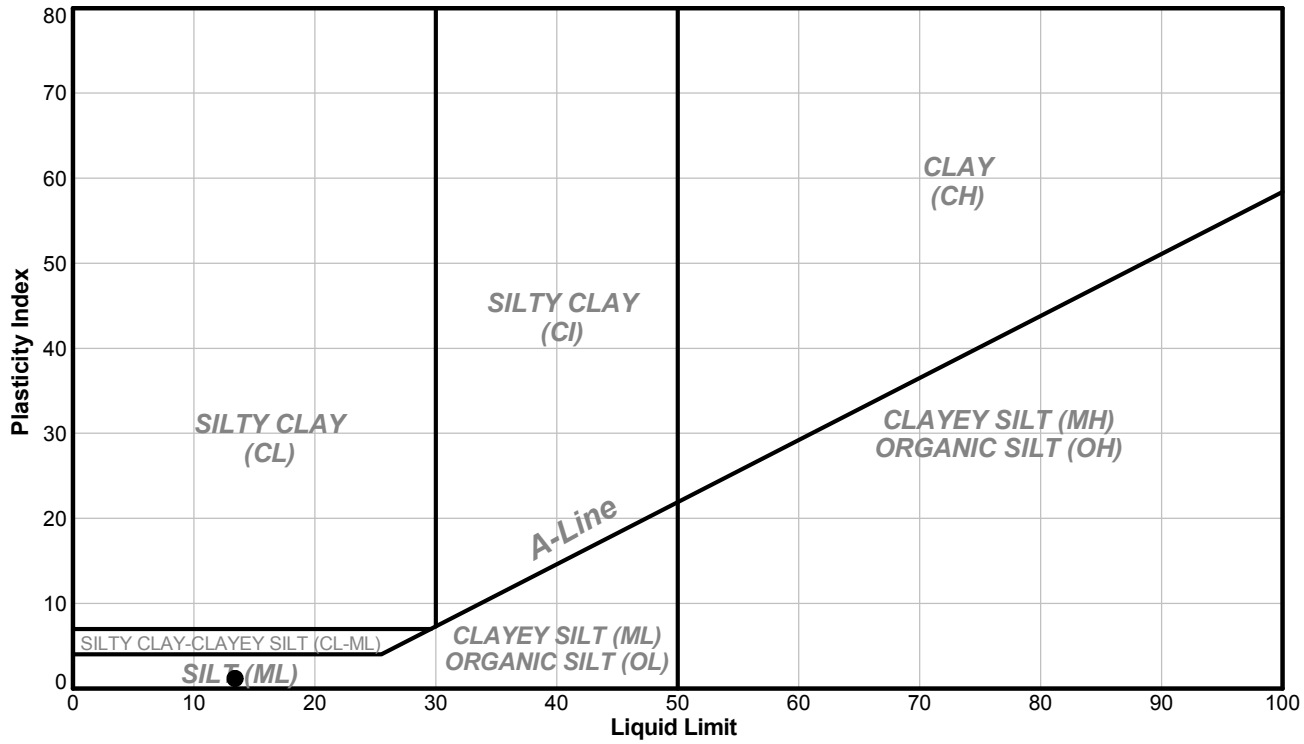
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-08**
Project:	Phase 4 Viterra	**Sample No.:**	**2**
Location:	Burnaby, BC	**Depth Interval (m):**	3.05 to 3.66
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-08	2	3.05	3.66	65	13	12	1.0	10.6	-1.4

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

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Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

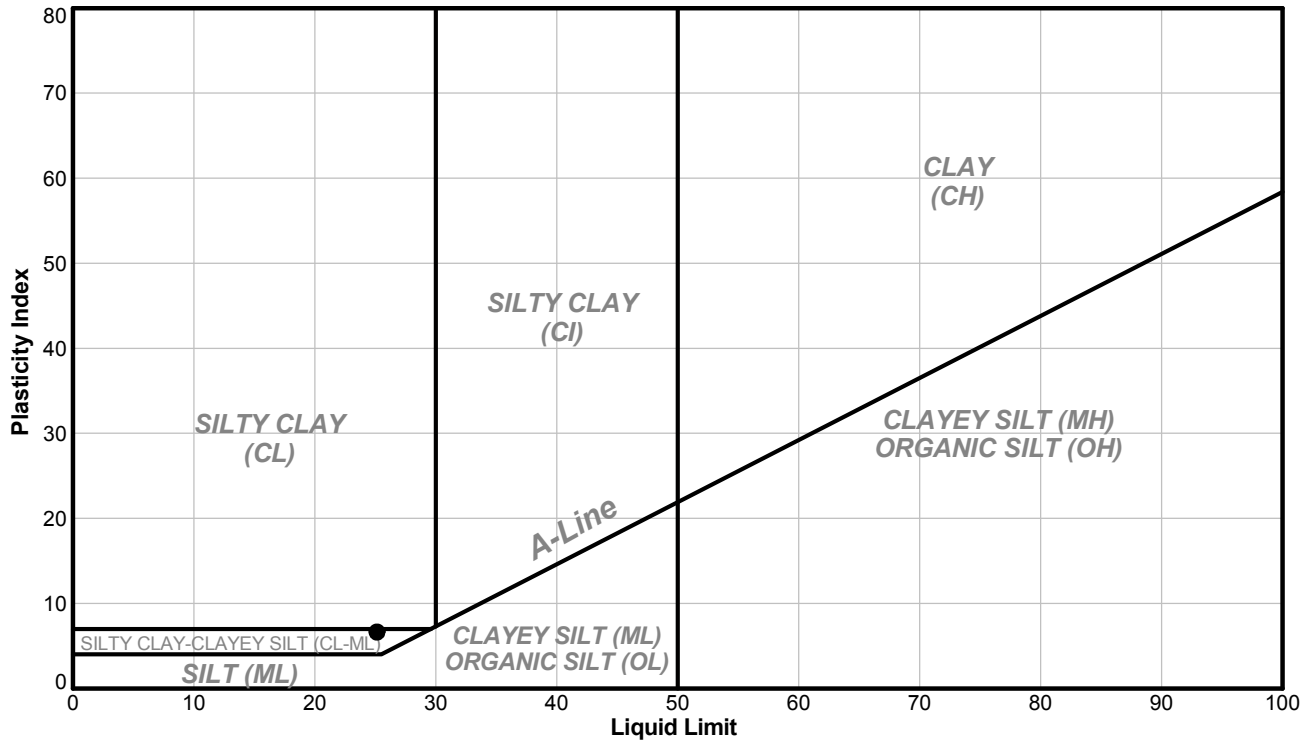
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-09**
Project:	Phase 4 Viterra	**Sample No.:**	**1** **Specimen:** 1B
Location:	Burnaby, BC	**Depth Interval (m):**	1.83 to 2.13
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-09	1B	1.83	2.13	69	25	18	7.0	23.4	0.8

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

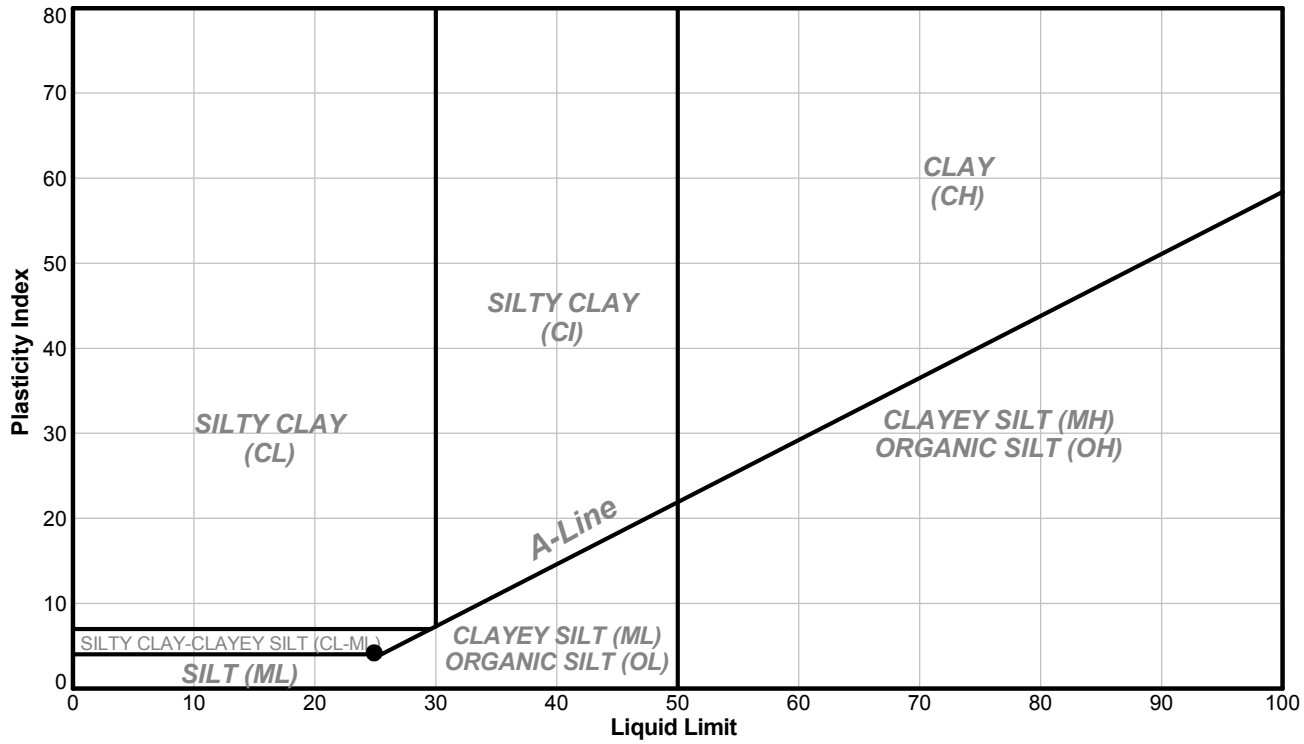
ASTM D 4318

Client:	CP Rail	**Borehole ID:**	**BH20-09**
Project:	Phase 4 Viterra	**Sample No.:**	**3**
Location:	Burnaby, BC	**Depth Interval (m):**	4.57 to 5.18
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	BH20-09	3	4.57	5.18	42	25	21	4.0	16.0	-1.2

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

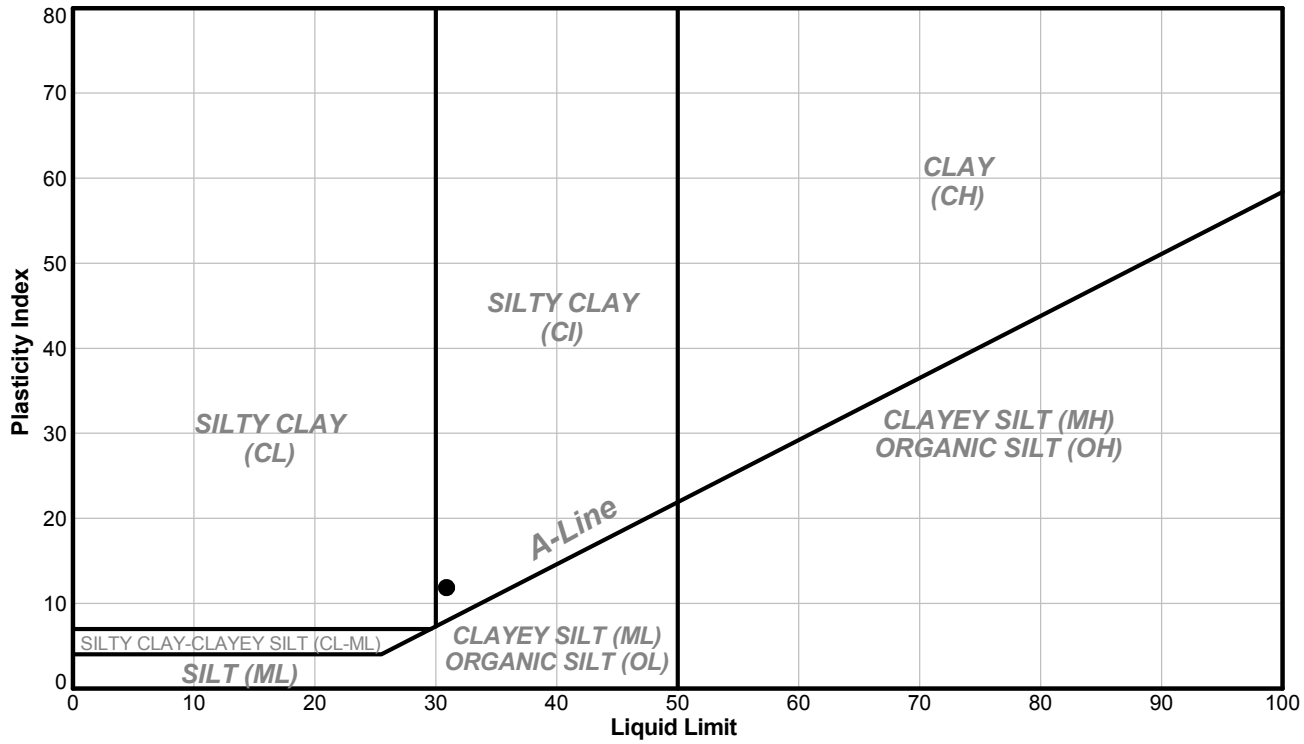
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-10**
Project:	Phase 4 Viterra	**Sample No.:**	**6**
Location:	Burnaby, BC	**Depth Interval (m):**	3.81 to 3.96
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-10	6	3.81	3.96	100	31	19	12.0	27.1	0.7

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	8/14/2020	SJ	8/20/2020
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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

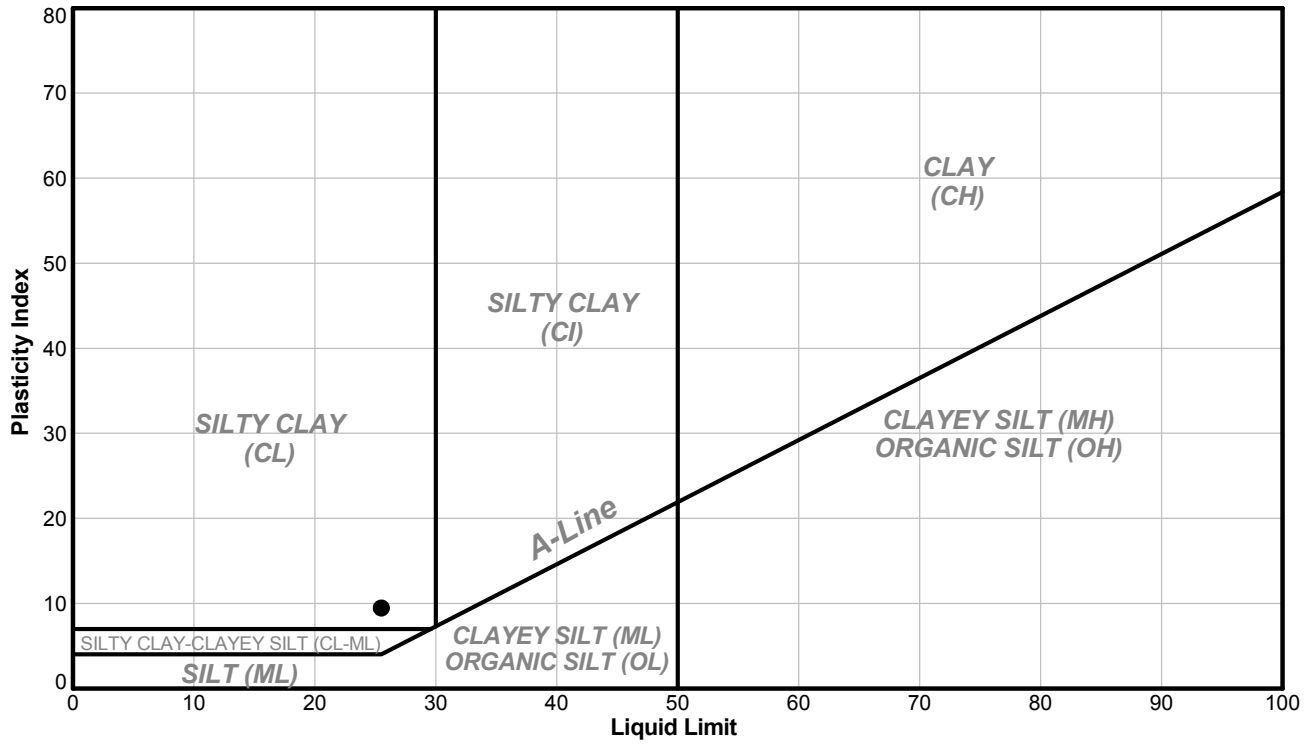
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-10**
Project:	Phase 4 Viterra	**Sample No.:**	**9**
Location:	Burnaby, BC	**Depth Interval (m):**	6.71 to 6.86
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-10	9	6.71	6.86	ND	25	16	9.0	27.7	1.3

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	8/13/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

