APPENDIX 'F'

GEOTECHNICAL REPORT

APPENDIX 'F' - GEOTECHNICAL REPORT

GEOTECHNICAL REPORT FOR:

- I. Aldine Street from Bruce Avenue to Lodge Avenue.
- II. Thompson Drive from Portage Avenue to Bruce Avenue.
- III. Oakdean Boulevard from Assiniboine Avenue to 138 Oakdean Boulevard
- IV Armour Crescent from Harris Boulevard to Harris Boulevard
- V. Assiniboine Crescent from 110m south of Portage Avenue to Portage Avenue

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.



Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999 Fax: (204) 488-6915



2014 RESIDENTIAL STREET RENEWALS GEOTECHNICAL INVESTIGAGTION ALDINE STREET LODGE AVENUE TO BRUCE AVENUE

Prepared for CITY OF WINNIPEG ENGINEERING DIVISION PUBLIC WORKS DEPARTMENT 106-1155 PACIFIC AVENUE WINNIPEG, MANITOBA R3E 3P1

Prepared by STANTEC CONSULTING LTD. 199 HENLOW BAY WINNIPEG, MANITOBA R3Y 1G4

December 17, 2013



TABLE 1 2014 RESIDENTIAL STREET RENEWALS ALDINE STREET, LODGE AVENUE TO BRUCE STREET GEOTECHNICAL INVESTIGATION

Testhole	Testhole Location		Pavement Surface		Pavement Structure Material		Sample	Moisture	Pa	rticle Siz	e Analys	sis	Att	terberg Limits		
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
	Aldine Street	Asphalt	35		_			_				_		_		
	1.0 m East from West curb	Concrete	135	-	-	-	-	-	-	-	-	-	-	-	-	
TH02	Aldine Street	Asphalt	75	Granular Fill	125	Clay Fill	0.6	11	21.0	13.0	17.8	173	34	13	21	
	1.0 m West from East curb	Concrete	140	Granular i III	125		0.0	11	21.0	43.9	17.0	17.5	54	15	21	
TH03	Aldine Street 0.5 m North from property 328 Aldine Street 1.0 m East from West curb		30													
			165	-	-	_	-	-	-	-	-	-	-	-	-	
тнои	Aldine Street	Asphalt	30	_	_	Clay	0.9	37	0.0	10	62	Q1 Q	80	27	62	
11104	1.0 m West from East curb	Concrete	150	_	- 01	Cidy	0.9	57	0.0	1.9	0.2	91.9	09	21	02	
TH05	Aldine Street	Asphalt	25		_		_	_	_	_	_	_	_	_	_	
11105	1.0 m East from West curb	Concrete	145		_	_	_	-	_	-	-	-	_	-	_	
TH06	Aldine Street	Asphalt	20	_	_			_	_	-	_	_	_	_	_	
TH06	1.0 m West from East curb	Concrete	140													
TH07	Aldine Street	Asphalt	55	Granular Fill	100					_	_	_		_		
	1.0 m East from West curb	Concrete	160		100	_	_	_	_	-	-	_	_	-	_	



		() St	Stantec									
Proje Proje Clier Drilli Drilli Testl	ect Na ect Lo nt: Cit ng Co ng Mo hole L	ame: 2014 Residential Street Renewals D acation: Aldine Street, Lodge Avenue to Bruce Avenue D y of Winnipeg L ontractor: Active Drilling and Piling R ethod: 125 mm Solid Stem Auger Location: 7.0 m North from Northwest corner of Lodge Avenue & Aldine Street	Date Drilled Depth of Tex ogged by: Reviewed by eet, 1.0 m E	lled: November 24, 2013 f Testhole: 2.0 m by: Sothea Bun ed by: German Leal m East from West curb								
Depth (m)	Symbol	Description		● Water Conte (%)								
	80.00	Asphalt			2	55	0 7	5 10	00			
		Concrete						 	 			
		Clay Fill							L 			
		- some fine to coarse sand		BS	·····	26			 ·····			
		- some fine gravel						 	 			
		- some slit										
- 0.5 -									<u> </u>			
				BS		●31			 ·····			
					l							
				БС		a21		 	 			
				во	ĺ	⊎ 31						
- 1.0 -		Clay						·	+ 			
		- brown, firm, moist, high plasticity							 			
		- trace silt						 	 			
				BS	l	•35						
								 	l 			
15												
1.5 -				BS		•38	3					
									l 			
								 	 ·····			
					l							
				BS		•34						
						• 1	 .		 			
- 2.0 -				69		●4	J					
		 No groundwater seepage or soil sloughing was observed during or upon of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	of c	Irillin	g.						
Page 1	of 1											



Depth of Testhole: 2.0 m

Logged by: Sothea Bun

Reviewed by: German Leal

Date Drilled: November 24, 2013

Project Name: 2014 Residential Street Renewals Project Location: Aldine Street, Lodge Avenue to Bruce Avenue **Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling**

Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 5.0 m South from property 325 & 323 Aldine Street, 1.0 m West from East curb

Depth (m)	Symbol	Description	Sample Type		Particle Size Distribution				● Wat	ter Co (%)	onte	nt
				(%)	(%)	(%)	(%)	2	55	0 7	5 1	00
		Asphalt										
		Concrete								 	 	
	م ص گ	Granular Fill	-				•••••			(l 	.l
	\mathbb{R}	- 20 mm max size aggregate	BS					· ••12	}∣	 	 	
		Clay Fill						 	 	1 	 	 .
- 05 -		- some fine to coarse sand		L	ļ				 	! !	 	
0.0		- some fine gravel - some silt								I I	 	
			BS	21.0	43.9	17.8	17.3	∎11	- 	 	 	· ·····
									 	⊧ 	 	.
			BS						i ∎30 ⁻	 	 	 .
L 10 -					L		L		L	 	 	
1.0		Clay										
		- trace fine to coarse sand								[r I	т Т
		- trace silt	BS						•33	} I	 	
										l	i	į
										 	 · · · · ·	
15											 	İ
F 1.5 -			BS		T				●36		 	
							•••••			 	! 	
									 	 	 	· [· · · · ·
			BS						■37		 	
									•37	 	 	ļ
20			BS						•39	þ		
- 2.0 -		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	or u	ipon	com	pletio	n of (drillin	g.			
Page	1 of 1											

TESTHOLE TH03							Stantec								
Project Name: 2014 Residential Street Renewals Date Dril Project Location: Aldine Street, Lodge Avenue to Bruce Avenue Depth of Client: City of Winnipeg Logged H Drilling Contractor: Active Drilling and Piling Reviewer Drilling Method: 125 mm Solid Stem Auger Testhole Location: 0.5 m North from property 328 Aldine Street, 1.0 m East from West curb					ed: November 24, 2013 Festhole: 2.0 m γ: Sothea Bun by: German Leal										
Depth (m)	Symbol	Description	Composition of Composition				er Co (%)	onter	nt						
	FERON E	Acabalt			2	5 5	0 7	5 10	00						
		Asphalt Concrete Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel - some silt		BS	 	•33			 						
- 0.5 -				BS	 	•34	 		 						
- 1.0 -				BS	 	•32 	·····		 						
		Clay - grey, firm, moist, high plasticity - trace fine to coarse sand - trace silt - brown below 1.4 m		BS	 	•35	· · · · · · · · · · · · · · · · · · ·		 						
- 1.5 -				BS	 	•35			 						
				BS BS	 	•34 •36			. 						
- 2.0 - Page 1		 No groundwater seepage or soil sloughing was observed during or upon of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	of d	rillin	g.									

