

APPENDIX 'A'

GEOTECHNICAL REPORT



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"Engineering and Testing Solutions That Work for You"

December 17, 2020

File No.: 20-035-03

WSP Canada Group Limited
111 – 93 Lombard Avenue
Winnipeg, Manitoba
R3B 3B1

ATTENTION: Mark Vogt, M.Sc., P.Eng.

RE: City of Winnipeg RFP No. 180-2020; 2020-2021 Keewatin/King Edward/ Pembina/ Lagimodiere Pavement Renewals Project

Introduction

ENG-TECH Consulting Limited (ENG-TECH) was retained by WSP Canada Inc. (WSP) to complete a pavement coring and testing program for future rehabilitation projects along sections of Keewatin Street, King Edward Street, Pembina Highway & Lagimodiere Boulevard in Winnipeg, Manitoba.

Scope of Work

The scope of work for the project entailed recovering a total of thirty (30) 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 from which cores were recovered were as follows:

- Keewatin Street (Logan Avenue to Selkirk Avenue) – 8 cores
- King Edward Street (Logan Avenue to Hyde Avenue) – 6 cores
- Pembina Highway (Rue Des Trappistes to Ducharme Avenue) – 6 cores
- Lagimodiere Boulevard (Springfield Road to 200m S of Headmaster Row) – 10 cores

Field Program

ENG-TECH conducted the coring program on the local streets from December 3rd to 11th, 2020 across all site locations previously stated. The cores were obtained by ENG-TECH at locations determined by WSP using a 150 mm diameter diamond end core barrel at joint locations and a 100mm diameter diamond end core barrel at mid slab locations. ENG-TECH repaired the core apertures with a City of Winnipeg approved material (Versaspeed 100 Rapid Hardening Mortar Repair) that has been accepted on previous street renewal projects.

Laboratory Program

ENG-TECH measured core thicknesses and photographed the pavement structure. The core thicknesses, pavement structure and UTM coordinates are outlined on Tables 1 to 4. Photographs of each core are shown in the attached Photographs 1 to 30. ENG-TECH also determined concrete compressive strengths in accordance with CSA A23.2-14C – wet condition on select cores from locations

determined by WSP. The compressive strength results are shown on the attached Obtaining and Testing Drilled Cores reports.

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

Enclosures: Table 1 – Summary of Pavement Structure – Keewatin Street (Logan Avenue to Selkirk Avenue)
Table 2 – Summary of Pavement Structure – King Edward Street (Logan Avenue to Hyde Avenue)
Table 3 – Summary of Pavement Core Structure - Pembina Highway (Rue Des Trappistes to Ducharme Avenue)
Table 4 - Summary of Pavement Core Structure – Lagimodiere Boulevard (Springfield Road to 200m S of Headmaster Row)
Obtaining and Testing Drilled Cores reports (Ref. No. 's 20-35-3-1, 2, 3, 4
Photographs of Cores (30 cores) (30 pages)

Email: Mark.Vogt@wsp.com



Table 1 - Summary of Pavement Core Structure Keewatin Street between Logan Avenue and Hyde Avenue						
Core No.	Date Collected	Test Hole Location		Pavement Surface		
		UTM (N)	14U (E)	Type	Core Diameter (mm)	Thickness (mm)
1	December 5, 2020	5531541	629554	Concrete	150	248
2	December 5, 2020	5531634	629565	Concrete	100	280
3	December 5, 2020	5531791	629544	Concrete	150	218
4	December 4, 2020	5531998	629549	Concrete	150	278
5	December 5, 2020	5532165	629533	Asphalt	100	35
				Concrete	100	251
6	December 4, 2020	5532211	629545	Asphalt	150	43
				Concrete	150	218
7	December 4, 2020	5532344	629530	Asphalt	150	82
				Concrete	150	200
8	December 4, 2020	5532440	629540	Asphalt	150	93
				Concrete	150	180

Table 2 - Summary of Pavement Core Structure King Edward Street between Logan Avenue and Selkirk Avenue						
Core No.	Date Collected	Test Hole Location		Pavement Surface		
		UTM (N)	14U (E)	Type	Core Diameter (mm)	Thickness (mm)
1	December 3, 2020	5531910	628721	Asphalt	150	114
				Concrete	150	228
2	December 9, 2020	5531950	628706	Concrete	150	230
3	December 8, 2020	5532086	628695	Concrete	100	290
4	December 5, 2020	5532166	628703	Asphalt	100	150
				Concrete	100	133
5	December 9, 2020	5532275	628610	Asphalt	150	70
				Concrete	150	230
6	December 9, 2020	5532324	628579	Concrete	150	180