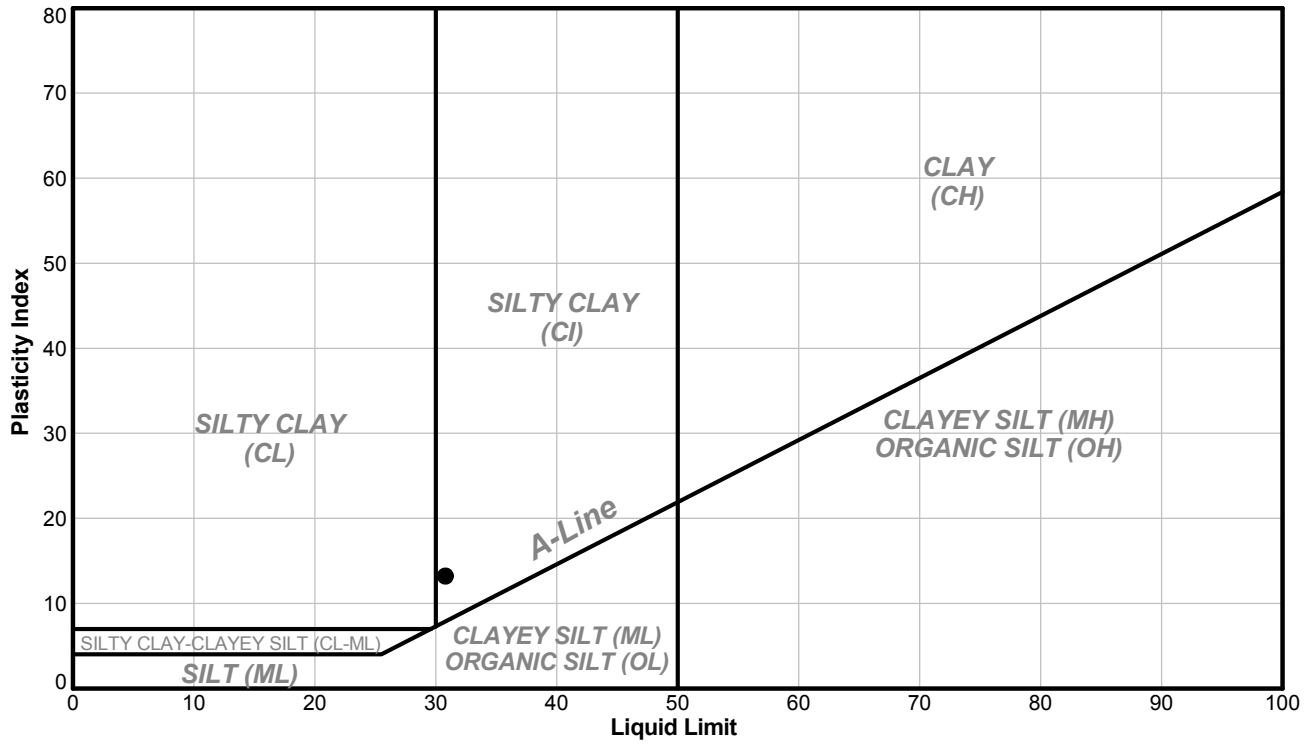
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-10**
Project:	Phase 4 Viterra	**Sample No.:**	**13**
Location:	Burnaby, BC	**Depth Interval (m):**	11.43 to 11.58
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-10	13	11.43	11.58	99	31	18	13.0	26.0	0.6

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	8/13/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

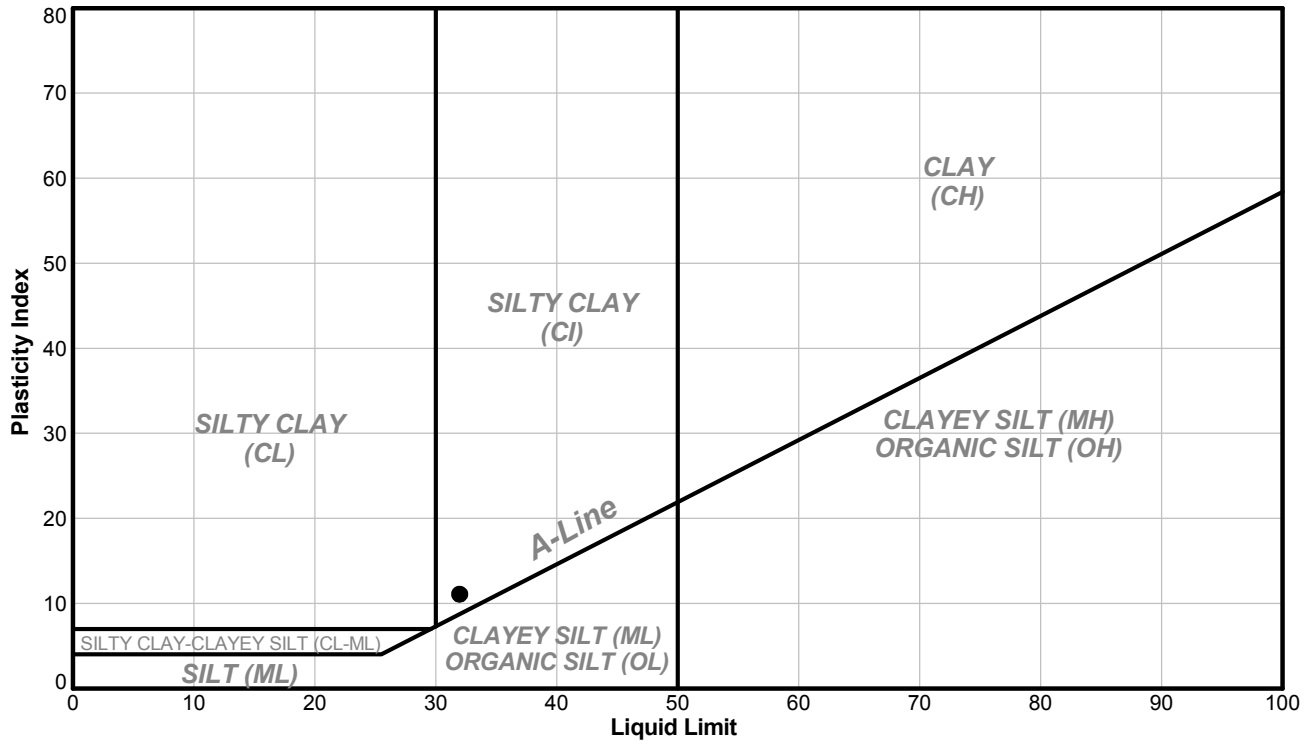
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-10**
Project:	Phase 4 Viterra	**Sample No.:**	**18**
Location:	Burnaby, BC	**Depth Interval (m):**	17.53 to 17.68
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-10	18	17.53	17.68	ND	32	21	11.0	27.7	0.6

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	8/13/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

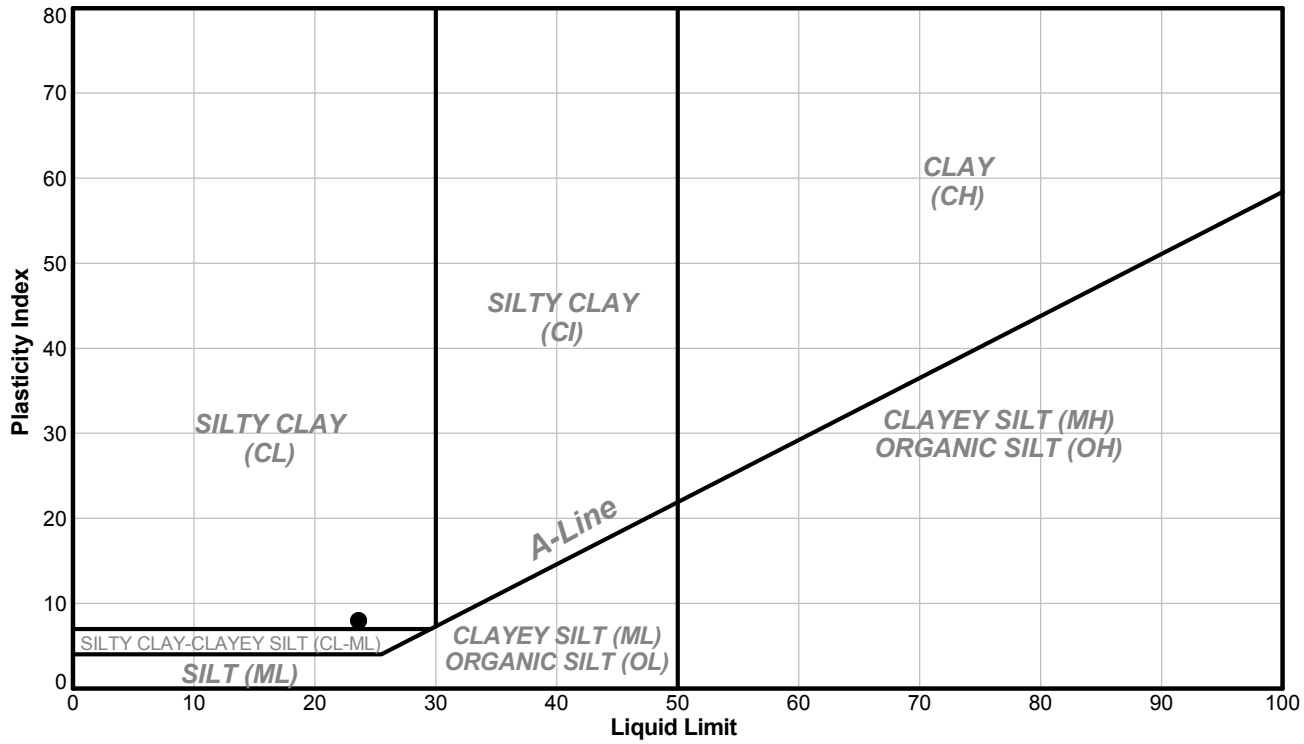
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-11**
Project:	Phase 4 Viterra	**Sample No.:**	**3**
Location:	Burnaby, BC	**Depth Interval (m):**	0.91 to 1.07
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-11	3	0.91	1.07	ND	24	16	8.0	19.7	0.5

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

DC	8/14/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

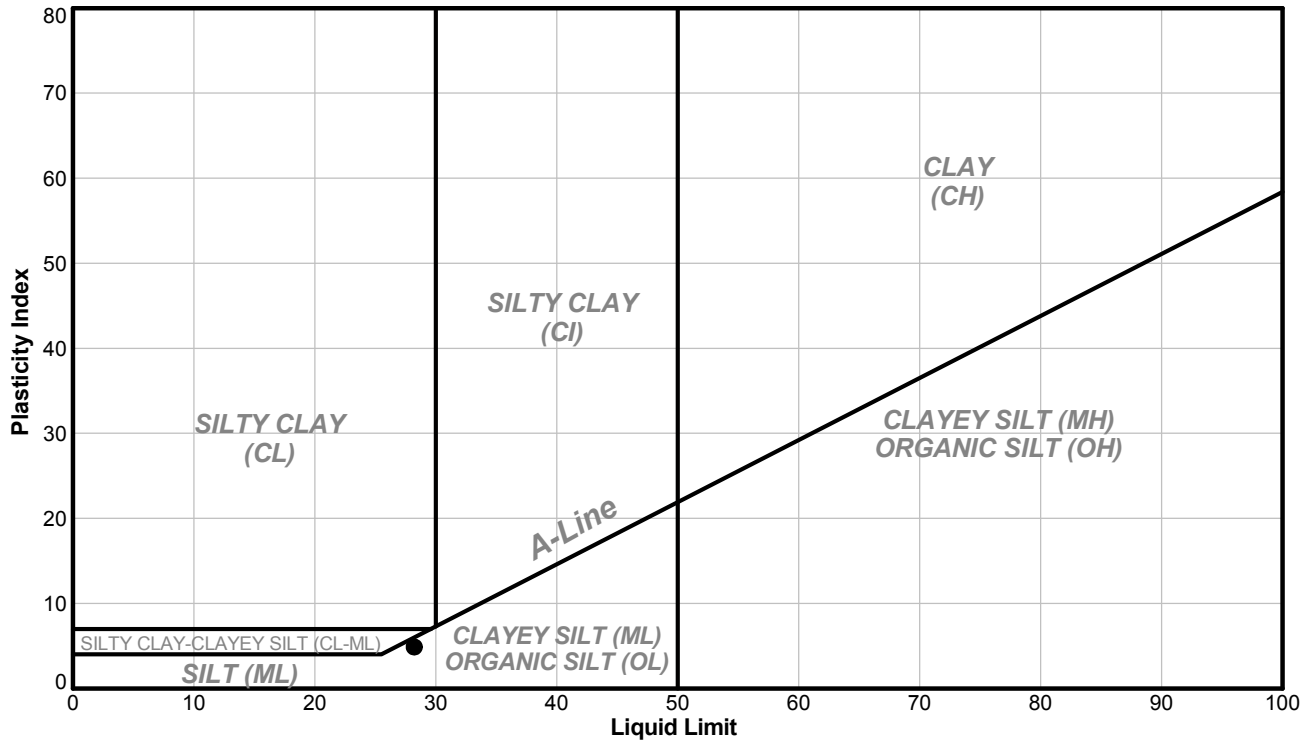
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-11**
Project:	Phase 4 Viterra	**Sample No.:**	**4**
Location:	Burnaby, BC	**Depth Interval (m):**	2.29 to 2.44
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-11	4	2.29	2.44	100	28	23	5.0	27.3	0.9

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	8/11/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

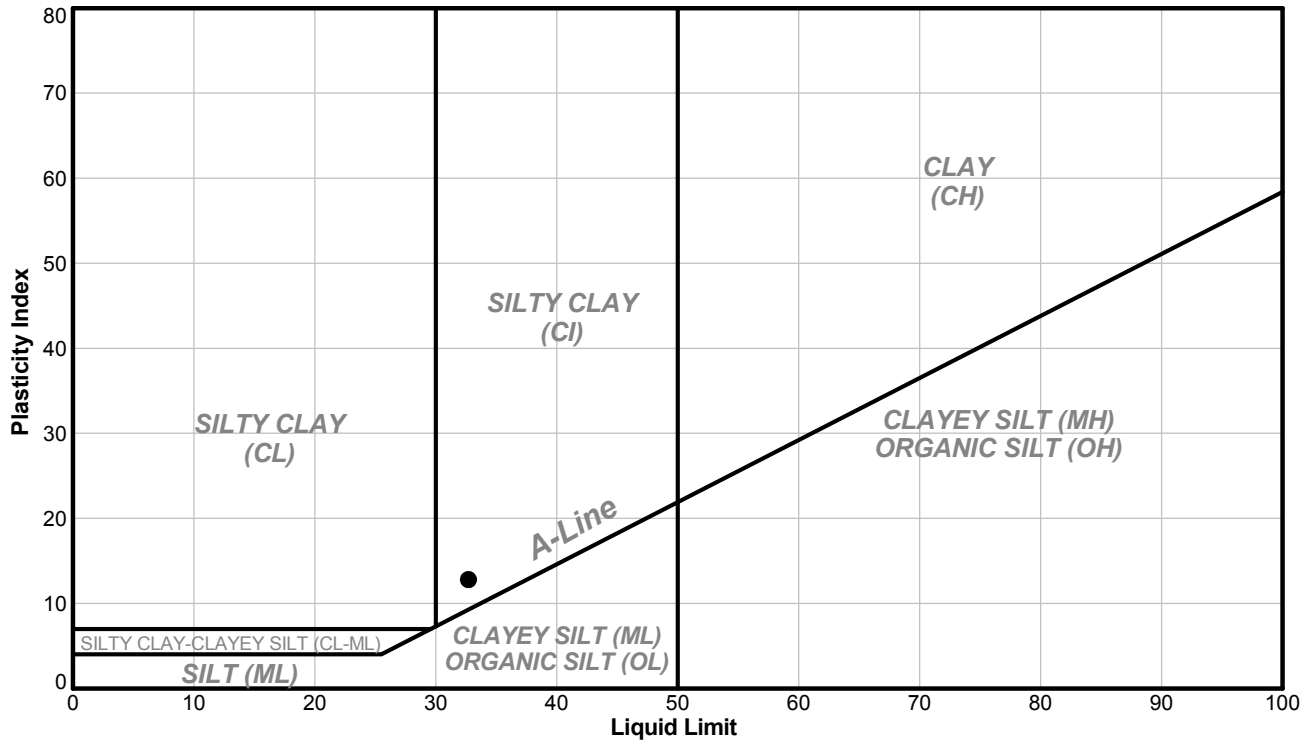
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-11**
Project:	Phase 4 Viterra	**Sample No.:**	**6**
Location:	Burnaby, BC	**Depth Interval (m):**	5.49 to 5.64
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Wet**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-11	6	5.49	5.64	ND	33	20	13.0	31.1	0.9

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

NE	**8/12/2020**	**SJ**	**8/20/2020**
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LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX OF SOILS

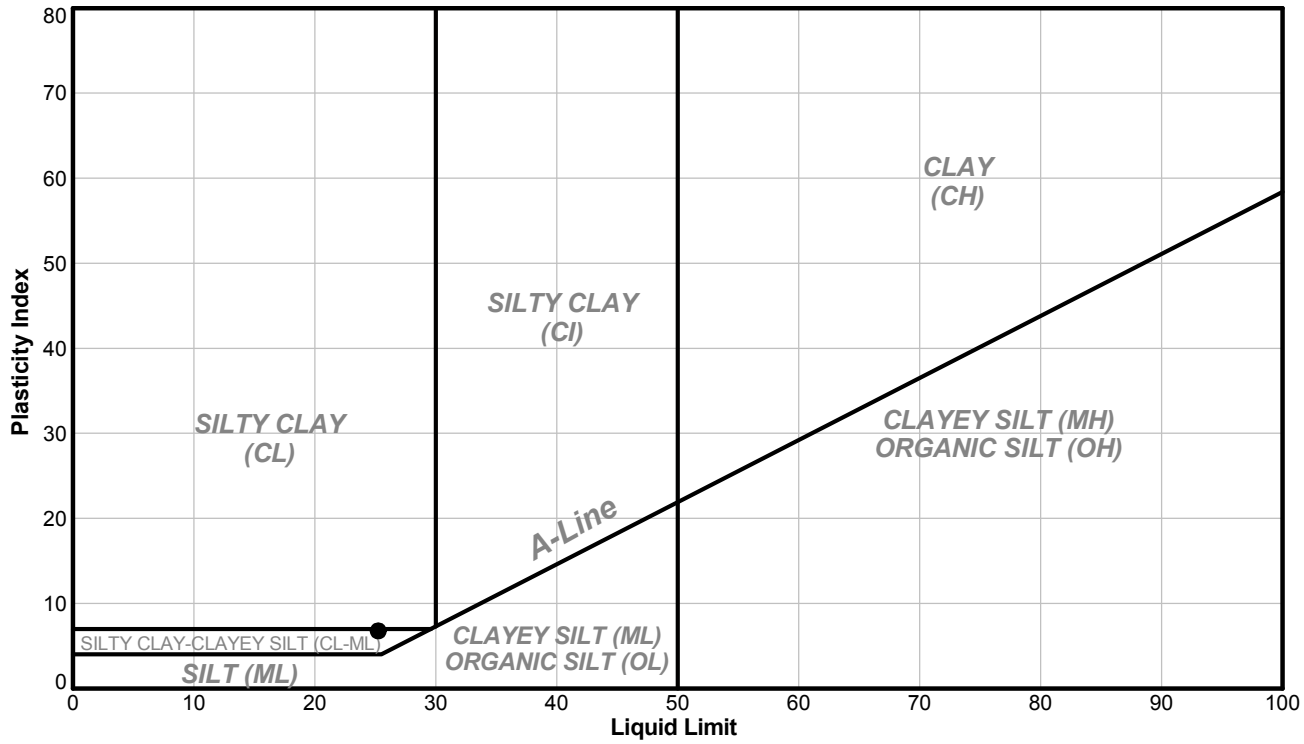
ASTM D 4318

Client:	CP Rail	**Sonic Hole ID:**	**SH20-11**
Project:	Phase 4 Viterra	**Sample No.:**	**9**
Location:	Burnaby, BC	**Depth Interval (m):**	9.91 to 10.06
Project No.:	20143647 **Phase:** 2000	**Lab Schedule No.:**	

Other Remarks: **N/A**

Test Method: A-Multi Point	**Preparation Method: Air Dried**

PLASTICITY CHART



Sym.	Sample Location	Sample / Specimen Number	Depth (m)	Bottom (m)	Percent Passing #40 Sieve (%)	Liquid Limit	Plastic Limit	Plasticity Index	Natural Water Content (%)	Liquidity Index
●	SH20-11	9	9.91	10.06	100	25	18	7.0	27.0	1.3

NP - NON-PLASTIC RESULT ND - NOT DETERMINED

Note: The test data given herein pertain to the sample provided only. This report constitutes a testing service only.

