APPENDIX ‘A’

GEOTECHNICAL REPORT

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"Engineering and Testing Solutions That Work for You"

Date: July 15, 2024 **File No.:** 24-035-01

Client: WSP Canada Inc.

Address: 1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

Attention: Scott Suderman, P.Eng.

Project: CW749 – 2023 Pavement Renewals on Dugald Road and Plessis Road, Winnipeg, Manitoba Canada

Introduction

ENG-TECH Consulting Limited (ENG-TECH) was retained by WSP Canada Inc. (WSP) to complete a geotechnical investigation inclusive of test holes and pavement cores for a future rehabilitation project along a section of Dugald Road and Plessis Road in Winnipeg, Manitoba, Canada. This report contains the Dugald Road portion of the project.

Scope of Work

The scope of work for the project entailed drilling a total of 22 test holes inclusive of recovering cores from the existing pavement structure, documenting findings in accordance with Appendix B – Site Investigation Requirements for Public Works Street Projects and providing a report outlining the work conducted, including photographs and pavement core summary tables showing the pavement core thicknesses and locations using UTM coordinates.

The section of road covered in the investigation was Eastbound and Westbound Dugald Road between Plessis Road and 300m East of Ravenhurst Street.

Field Program

ENG-TECH conducted the coring and drilling program between April 1st, 10th, and 15th to 19th 2024 across 22 site locations in the road section previously stated. The cores were obtained by ENG-TECH at locations determined by WSP using a 150mm diameter diamond end core barrel. The test holes were drilled using a Lone Star T1A+ drill rig equipped with 100 mm diameter solid stem continuous flight augers owned and operated by ENG-TECH. The test holes were advanced to 2.5 m to 3.0m below the pavement structure in the Eastbound and Westbound lanes at the locations as shown on Core and Test Hole Location Plan Figures 1 to 3. Soil samples were collected off the auger flights, as measured from the bottom of the pavement structure, at depth intervals of 0.6, 0.9, 1.2, 1.6, 2.0, and 2.5m as specified in the Site Investigation Requirements for Public Works Street Projects. After sample collection the test holes were backfilled with soil auger cuttings and granular fill. ENG-TECH repaired the core apertures where required with a City of Winnipeg approved material (cold mix asphalt) that has been accepted on previous street renewal projects.

Laboratory Program

The soil samples collected were retained for testing in ENG-TECH'S laboratory. The moisture content of each sample depth collected was determined and select samples were tested for particle

size and Atterberg Limits. The moisture content, particle size and Atterberg Limit test results are summarized in Table 1 and in the attached test hole logs. The Particle Size Analysis and Liquid Limit, Plastic Limit and Plasticity Index of Soils results with ASTM D2487 and D3282 classifications are shown in Table 1 and in the separate reports enclosed.

Three composite samples for standard proctor (Moisture-Density Relationships) and California Bearing Ratio (CBR) testing were recovered from Test Holes (TH) 27 and 28, Test Holes (TH) 32, 33 and 34 and Test Holes (TH) 45, 46 and 47 as directed by WSP. Results of the standard proctor test and CBR are enclosed. The TH 27 and 28 CBR results will be provided separately upon completion.

The pavement core thicknesses were measured and photographed. Photographs of each core are shown in the attached Photographs 1 to 16.

Soil Stratigraphy Summary

The existing shoulder pavement structure ranged from 0.083m to 0.19m where asphalt pavement was present and generally consisted of a granular fill layer underlain by a mostly high plastic clay. Test holes 25, 29, 35, did not contain an asphalt layer but generally consisted of granular material layer ranging between 0.15 to 0.575m underlain by a clay fill layer followed by a high plastic clay to depth explored. Test holes 40, 44 and 46 also did not contain an asphalt layer but consisted of granular material underlain by high plastic clay to depth explored.

The existing pavement structure ranged from 0.205 to 0.305m. Test Holes 28, 32 to 34, 36, 38, 39, 41 to 43 contained no granular materials at the surface and the underlying layer was comprised of predominately high plastic clay with minor irregular sections of slight siltier and sandier clay to depth explored. As measured from the bottom of the pavement structure, there was typically 2.695m to 2.795m of clay. Test Holes 30, 31 and 37 generally consisted of clay fill layer ranging between 0.595 to 0.721m underlain by a high plastic clay to depth explored.

Closure

ENG-TECH trusts this is all the information required. If you have any questions, please contact the undersigned.

Sincerely,
ENG-TECH Consulting Limited

Darci Babisky, C.E.T.
Operations Manager – Laboratory

Email: WSP Canada Inc. Contact Group

Enclosures: Table 1 – Summary of Pavement Structure – Dugald Road between Plessis Road and 300m East of Ravenhurst Street
Figures 1 to 3 – Core and Test Hole Location Plan
Specimen Photographs (16 pages)
Test Hole Logs (23 pages)
Atterberg Limits, Plastic Index and Plasticity Index of Soil Reports Ref. No.'s 24-35-1-35, 37 and 33
Particle Size Analysis Reports Ref. No.'s 24-35-1-34, 36 and 32
Moisture-Density Relationship Report Ref. No. 24-35-1-16, 17 and 18
California Bearing Ratio (CBR) of Laboratory Compacted Soils Reports Ref. No.'s 24-35-1-20 and 22

Table 1
Summary of Pavement Structure
Dugald Road between Plessis Road and 300m East of Ravenhurst Street

Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM (N)	14U (E)	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH25	5527820	641924	None	0	Gravel Fill	575	Clay Fill	0.6	21.5	-	-	-	-	-	-	-
								0.9	23.3	-	-	-	-	-	-	-
							Clay	1.2	31.5	-	-	-	-	-	-	-
								1.6	27.8	-	-	-	-	-	-	-
								2.0	28.2	-	-	-	-	-	-	-
								2.5	24.5	-	-	-	-	-	-	-
TH26	5527824	641987	-	-	-	-	-	0.6	-	-	-	-	-	-	-	-
								0.9	-	-	-	-	-	-	-	-
								1.2	-	-	-	-	-	-	-	-
								1.6	-	-	-	-	-	-	-	-
								2.0	-	-	-	-	-	-	-	-
								2.5	-	-	-	-	-	-	-	-
TH27	5527825	642076	Asphalt	190	Clay Fill	610	Clay	0.6	18.7	-	-	-	-	-	-	-
								0.9	32.1	-	-	-	-	-	-	-
								1.2	33.9	-	-	-	-	-	-	-
								1.6	28.5	-	-	-	-	-	-	-
								2.0	29.5	-	-	-	-	-	-	-
								2.5	30.7	-	-	-	-	-	-	-
TH28	5527830	642198	Asphalt	205	Clay	2795	Clay	0.6	38.0	-	-	-	-	-	-	-
								0.9	36.6	-	-	-	-	-	-	-
								1.2	34.2	-	-	-	-	-	-	-
								1.6	33.8	-	-	-	-	-	-	-
								2.0	31.5	-	-	-	-	-	-	-
								2.5	31.9	-	-	-	-	-	-	-

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Dugald Road between Plessis Road and 300m East of Ravenhurst Street

Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM (N)	14U (E)	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH29	5527827	642196	None	0	Gravel Fill	300	Clay Fill	0.6	15.8	-	-	-	-	-	-	-
								0.9	17.2	-	-	-	-	-	-	-
							Clay	1.2	32.2	-	-	-	-	-	-	-
								1.6	32.8	-	-	-	-	-	-	-
								2.0	40.9	-	-	-	-	-	-	-
								2.5	43.7	-	-	-	-	-	-	-
TH30	5527837	642481	Asphalt	265	Gravel Fill	595	Gravel/ Clay Fill	0.6	7.2	-	-	-	-	-	-	-
								0.9	11.3	-	-	-	-	-	-	-
							Clay	1.2	33.2	-	-	-	-	-	-	-
								1.6	32.4	-	-	-	-	-	-	-
								2.0	41.4	-	-	-	-	-	-	-
								2.5	41.8	-	-	-	-	-	-	-
TH31	5527845	642612	Asphalt	279	Clay Fill	721	Sandy Lean Clay Fill	0.6	13.3	1.8	38.6	29.9	29.8	48	20	28
							Clay	0.9	30.8	-	-	-	-	-	-	-
								1.2	38.4	-	-	-	-	-	-	-
								1.6	33.4	-	-	-	-	-	-	-
								2.0	31.7	-	-	-	-	-	-	-
								2.5	31.5	-	-	-	-	-	-	-
TH32	5527851	642958	Asphalt	285	Clay	2715	Clay	0.6	25.7	-	-	-	-	-	-	-
								0.9	36.7	-	-	-	-	-	-	-
								1.2	31.0	-	-	-	-	-	-	-
								1.6	26.1	-	-	-	-	-	-	-
								2.0	25.3	-	-	-	-	-	-	-
								2.5	40.8	-	-	-	-	-	-	-

Table 1
Summary of Pavement Structure
Dugald Road between Plessis Road and 300m East of Ravenhurst Street

Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM	14U	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH33	5527855	643042	Asphalt	305	Clay	2695	Clay	0.6	26.0	-	-	-	-	-	-	-
								0.9	27.6	-	-	-	-	-	-	-
								1.2	27.3	-	-	-	-	-	-	-
								1.6	25.2	-	-	-	-	-	-	-
								2.0	27.5	-	-	-	-	-	-	-
								2.5	23.8	-	-	-	-	-	-	-
TH34	5527863	643470	Asphalt	275	Clay	2725	Clay	0.6	30.8	-	-	-	-	-	-	-
								0.9	33.0	-	-	-	-	-	-	-
								1.2	27.0	-	-	-	-	-	-	-
								1.6	25.5	-	-	-	-	-	-	-
								2.0	26.9	-	-	-	-	-	-	-
								2.5	26.4	-	-	-	-	-	-	-
TH35	5527860	643478	None	0	Gravel Fill	150	Clay Fill	0.6	17.8	-	-	-	-	-	-	-
								0.9	19.4	-	-	-	-	-	-	-
							Clay	1.2	31.9	-	-	-	-	-	-	-
								1.6	32.0	-	-	-	-	-	-	-
								2.0	40.0	-	-	-	-	-	-	-
								2.5	40.4	-	-	-	-	-	-	-
TH36	5527868	643672	Asphalt	290	Clay	2710	Clay	0.6	35.9	-	-	-	-	-	-	-
								0.9	38.2	-	-	-	-	-	-	-
								1.2	38.3	-	-	-	-	-	-	-
								1.6	28.7	-	-	-	-	-	-	-
								2.0	26.5	-	-	-	-	-	-	-
								2.5	25.8	-	-	-	-	-	-	-

Table 1
Summary of Pavement Structure
Dugald Road between Plessis Road and 300m East of Ravenhurst Street

Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM	14U	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH37	5527880	644046	Asphalt	279	Clay Fill	721	Clay Fill	0.6	11.7	-	-	-	-	-	-	-
							Clay	0.9	29.9	-	-	-	-	-	-	-
								1.2	22.8	-	-	-	-	-	-	-
								1.6	32.4	-	-	-	-	-	-	-
								2.0	26.8	-	-	-	-	-	-	-
								2.5	25.7	-	-	-	-	-	-	-
TH38	5527880	644185	Asphalt	287	Clay	2713	Sandy Fat Clay	0.6	42.7	3.8	29.7	28.3	38.2	67	27	40
								0.9	33.8	-	-	-	-	-	-	-
								1.2	46.8	-	-	-	-	-	-	-
								1.6	22.1	-	-	-	-	-	-	-
								2.0	28.3	-	-	-	-	-	-	-
								2.5	29.3	-	-	-	-	-	-	-
TH39	5527890	644602	Asphalt	264	Clay	2736	Clay	0.6	27.7	-	-	-	-	-	-	-
								0.9	39.0	-	-	-	-	-	-	-
								1.2	30.5	-	-	-	-	-	-	-
								1.6	31.8	-	-	-	-	-	-	-
								2.0	32.6	-	-	-	-	-	-	-
								2.5	36.9	-	-	-	-	-	-	-
TH40	5527888	644609	None	0	Gravel Fill	150	Sandy Fat Clay	0.6	32.0	8.5	27.1	30.3	34.1	56	20	36
								0.9	29.3	-	-	-	-	-	-	-
								1.2	28.8	-	-	-	-	-	-	-
								1.6	25.9	-	-	-	-	-	-	-
								2.0	26.7	-	-	-	-	-	-	-
								2.5	27.5	-	-	-	-	-	-	-

Table 1
Summary of Pavement Structure
Dugald Road between Plessis Road and 300m East of Ravenhurst Street

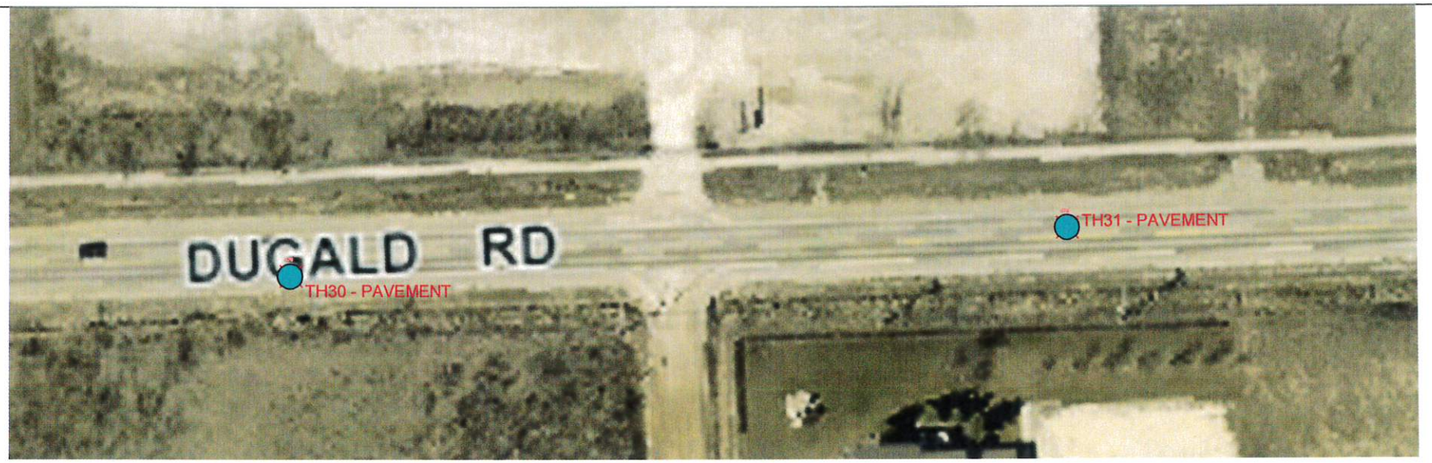
Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM	14U	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH41	5527902	644920	Asphalt	290	Clay	2710	Clay	0.6	32.0	-	-	-	-	-	-	-
								0.9	29.3	-	-	-	-	-	-	-
								1.2	28.8	-	-	-	-	-	-	-
								1.6	25.9	-	-	-	-	-	-	-
								2.0	26.7	-	-	-	-	-	-	-
								2.5	27.5	-	-	-	-	-	-	-
TH42	5527909	645156	Asphalt	296	Clay	2704	Clay	0.6	32.3	-	-	-	-	-	-	-
								0.9	36.9	-	-	-	-	-	-	-
								1.2	29.8	-	-	-	-	-	-	-
								1.6	28.3	-	-	-	-	-	-	-
								2.0	28.6	-	-	-	-	-	-	-
								2.5	29.7	-	-	-	-	-	-	-
TH43	5527908	645275	Asphalt	289	Clay	2711	Clay	0.6	31.7	-	-	-	-	-	-	-
								0.9	35.3	-	-	-	-	-	-	-
								1.2	32.9	-	-	-	-	-	-	-
								1.6	28.2	-	-	-	-	-	-	-
								2.0	25.5	-	-	-	-	-	-	-
								2.5	25.9	-	-	-	-	-	-	-
TH44	5527905	645270	None	0	Gravel Fill	150	Clay	0.6	18.3	-	-	-	-	-	-	-
								0.9	17.9	-	-	-	-	-	-	-
								1.2	33.5	-	-	-	-	-	-	-
								1.6	39.0	-	-	-	-	-	-	-
								2.0	28.2	-	-	-	-	-	-	-
								2.5	26.4	-	-	-	-	-	-	-

