The City of Winnipeg Tender No. 166-2025

# **APPENDIX 'A'**

## **GEOTECHNICAL REPORT**



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"Engineering and Testing Solutions That Work for You"

Date:	January 15, 2024	File No.:	23-035-03
Client: Address:	WSP Canada Inc. 1600 Buffalo Place Winnipeg, Manitoba R3T 6B8		
Attention:	Scott Suderman, P.Eng.		
Project:	Bishop Grandin Boulevard (Abinojii Mikanah) Pavement R Manitoba Canada	enewals, W	/innipeg,

## 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 sections of Bishop Grandin Boulevard (Abinojii Mikanah) in Winnipeg, Manitoba, Canada.

## Scope of Work

The scope of work for the project entailed drilling a total of 12 test holes and recovering a total of thirty-four (34) cores through 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 sections of road covered in the investigation were as follows:

- Eastbound Bishop Grandin Blvd (Abinojii Mikanah) (River Road to St Anne's Road) 12 Test Holes, 17 cores
- Westbound Bishop Grandin Blvd (Abinojii Mikanah) (Dakota Street to River Road) 17 cores

## Field Program

ENG-TECH conducted the coring and drilling program between December 4<sup>th</sup> and 13<sup>th</sup>, 2023 across the site locations previously stated. The cores were obtained by ENG-TECH at locations determined by WSP using 100mm and 150mm diameter diamond end core barrels. 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 below the pavement structure on Eastbound Bishop Grandin Boulevard (Abinojii Mikanah) at the locations as shown on Coring and Drilling Location Plan Figures 1 to7. 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 2.5 m 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 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 on Table 3 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 on Table 3 and separate reports enclosed.

Two standard proctors (moisture-density relationships) and California Bearing Ratios (CBR) were determined on composite samples of Test Holes (TH#) 1 to 7 and TH#'s 8 to 12 to represent the 2 sections of the eastbound lanes. The results are shown on the enclosed Moisture-Density Relationship and California Bearing Ratio Reports.

The pavement core thicknesses were measured and photographed. Photographs of each core are shown in the attached Photographs 1 to 34. Select concrete pavement cores were tested for compressive strength and the results are shown on the enclosed Obtaining and Testing Drilled Cores report.

## Soil Stratigraphy Summary

The pavement structure ranged from 0.25m to 0.36m. As measured from the bottom of the pavement structure, there was typically 0.9m to 1.4m of high plastic (fat) clay underlain by another layer of predominately high plastic clay with minor irregular sections of slight silty clay to 2.5m 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 Core Structure – EB Bishop Grandin Boulevard St Mary's Road to St Anne's Road Table 2 - Summary of Pavement Core Structure - WB Bishop Grandin Boulevard Dakota Street to River Road Table 3 - Summary of Pavement Structure - EB Bishop Grandin Boulevard River Road to St Annes's Road Figures 1 to 7 - Coring and Drilling Location Plan Specimen Photographs (34 pages) Test Hole Logs (12 pages) Obtaining and Testing Drilled Cores Report Ref. No. 23-35-3-2 Atterberg Limits, Plastic Index and Plasticity Index of Soil Reports Ref. No.'s 23-35-3-4, 5 and 9 Particle Size Analysis Reports Ref. No.'s 23-35-3-6, 7 and 10 Moisture-Density Relationship Report Ref. No. 23-35-3-11 and 13 California Bearing Ratio Report Ref. No. 23-35-3-12 and 14

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	Table 1 - Summary of Pavement Core Structure           Eastbound Bishop Grandin Boulevard St Mary's Road to St Anne's Road												
Core	Long	Test Hole	e Location	Pavement Surface									
No.	Lane	UTM (N)	14U (E)	Туре	Core Diameter (mm)	Thickness (mm)							
504	NA J	5504500	025042	Asphalt	150	90							
PC1	Median	5521533	635642	Concrete	150	190							
	A	5504000	005000	Asphalt	100	105							
PC2	Acceleration	5521630	635830	Concrete	100	195							
<b>D</b> 00	2	5504050	005050	Asphalt	150	145							
PC3	Curb	5521650	635856	Concrete	150	180							
504	NA	5504044	000100	Asphalt	100	100							
PC4	Median	5521811	636133	Concrete	100	200							
DOC	Marilian	5504007	626267	Asphalt	150	140							
PC5	Median	5521887	636267	Concrete	150	210							

Table 2 - Summary of Pavement Core Structure           Westbound Bishop Grandin Boulevard Dakota Street to River Road											
Core	Tana	Test Hole	Location	Pavement Surface							
No.	Lane –	UTM (N)	14U (E)	Туре	Core Diameter (mm)	Thickness (mm)					
	Longitudinal Joint	5500700	00.44.00	Asphalt	150	90					
PC6	between Lanes	5520783	634163	Concrete	150	180					
		5500700	004404	Asphalt	100	75					
PC7	Median	5520783	634164	Concrete	100	175					
1927 IZ 13			00.4400	Asphalt	150	68					
PC8	Median	5520784	634169	Concrete	150	205					
			004400	Asphalt	150	70					
PC9	Middle	5520967	634483	Concrete	150	185					
5010		5500000	004404	Asphalt	100	85					
PC10	Middle	5520968	634484	Concrete	100	190					



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		Westbo	Table 2 - Summary of I und Bishop Grandin Boul	Pavement Core Structure evard Dakota Street to Riv	ver Road				
Core	Laws	Test Hole	Location	Pavement Surface					
No.	Lane	UTM (N)	14U (E)	Туре	Core Diameter (mm)	Thickness (mm)			
5011		5504000	004000	Asphalt	150	80			
PC11	Curb	5521066	634662	Concrete	150	210			
5040	0	5504005	004000	Asphalt	150	90			
PC12	Curb	5521065	634662	Concrete	150	210			
DOID		5504007	624662	Asphalt	100	90			
PC13	Curb	5521067	634662	Concrete	100	190			
D011	N.A I'	5504450	624924	Asphalt	150	120			
PC14	Median	5521152	634824	Concrete	150	230			
DOIL	Marilian.	5504044	625100	Asphalt	150	110			
PC15	Median	5521311	635199	Concrete	150	220			
		5504040	025400	Asphalt	150	130			
PC16	Median	5521310	635199	Concrete	150	210			
D017	NA I'	5504040	635200	Asphalt	100	110			
PC17	Median	5521310	635200	Concrete	100	190			
5040		5504004	635779	Asphalt	100	110			
PC18	Curb	5521634	635779	Concrete	100	160			
2010		5504700	025042	Asphalt	150	100			
PC19	Curb	5521709	635912	Concrete	150	155			
DODO	Qual	EE01709	635910	Asphalt	100	100			
PC20	Curb	5521708	033910	Concrete	100	190			
<b>DO01</b>	Quit	5524700	625012	Asphalt	150	100			
PC21	Curb	5521709	635912	Concrete	150	190			
	A Annual Property C	5504500	025040	Asphalt	100	110			
PC22	Median	5521533	635640	Concrete	100	200			



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					Eastbound I		Table nary of Paven din Boulevard	nent Struct	ure Id to St Annes	's Road								
Test	GPS Co	oordinates	Paveme	nt Surface		nt Structure terial	Subgrade	Sample	Moisture	Hydrometer Analysis			sis	Atterberg Limits				
Hole	UTM (N)	14U (E)	Туре	Depth (mm)	Туре	Depth (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
								0.6	31.0	-	-	-	-	-	-	-		
			Asphalt	190			Fat Clay	0.9	30.5	0.9	6.3	30.0	62.7	75	19	56		
TH1								1.2	31.8	-	-	-	-	-	-	-		
	5520738	634189			Clay	2500		1.6	40.3	-	-		-	-	2 <del></del>	- 1		
			Concrete	155				2.0	39.5	-	-	-	-	-	-	-		
								2.5	44.1	-	-	-	-	-		-		
										0.6	31.7	-	-	÷	-	-	-	-
			Asphalt	140	Clay	2500		0.9	33.0		-	-	=			-		
TH2	5520855	634403						1.2	39.1	-		-	-	-	2-	-		
THZ	5520655	034403			Clay	2500		1.6	41.5	-	-	-	-	-	-	-		
			Concrete	150				2.0	28.6	Ξ.	-	-	-	-	12	-		
								2.5	48.6	e <del>n</del>	-	-	-	-	-	-		
				sphalt 100				0.6	27.6	3-	-	-	-		87	-		
			Asphalt					0.9	29.1	-	-	-	-	-	-	-		
TH3	5520939	634553			Clay	2500	Fat Clay	1.2	34.0	2.7	4.0	17.7	75.6	80	27	53		
1115	3320333	004000			Oldy	2000		1.6	28.7	-	-	-		-	-	-		
			Concrete	180				2.0	25.2		-	=	-	-	-	-		
								2.5	32.3	-	-	-	-	-		-		
								0.6	34.7	-	-	-	-			-		
			Asphalt	85				0.9	33.5	) <del></del>	-	-	-	-	-	-		
TH4	5521041	634728			Clay	2700		1.2	34.6	-	-	-	-	-	-	-		
	0021011	00.120	Concrete	200	Clay	2100		1.6	29.6	-	-	-	-	-	-	-		
								2.0	27.9	-	-	-	-	4	-	-		
								2.5	21.3	=	-	-	-	E	-	-		

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	Table 3 Summary of Pavement Structure Eastbound Bishop Grandin Boulevard Road River to St Anne's Road															
Test	GPS Coo	ordinates	Pavemen	t Surface	Pavement Mat	t Structure erial	Subgrade	Sample	Moisture	Hydrometer Analysis				Atterberg Limits		
Hole	UTM (N)	14U (E)	Туре	Depth (mm)	Туре	Depth (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
								0.6	40.1	-	-	-	-	-	-	-
			Asphalt	135				0.9	28.8	-	-	-	-	-	-	-
						0700		1.2	33.1	-	-	-	-	H.	-	-
TH5	5521147	634954			Clay	2700		1.6	34.8	-	-	-	-		-	-
			Concrete	150				2.0	36.4	-	-	-	-	-	-	-
								2.5	43.7	-	-	-	-	-	-	-
	5521213		Asphalt					0.6	32.0	-	-	-	-	-	-	-
				110	- Clay	2500		0.9	24.4	-	-	-	-	-	-	-
TUC		635083						1.2	22.9	-	-	-	-			-
TH6		635063						1.6	35.4	-	-	-	-	-	-	-
			Concrete	200				2.0	38.3	-	-	-	-	-	-	-
								2.5	44.2	-	-	-	-	-	-	-
								0.6	39.3	-	-		-	-	-	-
			Asphalt	75				0.9	38.6	-	-	-	-	-	-	-
TH7	5521313	635083			Clay	2700		1.2	34.8	-	-	-	-	-	-	-
	5521515	035005			Ciay	2700		1.6	29.6	-	-	-	-		-	-
			Concrete	200				2.0	25.0	-	-	-	-	-	-	-
								2.5	21.9	-	-	-	-		-	-
								0.6	29.2	-	-	-	-	-	-	-
			Asphalt	170				0.9	29.6	-	-	-	-		-	-
TH8	5521567	636401			Clay	2500		1.2	29.9	-	-	-	-	-	-	-
100	3521507	000401	Concrete		Oldy	2000		1.6	23.3	-	-	-	-	-	-	-
				195				2.0	22.5	-	-	-	-	-	-	-
								2.5	32.5	-	-	-	-	-	-	-