FF	**8/11/2020**	**SJ**	**8/20/2020**
Tech	Date	Checked	Date

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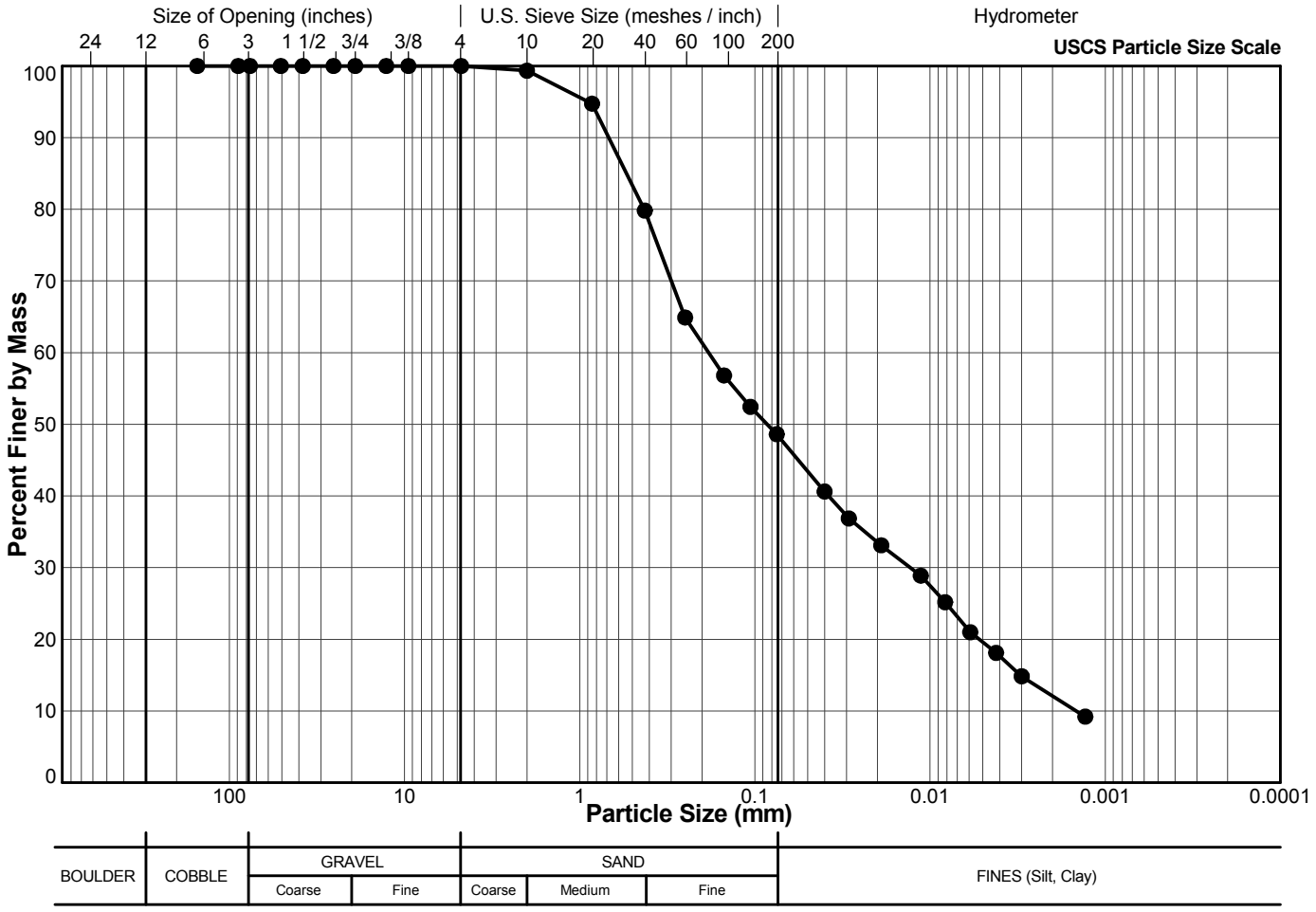
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-01
Sample No.: 5
Depth Interval (m): 4.57 to 4.98
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		99.3
#20 US MESH	0.85		94.7
#40 US MESH	0.425		79.8
#60 US MESH	0.25		64.9
#100 US MESH	0.15		56.8
#140 US MESH	0.106		52.4
#200 US MESH	0.075		48.6
		0.0400	40.6
		0.0291	36.9
		0.0190	33.1
		0.0113	28.9
		0.0082	25.2
		0.0059	21.0
		0.0042	18.1
		0.0030	14.8
		0.0013	9.2

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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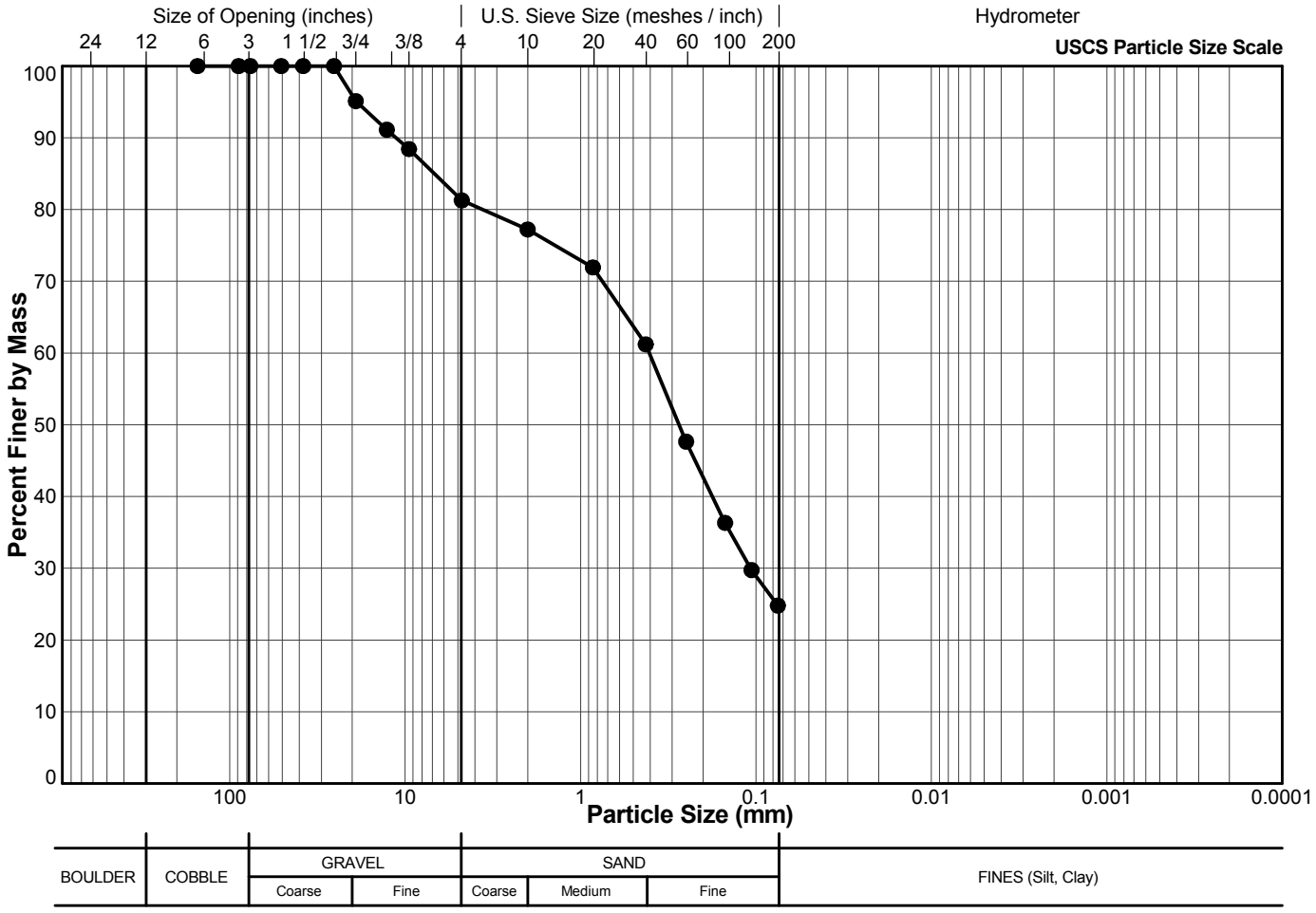
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-02
Sample No.: 1
Depth Interval (m): 0.76 to 1.37
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		95.1
1/2"	12.7		91.1
3/8"	9.5		88.4
#4 US MESH	4.75		81.3
#10 US MESH	2		77.2
#20 US MESH	0.85		71.9
#40 US MESH	0.425		61.2
#60 US MESH	0.25		47.6
#100 US MESH	0.15		36.3
#140 US MESH	0.106		29.7
#200 US MESH	0.075		24.8

PE	7/9/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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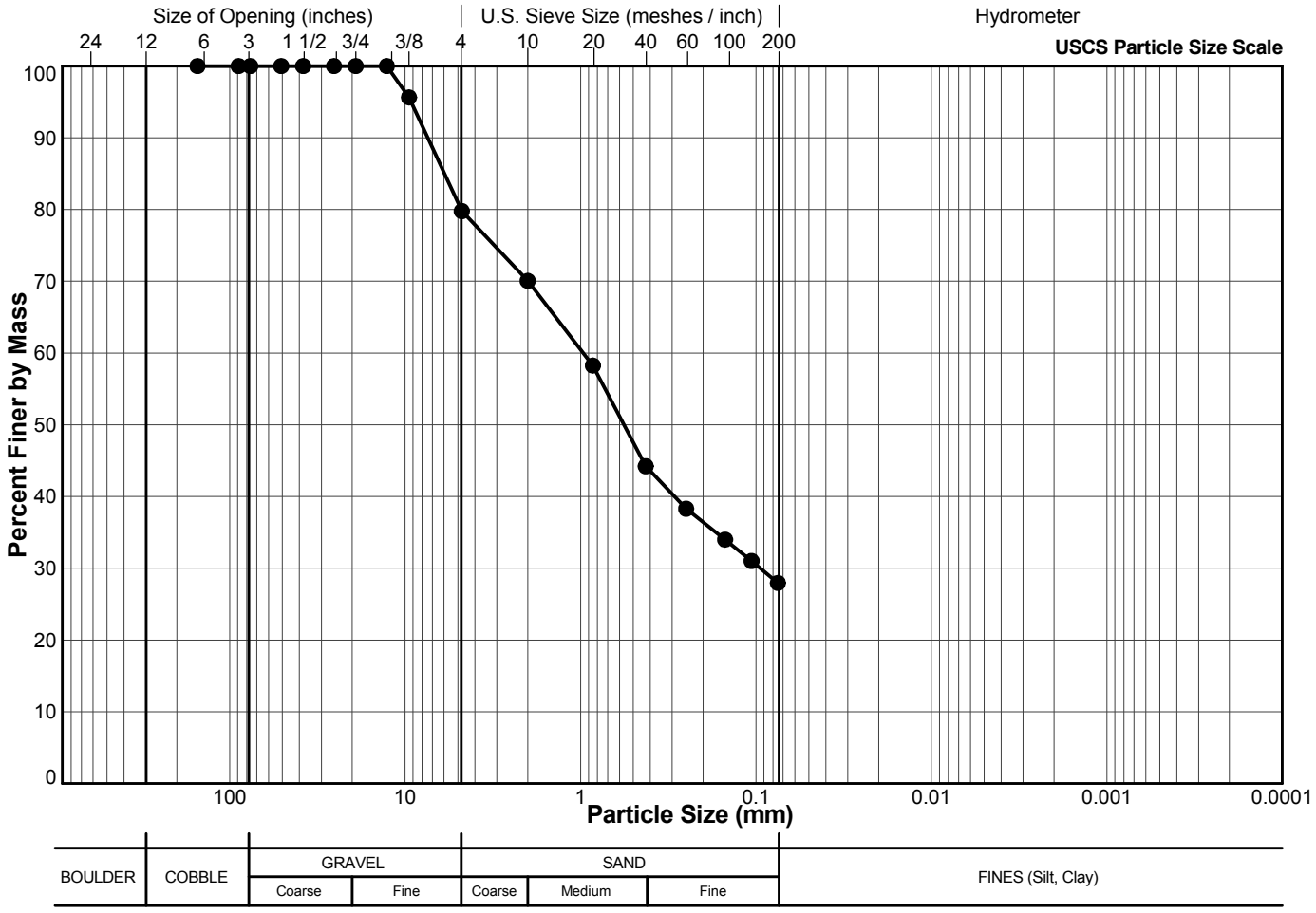
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-02
Sample No.: 4
Depth Interval (m): 3.05 to 3.66
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		95.6
#4 US MESH	4.75		79.8
#10 US MESH	2		70.1
#20 US MESH	0.85		58.2
#40 US MESH	0.425		44.2
#60 US MESH	0.25		38.3
#100 US MESH	0.15		34.0
#140 US MESH	0.106		31.0
#200 US MESH	0.075		27.9

VN	7/11/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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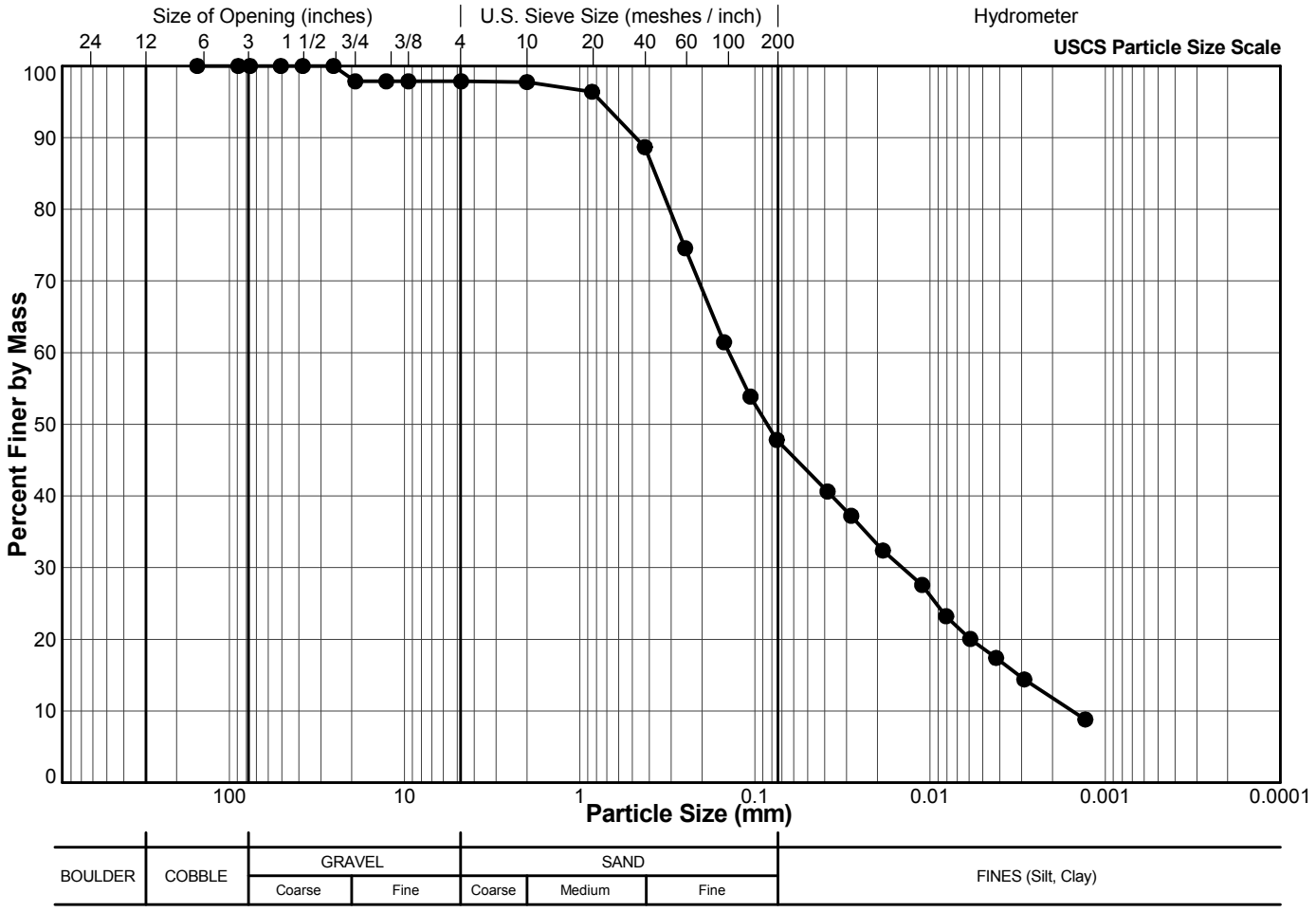
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-02
Sample No.: 6
Depth Interval (m): 4.27 to 4.42
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		97.9
1/2"	12.7		97.9
3/8"	9.5		97.9
#4 US MESH	4.75		97.9
#10 US MESH	2		97.8
#20 US MESH	0.85		96.4
#40 US MESH	0.425		88.7
#60 US MESH	0.25		74.6
#100 US MESH	0.15		61.5
#140 US MESH	0.106		53.9
#200 US MESH	0.075		47.8
		0.0385	40.6
		0.0282	37.2
		0.0186	32.4
		0.0111	27.6
		0.0081	23.2
		0.0059	20.0
		0.0042	17.4
		0.0029	14.4
		0.0013	8.8

