Soil Engineers Ltd.
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April 23, 2008

Reference No. 0803-S002

678604 Ontario Inc.
c/o Lethbridge & Lawson Inc.
2020 Winston Park Drive
Unit 102
Oakville, Ontario
L6H 6X7

Attention: Mr. Steve Lawson

Re: Geotechnical Investigation for
Slope Stability Study
Southwest Quadrant of Highway 407 and Hurontario Street
City of Mississauga

Dear Sir:

In accordance with written authorization dated February 29, 2008, from Mr. Steve Lawson of Lethbridge & Lawson Inc., a slope stability study was carried out at the ravine situated within the southwest quadrant of Highway 407 and Hurontario Street, just north of the Derrydale Golf Club, City of Mississauga.

The purpose of the investigation was to reveal the subsurface conditions and to assess the impact of the slope stability in the subject areas. The geotechnical assessment and recommendations for the captioned project are presented herein.

Field Work

The field work, consisting of 4 boreholes to depths ranging from 4.9 to 7.9 m, was performed on March 28, 2008, at the locations shown on the Borehole Location Plan and Subsurface Profile, Drawing No. 1.

The holes were advanced at intervals to the sampling depths by a track-mounted, continuous-flight power-auger machine equipped for soil sampling. Standard Penetration tests, using the procedures described on the enclosed "List of Abbreviations and Terms", were performed at the sampling depths. The test results are recorded as the Standard Penetration Resistance (or 'N' values) of the subsoil. The relative density of the granular strata and the consistency of the cohesive strata are inferred from the 'N' values. Split-spoon samples were recovered for soil classification and laboratory testing.

The elevation at each of the borehole locations was interpolated from the contours on the Draft Plan provided by Lethbridge & Lawson Inc.

SUBSURFACE CONDITIONS

Detailed descriptions of the encountered subsurface conditions are presented on the Borehole Logs, comprising Figures 1 to 4, inclusive. The revealed stratigraphy is plotted on the subsurface profile on Drawing No. 1.

The investigation revealed that beneath the topsoil veneer, the site is predominantly underlain by a stratum of soft to hard, generally hard silty clay till. A layer of very dense sandy silt till was found underlying the silty clay till in 2 borehole locations, drilled at either sides of a gully. The soft to stiff soils are restricted to the surficial

weathered zone of the clay till, extending to a depth of 1.0± m below the prevailing ground surface.

Grain size analyses were performed on 2 samples of the silty clay till, and 1 sample of the sandy silt till. The results are plotted on Figures 5 and 6, respectively.

GROUNDWATER CONDITIONS

All the boreholes remained dry upon completion of investigation. Minor groundwater seepage was detected from the sandy silt till layer at a depth of 7.6± m below the prevailing ground surface.

The colour of the soil changes from brown to grey generally at a depth of 4.0± m or at El. 195.0± m, indicating that the upper zone of the brown soils has oxidized. The permanent groundwater regime is generally inferred to lie in the grey, saturated soils, draining towards the creek; however, the groundwater regime is subject to seasonal fluctuations.

The overall yield from the clay till, due to its low permeability, will generally be small and limited. The yield from the silt till, if encountered, will be some to moderate.

SLOPE STABILITY ANALYSIS

The slope stability analysis focuses on the eastern bank of the Fletcher's Creek that meanders from the north, collecting from gulleys and feeding downstream into the Credit River. The site is bounded by the Hydro One corridor and the Highway 407 to the north, the Derrydale Golf Club to the south, Hurontario Street to the east, and

residential subdivision to the west. The tablelands currently consist of an open field that was once used for agricultural purposes.

Four sections, Cross-Sections A-A to D-D, some cut at the steepest portions of the slope, were selected for the analysis, not only to determine the stability of the critical sections, but also to gain an overall picture of the valley. The locations of the cross-sections are shown on Drawing No. 1. These sections have an overall slope height of 3.0 to 7.0 m, measured from the tableland to the toe of the slope, adjacent to the bank of the creek with an overall gradient of 1 vertical:1.39 to 2.83+ horizontal.

The borehole findings reveal that the soil stratigraphy of the bank generally consists of a stratum of silty clay till, and in places, overlying a stratum of sandy silt till. Visual inspection revealed that the slope is generally well-vegetated with dense grass- and weed-covers in the northern region where the slope is gentle and with tree growth in the southern region where the slope is the steepest. No signs of seepage or major deep-seated failure were observed; however, minor channelization and surface creeping were noted in the proximity of Cross-Section B-B. In addition, active toe erosion was observed along the bank of the creek of Cross-Sections A-A and B-B (Boreholes 1 and 2), in the absence of a flood plain. The surface profiles of the cross-sections are interpreted from the contours on the site plan provided by Lethbridge & Lawson Inc.; the subsurface profiles are interpreted from the Borehole Logs. Cross-Sections A-A to D-D are shown on Drawing Nos. 2 to 6.

The slope stability was analyzed using force-moment-equilibrium criteria of the Bishop Method with the soil strength parameters shown in the table below.

Strength Parameters For Slope Stability Analysis			
	γ (kN/m^3)	c (kPa)	ϕ (degrees)
Silty Clay Till	22.0	5	30
Sandy Silt Till	22.5	0	31

The result from the analysis indicates that the slope at the locations of Cross-Sections A-A to D-D has a minimum factor of safety of 1.39 to 3.31 which exceeds the Ontario Ministry of Natural Resources (OMNR) guideline requirements for both light and active land uses. Hence, the stability of the existing natural slope generally satisfies the guidelines' recommendations.

It is not known at the time of the report preparation of the future development that will take place at the tablelands. In view of the uncertainty, where the slope is the steepest at Cross-Section B-B, a factor of safety of 1.39 is not satisfactory for infrastructure and public land uses according to the OMNR guidelines. As such, the existing slope at that location is considered to be geotechnically unstable for infrastructure and public land uses.

According to the Credit Valley Conservation (CVC) regulations, a toe erosion setback of 8 m will be required in the absence of an adequate flood plain (a minimum flood plain width of 15 m). As mentioned above, a stability setback may be necessary in the vicinity of Cross-Section B-B, depending on the future designated tableland use. As such, a long-term stable slope gradient of 1 vertical: 2 horizontal from the toe of slope will be required for infrastructure and public land uses. The stability of the slope with such gradient was found to have a factor of safety of 1.95, which meets the OMNR requirements. The analysis result is presented on Drawing No. 4. Lastly, a development setback buffer for man-made

and environmental degradation of the bank will be required. A long-term stable slope line, for both light/active and infrastructure/public land uses is established on Drawing No. 1. It incorporates a minimum 5 m development setback and the applicable toe erosion and stability setbacks.

In case of any removal of vegetation during the course of construction or remediation, restoration with selective native plantings, including deep rooting systems which would penetrate the original topsoil, shall be carried out after the development to ensure bank stability.

The above recommendations are subject to the approval and requirements of the Credit Valley Conservation (CVC).