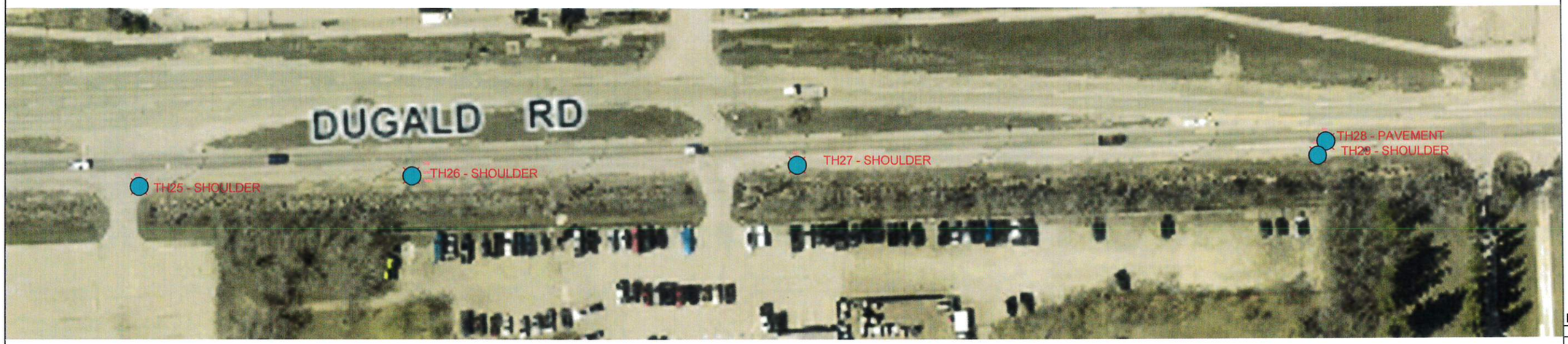
Table 1
Summary of Pavement Structure
Dugald Road between Plessis Road and 300m East of Ravenhurst Street

Test Hole	GPS Coordinates		Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
	UTM	14U	Type	Depth (mm)	Type	Depth (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH45	5527928	646076	Asphalt	83	Granular Fill	267	Clay	0.6	15.7	-	-	-	-	-	-	-
								0.9	31.4	-	-	-	-	-	-	-
								1.2	32.5	-	-	-	-	-	-	-
								1.6	34.3	-	-	-	-	-	-	-
								2.0	28.3	-	-	-	-	-	-	-
								2.5	27.0	-	-	-	-	-	-	-
TH46	552729	646155	None	0	Granular Fill	240	Clay	0.6	36.0	-	-	-	-	-	-	-
								0.9	33.0	-	-	-	-	-	-	-
								1.2	33.8	-	-	-	-	-	-	-
								1.6	34.6	-	-	-	-	-	-	-
								2.0	27.8	-	-	-	-	-	-	-
								2.5	28.6	-	-	-	-	-	-	-
TH47	5527930	646232	Asphalt	124	Granular Fill	120	Clay	0.6	27.5	-	-	-	-	-	-	-
								0.9	26.8	-	-	-	-	-	-	-
								1.2	29.9	-	-	-	-	-	-	-
								1.6	30.7	-	-	-	-	-	-	-
								2.0	30.3	-	-	-	-	-	-	-
								2.5	29.3	-	-	-	-	-	-	-

FIGURES 1 TO 3 – CORE AND TEST HOLE LOCATION PLAN

TEST HOLE LOCATION TABLE		
HOLE #	GPS COORDINATES OF TEST HOLES APRIL 16,17 & 19, 2024	
	UTM	14U
TH25	5527820	641924
TH26	5527824	641987
TH27	5527825	642076
TH28	5527830	642198
TH29	5527827	642196
TH30	5527837	642481
TH31	5527845	642612
TH32	5527851	642958
TH33	5527855	643042





LEGEND

TH — TEST HOLE

NO.	DATE	ISSUE / REVISION
0	July 2024	Report

ENG-TECH CONSULTING LIMITED
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ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

CLIENT: WSP CANADA INC.

PROJECT: CW749 - 2023 PAVEMENT RENEWALS ON DUGALD RD AND PLESSIS RD

DWG DESCRIPTION: CORE AND TEST HOLE LOCATION PLAN

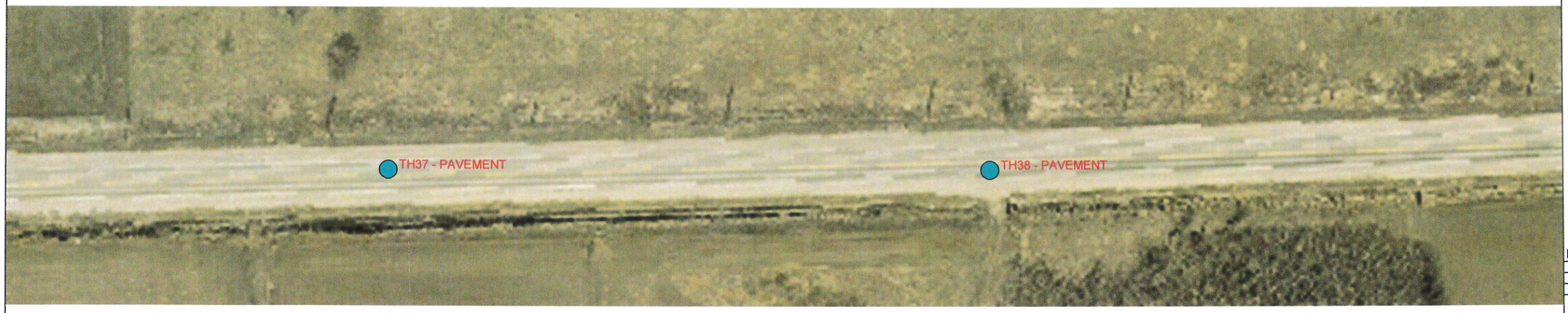
SCALE: 1:1000

DRAWN BY:	DATE:
EAL	JULY 2024
FILE No.: 24-035-01	CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.: 1 of 3 | NO.:

P:\2024\035(WSP)\01(Dugald & Plessis Pavement Renewals)\Drawing\24-035-01 (July 16, 2024).dwg

TEST HOLE LOCATION TABLE		
HOLE #	GPS COORDINATES OF TEST HOLES APRIL 15,16 & 17, 2024	
	UTM	14U
TH34	5527863	643470
TH35	5527860	643478
TH36	5527868	643672
TH37	5527880	644046
TH38	5527880	644185
TH39	5527890	644602
TH40	5527888	644609
TH41	5527902	644920



LEGEND

TH — TEST HOLE

NO.	DATE	ISSUE / REVISION
0	July 2024	Report

ENG-TECH CONSULTING LIMITED
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ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

CLIENT: WSP CANADA INC.

PROJECT: CW749 - 2023 PAVEMENT RENEWALS ON DUGALD RD AND PLESSIS RD

DWG DESCRIPTION: CORE AND TEST HOLE LOCATION PLAN

SCALE: 1:1000

DRAWN BY: EAL

DATE: JULY 2024

FILE No.: 24-035-01

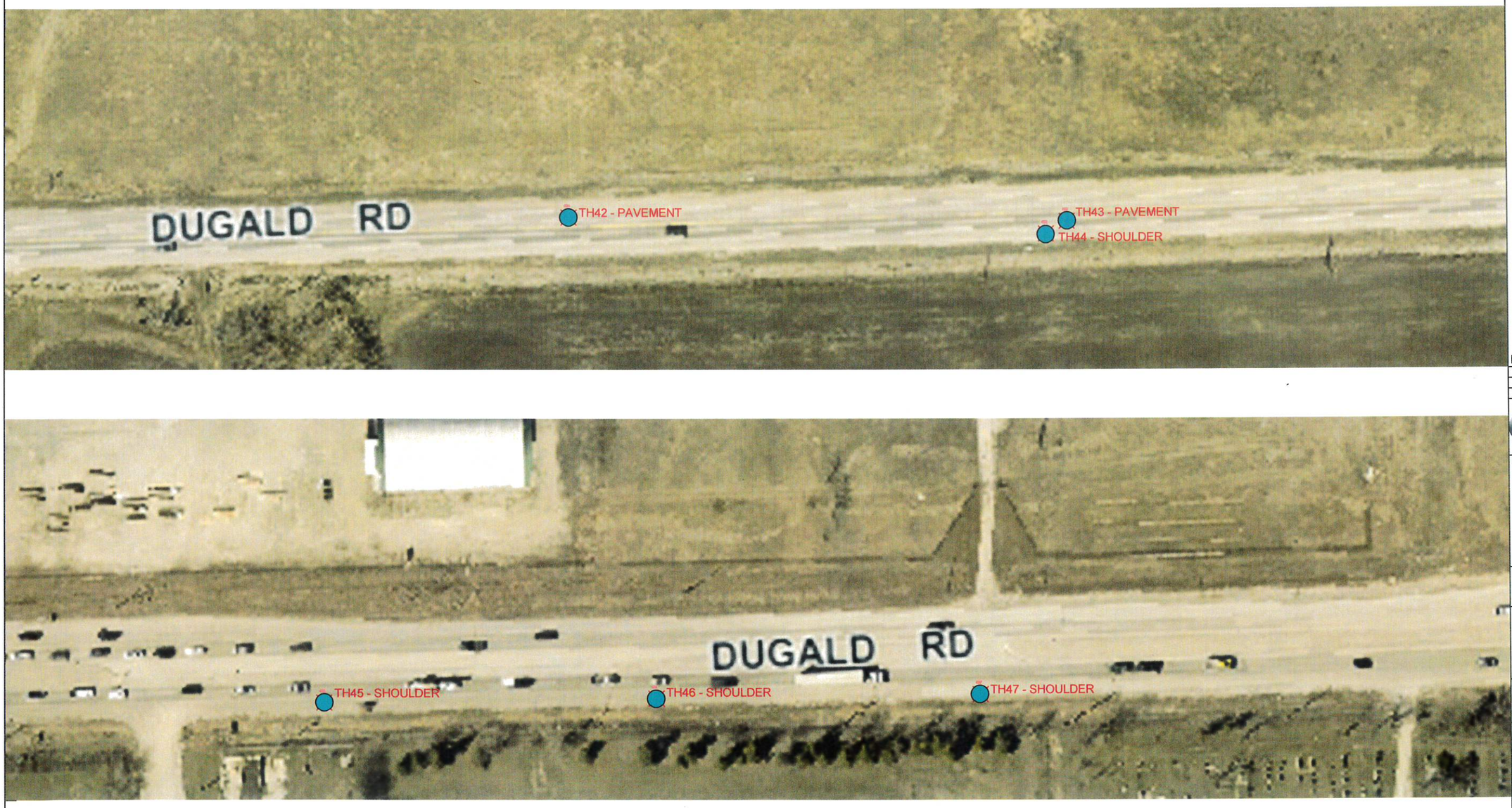
CLIENT DWG/FIG. No.:

ENG-TECH DWG/FIG. No.: 2 of 3

NO.:

P:\2024\035(WSP)\01(Dugald & Plessis Pavement Renewals)\Drawing\24-035-01 (July 16, 2024).dwg

TEST HOLE LOCATION TABLE		
HOLE #	GPS COORDINATES OF TEST HOLES APRIL 1, 10 & 15, 2024	
	UTM	14U
TH42	5527909	645156
TH43	5527908	645275
TH44	5527905	645270
TH45	5527928	646076
TH46	5527929	646155
TH47	5527930	646232



LEGEND

TH — TEST HOLE

NO.	DATE	ISSUE / REVISION
0	July 2024	Report

ENG-TECH CONSULTING LIMITED
420 Turenne Street
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ENG. STAMP:

ENGINEERS GEOSCIENTISTS MANITOBA
Certificate of Authorization
ENG-TECH Consulting Limited
No.2475

CLIENT: WSP CANADA INC.