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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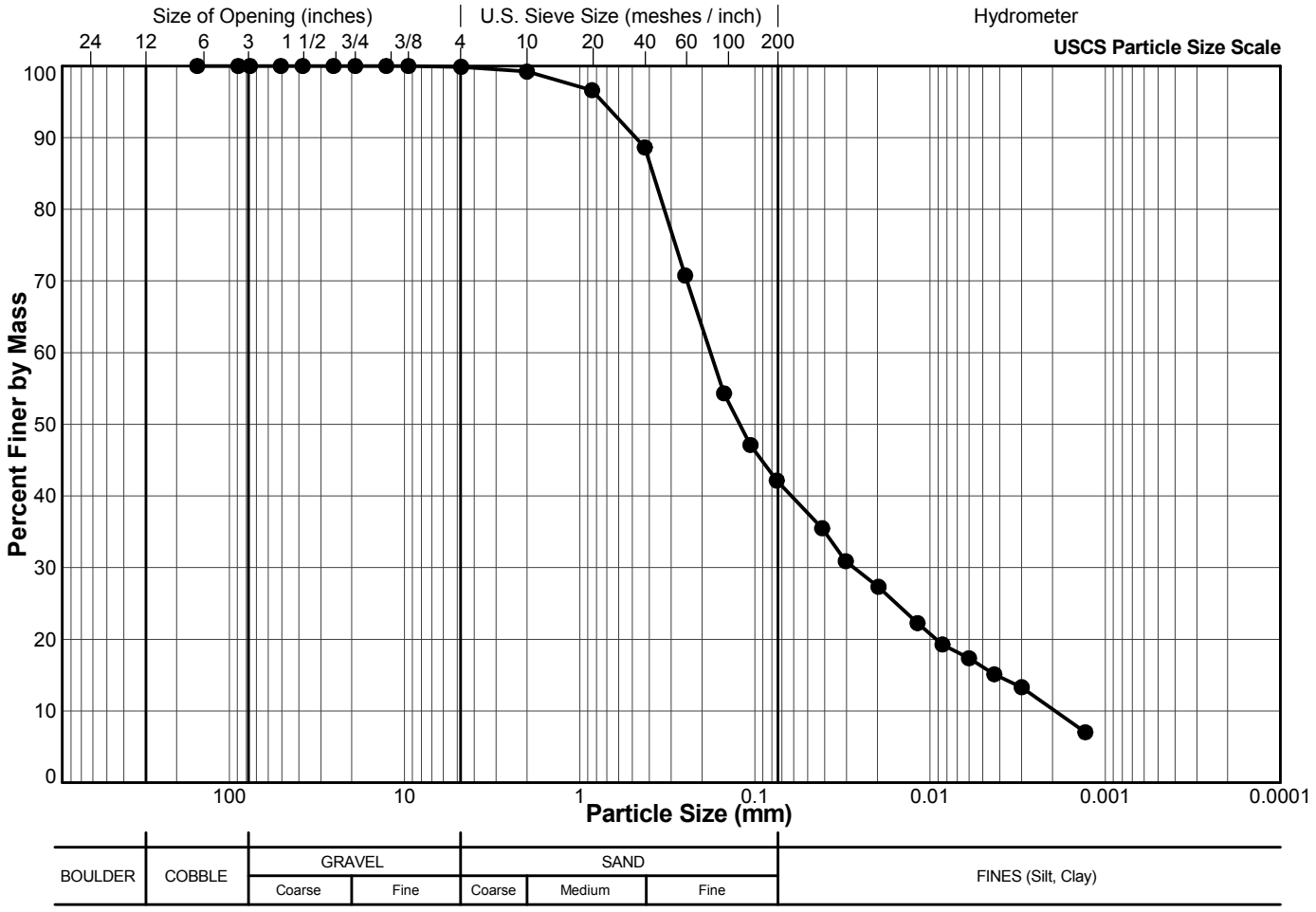
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-02
Sample No.: 7
Depth Interval (m): 6.10 to 6.55
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		99.9
#10 US MESH	2		99.2
#20 US MESH	0.85		96.6
#40 US MESH	0.425		88.6
#60 US MESH	0.25		70.8
#100 US MESH	0.15		54.3
#140 US MESH	0.106		47.1
#200 US MESH	0.075		42.2
		0.0413	35.5
		0.0303	30.9
		0.0197	27.3
		0.0118	22.3
		0.0085	19.3
		0.0060	17.3
		0.0043	15.1
		0.0030	13.3
		0.0013	7.0

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

National IM Server:GINT_GAL_NATIONALIM Unique Project ID:2563 Output Form:_LAB_PARTICLE SIZE (W/ GRADATIONS) 2018 JSoquila 8/21/20

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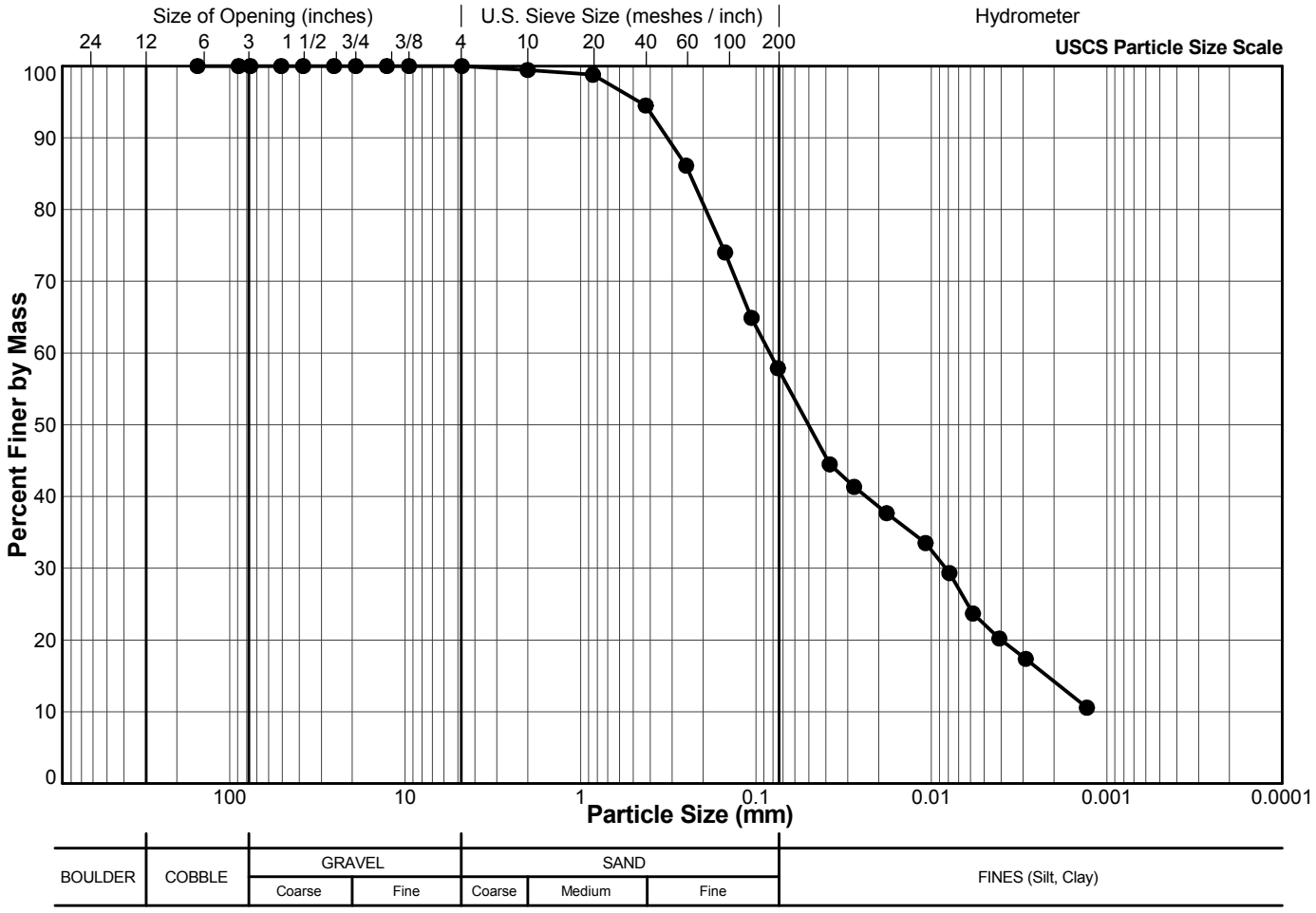
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-03
Sample No.: 3 **Specimen:** 3A
Depth Interval (m): 3.05 to 3.35
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		99.4
#20 US MESH	0.85		98.8
#40 US MESH	0.425		94.5
#60 US MESH	0.25		86.1
#100 US MESH	0.15		74.0
#140 US MESH	0.106		64.9
#200 US MESH	0.075		57.9
		0.0380	44.5
		0.0276	41.3
		0.0180	37.7
		0.0108	33.5
		0.0079	29.3
		0.0058	23.7
		0.0041	20.2
		0.0029	17.4
		0.0013	10.6

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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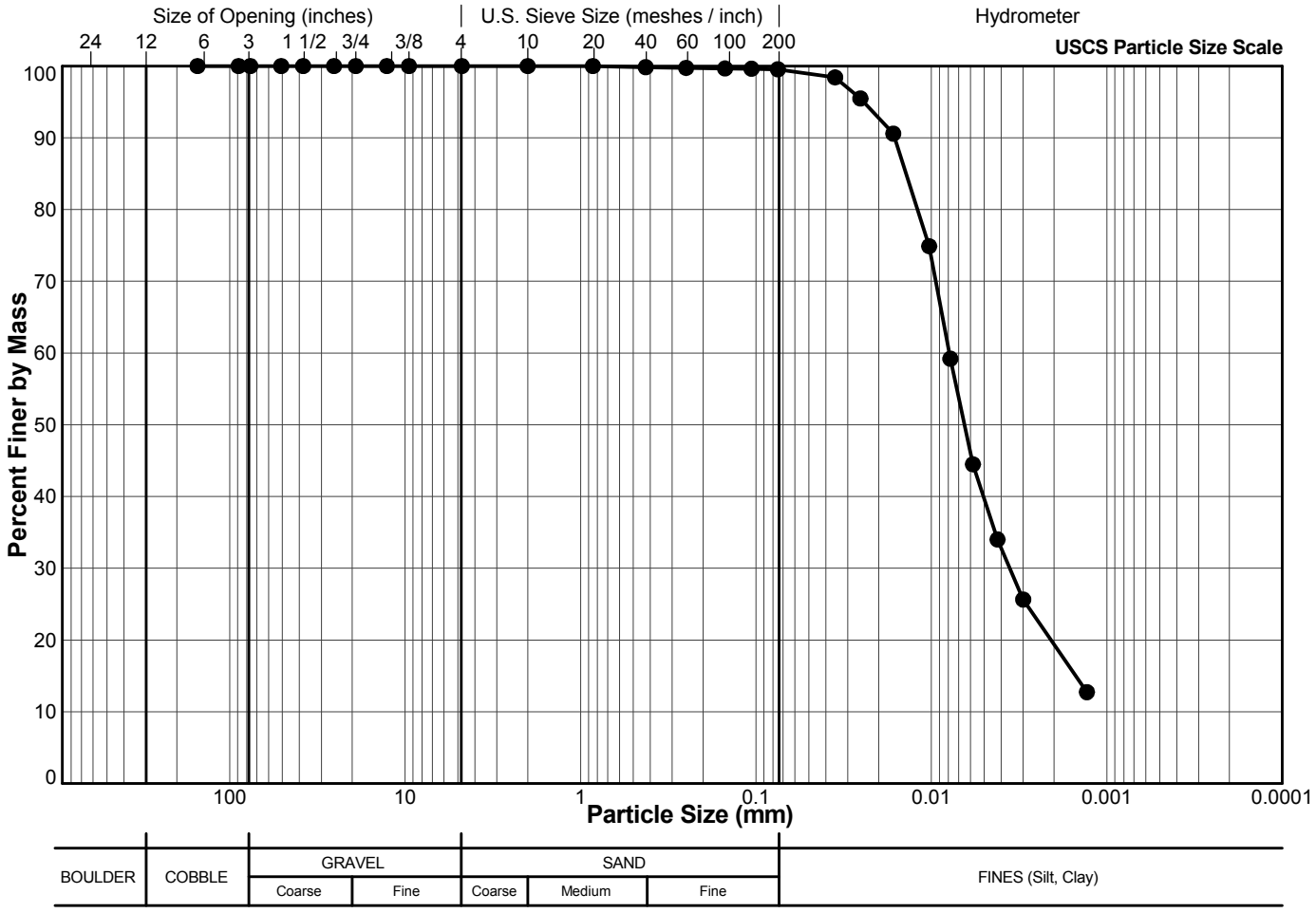
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-04
Sample No.: 6
Depth Interval (m): 6.10 to 6.71
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		100.0
#40 US MESH	0.425		99.8
#60 US MESH	0.25		99.7
#100 US MESH	0.15		99.7
#140 US MESH	0.106		99.6
#200 US MESH	0.075		99.5
		0.0354	98.4
		0.0254	95.5
		0.0165	90.6
		0.0103	74.9
		0.0078	59.2
		0.0058	44.5
		0.0042	34.0
		0.0030	25.6
		0.0013	12.7

KS/DC	7/14/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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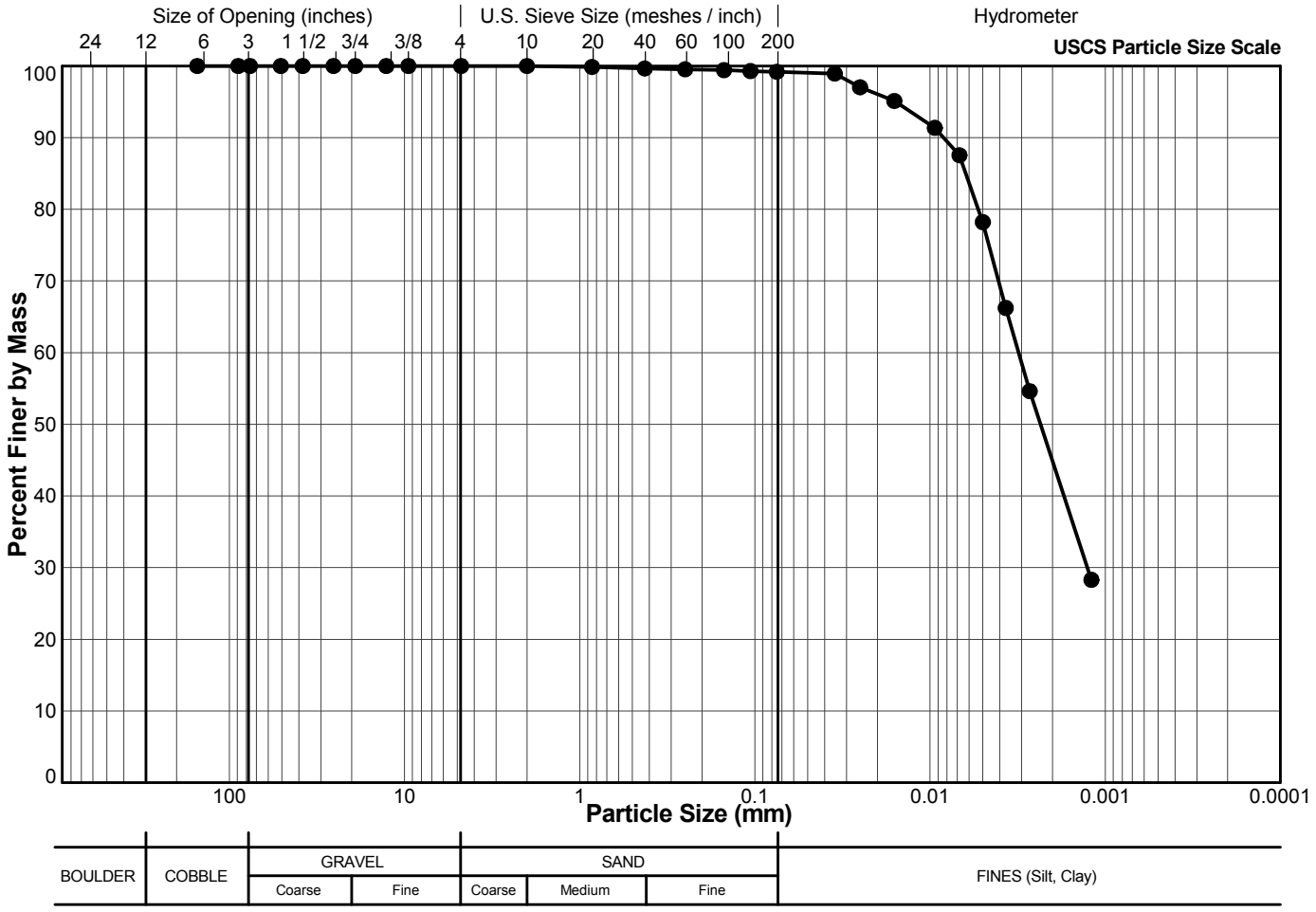
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-04
Sample No.: 7
Depth Interval (m): 7.62 to 8.23
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.9
#40 US MESH	0.425		99.7
#60 US MESH	0.25		99.5
#100 US MESH	0.15		99.4
#140 US MESH	0.106		99.3
#200 US MESH	0.075		99.2
		0.0350	98.9
		0.0251	97.0
		0.0160	95.1
		0.0094	91.4
		0.0068	87.5
		0.0050	78.2
		0.0037	66.2
		0.0027	54.6
		0.0012	28.3