Table 3 - Summary of Pavement Core Structure Pembina Highway between Rue Des Trappistes and Ducharme Avenue						
Core No.	Date Collected	Test Hole Location		Pavement Surface		
		UTM (N)	14U (E)	Type	Core Diameter (mm)	Thickness (mm)
1	December 8, 2020	5514181	632938	Asphalt	150	100
				Concrete	150	185
2	December 7, 2020	5514184	632956	Asphalt	100	100
				Concrete	100	230
3	December 8, 2020	5514318	632882	Asphalt	150	130
				Concrete	150	170
4	December 7, 2020	5514373	632829	Asphalt	100	90
				Concrete	100	212
5	December 8, 2020	5514400	632818	Asphalt	150	63
				Concrete	150	193
6	December 8, 2020	5514485	632752	Asphalt	150	107
				Concrete	150	196

Table 4 - Summary of Pavement Core Structure Lagimodiere Boulevard between Springfield Road and 200m S of Headmaster Row						
Core No.	Date Collected	Test Hole Location		Pavement Surface		
		UTM (N)	14U (E)	Type	Core Diameter (mm)	Thickness (mm)
1	December 11, 2020	5532907	640707	Asphalt	150	75
				Concrete	150	180
2	December 10, 2020	5532955	640441	Asphalt	150	70
				Concrete	150	230
3	December 11, 2020	5533137	640509	Asphalt	100	65
				Concrete	100	210
4	December 11, 2020	5533705	640536	Concrete	150	70
5	December 10, 2020	5533159	640559	Asphalt	150	81
				Concrete	150	200

Table 4 - Summary of Pavement Core Structure
 Lagimodiere Boulevard between Springfield Road and 200m S of Headmaster Row

Core No.	Date Collected	Test Hole Location		Pavement Surface		
		UTM (N)	14U (E)	Type	Core Diameter (mm)	Thickness (mm)
6	December 10, 2020	5533176	640577	Asphalt	150	65
7	December 11, 2020	5533418	640655	Asphalt	150	85
				Concrete	150	217
8	December 11, 2020	5533460	640707	Asphalt	150	140
				Concrete	150	225
9	December 11, 2020	5533648	640793	Asphalt	100	75
				Concrete	100	210
10	December 11, 2020	5533705	640797	Asphalt	150	80
				Concrete	150	145



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 Winnipeg, Manitoba
 R3B 3B1

File No.: 20-035-03

Ref. No.: 20-35-3-1

Attention: Mark Vogt, M.Sc, P. Eng.

Project: CITY OF WINNIPEG RFP NO. 180 - 2020; 2020 - 2021 KEEWATIN / KING EDWARD /
 PEMBINA / LAGIMODIERE PAVEMENT RENEWALS

Date Cored: Dec 5/20 Cored By: ENG-TECH (Kyle Zebiere) Page: 1 of 1
 Date Received: Dec 5/20 Received By: ENG-TECH (Kyle Zebiere)
 Age of Concrete - Concrete Design Strength: - Method: CSA A23.2-14C, 9C
 Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 Direction of Load: Parallel

Core No.	GPS Coordinates	Density (kg/m ³)	Length		Average Diameter (mm)	Compressive Strength (MPa)	Date Tested (m/d/y)	Type of Fracture	Tested By
			Cored (mm)	Tested (mm)					
2	Northing: 5531634, Easting: 629565	-	282	200	100	57.7	Dec 15/20	1	P. L'Anglais
5	Northing: 5532165, Easting: 629533	-	251	200	100	50.2	Dec 15/20	1	P. L'Anglais

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.

Strength Specification: -

Comments: Keewatin Street

Deviations from test procedure: None

Email: mark.vogt@wsp.com
 vilko.maroti@wsp.com
 scott.minty@wsp.com
 lissa.vandorp@wsp.com

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File No.: 20-035-03

Ref. No.: 20-35-3-2

Attention: Mark Vogt, M.Sc, P. Eng.

Project: CITY OF WINNIPEG RFP NO. 180 - 2020; 2020 - 2021 KEEWATIN / KING EDWARD / PEMBINA / LAGIMODIERE PAVEMENT RENEWALS

Date Cored: See comments Cored By: ENG-TECH (Kyle Zebiere) Page: 1 of 1
Date Received: Dec 3 and 8/20 Received By: ENG-TECH (Kyle Zebiere)
Age of Concrete - Concrete Design Strength: - Method: CSA A23.2-14C, 9C
Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 Direction of Load: Parallel

Core No.	GPS Coordinates	Density (kg/m ³)	Length		Average Diameter (mm)	Compressive Strength (MPa)	Date Tested (m/d/y)	Type of Fracture	Tested By ENG-TECH
			Cored (mm)	Tested (mm)					
3	Northing: 5532086, Easting: 628695	-	290	201	100	67.8	Dec 15/20	1	P. L'Anglais
4	Northing: 5532166, Easting: 628703	-	133	105	100	47.2*	Dec 16/20	1	P. L'Anglais

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*Denotes corrected strength for Length/Diameter ratio less than 2.0 to 1.0.