PROJECT: CW749 - 2023 PAVEMENT RENEWALS ON DUGALD RD AND PLESSIS RD

DWG DESCRIPTION: CORE AND TEST HOLE LOCATION PLAN

SCALE: 1:1000

DRAWN BY: EAL

DATE: JULY 2024

FILE No.: 24-035-01

CLIENT DWG/FIG. No.:

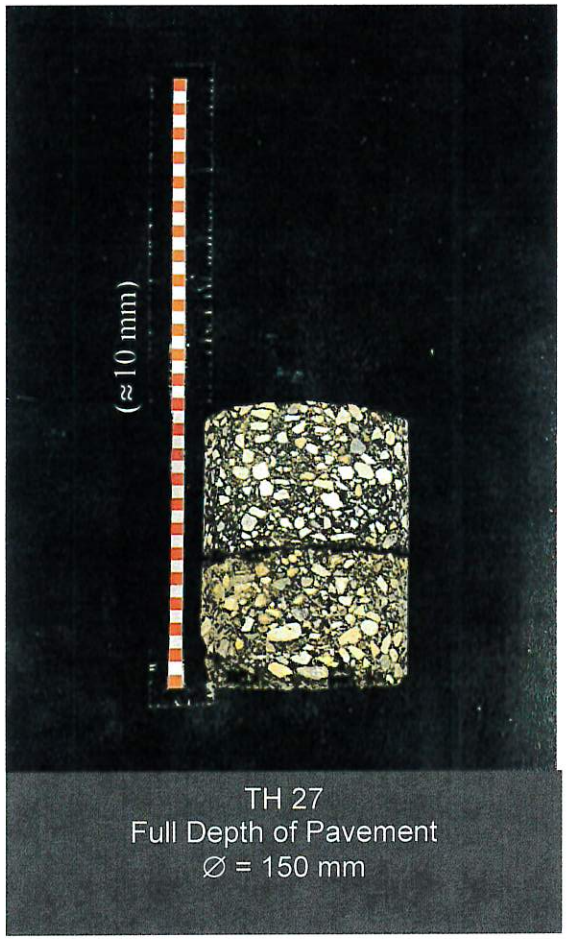
ENG-TECH DWG/FIG. No.: 3 of 3

NO.:

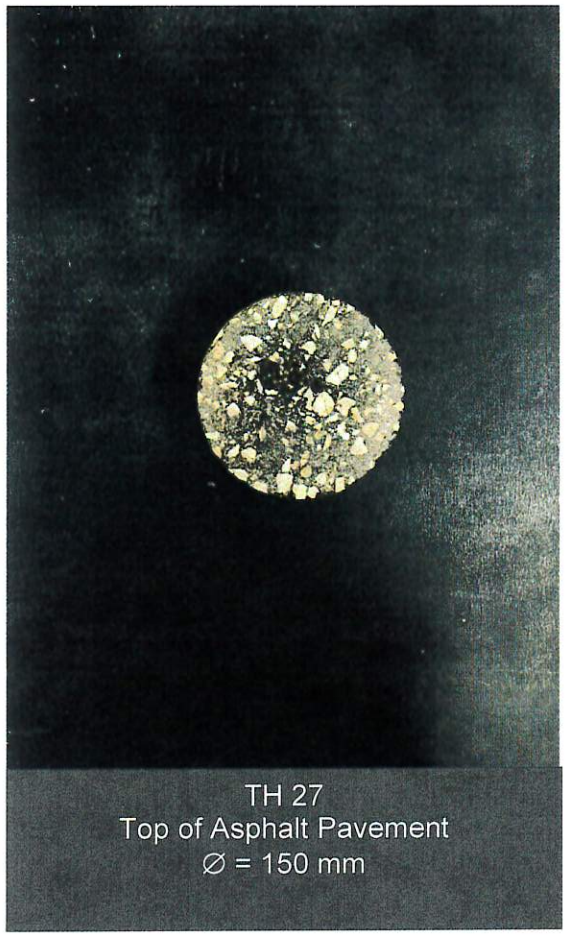
P:\2024\035(WSP)\01(Dugald & Plessis Pavement Renewals)\Drawing\24-035-01 (July 16, 2024).dwg

SPECIMEN PHOTOGRAPHS
(16 PAGES)

Photograph 1: Specimen from Dugald Road, Eastbound Shoulder

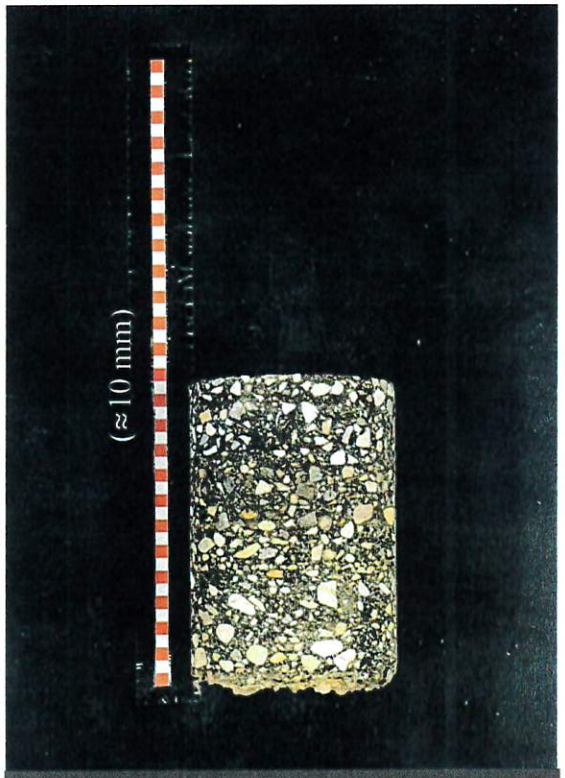


TH 27
Full Depth of Pavement
∅ = 150 mm

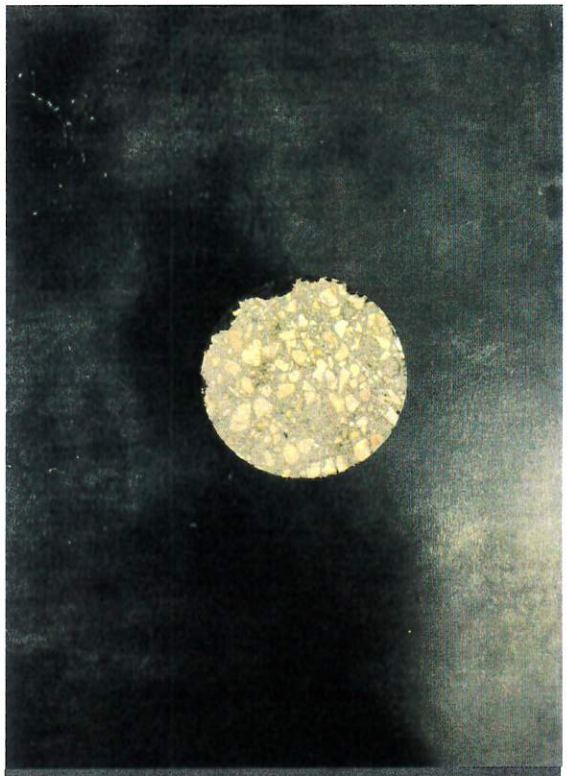


TH 27
Top of Asphalt Pavement
∅ = 150 mm

Photograph 2: Specimen from Dugald Road, Eastbound Lane

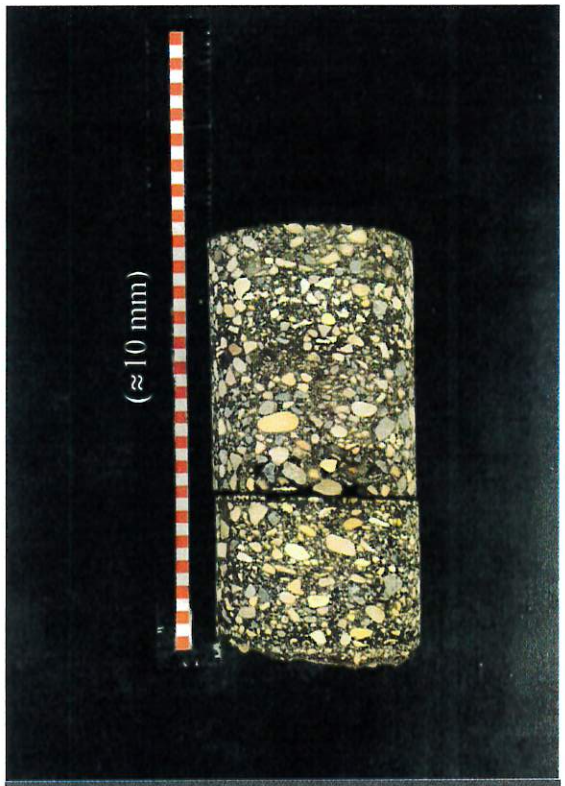


TH 28
Full Depth of Pavement
∅ = 150 mm



TH 28
Top of Asphalt Pavement
∅ = 150 mm

Photograph 3: Specimen from Dugald Road, Eastbound Lane



TH 30
Full Depth of Pavement
∅ = 150 mm

TH 30
Top of Asphalt Pavement
∅ = 150 mm

Photograph 4: Specimen from Dugald Road, Westbound Lane

TH 31
Full Depth of Pavement
∅ = 150 mm

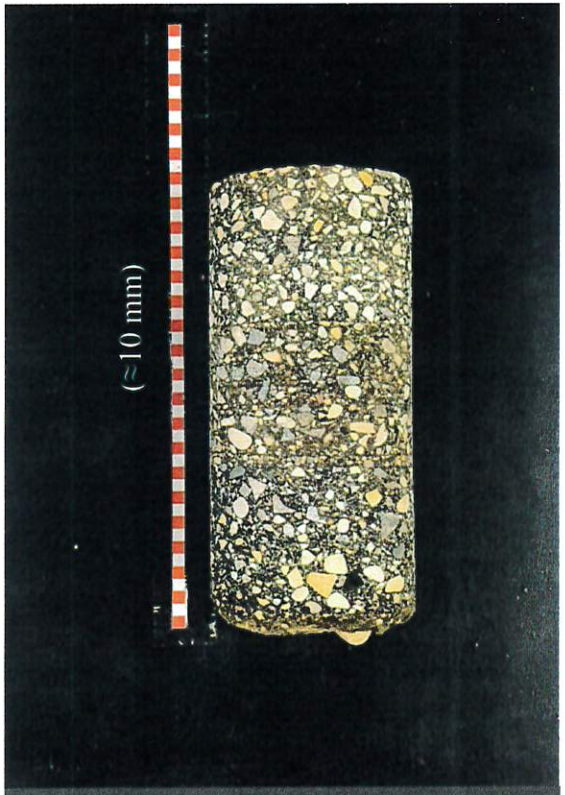
TH 31
Top of Asphalt Pavement
∅ = 150 mm

Photograph 5: Specimen from Dugald Road, Eastbound Lane

TH 32
Full Depth of Pavement
∅ = 150 mm

TH 32
Top of Asphalt Pavement
∅ = 150 mm

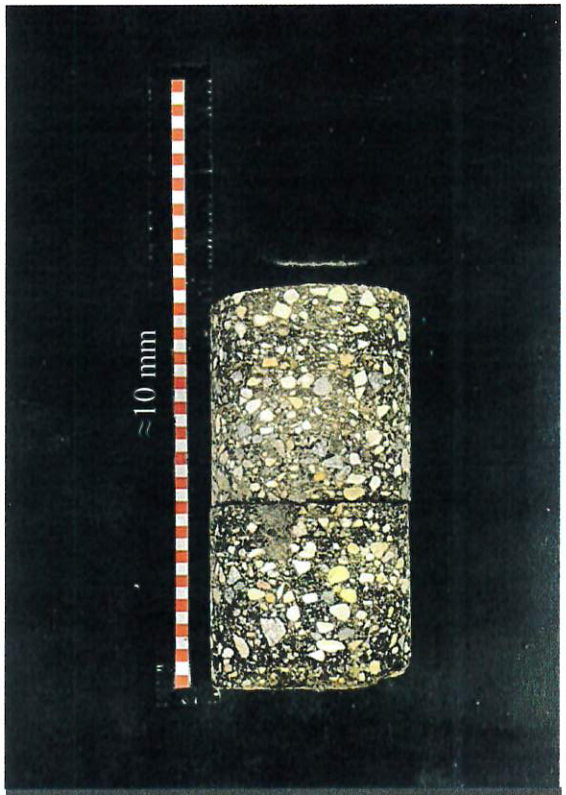
Photograph 6: Specimen from Dugald Road, Westbound Lane



TH 33
Full Depth of Pavement
∅ = 150 mm

TH 33
Top of Asphalt Pavement
∅ = 150 mm

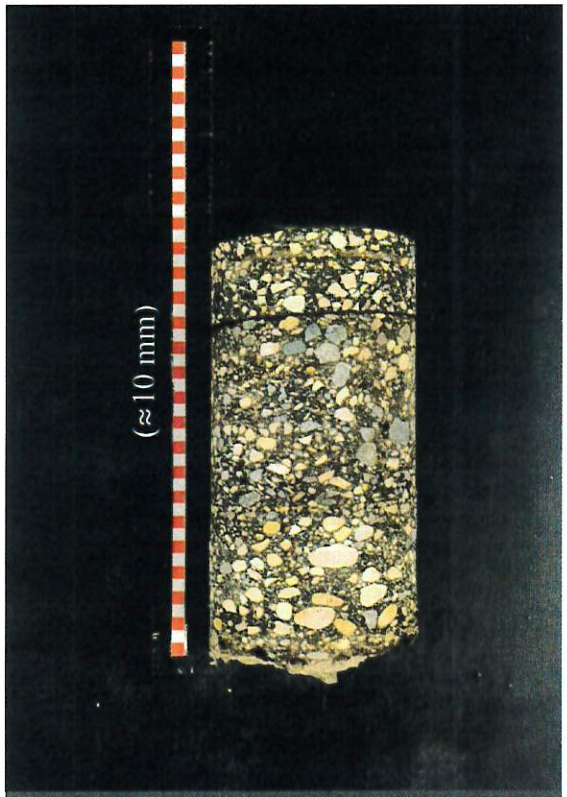
Photograph 7: Specimen from Dugald Road, Eastbound Lane



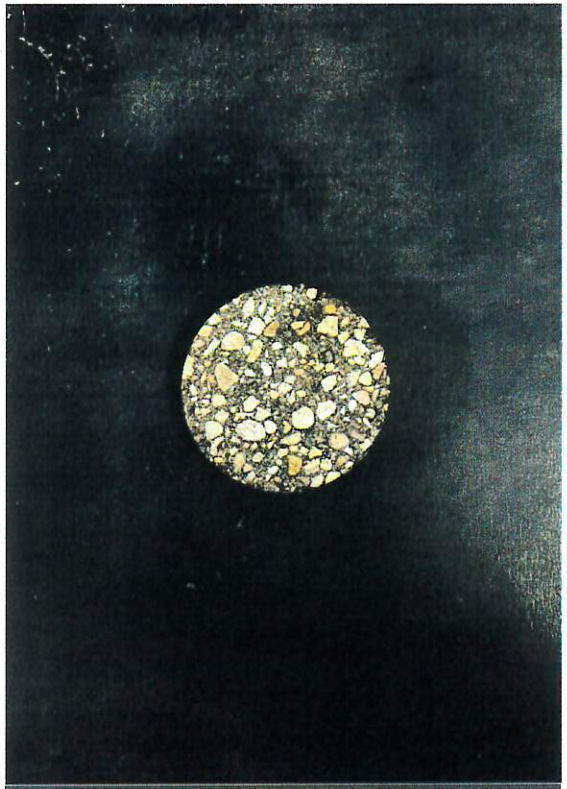
TH 34
Full Depth of Pavement
∅ = 150 mm

TH 34
Top of Asphalt Pavement
∅ = 150 mm

Photograph 8: Specimen from Dugald Road, Eastbound Lane



TH 36
Full Depth of Pavement
∅ = 150 mm



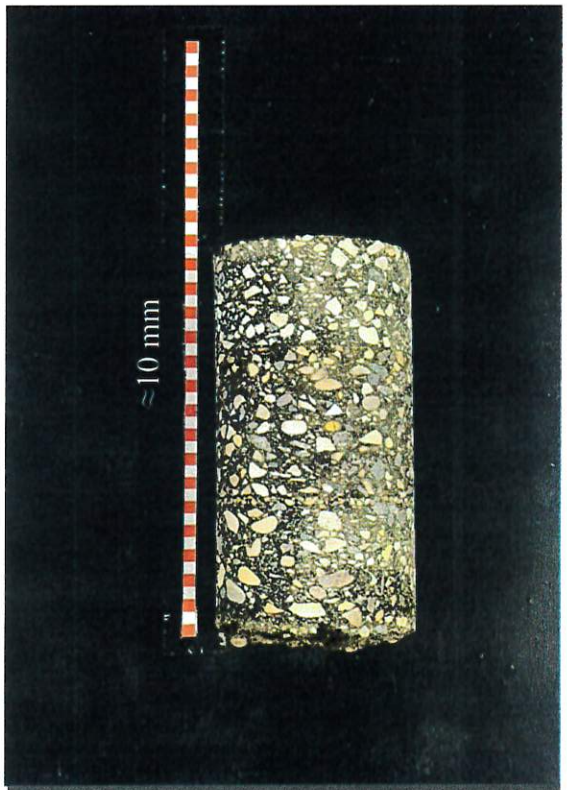
TH 36
Top of Asphalt Pavement
∅ = 150 mm