KS	7/20/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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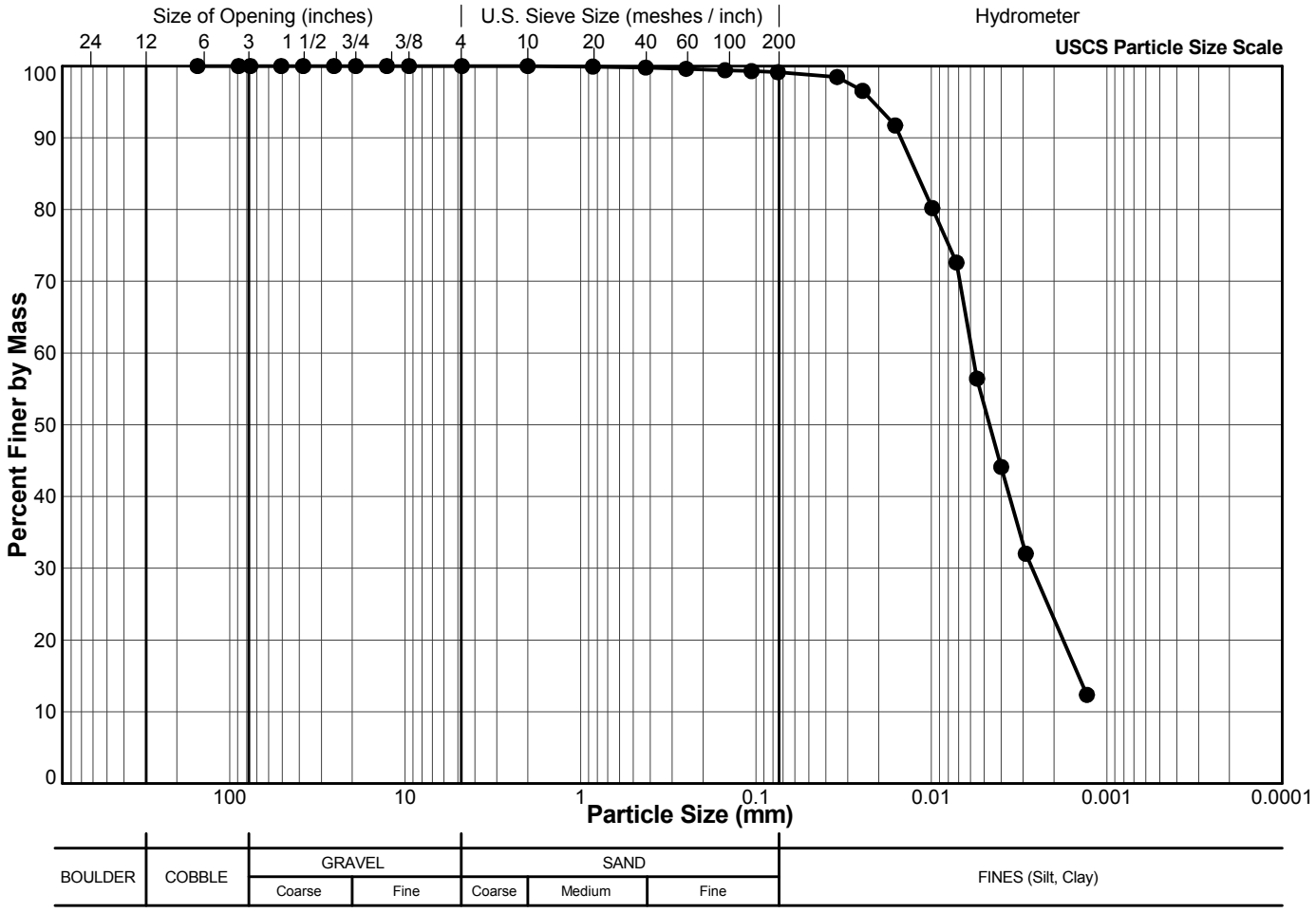
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-04
Sample No.: 9
Depth Interval (m): 10.67 to 11.28
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.9
#40 US MESH	0.425		99.8
#60 US MESH	0.25		99.6
#100 US MESH	0.15		99.4
#140 US MESH	0.106		99.3
#200 US MESH	0.075		99.1
		0.0345	98.5
		0.0247	96.5
		0.0161	91.7
		0.0099	80.2
		0.0072	72.6
		0.0055	56.4
		0.0040	44.1
		0.0029	32.0
		0.0013	12.4

KS	7/20/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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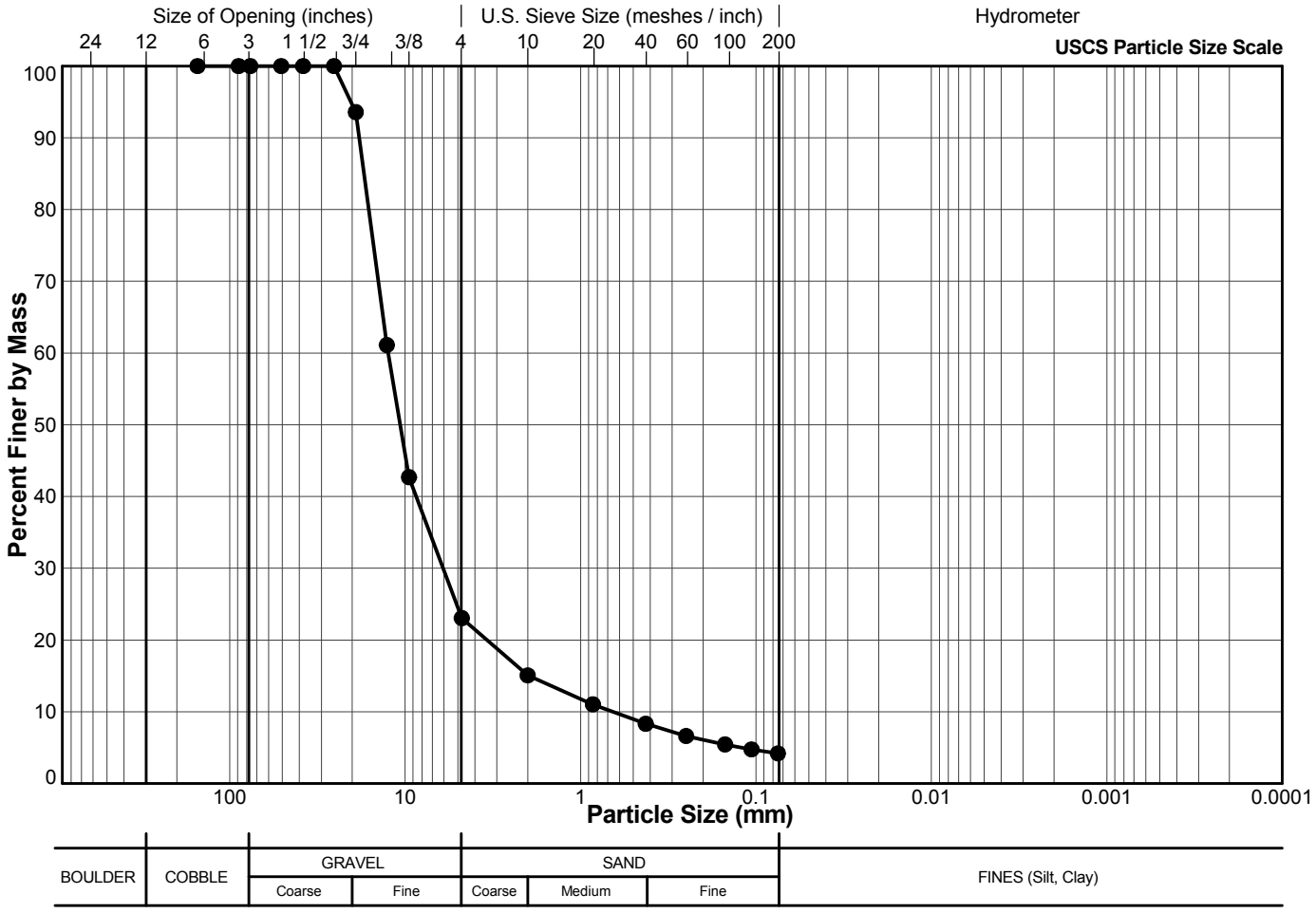
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-06
Sample No.: 5
Depth Interval (m): 5.33 to 6.10
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		93.6
1/2"	12.7		61.1
3/8"	9.5		42.7
#4 US MESH	4.75		23.1
#10 US MESH	2		15.1
#20 US MESH	0.85		11.0
#40 US MESH	0.425		8.3
#60 US MESH	0.25		6.6
#100 US MESH	0.15		5.4
#140 US MESH	0.106		4.8
#200 US MESH	0.075		4.2

PE	7/9/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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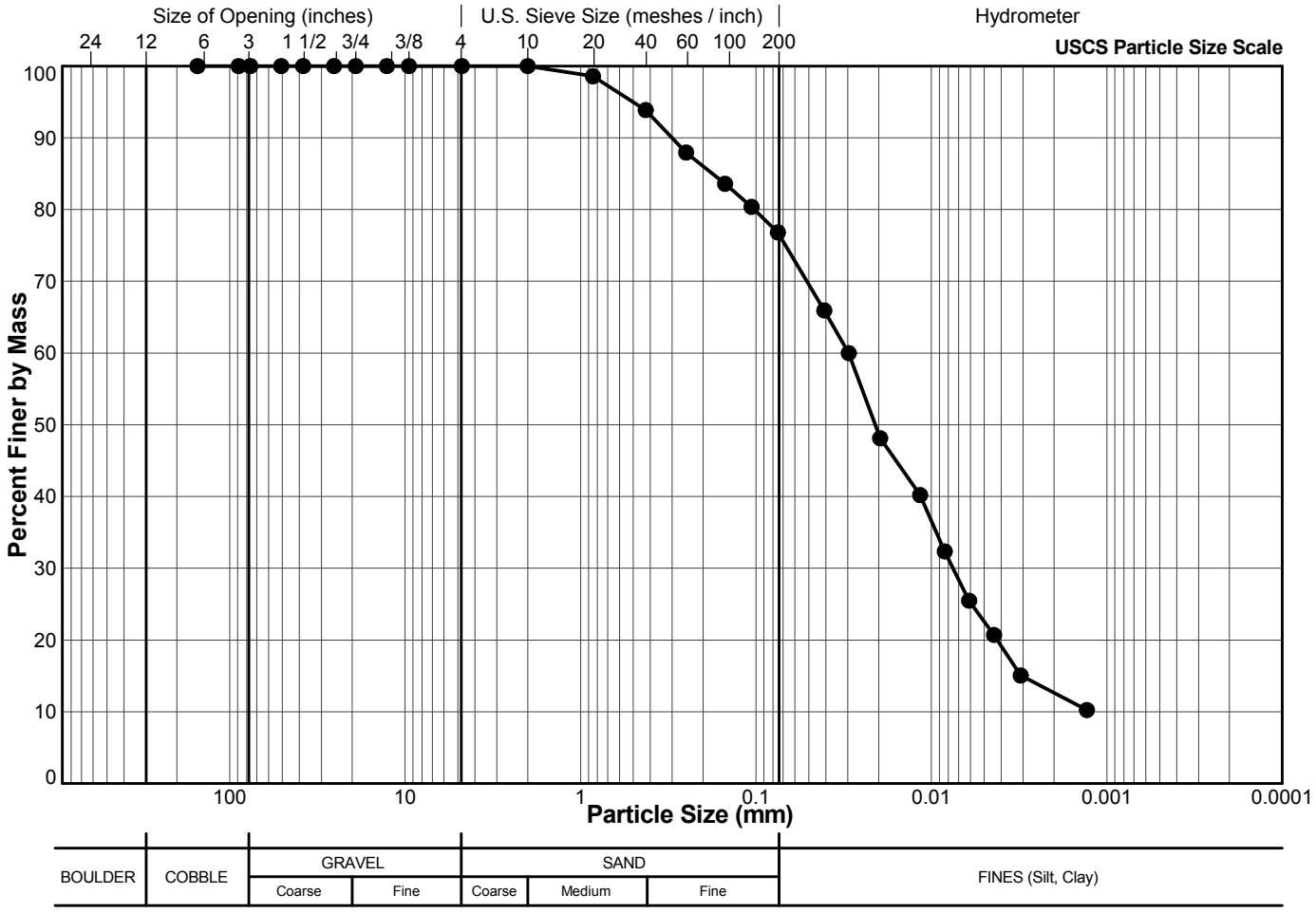
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-06
Sample No.: 7
Depth Interval (m): 7.62 to 8.23
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		98.6
#40 US MESH	0.425		93.9
#60 US MESH	0.25		87.9
#100 US MESH	0.15		83.6
#140 US MESH	0.106		80.4
#200 US MESH	0.075		76.8
		0.0408	65.9
		0.0296	60.0
		0.0196	48.1
		0.0116	40.2
		0.0084	32.3
		0.0061	25.5
		0.0044	20.7
		0.0031	15.1
		0.0013	10.2

KS/DC	7/14/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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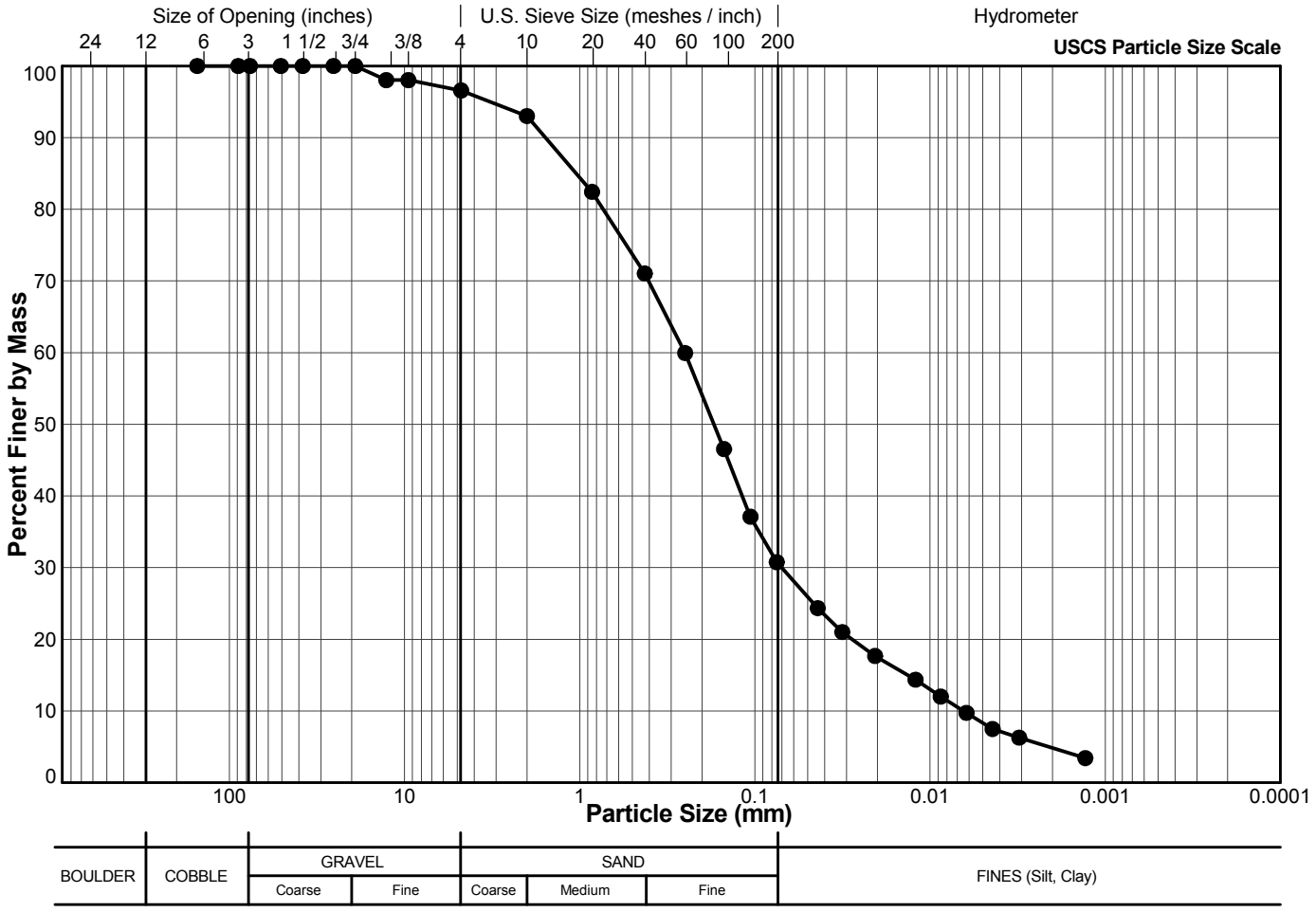
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-07
Sample No.: 2
Depth Interval (m): 3.05 to 3.66
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		98.0
3/8"	9.5		98.0
#4 US MESH	4.75		96.6
#10 US MESH	2		93.0
#20 US MESH	0.85		82.4
#40 US MESH	0.425		71.0
#60 US MESH	0.25		59.9
#100 US MESH	0.15		46.5
#140 US MESH	0.106		37.1
#200 US MESH	0.075		30.8
		0.0438	24.3
		0.0317	21.0
		0.0206	17.7
		0.0121	14.4
		0.0087	12.0
		0.0062	9.7
		0.0044	7.5
		0.0031	6.3
		0.0013	3.4