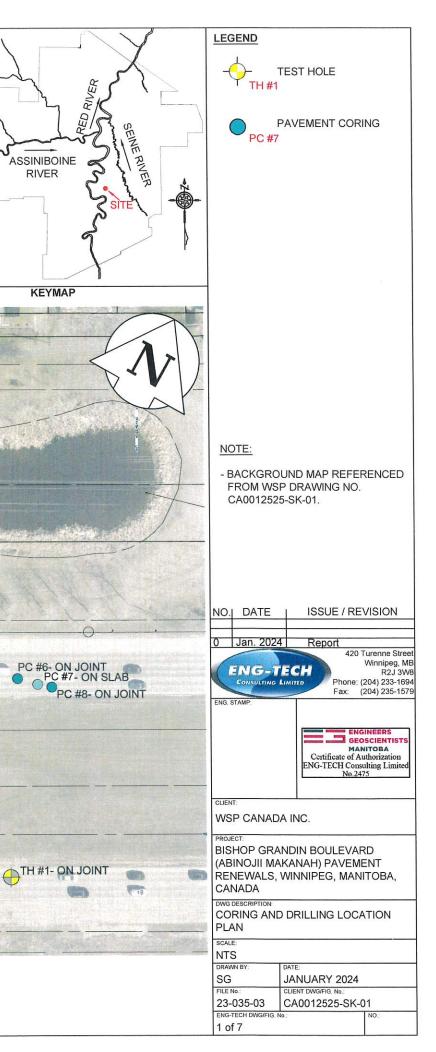
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	Table 3         Summary of Pavement Structure         Eastbound Bishop Grandin Boulevard River Road to St Anne's Road																	
Test	GPS Coo	ordinates	Pavemen	t Surface	Pavement Mat	t Structure erial	Subgrade	Sample	Moisture	Hydrometer Analysis			is	Atterberg Limits				
Hole	UTM	14U	Туре	Depth (mm)	Туре	Depth (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index		
								0.6	32.7	-	-	-	-	-	-	-		
			Asphalt	110				0.9	32.9*	-	-	-	-		-	-		
TH9 5522044								1.2	33.7	-	-	-	-	-	-	-		
	5522044	636534			Clay	2500		1.6	40.6	-	-	-	-	-	-	-		
			Concrete	140				2.0	39.4	-	-	-	-	-	-	-		
								2.5	45.8	-	-	-	-	-	-	-		
										0.6	37.3		-	-	-	-	-	-
			Asphalt 10	105			Fat Clay	0.9	32.2	0.2	6.0	19.6	74.2	88	31	57		
THE	5522130	000000	22		- Clay	0500		1.2	35.5	-	-	-	-	-	-	-		
TH10		636686				2500		1.6	35.6	-	-	-	-	-	-	-		
			Concrete	200				2.0	36.1	-	-	-	-	-	-	-		
								2.5	36.3		-	-	-	-	-	-		
								0.6	31.1	-	. <del></del>	. –	-		-	-		
			Asphalt	90				0.9	31.0	-	-	-	-	-	-	- 2		
TH11	5522187	636788			Clay	2500		1.2	34.3	-	-	-	-	-	-	-		
	5522107	030700			Ciay	2000		1.6	24.6	-	-	-	-	-	-	-		
			Concrete	200				2.0	33.8	-	-	-	-	-	-	-		
								2.5	40.0	-	-	-	-	-	-	-		
								0.6	29.2	~	-	-	-	-	-			
			Asphalt	95				0.9	33.4	-	-	-	-	-	-	-		
TH12	5522267	636929			Clay	2500		1.2	32.8	-	. <del></del>	-	-	-	-	-		
11112	JULLEUT	000020	Concrete		,			1.6	32.0	-	-	-	-	-	-	-		
				te 200				2.0	29.3	-	-	-	-	-	-	-		
								2.5	27.3	-	-	-	-	-	-	-		

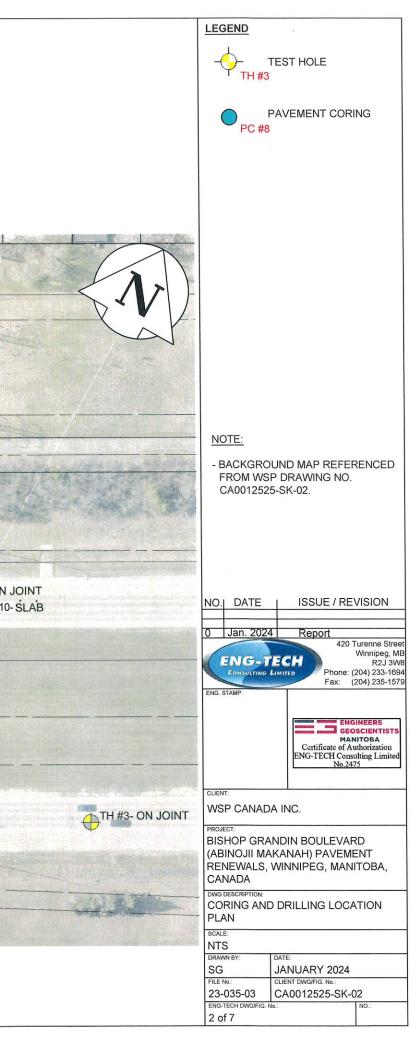


	and the second sec		CORE LOCATION TABLE		
HOLE	CORING COM DECEMBER 4, 5	APLETED ON 6 AND 7 2023			
NUMBER	UTM COO		LOCATION DESCRIPTIONS		
	UTM	14U	-		
TH #1	5520738	634189	EB LANE, MEDIAN LANE, ON € OF LANE		and a
PC #6	5520783	634163	WB LANE, ON € BETWEEN MEDIAN AND MIDDLE LAN	JE	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
PC #7	5520783	634164	WB MEDIAN LANE, ON &LANE		
PC #8	5520784	634169	WB MEDIAN LANE, ON & OF LANE		
		*			
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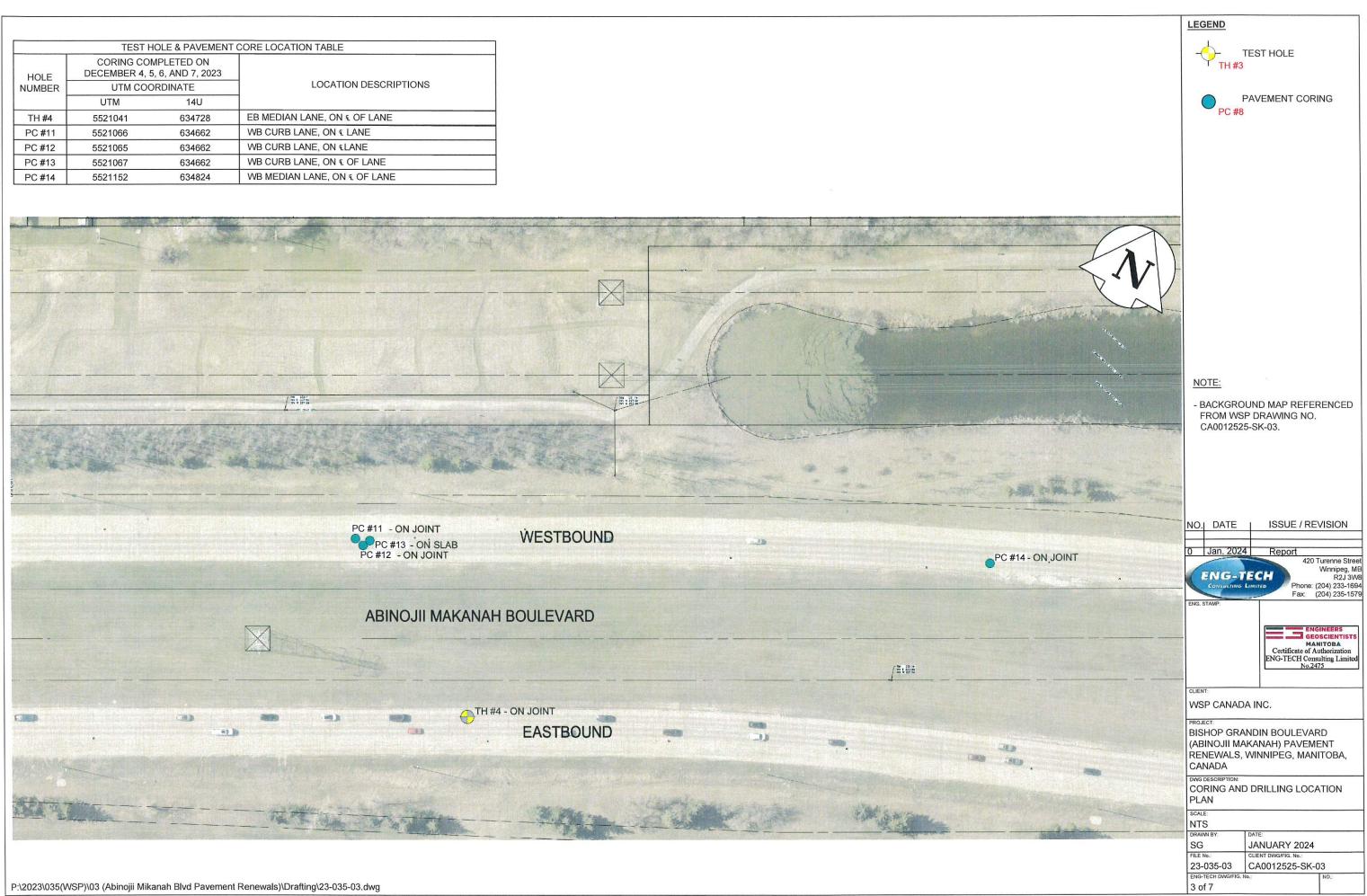