	TESTHOLE TH04 Stantec																	
Project Name: 2014 Residential Street RenewalsDate Drilled: November 24, 2013Project Location: Aldine Street, Lodge Avenue to Bruce AvenueDepth of Testhole: 2.0 mClient: City of WinnipegLogged by: Sothea BunDrilling Contractor: Active Drilling and PilingReviewed by: German LealDrilling Method: 125 mm Solid Stem AugerTesthole Location: 8.0 m North from property 345 & 349 Aldine Street, 1.0 m West from Fast curb							;											
Depth (m)	Symbol	Description	Sample Type	Gravel	Partic	le Size	Clay	● Water Conten (%) PL LL						Water Con (%) PL L				
				(%)	(%)	(%)	(%)	2	5 5) 7	<u>′5 1</u>	100						
		Asphalt	1															
		Concrete Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel - some silt	BS	······	· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·		 	•4 	 1	 							
		Clay	BS					 	•37		 	· · · · · · · · · · · · · · · · · · ·						
 - 1.0		- grey, firm, moist, high plasticity - brown below 1.1 m - some fine to coarse sand below 1.7 m - trace silt	BS	0.0	1.9	6.2	91.9	 	 ●37 		; 	 						
			BS					 	•37		 							
- 1.5 - 			BS	 	 	 		+ + 	•39	,— — 	 	+ 						
			BS BS					 	●33 ●36		 							
 	of 1	 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	oru	ipon (comp	oletio	n of d	Irillin	g.									



BS

•34

•38

Т

Project Name: 2014 Residential Street Renewals Date Driller Project Location: Aldine Street, Lodge Avenue to Bruce Avenue Depth of Te Client: City of Winnipeg Logged by Drilling Contractor: Active Drilling and Piling Reviewed I Drilling Method: 125 mm Solid Stem Auger Testhole Location: 10.0 m South from property 362 & 364 Aldine Street, 1.0 m East from West of				: No stho Sot y: G urb	overr ble: 2 hea ierm	nber 2.0 m Bun an L	24, 2 1 eal	2013	
Depth (m)	Symbol	Description		Sample Type	2	• Wat	:er C (%)	onten	i t
		Asphalt					 	 	
		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel - some silt		BS	· · · · · · · · · · · · · · · · · · ·	26	 		L
-		Clay - black, firm, moist, high plasticity - trace fine to coarse sand		BS		●36	 	 ····· 	

- trace fine to coarse sand - trace silt - brown below 1.1 m

BS	
BS	

			 1
BS		•3	9 I
		····	
	 	, 	

			BS		●3§ 	9	
2.0			BS		•4	2	
2.0	-	 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of c	Irillin	g.		
]						

1.0

- 1.5 -

	TESTHOLE TH06							Stantec									
Proje Proje Clien Drilli Drilli Testl	ect Na ect Lo nt: City ng Co ng Me nole L	Ime: 2014 Residential Street RenewalsDcation: Aldine Street, Lodge Avenue to Bruce AvenueDy of WinnipegLontractor: Active Drilling and PilingRethod: 125 mm Solid Stem Auger	Date Drilled: Depth of Test ogged by: Seviewed by Dem East cur	led: November 24, 2013 Testhole: 2.0 m by: Sothea Bun d by: German Leal curb													
Depth (m)	Symbol	Description	● Water Conte (%)						nt								
		Aanhalt			2	5 5	0 7	5 10	00								
		Concrete	/						 								
		Concrete															
		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - some fine gravel - some silt		BS		●31 	· · · · · · · 		l 								
- 0.5 -							 		 ······								
· -		Clay - black, firm, moist, high plasticity - trace fine to coarse sand - trace silt		BS		●32 	 		 								
				BS		●30 	 		 								
		Silty Clay - tan, firm, moist, medium plasticity		BS		26	 		 								
		Clay - brown, firm, moist, high plasticity - trace fine to coarse sand - trace silt		BS		●38 	 		 ·····								
				BS		●4(
				BS		●3)										
- 2.0 - 	 No groundwater seepage or soil sloughing was observed during or upon completion of drilling. The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 																
Page 1	of 1																

TESTHOLE TH07							Stantec								
Project Name: 2014 Residential Street Renewals Date Dril Project Location: Aldine Street, Lodge Avenue to Bruce Avenue Depth of Client: City of Winnipeg Logged I Drilling Contractor: Active Drilling and Piling Reviewe Drilling Method: 125 mm Solid Stem Auger Testhole Location: 9.0 m South from Southwest corner of Aldine Street & Bruce Avenue, 1.0						ed: November 24, 2013 Testhole: 2.0 m y: Sothea Bun I by: German Leal m East from West curb									
Depth (m)	Symbol	Description				Wat	er Co (%)		it						
		Asphalt			2			ור כ							
	4 7 4 4 7 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete			 	 	 		 						
 - 0.5 - 		Granular Fill - 20 mm max size aggregate Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand		BS	· · · · • 	9 	 		 						
		- some fine gravel - some silt		BS	 	22 	 		 						
- 1.0 -		Clay		BS	 	22	 		 						
		- brown, firm, moist, high plasticity - trace fine to coarse sand - trace silt		BS		•27	·····		· · · · · · · · ·						
- 15 -					 	 	 		 						
				BS	 	●28 	 		 						
				BS	 	•34 	 								
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	of d	Irillin	9.			1						
 Page 1	of 1														







Core sample from Testhole TH01



Core sample from Testhole TH02







Core sample from Testhole TH03



Core sample from Testhole TH04







Core sample from Testhole TH05



Core sample from Testhole TH06







Core sample from Testhole TH07



Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

Derek Teperto

PROJECT: 2014 Residential Street Renewals Aldine Street Lodge Avenue to Bruce Avenue

PROJECT NO.: 123301054





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

Derek Teperto

PROJECT: 2014 Residential Street Renewals Aldine Street Lodge Avenue to Bruce Avenue

PROJECT NO.: 123301054





Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999 Fax: (204) 488-6947



2014 RESIDENTIAL STREET RENEWALS GEOTECHNICAL INVESTIGAGTION THOMPSON DRIVE PORTAGE AVENUE TO LODGE AVENUE

Prepared for CITY OF WINNIPEG ENGINEERING DIVISION PUBLIC WORKS DEPARTMENT 106-1155 PACIFIC AVENUE WINNIPEG, MANITOBA R3E 3P1

Prepared by STANTEC CONSULTING LTD. 199 HENLOW BAY WINNIPEG, MANITOBA R3Y 1G4

December 18, 2013





TABLE 1 2014 RESIDENTIAL STREET RENEWALS THOMPSON DRIVE, PORTAGE AVENUE TO LODGE AVENUE GEOTECHNICAL INVESTIGATION

Testhole	Testhole Location	Pavement Surface		Pavement Structure Material		Sample	Sample	Moisture	Pa	rticle Siz	ze Analys	sis	Atterberg Limits			
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH01	Thompson Drive 15.0 m North from Northwest corner of Portage Avenue & Thompson Drive	Asphalt	30	-	-	-	-	-	-	-	-	-	-	-	-	
-	1.5 m East from West curb	Concrete	180													
TH02	Thompson Drive 3.5 m South from property 204 & 206 Thompson Drive	Asphalt	50	Granular	100	Clav	12	37	0.1	66	17 1	76.2	86	29	57	
11102	1.0 m West from East curb	Concrete	160	Fill	100	olay	1.2	01	0.1	0.0		10.2	00	20	01	
TH03	Thompson Drive		60	_	-	-	-	-	-	-	-	-		_	_	
11100	1.0 m East from West curb	Concrete	170													
TH04	Thompson Drive	Asphalt	60	_	-	_	-	-	-		-		_	_	_	
11101	1.0 m West from East curb	Concrete	135													
TH05	Thompson Drive		45	Granular	50	_	-	-	-		-		_	_	_	
11100	1.0 m East from West curb	Concrete	160	Fill	00											
THOS	Thompson Drive	Asphalt	45	Granular	100	Clay Fill	0.9	30	37	22.1	12.0	62.2	66	20	46	
11100	1.0 m West from East curb	Concrete	140	Fill	100	Oldy 1 III	0.0	50	0.7	22.1	12.0	02.2	00	20	40	
THOZ	Thompson Drive	Asphalt	45	_	-	_	-	-	_		-	_	_	_	_	
TH07	1.0 m East from West curb	Concrete	165						-							
TH08	Thompson Drive	Asphalt	30	_	-	_	_	_	-	_	-			-	_	
TH08	1.0 m West from East curb	Concrete	150	_	_											