Strength Specification: -

Comments: King Edward Street. Core No. 1 was recovered on December 8, 2020 and Core No. 2 was recovered on December 3, 2020

Deviations from test procedure: None

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File No.: 20-035-03

Ref. No.: 20-35-3-3

Attention: Mark Vogt, M.Sc, P. Eng.

Project: CITY OF WINNIPEG RFP NO. 180 - 2020; 2020 - 2021 KEEWATIN / KING EDWARD / PEMBINA / LAGIMODIERE PAVEMENT RENEWALS

Date Cored: Dec 7/20 Cored By: ENG-TECH (Kyle Zebiere) Page: 1 of 1
 Date Received: Dec 7/20 Received By: ENG-TECH (Kyle Zebiere)
 Age of Concrete - Concrete Design Strength: - Method: CSA A23.2-14C, 9C
 Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 Direction of Load: Parallel

Core No.	GPS Coordinates	Density (kg/m ³)	Length		Average Diameter (mm)	Compressive Strength (MPa)	Date Tested (m/d/y)	Type of Fracture	Tested By ENG-TECH
			Cored (mm)	Tested (mm)					
2	Northing: 5514184, Easting: 632956	-	230	193	100	66.8	Dec 15/20	1	P. L'Anglais
4	Northing: 5514373, Easting: 632829	-	212	102	100	59.7*	Dec 16/20	1	P. L'Anglais

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.

Strength Specification: -

Comments: Pembina Highway. Core no. 4 was trimmed prior to testing as it contained reinforcing steel 110mm from the top of the core

Deviations from test procedure: None

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File No.: 20-035-03

Ref. No.: 20-35-3-4

Attention: Mark Vogt, M.Sc, P. Eng.

Project: CITY OF WINNIPEG RFP NO. 180 - 2020; 2020 - 2021 KEEWATIN / KING EDWARD / PEMBINA / LAGIMODIERE PAVEMENT RENEWALS

Date Cored: Dec 11/20 Cored By: ENG-TECH (Kyle Zebiere) Page: 1 of 1
 Date Received: Dec 14/20 Received By: ENG-TECH (Kyle Zebiere)
 Age of Concrete: - Concrete Design Strength: - Method: CSA A23.2-14C, 9C
 Core Conditioning: As per CSA A23.2-14C Clause 7.3.1 Direction of Load: Parallel

Core No.	GPS Coordinates	Density (kg/m ³)	Length		Average Diameter (mm)	Compressive Strength (MPa)	Date Tested (m/d/y)	Type of Fracture	Tested By ENG-TECH
			Cored (mm)	Tested (mm)					
3	Northing: 5533137, Easting: 0640509	-	265	114	100	52.9*	Dec 17/20	1	P. L'Anglais
9	Northing: 5533648, Easting: 0640793	-	272	190	100	40.1	Dec 17/20	1	P. L'Anglais

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.

Strength Specification: -

Comments: Lagimodiere Boulevard

Deviations from test procedure: None

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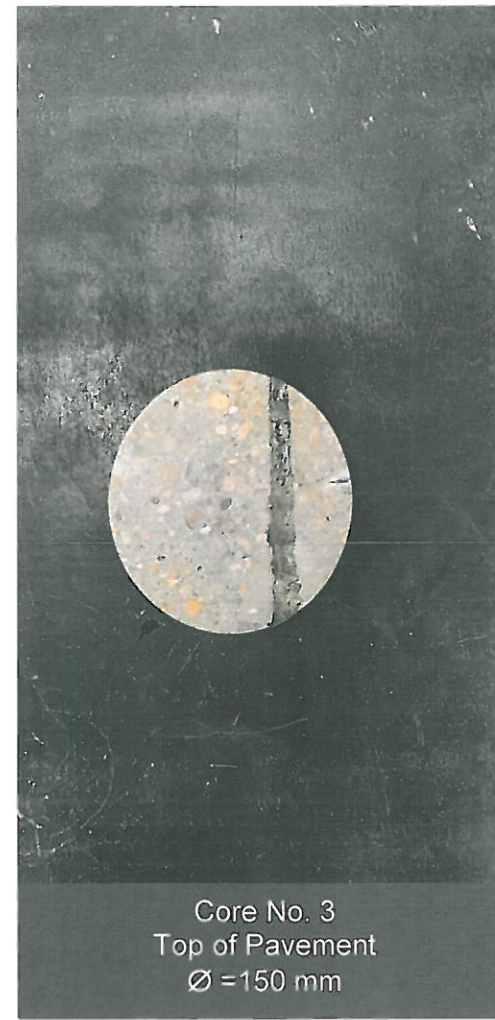
Photograph 1: Intact specimens from Keewatin Street