IST HOLE & PAVEMENT CORE LOCATION TABLE         HOLE       UTIM       LOCATION DESCRIPTIONS         UTIM       14U       LOCATION DESCRIPTIONS         TH #2       5520855       534403       EB CURB LANE, ON & OF LANE         PC #8       5520855       634453       EB CURB LANE, ON & LANE         PC #9       5520865       634454       WB MIDDLE LANE, ON & LANE         PC #10       5520865       634454       WB MIDDLE LANE, ON & LANE         PC #10       5520865       634454       WB MIDDLE LANE, ON & LANE         PC #10       5520867       634454       WB MIDDLE LANE, ON & LANE         VESTBOUND       VESTBOUND       WESTBOUND	
NUMBER         UTM COORDINATE         LOCATION DESCRIPTIONS           11 H#2         5520855         634403         EB CURB LANE, ON & OF LANE           TH #3         5520986         634403         WB MIDDLE LANE, ON & OF LANE           PC #10         5520986         634404         WB MIDDLE LANE, ON & OF LANE	
NUMBER         UTM         144         LOCATION DESCRIPTIONS           TH #2         5520855         634403         EB CURB LANE, ON & OF LANE           TH #3         5520967         634483         WB MIDDLE LANE, ON & LANE           PC #3         5520968         634484         WB MIDDLE LANE, ON & OF LANE           PC #10         5520968         634484         WB MIDDLE LANE, ON & OF LANE	
TH #2         5520855         634403         EB CURB LANE, ON & OF LANE           TH #3         5520893         634553         TE CUBB LANE, ON & LANE           PC #0         5520967         634483         WB MIDDLE LANE, ON & LANE           PC #10         5520988         634484         WB MIDDLE LANE, ON & LANE	
TH #3         5520939         634553         EB CURB LANE, ON & LANE           PC #9         5520967         634483         WB MIDDLE LANE, ON & OF LANE           PC #10         5520968         634484         WB MIDDLE LANE, ON & OF LANE	
PC #9         5520967         634483         WB MIDDLE LANE, ON & OF LANE           PC #10         5520968         634484         WB MIDDLE LANE, ON & OF LANE	
PC #10 5520968 634484 WB MIDDLE LANE, ON % OF LANE	
EINE WESTBOUND ABINOJII MAKANAH BOULEVARD	
ABINOJII MAKANAH BOULEVARD	
	PC #9 - ON J
EASTBOUND OTH #2- ON JOINT	
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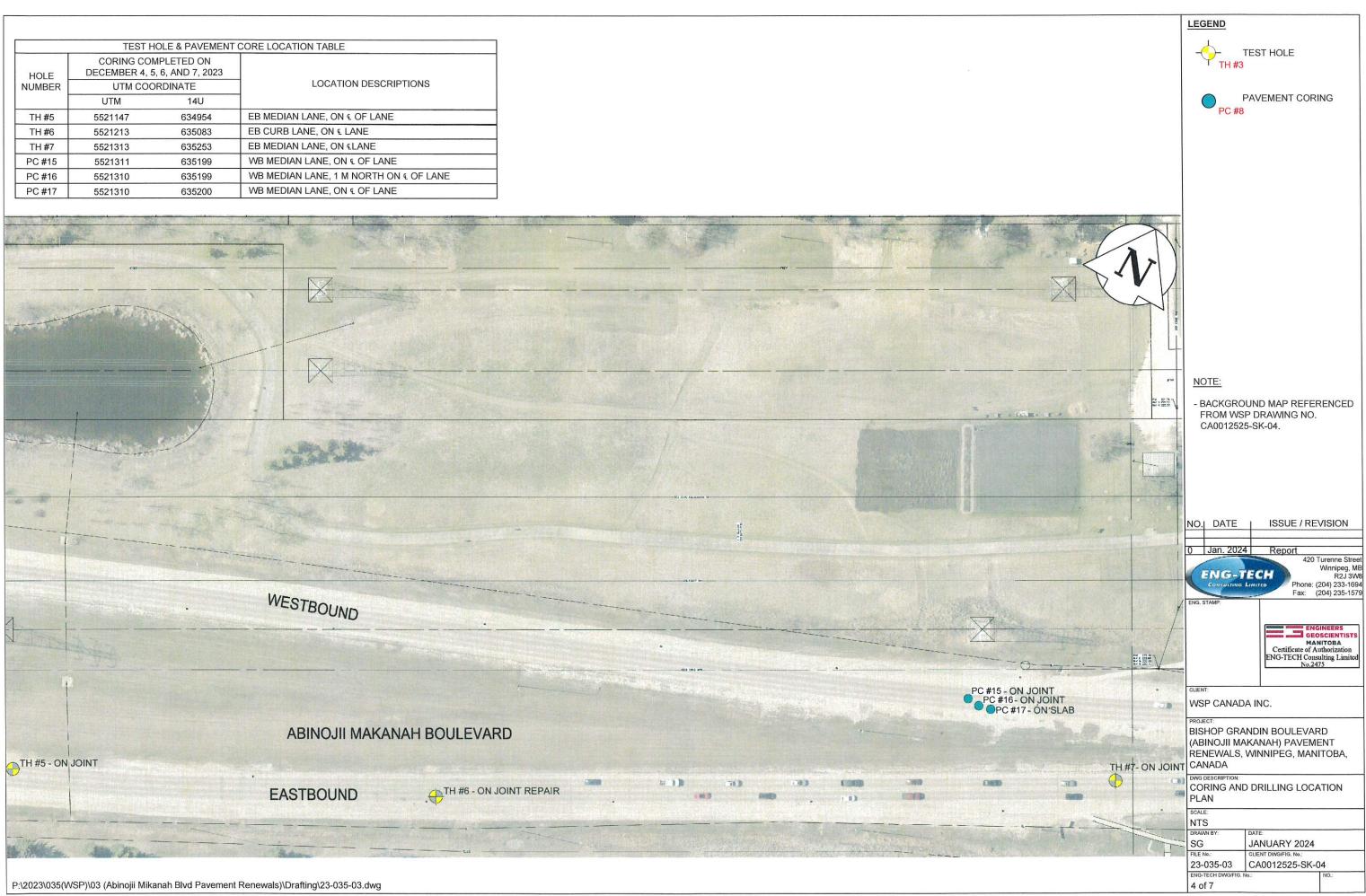
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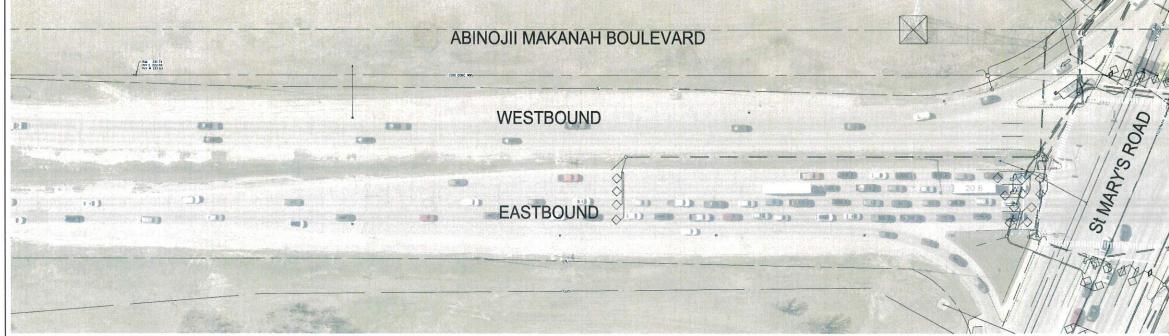
	TEST H	OLE & PAVEMENT	CORE LOCATION TABLE
HOLE CORING COMPLETED ON DECEMBER 4, 5, 6, AND 7, 2023 NUMBER UTM COORDINATE			
		RDINATE	LOCATION DESCRIPTIONS
	UTM	14U	
TH #4	5521041	634728	EB MEDIAN LANE, ON € OF LANE
PC #11	5521066	634662	WB CURB LANE, ON € LANE
PC #12	5521065	634662	WB CURB LANE, ON €LANE
PC #13	5521067 634662		WB CURB LANE, ON € OF LANE
PC #14	5521152 634824		WB MEDIAN LANE, ON € OF LANE

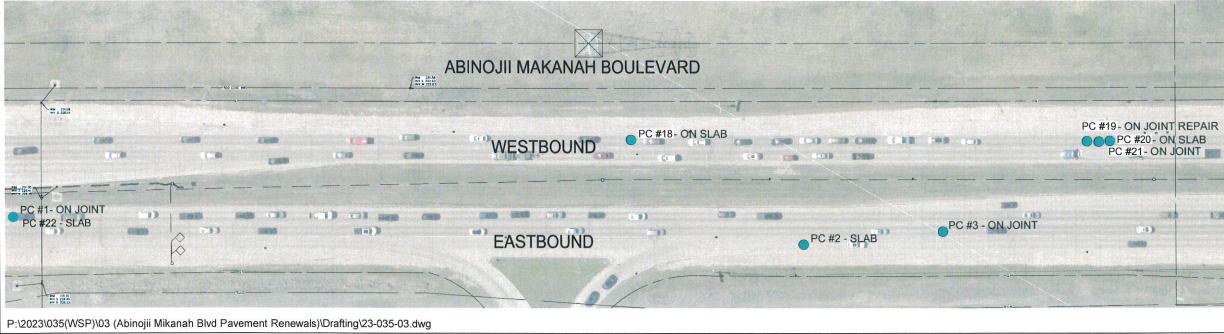


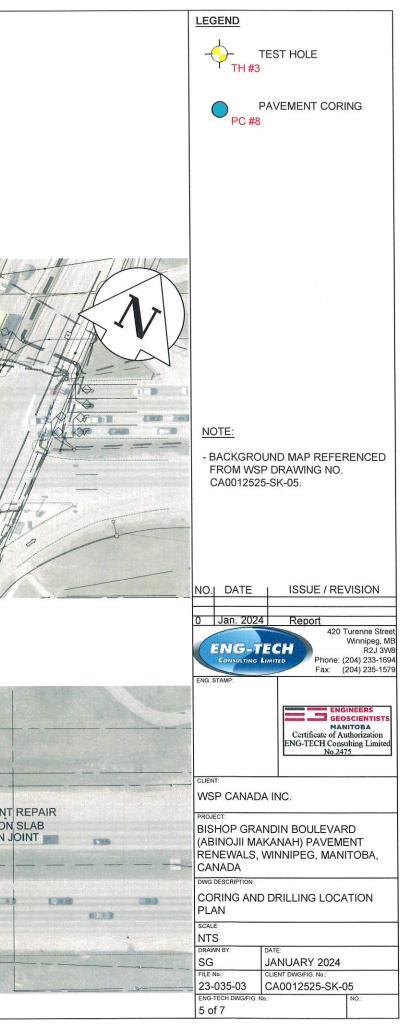
	IPLETED ON		
	HOLE DECEMBER 4, 5, 6, AND 7, 2023 NUMBER UTM COORDINATE		
LOCATION DESCRIPTIONS			
	14U	UTM	
EB MEDIAN LANE, ON € OF LANE	634954	5521147	TH #5
EB CURB LANE, ON € LANE	635083	5521213	TH #6
EB MEDIAN LANE, ON €LANE	635253	5521313	TH #7
WB MEDIAN LANE, ON € OF LANE	635199	5521311	PC #15
WB MEDIAN LANE, 1 M NORTH ON € OF LANE	5521310 635199		PC #16
WB MEDIAN LANE, ON € OF LANE	635200	5521310	PC #17



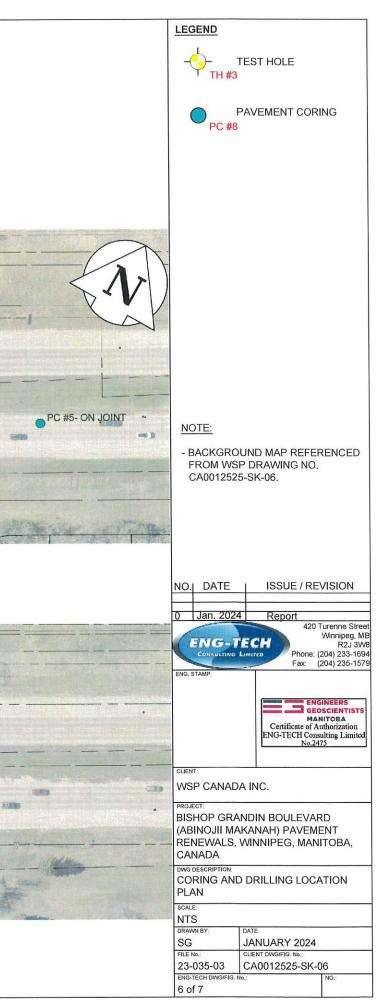
	TEST F	IOLE & PAVEMENT	CORE LOCATION TABLE	
HOLE				
NUMBER			LOCATION DESCRIPTIONS	
	UTM 14U			
PC #1	5521533	635642	EB MEDIAN LANE, 0.8 M NORTH OF € OF LANE	
PC #2	5521630	635830	EB ACCELERATION LANE, ON € LANE	
PC #3	5521650	635856	EB CURB LANE, ON & LANE	
PC #18	5521634	635779	WB CURB LANE, ON € OF LANE	
PC #19	5521709	635912	WB CURB LANE, ON € OF LANE	
PC #20	5521708	635910	WB CURB LANE, ON € OF LANE	
PC #21	5521709	635912	WB CURB LANE, ON € OF LANE	
PC #22	5521533	635642	EB MEDIAN LANE, 0.8 M NORTH OF & OF LANE	