LIMITATIONS OF REPORT

It should be noted that a separate investigation with Report Reference No. 0803-S001 will be issued for the proposed commercial development at the same site. Therefore, this report deals only with a study of the geotechnical aspects of the slope stability analysis.

This report was prepared by Soil Engineers Ltd. for the account of 678604 Ontario Inc., and for review by its designated consultants and government agencies. The material in it reflects the judgement of Hui Wing Yang, B.A.Sc., and Daniel Man, P.Eng., in light of the information available to it at the time of preparation. Any use which a Third Party makes of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties.

Soil Engineers Ltd. accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

Yours very truly,
SOIL ENGINEERS LTD.

Hui Wing Yang, B.A Sc.

Daniel Man, P.Eng.
HWY/DM:rx

ENCLOSURES

Borehole Logs	Figures 1 to 4
Grain Size Distribution Graphs	Figures 5 and 6
Borehole Location Plan and Subsurface Profile	Drawing No. 1
Cross-Section A-A	Drawing No. 2
Cross-Section B-B (Light to Active Land Uses)	Drawing No. 3
Cross-Section B-B (Infrastructure and Public Land Uses)	Drawing No. 4
Cross-Sections C-C and D-D	Drawing Nos. 5 and 6

c Soil Engineers Ltd. (Mississauga)

LIST OF ABBREVIATIONS AND DESCRIPTION OF TERMS

The abbreviations and terms commonly employed on the borehole logs and figures, and in the text of the report are as follows:

1. SAMPLE TYPES

AS	Auger sample
CS	Chunk sample
DO	Drive open
DS	Denison type sample
FS	Foil sample
RC	Rock core with size and percentage of recovery
ST	Slotted tube
TO	Thin-walled, open
TP	Thin-walled, piston
WS	Wash Sample

2. PENETRATION RESISTANCE/'N'

Dynamic Cone Penetration Resistance:

A continuous profile showing the number of blows for each foot of penetration of a 2-inch diameter 90° point cone driven by a 140-pound hammer falling 30 inches.
Plotted as _____

Standard Penetration Resistance or 'N' value:

The number of blows of a 140-pound hammer falling 30 inches required to advance a 2-inch O.D. drive open sampler one foot into undisturbed soil.
Plotted as 'O'

WH	Sampler advanced by static weight
PH	Sampler advanced by hydraulic pressure
PM	Sampler advanced by manual pressure
NP	No penetration

3. SOIL DESCRIPTION

a) Cohesionless Soils:

'N' (Blows/ft)	Relative Density
0 to 4	very loose
4 to 10	loose
10 to 30	compact
30 to 50	dense
over 50	very dense

b) Cohesive Soils:

Undrained Shear Strength (ksf)	'N' (Blows/ft)	Consistency
Less than 0.25	0 to 2	very soft
0.25 to 0.50	2 to 4	soft
0.50 to 1.0	4 to 8	firm
1.0 to 2.0	8 to 16	stiff
2.0 to 4.0	16 to 32	very stiff
over 4.0	over 32	hard

c) Method of Determination of Undrained Shear Strength of Cohesive Soils:

x 0.0 - Field vane test in borehole
The number denotes the sensitivity to remoulding.

△ - Laboratory vane test

□ - Compression test in laboratory

For a saturated cohesive soil, the undrained shear strength is taken as one half of the undrained compressive strength.

METRIC CONVERSION FACTORS

1 ft. = 0.3048 metres
1 lb. = 0.453 kg
1 inch = 25.4 mm
1 ksf = 47.88 kN/m^2

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JOB NO.: 0803-S002

LOG OF BOREHOLE NO.: 1

FIGURE NO.: 1

JOB DESCRIPTION: Slope Stability Study

JOB LOCATION: SW Quad. of Hwy. 407 and Hurontario St
City of Mississauga

METHOD OF BORING: Flight-Auger

DATE: March 28, 2008

Elev. / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
198.5 0.0	Ground Surface			
	30cm TOPSOIL	1	DO	9
	Stiff to hard — weathered	2	DO	38
		3	DO	41
		4	DO	100+
	SILTY CLAY, Till	5	DO	100+
	brown / grey	6	DO	49
	some sand to sandy a tr. of gravel occ. sand and silt seams and layers, cobbles and boulders occ. shale fragments	7	DO	46
190.9 7.6 190.6 7.9	Grey, very dense **SANDY SILT, Till** a tr. to some clay a tr. of gravel occ. sand and clay seams and layers, cobbles and boulders	8	DO	100+
	END OF BOREHOLE			

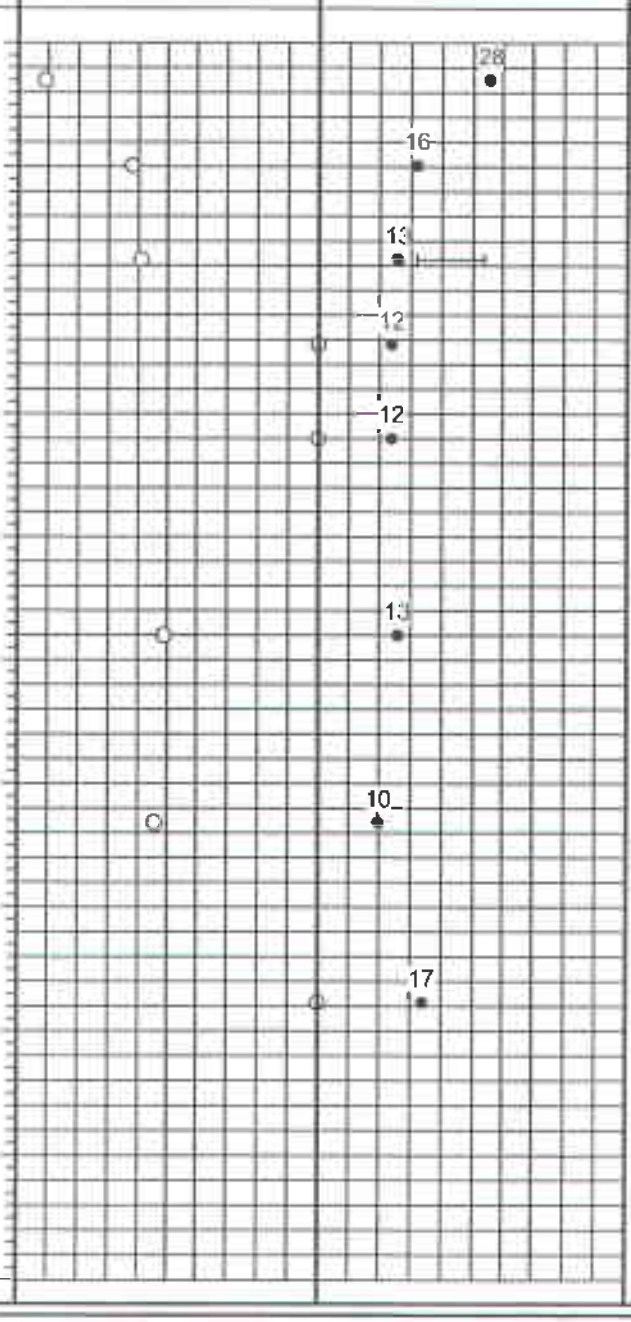
Depth Scale (m)

Shear Strength (kN/m2): × 50 100 150 200 ×

Penetration Resistance (blows/0.3m): ○ 10 30 50 70 90 ○

Atterberg Limits: W_p ⊢—⊣ W_L

Water Content (%): ● 5 15 25 35 45 ●



WATER LEVEL

Dry on completion

Soil Engineers Ltd.