		TESTHOLE TH01	St	ta	nt	ec			
Proje Proje Clier Drilli Drilli Testl	ect Na ect Lo nt: Cit ng Co ng Mo hole L	Ime: 2014 Residential Street Renewals I cation: Thompson Drive, Portage Avenue to Lodge Avenue I y of Winnipeg I ontractor: Active Drilling and Piling F ethod: 125 mm Solid Stem Auger Location: 15.0 m North from Northwest corner of Portage Ave & Thompson	Date Drilled Depth of Tes Logged by: Reviewed by Dr, 1.5 m E	: No stho Sot y: C	overr ole: 2 hea Germ	iber : 2.0 m Bun an L n We	27, 2 n eal	2013 urb	
Depth (m)	Symbol	Description		Sample Type		Wat	ter Co (%)	ontei	nt
	a noti	Asphalt			2	55	0 7	51	00
		Concrete	/				 	 	 .
									l I
		Clay Fill - brown, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel		BS		●28	 	 	
- 0.5 -				BS		•33	 	 	
				BS		●32 ⁻		 	
- 1.0 -		Clay - black, firm, moist, high plasticity - some silt - trace sand - brown below 1.2 m					 	 	
				BS		●34		 	
- 1.5 -				BS	·····	•3		 	
								 ·····	
				BS		●3) 	 	
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	BS of c	drillin	g.	48		
Page 1	l of 1								



Depth of Testhole: 2.0 m

Logged by: Sothea Bun

Reviewed by: German Leal

Date Drilled: November 27, 2013

Project Name: 2014 Residential Street Renewals Project Location: Thompson Drive, Portage Avenue to Lodge Avenue **Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling**

Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 3.5 m South from property 204 & 206 Thompson Drive, 1.0 m West from East curb

Depth (m)	Symbol	Description	Sample Type	Gravel	Partic Distri	le Size	Clay) Wat PL ⊢	ent		
	6 N. 1.	Asnhalt	_	(%)	(%)	(%)	(%)	2	5 5	0 7	5	100
		Concrete						 		 	 	 [
	000	Granular Fill								1		
		- 20 mm maximum size aggregate	BS					⊷●12				·
		- brown, firm, moist, high plasticity - some medium to coarse sand						· · · · · · 		 	 	
- 0.5 -							+			— —		
			BS						●36	 	 	·
										[
		Clay							● <u>32</u>	} • • • • • • 	 	
- 1.0 -		- black, firm, moist, high plasticity - some silt						 		 	 	- <u> </u>
		- trace sand - brown below 1.7 m								[1	1
			BS	0.1	6.6	17.1	76.2		 ● 37	<u> </u> 		
- 1.5 -								 	•26	 	 	 - + ·
									•30	! 	 	
									•••••	 	 	
			BS					 	●36	 }	 	 -
										 	<u> </u>	
- 20 -			BS						•3	9	į	İ
		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	or ι	ıpon	comp	oletio	n of d	drillin	g .			
Page	1 of 1											

		TESTHOLE TH03	🚺 Sta	ar	nt	ec			
Proje Proje Clier Drilli Drilli Testl	ect Na ect Lo nt: Cit ng Co ng Mo hole L	ame: 2014 Residential Street Renewals Incation: Thompson Drive, Portage Avenue to Lodge Avenue Incation: Thompson Drive, Portage Avenue to Lodge Avenue Incation: Generation: Active Drilling and Piling Intractor: Active Drilling and Piling Intractor: Active Drilling Avenue Incation: 125 mm Solid Stem Auger	Date Drilled: N Depth of Testh Logged by: So Reviewed by: (on Dr, 1.0 m E	lov iol th Ge	vem e: 2 ea l erma	iber : 2.0 m Bun an L om V	27, 2 1 eal Vest	013 cur	b
Depth (m)	Symbol	Description	Sample Type			Wat	er Co (%)	onter	nt
	8. S.	Asnhalt			2	5 5	0 /	5 1	00
		Concrete			 	·····		 	
		Clay Fill - grey, firm, moist, high plasticity - some fine to medium sand	BS		 	•34		 	
- 0.5 -			BS		 	•35	·	 	
		Clay	BS		 	•35			
- 1.0 -		- black, firm, moist, high plasticity - some silt - trace sand - brown below 1.1 m			 			 	
		- silty below 1.9 m	BS		····· 	●35			·þ·····
- 1.5 -			BS		 	•4	o	 	
			BS		 	•37	,	• • • • • • • • • • • • • • • • • • •	
- 20 -			BS		 	•4	3		
- 2.U -	L of 1	 No groundwater seepage or soil sloughing was observed during or upon The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion of	dr	illin	g.			

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Project Name: 2014 Residential Street Renewals Date Dr	illed: November 27, 2013
Project Location: Thompson Drive, Portage Avenue to Lodge Avenue Depth of	f Testhole: 2.0 m
Client: City of Winnipeg Logged	by: Sothea Bun
Drilling Contractor: Active Drilling and Piling Review	ed by: German Leal
Drilling Method: 125 mm Solid Stem Auger	
Testhole Location: 2.0 m North from property 227 & 231 Thompson Drive, 1.0 m West from I	East curb

Depth (m)	Symbol	Description	Sample Type		● Wa	ter C (%)	onte	nt
				2	25 5	<u>;0</u> 7	75 1	00
	17.	Asphalt			l I	1		
		Concrete			·····	·····	· [· · · · · ·	·[· · · · · ·
L .					. l	l	.l	
		Clay Fill			1	1		
		- some fine to coarse sand	BS		•36	\$	· · · · · ·	
		- trace fine gravel			 	 	 .	
					1	1		
- 0.5 -					+	¦	·¦	<u> </u>
ļ .			BS		 :•33	 	 -	 .
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- 1					 	 	· · · · · · · 	
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						ļ	ļ	
-			BS		€36	\$ 	· · · · · · · ·	- -
- 1.0 -					<u> </u>	į		Ļ
					1	[1	T
			BS		•36	¦		
					 	1 1	 .	
					1	1	1	
						<u>.</u>	·	
- 1.5 -					 +∎35	 ;	 .	
		Clay				Ì		1
		- brown, firm, moist, high plasticity						1
		- some slit - trace sand			 ·····	 	 .	
					Ì	Ì	İ	į.
-			BS		•4	µ ∦1	 	
						[
			BS		•4	,b	į	1
		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of	drillir	ıg.			
[
Page	1 of 1							



Project Name: 2014 Resident	ial Street Renewals	Date Drilled: November 27, 2013
Project Location: Thompson	Drive, Portage Avenue to Lodge Avenue	Depth of Testhole: 2.0 m
Client: City of Winnipeg		Logged by: Sothea Bun
Drilling Contractor: Active Dr	illing and Piling	Reviewed by: German Leal
Drilling Method: 125 mm Soli	d Stem Auger	
Testhole Location: 0.5 m Nor	th from property 234 & 238 Thompson Drive, 1.0) m East from West curb

Depth (m)	Symbol	Description	Sample Type		● Wat	ter C (%)	onte	nt
		Asphalt						
		Concrete			 	, 	 	
							l l	1
	βŽĆ	Granular Fill			1	(l 	1
		V - 20 mm maximum size aggregate	BC		 :∎33	 	 	1
		Clav Fill				Ì		
		- black, firm, moist, high plasticity			 	↓ □	 	. . I
0.5		- some medium to coarse sand				i		
- 0.5 -						1		Ī
			BS		····⊕4	3	 ·····	+
						l I		
						l		
						¦	 	
					1	1	İ	i -
			BS		●4	۱ ۱	 	· [· · · · · ·
- 1.0 -					Ļ	ļ		Ļ
						i I		
		Clay			ji	[j	
		- brown, firm, moist, nign plasticity - some silt			 	ו [.
		- trace sand	BS		•37	ĺ	į	į.
					l	t 	l 	
					įi		 	İ
						i I		
- 1.5 -			BS		+	0		+
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								1
							 ·····	+
						 		1
			BS		•35			
						! ! !	 	1
			BS		•38	3		
- 2.0 -		• No groundwater soonage or soil cloughing was cheened during or upon completion		drillin				
		• The soil was frozen to a depth of 0.6 m.			y.			
		Testhole terminated at a depth of 2.0 m.						
F -								
Page 1	l of 1							