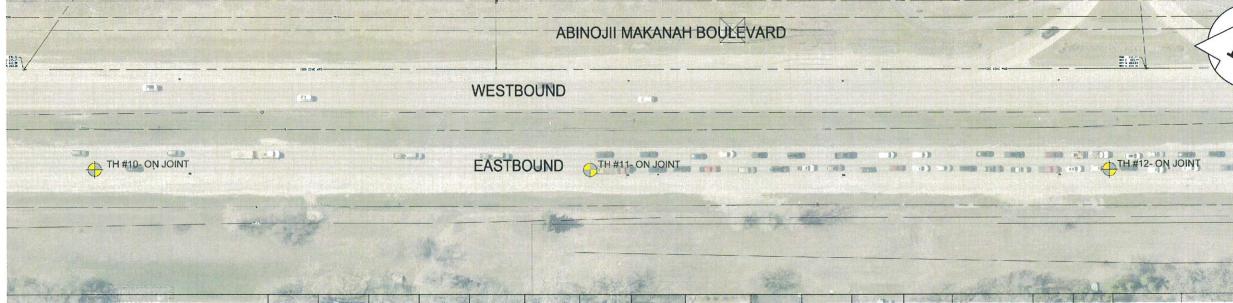


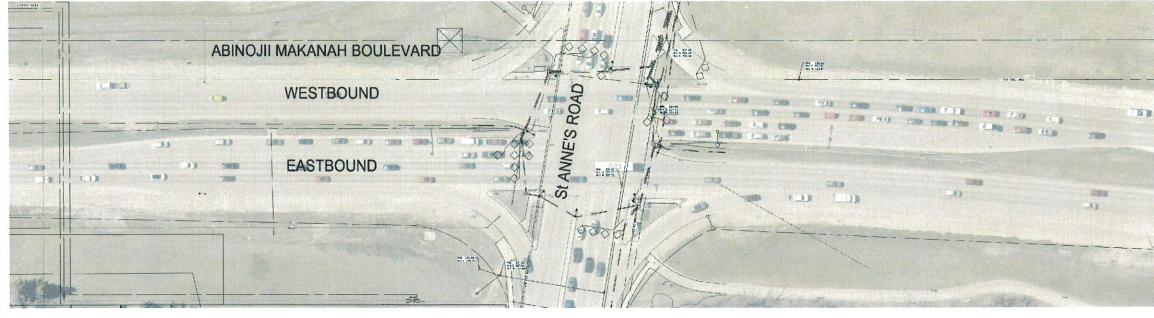


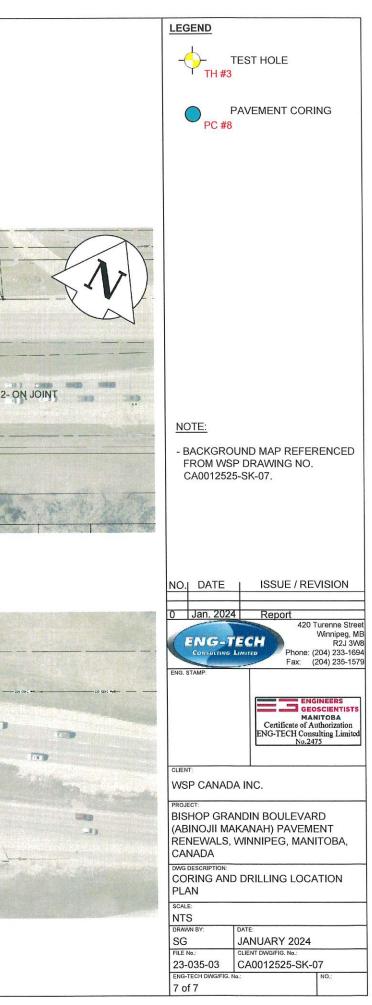
	TEST H	OLE & PAVEMENT	CORE LOCATION TAB	LE						
IOLE - IMBER	CORING COM DECEMBER 4, 5, UTM COOI	6, AND 7, 2023	LOCA	TION DESCRIPTIONS						
	UTM	14U	-							
-H #8	5521567	636401	EB MEDIAN LANE, 0	.8 M NORTH OF € OF LANE						
<sup>-</sup> H #9	5522044	636534	EB CURB LANE, 0.5	M NORTH OF & LANE						
PC #4	5521811	636133	EB MEDIAN LANE, C	N €LANE						
PC #5	5521887	636267	WB MEDIAN LANE,	ON € OF LANE						
	DAKOTA STREET	a state of the sta				PC #4 - ON SLAB	JII MAKANA WESTBOUI			
~~~			=====							
							Hele			
	A THE			ABINOJ	II MAKANAH BOULEVA	ARD		A	Z	2
		•			/ESTBOUND					•
-0	0	-1) (200	1 ed	⊕ <sup>TH #8- ON JOINT</sup> , E	ASTBOUND			. <b>Ф</b> тна	#9- ON JOINT	
	D.			➡ <sup>TH #8- ON JOINT</sup>	ASTBOUND			<b>⊕</b> ™	#9- ON JOINT	



[	TEST H	OLE & PAVEMENT	CORE LOCATION TABLE			
		/PLETED ON , 6, AND 7, 2023				
NUMBER	UTM COC	RDINATE	LOCATION DESCRIPTIONS			
	UTM	14U				
TH #10	5522130	636686	EB CURB LANE, ON € OF LANE			
TH #11	5522187 636788		EB CURB LANE, ON € LANE			
PC #12	5522267	636929	EB CURB LANE, ON €LANE			

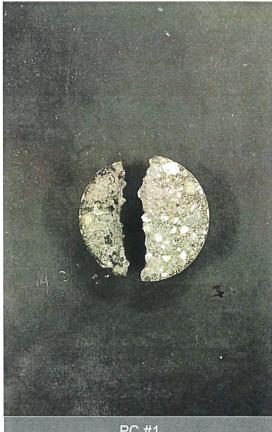






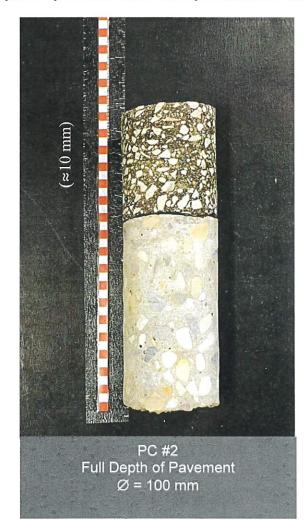
## Photograph 1: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



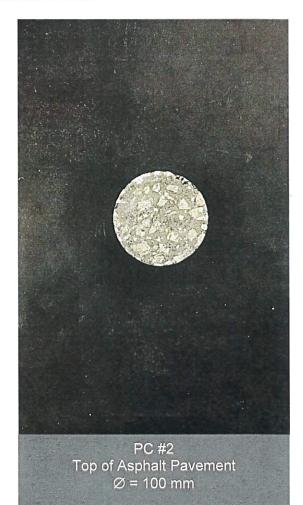


PC #1 Top of Asphalt Pavement Ø = 150 mm

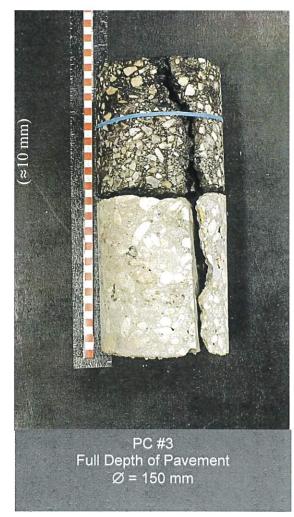




## Photograph 2: Specimen from Bishop Grandin Boulevard, Eastbound Acceleration Lane



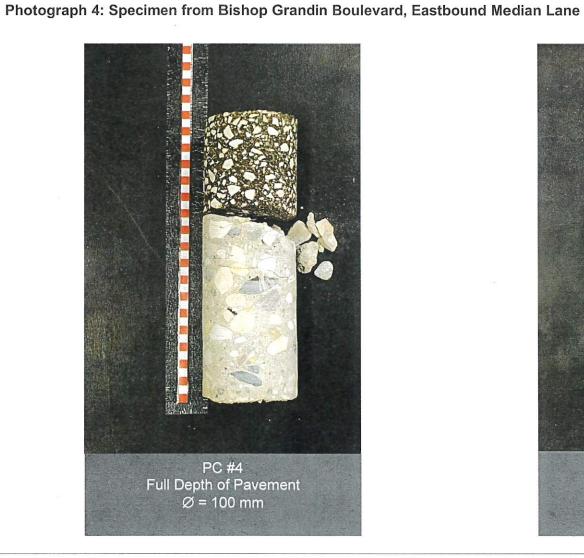








## Photograph 3: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane





Top of Asphalt Pavement  $\emptyset = 100 \text{ mm}$ 



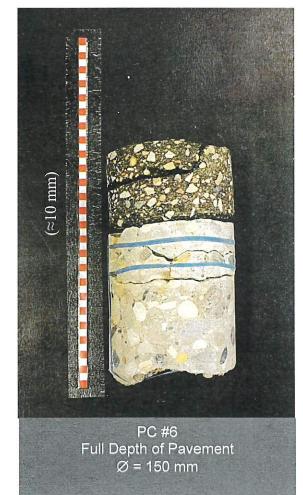


## Photograph 5: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane











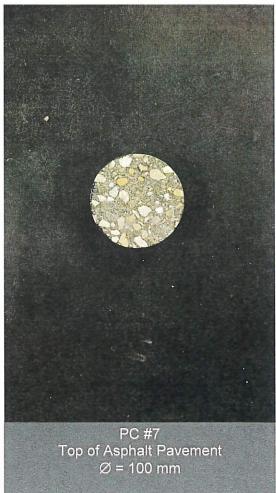


Photograph 6: Specimen from Bishop Grandin Boulevard, Westbound Lane Longitudinal Joint between Lanes

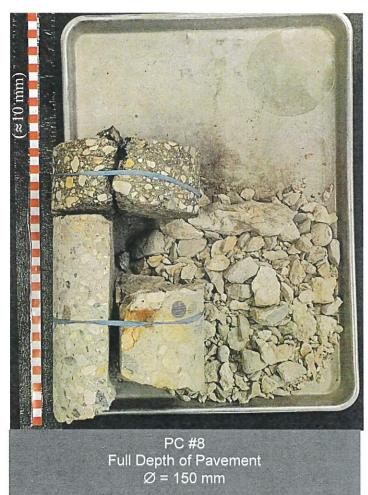
Photograph 7: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

File No.: 23-035-03 Page 7

# PC #7 Full Depth of Pavement $\emptyset$ = 100 mm





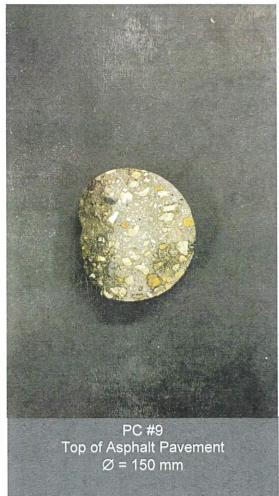






Photograph 8: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

# PC #9 Full Depth of Pavement Ø = 150 mm

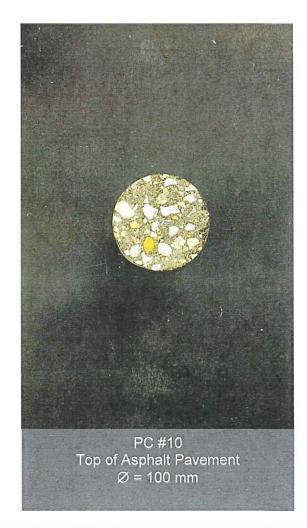




Photograph 9: Specimen from Bishop Grandin Boulevard, Westbound Middle Lane

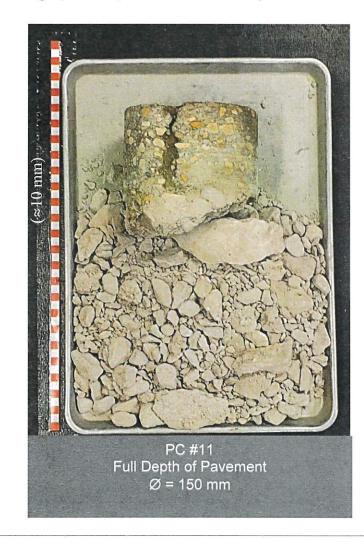
## Photograph 10: Specimen from Bishop Grandin Boulevard, Westbound Middle Lane







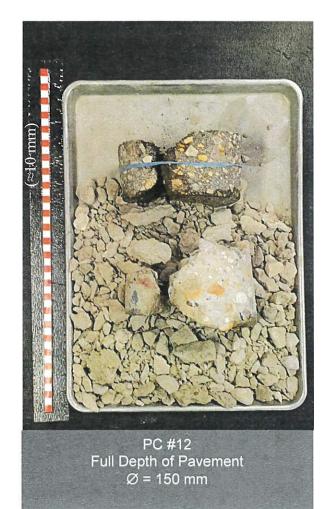
## Photograph 11: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane







## Photograph 12: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane







Photograph 13: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



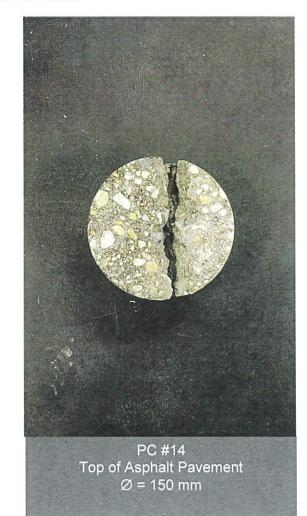
PC #13 Top of Asphalt Pavement

 $\emptyset = 100 \text{ mm}$ 

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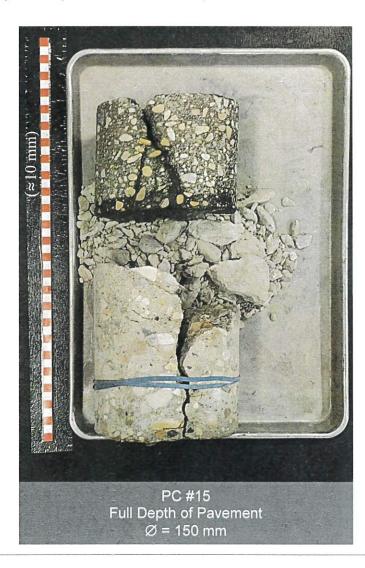
PC #14 Full Depth of Pavement  $\varnothing = 150 \text{ mm}$ 





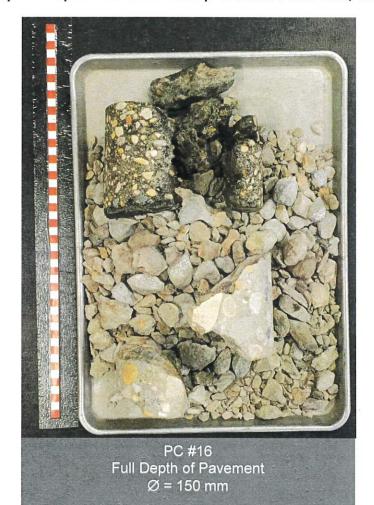
Photograph 14: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

## Photograph 15: Specimen from Bishop Grandin Boulevar, Westbound Median Lane









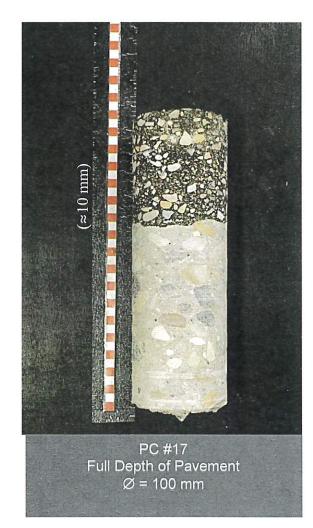


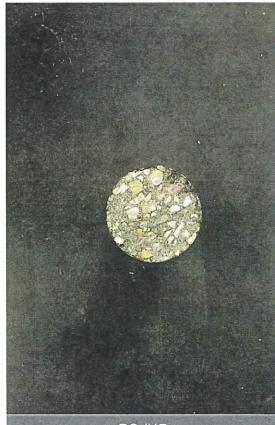


## Photograph 16: Specimen from Bishop Grandin Boulevard, Westbound Median Lane

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## Photograph 17: Specimen from Bishop Grandin Boulevard, Westbound Median Lane



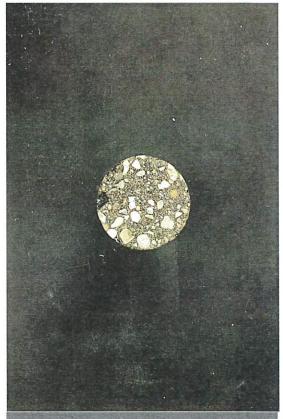


PC #17 Top of Asphalt Pavement Ø = 100 mm



Photograph 18: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



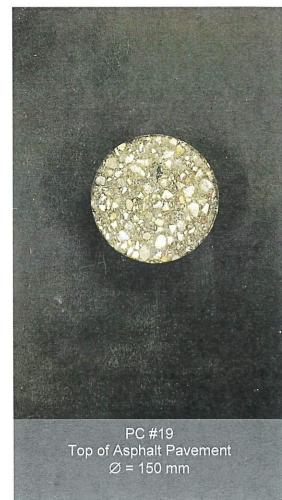


PC #18 Top of Asphalt Pavement Ø = 100 mm



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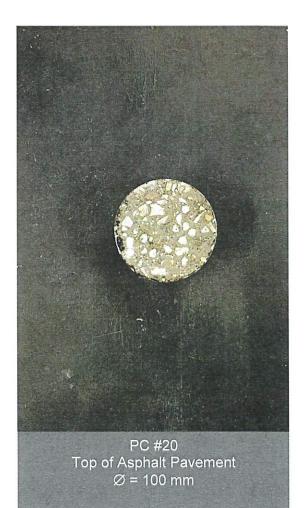




Photograph 19: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane

## Photograph 20: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



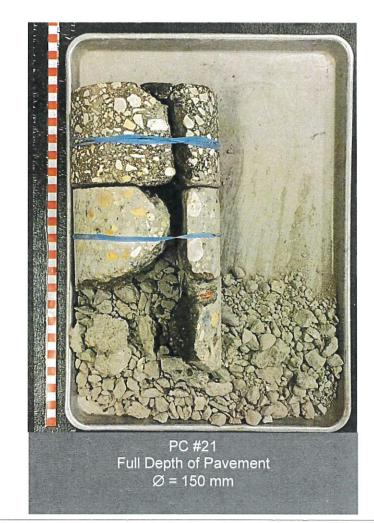




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Photograph 21: Specimen from Bishop Grandin Boulevard, Westbound Curb Lane



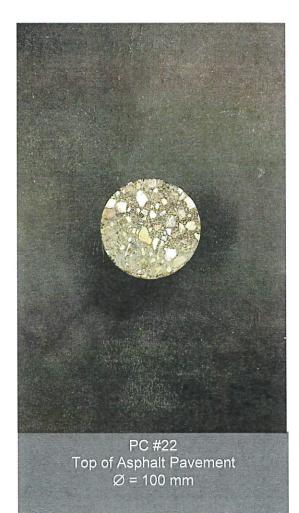




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Photograph 22: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



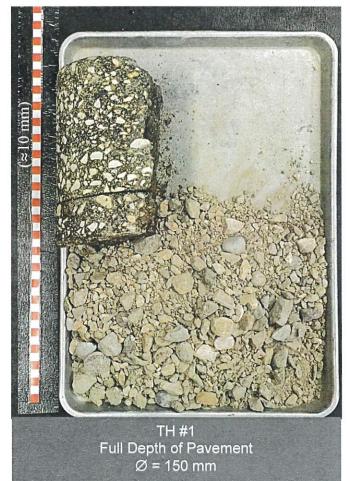


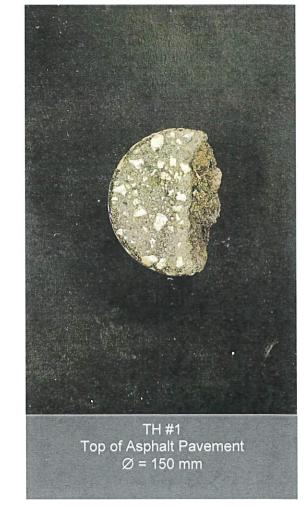


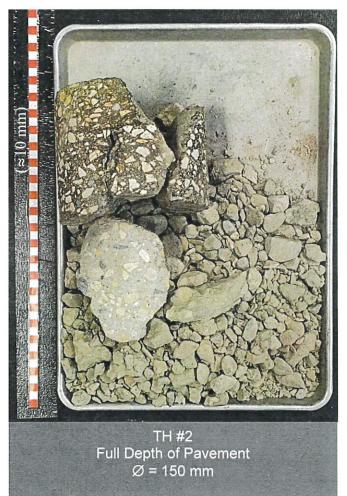
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Photograph 23: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane

File No.: 23-035-03 Page 23











# Photograph 24: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

Photograph 25: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

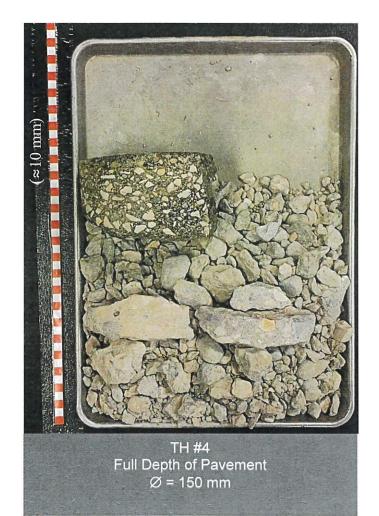
TH #3 Full Depth of Pavement Ø = 150 mm





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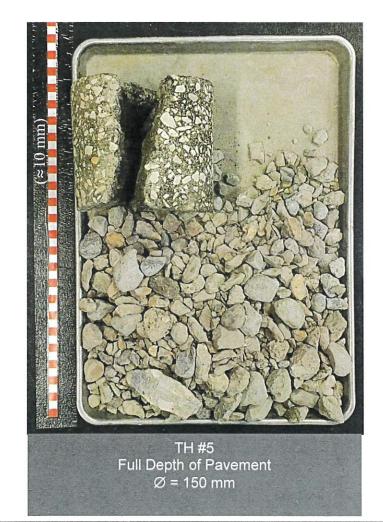
Photograph 26: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







Photograph 27: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







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Photograph 28: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



TH #6 Full Depth of Pavement  $\emptyset$  = 150 mm





Photograph 29: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane



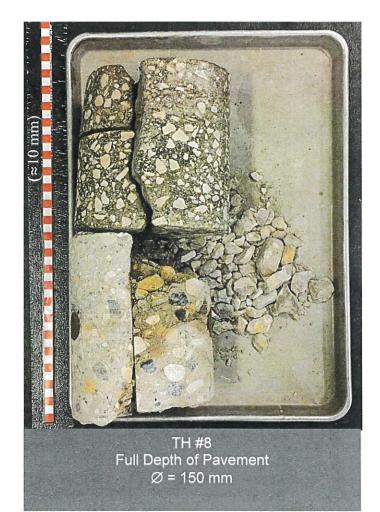
Full Depth of Pavement  $\emptyset = 150 \text{ mm}$ 



Top of Asphalt Pavement  $\emptyset = 150 \text{ mm}$ 



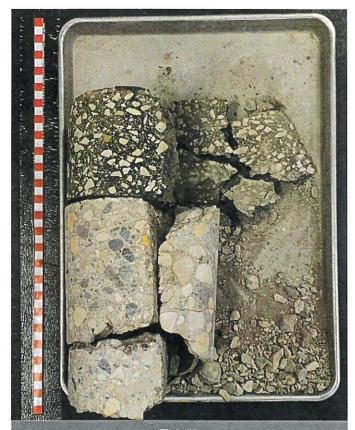
Photograph 30: Specimen from Bishop Grandin Boulevard, Eastbound Median Lane







Photograph 31: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane

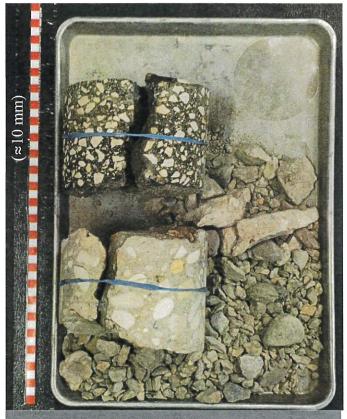


TH #9 Full Depth of Pavement Ø = 150 mm





Photograph 32: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



TH #10 Full Depth of Pavement Ø = 150 mm



Top of Asphalt Pavement  $\emptyset = 150 \text{ mm}$ 



Photograph 33: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



Ø = 150 mm



Top of Asphalt Pavement Ø = 150 mm



Photograph 34: Specimen from Bishop Grandin Boulevard, Eastbound Curb Lane



Ø = 150 mm



**Top of Asphalt Pavement**  $\emptyset = 150 \text{ mm}$ 



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Location: See Figure 1

Client: WSP Canada Inc.

Site: EB Abinojii Mikanah Blvd, Winnipeg, MB

File No.: 23-035-03

Water Elevation: --

Date Drilled: December 4, 2023

Grade Elevation: 100.0 m

Engineering And TestingLocation: See Figure 1water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

		SUBSURFACE PROFILE		S	AMPL	E DAT	A	_		SHEAR ENGTH	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	nc
0.0-		Ground Surface Asphalt (190 mm)	100.0						-		
-		Concrete (155 mm)									
-		<i>Fat Clay</i> - dark brown, moist, stiff, high plastic, trace silt, trace sand, trace gravel.	-	S1	1	31.0		•			
- 1.0-	-		99.0-	S2	1	30.5					
-			-	<b>S</b> 3	1	31.8	1				
-		- below 1.5 m medium brown, stiff, trace silt.	_	S4	\$	40.3		•			
2.0-		<i>Clay</i> - light brown, moist, very stiff, high plastic. - below 2.2 m medium brown, stiff.	98.0-	S5	\$	39.5					