JOB NO.: 0803-S002

LOG OF BOREHOLE NO.: 2

FIGURE NO.: 2

JOB DESCRIPTION: Slope Stability Study

JOB LOCATION: SW Quad of Hwy. 407 and Hurontario St. City of Mississauga

METHOD OF BORING: Flight-Auger

DATE: March 28, 2008

Elev. / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
198.5 / 0.0	Ground Surface			
	15cm TOPSOIL	1	DO	10
	Stiff to hard — weathered	2	DO	46
		3	DO	100+
		4	DO	100+
	SILTY CLAY, Till	5	DO	100+
	brown / grey	6	DO	52
	some sand to sandy, a tr. of gravel occ. wet sand and silt seams and layers, cobbles and boulders	7	DO	100+
191.5 / 7.0	Grey, very dense **SANDY SILT, Till** a tr. to some clay a tr. of gravel occ. sand and clay seams and layers, cobbles and boulders	8	DO	100+
190.7 / 7.8	**END OF BOREHOLE**			

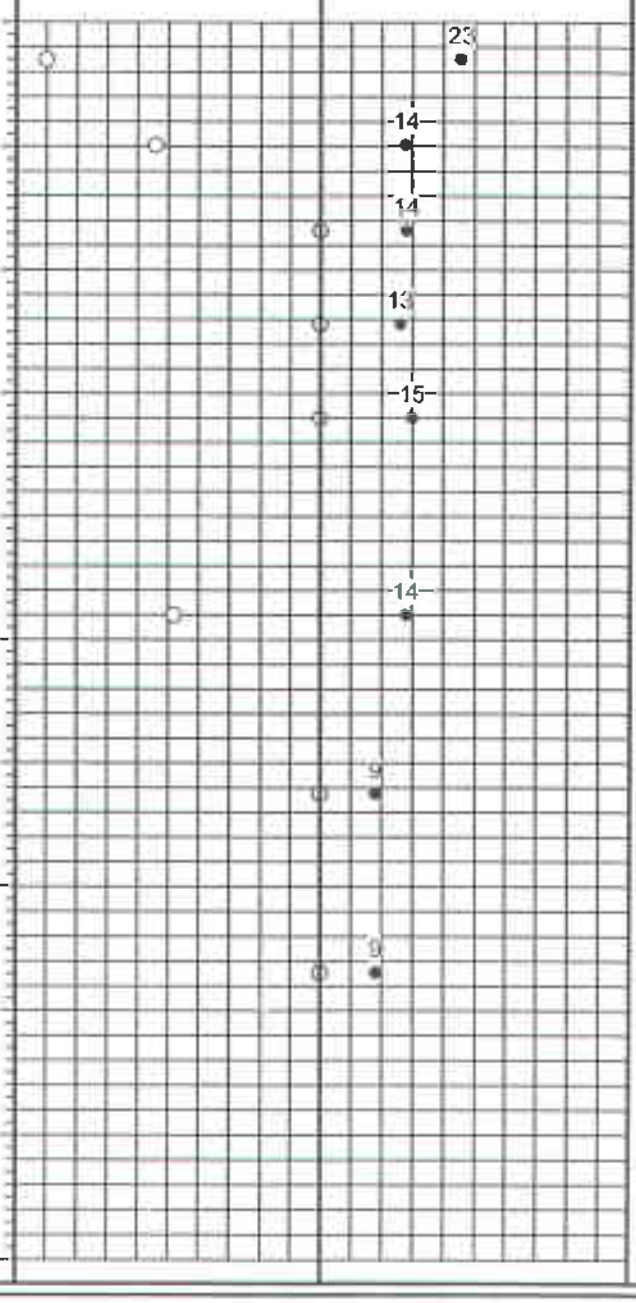
Depth Scale (m)

Shear Strength (kN/m2) × 50 100 150 200 ×

Penetration Resistance ○ (blows/0.3m) ○ 10 30 50 70 90

Alterberg Limits W_P ⊢—⊣ W_L

Water Content ● (%) ● 5 15 25 35 45



WATER LEVEL

Dry on completion

Soil Engineers Ltd.

JOB NO.: 0803-S002

LOG OF BOREHOLE NO.: 3

FIGURE NO.: 3

JOB DESCRIPTION: Slope Stability Study

JOB LOCATION: SW Quad. of Hwy. 407 and Hurontario St. City of Mississauga

METHOD OF BORING: Flight-Auger

DATE: March 28, 2008

Elev. / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
199.0 / 0.0	Ground Surface			
	20cm TOPSOIL	1	DO	4
	Soft to hard — weathered	2	DO	40
	SILTY CLAY, Till	3	DO	57
		4	DO	100+
	some sand to sandy a tr. of gravel occ. wet sand and silt seams and layers, cobbles and boulders	5	DO	82
	brown - - - grey			
194.0 / 5.0		6	DO	40
	END OF BOREHOLE			

