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Harrison Hot Springs Dike Upgrades

Factual Geotechnical Report

Client Name: Northwest Hydraulic Consultants
Date: October 21, 2025
File: 34701

#130 - 33456 South Fraser Way, Abbotsford, BC V2S 2B5

THURBER

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APPENDICES

1. INTRODUCTION

At the request of Northwest Hydraulic Consultants (NHC), Thurber Engineering Ltd. (Thurber) has prepared this factual geotechnical report for upgrades planned for the Harrison Lake dike and access road located between the Miami River pump station and wastewater treatment facility in the Village of Harrison Hot Springs, BC.

This report provides factual information for the design of the project. Any use that a third party makes of this report, or any reliance on decisions based on it are the responsibility of such third parties. Thurber accepts no responsibility for damage incurred by third parties as a result of decisions made or actions taken based on this report.

It is a condition of this report that Thurber's performance of its professional services is subject to the attached Statement of Use and Interpretation of Report.

2. GEOTECHNICAL INVESTIGATION

2.1 Overview

Thurber completed a geotechnical investigation for this project between November 20, 2023 and November 24, 2023. The investigation included eighteen solid-stem auger test holes and three seismic cone penetration tests (SCPTs). The test holes and SCPTs were advanced by On-Track Drilling Inc. Test hole locations are shown on Drawing No.34701-1 in Appendix A

Groundwater measurements taken during drilling were recorded at each open test hole as documented on the test hole logs in Appendix B.

Prior to the start of the geotechnical investigation, permits and authorization to complete the drilling were obtained from the Village of Harrison Hot Springs, the BC Ministry of Water, Land and Resource Stewardship (the Ministry, formerly the Ministry of Forests) and Harrison Hot Springs Resort. Utility information was requested from BC1Call, and FJM Utility Locating Ltd. was retained to scan the proposed test hole locations for conductive utilities before drilling. The locating work was performed under the supervision of Thurber personnel.

The soil conditions at the test holes were logged in the field by qualified personnel and representative disturbed samples were collected for testing in our laboratory. The test holes were sealed in accordance with the requirements of the BC groundwater protection regulations and the Ministry.

2.2 Investigation

The solid-stem auger test holes were advanced to a depth of approximately 9 m below surface grade, except for TH23-18 which was terminated at approximately 5 m depth due to practical auger refusal.

2.3 In-Situ Testing

2.3.1 Dynamic Cone Penetration Test

Dynamic Cone Penetration Test (DCPT) profiles were advanced at select solid-stem auger holes using a cone with a diameter of 50 mm. The cone was driven with a 63.5 kg hammer free-falling 760 mm. The numbers of blows required to advance the cone was recorded at 305 mm intervals. These blow counts are recorded on the soil logs provided in Appendix B. The DCPT provides a relative measure of in-situ soil density and strength.

The DCPT profiling was conducted at TH23-01, TH23-03, TH23-04, TH23-07, TH23-08, TH23-09, TH23-10, TH23-12, TH23-13, TH23-14, TH23-15, TH23-17 and TH23-18. The DCPT profiles generally extended to 9 m depth, except at TH23-15 and TH23-18, where early practical refusal of the DCPT was encountered.

2.3.1 Seismic Cone Penetration testing

Three SCPT profiles were conducted in general accordance with ASTM D5778. The SCPTs were advanced adjacent to solid-stem augers at TH23-05, TH23-11 and TH23-17 and are provided in Appendix C.

The SCPT provides a continuous trace of cone tip resistance, sleeve friction and pore pressure measurements, plus shear wave velocity measurements that can be used to estimate the small-strain shear modulus of the soil. This data is used to interpret soil stratigraphy as well as generate estimates of soil parameters used to characterize the soil strength, deformation and liquefaction properties. The small-strain shear modulus is required to carry out a seismic site-specific response analysis (SSRA), which is used in the assessment of liquefaction potential and for assessing seismic deformations.

2.4 Laboratory Testing

Disturbed soil samples were collected at selected intervals and brought back to Thurber's Vancouver laboratory for routine visual classification and moisture content determination. Select samples were also subjected to Atterberg limit testing

2.4.1 Soil Description and Classification

All samples were subject to routine soil classification in our laboratory. Classifications are based on visual and tactile assessment of samples in general accordance with the Canadian Foundation Engineering manual (5th Edition). Soil samples are further classified under the Unified Soil Classification System (USCS) per ASTM D2847, and the group symbols are reported in the comments column of the test hole logs in Appendix B.

2.4.2 Moisture Content Determination

Moisture content testing was completed on all samples in general accordance with ASTM D2216. Moisture content is a measure of the water contained in the soil expressed as a percentage of the dry weight of the soil. The results of the moisture content testing are presented on the test hole logs in Appendix B.

2.4.3 Atterberg limits

Atterberg Limits tests were completed in accordance with ASTM D4318 on selected soil samples. The liquid and plastic limits are reported on the test hole logs. The plasticity index is plotted against the liquid limit on the USCS Plasticity Charts provided in Appendix B.

3. CLOSURE

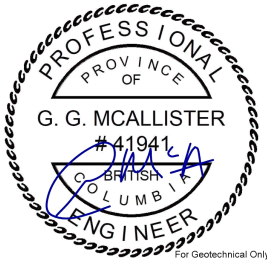
We trust this information meets your present needs. If you have any questions, please contact the undersigned at your convenience.

Graeme McAllister, M.A.Sc., P. Eng.
Review Engineer

Rajan Brar, B.A.Sc., EIT
Geotechnical Engineer-In-Training

Date: October 21, 2025
File: **34701**

Thurber Engineering Ltd.
Permit to Practice #1001319



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STATEMENT FOR USE AND INTERPRETATION OF REPORT

1. STANDARD OF CARE

This Report has been prepared in a manner consistent with that degree of care and skill ordinarily exercised by members of the same profession currently practicing under similar circumstances at the same time and in the same or similar locality and in compliance with all applicable laws.

2. COMPLETE REPORT

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

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

3. BASIS OF REPORT

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

4. USE OF THE REPORT

The information and opinions expressed in the Report, or any document forming part of the Report, are for the sole benefit of the Client for the development, design objectives, and/or purposes described to Thurber by the Client. **NO OTHER PARTY MAY USE OR RELY ON THE REPORT OR ANY PORTION THEREOF FOR OTHER THAN THE CLIENT'S BENEFIT IN CONNECTION WITH THE PURPOSES DESCRIBED IN THE REPORT**. Any use which a third party makes of the Report is the sole responsibility of such third party and is always subject to this Statement for Use and Interpretation of Report. Thurber accepts no liability or responsibility for damages suffered by any third party resulting from use of the Report for purposes outside the reasonable contemplation of Thurber at the time it was prepared or in any manner unintended by Thurber.

5. INTERPRETATION OF THE REPORT

a) **Nature and Exactness of Soil and Contaminant Description:** Classification and identification of soils, rocks, geological units, contaminant materials and quantities have been based on investigations performed in accordance with the standards set out in Paragraph 1. Classification and identification of these factors is inherently judgement-based. Comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations utilizing the standards of Paragraph 1 will involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and the Client and all other parties making use of such documents or records with or without our express written consent need to be aware of this risk and the Report is delivered subject to the express condition that such risk is accepted by the Client and such other parties. Some conditions are subject to change over time and those making use of the Report need to be aware of this possibility and understand that the Report only presents the interpreted conditions at the sampled points at the time of sampling. If special concerns exist, or the Client has special considerations or requirements, the Client must disclose them so that additional or special investigations may be undertaken which would not otherwise be within the scope of investigations made for the purposes of the Report.

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

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

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

6. INDEPENDENT JUDGEMENTS OF CLIENT

The information, interpretations and conclusions in the Report are based on Thurber's interpretation of conditions revealed through limited investigation conducted within a defined scope of services. Thurber does not accept responsibility for independent conclusions, interpretations, interpolations and/or decisions of the Client, or other parties who may come into possession of the Report, or any part thereof, which may be based on information contained in the Report. This restriction of liability includes, but is not limited to, decisions made to develop, purchase, or sell land, unless such decisions expressly form part of the stated purpose of the Report as described in Paragraph 3.