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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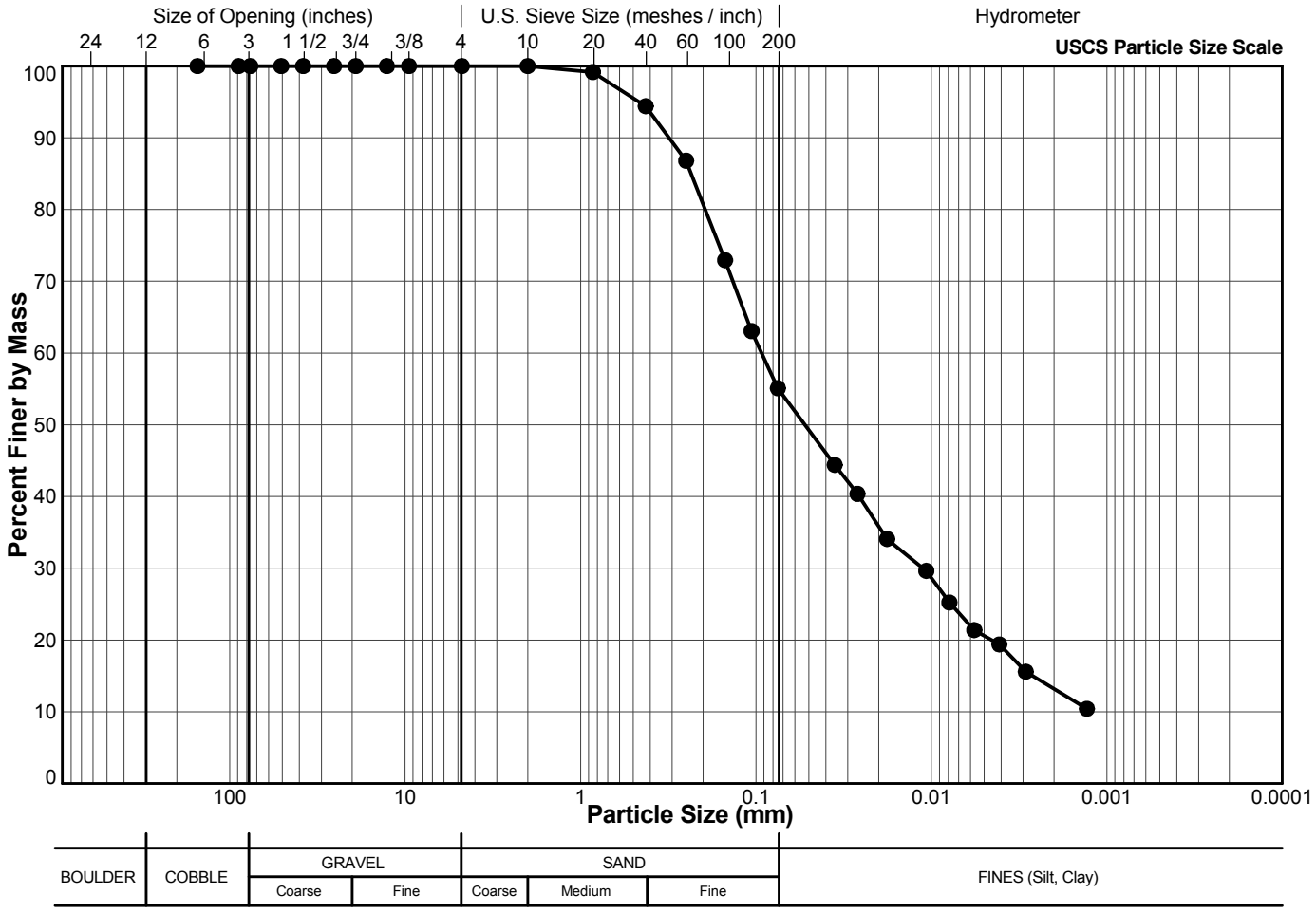
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-07
Sample No.: 3 **Specimen:** 3B
Depth Interval (m): 4.88 to 5.03
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.2
#40 US MESH	0.425		94.4
#60 US MESH	0.25		86.8
#100 US MESH	0.15		72.9
#140 US MESH	0.106		63.1
#200 US MESH	0.075		55.1
		0.0356	44.4
		0.0264	40.4
		0.0179	34.1
		0.0107	29.6
		0.0079	25.2
		0.0057	21.4
		0.0041	19.4
		0.0029	15.6
		0.0013	10.4

KS/NE	7/13/2020	SJ	7/21/2020
Tech	Date	Checked	Date

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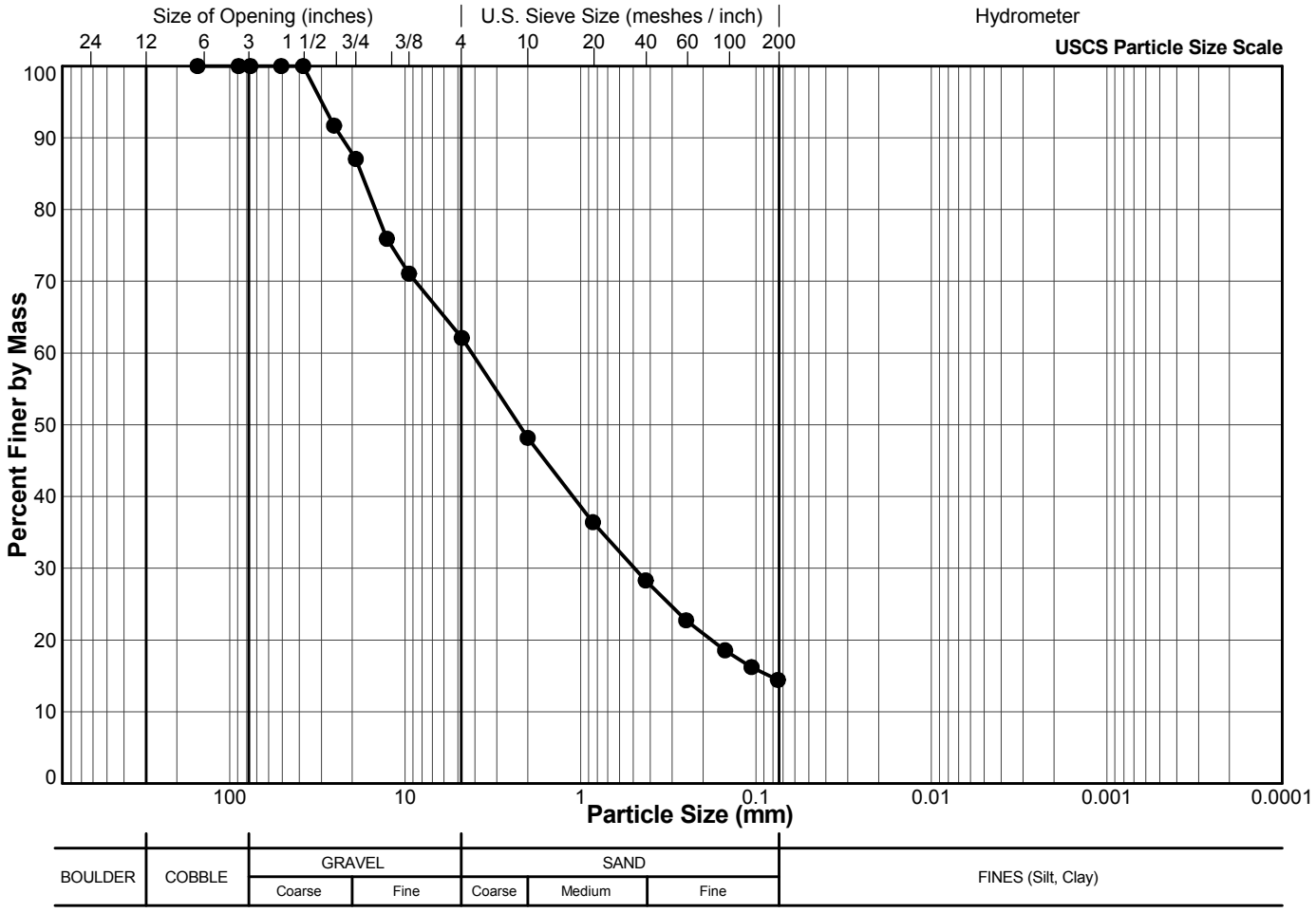
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-08
Sample No.: 1
Depth Interval (m): 1.52 to 2.13
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		91.7
3/4"	19.1		87.0
1/2"	12.7		75.9
3/8"	9.5		71.1
#4 US MESH	4.75		62.1
#10 US MESH	2		48.2
#20 US MESH	0.85		36.4
#40 US MESH	0.425		28.3
#60 US MESH	0.25		22.7
#100 US MESH	0.15		18.6
#140 US MESH	0.106		16.2
#200 US MESH	0.075		14.4

NE	7/16/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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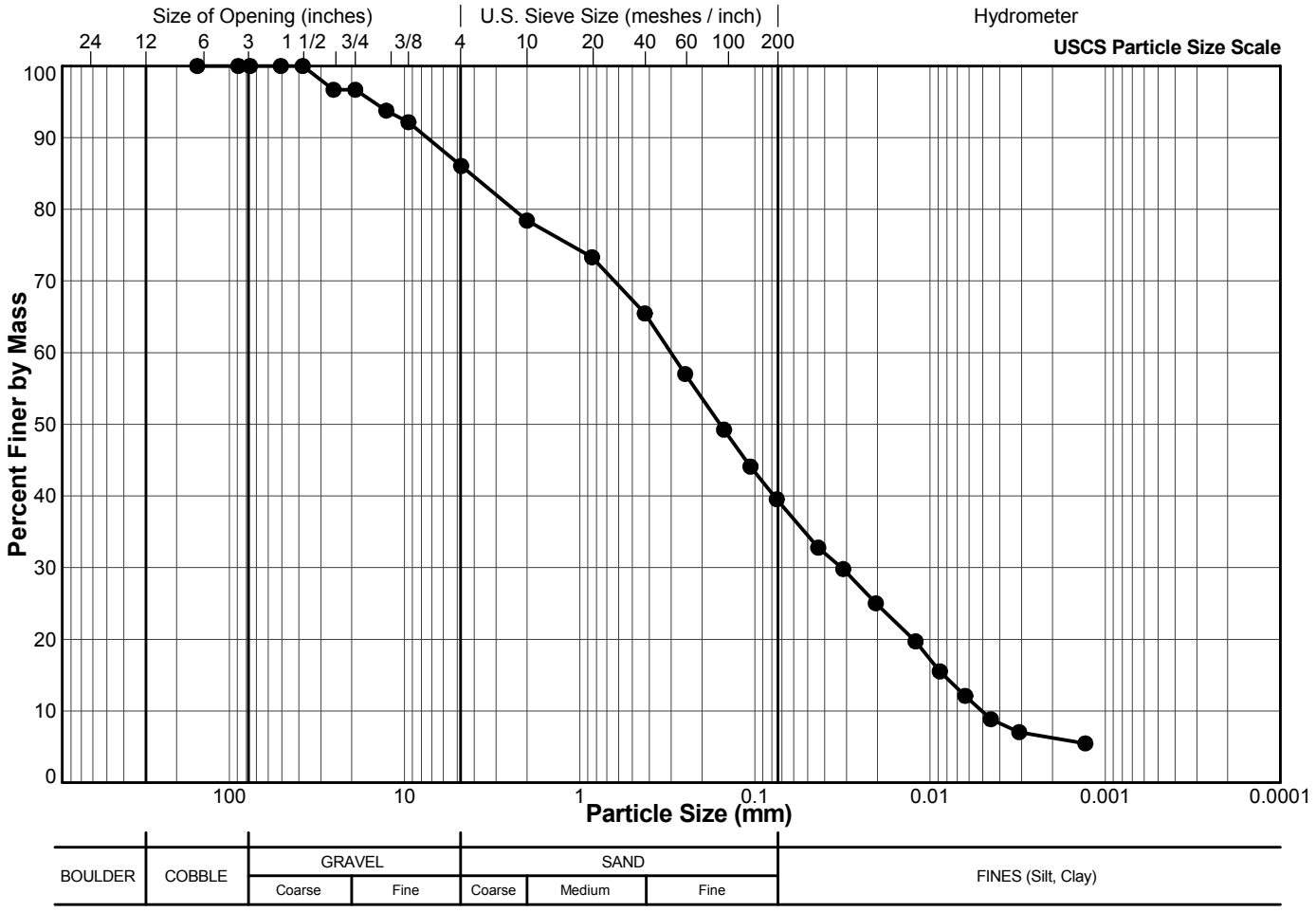
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-08
Sample No.: 2
Depth Interval (m): 3.05 to 3.66
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		96.7
3/4"	19.1		96.7
1/2"	12.7		93.8
3/8"	9.5		92.2
#4 US MESH	4.75		86.0
#10 US MESH	2		78.4
#20 US MESH	0.85		73.3
#40 US MESH	0.425		65.5
#60 US MESH	0.25		57.0
#100 US MESH	0.15		49.2
#140 US MESH	0.106		44.1
#200 US MESH	0.075		39.5
		0.0435	32.8
		0.0313	29.8
		0.0204	25.0
		0.0121	19.7
		0.0088	15.5
		0.0063	12.1
		0.0045	8.8
		0.0031	7.0
		0.0013	5.5

KS	7/20/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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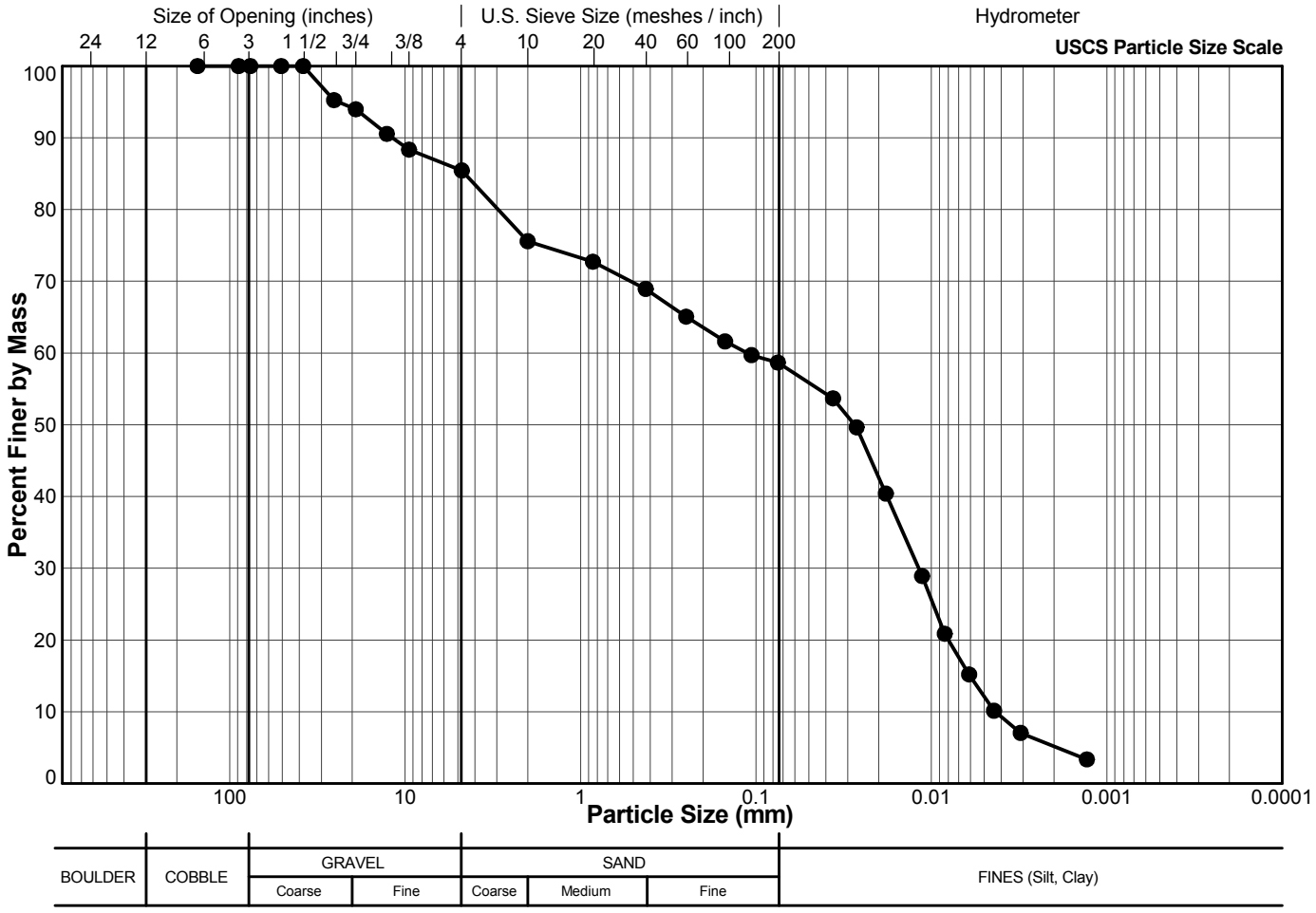
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-09
Sample No.: 1 **Specimen:** 1B
Depth Interval (m): 1.83 to 2.13
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		95.2
3/4"	19.1		94.0
1/2"	12.7		90.5
3/8"	9.5		88.4
#4 US MESH	4.75		85.4
#10 US MESH	2		75.6
#20 US MESH	0.85		72.7
#40 US MESH	0.425		68.9
#60 US MESH	0.25		65.1
#100 US MESH	0.15		61.6
#140 US MESH	0.106		59.7
#200 US MESH	0.075		58.7
		0.0364	53.7
		0.0267	49.6
		0.0182	40.4
		0.0113	28.9
		0.0084	20.9
		0.0061	15.2
		0.0044	10.1
		0.0031	7.0
		0.0013	3.4