TES	THO	LE T	H06



Depth of Testhole: 2.0 m

Logged by: Sothea Bun

Reviewed by: German Leal

Date Drilled: November 27, 2013

Project Name: 2014 Residential Street Renewals Project Location: Thompson Drive, Portage Avenue to Lodge Avenue **Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling**

Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 1.0 m North from property 247 & 249 Thompson Drive, 1.0 m West from East curb

Depth (m)	Symbol	Description					● Water Conten (%) PL LL									
				Grave (%)	I Sand (%)	Silt (%)	Clay (%)	2	55	50 7		00				
		Asphalt Concrete										 				
		Granular Fill						 ●13		 	 	 				
		Clay Fill - black, firm, moist, high plasticity - some sand, some silt						 		 	 	 				
- 0.5 -		- trace fine gravel								 	 					
			BS						•30	 	 	 . 				
			BS	3.7	22.1	12.0	62.2		• 30	 	 	 				
- 1.0 -		Clay								 	 	 				
		- brown, firm, moist, high plasticity - some silt - trace sand	BS	s				 	•3	 	 	 				
										 	 	.L 				
- 1.5 -			BS	s					•3	9 	 	 				
			BS	s				· · · · · · · · · · · ·	•	 44 	 	 				
- 2.0 -		 No groundwater seepage or soil sloughing was observed during The soil was frequente a depth of 0.6 m 	BS Or	upon	com	oletio	n of d	drillin	•37 g.	<u>+</u>		<u> </u>				
	1 of 1	The soli was nozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m.														



Date Drilled: November 27, 2013
Depth of Testhole: 2.0 m
Logged by: Sothea Bun
Reviewed by: German Leal
East from West curb

Depth (m)	Symbol	Description	Sample Type) Wat	ter Co (%)	onte	nt
	R. N. M.S.	Aanhalt		2	55	0 7	5 1	00
		Asphalt			ļ	l	Ì	Ì
-	4 4 4 4 4 7 7 4 7	Concrete			1			
					ļ	[ļ	.l
		Clay Fill			1	i I		
		- black, firm, moist, high plasticity - some medium to coarse sand	BS		●35	· · · · · · ·	 	1
					1 	ı 	, 	
					1	1		
- 0.5 -						i — —		<u> </u>
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L .						ļ	ļ	<u>.</u> j
					1	1	1	
			BS		●30 ⁻			· · · · · ·
- 10 -				L	 	 	 	
1.0								1
		Clay			 		 	+
		- brown, firm, moist, high plasticity			 	 	 	
		- some slit	BS		•36	1		1
					l	l	l	.l
					ĺ	ĺ	Ì	i –
					1	 		1
- 1.5 -			BC	┝		Ĺ— —		+
					•3	P I		
							 	Ì
					 	1 	 	· · · · · ·
			BS		•4	1 4	 	
						 	 	.
			BS		•	44	ļ	1
		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of c	Jrillin	g.			
Page 7	1 of 1							



Project I	: November 27, 2013						
Client: City of Winnipeg		Logged by: Sothea Bun					
Drilling Drilling I Testhole	Contractor: Active Drilling and Piling lethod: 125 mm Solid Stem Auger Location: 3.5 m South from property 275 & 295 Thompson Drive, 1.0 m V	Reviewed by Vest from East	/: Go cur	erman Leal b			
oth (r ibol	Description		e Type	● Water Content			

Depth (m)	Symbo	Description	Sample Ty	• Water Content (%)				
				2	25 8	50	75	100
		Asphalt	1			Ì	i	
	7 4 4 9 4 7 9 4 7	Concrete			 	· · · · · ·	· [· · · ·	
			-		l	.i	.i	
		- black firm moist high plasticity			1			
		- some medium to coarse sand	BS		●31	i	· [· · · ·	
L .					 	 .	 .	
					Ì	Ì	1	
- 0.5 -					+ 	<u> </u>		
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I			BS		•29 [°]	· · · · · ·	- - -	
- 1.0 -					Ļ	↓ ↓		
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					1	 	 .	
			BS		• 34	'İ	Ì	Ì
		Clav	1		l 	.t 		· · · · · · · · · · · · · · · · · · ·
		- brown, firm, moist, high plasticity			 ····		 	
		- some silt			į	į	į.	i i
- 1.5 -		- trace sand	BS		• •3	;9 	- · 	-+
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						.		
			BS		•3 	.φ 	Ì	
[·					 	Ì	Ĵ	
- 2.0 -			BS		•3	8		
		• No groundwater seepage or soil sloughing was observed during or upon completion	of o	drillir	ng.			
· ·	1	• The soil was frozen to a depth of 0.6 m.						
	$\left \right $							
[.]							
	$\left \right $							
Page [•]	1 of 1							







Core sample from Testhole TH01



Core sample from Testhole TH02







Core sample from Testhole TH03



Core sample from Testhole TH04







Core sample from Testhole TH05



Core sample from Testhole TH06







Core sample from Testhole TH07



Core sample from Testhole TH08



Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals Thompson Dr. between Portage Ave. and Lodge Ave.

PROJECT NO.: 123301054





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

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PROJECT: 2014 Residential St. Renewals Thompson Dr. between Portage Ave. and Lodge Ave.

PROJECT NO.: 123301054





Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999 Fax: (204) 488-6947



2014 RESIDENTIAL STREET RENEWALS GEOTECHNICAL INVESTIGATION OAKDEAN BOULEVARD ASSINIBOINE AVENUE TO 138 OAKDEAN BOULEVARD

Prepared for CITY OF WINNIPEG ENGINEERING DIVISION PUBLIC WORKS DEPARTMENT 106-1155 PACIFIC AVENUE WINNIPEG, MANITOBA R3E 3P1

Prepared by STANTEC CONSULTING LTD. 199 HENLOW BAY WINNIPEG, MANITOBA R3Y 1G4

December 12, 2013




TABLE 1 2014 RESIDENTIAL STREET RENEWALS OAKDEAN BOULEVARD, ASSINIBOINE AVENUE TO 138 OAKDEAN BOULEVARD GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Paveme	ent Surface	Pavement Stru	cture Material	Sample	Sample	Moisture	Pa	Particle Size Analysis			Atterberg Limits		
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Oakdean Boulevard 13.0 m South from property 112 & 114 Oakdean Boulevard, 1.0 m East from West curb	Asphalt	60	Granular Fill	75	Clay Fill	0.6	27	4.9	25.2	18.3	51.6	65	23	42
TH02	Oakdean Boulevard 8.0 m South from property 121 & 119 Oakdean Boulevard, 1.0 m West from East curb	Asphalt	55	Granular Fill	75	-	-	-	-	-	-	-	-	-	-
TH03	Oakdean Boulevard 1.5 m North from property 122 & 124 Oakdean Boulevard, 1.0 m East from West curb	Asphalt	140	-	-	-	-	-	-	-	-	-	-	-	-
TH04	Oakdean Boulevard 4.0 m South from property 131 & 133 Oakdean Boulevard, 1.0 m West from East curb	Asphalt	80	Granular Fill	75	-	-	-	-	-	-	-	-	-	-
TH05	Oakdean Boulevard 3.0 m South from property 134 & 136 Oakdean Boulevard, 1.0 m East from West curb	Asphalt	150	-	-	Clay	0.9	35	0.0	1.2	11.3	87.5	76	24	52