Photograph 9: Specimen from Dugald Road, Westbound Lane

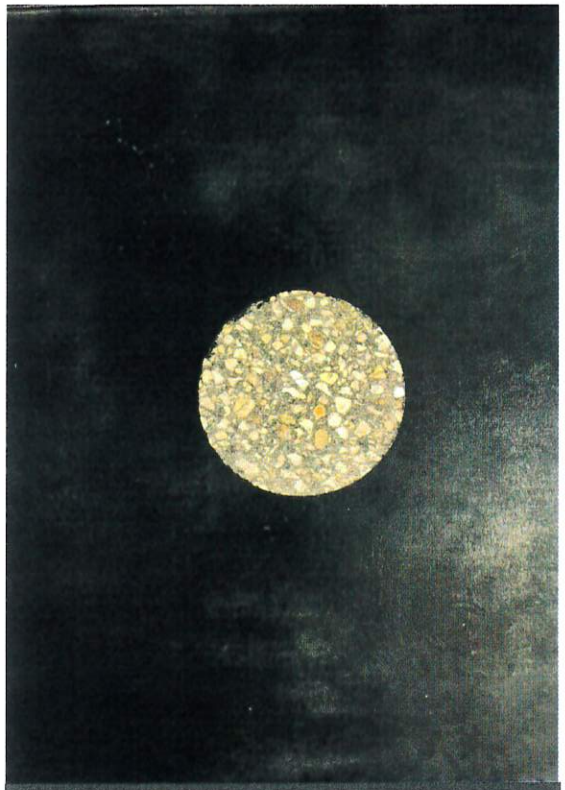
TH 37
Full Depth of Pavement
∅ = 150 mm

TH 37
Top of Asphalt Pavement
∅ = 150 mm

Photograph 10: Specimen from Dugald Road, Eastbound Lane

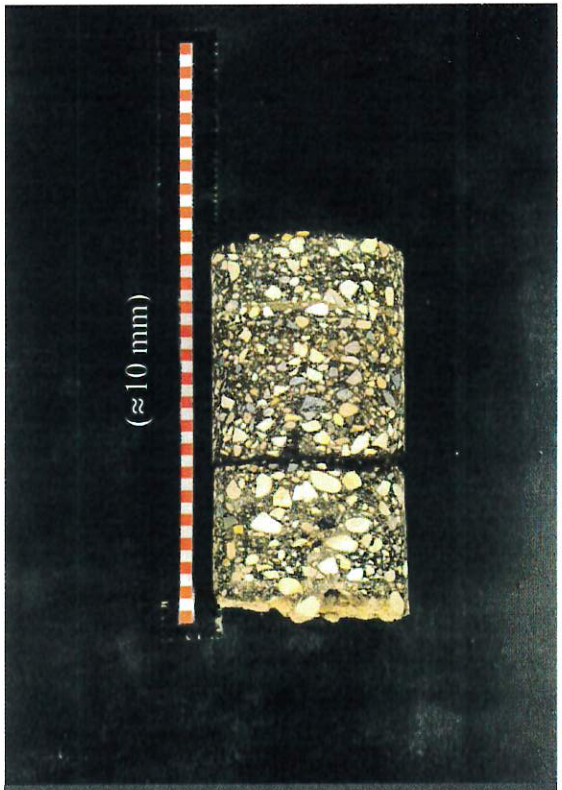


TH 38
Full Depth of Pavement
∅ = 150 mm

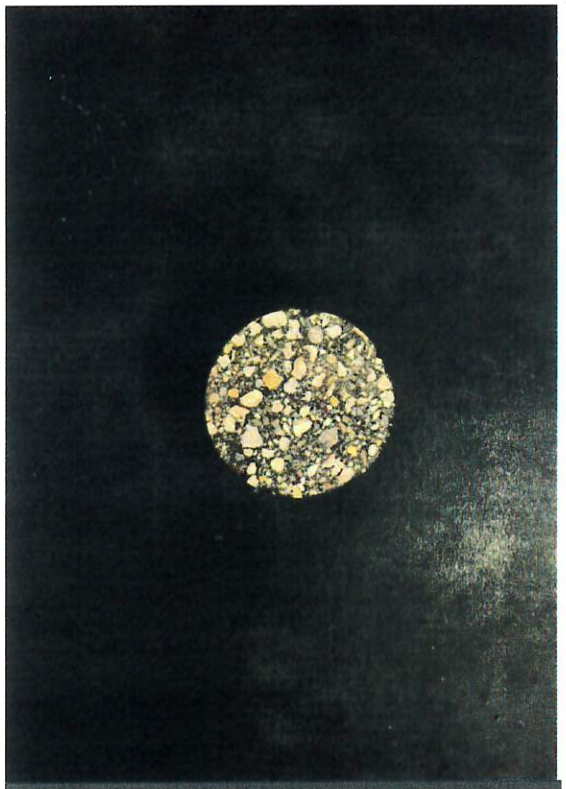


TH 38
Top of Asphalt Pavement
∅ = 150 mm

Photograph 11: Specimen from Dugald Road, Eastbound Lane



TH 39
Full Depth of Pavement
∅ = 150 mm



TH 39
Top of Asphalt Pavement
∅ = 150 mm

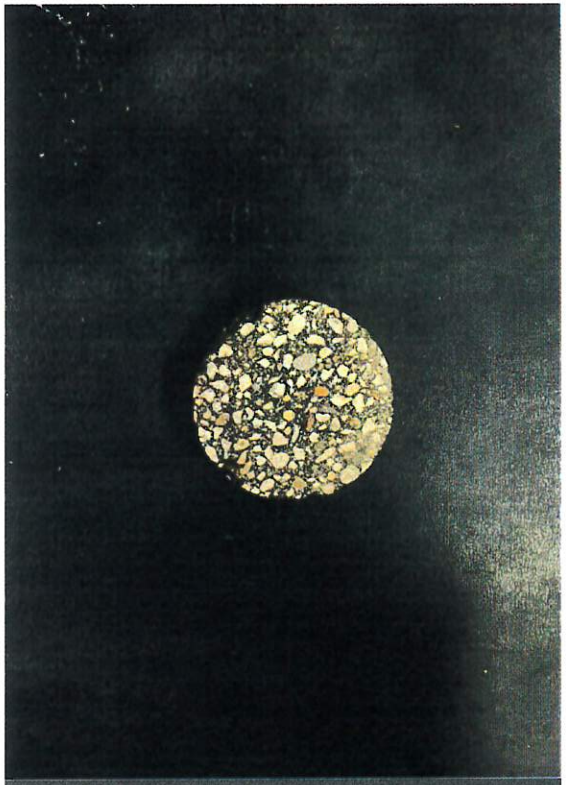
Photograph 12: Specimen from Dugald Road, Westbound Lane

TH 41
Full Depth of Pavement
∅ = 150 mm

TH 41
Top of Asphalt Pavement
∅ = 150 mm

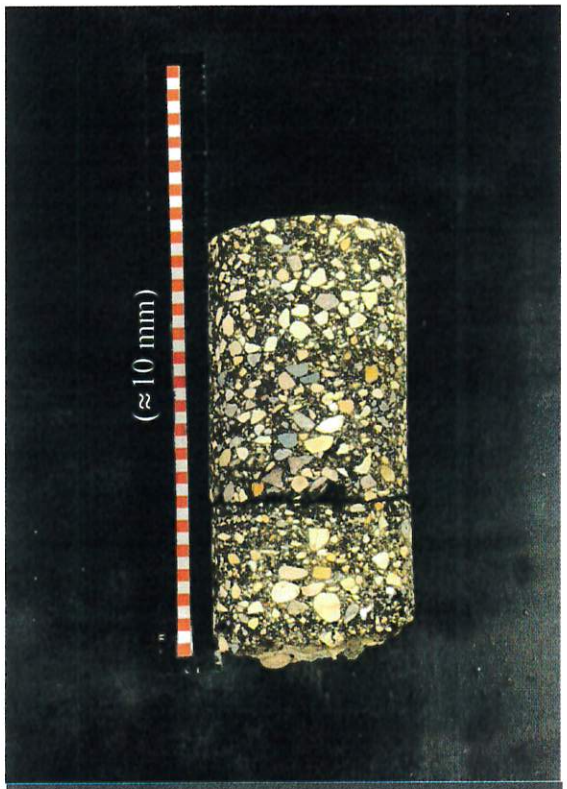
Photograph 13: Specimen from Dugald Road, Westbound Lane

TH 42
Full Depth of Pavement
∅ = 150 mm

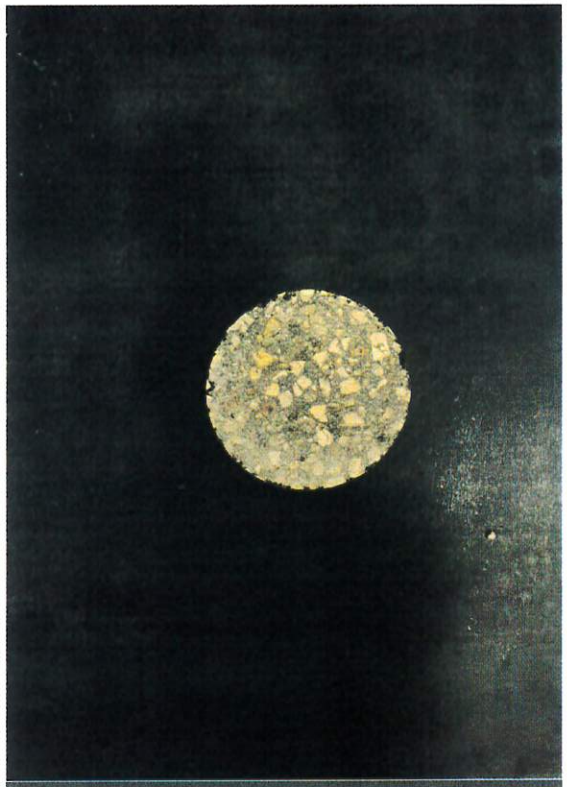


TH 42
Top of Asphalt Pavement
∅ = 150 mm

Photograph 14: Specimen from Dugald Road, Eastbound Lane

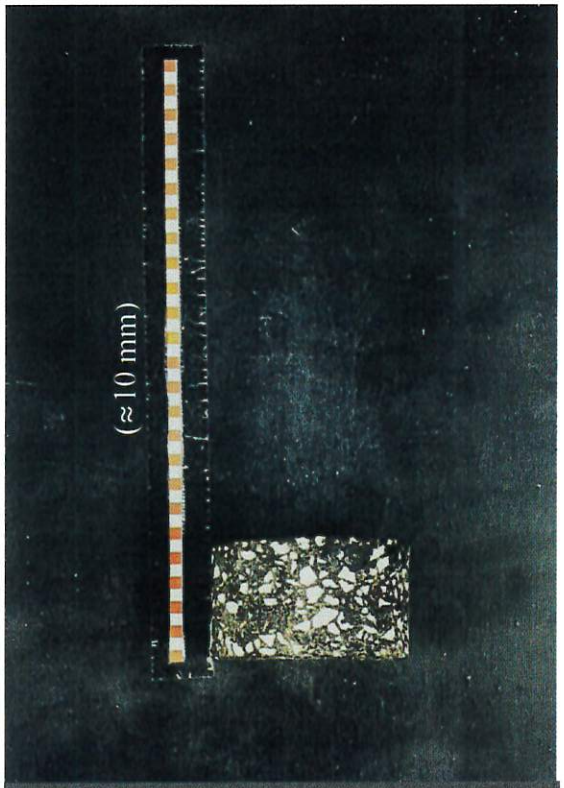


TH 43
Full Depth of Pavement
∅ = 150 mm



TH 43
Top of Asphalt Pavement
∅ = 150 mm

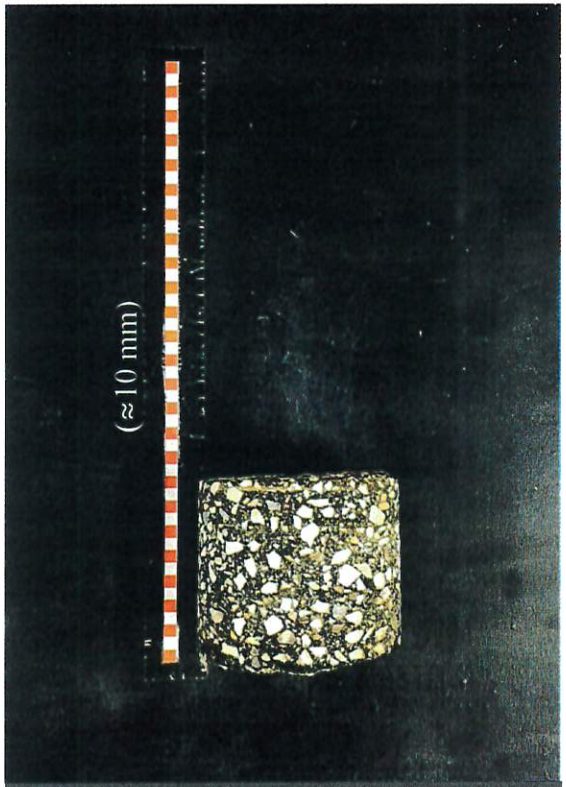
Photograph 15: Specimen from Dugald Road, Eastbound Shoulder



TH 45
Full Depth of Pavement
∅ = 150 mm

TH 45
Top of Asphalt Pavement
∅ = 150 mm

Photograph 16: Specimen from Dugald Road, Eastbound Shoulder



TH 47
Full Depth of Pavement
∅ = 150 mm

TH 47
Top of Asphalt Pavement
∅ = 150 mm

TEST HOLE LOGS
(23 PAGES)

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH25

Client: WSP Canada Inc.
Site: Shoulder Dugald Road, Winnipeg, MB
Location: See Figure 1
Project: CW749 - 2023 Pavement Renewals on Dugald Rd and Plessis Rd

File No.: 24-035-01
Date Drilled: April 1, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	SHEAR STRENGTH (kPa) P. Pen	Torvane	UC
0		***Gravel Fill*** - light brown, moist.									
		Clay Fill - brown, moist, low plastic.		S1		21.5					
1.0			-1.0	S2		23.3					
		Clay - dark brown, moist, highly plastic, trace silt, some sand, trace gravel.		S3		31.5					
				S4		27.8					
2.0			-2.0	S5		28.2					
				S6		24.5					
		End of Test Hole - end of test hole at 2.5 m below grade. - sloughing observed at 0.9 m. - no seepage observed during drilling. - test hole backfilled with auger cuttings upon completion of drilling.									
3.0			-3.0								
4.0			-4.0								

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited.
Drill Rig: Lone Star T1A+
Auger Size: 100 mm Solid Stem

Completion Depth: 2.5 m
Completion Elevation: 97.5 m
Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH Consulting Limited

Engineering And Testing Solutions That Work For You

Test Hole #: TH26

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 1

Project: CW749-2023-Pavement Renewals, Dugald and Plessis road, Winnipeg, MB

File No.: 24-035-01

Date Drilled: -

Grade Elevation: --

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA					SHEAR STRENGTH (kPa)		
Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
		Test Hole not drilled due to safety concerns. No samples recovered.									
1.0			-1.0								
2.0			-2.0								
3.0			-3.0								
4.0			-4.0								
5.0			-5.0								
6.0			-6.0								
7.0			-7.0								
8.0			-8.0								
9.0			-9.0								
10.0			-10.0								
11.0			-11.0								

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Ltd.