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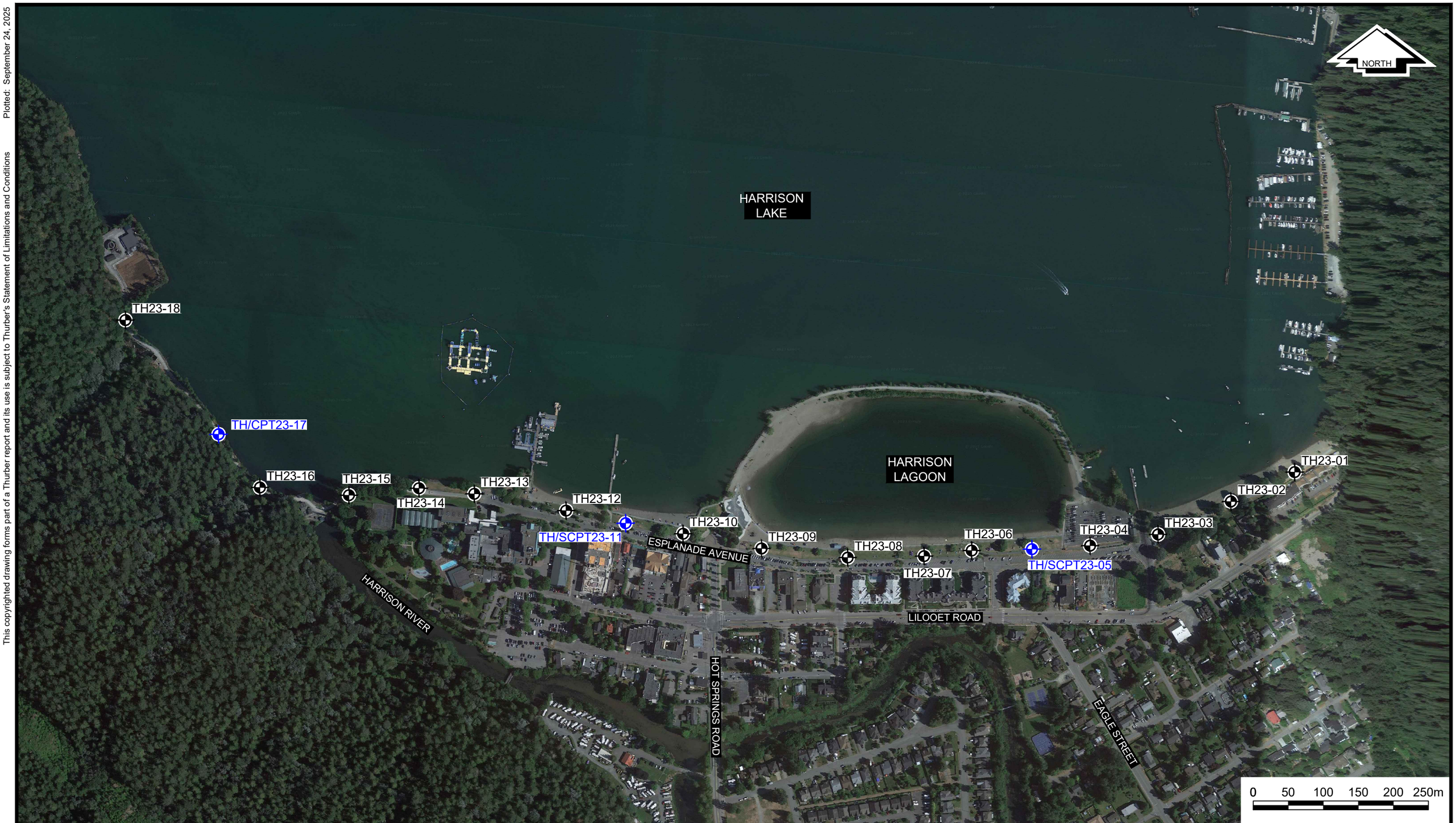
APPENDIX A

Drawing No. 34701-1

Plotted: September 24, 2025



LEGEND:

- TEST HOLE
- TEST HOLE / CPT OR SCPT

NOTES:

1. AERIAL IMAGERY TAKEN FROM GOOGLE.
2. TEST HOLE LOCATIONS ARE APPROXIMATE.

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NORTHWEST HYDRAULIC CONSULTANT

TEST HOLE LOCATION PLAN

HARRISON LAKE DIKE UPGRADE — HARRISON HOT SPRINGS, BC

DESIGNED	DRAWN	APPROVED	DATE	SCALE	PROJECT No.	DWG. NO.	REV.
KTD	MOM	GGM/IFA	NOV. 30, 2023	1:5000	34701 - 1		-

34701.dwg

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APPENDIX B

Test Hole Logs

Laboratory Test Result

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-01**

LOCATION: See DWG. 34701-1
N 5462005, E 589130 (Est.)

TOP OF HOLE ELEV: 14.2 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 21, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SM	Loose to compact, brown SAND with some gravel and a trace of silt (FILL).	14
1		SP-SM		
		SM	Loose, brown SAND with some silt and trace of gravel and cobbles (FILL).	13
2		SP-SM	Loose to compact, brown SAND with a trace of silt and some gravel.	12
3		ML	Soft to firm, brown-grey SILT with some sand.	11
4	Water level estimated based on seepage observations in test hole.	SM	Stiff/loose, brown, interlayered sandy SILT and silty SAND.	10
5		SM/ML		9
6			Firm/loose, grey SILT and SAND.	8
7		SM/ML		7
8		SP-SM	Loose to compact, grey SAND with a trace to some silt and a trace of gravel.	6
9			Decayed log.	
			End of hole at required depth. Hole open to 1.5 m depth.	5
10				

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-02

LOCATION: See DWG. 34701-1
N 5461963, E 589039 (Est.)

TOP OF HOLE ELEV: 14.2 m (Est.)
METHOD: Solid Stem Auger
DRILLING CO.: On-Track Drilling Inc.
INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants
PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 21, 2023
FILE NO.: 34701
REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SM	Brown SAND with traces of silt and rootlets (FILL).	14
1		ML	Brown SILT with traces of clay and sand (FILL).	13
		SM/ML	Brown SAND and SILT.	
2		SM	Brown SAND with some silt.	12
3				11
		SM	Brown SAND with a trace of silt.	
4		SM		10
5		SP	- a trace of gravel between 4.6 and 6.7 m depth	9
6 ▼	Water level estimated based on seepage observations in test hole.			8
7		SP-SM		7
8				6
		GP/SP	SAND with some gravel and a trace of silt.	
9			End of hole at required depth. Hole open to 4.0 m depth.	5
10				

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-03**

LOCATION: See DWG. 34701-1
N 5461916, E 588935 (Est.)

TOP OF HOLE ELEV: 14.0 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 21, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	10 20 30 40 50 60 70 80 90 100	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0			ML	Compact, brown, gravelly SAND with a trace of silt (FILL).	
				Stiff, brown SILT with some sand and traces of gravel and clay (FILL).	
				Stiff, brown, sandy SILT (FILL).	
1			SM/ML	Loose to compact, brown SAND with some silt (FILL).	13
2			ML/SM		12
			ML	Firm, brown, sandy SILT.	
3					11
			ML/SM	Loose, brown SAND and SILT with a trace of gravel.	
4 ▼		Water level estimated based on seepage observations in test hole.			10
			ML/SM	Loose, brown, silty SAND with some silt to silty, a trace of gravel.	
5	▲		SM		9
6				Loose to compact, rust brown SAND with some silt.	8
7			SM		7
8					6
			SP-SM	Compact, grey SAND with a trace of silt.	
9					5
				End of hole at required depth. Hole open to 3.7 m depth.	
10					

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-04

LOCATION: See DWG. 34701-1
N 5461900, E 588838 (Est.)

TOP OF HOLE ELEV: 13.6 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 21, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	10 20 30 40 50 60 70 80 90 100	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0			SM	SOD (50 mm thick), over firm, brown SILT with some sand (TOPSOIL FILL).	13
				Loose, brown SAND with some gravel and a trace of silt (FILL).	
1			SP	Loose, brown SAND with traces of silt and gravel (FILL).	12
2			SP		
			SW-SM/GW-GM	Compact, brown SAND and GRAVEL with a trace of silt (FILL).	11
3				Firm/ loose, brown SILT and SAND.	
			ML/SM	Loose, brown silty SAND.	10
4			SM/ML	Stiff/ compact, brown SILT and SAND.	9
5 ▼		Water level estimated based on seepage observations in test hole.	SM	Compact, brown-grey SAND with some silt.	8
6					
7			SP-SM	Compact to dense, grey SAND with traces of silt and gravel.	7
					6
8					
			SP-SM		5
9				End of hole at required depth. Hole open to 3.6 m depth.	
10					4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-05**

LOCATION: See DWG. 34701-1
N 5461895, E 588755 (Est.)