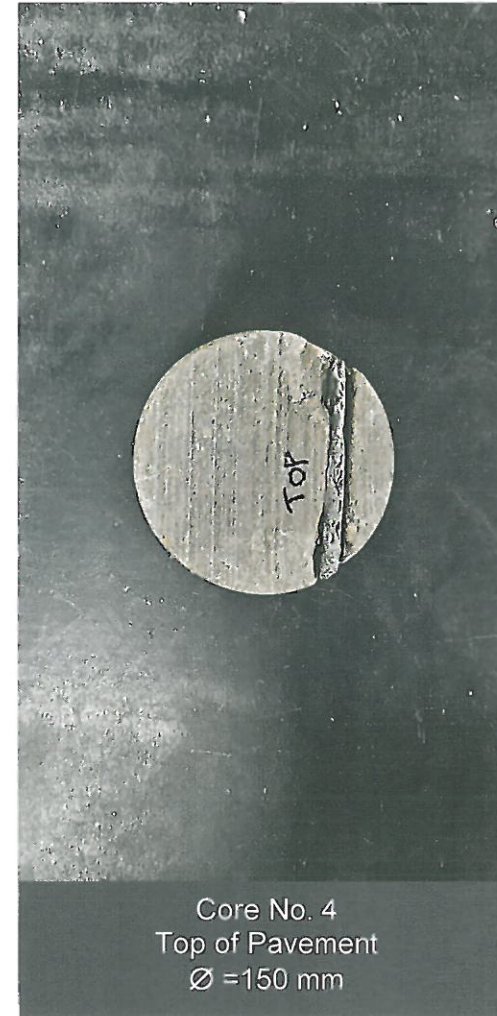
Photograph 2: Intact specimens from Keewatin Street



Photograph 3: Intact specimens from Keewatin Street



Photograph 4: Intact specimens from Keewatin Street



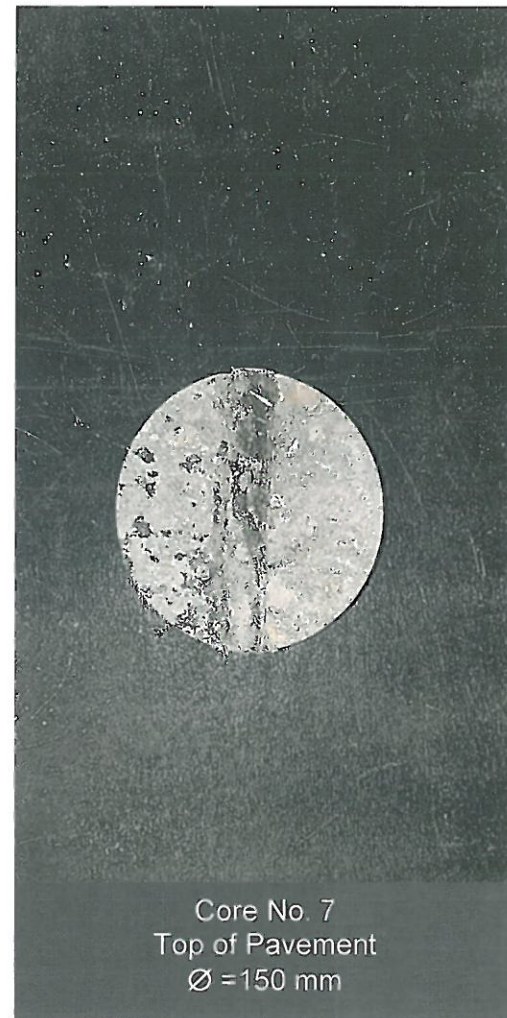
Photograph 5: Intact specimens from Keewatin Street



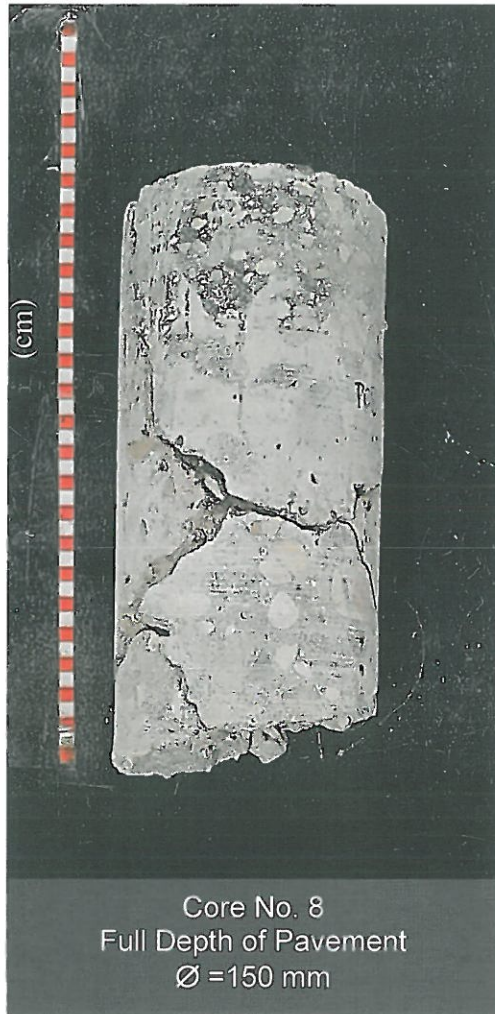
Photograph 6: Intact specimens from Keewatin Street