KS	7/20/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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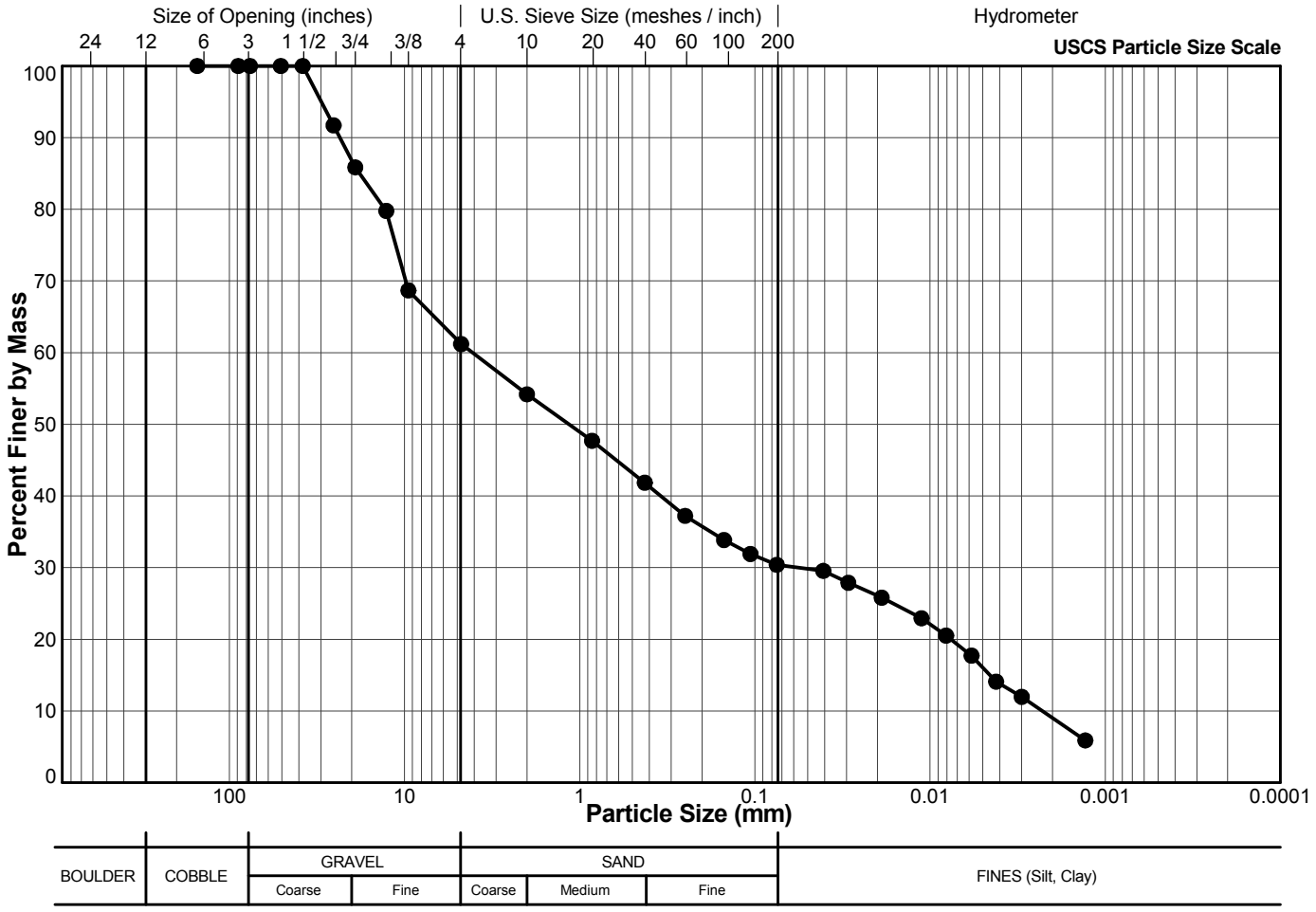
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-09
Sample No.: 3
Depth Interval (m): 4.57 to 5.18
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		91.7
3/4"	19.1		85.9
1/2"	12.7		79.8
3/8"	9.5		68.7
#4 US MESH	4.75		61.2
#10 US MESH	2		54.2
#20 US MESH	0.85		47.7
#40 US MESH	0.425		41.8
#60 US MESH	0.25		37.2
#100 US MESH	0.15		33.9
#140 US MESH	0.106		31.9
#200 US MESH	0.075		30.4
		0.0407	29.5
		0.0293	27.9
		0.0189	25.8
		0.0112	22.9
		0.0081	20.5
		0.0058	17.7
		0.0042	14.1
		0.0030	12.0
		0.0013	5.9

KS	7/20/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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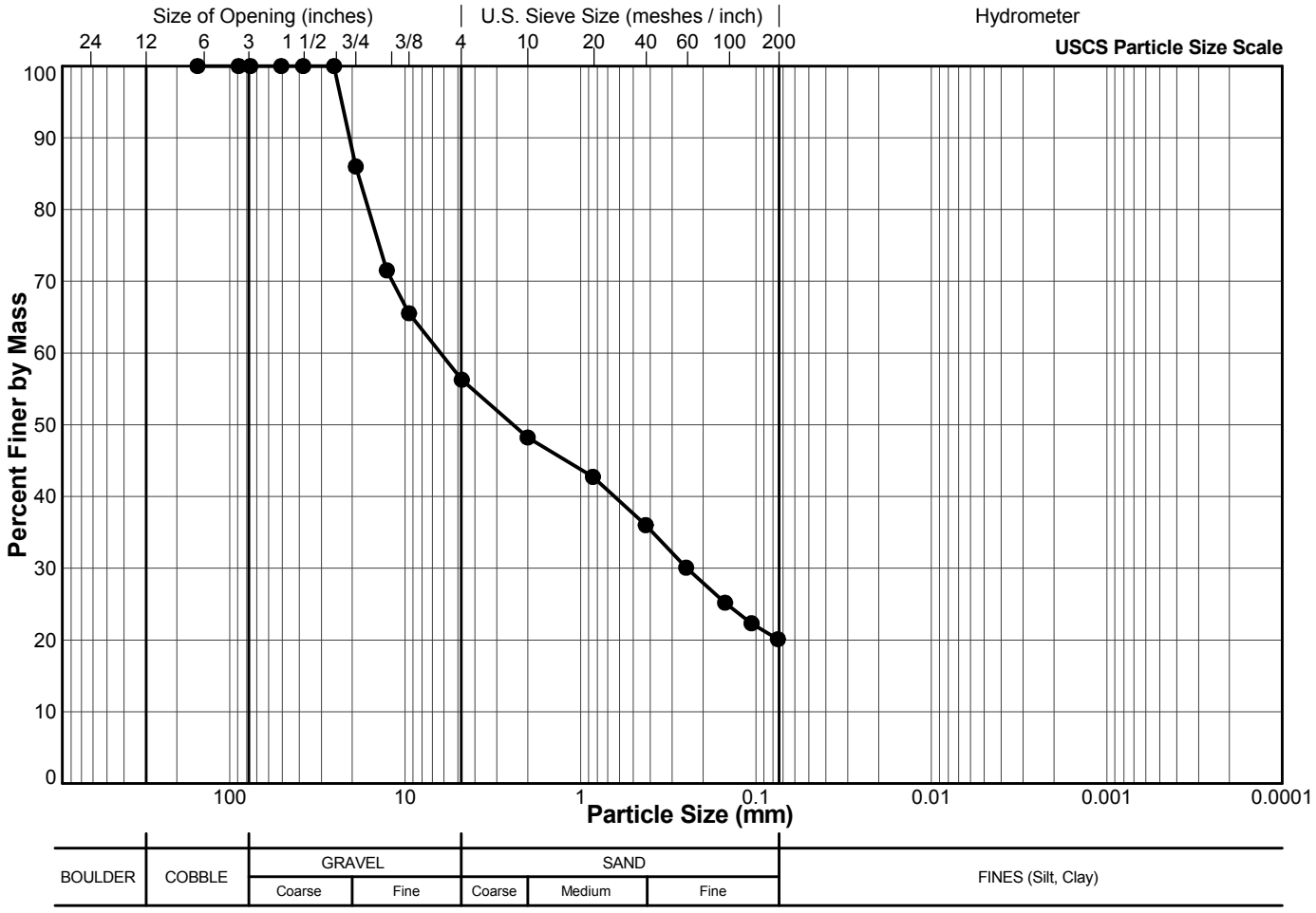
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: BH20-09
Sample No.: 5
Depth Interval (m): 7.62 to 8.23
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		86.0
1/2"	12.7		71.5
3/8"	9.5		65.5
#4 US MESH	4.75		56.3
#10 US MESH	2		48.2
#20 US MESH	0.85		42.7
#40 US MESH	0.425		36.0
#60 US MESH	0.25		30.1
#100 US MESH	0.15		25.2
#140 US MESH	0.106		22.3
#200 US MESH	0.075		20.1

NE	7/16/2020	SJ	7/22/2020
Tech	Date	Checked	Date

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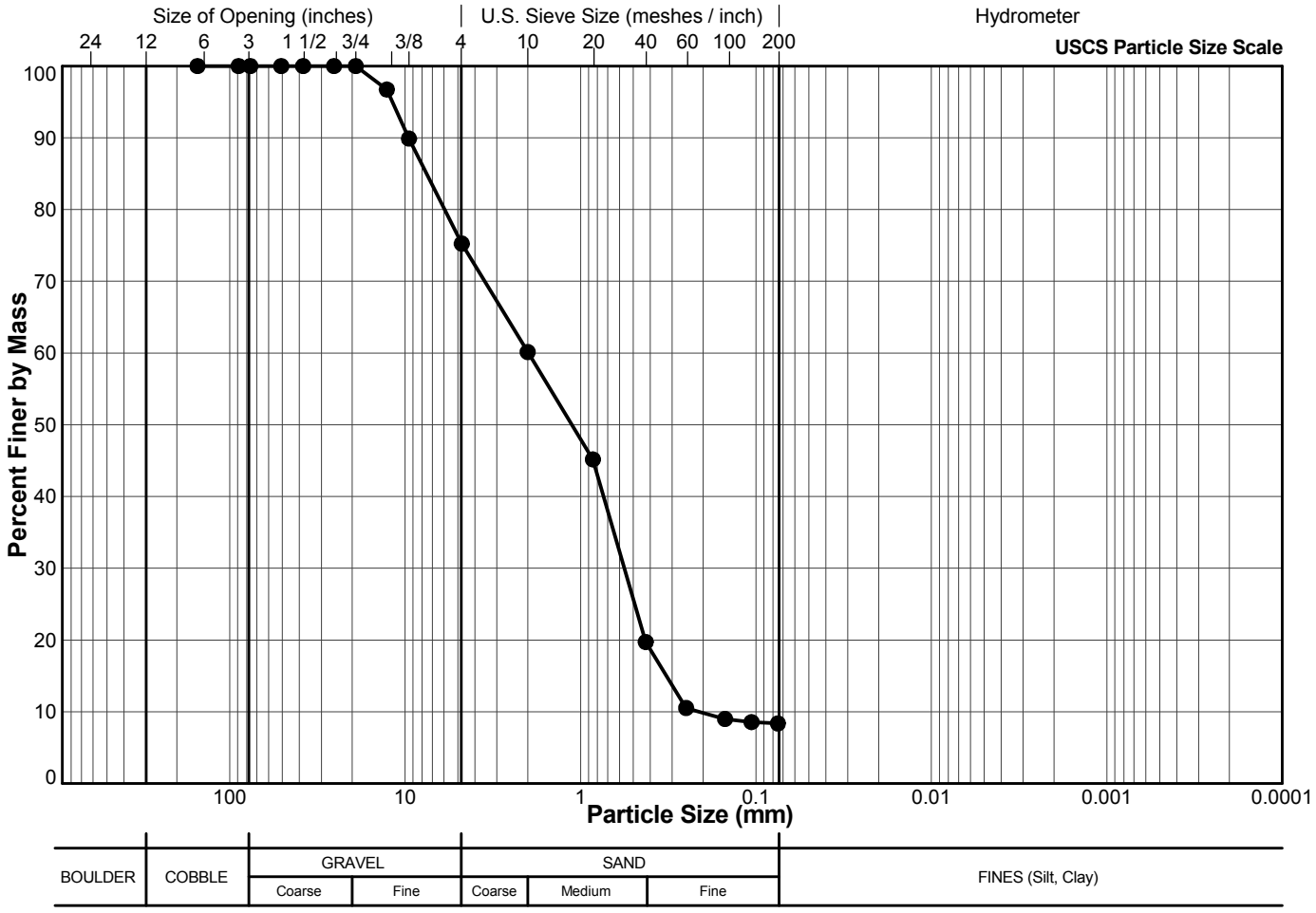
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-10
Sample No.: 3
Depth Interval (m): 1.37 to 1.52
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		96.7
3/8"	9.5		89.9
#4 US MESH	4.75		75.2
#10 US MESH	2		60.1
#20 US MESH	0.85		45.2
#40 US MESH	0.425		19.7
#60 US MESH	0.25		10.5
#100 US MESH	0.15		9.0
#140 US MESH	0.106		8.6
#200 US MESH	0.075		8.4

NE	8/7/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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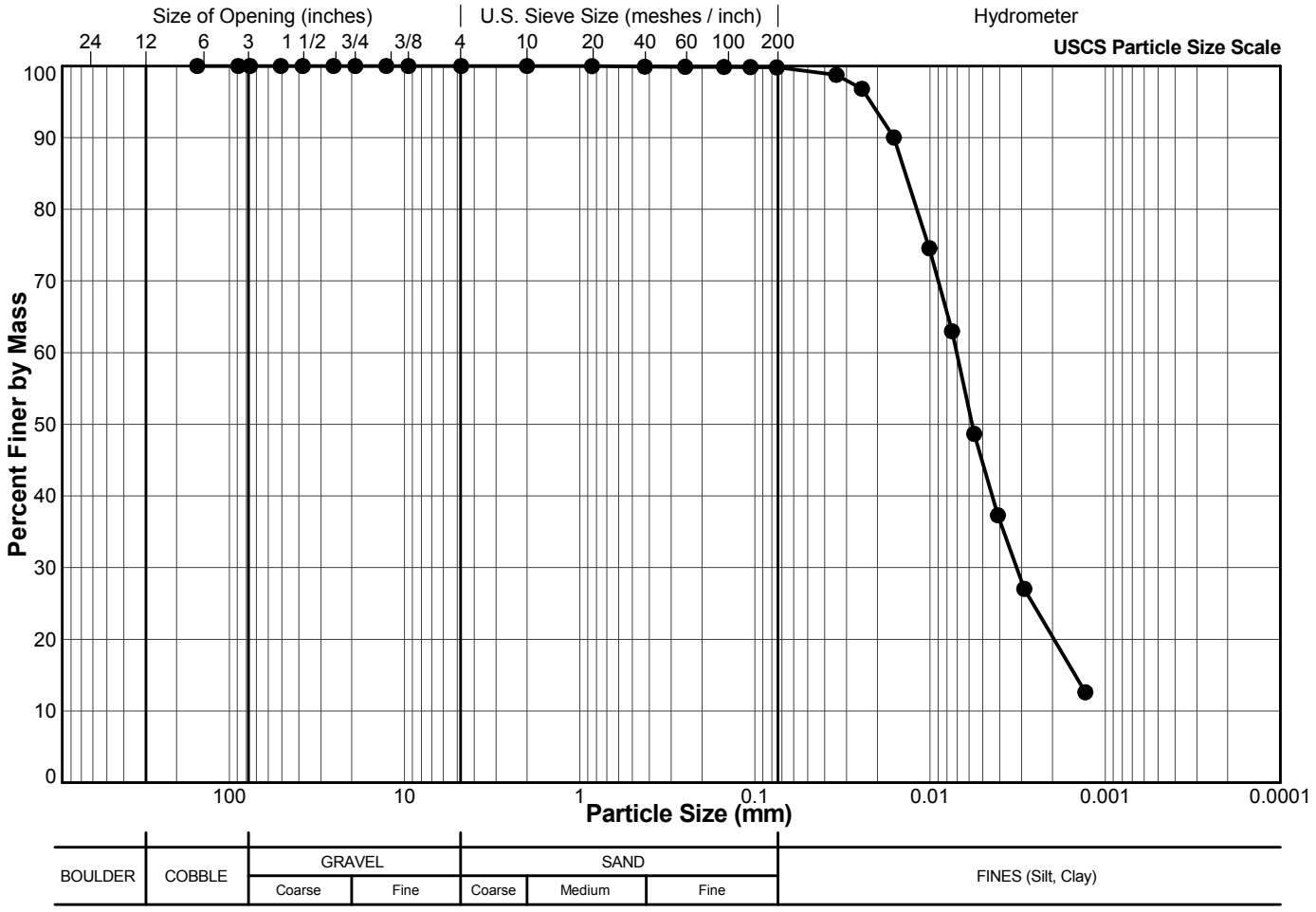
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-10
Sample No.: 6
Depth Interval (m): 3.81 to 3.96
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		100.0
#40 US MESH	0.425		99.9
#60 US MESH	0.25		99.9
#100 US MESH	0.15		99.9
#140 US MESH	0.106		99.8
#200 US MESH	0.075		99.8
		0.0343	98.8
		0.0245	96.8
		0.0161	90.0
		0.0101	74.6
		0.0075	63.0
		0.0056	48.7
		0.0041	37.3
		0.0029	27.0
		0.0013	12.6