TOP OF HOLE ELEV: 14.0 m (Est.)
METHOD: Solid Stem Auger
DRILLING CO.: On-Track Drilling Inc.
INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants
PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 20, 2023
FILE NO.: 34701
REVIEWED BY: GGM/IFA

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

DEPTH (m)	10 20 30 40 50 60 70 80 90 100	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0	○		SM	SOD (50 mm thick), brown SILT with some sand (TOPSOIL FILL).	
				Brown SAND with a trace to some silt and a trace of gravel (FILL).	
1	○		SM		13
				Brown SAND with traces of gravel and silt (FILL).	
2	○		SP-SM		12
3	○		SP-SM	- some gravel between 3.1 and 3.7 m depth	11
4	○		SP-SM	Brown SAND with some silt and a trace of gravel.	10
5	○	Water level estimated based on seepage observations in test hole.	SM		9
6	○		SM	Brown SAND with a trace of silt.	8
7	○		SM		7
8	○		SP-SM		6
9	○			End of hole at required depth. Hole open to 3.8 m depth.	5
10					

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

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LOG OF TEST HOLE

TEST HOLE NO. **TH23-06**

LOCATION: See DWG. 34701-1
N 5461893, E 588669 (Est.)

TOP OF HOLE ELEV: 13.9 m (Est.)
METHOD: Solid Stem Auger
DRILLING CO.: On-Track Drilling Inc.
INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants
PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 21, 2023
FILE NO.: 34701
REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SM	SOD (50 mm thick), brown SILT with some sand (FILL).	
			Brown, silty SAND with a trace of gravel (FILL).	
		SM	Brown SAND with some silt (FILL).	13
1		SP-SM	Brown, SAND with a trace of silt (FILL).	
2				12
		SP-SM/GP-GM	Brown SAND and GRAVEL with a trace to some silt (FILL).	
3				11
4		GM/SM		10
5				9
		SM	Brown SAND with some silt and a trace of gravel.	
6 ▼	Water level estimated based on seepage observations in test hole.			8
7		SM	Brown SAND with traces of silt and gravel.	7
8				6
		SM		
9				5
			End of hole at required depth. Hole open to 3.4 m depth.	
10				4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-07

LOCATION: See DWG. 34701-1
N 5461885, E 588601 (Est.)

TOP OF HOLE ELEV: 13.9 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 22, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SM	SOD (50 mm thick), over firm, brown SILT with some sand (FILL).	
			Compact, brown SAND with some gravel and a trace of silt (FILL).	
1		SP-SM	Loose to compact, brown SAND with a trace of silt (FILL).	13
2		SP-SM		12
		SP-SM/GP-GM	Loose to compact, brown SAND and GRAVEL with some silt (FILL).	
3				11
	Water level estimated based on seepage observations in test hole.	SM/GM		
4				10
		ML	Firm, brown-grey SILT with traces of clay, sand and wood fragments (FILL).	
5				9
		SM	Compact, brown SAND with some silt and a trace of gravel.	
6				8
7		SP-SM	- a trace of sand below 7 m depth	7
8				6
		SM		
9				5
			End of hole at required depth. Hole open to 3.8 m depth.	
10				4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-08**

LOCATION: See DWG. 34701-1
N 5461883, E 588492 (Est.)

TOP OF HOLE ELEV: 13.8 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 22, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SP-SM	SOD (50 mm thick), over firm, brown SILT with some sand (FILL).	13
1		SP	Loose to compact, brown SAND with traces of silt and gravel (FILL).	
2		SP		12
3		GP-GM/SP-SM	Loose to compact, brown SAND and GRAVEL with a trace of silt (FILL).	11
4 ▼	Water level estimated based on seepage observations in test hole.	GP-GM/SP-SM		10
5		ML/SM	Loose to compact, grey-brown, silty SAND with a trace of gravel.	9
6		SM		8
7		SM	Compact, grey-brown SAND with traces of silt and gravel.	7
8		SP-SM		6
9			End of hole at required depth. Hole open to 3.7 m depth.	5
10				4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-09**

LOCATION: See DWG. 34701-1
N 5461896, E 588369 (Est.)

TOP OF HOLE ELEV: 13.8 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 22, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SP-SM	SOD (50 mm thick), over firm, brown SILT with some sand (FILL).	13
1		SP-SM	Loose to compact, brown SAND with traces of silt and gravel (FILL).	
2		SP		12
3		SP		11
4		GP-GM/SP-SM	Compact to dense, sandy GRAVEL (FILL).	10
5	Water level estimated based on seepage observations in test hole.	SM	Compact, grey SAND with some silt, traces of gravel and refuse (duct tape) (FILL).	9
6		SM	Compact, brown, rust mottled SAND with some silt and a trace of gravel.	8
7		SP-SM	Compact, brown SAND with traces of silt and gravel.	7
8				6
9		SP-SM	End of hole at required depth. Hole open to 3.5 m depth.	5
10				4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-10**

LOCATION: See DWG. 34701-1
N 5461917, E 588257 (Est.)

TOP OF HOLE ELEV: 13.9 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 22, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SP-SM	GRAVEL (50 mm thick), over compact, brown SAND with some silt and gravel (FILL).	13
1		SP-SM	Loose to compact, brown SAND with a trace of silt (FILL).	
2		SP		12
3		SP		11
4 ▼	Water level estimated based on seepage observations in test hole.	SM	Compact, grey, silty SAND with traces of wood fragments and gravel (FILL).	10
5		SM		9
6			Compact, grey SAND with a trace to some silt and a trace of gravel.	8
7		SM		7
8		SM		6
9			End of hole at required depth. Hole open to 4.1 m depth.	5
10				4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-11

LOCATION: See DWG. 34701-1
N 5461932, E 588175 (Est.)

TOP OF HOLE ELEV: 14.0 m (Est.)
METHOD: Solid Stem Auger
DRILLING CO.: On-Track Drilling Inc.
INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants
PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 20, 2023
FILE NO.: 34701
REVIEWED BY: GGM/IFA

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

DEPTH (m)	10 20 30 40 50 60 70 80 90 100	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0			SM	SOD (50 mm thick), brown SILT with some sand (TOPSOIL FILL).	
				Brown SAND with traces of silt and gravel (FILL).	
				Brown, sandy SILT with a trace of gravel (FILL).	
1			SP-SM	Brown, SAND with traces of silt and gravel (FILL).	13
2			SP-SM		12
3			SP-SM		11
			SP		
4			GM/SM	Brown SAND mixed with some clayey silt and gravel (FILL).	10
▼		Water level estimated based on seepage observations in test hole.		Brown, silty SAND with a trace of gravel.	
5			SM		9
6			SM		8
				Brown SAND with some silt.	
7			SM		7
8					6
			SM		
9					5
				End of hole at required depth. Hole open to 4.0 m depth.	
10					

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-12

LOCATION: See DWG. 34701-1
N 5461950, E 588090 (Est.)

TOP OF HOLE ELEV: 14.1 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 23, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		SM	SOD (50 mm thick), over firm, brown SILT with some sand (FILL).	14
			Compact, brown, silty SAND (FILL).	
1		SP-SM	Loose to compact, brown SAND with a trace of silt (FILL).	13
2		SP-SM		12
3		SP-SM		11
4		GP-GM/SP-SM	Compact, brown SAND with some gravel and silt (FILL).	10
		ML	Loose to compact, brown SAND mixed with clayey SILT with some gravel (FILL).	
5		SM	Loose to compact, brown-grey, silty SAND with a trace of tile fragments (FILL).	9
6	Water level estimated based on seepage observations in test hole.		Loose to compact, brown, silty SAND.	8
7		SM	Compact, brown SAND with some silt.	7
8				6
9		SM/ML	Loose to compact, silty SAND.	5
			End of hole at required depth. Hole open to 4.0 m depth.	
10				

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-13

LOCATION: See DWG. 34701-1
N 5461974, E 587959 (Est.)

TOP OF HOLE ELEV: 14.0 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 23, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

Depth (m)	Elevation (m)	COMMENTS		SOILS DESCRIPTION
0	14		SM	Compact, brown, silty SAND with a trace of gravel (FILL).
1	13		SM	Loose to compact, brown SAND with a trace of silt (FILL).
2	12		SP-SM	
3	11		SP-SM	
4	10	Water level estimated based on seepage observations in test hole.	GM/SM	Compact, brown SAND with some gravel and a trace of silt (FILL).
5	9		SM/ML	Compact, brown SAND mixed with SILT (FILL).
6	8		ML	Firm brown-grey SILT with some clay.
7	7		ML	Firm to stiff, brown SILT with some sand to sandy.
8	6		SM	Compact, brown SAND with some silt.
9	5			End of hole at required depth. Hole open to 7.3 m depth.
10				

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-14

LOCATION: See DWG. 34701-1
N 5461982, E 587880 (Est.)