Photograph 7: Intact specimens from Keewatin Street



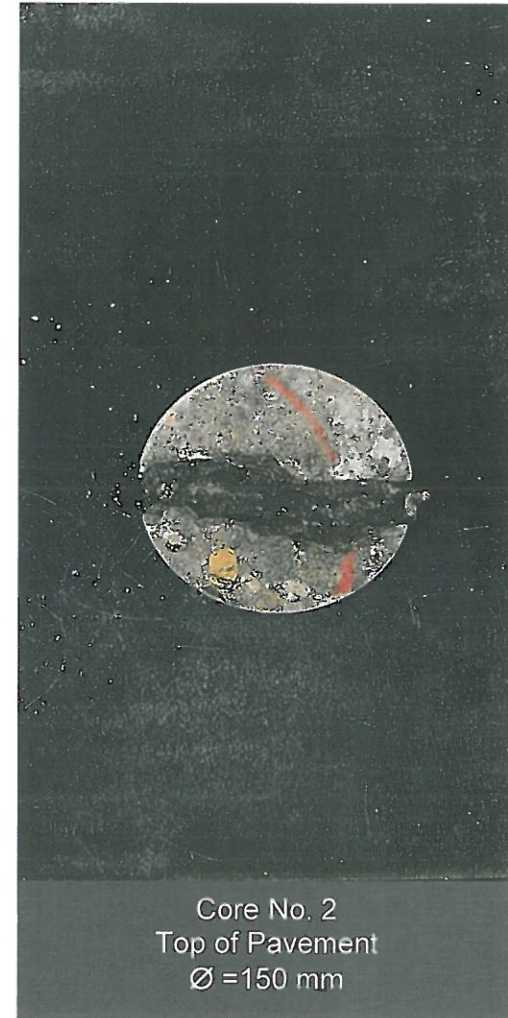
Photograph 8: Intact specimens from Keewatin Street



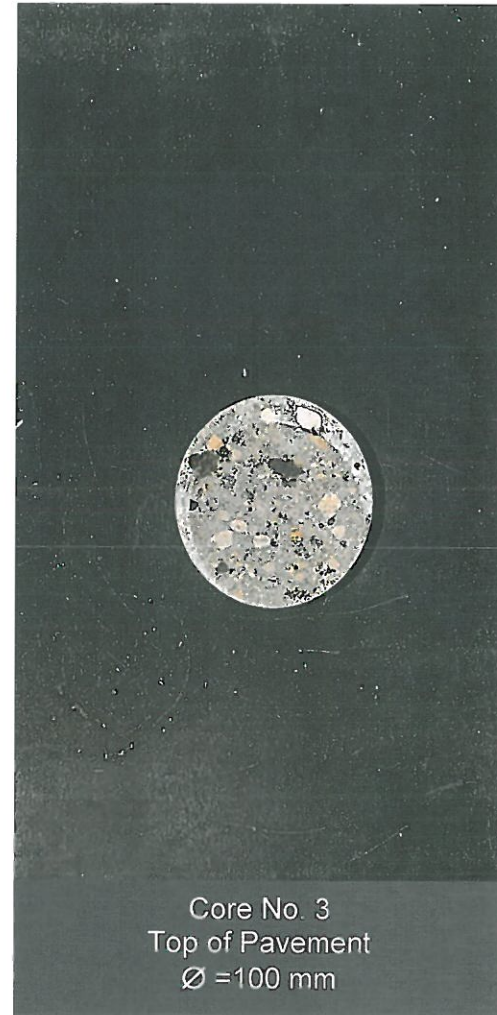
Photograph 9: Intact specimens from King Edward Street