Drill Rig: Lone Star

Auger Size: 100 mm Solid Stem

Completion Depth: --

Completion Elevation: --

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH27

Client: WSP Canada Inc.

Site: Shoulder Dugald Road, Winnipeg, Manitoba

Location: See Figure 1

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 17, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
	Asphalt (190 mm)	0.0				
	Clay Fill - light to medium brown, moist, trace to some silt & gravel.		S1		18.7	
1.0	*Clay* - light to medium brown, moist, medium plastic, some silt, trace sand.	-1.0	S2		32.1	
	Clay - dark brown, moist, highly plastic, trace silt.		S3		33.9	
	Clay - light to medium brown, moist, highly plastic, some to with sand.		S4		28.5	
2.0		-2.0	S5		29.5	
			S6		30.7	
3.0	*End of Test Hole* - end of test hole at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0						

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH28

Client: WSP Canada Inc.
Site: Dugald Road, Winnipeg, Manitoba
Location: See Figure 1
Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01
Date Drilled: April 17, 2024
Grade Elevation: 100.0 m
Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA					SHEAR STRENGTH (kPa)		
Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
		Asphalt (205 mm)	0.0								
		Clay - black, moist, stiff, high plastic, trace to some sand.		S1		38.0					
1.0			-1.0	S2		36.6					
				S3		34.2					
				S4		33.8					
2.0		- below 2.0 m, very stiff.	-2.0	S5		31.5					
				S6		31.9					
3.0		***End of Test Hole*** - end of test hole at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited
Drill Rig: Lone star
Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m
Completion Elevation: 97.0 m
Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH29

Client: WSP Canada Inc.
Site: Shoulder Dugald Road, Winnipeg, MB
Location: See Figure 1
Project: Dugald Road and Plessis Road Pavement Renewals

File No.: 24-035-01
Date Drilled: April 1, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0	**Gravel Fill**					
	Gravel Clay Fill					
	Clay Fill - medium brown, moist, highly plastic, with silt, sand & gravel.		S1		15.8	
1.0		-1.0	S2		17.2	
	Clay - black, moist, highly plastic, trace to some silt, sand, gravel.		S3		32.2	
			S4		32.8	
2.0	**Clay** - medium brown, moist, highly plastic, trace silt.	-2.0	S5		40.9	
			S6		43.7	
3.0	**End of Test Hole** - end of test hole at 2.6 m below grade. - no seepage encountered. - sloughing encountered at 1.1 m below grade. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0		-4.0				

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited.
Drill Rig: Lone Star T1A+
Auger Size: 100 mm Solid Stem

Completion Depth: 2.6 m
Completion Elevation: 97.4 m
Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH30

Client: WSP Canada Inc.
Site: Dugald Road, Winnipeg, Manitoba
Location: See Figure 1
Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01
Date Drilled: April 19, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0	*Asphalt (265 mm)*	0.0				
	Gravel Fill					
1.0	*Gravel/Clay Fill* - medium brown, moist, with silt, sand, gravel.	-1.0	S1		7.2	
	Clay - black, moist, highly plastic, trace to some silt, sand, gravel.		S2		11.3	
			S3		33.2	
2.0	*Clay* - medium brown, moist, highly plastic, trace silt.	-2.0	S4		32.4	
			S5		41.4	
3.0	*End of Test Hole* - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0	S6		41.8	
4.0						

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited
Drill Rig: Lone star
Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m
Completion Elevation: 97.0 m
Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH31

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 1

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 17, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0	***Asphalt (279 mm)***	0.0				
	Sandy Lean Clay Fill (CL) - dark brown, moist, low plastic, and sand, with silt, trace gravel.		S1		13.3	
1.0	***Clay*** - black, moist, high plastic, with silt, trace sand.	-1.0	S2		30.8	
			S3		38.4	
	- below 1.5 m, light brown.		S4		33.4	
2.0		-2.0	S5		31.7	
			S6		31.5	
3.0	***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0						

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH32

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 1

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 16, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	SHEAR STRENGTH (kPa) P. Pen	Torvane	UC
0		***Asphalt (285 mm)***	0.0								
		Clay - black, moist, high plastic, with silt, some to with sand.		S1		25.7					
1.0			-1.0	S2		36.7					
		- below 1.2 m, trace gravel.		S3		31.0					
		- below 1.6 m, medium brown.		S4		26.1					
2.0		- below 1.9 m, light brown, some silt.	-2.0	S5		25.3					
				S6		40.8					
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH33

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 1

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 17, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
		Asphalt (305 mm)	0.0								
		Clay - dark brown, moist, high plastic, with silt, some to with sand.		S1		26.0					
1.0		- below 1.1 m, black.	-1.0	S2		27.6					
		- below 1.5 m, light brown.		S3		27.3					
2.0				S4		25.2					
			-2.0	S5		27.5					
				S6		23.8					
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

SUBSURFACE PROFILE | SAMPLE DATA | SHEAR STRENGTH (kPa)

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH Consulting Limited

Engineering And Testing Solutions That Work For You

Test Hole #: TH34

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

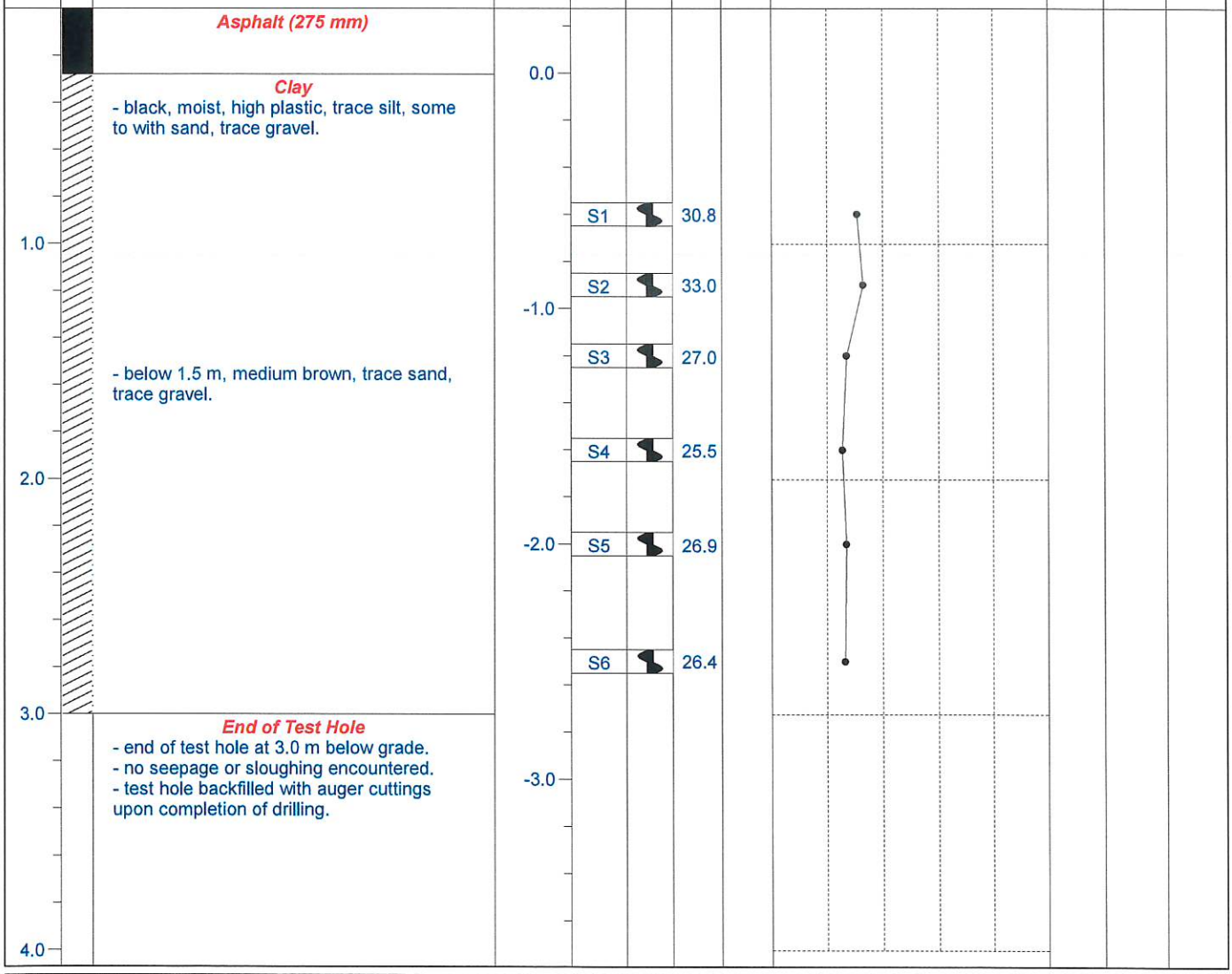
Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 16, 2024

Grade Elevation: 100.0 m

Water Elevation: --



ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH35

Client: WSP Canada Inc.

Site: Shoulder Dugald Road, Winnipeg, MB

Location: See Figure 2

Project: Dugald Road and Plessis Road Pavement Renewals

File No.: 24-035-01

Date Drilled: April 1, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
	Gravel Fill					
	Sand / Clay Fill					
	Clay Fill - light brown with black, moist, high plastic, some silt, some sand, some gravel.		S1		17.8	
1.0		-1.0	S2		19.4	
	Clay - dark grey, moist, high plastic, trace silt, trace sand.		S3		31.9	
			S4		32.0	
	Clay - brown, moist, high plastic.					
2.0		-2.0	S5		40.0	
			S6		40.4	
3.0	***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0		-4.0				

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited.

Drill Rig: Lone Star T1A+

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH36

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 16, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0		***Asphalt (290 mm)***	0.0				
		Clay - black, moist, high plastic, trace to some sand.		S1		35.9	
1.0			-1.0	S2		38.2	
				S3		38.3	
				S4		28.7	
2.0		- below 2.0 m, light brown, trace to some silt.	-2.0	S5		26.5	
				S6		25.8	
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0							

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH Consulting Limited

Engineering And Testing Solutions That Work For You

Test Hole #: TH37

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 16, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I---------X---------I LL 20 40 60 80	P. Pen	Torvane	UC
0.0	***Asphalt (279 mm)***	0.0								
	Clay Fill - light brown with black, low plastic, and sand.		S1		11.7					
1.0	***Clay*** - dark brown, moist, high plastic, some silt, some sand, trace to some gravel. - below 1.2 m, with sand.	-1.0	S2		29.9					
			S3		22.8					
2.0	***Clay*** - black, moist, high plastic, trace silt, trace sand.		S4		32.4					
		-2.0	S5		26.8					
	- below 2.5 m, medium brown.		S6		25.7					
3.0	***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0										

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH38

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 16, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0		***Asphalt (287 mm)***	0.0				
		Sandy Fat Clay (CH) - black, moist, high plastic, with silt & sand, trace gravel.		S1		42.7	
1.0			-1.0	S2		33.8	
				S3		46.8	
		- below 1.6 m, dark to medium brown, trace sand.		S4		22.1	
2.0			-2.0	S5		28.3	
				S6		29.3	
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0							

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH39

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 15, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
0		***Asphalt (264 mm)***	0.0								
		Clay - black, moist, high plastic, some to with sand.		S1		27.7					
1.0			-1.0	S2		39.0					
				S3		30.5					
		- below 1.5 m, medium brown, trace sand, trace gravel.		S4		31.8					
2.0			-2.0	S5		32.6					
				S6		36.9					
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH40

Client: WSP Canada Inc.
Site: Shoulder Dugald Road, Winnipeg, MB
Location: See Figure 2
Project: Dugald Road and Plessis Road Pavement Renewals

File No.: 24-035-01
Date Drilled: April 1, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0	***Gravel Fill***					
	Sandy Fat Clay (CH) - black, moist, high plastic, trace gravel, with silt, sand, sand.		S1		32.0	
1.0		-1.0	S2		29.3	
			S3		28.8	
			S4		25.9	
2.0	- below 2.0 m, light brown.	-2.0	S5		26.7	
			S6		27.5	
3.0	***End of Test Hole*** - end of test hole at 3.0 m below grade. - seepage encountered at 2.1 m. - no sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0		-4.0				

Moisture Content (%): PL I----------X----------I LL; 20 40 60 80

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited.
Drill Rig: Lone Star T1A+
Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m
Completion Elevation: 97.0 m
Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH41

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 2

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 15, 2024

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA					SHEAR STRENGTH (kPa)		
Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
0		***Asphalt (290 mm)***	0.0								
		Clay - black, moist, high plastic, some to with sand.		S1		32.0					
1.0		- below 1.0 m, dark brown.	-1.0	S2		29.3					
				S3		28.8					
2.0				S4		25.9					
			-2.0	S5		26.7					
				S6		27.5					
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH42

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 3

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 15, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
	Asphalt (296 mm)	0.0				
	Clay - black, moist, high plastic, some to with sand, trace gravel.		S1		32.3	
1.0		-1.0	S2		36.9	
	- below 1.5 m, medium brown, trace sand.		S3		29.8	
	- below 1.8 m, medium to light brown, some silt.		S4		28.3	
2.0		-2.0	S5		28.6	
			S6		29.7	
3.0	***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0						

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH Consulting Limited

Engineering And Testing Solutions That Work For You

Test Hole #: TH43

Client: WSP Canada Inc.