TOP OF HOLE ELEV: 13.9 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 23, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

10 20 30 40 50 60 70 80 90 100

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0			Compact, brown, silty SAND with some gravel (FILL).	
		GP-GM/SP-SM	Loose to compact, brown, gravelly SAND with a trace of silt (FILL).	
1		SM	Loose, brown SAND with a trace of silt (FILL).	13
2		SP-SM		12
3		SP-SM		11
4		SM/GM	Compact, brown SAND and GRAVEL with some silt (FILL).	10
	Water level estimated based on seepage observations in test hole.		- cobbles at 4.6 m depth	
5		SM/ML	Stiff, grey SILT with some sand and traces of clay and gravel.	9
6			Soft, grey, sandy SILT.	8
7		ML		7
8		ML	Soft to firm, grey SILT with some clay and a trace of sand.	6
		SM	Loose to compact SAND with some silt.	
9				5
10			End of hole at required depth. Hole open to 3.7 m depth.	4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-15**

LOCATION: See DWG. 34701-1
N 5461972, E 587780 (Est.)

TOP OF HOLE ELEV: 13.8 m (Est.)
METHOD: Solid Stem Auger/DCPT
DRILLING CO.: On-Track Drilling Inc.
INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants
PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 23, 2023
FILE NO.: 34701
REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0		GP-GM/SP-SM	Loose to compact, brown SAND and GRAVEL with some cobbles/riprap and a trace of silt (FILL).	13
1	Rock, Drilled out to 0.9 m depth	SM/GM		
2		SW-SM/GW-GM		12
3	DCPT refusal on rock 30 blows for 25 mm penetration	ML	Brown, silty SAND with a trace of gravel (FILL).	11
4		SM/GM	Brown, silty SAND with some gravel (FILL).	10
5	Water level estimated based on seepage observations in test hole.	ML	Brown-grey, sandy SILT with a trace of gravel.	9
6				8
7		ML	Grey, sandy SILT with a trace of gravel.	7
8		SP-SM	Grey SAND with trace to some silt.	6
9				5
10			End of hole at required depth. Hole open to 1.2 m depth.	4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. TH23-16

LOCATION: See DWG. 34701-1
N 5461983, E 587653 (Est.)

TOP OF HOLE ELEV: 13.0 m (Est.)

METHOD: Solid Stem Auger

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 24, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0	Hydrovac to 1.8 m depth		Brown SAND and GRAVEL with some cobbles/talus rock and a trace of silt (FILL).	
1		SP-SM/GP-GM		12
2		SW-SM/GW-GM		11
3	Water level estimated based on seepage observations in test hole.		Brown, silty SAND with some gravel (FILL).	10
3.7	274	WOOD	Brown, fibrous PEAT.	
4		ML	Grey, sandy SILT with traces of clay.	9
5		ML/SM	Grey SAND and SILT with a trace of gravel.	8
6				7
7		ML/SM	Brown-grey, silty SAND.	6
8		OL/ML	Grey SILT with some sand and a trace of clay.	5
8.7		SM	Grey SAND with a trace of silt.	
9				4
10			End of hole at required depth. Hole open to 3.7 m depth.	

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-17**

LOCATION: See DWG. 34701-1
N 5462059, E 587594 (Est.)

TOP OF HOLE ELEV: 13.3 m (Est.)

METHOD: Hydrovac / Solid Stem Auger

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 24, 2023

FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0	Hydrovac to 1.8 m depth Drillout for DCPT to 3.4 m depth		Brown SAND and GRAVEL with some cobbles/talus rock and a trace of silt (FILL).	13
1		GP-GM/SP-SM		12
2		CL/ML	Brown mottled SILT with some sand and traces of gravel (FILL).	11
3			Stiff, sandy SILT with some gravel/talus rock.	10
4	Water level estimated based on seepage observations in test hole.	GM/SM		9
5		CL	Stiff, grey, silty CLAY with some gravel.	8
6				7
7		CL	Firm to very stiff, grey SILT and CLAY to clayey SILT with traces of sand and gravel. - Rock encountered at 7.3 m and 8.8 m	6
8		ML/CL		5
9			End of hole at required depth. Hole open to 0.9 m depth.	4
10				

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB

Sheet 1 of 1

LOG OF TEST HOLE

TEST HOLE NO. **TH23-18**

LOCATION: See DWG. 34701-1
N 5462222, E 587461 (Est.)

TOP OF HOLE ELEV: 13.6 m (Est.)

METHOD: Solid Stem Auger/DCPT

DRILLING CO.: On-Track Drilling Inc.

INSPECTOR: KTD

THURBER

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

DATE: November 24, 2023

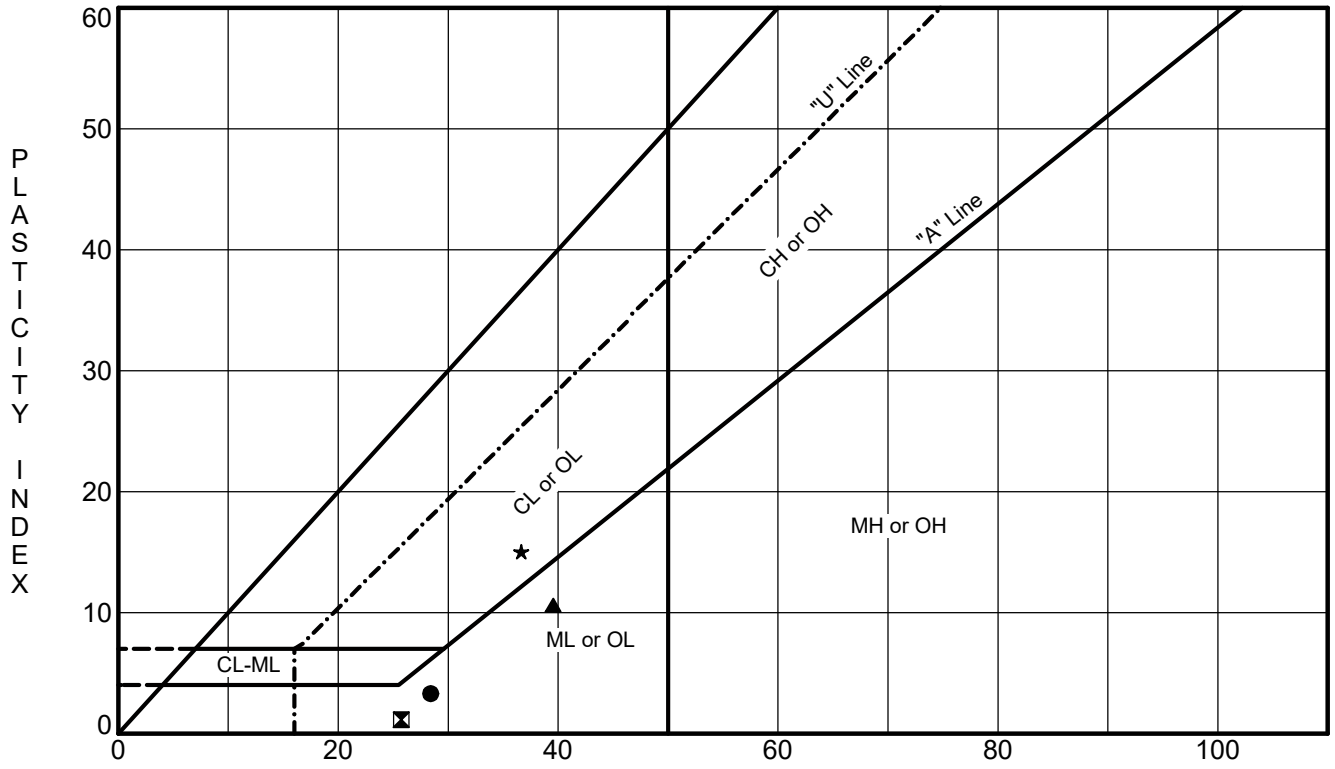
FILE NO.: 34701

REVIEWED BY: GGM/IFA

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

DEPTH (m)	10 20 30 40 50 60 70 80 90 100	COMMENTS		SOILS DESCRIPTION	ELEVATION (m)
0			GM/SM	Compact to dense SAND and GRAVEL with some cobbles/riprap and a trace of silt (FILL).	13
1		Drilled out from 0.6 m to 1.5 m depth	SM/GM		
2			SP-SM	Loose to compact, brown, gravelly SAND with a trace of silt (FILL).	12
3			SM/GM		11
4 ▼		Water level estimated based on seepage observations in test hole.	SM		10
5			SM/ML	Compact/ very stiff, brown-grey SAND and SILT with some gravel and a trace of wood fragments.	9
6		DCPT refusal 50 blows for 50 mm penetration	ML/GM	Hard, grey SILT mixed with GRAVEL and SAND with some cobbles.	8
7				End of hole at auger refusal. Hole open to 3.1 m depth.	7
8					6
9					5
10					4