Photograph 10: Intact specimens from King Edward Street



Photograph 11: Intact specimens from King Edward Street



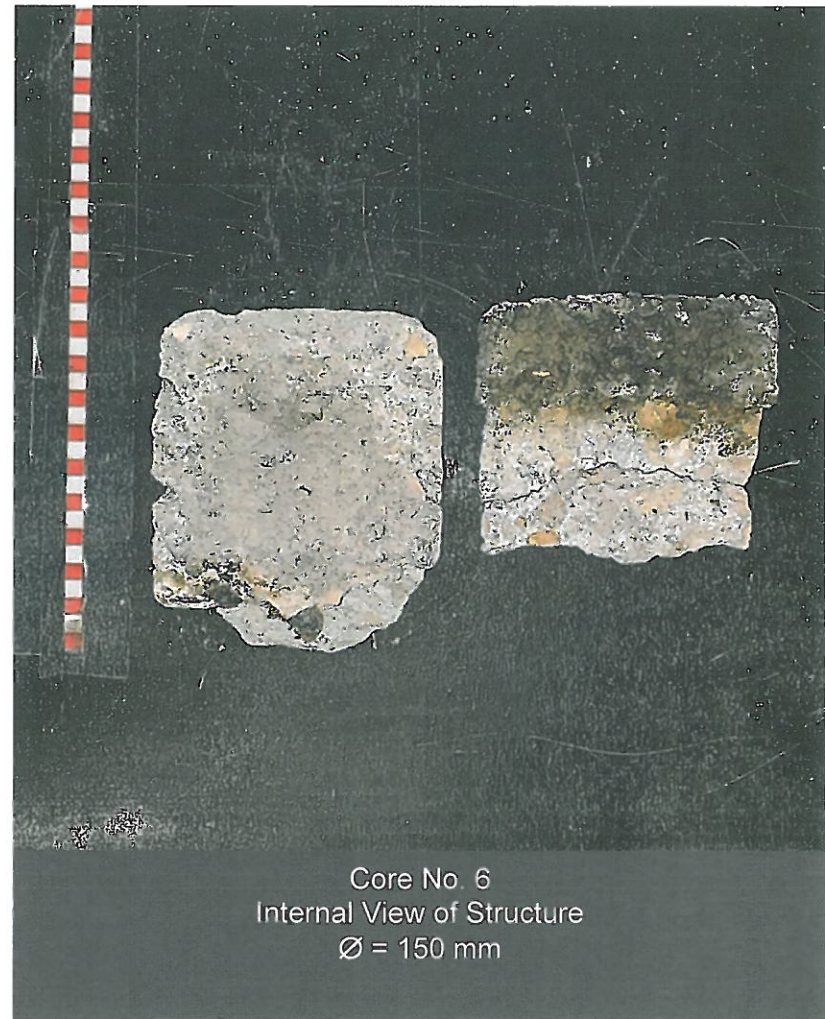
Photograph 12: Intact specimens from King Edward Street



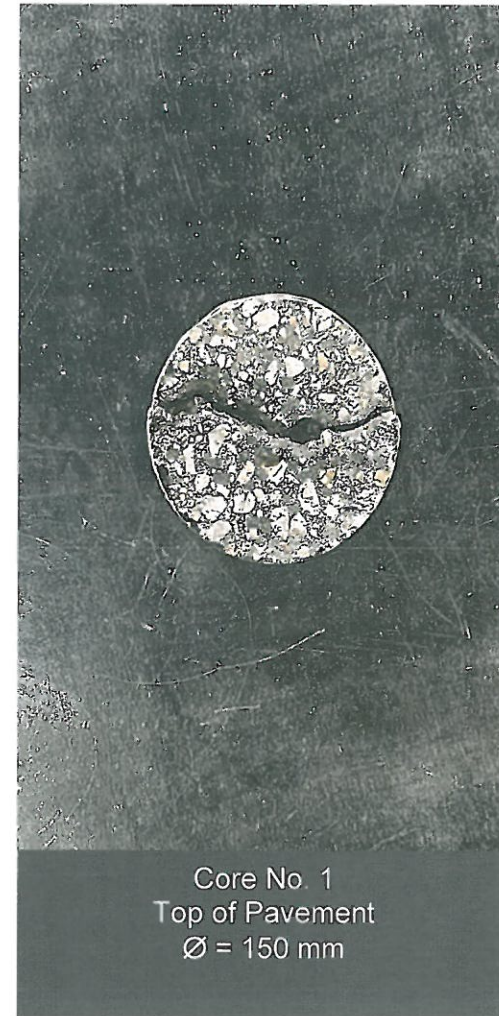
Photograph 13: Intact specimens from King Edward Street