Site: Dugald Road, Winnipeg, Manitoba

Location: See Figure 3

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 15, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
		Asphalt (289 mm)	0.0								
		Clay - black, moist, high plastic, some to with sand.		S1		31.7					
1.0			-1.0	S2		35.3					
		- below 1.5 m, light brown, some to with silt.		S3		32.9					
				S4		28.2					
2.0			-2.0	S5		25.5					
				S6		25.9					
3.0		***End of Test Hole*** - test hole ended at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH44

Client: WSP Canada Inc.
Site: Shoulder Dugald Road, Winnipeg, MB
Location: See Figure 3
Project: Dugald Road and Plessis Road Pavement Renewals

File No.: 24-035-01
Date Drilled: April 1, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0		***Gravel Fill***					
		Clay - black, moist, high plastic, some sand, trace gravel.		S1		18.3	
1.0			99.0	S2		17.9	
				S3		33.5	
				S4		39.0	
2.0		- below 2.0 m, light brown.	98.0	S5		28.2	
				S6		26.4	
3.0		***End of Test Hole*** - test hole ended 3.0 m below grade. - seepage encountered at 2.1 m below grade. - no sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	97.0				
4.0			96.0				

Moisture Content (%): PL I---------X---------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited.
Drill Rig: Lone Star T1A+
Auger Size: 100 mm Solid Stem

Completion Depth: 3.0 m
Completion Elevation: 97.0 m
Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH45

Client: WSP Canada Inc.

Site: Shoulder Dugald Road, Winnipeg, MB

Location: See Figure 3

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 10, 2024

Grade Elevation: 100.0 m

Water Elevation: --

SUBSURFACE PROFILE				SAMPLE DATA					SHEAR STRENGTH (kPa)		
Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
		Asphalt (83 mm)	0.0								
		Granular Fill									
		Clay - black, moist, stiff, high plastic, some sand.		S1		15.7					
1.0			-1.0	S2		31.4					
				S3		32.5					
		- below 1.8 m, light brown.		S4		34.3					
2.0			-2.0	S5		28.3					
				S6		27.0					
3.0		***End of Test Hole*** - end of test hole 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cutting upon completion of drilling.	-3.0								
4.0											

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH46

Client: WSP Canada Inc.

Site: Shoulder Dugald Road, Winnipeg, MB

Location: See Figure 3

Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01

Date Drilled: April 10, 2024

Grade Elevation: 100.0 m

Water Elevation: --

Depth (m)	Soil Symbol	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL I----------X----------I LL 20 40 60 80	P. Pen	Torvane	UC
0		***Granular Fill***									
		Clay - black, moist, high plastic, trace sand.		S1		34.0					
1.0			-1.0	S2		33.0					
				S3		33.8					
				S4		34.6					
2.0		- below 2.0 m, light brown.	-2.0	S5		27.8					
				S6		28.6					
3.0		***End of Test Hole*** - end of test hole at 3.0 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0								
4.0			-4.0								

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited

Drill Rig: Lone star

Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m

Completion Elevation: 97.0 m

Sheet: 1 of 1

SAMPLE TYPE — SPLIT BARREL — SHELBY TUBE — AUGER CUTTINGS — SPLIT SPOON

ENG-TECH CONSULTING LIMITED

Engineering And Testing Solutions That Work For You

Test Hole #: TH47

Client: WSP Canada Inc.
Site: Shoulder Dugald Road, Winnipeg, MB
Location: See Figure 3
Project: CW749-2023 Pavement Renewals on Dugald Road and Plessis Road

File No.: 24-035-01
Date Drilled: April 10, 2024
Grade Elevation: 100.0 m
Water Elevation: --

Depth (m)	Description	Sample Depth from Pavement Bottom (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm
0.0	*Asphalt (124 mm)*	0.0				
	Granular Fill					
	Clay - black, moist, highly plastic, some sand, trace gravel.		S1		27.5	
1.0	- below 1.0 m, some silt.	-1.0	S2		26.8	
			S3		29.9	
			S4		30.7	
2.0	- below 1.9 m, dark brown.	-2.0	S5		30.3	
	- below 2.4 m, highly plastic.		S6		29.3	
3.0	*End of Test Hole* - end of test hole at 3.0 m below grade. - no seepage or sloughing encountered. - test hole backfilled with auger cuttings upon completion of drilling.	-3.0				
4.0						

Moisture Content (%): PL I----------X----------I LL (20, 40, 60, 80)

SHEAR STRENGTH (kPa): P. Pen | Torvane | UC

ENG- TECH Consulting Limited

Logged by: SZ

Reviewed by:

Drilled By: ENG-TECH Consulting Limited
Drill Rig: Lone star
Auger Size: 125 mm Solid Stem

Completion Depth: 3.0 m
Completion Elevation: 97.0 m
Sheet: 1 of 1

SAMPLE TYPE: SPLIT BARREL | SHELBY TUBE | AUGER CUTTINGS | SPLIT SPOON

ATTERBERG LIMTS, PLASTIC INDEX AND PLASTICITY INDEX OF SOILS REPORTS

ENG-TECH CONSULTING LIMITED
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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS

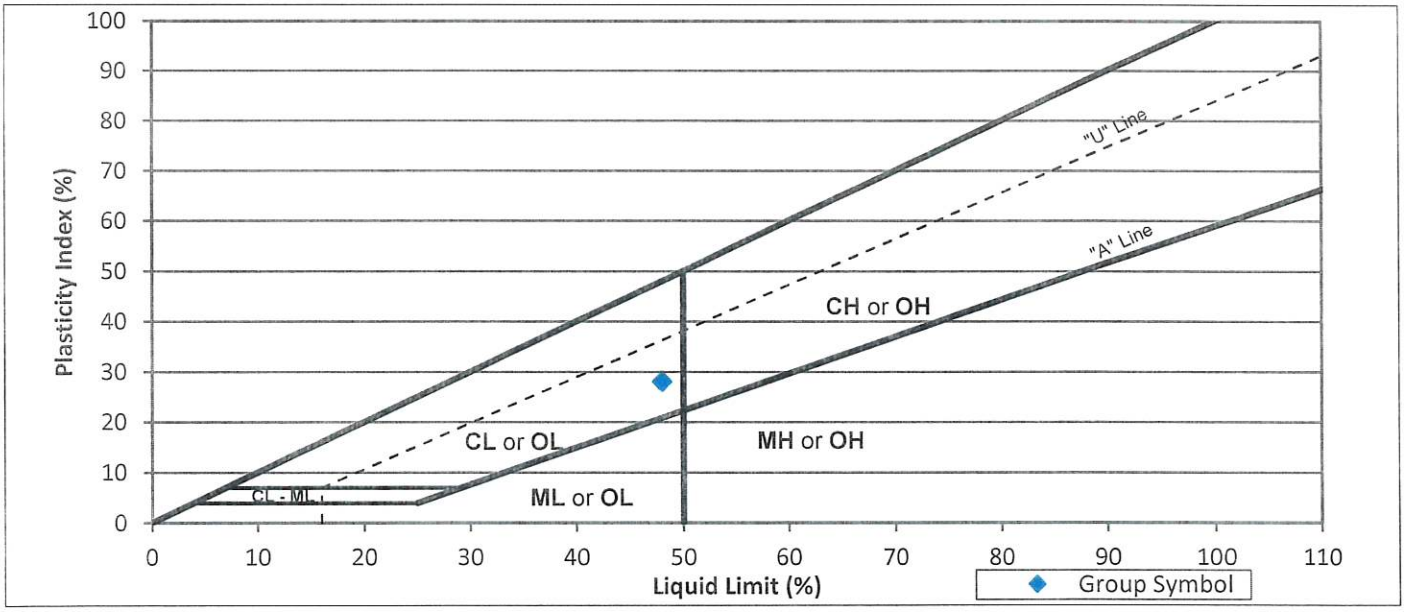
CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

File No.: 24-035-01
Ref. No.: 24-35-1-35

Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road
Material Type: -
Material Description: Sandy clay
Test Hole No.: 31
Date Sampled: Apr 1/24
Date Received: Apr 1/24
Sample No.: 1
Sampled By: ENG-TECH (Shah Zeb)
Date Tested: Jul 15/24
Depth: 0.6 m
Tested By: ENG-TECH (Jessica Bauer)
Test Method: ASTM D4318 - A (Multipoint)
Sampling Method: Auger
Specimen Preparation Procedure: 2 (Dry)
Drying Method: Air
Liquid Limit Device: Manual
Grooving Tool: Metal
Plastic Limit Rolling Procedure: 1 (Hand Rolled)



Liquid Limit (%): 48 **Plastic Limit (%):** 20 **Plasticity Index (%):** 28

Percentage of sand particles retained on 0.425mm sieve: 40.1

Classification: ASTM D2487: Sandy lean clay (CL)
ASTM D3282: A-7-6 (14)

As Received Moisture Content (%): 13.3

Comments:
-

ENG-TECH Consulting Limited

Per _____

Darci Babisky, C.E.T.
Operations Manager - Laboratory
Ph: (204) 233-1694 Fx: (204) 235-1579

Email: WSP Canada Inc. Contact Group

Supplementary information may be provided upon request. Restrictions and additional fees may apply.

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www.eng-tech.ca

LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS

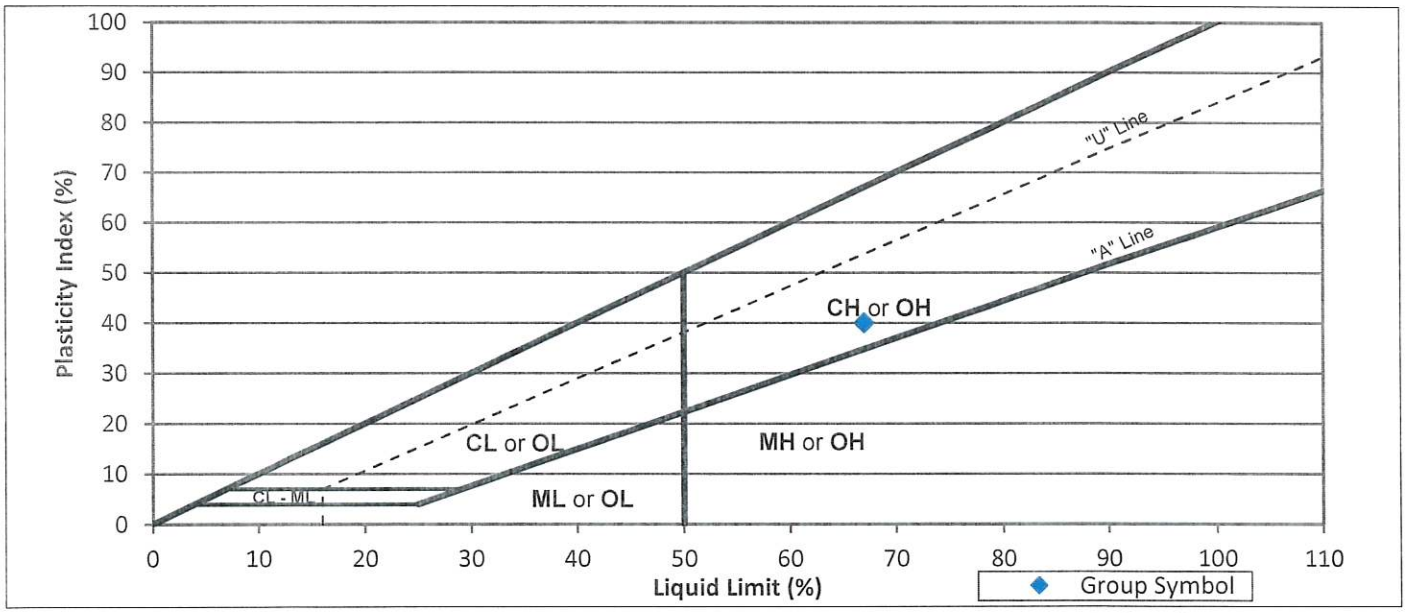
CERTIFIED BY CCIL Canadian Council of Independent Laboratories For specific tests as listed on www.ccil.com

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

File No.: 24-035-01
Ref. No.: 24-35-1-37

Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road
Material Type: -
Material Description: Sandy clay
Test Hole No.: 38
Date Sampled: Apr 1/24
Date Received: Apr 1/24
Sample No.: 1
Sampled By: ENG-TECH (Shah Zeb)
Date Tested: Jul 15/24
Depth: 0.6 m
Tested By: ENG-TECH (Jessica Bauer)
Test Method: ASTM D4318 - A (Multipoint)
Sampling Method: Auger
Specimen Preparation Procedure: 2 (Dry)
Drying Method: Air
Liquid Limit Device: Manual
Grooving Tool: Metal
Plastic Limit Rolling Procedure: 1 (Hand Rolled)



Liquid Limit (%): 67 **Plastic Limit (%):** 27 **Plasticity Index (%):** 40

Percentage of sand particles retained on 0.425mm sieve: 29.6

Classification: ASTM D2487: Sandy fat clay (CH)
ASTM D3282: A-7-6 (26)

As Received Moisture Content (%): 42.7

Comments:
-

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Per _____

Darci Babisky, C.E.T.
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Email: WSP Canada Inc. Contact Group

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LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS

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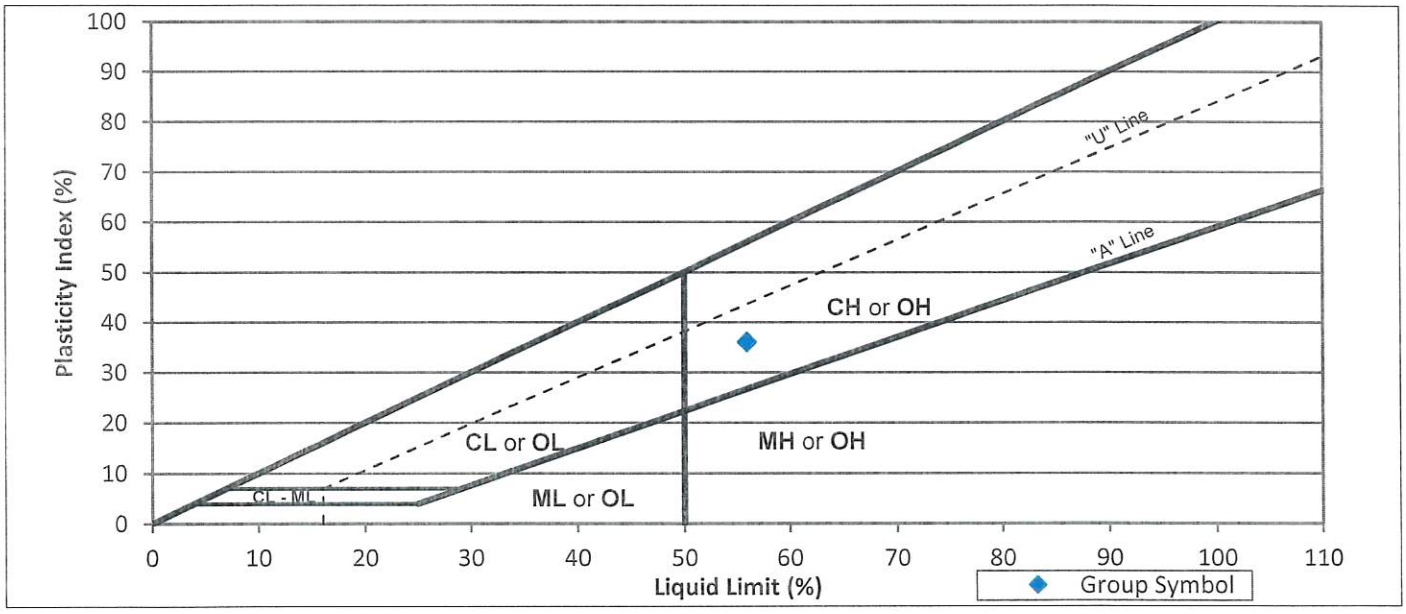
WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