LOG OF TEST HOLE (COORDS+EL. EST.) 34701.GPJ THURBER_MOM.GDT 25/10/22- THURBER - BC OPERATIONS_2024.GLB



	Specimen Identification	LL	PL	PI	MC%	USCS Classification
●	**TH23-01, Sa. 24**	**28**	**25**	**3**	**30.3**	**ML**
⊠	**TH23-07, Sa. 69**	**26**	**25**	**1**	**33.9**	**ML**
▲	**TH23-13, Sa. 114**	**40**	**29**	**11**	**33.6**	**ML**
★	**TH23-17, Sa. 144**	**37**	**22**	**15**	**25.2**	**CL**

THURBER ENGINEERING LTD.

PLASTICITY CHART

CLIENT: Northwest Hydraulic Consultants

PROJECT: Harrison Lake Dike Upgrade
Dike Upgrade

FILE NO.: 34701

ATTERBERG LIMITS 34701.GPJ THURBER BC -2017.GDT 24-1-29- THURBER - BC OPERATIONS_2024.GLB

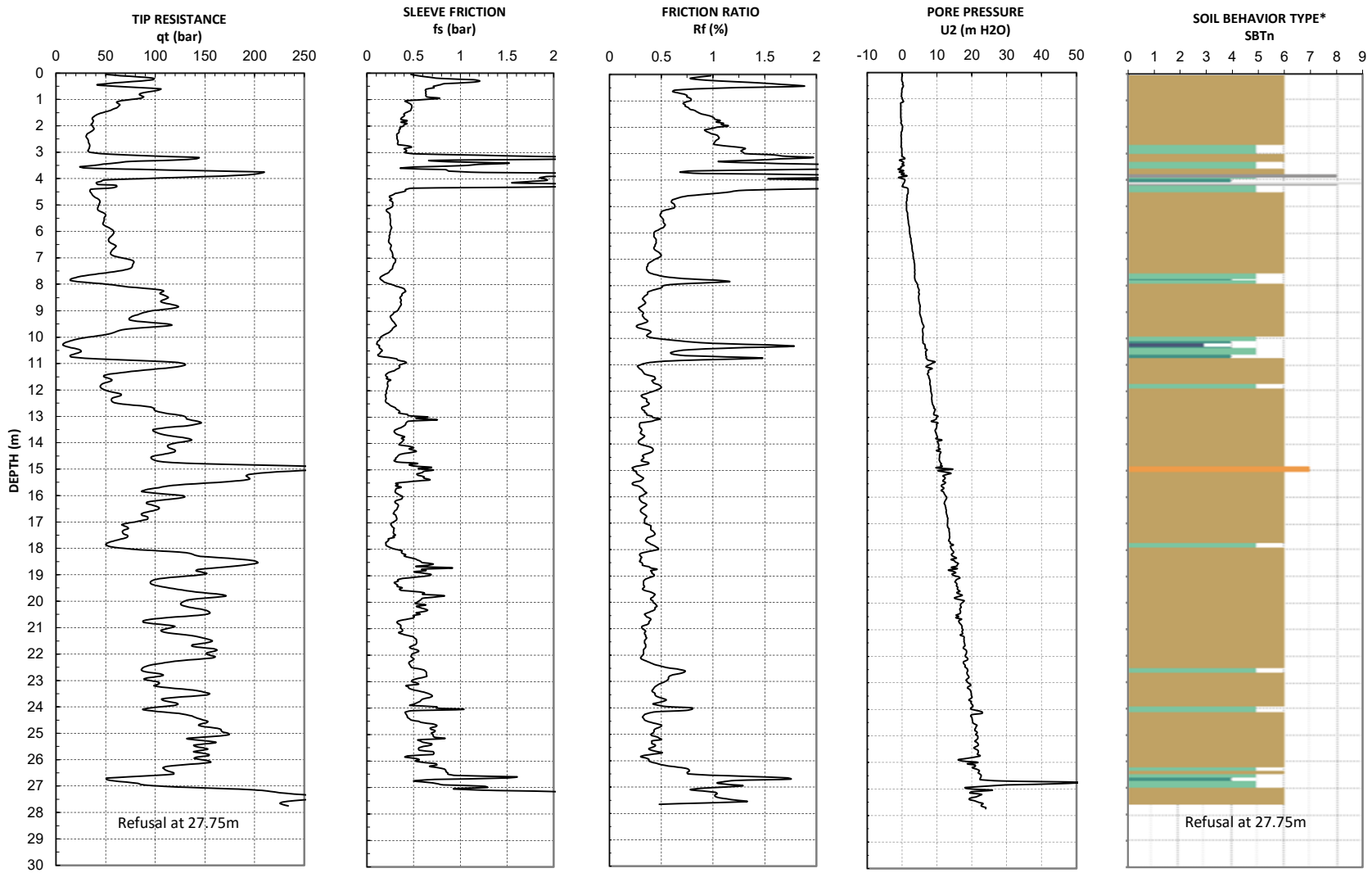
THURBER

APPENDIX C

Seismic Cone Penetration Test Profiles

ON TRACK
An earth DRILLING Company
SAFETY IS OUR CORE

Sounding: SCPT23-05	Client: Thurber Engineering Ltd.
20-Nov-2023	Site: Esplanade Avenue, Harrison Hot Springs, BC



* Based on Robertson et. al 1990

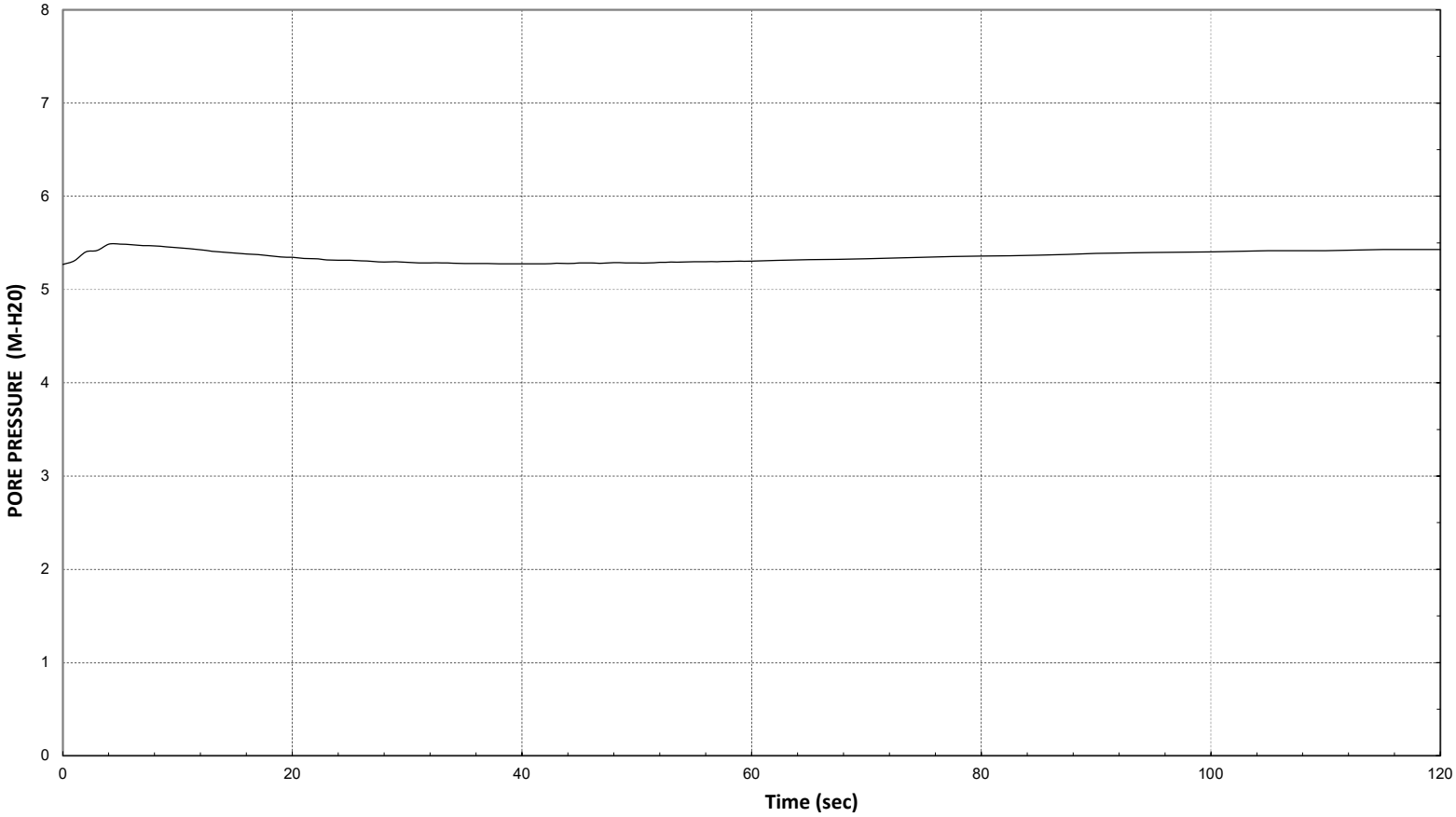
1. Sensitive Fine Grained
2. Organic Material
3. Clay to Silty Clay
4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt
6. Clean Sand to Silty Sand
7. Gravely Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