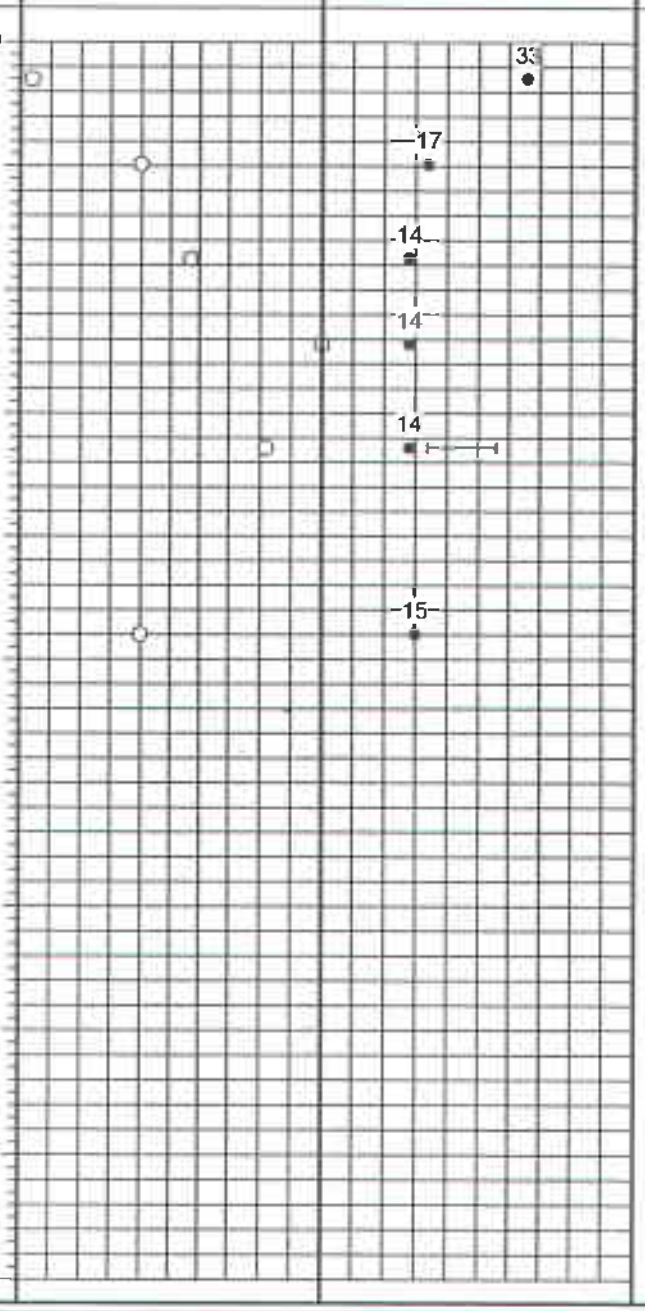
Depth Scale (m)

Shear Strength (kN/m2) × 50 100 150 200 ×

Penetration Resistance ○ (blows/0.3m) ○ 10 30 50 70 90

Atterberg Limits W_p ⊢——⊣ W_l

Water Content ● (%) ● 5 15 25 35 45



WATER LEVEL

Dry on completion

Soil Engineers Ltd.

JOB NO.: 0803-S002

LOG OF BOREHOLE NO.: 4

FIGURE NO.: 4

JOB DESCRIPTION: Slope Stability Study

JOB LOCATION: SW Quad. of Hwy 407 and Hurontario St
City of Mississauga

METHOD OF BORING: Flight-Auger

DATE: March 28, 2008

Elev. / Depth (m)	SOIL DESCRIPTION	SAMPLES Number	Type	N-Value
200.0	Ground Surface			
0.0	**15cm TOPSOIL**	1	DO	3
	Brown, soft to hard weathered	2	DO	40
		3	DO	100+
	SILTY CLAY, Till	4	DO	100+
	some sand to sandy, a tr. of gravel occ. wet sand and silt seams and layers, cobbles and boulders	5	DO	100+
195.1		6	DO	100+
4.9	**END OF BOREHOLE**			