		TESTHOLE TH01			J	5	Sta	nt	tec			
Proje Proje Clien Drilli Drilli Testi	ect Na ect Lo nt: City ng Co ng Me hole L	me: 2014 Residential Street Renewals cation: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd y of Winnipeg ontractor: Active Drilling and Piling ethod: 125 mm Solid Stem Auger .ocation: 13.0 m South from property 112 & 114 Oakdean Boulevar	d, 1	C C L F .0 m	Date I Depth .ogge Revie East	Drille a of T ed by wed from	d: No esth v: Sof by: C n Wes	oven ole: thea Serm st cu	nber : 2.0 m Bun nan Lu Irb	27, 2 ' eal	2013	\$
Depth (m)	Symbol	Description	Sample Type	Gravel	Partic Distril	le Size	e Clav		● Wat PL	er C (%)	onte	ent
	1.0 K. 18 P.			(%)	(%)	(%)	(%)	2	25 5	<u> </u>	<u>'5 1</u>	100
		Asphalt Granular Fill							ı 		 	
		- 20 mm max size aggregate	BS					•8	i i []		 	i
		- black, firm, moist, high plasticity	BS					• • 1	 		 	
		- trace fine gravel							 		 .	
- 0.5 -		- some silt		L					 	·	 	
					· 25 · 2	10.2	51.6		 ►27∵	· · · · · ·	 	
			63	4.9	20.2	10.3	51.0				 .	
											i I	i I
			BS						•28			
- 1.0 -											 	
												ļ
			BS						●35		 	
												1
- 1.5 -		Clay	-						+		 	· +
		- brown, firm, moist, high plasticity - trace fine to medium sand	BS						●36		 	
		- some silt							····		 	· · · · · · ·
			BS						•34		 	
			BS						•37		! 	· .¦
- 2.0 -	×11114	 No groundwater seepage or soil sloughing was observed during of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	or u	ipon (comp	bletio	n of (drillir	ng.			
Page 1	of 1											

Proje Proje Clien Drilli Drilli Testl	ect Na ect Lo it: Cit ng Co ng Me nole L	TESTHOLE TH02 (Imme: 2014 Residential Street Renewals Date Ication: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd Date Intractor: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd Date Intractor: Active Drilling and Piling Rete Intractor: Active Drilling and Piling Rete Intractor: 8.0 m South from property 121 & 119 Oakdean Boulevard, 1.0 m Wet	State Drilled: ate Drilled: ogged by: a eviewed by est from E	ta : No stho Sof y: C	overr ole: 2 thea Serm	Cec nber 2 2.0 m Bun an Lo o	27, 2 eal	013	
Depth (m)	Symbol	Description		Sample Type	2	• Wat	er Cc (%)	onten	t
		Asphalt Granular Fill					- 		
		- 20 mm max size aggregate - some clay Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel - some silt		BS	•10 •1	6 	 	· · · · · · · · · · · · · · · · · · ·	
- 0.5 -		Clay		BS	••••	20	 	 	
		- black, firm, moist, high plasticity - trace fine to medium sand - some silt - brown below 1.2 m		BS		•37 	 	 	
				BS		●34 	 	 	
- 1.5 -				BS		●35 	 	+ + 	
				BS		●33 	 	 	
- 2.0 -				BS		●38			
 	of 1	 No groundwater seepage or soil sloughing was observed during or upon co The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	ompletion	of o	drillin	g.			

		TESTHOLE TH03	() St	ta	nt	ec			
Proje Proje Clier Drilli Drilli Testl	ect Na ect Lo nt: Cit ng Co ng Mo hole L	me: 2014 Residential Street Renewals C cation: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd C y of Winnipeg L ontractor: Active Drilling and Piling R ethod: 125 mm Solid Stem Auger .ocation: 1.5 m North from property 122 & 124 Oakdean Boulevard, 1.0 m Ea	Date Drilled: Depth of Tes Logged by: Reviewed by ast from Wo	: No sthe Sot y: C	overr ole: 2 hea Serm curb	nber : 2.0 m Bun an L	27, 2 1 eal	013	
Depth (m)	Symbol	Description		Sample Type		Wat	er Co (%)	onter	ıt
	88. 19	Asphalt			2	55	0 7	5 1	00
		Aspnalt Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel - some silt		BS BS	•9	 			
- 0.5 -		Clay		BS	······	●27	· /		
 - 1.0 -		 black, firm, moist, high plasticity trace fine to medium sand some silt brown below 1.4 m 		BS	······	•34	· 		
				BS		●32			
- 1.5 - 				BS		●32	· 	···· ··· ·	+
				BS BS		●32 ●37			
- 2.0 - 	of 1	 No groundwater seepage or soil sloughing was observed during or upon of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	of c	drillin	g.			

		TESTHOLE TH04	St	ta	nt	ec			
Proje Proje Clier Drilli Drilli Testl	ect Na ect Lo nt: Cit ng Co ng Mo hole L	ame: 2014 Residential Street Renewals Data ocation: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd Dep y of Winnipeg Log ontractor: Active Drilling and Piling Rev ethod: 125 mm Solid Stem Auger Location: 4.0 m South from property 131 & 133 Oakdean Boulevard, 1.0 m Wes	e Drilled: oth of Tes gged by: viewed by st from E	: No sthe Sof y: C	overr ole: 2 hea Serm	nber : 2.0 m Bun an L	27, 2 1 eal	013	
Depth (m)	Symbol	Description		Sample Type		Wat	er Co (%)	onter	nt
		Asphalt			2	55	0 7	5 10	00
		Granular Fill - 20 mm max size aggregate Clay Fill - black, firm, moist, high plasticity - some fine to coarse sand - trace fine gravel - some silt	/¯	BS BS	●5 ●1	 		 	
- 0.5 -				BS	·····	●29 	·····		<u> </u>
- 1.0 -		Clay - black, firm, moist, high plasticity - trace fine to medium sand - some silt - brown below 1.2 m		BS		●36	·	 	
				BS		●30 ●33	·	 	
				BS		●37			
				BS		•39))	 	
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon cor The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	mpletion	of o	drillin	g.			



Project Name: 2014 Residential Street Renewals Project Location: Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Test	hole L	ocation: 3.0 m South from property 134 & 136 Oakdean Boulevard	l, 1.0) m E	ast f	rom	West	curb			
Depth (m)	Symbol	Description	Sample Type	Gravel (%)	Partic Distri	le Size bution	Clay (%)	● Wa PL 	ter C (%)	onter LL 	1t
		Asphalt									
· -		Clay - black, firm, moist, high plasticity - trace fine to medium sand - some silt - brown below 0.9 m	BS					•36		 	
- 0.5 -			BS						 	 	
- 1.0 -			BS	0.0	1.2	11.3	87.5	 +●34 	 	 	
· -			BS					 	0 0 1 1 1 1	 	
- 1.5 - 			BS				 	+	ρ 	 	
· -			BS BS						 	 	
- 2.0 -		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	or u	ipon	comp	bletio	n of c	Irilling.			