Depth Increment: 0.05 m
Geodetic Elevation: N/A
Maximum Depth: 27.75 m

Cone ID: DDG1522
Operator: RS

Sounding: SCPT23-05	Client: Thurber Engineering Ltd.
20-Nov-2023	Site: Esplanade Avenue, Harrison Hot Springs, BC

PORE PRESSURE DISSIPATION TEST



Test Depth:	9.20 m
Duration:	120 s
Cone Area:	10 cm^2
Cone ID:	DG1522

u Min:	5.27 m
u Max:	5.49 m
u Final:	5.43 m

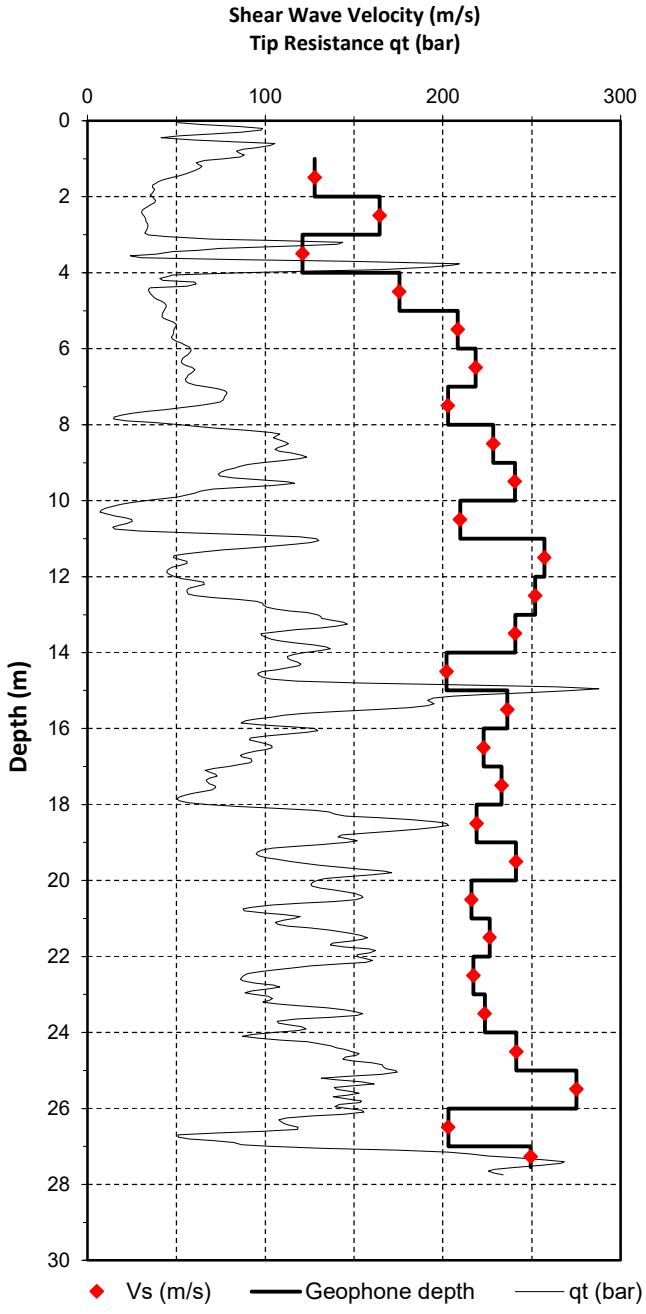
Sounding: SCPT23-05	Client: Thurber Engineering Ltd.
20-Nov-23	Site: Esplanade Avenue, Harrison Hot Springs, BC

Seismic Source: Beam
Source to cone (m): 1.2

Geodetic Elevation: N/A
Cone ID: DDG1522
Operator: RS

Shear Wave Velocity Data (Vs)

Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Time Difference (ms)	Shear Wave Velocity Vs (m/s)
1.20	1.00	1.56			
2.20	2.00	2.33	0.77	6.02	**128**
3.20	3.00	3.23	0.90	5.47	**164**
4.20	4.00	4.18	0.95	7.81	**121**
5.20	5.00	5.14	0.97	5.51	**175**
6.20	6.00	6.12	0.98	4.69	**208**
7.20	7.00	7.10	0.98	4.50	**218**
8.20	8.00	8.09	0.99	4.87	**203**
9.20	9.00	9.08	0.99	4.34	**228**
10.20	10.00	10.07	0.99	4.13	**240**
11.20	11.00	11.07	0.99	4.74	**210**
12.20	12.00	12.06	0.99	3.87	**257**
13.20	13.00	13.06	1.00	3.95	**252**
14.20	14.00	14.05	1.00	4.14	**241**
15.20	15.00	15.05	1.00	4.93	**202**
16.20	16.00	16.04	1.00	4.22	**236**
17.20	17.00	17.04	1.00	4.48	**223**
18.20	18.00	18.04	1.00	4.28	**233**
19.20	19.00	19.04	1.00	4.56	**219**
20.20	20.00	20.04	1.00	4.14	**241**
21.20	21.00	21.03	1.00	4.62	**216**
22.20	22.00	22.03	1.00	4.41	**226**
23.20	23.00	23.03	1.00	4.60	**217**
24.20	24.00	24.03	1.00	4.47	**224**
25.20	25.00	25.03	1.00	4.14	**241**
26.20	26.00	26.03	1.00	3.63	**275**
27.20	27.00	27.03	1.00	4.92	**203**
27.75	27.55	27.58	0.55	2.20	**249**


Shear Wave Velocity (m/s)
Tip Resistance qt (bar)
0
100
200
300
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Depth (m)
Vs (m/s)
Geophone depth
qt (bar)