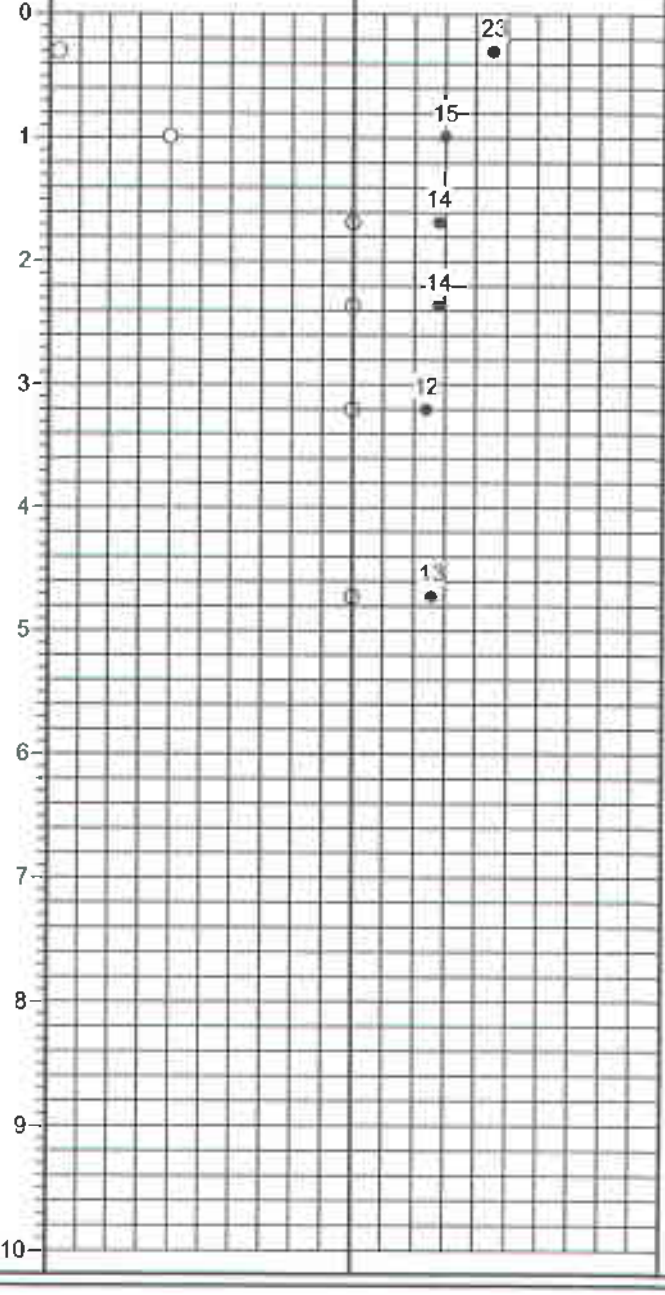
Depth Scale (m): 0 1 2 3 4 5 6 7 8 9 10

Shear Strength (kN/m2): × 50 100 150 200 ×

Penetration Resistance (blows/0.3m): O 10 30 50 70 90 O

Atterberg Limits: W_P ⊢——⊣ W_L

Water Content (%): ● 5 15 25 35 45 ●



WATER LEVEL: Dry on completion

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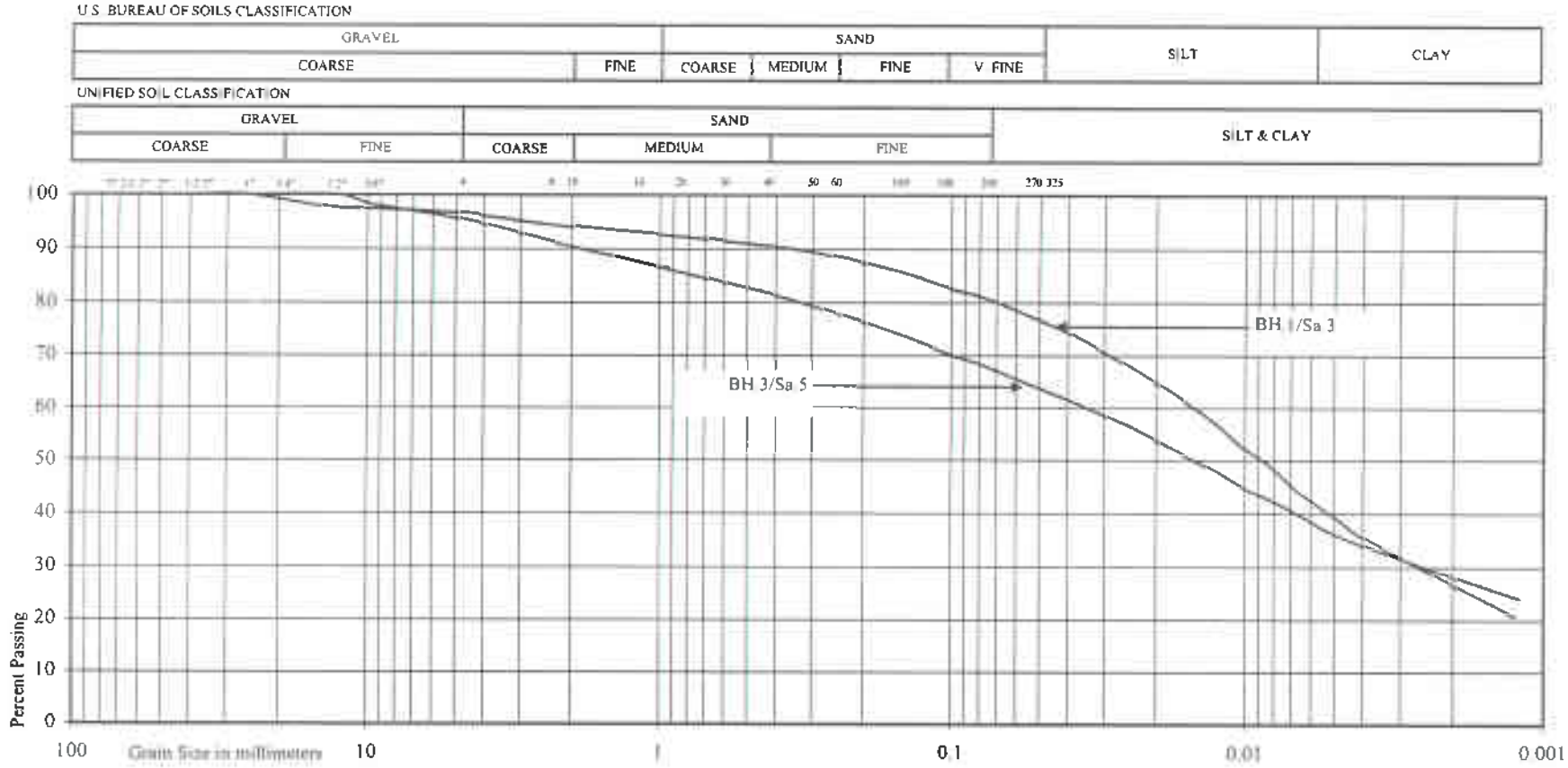
GRAIN SIZE DISTRIBUTION

Reference No: 0803-S002



Project:	Slope Stability Study	
Location	SW Quad. of Hwy. 407 and Hurontario St.	
	City of Mississauga	
Borehole No:	1	3
Sample No:	3	5
Depth (m):	1.8	3.3
Elevation (m):	196.7	195.7

BH./Sa.	1/3	3/5
Liquid Limit (%) =	27	28
Plastic Limit (%) =	16	17
Plasticity Index (%) =	11	11
Moisture Content (%) =	13	14
Estimated Permeability (cm./sec.) =	10^{-5}	10^{-7}

Classification of Sample [& Group Symbol]: SILTY CLAY, Till
some sand to sandy, a tr. of gravel

Figure: 5

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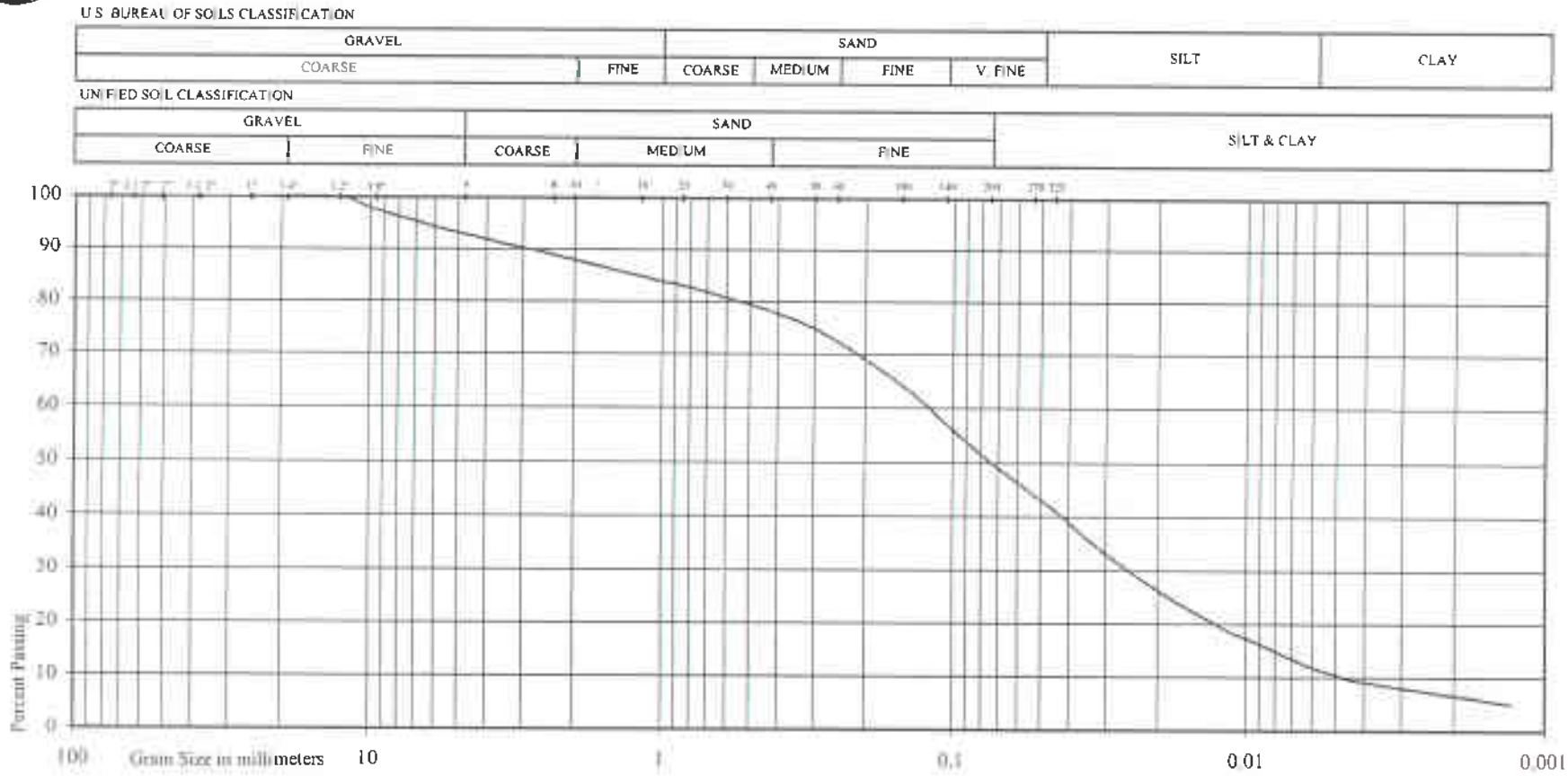
GRAIN SIZE DISTRIBUTION