Core sample from Testhole TH01



Core sample from Testhole TH02





Core sample from Testhole TH03



Core sample from Testhole TH04





Core sample from Testhole TH5



Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals, Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd

PROJECT NO.: 123301054





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals, Oakdean Blvd, Assiniboine Ave to 138 Oakdean Blvd

PROJECT NO.: 123301054





Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999 Fax: (204) 488-6947



2014 REGIONAL STREET RENEWALS GEOTECHNICAL INVESTIGAGTION ARMOUR CRESCENT HARRIS BOULEVARD TO HARRIS BOULEVARD

Prepared for CITY OF WINNIPEG ENGINEERING DIVISION PUBLIC WORKS DEPARTMENT 106-1155 PACIFIC AVENUE WINNIPEG, MANITOBA R3E 3P1

Prepared by STANTEC CONSULTING LTD. 199 HENLOW BAY WINNIPEG, MANITOBA R3Y 1G4

December 19, 2013

TH07 TH08 TH06 _TH05 TH04 \square THOS TH02 50 ARMOUR CRES TH09 TH $\pi\pi$ HARRIS BLVD **Testhole Location Plan** Project No.123301054 Drawn by: NB Figure: 1 2014 Residential Street Renewals **Stantec Armour Crescent** Reviewed by: GL Scale: NTS Date: Dec. 17, 2013 Harris Boulevard to Harris Boulevard



TABLE 1 2014 RESIDENTIAL STREET RENEWALS ARMOUR CRESCENT, HARRIS BOULEVARD TO HARRIS BOULEVARD GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location	Paveme	ent Surface	Pavemen Mat	t Structure erial	Sample	Sample	Moisture	Pa	rticle Siz	e Analys	sis	Att	erberg Lim	iits
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Armour Crescent 15.0 m West from Southwest corner of Harris Boulevard & Armour Crescent 1.0 m North from South curb	Concrete	185	Crushed Limestone	405	-	-	-	-	-	-	-	-	-	-
TH02	Armour Crescent 18.0 m West from property 206 Harris Boulevard & 39 Armour Crescent	Asphalt	40	_	-	-	-	-	-	-	-	-	-	-	-
	1.0 m South from North curb	Concrete	180												
TH03	Armour Crescent 2.0 m East from property 42.8.44 Armour Crescent	Asphalt	70	_	_	-	_	-	-	-	-	-	-	-	-
11100	1.0 m Northwest from Southeast curb	Concrete	160												
TH04	Armour Crescent 2.0 m South from property 36 & 38 Armour Crescent	Asphalt	30	_	_	Clav	0.6	34	0.0	24	15.6	82.0	83	29	54
11104	1.0 m East from West curb	Concrete	160			olay	0.0	01	0.0	2.1	10.0	02.0	00	20	01
TH05	Armour Crescent	Asphalt	70	_	_	_	_	-	_		-	-	-	_	-
11105	1.0 m West from East curb	Concrete	150	_	-										
TH06	Armour Crescent	Asphalt	35	_	_	_	_	-	_		-	-	-	_	-
11100	1.0 m East from West curb	Concrete	170												
TH07	Armour Crescent	Asphalt	55	_	_	Clay Fill	0.6	25	0.5	13.7	437	42 1	45	16	29
11107	1.0 m West from East curb	Concrete	145	_	-	Oldy T III	0.0	23	0.0	10.7	40.7	72.1	45	10	25
THOS	Armour Crescent	Asphalt	40		_	_	_	_					-	_	_
11100	1.0 m East from West curb	Concrete	170	_	-	-	_	_	-	-	-	-	-	-	-
THOO	Armour Crescent	Asphalt	35		_	_	_	_						_	_
1109	1.0 m South from North curb	Concrete	200	-	-	-	-	-	-	-	-	-	-	-	-
TH10	Armour Crescent	Asphalt	35				_	_		_				_	
INIU	1.0 m North from South curb	Concrete	160		-	-	-	-	-	-	-	-	-	-	-



Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling

Drilling Method: 125 mm Solid Stem Auger

Date Drilled: November 27, 2013 Depth of Testhole: 2.0 m Logged by: Sothea Bun Reviewed by: German Leal

Depth (m)	Symbol	Description	Sample Type	2) Wa t	ter Co (%)	onte r	It
	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete				 	 	
		Crushed Limestone - 20 mm maximum size aggregate	BS	•6		 	 	
- 0.5 -		Clav Fill	BS	•7	 			
		- grey, firm, moist, medium plasticity - silty - some fine to coarse sand				 	 	
- 1.0 -			BS		•35 	 	 	
· -			BS		●36	 	 	 ·····
- 1.5 -		Clay - brown, firm, moist, high plasticity - some silt - trace sand	BS	······	•4	1	 	
· -			BS		•4	2	 	
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	вs of c	Irillin	g.	46		
· -								

Testhole Location: 15.0 m West from Southwest corner of Harris Blvd & Armour Cr, 1.0 m North from South curb



Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Test	hole I	ocation: 18.0 m West from property 206 Harris Blvd & 39 Armour Cr, 1.0 m South from	n No	orth (curb			
Depth (m)	Symbol	Description	Sample Type	9) Wat	er Co (%)	onten	1t
		Asphalt			<u> </u>	<u> </u>	<u> </u>	
· -	r b r b a b r b b r b a b a b a b b a a	Concrete		 	 	 	 	
		Clay Fill - black, firm, moist, medium plasticity - silty	BS	 	•36	 		 ·····
- 0.5 -		- some fine to coarse sand - trace organic material		 	 	 		
· -		Clay - black, firm, moist, high plasticity	BS	 	●34 	 		 ·····
· -		- some silt - trace sand - brown below 1.2 m	BS	 	 	 	 	
- 1.0 -				 	 	 	 	
- -			BS	 	●35	 		
- 15 -				 	 	 	 	
			BS	 	•34 	 		
· -			BS	 	●35	 		
- 2.0 -			BS	 	•39) 		
· -		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of d	rillin	g.			

		TESTHOLE TH03	🚺 Sta	ar	٦t	ec	-		
Proje Proje Clier Drilli Drilli Test	ect Na ect Lo nt: Cit ng Co ng Mo hole L	me: 2014 Residential Street Renewals cation: Armour Crescent, Harris Boulevard to Harris Boulevard y of Winnipeg ontractor: Active Drilling and Piling othod: 125 mm Solid Stem Auger .ocation: 2.0 m East from property 42 & 44 Armour Crescent, 1.0 m Northw	Date Drilled: N Depth of Testl Logged by: So Reviewed by: vest from Sout	lov hol oth Ge	'em e: 2 ea l erma	ber 2 2.0 m Bun an Lo curl	27, 2 1 eal	013	
Depth (m)	Symbol	Description	Samole Type	odf. orduno	•) Wat	er Co (%)	onter	nt
		Asphalt						5 10	10
		Concrete			 	 	 		 .
		Clay Fill - black, firm, moist, medium plasticity - silty - some fine to coarse sand - brown below 0.9 m	B	S	 	•39 •••39)) 	 	
- 0.5			B	s		•4(
			B	S	 	•32	 	 	
- 1.0 -					 		 	 	
		Clay - brown, firm, moist, high plasticity - some silt - trace sand	B	S 	۲ ا	▶28 	 		
- 1.5 -			B	S	+	•36	 		
· ·			B	S	·····	•37	·····		
_ 20			в	S		●4	1		
- 2.0 - 		 No groundwater seepage or soil sloughing was observed during or upon The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion of	dri	illing	; g.	1		<u>.</u>
Page 1	1 of 1								



Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard **Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling**

Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 2.0 m South from property 36 & 38 Armour Crescent, 1.0 m East from West curb

Depth (m)	Symbol	Description	H 	Sample Type		Partic Distri	le Size butior	e 1		● Wat PL	ter Co (%)	onte 	nt
					(%)	(%)	(%)	(%)	2	55	0 7	′ 5 1	100
	A 4 4 4	Asphalt											
	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete							 	· · · · · 	r • • • • • • 	 	
		Clay Fill - black, firm, moist, medium plasticity \ - silty	Ē	3S						●38	}	 	
		- some fine to coarse sand							 · · · · ·			 	
- 0.5 -		Clay - brown, firm, moist, high plasticity - some silt		-						 		 	 . <u> </u>
		- trace sand	E	3S	0.0	2.4	15.6	82.0	· · · · · · · 	 ●3 4 	<u> </u> 	 	
			E	BS					 	€35	 	 	
- 1.0 -									 	 	 	 	
			E	35						●35	 	 	
											l	 	
- 1.5 -									i i	 	 	 	
				35					 	•3/		 	
										•••••	· · · · · · · · · · · · · · · · · · ·	 	
			E	3S						•3) 	 	
- 2.0 -			E	ss						●4	2		
		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	g or	r uf	oon (comp	oletio	n of d	drilling	g.			
Page	1 of 1												



Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Test	hole L	ocation: 8.0 m South from property 31 & 33 Armour Crescent, 1.0 m West from East c	urb)		
Depth (m)	Symbol	Description	Sample Type	● Water ((%)	Content	
	324	Asphalt				
· -		Concrete		·····		•••
 		Clay Fill - black, firm, moist, medium plasticity - silty - some fine to coarse sand	BS	 ••38 	 	
- 0.5 -		Clay - brown, firm, moist, high plasticity - some silt				
		- trace sand	BS			
- 1.0 -			BS	•37		
· -			BS	• • 37		
- 1.5 			BS	• • • • • • • • • • • • • • • • • • • •		
 			BS	●39 		•••
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of c	∮•43 drilling.		
Page 1	of 1					



Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 12.0 m North from property 24 & 26 Armour Crescent, 1.0 m East from West curb										
Depth (m)	Symbol	Description	Sample Type	9) Wat	er Content (%)				
	2 N. 1.	_ Asphalt			5 50		5 10			
	7 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete		 	 	 		 		
		Clay Fill - black, firm, moist, medium plasticity - silty - some fine to coarse sand	BS	 	•36	 	 	 		
- 0.5 -				 	 	 		 		
 		Clay - brown, firm, moist, high plasticity - some silt	BS	••••••	25 	 	••••••	 		
· ·		- trace sand	BS	 	•32	 	· · · · · · · · · · ·	 • • • • •		
- 1.0 -				 	 	 	 	∟ 		
 			BS	 	●36	 		 		
				י 	 	 	·····	 		
			BS	 	•38 		 	, 		
			BS	 	•4	2	· · · · · · · · · · · · · · · · · · ·	 		
- 2.0 -		No groundwater seepage or soil sloughing was observed during or upon completion	вs of c	 Irillin	 ●4	1		 		
· ·		 The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 			y.					
Page 1	1 of 1									



Depth of Testhole: 2.0 m

Logged by: Sothea Bun

Reviewed by: German Leal

Date Drilled: November 27, 2013

Project Name: 2014 Residential Street Renewals Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard Client: City of Winnipeg Drilling Contractor: Active Drilling and Piling

Drilling Method: 125 mm Solid Stem Auger

Testhole Location: 4.0 m North from property 21 & 23 Armour Crescent, 1.0 m West from East curb

Depth (m)	Symbol	Description	add F ald Bistribution Gravel Sand Silt Clav						● Water Content (%) PL LL						
				(%)	(%)	(%)	(%)	2	55	0 7	75	100			
		Concrete							· · · · · · ·	 	 	 			
· ·		Clay Fill - black, firm, moist, medium plasticity - silty - some fine to coarse sand	BS					• • • •	21	l I I I I I I I I I	.l 	· · · · · · · · · · · · · · · · · · ·			
- 0.5 -			BS	0.5	13.7	43.7	42.1		▶ 25 	! 		- <u> </u> 			
			BS					•	20 	 	 	 			
 			BS						₽26	 	 	 			
- 1.5 - - 1.5 -		Clay - brown, firm, moist, high plasticity - some silt	BS			· · · · · · · · · ·			●36	 	 - 	- 			
 		- some silt - trace sand	BS						●3{	 \$. 	 			
- 2.0 -		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	BS or ι	l Ipon	comp	oletio	n of d	drillin	●4 g.	<u>þ</u>		 			
 Page	1 of 1														



Project Name: 2014 Residential Street Renewals	Date Drilled: November 27, 2013
Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard	Depth of Testhole: 2.0 m
Client: City of Winnipeg	Logged by: Sothea Bun
Drilling Contractor: Active Drilling and Piling	Reviewed by: German Leal
Drilling Method: 125 mm Solid Stem Auger	
Testhole Location: 5.0 m South from property 16 & 18 Armour Crescent, 1.0 m	East from West curb

Depth (m)	Symbol	Description	Sample Type		• Wa t	ter Co (%)	o nte	nt
	2. S. S.	Asphalt			<u>.5 5</u>			1
		Concrete			 	 	 	 .
-		Clay Fill					\ 	1
		- black, firm, moist, medium plasticity	BS		●30 ⁻	 	 	+
		- silty - some fine to coarse sand			 	 	 	
					Ì	Ì	ĺ	i
- 0.5 -					<u>+</u>	<u> </u>	<u> </u>	<u> </u>
			BS	,	∣ ●24 […]	 ·····	 ·····	
					1			1
-								1
			БС		 	 	 	
			60		"2 I			į
- 1.0 -					+ 	 	 	1
						 	 	1
		Clay	BS		•35			
		- brown, firm, moist, nigh plasticity - some silt			l	l 	l 	1
ļ .		- trace sand				 	 	1
					i i	į.	ĺ	i
- 1.5 -			BS		•4	0	 	+
			BS		•37	7 7	 	
					 ·····		 	1
20			BS		●2	2		į
- 2.0 - 		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of	Jrillin	ıg.			
Page 1	1 of 1							



Project Name: 2014 Residential Street Renewals	Date Drilled: November 27, 2013
roject Name. 2014 Residential Offeet Renewals	Date Diffied. November 27, 2013
Project Location: Armour Crescent, Harris Boulevard to Harris Boulevard	Depth of Testhole: 2.0 m
Client: City of Winnipeg	Logged by: Sothea Bun
Drilling Contractor: Active Drilling and Piling	Reviewed by: German Leal
Drilling Method: 125 mm Solid Stem Auger	
Testhole Location: 5.0 m East from property 6 & 8 Armour Crescent, 1.0 m Sout	h from North curb

Depth (m)	Symbol	Description	Sample Type		● Wat	ter Co (%)		nt
	<u>,</u>	Asphalt			.5 5 		5 1	
		Concrete			 	 	 	 .
						1		1
-			-				\ 	1
		- black, firm, moist, medium plasticity	BS		●32	 	 	· ····
		- silty			 	 	 	
		- some fine to coarse sand			j i	Ì	ļ	į
- 0.5 -					<u> </u>	<u> </u>	<u> </u>	<u> </u>
			BS	,	●25 […]	 	 ·····	
								1
-								1
						 	 	1
ļ .					 	 	 	
			69		23			
- 1.0 -					⊢ 	i 	 	
					 	 	 	İ
			BS	•	21	ļ		
		Clay			l 	l 	l 	1
		- brown, firm, moist, nigh plasticity - some silt				 	 	
4.5		- trace sand						i i
- 1.5 -			BS		•33			+
					 	l I	 	1
ļ .					 	 	 	
							ļ	i.
			BS		●27	+ 	 	
						 	 	. <u> </u>
- 20 -			BS		•38	\$	İ	İ
		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of	İrillin	g.			
Page 1	1 of 1							



Project Name: 2014 Residential Street RenewalsDate Drilled: November 27, 2013Project Location: Armour Crescent, Harris Boulevard to Harris BoulevardDepth of Testhole: 2.0 mClient: City of WinnipegLogged by: Sothea BunDrilling Contractor: Active Drilling and PilingReviewed by: German LealDrilling Method: 125 mm Solid Stem AugerTesthole Location: 7.0 m West from Southwest corner of Harris Blvd & Armour Cr, 1.0 m North from South curb

Depth (m)	Symbol	Description	Sample Type		● Wat	t er Co (%)	onte	nt
	.	Asphalt	-					
		Concrete			 ···· 	 	 	 .
		Clay Fill - black, firm, moist, medium plasticity - silty	BS		●35		 	
		- some fine to coarse sand			 	. 	 	 .
- 0.5 -			BS	·····	●32	· ' · · · · · ·	 	
			BS		24	 	 	
- 1.0 -					 	 	 	
		- brown, firm, moist, high plasticity - some silt - trace sand	BS		●29	 	 	
					 	, 	, 	
- 1.5 -			BS		●32	, 	, 	+
- ·			BS		•37	 7	 	
- 2.0 -			BS		•3{	 	 	
		 No groundwater seepage or soil sloughing was observed during or upon completion The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	of	drillin	ıg.			
Page	1 of 1							







Core sample from Testhole TH01









Core sample from Testhole TH03









Core sample from Testhole TH05









Core sample from Testhole TH07









Core sample from Testhole TH09





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals Armour Cr. between Harris Blvd. and Harris Blvd.