File No.: 24-035-01
Ref. No.: 24-35-1-33

Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Shoulder, Dugald Road
Material Type: -
Material Description: Sandy clay
Test Hole No.: 40
Date Sampled: Apr 1/24
Date Received: Apr 1/24
Sample No.: 1
Sampled By: ENG-TECH (Shah Zeb)
Date Tested: Jul 15/24
Depth: 0.6 m
Tested By: ENG-TECH (Jessica Bauer)
Test Method: ASTM D4318 - A (Multipoint)
Sampling Method: Auger
Specimen Preparation Procedure: 2 (Dry)
Drying Method: Air
Liquid Limit Device: Manual
Grooving Tool: Metal
Plastic Limit Rolling Procedure: 1 (Hand Rolled)



Liquid Limit (%): 56 **Plastic Limit (%):** 20 **Plasticity Index (%):** 36

Percentage of sand particles retained on 0.425mm sieve: 25.7

Classification: ASTM D2487: Sandy fat clay (CH)
ASTM D3282: A-7-6 (21)

As Received Moisture Content (%): 32.0

Comments:
-

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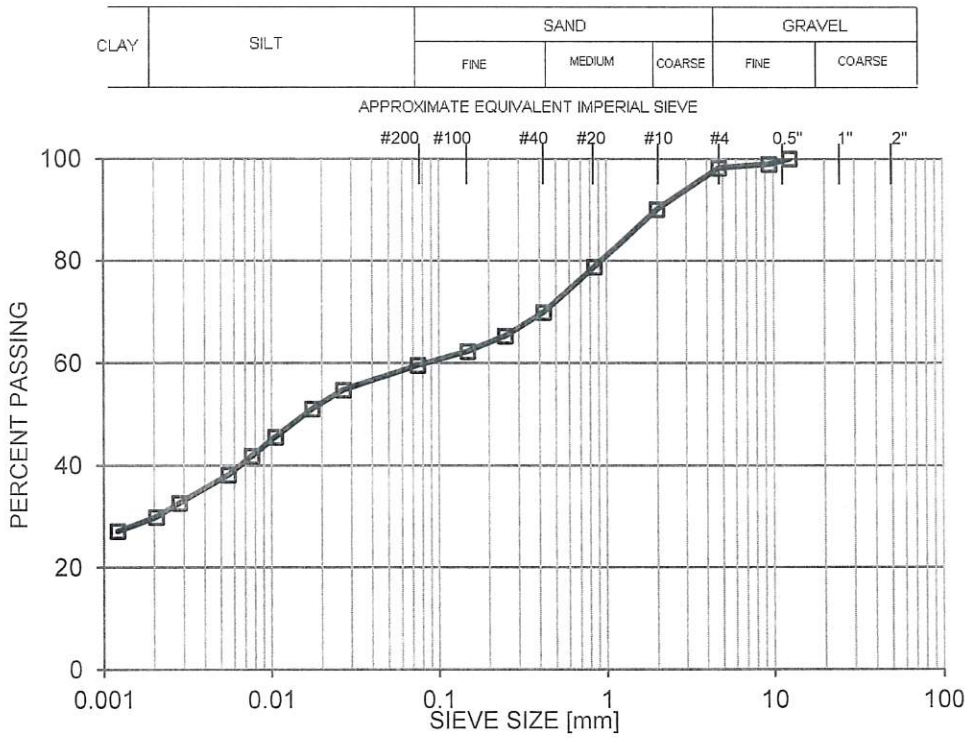
File No.: 24-035-01
Ref. No.: 24-35-1-34

Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road
Material Description: Sandy clay

Test Hole No.:	31	**Date Sampled:**	Apr 1/24	**Sampled By:**	ENG-TECH (Shah Zeb)
Sample No.:	1	**Date Received:**	Apr 1/24	**Sample Type:**	Auger cutting
Depth:	0.6 m	**Date Tested:**	Jul 15/24	**Tested By:**	ENG-TECH (Jessica Bauer)
Test Method:	ASTM D7928	**Drying Method:**	Air	**Specific Gravity:**	Estimated 2.7
Method Used:	-	**Dispersion Process:**	Stirrer / Tipping	**Separating Sieve Size (mm):**	2.0
Dispersion Device:	Apparatus A: Humboldt Mechanical Analysis Stirrer			**Dispersion Time (min.):**	1



SIEVE SIZE (mm)	PERCENT PASSING
12.5	100
9.5	99
4.75	98
2.0	90.1
0.850	79
0.425	70
0.250	65
0.150	62
0.075	59.6
0.027	55
0.018	51
0.011	46
0.0077	42
0.0056	38
0.0028	33
0.0021	30
0.0012	27

Percent of: GRAVEL (1.8 %), SAND (38.6 %), SILT (29.9 %), CLAY (29.8 %)
Classification: ASTM D2487: Sandy lean clay (CL)
ASTM D3282: A-7-6 (14)
As Received Moisture Content (%): 13.3
Comments:

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Per

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File No.: 24-035-01
Ref. No.: 24-35-1-36

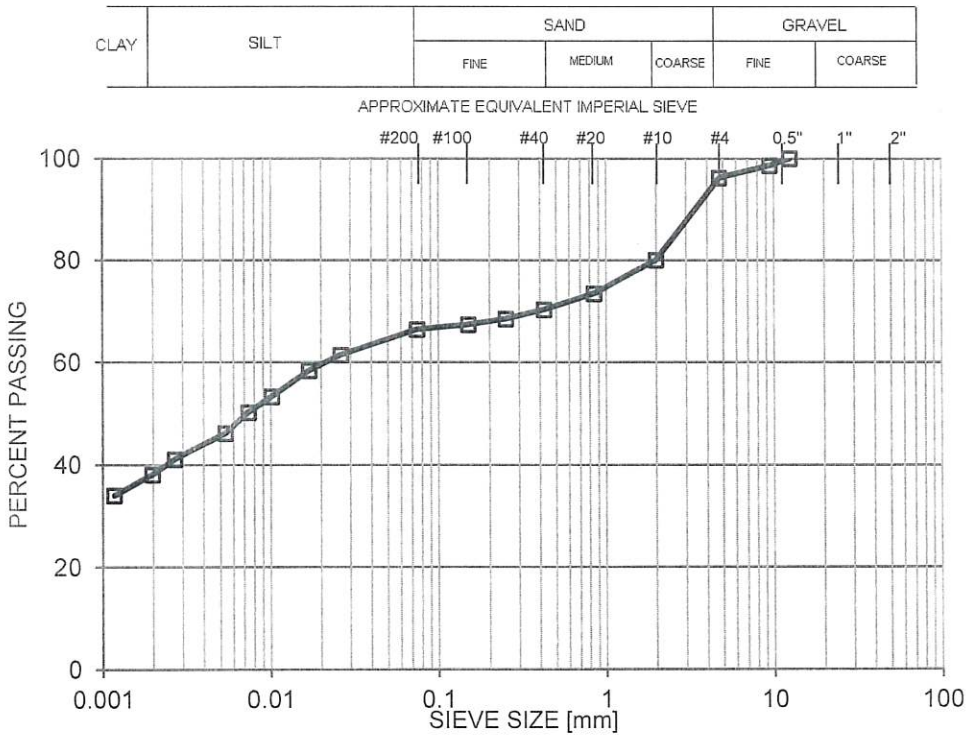
Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road
Material Description: Sandy clay

Test Hole No.: 38
Sample No.: 1
Depth: 0.6 m
Test Method: ASTM D7928
Method Used: -
Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer

Date Sampled: Apr 1/24
Date Received: Apr 1/24
Date Tested: Jul 15/24
Drying Method: Air
Dispersion Process: Stirrer / Tipping

Sampled By: ENG-TECH (Shah Zeb)
Sample Type: Auger cutting
Tested By: ENG-TECH (Jessica Bauer)
Specific Gravity: Estimated 2.75
Separating Sieve Size (mm): 2.0
Dispersion Time (min.): 1



SIEVE SIZE (mm)	PERCENT PASSING
12.5	100
9.5	99
4.75	96
2.0	80.1
0.850	73
0.425	70
0.250	69
0.150	67
0.075	66.5
0.026	61
0.017	58
0.010	53
0.0074	50
0.0054	46
0.0027	41
0.0020	38
0.0012	34

Percent of: GRAVEL (3.8 %), SAND (29.7 %), SILT (28.3 %), CLAY (38.2 %)
Classification: ASTM D2487: Sandy fat clay (CH)
ASTM D3282: A-7-6 (26)
As Received Moisture Content (%): 42.7
Comments:

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File No.: 24-035-01
Ref. No.: 24-35-1-32

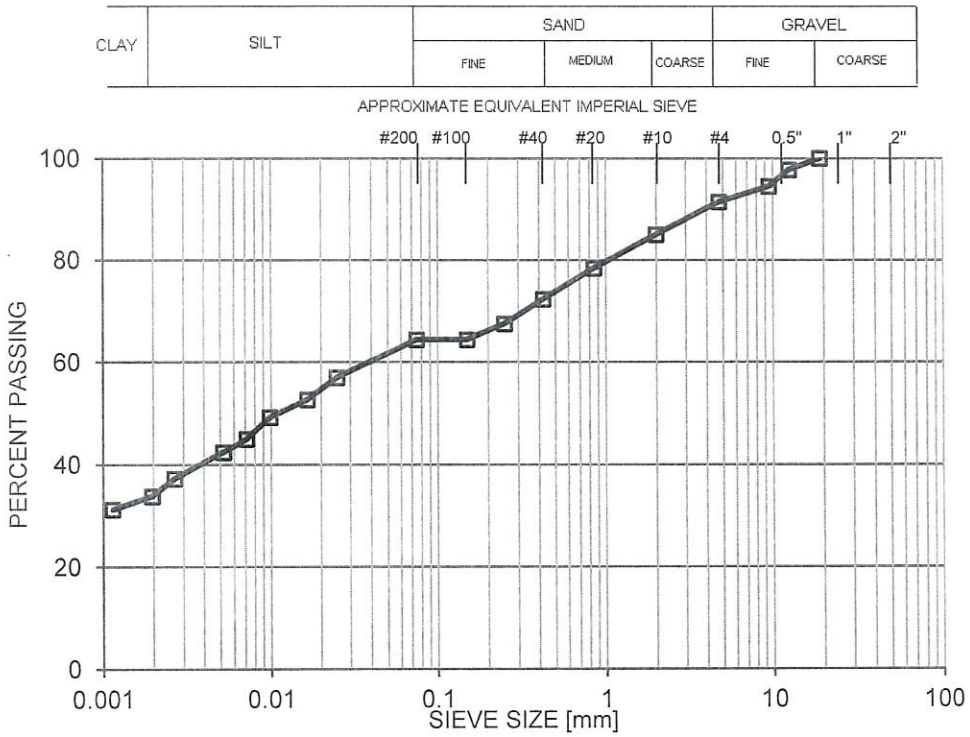
Attention: Scott Suderman, C.E.T., P. Eng.
Project: CW 749 - 2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Shoulder Dugald Road
Material Description: Sandy clay

Test Hole No.: 40
Sample No.: 1
Depth: 0.6 m
Test Method: ASTM D6913 &D7928
Method Used: A
Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer

Date Sampled: Apr 1/24
Date Received: Apr 1/24
Date Tested: Jul 15/24
Drying Method: Air
Dispersion Process: Stirrer / Tipping

Sampled By: ENG-TECH (Shah Zeb)
Sample Type: Auger cutting
Tested By: ENG-TECH (Jessica Bauer)
Specific Gravity: Estimated 2.75
Separating Sieve Size (mm): 2.0
Dispersion Time (min.): 1



SIEVE SIZE (mm)	PERCENT PASSING
19.0	100
12.5	98
9.5	95
4.75	91
2.0	85.0
0.850	78
0.425	72
0.250	68
0.150	64
0.075	64.4
0.025	57
0.017	53
0.010	49
0.0072	45
0.0052	42
0.0026	37
0.0020	34
0.0011	31

Percent of: GRAVEL (8.5 %), SAND (27.1 %), SILT (30.3 %), CLAY (34.1 %)
Classification: ASTM D2487: Sandy fat clay (CH)
ASTM D3282: A-7-6 (21)
As Received Moisture Content (%): 32.0
Comments:

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MOISTURE-DENSITY RELATIONSHIP

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For specific tests as listed on www.ccil.com

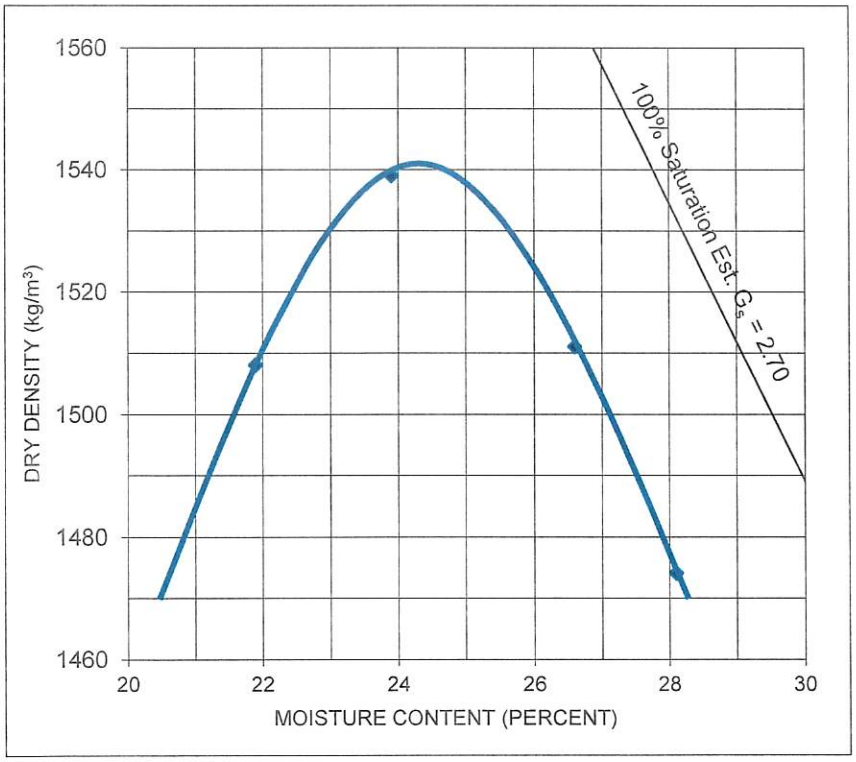
File No.: 24-035-01
Ref. No.: 24-35-1-16

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

Attention: Scott Suderman, C.E.T., P. Eng.