Reference No: 0803-S002



Project: Slope Stability Study

Location: SW Quad. of Hwy. 407 and Hurontario St.
City of Mississauga

Borehole No: 2

Sample No: 8

Depth (m): 7.7

Elevation (m): 190.8

Liquid Limit (%) = -

Plastic Limit (%) = -

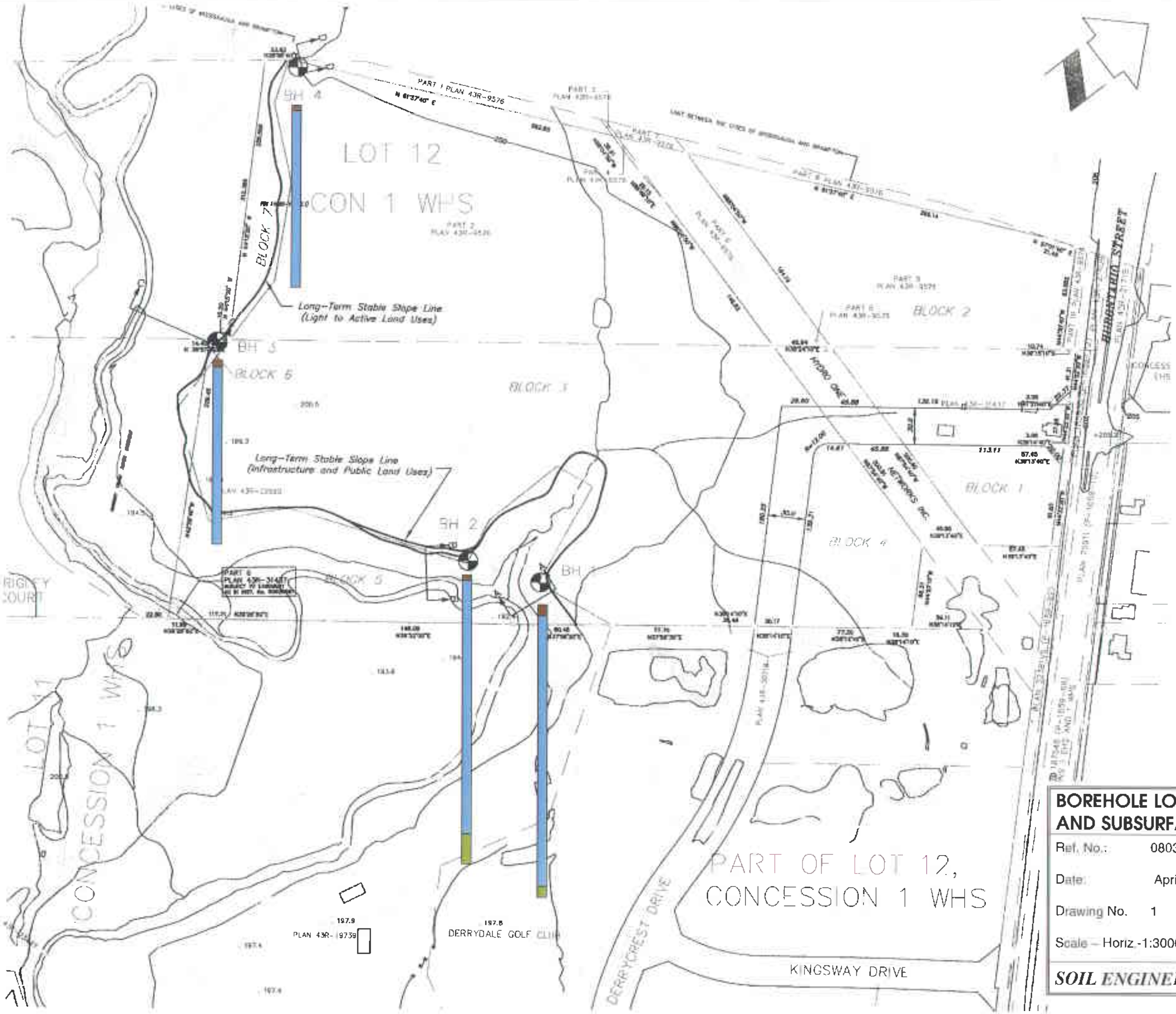
Plasticity Index (%) = -

Moisture Content (%) = 9

Estimated Permeability (cm/sec.) = 10^{-5}

Classification of Sample [& Group Symbol]: SANDY SILT, Till
traces of clay and gravel

Figure: 6



BOREHOLE LOCATION PLAN AND SUBSURFACE PROFILE

Ref. No.:	0803-S002
Date:	April 2008
Drawing No.	1
Scale – Horiz.-1:3000	Vert.-1:100