PROJECT NO.: 123301054





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, Manitoba R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals Armour Cr. between Harris Blvd. and Harris Blvd.

PROJECT NO.: 123301054





Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999 Fax: (204) 488-6947



2014 RESIDENTIAL STREET RENEWALS GEOTECHNICAL INVESTIGATION ASSINIBOINE CRESCENT 110 m SOUTH OF PORTAGE AVENUE TO PORTAGE AVENUE

Prepared for CITY OF WINNIPEG ENGINEERING DIVISION PUBLIC WORKS DEPARTMENT 106-1155 PACIFIC AVENUE WINNIPEG, MANITOBA R3E 3P1

Prepared by STANTEC CONSULTING LTD. 199 HENLOW BAY WINNIPEG, MANITOBA R3Y 1G4

December 12, 2013





TABLE 1 2014 RESIDENTIAL STREET RENEWALS ASSINIBOINE CRESCENT, 110 m SOUTH OF PORTAGE AVENUE TO PORTAGE AVENUE GEOTECHNICAL INVESTIGATION

Testhole ID	Testhole Location		vement Surface Pavement Structure Material Sample Sample Moisture Particle Size A				ze Analys	sis	Atterberg Lin						
		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Assiniboine Crescent	Asphalt	50	Cropular Fill	65	Clay Fill	0.6	22	4.6	22.0	25.4	46.2	50	22	27
	1.0 m West from East curb	Concrete	140	Granulai Fili	" 0 <u>0</u>	Ciay I III	0.0	55	4.0	20.0	20.4	40.2	59	22	57
THO2	Assiniboine Crescent 5.0 m North from property 2420 & 2422 Assiniboine Crescent, 1.0 m East from West curb	Asphalt	30			_	_	_	_			_	_	_	_
THUZ		Concrete	160	-	-	-	-	-	-		-	-	-	_	_
THO2	Assiniboine Crescent 2.0 m South from property 2424 & 2426 Assiniboine Crescent, 2.0 m West from East curb	Asphalt	30	Cropular Fill	50	Silty Clay	0.0	24	0.0	6.5	22.0	60.6	01	22	50
1H03		Concrete	130	Granulai Fili	50	Silly Ciay	0.9	34	0.0	0.5	32.9	00.0	91	52	59

	TESTHOLE TH01							antec						
Project Name: 2014 Residential Street RenewalsDate Drilled: November 27, 2013Project Location: Assiniboine Cres,110 m South of Portage Ave to Portage Ave Client: City of WinnipegDepth of Testhole: 2.0 m Logged by: Sothea Bun Reviewed by: German LealDrilling Contractor: Active Drilling and PilingReviewed by: German LealDrilling Method: 125 mm Solid Stem Auger Testhole Location: 4.0 m North from property 2418 & 2416 Assiniboine Crescent, 1.0 m West from East curb								.013						
Depth (m)	Symbol	Description adu			Partic Distril	e Size	9	● Water Content (%)						
			Sa	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	25 F	50 7		20			
		Asphalt Concrete	-						 	5 10 	50 			
		Granular Fill - 20 mm max size aggregate Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand trace fine aroual	BS					●27 		 	 			
- 0.5		- trace line graver - some silt	BS	4.6	23.8	25.4	46.2	 	 		 			
 - 1.0 -			BS					 ●32	 	 	 			
		Silty Clay - brown, firm, moist, high plasticity - trace fine to coarse sand	BS					 	 	 				
- 1.5 -			BS					+ 	 	 				
			BS					 	 1 2	 	 - - - - -			
			BS					•	46	 	 			
- 2.0 - 	~ * ~ * * *	 No groundwater seepage or soil sloughing was observed during of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	or u	pon	comp	oletio	n of d	rilling.	·					
Page 1	of 1													
	TESTHOLE TH02				tantec									
---	---	--	------------	---	--	-------------	---	---------------------------------------	---	--	--	--		
Project Name: 2014 Residential Street RenewalsDate Drilled:Project Location: Assiniboine Cres,110 m South of Portage Ave to Portage AveDepth of TestClient: City of WinnipegLogged by: SDrilling Contractor: Active Drilling and PilingReviewed by:Drilling Method: 125 mm Solid Stem AugerTesthole Location: 5.0 m North from property 2420 & 2422 Assiniboine Crescent, 1.0 m East from				November 27, 2013 Sthole: 2.0 m Sothea Bun y: German Leal n West curb										
Depth (m)	Symbol	Description					• Water Content (%)							
	<u>> </u>	Asphalt			2	5 5	0 7	5 1						
		Concrete	/			 	 	 	 					
 		Clay Fill - black, firm, moist, medium plasticity - some fine to coarse sand - trace fine gravel - some silt		BS		●34			 					
- 0.5 -				BS	 	•33	 		I 					
- 1.0 -				BS	·····	●35	 	 	 					
		Silty Clay - brown, firm, moist, high plasticity - trace fine to coarse sand		BS		●34			 					
- 1.5 - 				BS		● 34	 	 	 					
· ·				BS BS		●35 ●37	· · · · · · · · ·	• • • • • • • • • • • • • • • • • • •	· · · · · · · · · · · · 					
- 2.0 -		 No groundwater seepage or soil sloughing was observed during or upon of The soil was frozen to a depth of 0.6 m. Testhole terminated at a depth of 2.0 m. 	completion	of c	Irillin	g.			1					

TESTHOLE TH03



Project Name: 2014 Residential Street Renewals

Project Location: Assiniboine Cres,110 m South of Portage Ave to Portage Ave

Client: City of Winnipeg

Drilling Contractor: Active Drilling and Piling

Drilling Method: 125 mm Solid Stem Auger

Date Drilled: November 27, 2013 Depth of Testhole: 2.0 m Logged by: Sothea Bun Reviewed by: German Leal

Testhole Location: 2.0 m South from property 2424 & 2426 Assiniboine Crescent, 2.0 m West from East curb													
Depth (m)	Symbol	Description	Sample Type	Gravel (%)	Partic Distri	le Size bution	Clay (%)	● Wat PL 25 5	● Water Content (%) PL LL				
	e 6 4 0 4 4	Asphalt	+					20 0					
		Concrete						· · · · · · ·	, I -	 			
		Granular Fill	-						i I I I	 			
	\sim	- 20 mm max size aggregate											
		Clay Fill	BS					●35					
		- black, firm, moist, medium plasticity						· · · · · · · · · · · ·	ι Ι []	 			
		- trace fine gravel							1 	 			
- 0.5 -		- some silt			+				i — — j	<u> </u>			
		City Olay	BS					•29					
		- brown, firm, moist, high plasticity							1 	 			
		- trace fine to coarse sand) 				
									(·····İ	· · · · · · · · · · · · · · · · · · ·			
			BS	0.0	6.5	32.9	60.6	▶34	<u> </u>	<u> </u>			
- 10				L		L			 	 			
1.0													
									ſ				
			BS						, , 	 ;			
									(
									i				
- 1.5 -				L	+			+	, ∣ Į — —∣	 			
			85					●30	ן י ן ו ו	 			
· -													
									, I []	 			
			BS					●38	} 	 			
			BS					●34		: 			
- 2.0 -									I				
		 No groundwater seepage or soil sloughing was observed during The soil was frozen to a depth of 0.6 m 	or ι	lpon	comp	oletio	n of c	drilling.					
		Testhole terminated at a depth of 2.0 m.											
· -													





Core sample from Testhole TH01



Core sample from Testhole TH02





Core sample from Testhole TH03



Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals Assiniboine Crescent, 110 m South of Portage Ave to Portage Ave

PROJECT NO.: 123301054





Attention:

PARTICLE SIZE ANALYSIS ASTM D422

City of Winnipeg Engineering Division, Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Derek Teperto

PROJECT: 2014 Residential St. Renewals Assiniboine Crescent, 110 m South of Portage Ave to Portage Ave

PROJECT NO.: 123301054