-			_	S6		44.1					
3.0-	-	End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	97.0-			-			-		
4.0-			96.0-						-		
-	-		-								
5.0-			95.0-						-		
Lo	ogge	CH Consulting Limited       Drilled By         ed by: DO       Drill Rig:         wed by: ①       Auger Siz	Lone Sta	ar T1,	A+			nited Completion Dep Completion Ele Sheet: 1 of 1			m
SA	AMPLE TYPE SPLIT BARREL SHELBY TUBE SAUGER CUTTINGS SPLIT SPOON										



Client: WSP Canada Inc.

Location: See Figure 3

File No.: 23-035-03

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba

Grade Elevation: 100.0 m Water Elevation: --

Engineering And Testing

		SUBSURFACE PROFILE		S	AMPL	E DAT	A	_		SHEAR	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	STRE Leu	Torvane	(kPa)
0.0-		Ground Surface	100.0	_					-		
-		Asphalt (85 mm) Concrete (200 mm)	1 -	_							
-	-	<i>Fat Clay</i> - dark brown, moist, stiff, high plastic, silt, trace sand, trace gravel.	-	- S1	\$	34.7		•			
- 1.0-			99.0-	S2	1	33.5		•			
1.0			99.0	- S3	1	34.6		•	-		
-			-								
-				<b>S</b> 4	•	29.6					
-		Clay - medium brown, moist, firm, high plastic,									
2.0-		silty. - below 2.1 m light brown.	98.0-	S5		27.9		<b></b>			
_	11	bolow 2.1 might brown.		<b>S</b> 6		21.3					
-	11			_							
- 3.0-	-	End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and	97.0-	-					-		
-		gravel and patched with cold mix asphalt upon completion of drilling.									
4.0-			96.0-	-					_		
-			8	-							
-				-							
-				-							
5.0-			95.0-								
	TEC	CH Consulting Limited			0				4.0-	,	
Lo	ogge	by: P7	By: ENG- : Lone St			sultir	ig Lir	nited Completion Dep Completion Elev			n
Re	evie					Stem		Sheet: 1 of 1			
SA	Auger Size: 100 mm Solid Stem Sheet: 1 of 1 AMPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON										



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And TestingLocation: See Figure 4water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

		SUBSURFACE PROFILE		S	AMPL	e dat	Ά			SHEAR	2
						(9			STRE	INGTH	(kPa)
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	nc
0.0-		Ground Surface	100.0					······			
_	3515	Asphalt (136 mm)	_	-							
-		Concrete (150 mm) Fat Clay - dark brown, moist, firm, high plastic, silt, trace sand, trace gravel, trace mica. - below 0.8 m stiff, trace gravel.	-	S1	\$	40.1		•			
1.0-		- below 0.0 m still, trace gravel.	99.0-	S2	5	28.8		•			
_			_	<b>S</b> 3		33.1		•			
_	*	01-11		-							
_	1	<i>Clay</i> - medium brown, moist, firm, high plastic,	-			-					
-		silty.	-	S4	1	34.8		•			
2.0-	1		98.0-	S5	1	36.4					
-	1		-								
_			1 <u>-</u>	S6	1	43.7		•			
-	1		-			-					
- 3.0- -		End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	97.0-	-							
			-	-							
4.0-			96.0-								
4.0			90.0-								
-			-								
_			-								
5.0-			95.0-								
ENG-	TEC	CH Consulting Limited		FOU	0	ou dat		mitod Completion D	the or	7	I
Lo	gge	ed by: DO Drilled By				suitir	ig Lin	mited Completion Dep Completion Elev			n
Re	evie					Stem		Sheet: 1 of 1		01.01	
SA	Auger Size: 100 mm Solid Stem Sheet: 1 of 1 MPLE TYPE SPLIT BARREL SHELBY TUBE SHELBY CUTTINGS SPLIT SPOON										



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Water Elevation: --

Date Drilled: December 4, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Engineering And Testing

		SUBSURFACE PROFILE		S/	AMPL	E DAT	A	-		SHEAF	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	nc
0.0-		Ground Surface	100.0						-		
_		Asphalt (110 mm) Concrete (200 mm)	-								
_		Fat Clay	_								
_		- dark brown, moist, stiff, high plastic, silt, trace sand, trace gravel, trace mica.	-	S1	1	32.0		,			
- 1.0-		- below 0.9 m very stiff, trace silt.	99.0-	S2	1	24.4		•	_		
_			-	S3	\$	22.9		<b>†</b>			
		0 km	-	S4	\$	35.4		-			
2.0-		<i>Clay</i> - medium brown, stiff, moist, high plastic.	98.0-	S5	1	38.3		· · · · · · · · · · · · · · · · · · ·	-		
_			_	S6	1	44.2		•			
- 3.0— -		End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	- 97.0- -						-		
			-								
4.0-			96.0-								
4.0-			96.0-						1		
			2								
5.0-			95.0-					iiiiii	1		
Lo	gge	H Consulting Limited Drilled By d by: DO Drill Rig: I wed by: 00 Auger Siz	Lone Sta	ar T1/	4+		g Lin	nited Completion Dep Completion Elev Sheet: 1 of 1			m
SAMPLE TYPE											



Client: WSP Canada Inc.

Location: See Figure 4

File No.: 23-035-03

Date Drilled: December 5, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing

		SUBSURFACE PROFILE		S	AMPL	E DAT	A			SHEAR	
						(9)			STRE	ENGTH	(kPa)
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	nc
0.0-		Ground Surface	100.0	-					-		
-		Asphalt (75 mm) Concrete (200 mm) Fat Clay - dark brown, moist, firm, high plastic, silt, trace sand, trace gravel.	-	S1	1	39.3		•			
-			-			20.0					
1.0-			99.0-	S2		38.6			-		
_			-	S3	\$	34.8		, f			
				S4	5	29.6		•			
2.0-		<i>Clay</i> - medium grey, moist, firm, high plastic, silty.	98.0-	<b>S</b> 5	\$	25.0			-		
-		-below 2.1 m, brown, firm	-	S6	1	21.9					
- 3.0— -		End of Test Hole - end of test hole at 2.7 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	 97.0 -								
4.0-			96.0-								
-			-	-							
-			-	_							
-			-								
_			-								
5.0-		H Consulting Limited	95.0	1				iiiiii	-		
Lo	gge	d by: DO Drilled By: DO Drill Rig: L	one Sta	ar T1/	4+		g Lin	nited Completion Dep Completion Elev Sheet: 1 of 1			n
SAI	Auger Size: 100 mm Solid Stem Sheet: 1 of 1 MPLE TYPE SPLIT BARREL SHELBY TUBE AUGER CUTTINGS SPLIT SPOON										



Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m Location: See Figure 6

Water Elevation: --

Engineering And TestingLocation: See Figure 6water Elevation: --Solutions That Work For YouProject: Bishop Grandin Boulevard (Abinojii Mikianah) Pavement Renewals

		SUBSURFACE PROFILE		SA	AMPL	E DAT	A	-		SHEAF	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	nc
0.0-		Ground Surface Asphalt (169 mm)	100.0								
-		Concrete (195 mm)	_								
_		Fat Clay - black, moist, stiff, high plastic, silt, trace gravel.	-	S1	\$	29.6		•			
1.0-			- 99.0	S2	1	29.6		•	_		
-			-	<b>S</b> 3	1	29.6		<b>•</b>			
		<i>Clay</i> - light brown, moist, stiff, high plastic, silty.	-								
-		- below 1.8 m, soft.	-	<b>S4</b>	1	23.3		•			
2.0-			98.0-	S5	1	22.5			-		
		- below 2.3 m, stiff.	-	S6	1	32.5					
3.0-		End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	- - 97.0 -			-					
 4.0 	-		- - 96.0 - -	-							
5.0-			- - 95.0 –								
Lo	gge	H Consulting Limited Drilled By: ed by: PZ Drill Rig: L wed by: 0	one Sta	ar T1/	4+			nited Completion Dep Completion Ele Sheet: 1 of 1			m
SAI	SAMPLE TYPE SPLIT BARREL SHELBY TUBE SAUGER CUTTINGS SPLIT SPOON										



Client: WSP Canada Inc.

Location: See Figure 6

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

Engineering And Testing

	P	SUBSURFACE PROFILE		SA	MPL	E DAT	A			SHEAR	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%)	STRE	Torvane	(kPa) O
0.0-		Ground Surface	100.0								
_		Asphalt (107 mm) Concrete (142 mm)	-								
-		Fat Clay - dark brown, moist, very stiff, high plastic, silt, trace sand, trace gravel.	-	S1	\$	32.7		•			
1.0-			99.0-	S2	5	32.7		•			
_			-	S3	\$	33.7					
-		<i>Clay</i> - light brown, moist, stiff, silty.		S4	\$	40.6					
2.0-			98.0-	<b>S</b> 5	5	39.9		••••••	1		