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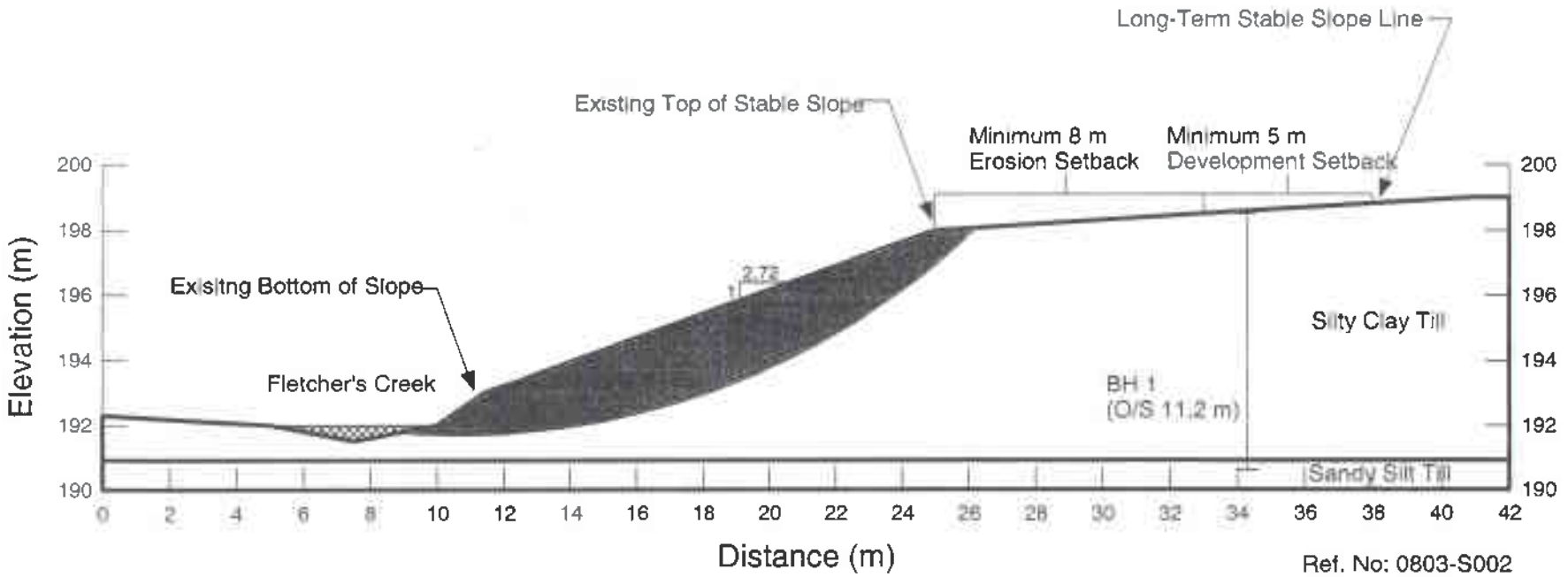
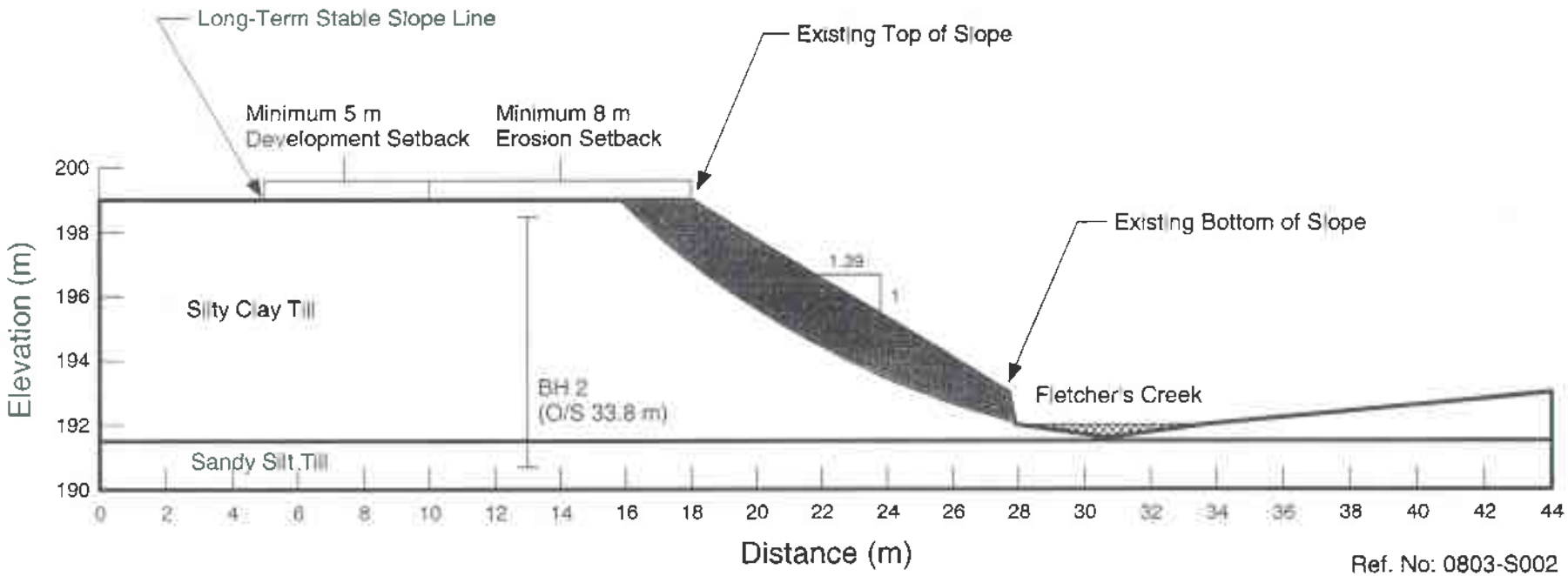
Minimum Factor of Safety = 2.13



Cross-Section A-A

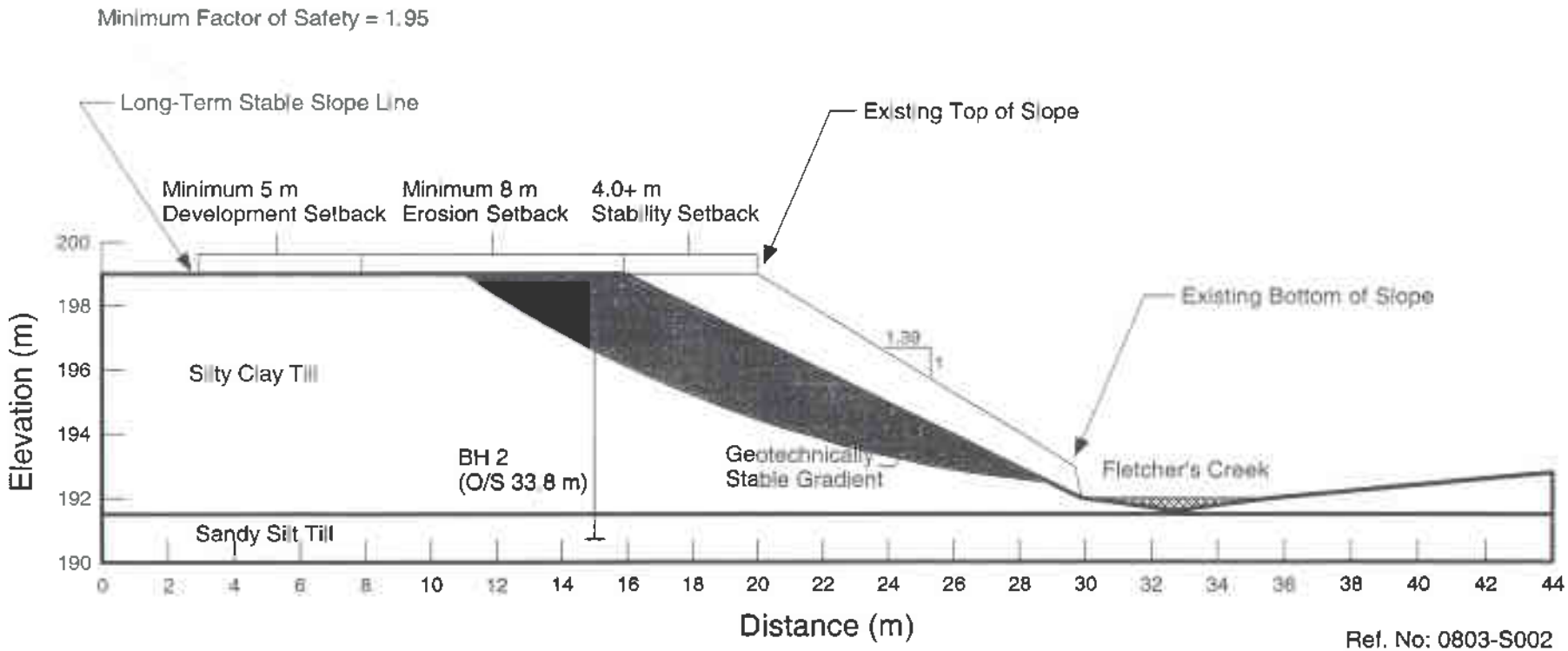
Ref. No: 0803-S002
Scale H 1:200
V 1:200
Drawing No. 2