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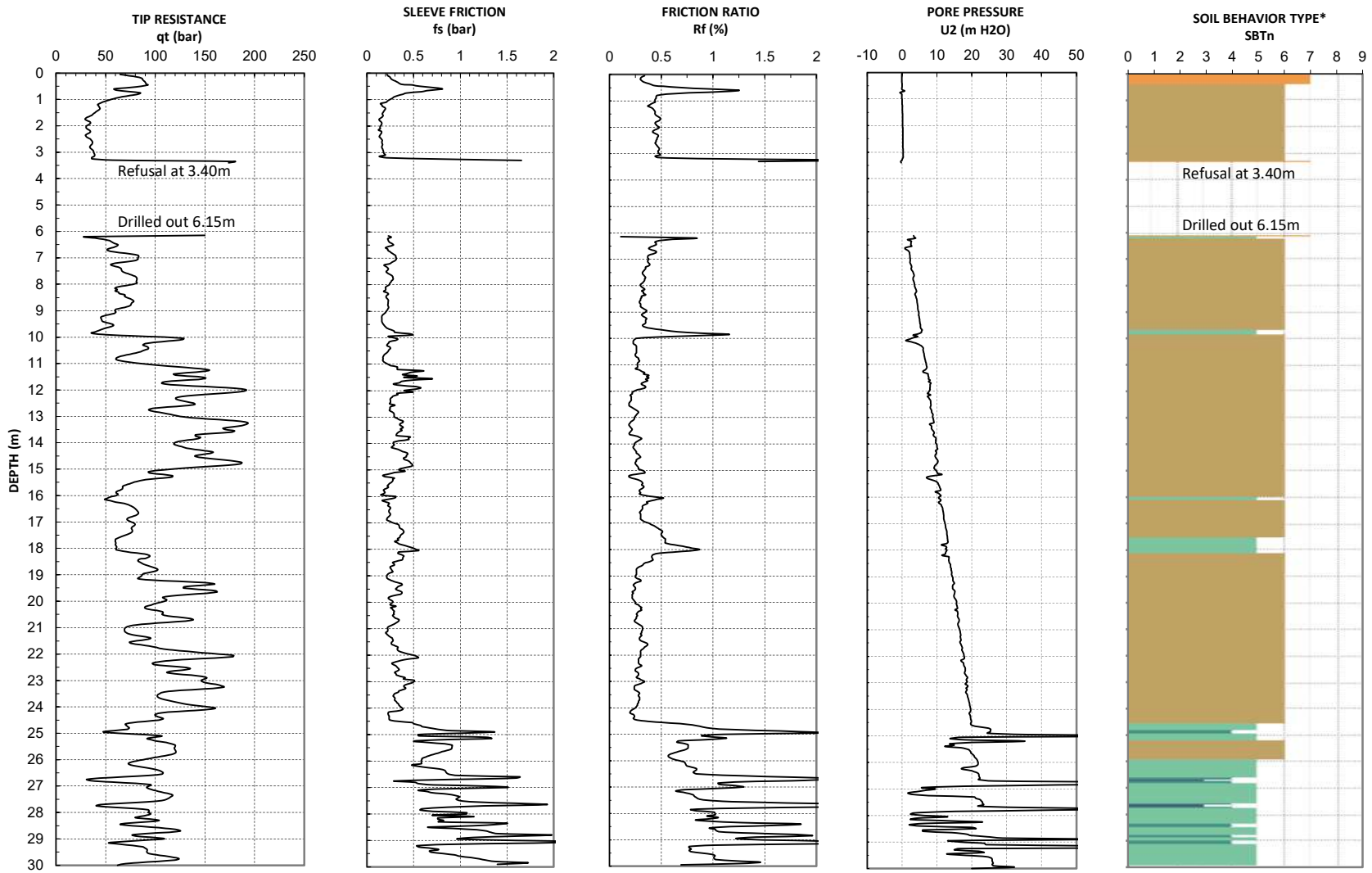
Sounding: SCPT23-11	Client: Thurber Engineering Ltd.
20-Nov-2023	Site: Esplanade Avenue, Harrison Hot Springs, BC



* Based on Robertson et. al 1990

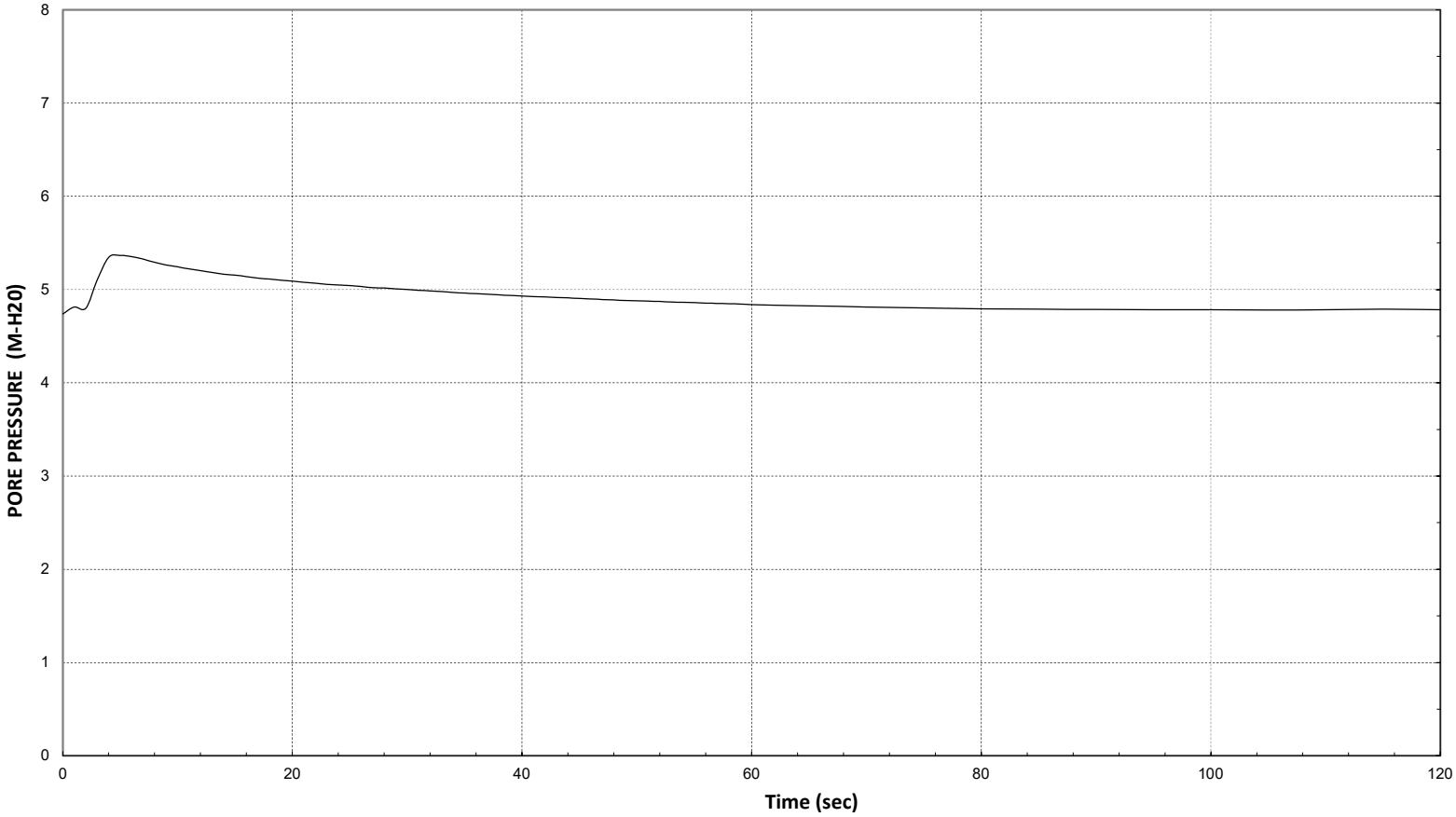
1. Sensitive Fine Grained
2. Organic Material
3. Clay to Silty Clay
4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt
6. Clean Sand to Silty Sand
7. Gravely Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

Depth Increment: 0.05 m
Geodetic Elevation: N/A
Maximum Depth: 30.00 m

Cone ID: DDG1521
Operator: RS

Sounding: SCPT23-11	Client: Thurber Engineering Ltd.
20-Nov-2023	Site: Esplanade Avenue, Harrison Hot Springs, BC