3-			-	S6	\$	45.8					
 3.0 		End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	- - 97.0- - -						-		
-			-	-							
4.0-			96.0-						_		
-			-	-							
			-								
-											
5.0-			95.0-						-		
Lo	gge	H Consulting Limited Drilled By: d by: PZ Drill Rig: I ved by: Auger Siz	one Sta e: 100 r	ar T1/ mm Se	۹+ olid s	Stem	g Lin	Completion Elev Sheet: 1 of 1	ation:	97.5 r	
SAI	MPL	E TYPE SPUT BARREL	S	HELB	ΥT	JBE	1	AUGER CUTTINGS	SPLIT	SPO	ON



Location: See Figure 7

Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

Water Elevation: --

**Engineering And Testing** 

		SUBSURFACE PROFILE		SA	MPL	e dat	A			SHEAR	
						(%			STRE	NGTH	(kPa)
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	UC
0.0-		Ground Surface	100.0								
-		Asphalt (105 mm) Concrete (200 mm)	-								
-		Fat Clay - medium brown, moist, stiff, high plastic, silt, trace sand, trace mica. - below 0.7 m very stiff.	-	S1	\$	37.3		•			
1.0-	***		99.0-	S2	5	32.2		i			
-	*			<b>S</b> 3		35.5					
r- 1		<i>Clay</i> - light brown, moist, very stiff, high plastic.									
33-	1		-	S4	Ъ	35.6		1			
2.0-			98.0-	S5	\$	36.1		•			
-	1		-	S6		36.3		•			
3.0 	~~	End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	- 97.0- - -								
			-								
4.0-			96.0-								
			-								
5.0-			95.0-								
Constanting?	TEC	H Consulting Limited							1		
Lo	gge	d by: PZ Drilled By: Drill Rig: I	one Sta	ar T1/	+		g Lin	nited Completion Dep Completion Elev Sheet: 1 of 1			n
	eviewed by:     Auger Size:     100 mm Solid Stem     Sheet:     1 of 1       MPLE TYPE     SPLIT BARREL     SHELBY TUBE     AUGER CUTTINGS     SPLIT SPOON										



Location: See Figure 7

Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Site: EB Abinojii Mikanah, Winnipeg, Manitoba

Water Elevation: --

Grade Elevation: 100.0 m

**Engineering And Testing** 

		SUBSURFACE PROFILE		S	AMPL	E DAT	A			SHEAF	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)	Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	UC
<mark>0.0</mark> -		Ground Surface Asphalt (90 mm)	100.0						-		
-	****	Concrete (200 mm)	-								
		<i>Fat Clay</i> - medium brown, moist, stiff, silt, trace sand, trace gravel.	-	S1	1	31.1		•			
- 1.0-		- below 1.0 m black, very stiff.	- 99.0	S2	1	31.0					
_		- below 1.0 m black, very sun.	=	<b>S</b> 3	\$	34.3					
-		<i>Clay</i> - light brown, moist, stiff, silty.	-			24.0					
- 2.0 -		- below 1.8 m medium brown.	- 98.0 <i>—</i>	S4		24.6 33.8					
-			-			-					
		End of Test Hole - end of test hole at 2.5 m below grade. - no seepage or sloughing encountered during drilling. - test hole backfilled with auger cuttings and gravel and patched with cold mix asphalt upon completion of drilling.	97.0 - - - 96.0 - - - -	S6	•	40			-		
5.0-	TEC	H Consulting Limited	95.0 -					iiiiii	-		
Lo	gge	H Consulting Limited Drilled By: d by: PZ Drill Rig: L wed by: 10 Auger Siz	one Sta	ar T1/	4+		g Lin	nited Completion Dep Completion Elev Sheet: 1 of 1			n
SAN	AMPLE TYPE										



Client: WSP Canada Inc.

File No.: 23-035-03

Date Drilled: December 7, 2023

Engineering And Testing Loca

Location: See Figure 7 Water Elevation: --

Solutions That Work For You Project: Bishop Grandin Boulevard (Abinojii Mikanah) Pavement Renewals

Site: EB Abinojii Mikanah, Winnipeg, Manitoba Grade Elevation: 100.0 m

		SUBSURFACE PROFILE			SAMF	PLE D					SHEAR ENGTH	
Depth (m)	Soil Symbol	Description	Elevation (m)	Sample No.	Sample Type	Moisture Content (%)		Blows/300 mm	Moisture Content (%) PL IXI LL 20 40 60 80	P. Pen	Torvane	UC
0.0-		Ground Surface	100.	C						-		
and the	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Asphalt (95 mm)										
	***	Concrete (200 mm)		1								
_		<i>Fat Clay</i> - dark brown, moist, stiff, high plastic, trace sand, trace gravel, trace mica.	, <mark>silt</mark> ,	- - S1	1	29	.2		•			
-	*			S2	1	33	.4					
1.0-		- below 1.0 m very stiff.	99.	- S3		32	8					
_	*											
-		<ul> <li>below 1.5 m black, firm, trace sand, gravel.</li> </ul>	trace	-	-							
-				S4		32	.0		<b>f</b>			
2.0-	*		98.	0- <u>S5</u>	1	29	.3			-		
_				- - S6		29	.3					
3.0-		End of Test Hole - end of test hole at 2.5 m below grad - no seepage or sloughing encounterd during drilling. - test hole backfilled with auger cuttin gravel and patched with cold mix asp upon completion of drilling.	ed gs and 97.1	-								
- - 4.0-			96.	- - 0								
-				-								
5.0-			95.	0-								
ENG- Lo	gge	D	rilled By: ENG rill Rig: Lone uger Size: 10	G-TECI	1A+			Lim	nited Completion Dep Completion Elev Sheet: 1 of 1			m
	AMPLE TYPE											



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#### OBTAINING AND TESTING DRILLED CORES

Test Method: CSA A23.2-14C, 9C



WSP Canada 1600 Buffalo F Winnipeg, Ma R3T 6B8	Place			File No.: Ref. No.:	23-035-03 23-35-3-2
Attention:	Scott Suderman,	C.E.T., P. Eng.			
Project:	BISHOP GRAND MANITOBA CAN		D (ABINOJII MIKANAH) PA	VEMENT RENEWA	ALS, WINNIPEG,
Date Cored:	Dec 6 to 13/23	Cored By:	ENG-TECH (Kyle Zebiere)	Page:	1 of 2
Date Received	: Dec 6 to13/23	Received By:	ENG-TECH (Kyle Zebiere)	Structure:	Road pavement
Age of Concret	e: -	Concrete Des	ign Strength: -	Direction of Load:	Parallel

Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 (moist)

Strength Specification: Minimum 85% of design strength on an average of 3 cores - no single core less than 75% as per CSA A23.1 Clause 4.4.2.2.2.2

Core No.	Location on Structure	Ler Cored (mm)	gth Tested (mm)	Average Diameter (mm)	Date Tested (m/d/y)	Compressive Strength (MPa)	Type of Fracture	Tested By ENG-TECH
PC #2	Eastbound acceleration lane, Northing: 5521630 Easting: 635830 Centerline of lane	195	184	100	Jan 17/24	46.53*	1	Rey Batac
PC #4	Eastbound median lane, Northing: 5521811 Easting: 636133 Centerline of lane	200	121	100	Jan 17/24	50.33*	1	Rey Batac
PC #7	Westbound median lane, Northing: 5520783 Easting: 634164 Centerline of lane	175	113	100	Jan 17/24	58.22*	1	Rey Batac
PC #10	Westbound middle lane, Northing: 5520968 Easting: 634484 Centerline of lane	190	187	100	Jan 17/24	52.65*	1	Rey Batac
PC #13	Westbound curb lane, Northing: 5521067 Easting: 634662 Centerline of lane	190	188	100	Jan 17/24	63.21*	1	Rey Batac

Reporting of these results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. \*Denotes corrected strength for Length/Diameter ratio less than 2.0 to 1.0. Type of fracture indicated when cylinder fails to meet 85% of design strength or if different than CSA A23.2-19-9C Table 3 Type 1.

Deviations from test procedure: None

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**OBTAINING AND TESTING** DRILLED CORES



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#### Project:

BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, MANITOBA CANADA 23-035-03 File No .: 23-35-3-2 Ref. No.: Date Cored: Dec 6/23 Page: 2 of 2

	A CONTRACTOR OF A CONTRACTOR							
Core No.	Location on Structure	Len Cored (mm)	ngth Tested (mm)	Average Diameter (mm)	Date Tested (m/d/y)	Compressive Strength (MPa)	Type of Fracture	Tested By ENG-TECH
PC #17	Westbound median lane, Northing: 5521310 Easting: 635200 Centerline of lane	190	191	100	Jan 17/24	57.91*	1	Rey Batac
PC #18	Westbound curb lane, Northing: 5521634 Easting: 635779 Centerline of lane	160	147	100	Jan 17/24	66.65*	1	Rey Batac