Minimum Factor of Safety = 1.39



Cross-Section B-B (For Light to Active Land Uses)

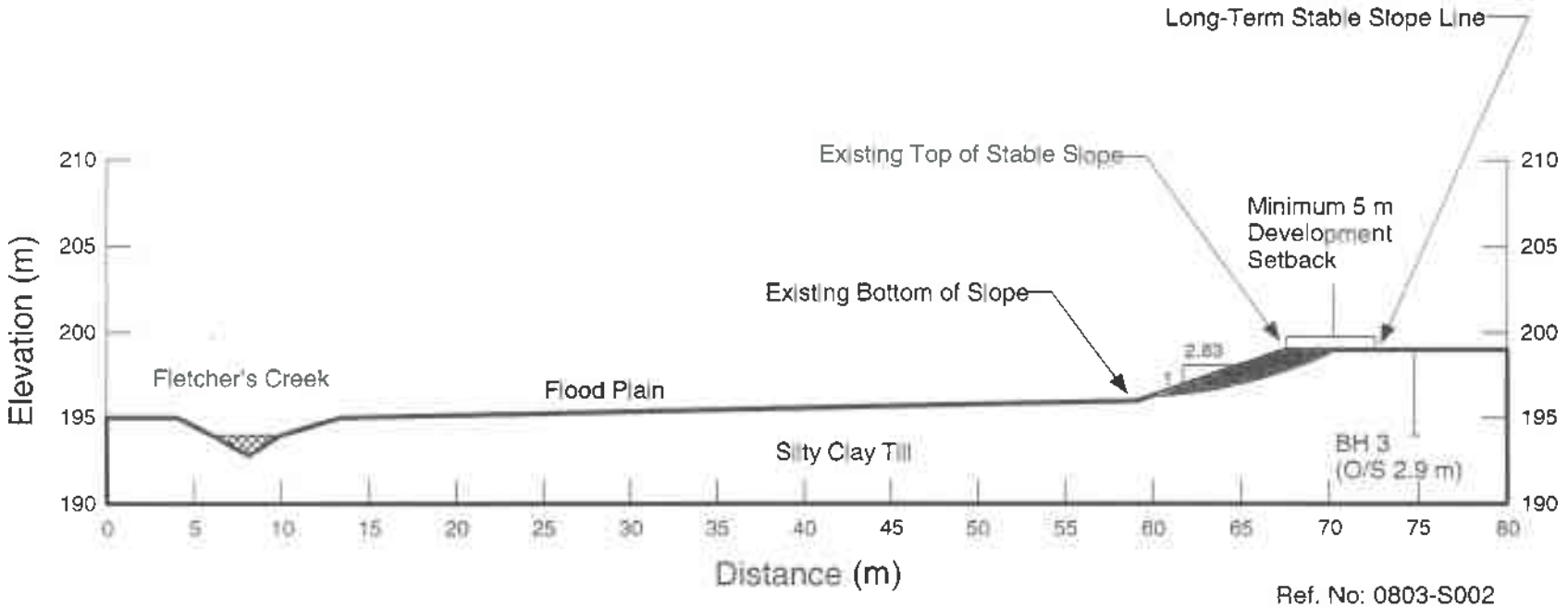
Ref. No: 0803-S002
Scale H 1:200
V 1:200
Drawing No. 3



Cross-Section B-B (For Infrastructure and Public Land Uses)

Ref. No: 0803-S002
Scale H 1:200
V 1:200
Drawing No. 4

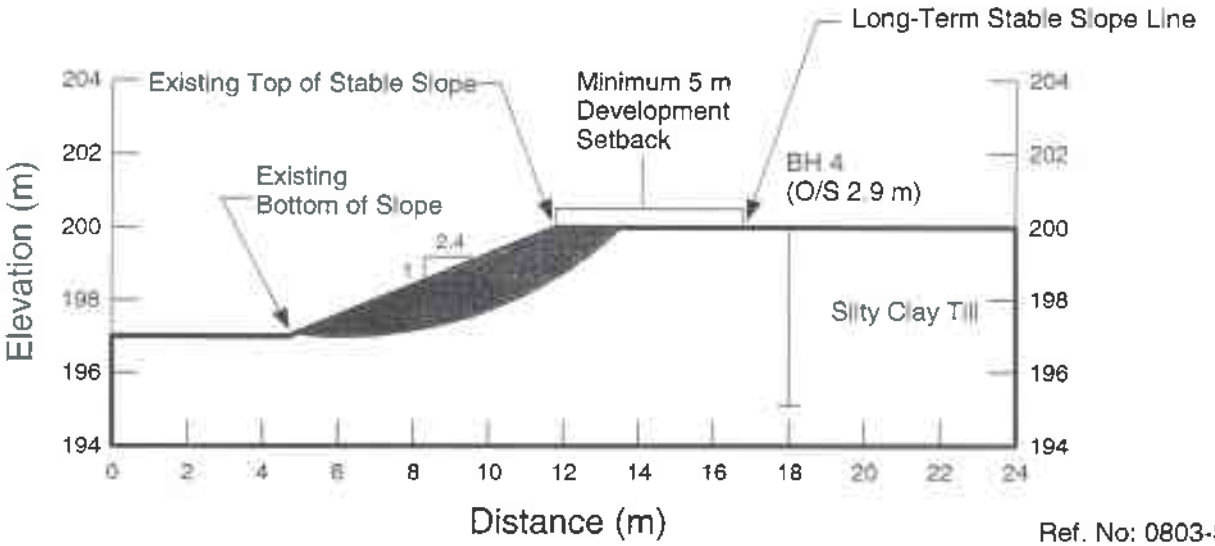
Minimum Factor of Safety = 3.31



Cross-Section C-C

Ref. No: 0803-S002
Scale H 1:400
V 1:400
Drawing No. 5

Minimum Factor of Safety = 2.49



Cross-Section D-D

Ref. No: 0803-S002
Scale H 1:200
V 1:200
Drawing No. 6