PORE PRESSURE DISSIPATION TEST



Test Depth:	9.20 m
Duration:	120 s
Cone Area:	10 cm^2
Cone ID:	DG1521

u Min:	4.74 m
u Max:	5.37 m
u Final:	4.78 m

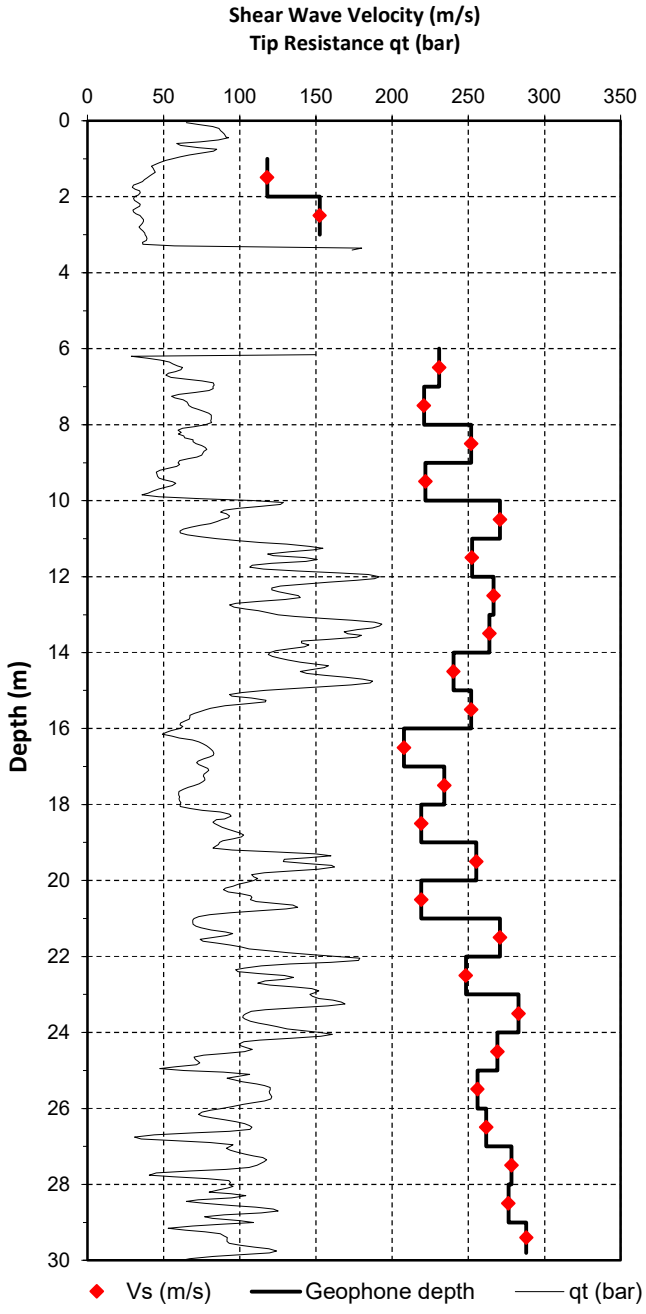
Sounding: SCPT23-11	Client: Thurber Engineering Ltd.
20-Nov-23	Site: Esplanade Avenue, Harrison Hot Springs, BC

Seismic Source: Beam
Source to cone (m): 1.2

Geodetic Elevation: N/A
Cone ID: DDG1521
Operator: RS

Shear Wave Velocity Data (Vs)

Depth (m)	Geophone Depth (m)	Ray Path (m)	Ray Path Difference (m)	Time Difference (ms)	Shear Wave Velocity Vs (m/s)
1.20	1.00	1.56			
2.20	2.00	2.33	0.77	6.53	**118**
3.20	3.00	3.23	0.90	5.90	**152**
6.20	6.00	6.12			
7.20	7.00	7.10	0.98	4.26	**231**
8.20	8.00	8.09	0.99	4.47	**221**
9.20	9.00	9.08	0.99	3.93	**252**
10.20	10.00	10.07	0.99	4.47	**222**
11.20	11.00	11.07	0.99	3.67	**271**
12.20	12.00	12.06	0.99	3.94	**252**
13.20	13.00	13.06	1.00	3.74	**267**
14.20	14.00	14.05	1.00	3.78	**264**
15.20	15.00	15.05	1.00	4.15	**240**
16.20	16.00	16.04	1.00	3.96	**252**
17.20	17.00	17.04	1.00	4.80	**208**
18.20	18.00	18.04	1.00	4.26	**234**
19.20	19.00	19.04	1.00	4.56	**219**
20.20	20.00	20.04	1.00	3.91	**255**
21.20	21.00	21.03	1.00	4.56	**219**
22.20	22.00	22.03	1.00	3.69	**271**
23.20	23.00	23.03	1.00	4.02	**248**
24.20	24.00	24.03	1.00	3.53	**283**
25.20	25.00	25.03	1.00	3.71	**269**
26.20	26.00	26.03	1.00	3.90	**256**
27.20	27.00	27.03	1.00	3.82	**262**
28.20	28.00	28.03	1.00	3.59	**278**
29.20	29.00	29.02	1.00	3.62	**276**
30.00	29.80	29.82	0.80	2.77	**288**


Shear Wave Velocity (m/s)
Tip Resistance qt (bar)
0
50
100
150
200
250
300
350
Depth (m)
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Vs (m/s)
Geophone depth
qt (bar)

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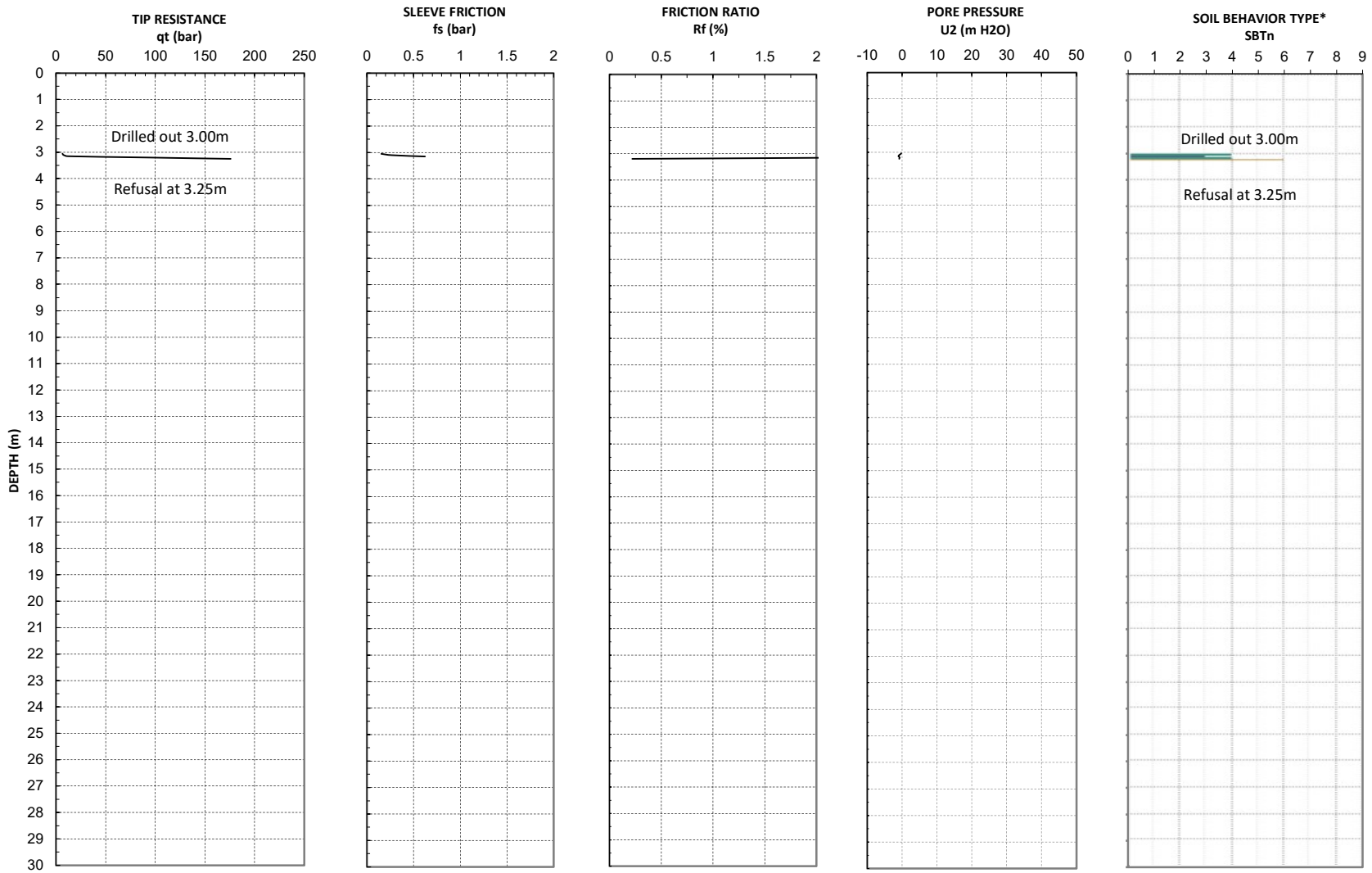
Sounding: CPT23-17	Client: Thurber Engineering Ltd.
24-Nov-2023	Site: Esplanade Avenue, Harrison Hot Springs, BC



* Based on Robertson et. al 1990

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2. Organic Material
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4. Clayey Silt to Silty Clay
5. Silty Sand to Sandy Silt
6. Clean Sand to Silty Sand
7. Gravely Sand to Sand
8. Very Stiff Sand to Clayey Sand
9. Very Stiff Fine Grained

Depth Increment: 0.05 m
Geodetic Elevation: N/A
Maximum Depth: 3.25 m

Cone ID: DDG1522
Operator: RS