PC #20	Westbound middle lane, Northing: 5521708 Easting: 635910 Centerline of lane	190	183	100	Jan 17/24	58.44*	1	Rey Batac
PC #22	Eastbound median lane, Northing: 5521533 Easting: 635640 0.5 meters North of centerline of lane	200	165	100	Jan 17/24	63.79*	1	Rey Batac

Comments: All core ends were trimmed prior to compressive strength testing and were end prepared using a high strength capping compound.

Deviations from test procedure: none

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## LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



WSP Canada Inc. File No.: 23-035-03 1600 Buffalo Place Winnipeg, Manitoba Ref. No.: 23-35-3-4 **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, Project: MANITOBA, CANADA Source: Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) River Road to St. Mary's Road Material Description: Clay Test Hole No.: 1 Date Sampled: Dec 4/23 Date Received: Dec 4/23 **ENG-TECH** Sample No.: 2 Sampled By: Date Tested: Dec 20/23 Depth: 0.9 m (Denys Ostrovskyi) 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) 100 90 80 1.5 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 or OL CL MH or OH 10 ML or OL 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol Liquid Limit (%): 75 Plastic Limit (%): 19 Plasticity Index (%): 56 Percentage of sand particles retained on 0.425mm sieve: 6.0

Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 30.5 Comments:

Email: WSP Canada Inc. Contact Group

may apply.





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## LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



WSP Canada Inc. File No.: 23-035-03 1600 Buffalo Place Winnipeg, Manitoba Ref. No.: 23-35-3-5 **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, **Project:** MANITOBA, CANADA Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) River Road to St. Mary's Road Source: Material Description: Clay Date Sampled: Date Received: Test Hole No.: 3 Dec 4/23 Dec 4/23 Sample No.: 3 Sampled By: **ENG-TECH** Date Tested: Dec 20/23 (Denys Ostrovskyi) Depth: 1.2 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) 100 90 80 20 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 CL or OL MH or OH ML or OL 10 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol 80 Plastic Limit (%): 27 Plasticity Index (%): 53 Liquid Limit (%): Percentage of sand particles retained on 0.425mm sieve: 6.0 Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 34.0 Comments:

Email: WSP Canada Inc. Contact Group



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## LIQUID LIMIT, PLASTIC LIMIT, AND PLASTICITY INDEX OF SOILS



File No.: 23-035-03 Ref. No.: 23-35-3-9

1600 Buffalo Place Winnipeg, Manitoba **R3T 6B8** Attention: Scott Suderman, C.E.T., P. Eng. BISHOP GRANDIN BOULEVARD (ABINOJII MIKANAH) PAVEMENT RENEWALS, WINNIPEG, **Project:** MANITOBA, CANADA Eastbound Bishop Grandin Boulevard (Abinojii Mikinah) Dakota Street To St. Anne's Road Source: Material Description: Clay Test Hole No.: 10 Date Sampled: Dec 4/23 Date Received: Dec 4/23 Sample No.: 2 Sampled By: **ENG-TECH** Date Tested: Dec 20/23 (Denys Ostrovskyi) Depth: 0.9 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) 100 90 80 70 Plasticity Index (%) 60 50 CH or OH 40 30 20 -01 or MH or OH VIL or OL 10 0 0 10 20 30 40 50 60 70 80 90 100 110 Liquid Limit (%) Group Symbol 88 Plastic Limit (%): Plasticity Index (%): Liquid Limit (%): 31 57 Percentage of sand particles retained on 0.425mm sieve: 4.0 Classification: ASTM D2487, CH, fat clay ASTM D3282: A-7-5 (64)

As Received Moisture Content (%): 32.2 Comments:

Email: WSP Canada Inc. Contact Group



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

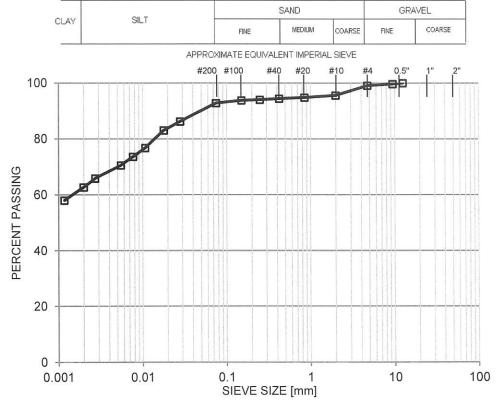


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## PARTICLE SIZE ANALYSIS

"Engineering and Testing Solutions That Wo	rk for You"				
WSP Canada Inc.			File No.: 23-035-03		
1600 Buffalo Place			Ref. No.: 23-35-3-6		
Winnipeg, Manitoba R3T 6B8					
KJI OBO					
Attention: Scott Suderman, C.E	.T., P. Eng.				
Project: BISHOP GRANDIN E	OULEVARD (ABINO	JII MIKANAH) PAVE	EMENT RENEWALS, WINNIPEG,		
MANITOBA, CANAD		•••••••••••••••••••••••••••••••••••••••	,		
	Grandin Boulevard (Abi	noiii Mikinah) River Ro	pad to St. Marv's Road		
	Chanan Boalovara (Abh				
Material Description: Clay					
Test Hole No.: 1	Date Sampled:	Dec 4/23	Sampled By: ENG-TECH (Denys Ostrovskyi)		
Sample No.: 2	Date Received:	Dec 4/23	Sample Type: Auger cutting		
Depth: 0.9 m	Date Tested:	Dec 20/23	Tested By: ENG-TECH (Tim Christensen)		
Test Method: ASTM D7928	Drying Method:	Air	Specific Gravity: Estimated 2.7		
Method Used: -	<b>Dispersion Proce</b>	ess: Stirrer / Tipping	Separating Sieve Size (mm): 2.0		
Dispersion Device: Apparatus A: Humboldt Mechanical Analysis Stirrer Dispersion Time (min.): 3					



SIEVE PERCENT SIZE (mm) PASSING 12.5 100 9.5 100 4.75 99 2.0 96 0.850 95 0.425 94 0.250 94 0.150 93.8 0.075 93 0.028 86 0.018 83 0.011 77 0.008 74 0.005 71 0.003 66 0.002 63 0.001 58

 Percent of:
 GRAVEL (0.9 %), SAND (6.3 %), SILT (30.0 %), CLAY (62.7 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-6 (57)

As Received Moisture Content (%): 30.5 Comments:

Email: WSP Canada Inc. Contact Group

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

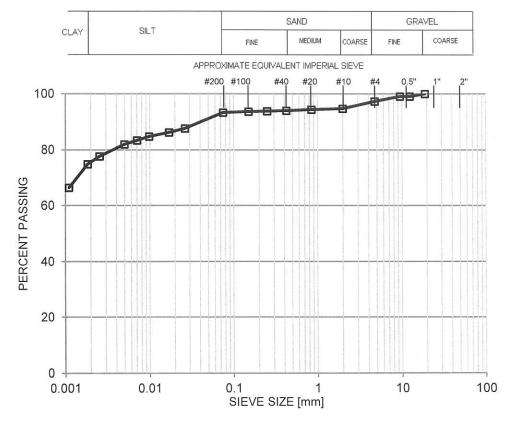
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## PARTICLE SIZE ANALYSIS

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WSP Canada I	nc.			File No.: 23-035-03
1600 Buffalo Pl				Ref. No.: 23-35-3-7
Winnipeg, Man R3T 6B8	itoba			
N31 0B0				
Attention: Sco	ott Suderman, C.E.T.,	P. Eng.		
Project: BIS	HOP GRANDIN BOU	LEVARD (ABINC	JII MIKANAH) PAVE	EMENT RENEWALS, WINNIPEG,
MA	NITOBA, CANADA	1.75	178-4	81 U.S
Source:	Eastbound Bishop Gran	ndin Boulevard (Ab	inojii Mikinah) River Ro	oad to St. Mary's Road
Material Descrip	otion: Clay			
Test Hole No.:	3	Date Sampled:	Dec 4/23	Sampled By: ENG-TECH (Denys Ostrovskyi)
Sample No.:	3	Date Received:	Dec 4/23	Sample Type: Auger cutting
Depth:	1.2 m	Date Tested:	Dec 20/23	Tested By: ENG-TECH (Tim Christensen)
Test Method:	ASTM D6913 & D7928	Drying Method:	Air	Specific Gravity: Estimated 2.7
Method Used:	А	<b>Dispersion Proc</b>	ess: Stirrer / Tipping	Separating Sieve Size (mm): 2.0
<b>Dispersion Devi</b>	ce: Apparatus A: Hu	mboldt Mechanical	Analysis Stirrer	Dispersion Time (min.): 3
				and an and the second



SIEVE SIZE (mm)	PERCENT PASSING		
19.0	100		
12.5	99		
9.5	99		
4.75	97		
2.0	94.7		
0.850	94		
0.425	94		
0.250	94		
0.150	94		
0.075	93.3		
0.026	88		
0.017	86		
0.010	85		
0.007	83		
0.005	82		
0.003	78		
0.002	75		
0.001	66		

 Percent of:
 GRAVEL (2.7 %), SAND (4.0 %), SILT (17.7 %), CLAY (75.6 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-6 (57)
 As Descined Moisture Content (%):

As Received Moisture Content (%): 34.0 Comments:

Email: WSP Canada Inc. Contact Group

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



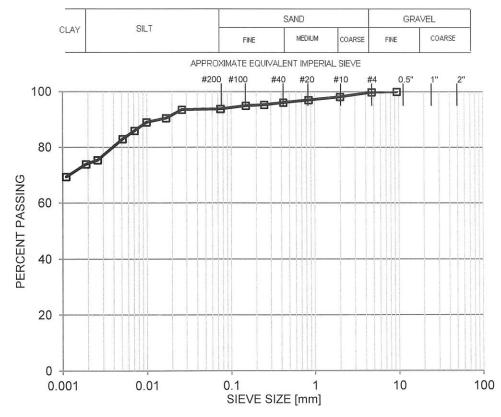
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## PARTICLE SIZE ANALYSIS

angine enig and re				
WSP Canada I				File No.: 23-035-03
1600 Buffalo Pl			Ref. No.: 23-35-3-10	
Winnipeg, Man	itoba			
R3T 6B8				
Attention: Sco	ott Suderman, C.E.T.,	P. Eng.		