Photograph 14: Intact specimens from King Edward Street



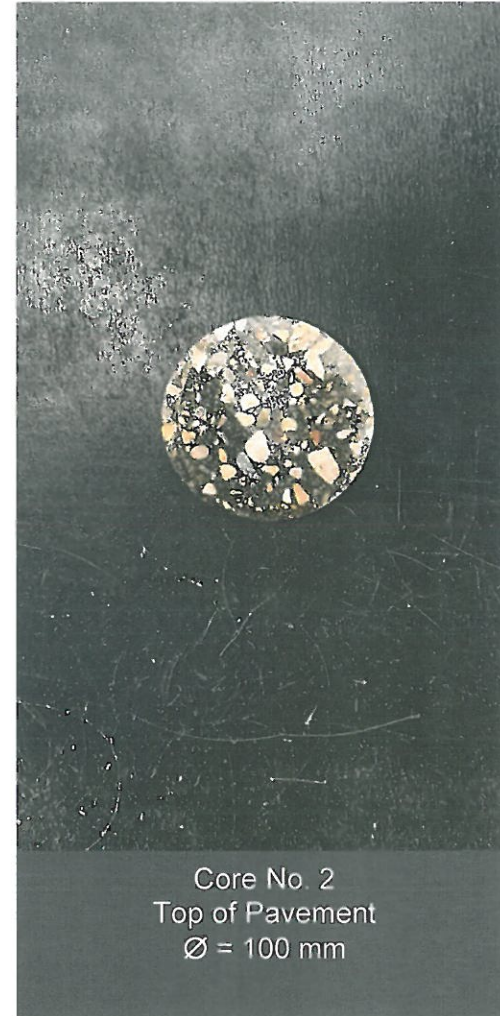
Photograph 15: Intact Specimens from Pembina Highway



Photograph 16: Intact Specimens from Pembina Highway



Core No. 2
Full Depth of Pavement
Ø = 100 mm



Core No. 2
Top of Pavement
Ø = 100 mm



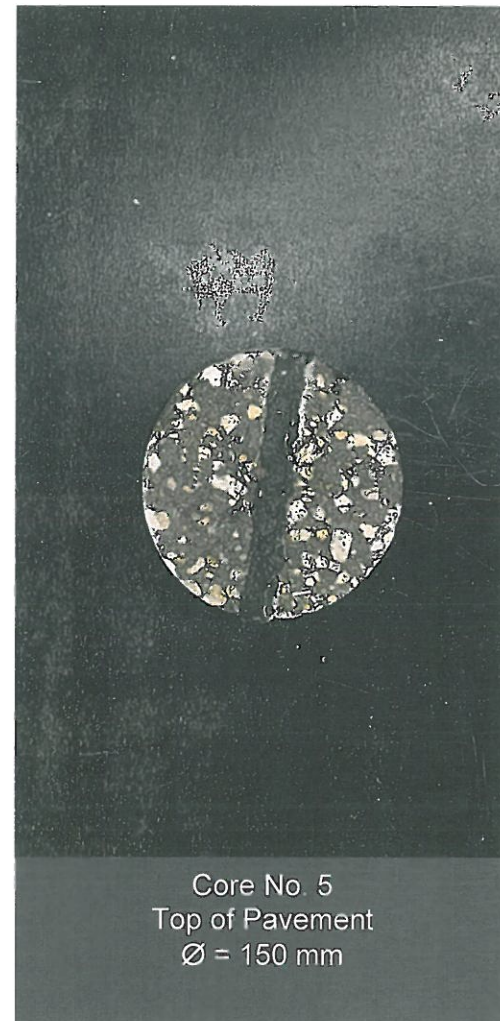
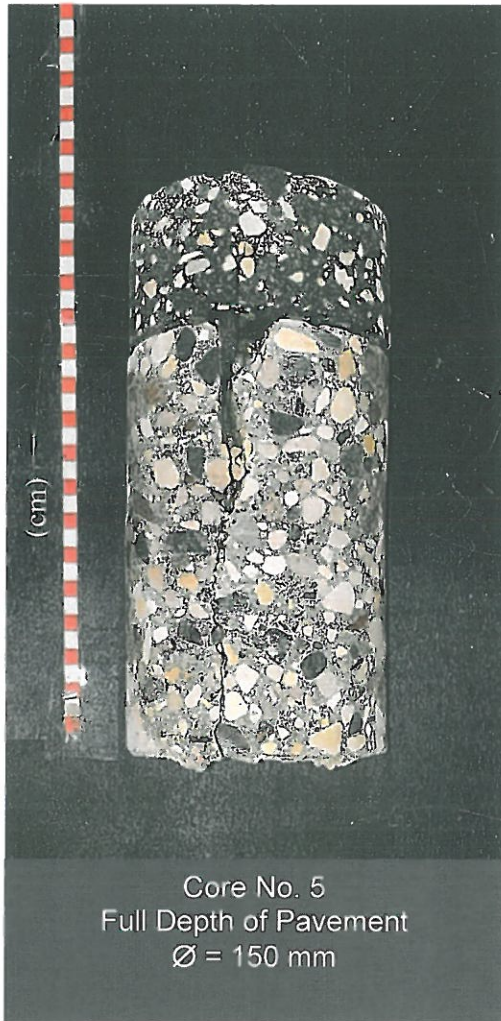
Photograph 17: Intact Specimens from Pembina Highway