Project: CW 749-2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road, composite of TH27 and TH28, 0.6 - 1.2 m
Material Type: Sub-grade Description: Clay, medium brown with black, med to high plastic, trace to some silt, sand & gravel
Date Sampled: Apr 17/24 Date Received: Apr 18/24 Date Tested: Jul 13/24
Sampled By: ENG-TECH (Shah Zeb) Tested By: ENG-TECH (Kristian Pajda)
Compaction Standard Method: [✓] ASTM D698 [ ] ASTM D1557
Correction Standard Method: [ ] ASTM D4718
Preparation Method: Moist Compaction Method: Manual



Test Compaction Method: A

Material Oversize:
4.75 mm: 1.5 %
19.0 mm: - %

Dry Density (kg/m³)	Moisture Content (%)
1508	21.9
1539	23.9
1511	26.6
1474	28.1

Maximum Dry Density (MDD): 1541 kg/m³
Optimum Moisture (OM): 24.3 %

MDD Corrected: - kg/m³
OM Corrected: - %

Received Moisture Content: 30.5 %

Comments:

Email: WSP Canada Inc. Contact Group

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MOISTURE-DENSITY RELATIONSHIP

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File No.: 24-035-01
Ref. No.: 24-035-1-17

WSP Canada Inc.
1600 Buffalo Place
Winnipeg, Manitoba
R3T 6B8

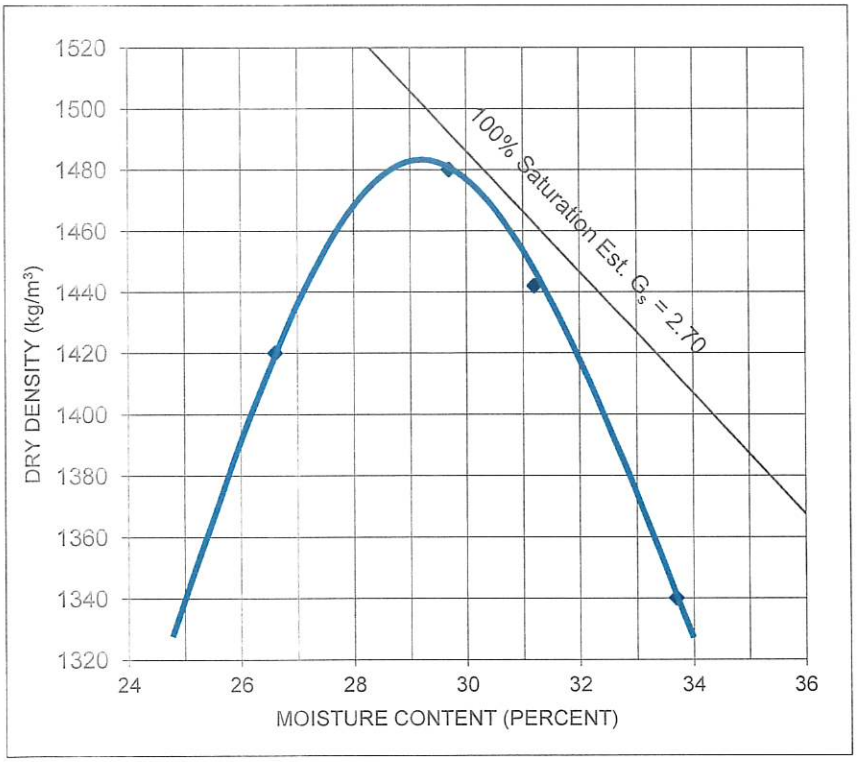
Attention: Scott Suderman, C.E.T., P. Eng.

Project: CW 749-2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road, composite of TH32, TH33 and TH34, 0.6 - 1.2 m
Material Type: Sub-grade Description: Clay, black, moist, high plastic, some silt, some to with sand, trace gravel
Date Sampled: Apr 16/24 - Apr 17/24 Date Received: Apr 18/24 Date Tested: Jun 3/24
Sampled By: ENG-TECH (Shah Zeb) Tested By: ENG-TECH (James McCauley)
Compaction Standard Method: [✓] ASTM D698 [ ] ASTM D1557
Correction Standard Method: [ ] ASTM D4718
Preparation Method: Moist Compaction Method: Manual

Test Compaction Method: A

Material Oversize:
4.75 mm: 1.0 %
19.0 mm: - %



Dry Density (kg/m³)	Moisture Content (%)
1420	26.6
1480	29.7
1442	31.2
1340	33.7

Maximum Dry Density (MDD): 1484 kg/m³
Optimum Moisture (OM): 29.2 %

MDD Corrected: - kg/m³
OM Corrected: - %

Received Moisture Content: 20.9 %

Comments:

Email: WSP Canada Inc. Contact Group

ENG-TECH Consulting Limited

Per
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MOISTURE-DENSITY RELATIONSHIP

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File No.: 24-035-01
Ref. No.: 24-35-1-18

WSP Canada Inc.
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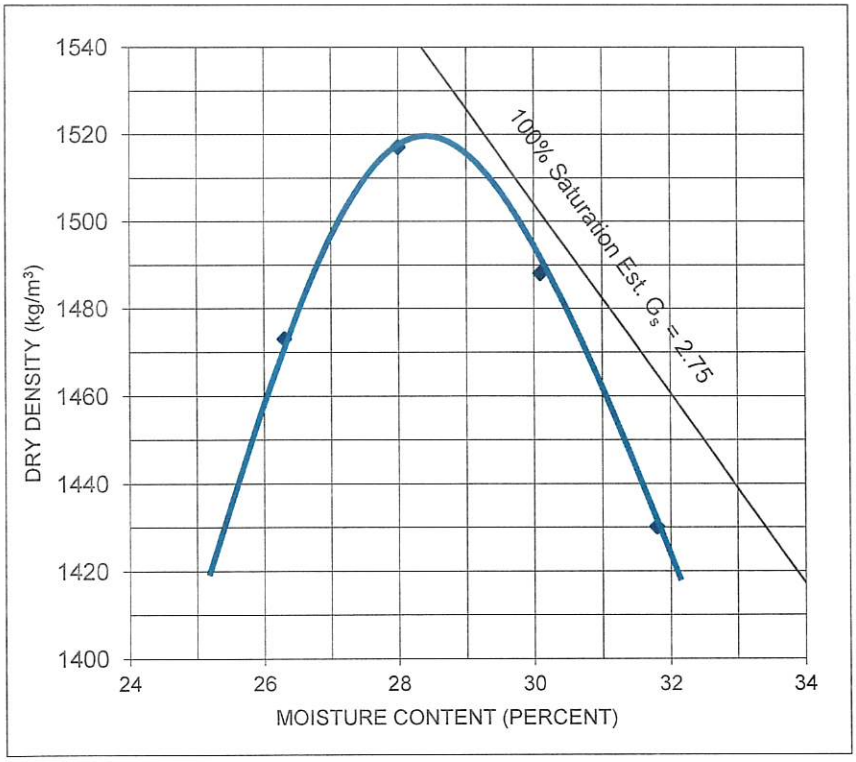
R3T 6B8

Attention: Scott Suderman, C.E.T., P. Eng.

Project: CW 749-2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source: Dugald Road, composite of TH45, TH46 and 47, 0.6 - 1.2 m
Material Type: Sub-grade Description: Clay, black, moist, high plastic, trace to some sand, trace gravel
Date Sampled: Apr 8/24 to Apr 10/24 Date Received: Apr 8/24 to Apr 10/24 Date Tested: Jun 3/24
Sampled By: ENG-TECH (Shah Zeb) Tested By: ENG-TECH (Jasraj Nanda)
Compaction Standard Method: [✓] ASTM D698 [ ] ASTM D1557
Correction Standard Method: [ ] ASTM D4718
Preparation Method: Moist Compaction Method: Manual



Test Compaction Method: A

Material Oversize:
4.75 mm: 2.2 %
19.0 mm: - %

Dry Density (kg/m³)	Moisture Content (%)
1473	26.3
1517	28.0
1488	30.1
1430	31.8

Maximum Dry Density (MDD): 1520 kg/m³
Optimum Moisture (OM): 28.3 %

MDD Corrected: - kg/m³
OM Corrected: - %

Received Moisture Content: 26.4 %

Comments:

Email: WSP Canada Inc. Contact Group

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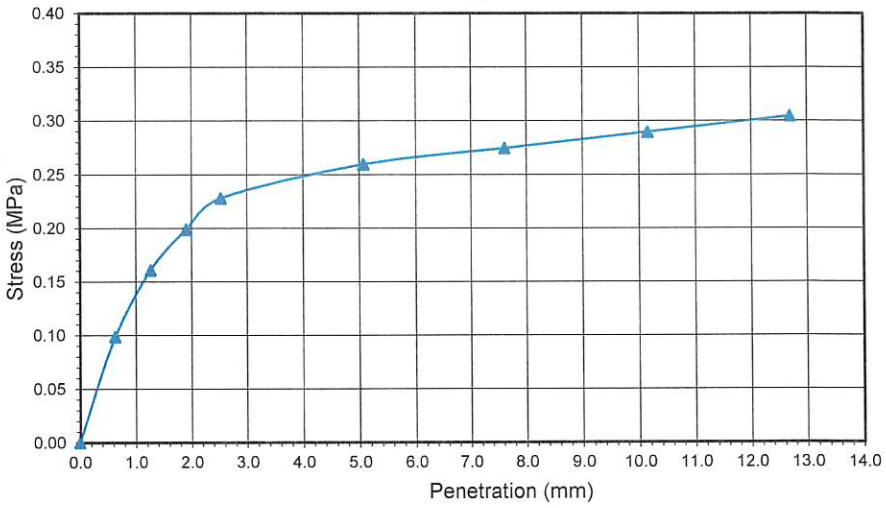
File No.: 24-035-01
Ref. No.: 24-35-1-20

Attention: Scott Suderman, C.E.T., P. Eng.

Project: CW 749-2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source:	Dugald Road, composite sample of TH32, TH33 and TH34, 0.6 - 1.2 meters		
Material Type:	Sub-grade	Date Sampled:	Apr 16/24 to Apr 17/24
Material Description:	Clay, black, moist, high plastic, some silt, some to with sand, trace gravel	Date Received:	Apr 18/24
Sampled By:	ENG-TECH (Shah Zeb)	Date Tested:	Jun 24/24
Immersion Period:	95.5 hours	Tested By:	ENG-TECH (Rey Batac)
Compactive Effort (Density):	Required: 95% Actual: 96%	Test Methods:	ASTM D698, D1883



Test Data

	Soaked		Unsoaked	
Dry Density: As Compacted;	1419	kg/m^3	-	kg/m^3
Moisture Content: As Compacted;	28.9	%	-	%
Moisture Content: Top 25 mm;	32.4	%	-	%
CBR Values: 2.54mm (0.1in);	3.3	%	-	%
CBR Values: 5.08mm (0.2in);	2.5	%	-	%

Swell: 0.9 % of Initial Height Oversize Correction: 1.0 % Surcharge Mass: 4.54 kg

Maximum Load: 584.8 N Penetration Depth: 12.70 mm

Comments:

Email: WSP Canada Inc. Contact Group

Enclosure: Moisture-Density Relationship Test Ref. No. 24-35-1-17

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Per

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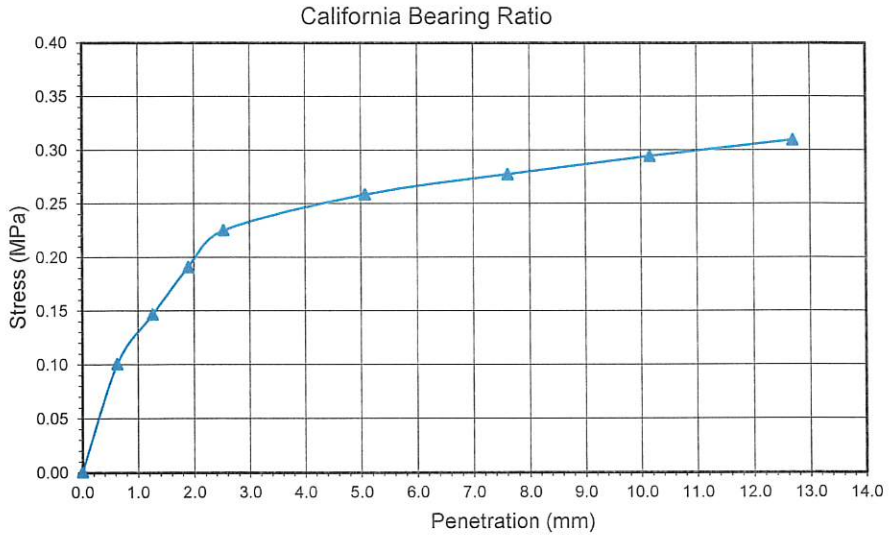
File No.: 24-035-01
Ref. No.: 24-35-1-22

Attention: Scott Suderman, C.E.T., P. Eng.

Project: CW 749-2023 - PAVEMENT RENEWALS ON DUGALD ROAD AND PLESSIS ROAD

Source:	Dugald Road, composite sample of TH45, TH46 and TH47, 0.6 - 1.2 meters		
Material Type:	Sub-grade	Date Sampled:	Apr 8/24 to Apr 10/24
Material Description:	Clay, black, moist, high plastic, trace to some sand, trace gravel	Date Received:	Apr 8/24 to Apr 10/24
Sampled By:	ENG-TECH (Shah Zeb)	Date Tested:	Jun 11/24
Immersion Period:	92.0 hours	Tested By:	ENG-TECH (Rey Batac)
Compactive Effort (Density):	Required: 95% Actual: 96%	Test Methods:	ASTM D698, D1883



Test Data

	Soaked		Unsoaked	
Dry Density: As Compacted;	1451	kg/m^3	-	kg/m^3
Moisture Content: As Compacted;	28.5	%	-	%
Moisture Content: Top 25 mm;	31.9	%	-	%
CBR Values: 2.54mm (0.1in) (Corrected);	2.6	%	-	%
CBR Values: 5.08mm (0.2in) (Corrected);	2.4	%	-	%

Swell:	1.3	% of Initial Height	Oversize Correction:	2.2	%	Surcharge Mass:	4.54 kg
Maximum Load:	594.5	N	Penetration Depth:	12.70	mm		

Comments:

Email: WSP Canada Inc. Contact Group

Enclosure: Moisture-Density Relationship Test Ref. No. 24-35-1-18

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