Project: BIS	SHOP GRANDIN BOU	LEVARD (ABINC	) JII MIKANAH) PAVI	EMENT RENEWALS, WINNIPEG,
MA	NITOBA, CANADA	,		
Source:	Eastbound Bishop Grai	ndin Boulevard (Ab	inojii Mikinah) Dakota	Street To St. Anne's Road
Material Descrip	otion: Clay			
Test Hole No.:	10	Date Sampled:	Dec 4/23	Sampled By: ENG-TECH (Denys Ostrovskyi)
Sample No.:	2	Date Received:	Dec 4/23	Sample Type: Auger cutting
Depth:	0.9 m	Date Tested:	Dec 20/23	Tested By: ENG-TECH (Tim Christensen)
Test Method:	ASTM D7928	Drying Method:	Air	Specific Gravity: Estimated 2.7
Method Used:		<b>Dispersion Proc</b>	ess: Stirrer / Tipping	Separating Sieve Size (mm): 2.0
<b>Dispersion Dev</b>	ice: Apparatus A: Hu	mboldt Mechanica	Analysis Stirrer	Dispersion Time (min.): 3



SIEVE SIZE (mm)	PERCENT PASSING			
9.5	100			
4.75	100			
2.0	98			
0.850	97			
0.425	96			
0.250	95			
0.150	95			
0.075	93.8			
0.026	94			
0.017	90			
0.010	89			
0.007	86			
0.005	83			
0.003	75			
0.002	74			
0.001	69			

 Percent of:
 GRAVEL (0.2 %), SAND (6.0 %), SILT (19.6 %), CLAY (74.2 %)

 Classification:
 ASTM D2487, CH, fat clay

 ASTM D3282: A-7-5 (64)
 ASTM D3282: A-7-5 (64)

As Received Moisture Content (%): 32.2 Comments:

Email: WSP Canada Inc. Contact Group

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



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"Engineering and Testing Solutions That Work for You	n		an Council of Independent Laboratories crific tests as listed on www.ccil.com
WSP Canada Inc.		File No.:	23-035-03
1600 Buffalo Place Winnipeg, Manitoba R3T 6B8		Ref. No.:	23-35-3-11
Attention: Scott Suderman, C.E.T., P	. Eng.		
Project: BISHOP GRANDIN BOUL MANITOBA, CANADA	EVARD (ABINOJII MIKANAH) F	PAVEMENT RENEWALS	, WINNIPEG,
from TH1, S3,1.2m; TH2, S	Boulevard (Abinojii Mikinah) River R 2, 0.9m; TH 2, S3, 1.2m; TH3, S2, 0. S2, 0.9m; TH6, S3, 1.2m; TH7, S2, 0	9m; TH4, S2, 0.9m; TH4, S3,	
Material Type: Subgrade		Description: CH, clay	
Date Sampled: Dec 4 to 6/23	Date Received: Dec 12/23	Date Tested: Dec 27/23	
Sampled By: ENG-TECH (Denys Ostrovs	skyi) TM D698 ASTM D1557	Tested By: ENG-TECH	(Rey Betac )
	TM D698ASTM D1557 TM D4718		
	mpaction Method: Manual	Test Compaction Method:	А
		Material Oversize: 4.75 mm: 1.2 19.0 mm: -	% %
1440	1000% Sa	Dry Density (kg/m³) Moist	ure Content (%)
	Satura	1412	28.3
	1 ag	1438 1436	30.1 32.3
ີ ເພິ່ງ 1430	ation Est. Q	1409	34.0
1420		Maximum Dry Density (MI Optimum Moisture (C	
1410		MDD Correc OM Correc	
		Received Moisture Cont	tent: - %
1400 + 27 29 31 27 29 31 MOISTURE CONTEN	33 35 IT (PERCENT)		
Comments:			

Email: WSP Canada Inc. Contact Group





ENG-TECH CONSULTING LIMITED	420 Turenne Street Winnipeg, Manitoba R2J 3W8 engtech@mymts.net www.eng-tech.ca	MOISTURE-DENSITY RELATIONSHIP
"Engineering and Testing Solutions That Work for Y	ou"	Canadan 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.:23-035-03Ref. No.:23-35-3-13
Attention: Scott Suderman, C.E.T.,	P. Eng.	
Project: BISHOP GRANDIN BOU MANITOBA, CANADA	JLEVARD (ABINOJII MIKANAH) P	AVEMENT RENEWALS, WINNIPEG,
from TH8, S2, 0.9m; TH8		Street to St. Anne's Road. Composite sample 2m; TH10, S3, 1.2m; TH10, S4, 1.6m; TH11,
Material Type: Subgrade Date Sampled: Dec 6 to 8/23 Sampled By: ENG-TECH (Denys Ostro	Date Received: Dec 12/23	Description: CH, clay Date Tested: Dec 28/23 Tested By: ENG-TECH (Rey Betac )
	STM D4718	
Preparation Method: Moist C	Compaction Method: Manual	Test Compaction Method: A Material Oversize: 4.75 mm: 0.4 % 19.0 mm: - %
1400	100	Dry Density (kg/m³) Moisture Content (%)
(function of the second	ho Saturation Est. G	1361         30.3           1391         32.1           1382         33.8           1340         35.7
	<sup>3</sup> "i, i, i	Maximum Dry Density (MDD): 1393 kg/m <sup>3</sup> Optimum Moisture (OM): 32.6 %
1340		MDD Corrected: - kg/m <sup>3</sup> OM Corrected: - %
1320 28 30 32	34 36 38	Received Moisture Content: - %
MOISTURE CONTE	ENT (PERCENT)	
Comments:		

Email: WSP Canada Inc. Contact Group

**ENG-TECH Consulting Limited** 

Per Darci Babisky, C.E.T.

Operations Manager – Laboratory Ph: (204) 233-1694 Fx: (204) 235-1579

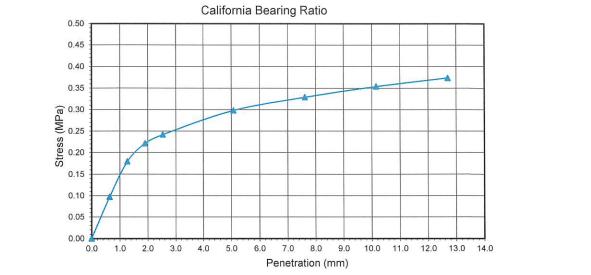




**CALIFORNIA BEARING RATIO** 

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WSP Canada Inc. 1600 Buffalo Place Winnipeg, Manitoba R3T 6B8						File No.: Ref. No.:	23-035-3 23-35-3-12	
Attention:	Scott S	Suderman, C.E	.T., P. Er	ng.				
Project:		P GRANDIN E OBA CANADA		ARD (ABI	NOJII MIKA	ANAH) PAVEMEN	T RENEWA	LS, WINNIPEG,
Source:	from Th	-11, S3,1.2m; TH	2, S2, 0.9	m; TH 2, S	3, 1.2m; TH	River Road to St. M 3, S2, 0.9m; TH4, S 1; TH7, S2, 0.9m an	2, 0.9m; TH4	, S3, 1.2m; TH5,
Material Type:		Subgrade				Date Sampled:	Dec 4 to	6/24
Material Desci	ription:	CH, clay				Date Received:	Dec 12/2	4
Sampled By:		ENG-TECH (D	enys Ostr	ovskyi)		Date Tested:	Jan 3/24	
Immersion Period: 94.5 hours Tested By:				Tested By:	ENG-TEC	CH (Rey Betac)		
Compactive Effort (Density) Required: 95% Actual: 94.3% Test			Test Methods:	ASTM De	598, D1883			



			Test Data	a						
			Soaked			Ur	soaked			
Dry Density: As Co	ompacted	d;	1366	kg/m <sup>3</sup>	5		-	kg/m <sup>3</sup>		
Moisture Content:	As Com	pacted;	31.4	%			-	%		
Moisture Content:	Top 25 r	nm;	34.8	%			-	%		
CBR Values: 2.54	mm (0.1i	n);	3.5	%			-	%		
CBR Values: 5.08	mm (0.2i	n);	2.9	%			-	%		
Swell:	1.7	% of Initial Height	Oversize Correct	tion:	1.2	%	Surchar	ge Mass:	4.54	kg
Maximum Load:	719.3	Ν	Penetration Dep	th:	12.7	mm				125
Comments:										

Email: WSP Canada Inc. Contact Group

## ENG-TECH Consulting Limited

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



420 Turenne Street Winnipeg, Manitoba R2J 3W8 engtech@mymts.net www.eng-tech.ca

## **CALIFORNIA BEARING RATIO**

"Engineering and	Testing Solutions That Work for You"					
WSP Canada	a Inc.			Fi	ile No.:	23-035-03
1600 Buffalo				R	ef. No.:	23-35-3-14
Winnipeg, Ma R3T 6B8	anitoba					20 00 0 11
Attention:	Scott Suderman, C.E.T., P. Er	ıg.				
Project:	BISHOP GRANDIN BOULEVA MANITOBA CANADA			,		
Source:	Eastbound Bishop Grandin Boule sample from TH8, S2, 0.9m; TH8 1.6m; TH11, S2, 0.9m; T11, S3, 1	, S3, 1.2m; TH9,	S2, 0.9m;	TH9, S3, 1.2m; T		
Material Type:		,,,		Date Sampled:	Dec 6 to 8	3/24
Material Desc			[	Date Received:	Dec 12/24	1
Sampled By:	ENG-TECH (Denys Ostro	ovskyi)	[	Date Tested:	Jan 2/24	
Immersion Pe	riod: 95.5 hours		10	Tested By:	ENG-TEC	H (Rey Betac)
Compactive E	ffort (Density) Required: 95%	Actual 94.89	% -	Test Methods:	ASTM D6	98, D1883
	0.20 0.18 0.16 0.14 (re 0.12 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.10 0.00 0.10 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	California Bearir	ng Ratio			
	0.04 0.02 0.00 0.0 1.0 2.0 3.0			.0 10.0 11.0 12.0	0 13.0 14.0	
		Pen	etration (mm	ו)		
		Test Dat	а			
		Soaked		Unsoaked		
Dry Density:	As Compacted;	1321	kg/m³	-	kg/m <sup>3</sup>	
the second	itent: As Compacted;	32.4	%	-	%	
1	ntent: Top 25 mm;	47.5	%	-	%	
2 5 4 5 4 5 6 6 6 7 6 7 6 6 6 7 6 6 6 7 6 6 6 7 6 6 6 6 7 6 6 6 6 7 6 6 6 7 6 7 6 6 7 6 7 6 7 6 7 6 7 6 7 6 7 6	2.54mm (0.1in);	1.6	%	-	%	
	5.08mm (0.2in);	1.4	%	-	%	
Swell:		Oversize Correc	tion: (	0.4 % Surcha	rge Mass:	4.54 kg

Penetration Depth:

12.7 mm

Email: WSP Canada Inc. Contact Group

Maximum Load: Comments: 314.9 N

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