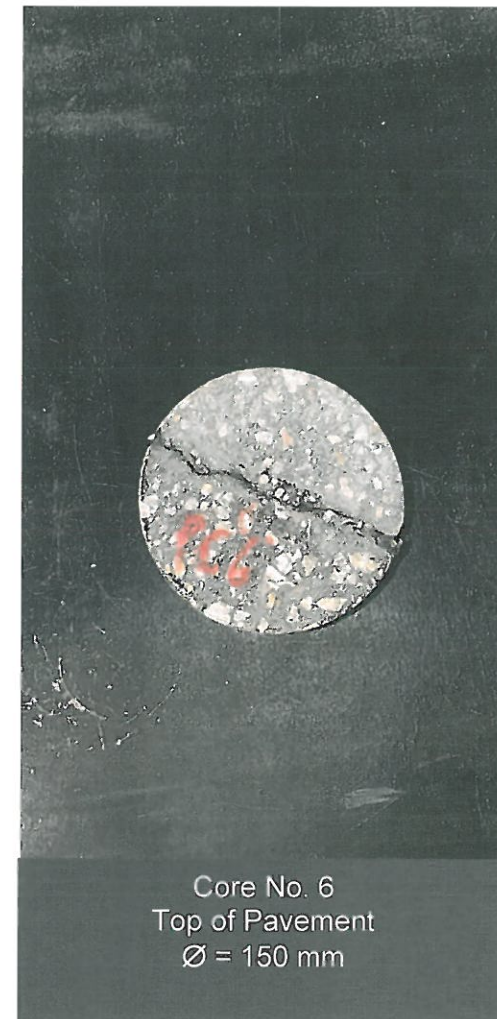
Photograph 18: Intact Specimens from Pembina Highway



Photograph 19: Intact Specimens from Pembina Highway



Photograph 20: Intact Specimens from Pembina Highway



Photograph 21: Intact Specimens from Lagimodiere Boulevard



Photograph 22: Intact Specimens from Lagimodiere Boulevard



Core No. 2
Full Depth of Pavement
Ø = 150 mm



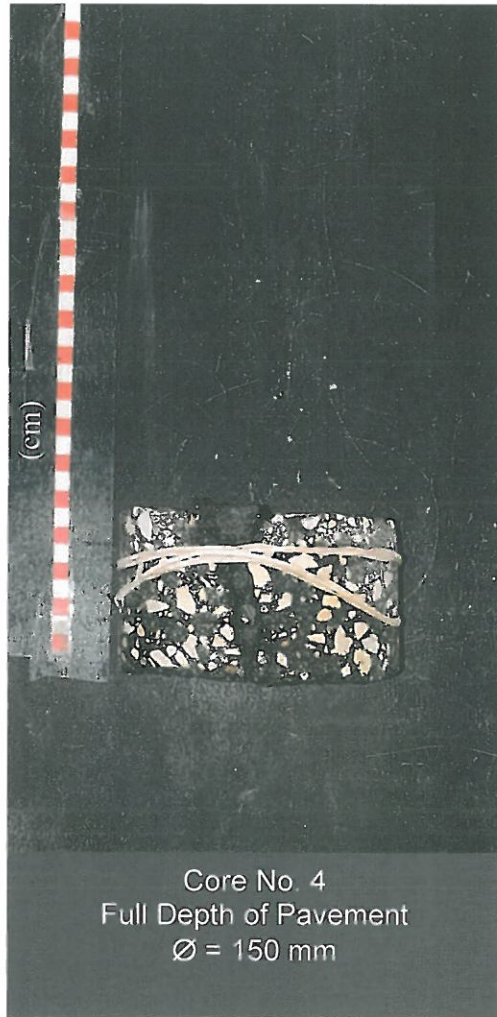
Core No. 2
Top of Pavement
Ø = 150 mm



Photograph 23: Intact Specimens from Lagimodiere Boulevard



Photograph 24: Intact Specimens from Lagimodiere Boulevard



Photograph 25: Intact Specimens from Lagimodiere Boulevard



Core No. 5
Full Depth of Pavement
Ø = 150 mm



Core No. 5
Top of Pavement
Ø = 150 mm



Photograph 26: Intact Specimens from Lagimodiere Boulevard



Photograph 27: Intact Specimens from Lagimodiere Boulevard



Photograph 28: Intact Specimens from Lagimodiere Boulevard



Photograph 29: Intact Specimens from Lagimodiere Boulevard



Photograph 30: Intact Specimens from Lagimodiere Boulevard