KS/NE	8/10/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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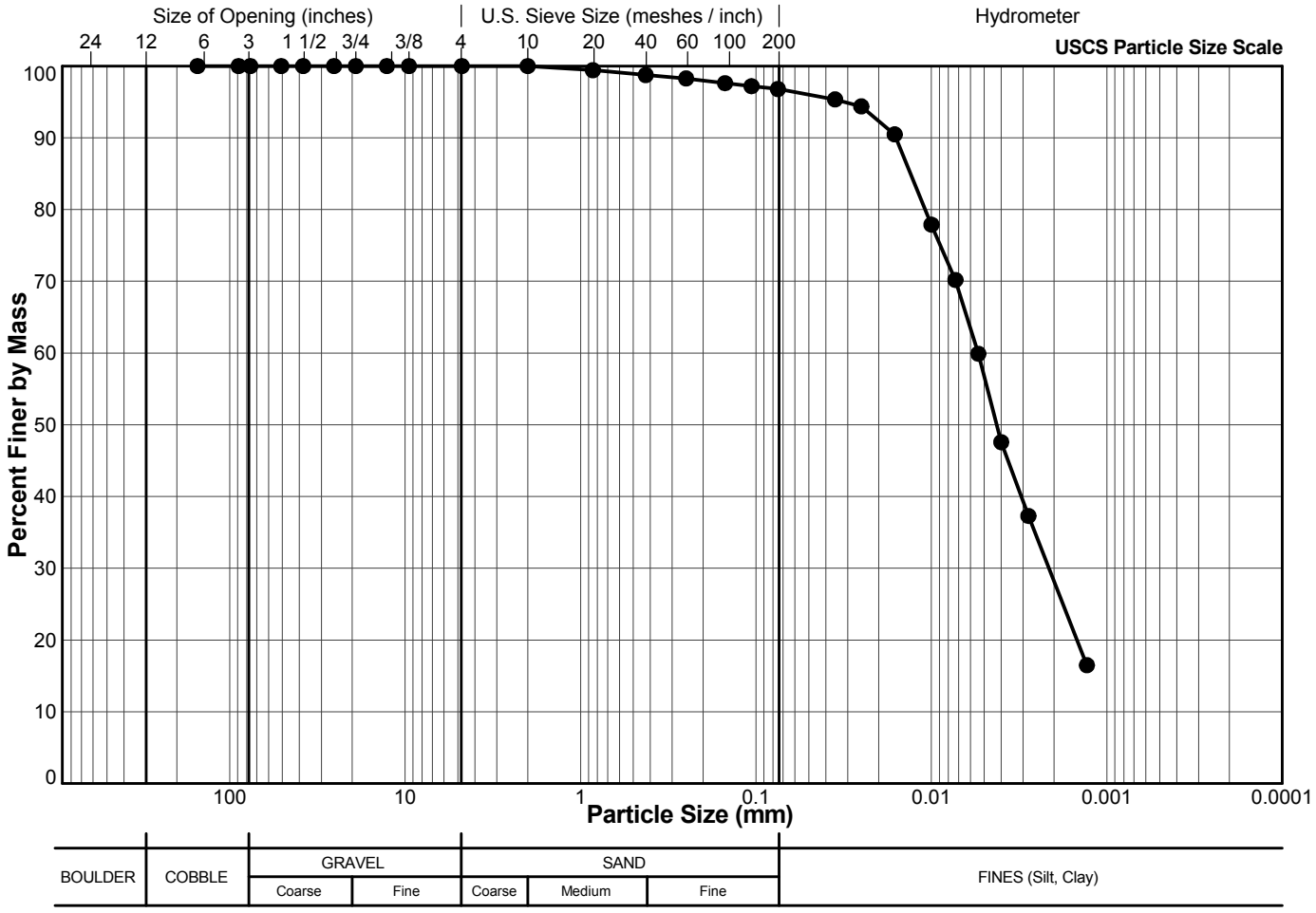
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-10
Sample No.: 13
Depth Interval (m): 11.43 to 11.58
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.4
#40 US MESH	0.425		98.7
#60 US MESH	0.25		98.3
#100 US MESH	0.15		97.6
#140 US MESH	0.106		97.2
#200 US MESH	0.075		96.8
		0.0354	95.4
		0.0251	94.4
		0.0162	90.5
		0.0100	77.9
		0.0073	70.2
		0.0054	59.9
		0.0040	47.6
		0.0028	37.3
		0.0013	16.5

KS/NE	8/10/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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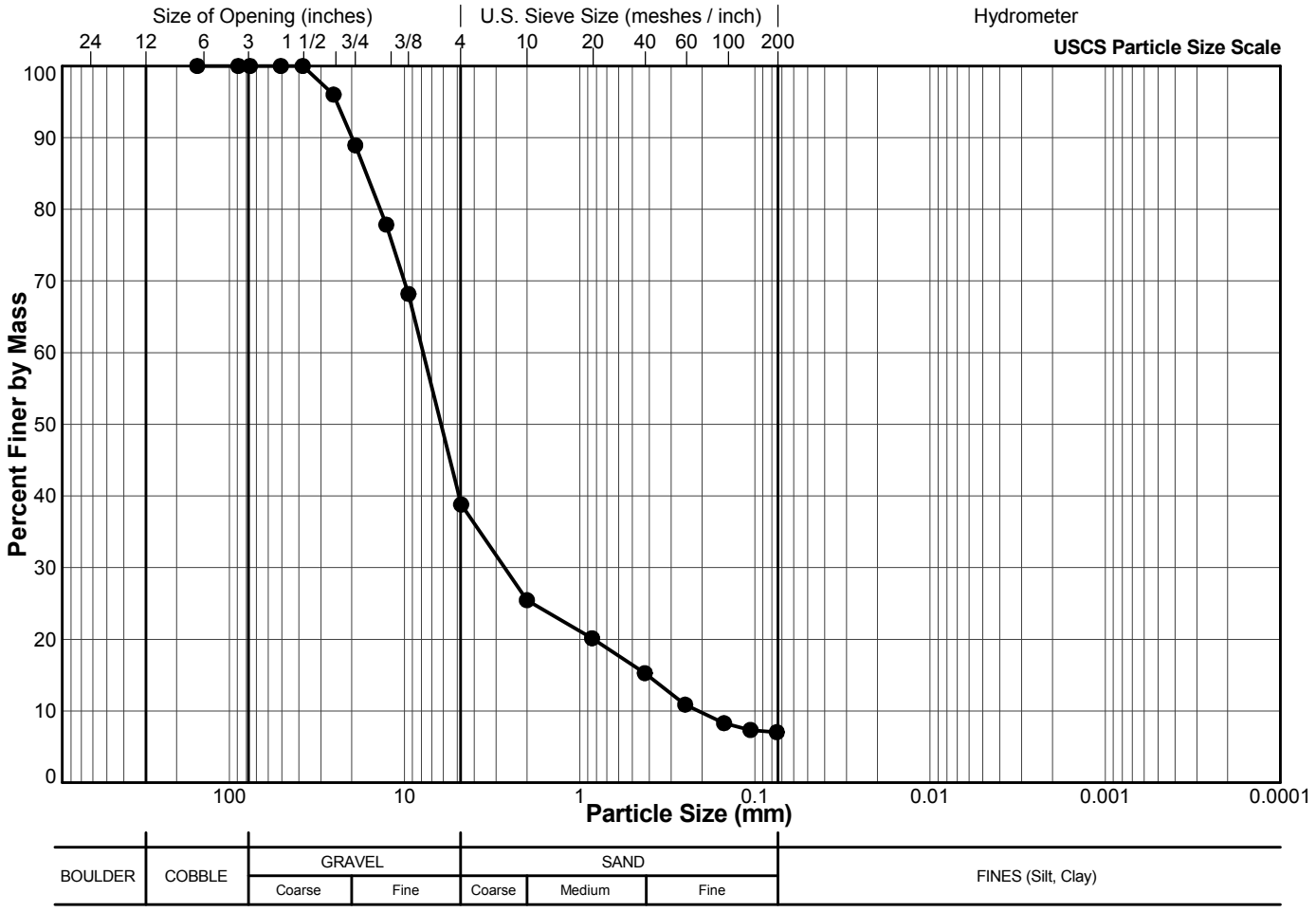
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D6913

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-11
Sample No.: 2
Depth Interval (m): 0.46 to 0.61
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		96.0
3/4"	19.1		88.9
1/2"	12.7		77.9
3/8"	9.5		68.2
#4 US MESH	4.75		38.8
#10 US MESH	2		25.5
#20 US MESH	0.85		20.1
#40 US MESH	0.425		15.3
#60 US MESH	0.25		10.9
#100 US MESH	0.15		8.3
#140 US MESH	0.106		7.3
#200 US MESH	0.075		7.0

NE	8/8/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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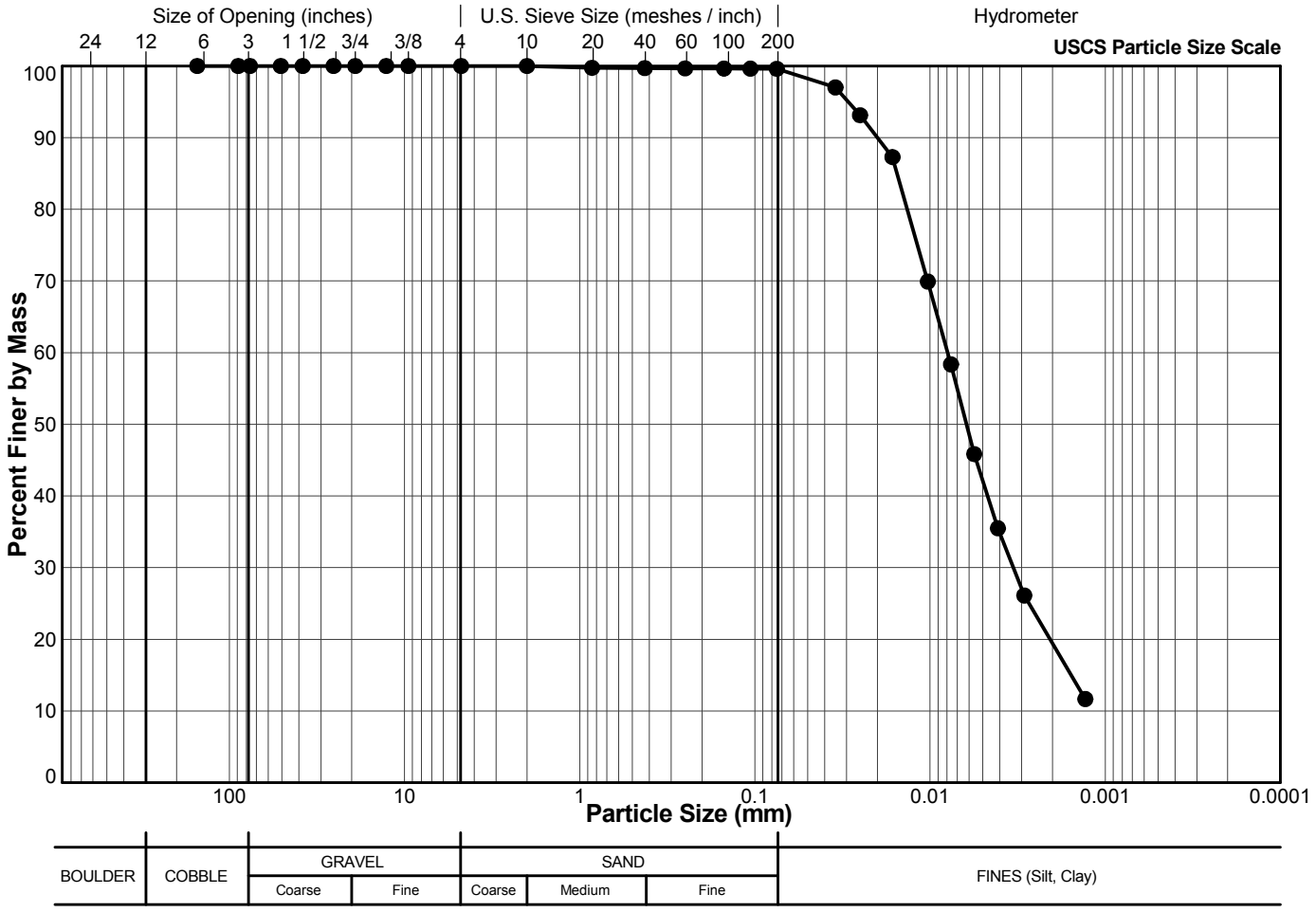
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-11
Sample No.: 4
Depth Interval (m): 2.29 to 2.44
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.7
#40 US MESH	0.425		99.7
#60 US MESH	0.25		99.7
#100 US MESH	0.15		99.6
#140 US MESH	0.106		99.6
#200 US MESH	0.075		99.6
		0.0347	97.0
		0.0251	93.1
		0.0164	87.3
		0.0103	69.9
		0.0076	58.4
		0.0056	45.8
		0.0041	35.5
		0.0029	26.1
		0.0013	11.7

KS/NE	8/10/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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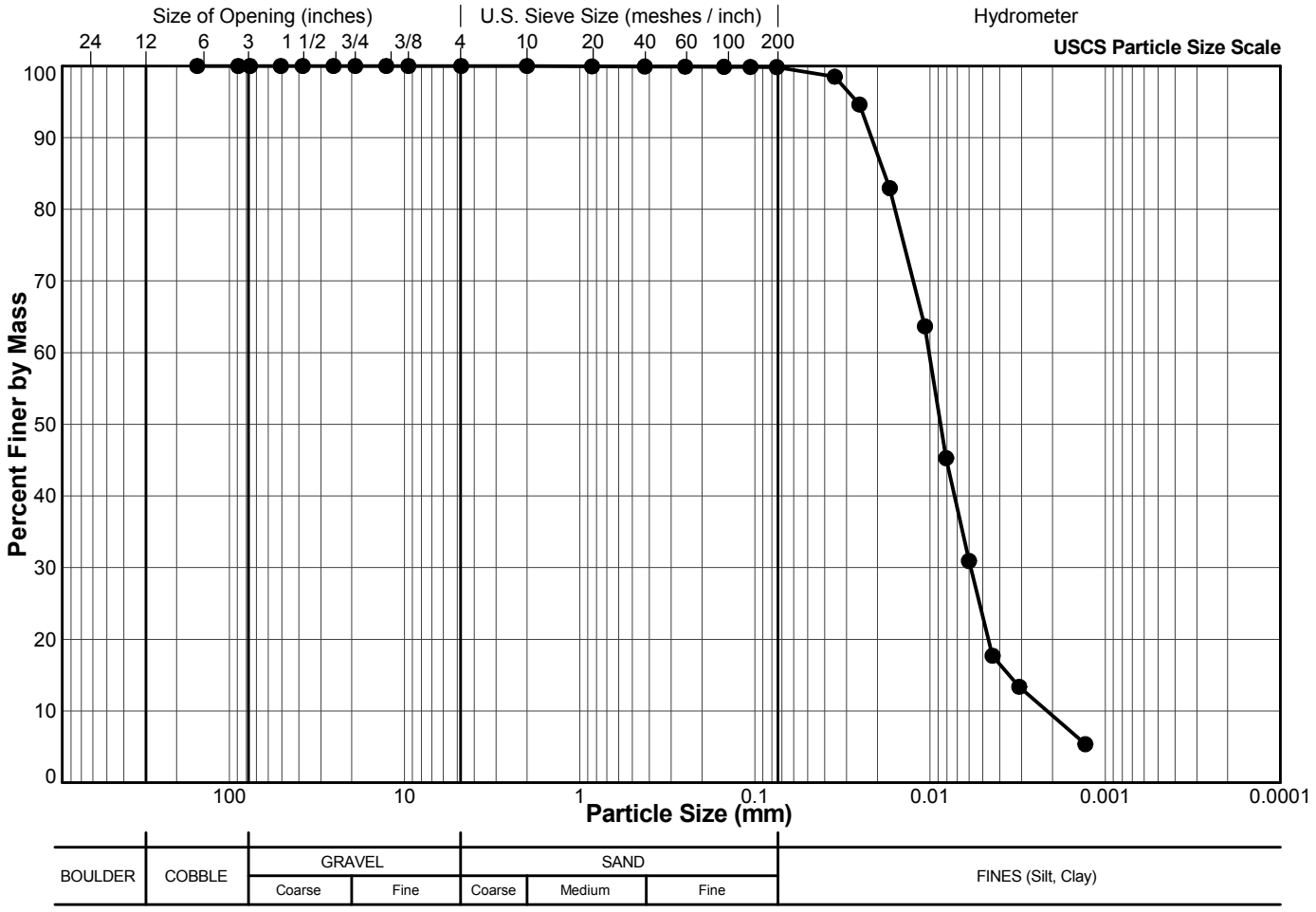
SUMMARY OF PARTICLE SIZE DISTRIBUTION

ASTM D 422

Client: CP Rail
Project: Phase 4 Viterra
Location: Burnaby, BC
Project No.: 20143647 **Phase:** 2000

Sample Location: SH20-11
Sample No.: 9
Depth Interval (m): 9.91 to 10.06
Lab Schedule No.:



Legend

Sieve Size (USS)	(mm)	Particle Size (mm)	Percent Passing
6"	152.4		100.0
3.5"	88.9		100.0
3"	76.2		100.0
2"	50.8		100.0
1 1/2"	38.1		100.0
1"	25.4		100.0
3/4"	19.1		100.0
1/2"	12.7		100.0
3/8"	9.5		100.0
#4 US MESH	4.75		100.0
#10 US MESH	2		100.0
#20 US MESH	0.85		99.9
#40 US MESH	0.425		99.9
#60 US MESH	0.25		99.9
#100 US MESH	0.15		99.9
#140 US MESH	0.106		99.9
#200 US MESH	0.075		99.8
		0.0350	98.5
		0.0253	94.6
		0.0170	83.0
		0.0107	63.7
		0.0081	45.3
		0.0060	30.9
		0.0044	17.7
		0.0031	13.4
		0.0013	5.4

KS/NE	8/10/2020	SJ	8/20/2020
Tech	Date	Checked	Date

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