## APPENDIX 'A'

## **GEOTECHNICAL INVESTIGATION REPORT**



Stantec Consulting Ltd. 199 Henlow Bay Winnipeg MB R3Y 1G4

February 26, 2024

Project/File: 123316895

### Ali Campbell

Dillon Consulting Ltd. 1558 Willson Place Winnipeg, MB R3T 0Y4

Good day Ali,

### Reference: 24-R-02 Geotechnical Investigation

Stantec Consulting Ltd. (Stantec) was retained to undertake a factual geotechnical investigation for the Local Streets Package 24-R-02 in Winnipeg, Manitoba. Use of this report is subject to the Statement of General Conditions provided in **Appendix A**.

The subsurface coring and drilling sampling program was conducted from January 10, 2024, to January 25, 2024. Pavement coring was performed by our geotechnical field personnel, and drilling services were provided by Maple Leaf Drilling under the supervision of our personnel. The borehole locations are shown on the attached Borehole Location Plan provided in **Appendix B**. When subsurface drilling was required, the pavement cores were sampled with a 150 mm bit and boreholes were drilled with 125 mm solid stem augers. Geotechnical drilling boreholes were terminated at a depth of 2.0 m below the pavement, which resulted in borehole depths ranging from 2.14 m to 2.25 m below the surface. Soil samples were obtained directly from the auger flights at depths of 0.6 m, 0.9 m, 1.2 m, 1.6 m, and 2.0 m from the bottom of the existing pavement. Upon completion of drilling, the testholes were examined for evidence of sloughing and groundwater seepage. The borehole records are provided in **Appendix C**. The soil classification used in the borehole records is as per ASTM D2487 – *Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)*. Core photographs are provided in **Appendix D**.

## Reference: 24-R-02 Geotechnical Investigation

# **EXISTING PAVEMENT THICKNESS**

The existing pavement thickness is provided in the following table:

Street	Core ID	Asphalt Thickness (mm)	Concrete Thickness (mm)	Total Pavement Thickness (mm)
Carruthers Ave	BH-40	0	165	165
Carruthers Ave	BH-41	0	175	175
Carruthers Ave	BH-42	0	140	140
McAdam Ave	BH-43	0	175	175
McAdam Ave	BH-44	40	130	170
McAdam Ave	BH-45	20	170	190
Gordon Ave	BH-46	95	160	255
Gordon Ave	BH-47	30	140	170
Gordon Ave	BH-48	90	100	190
Rudolph Bay	BH-49	0	145	145
Rudolph Bay	BH-50	0	150	150
Rudolph Bay	BH-51	0	175	175
Rudolph Bay	BH-52	0	140	140
Dahlia Alley	BH-53	0	160	160
Dahlia Alley	BH-54	0	165	165
Hood Ave	BH-55	0	145	145
Hood Ave	BH-56	0	165	165
Fortier Ave	BH-57	0	165	165
Fortier Ave	BH-58	0	150	150
Summerfield Way	BH-59	55	145	200
Summerfield Way	BH-60	0	155	155
Summerfield Way	BH-61	0	145	145
Summerfield Way	BH-62	0	150	150
Summerfield Way	BH-63	0	155	155
Summerfield Way	BH-64	0	150	150
Summerfield Way	BH-65	65	160	225
Tranquility Cove	BH-66	75	155	230
Tranquility Cove	BH-67	0	155	155

Table 1 – Existing	Pavement	Thickness
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#### Reference: 24-R-02 Geotechnical Investigation

Street	Core ID	Asphalt Thickness (mm)	Concrete Thickness (mm)	Total Pavement Thickness (mm)
Tranquility Cove	BH-68	0	150	150
Snowdon Ave	BH-69	0	140	140
Snowdon Ave	BH-70	0	135	135
Snowdon Ave	BH-71	0	180	180
Snowdon Ave	BH-72	0	125	125
Snowdon Ave	BH-73	30	150	180
Dearborn Ave	BH-74	0	165	165
Dearborn Ave	BH-75	0	170	170
Lacy St	BH-76	0	165	165
Lacy St	BH-77	0	180	180
Norilyn Bay	BH-78	0	155	155
Norilyn Bay	BH-79	0	160	160
Norilyn Bay	BH-80	0	150	150
Norilyn Bay	BH-81	0	155	155
Kullman St	BH-82	0	150	150
Kullman St	BH-83	0	155	155

## LABORATORY TESTING

The following laboratory tests were conducted on select soil samples:

- ASTM D2216 Laboratory Determination of Water (Moisture) Content of Soil by Mass
- ASTM D4318 Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D7928 Particle-Size Distribution of Fine-Grained Soils Using The Sedimentation Analysis
- ASTM D698 Laboratory Compaction Characteristics of Soil Using Standard Effort
- ASTM D1883 California Bearing Ratio (CBR) of Laboratory-Compacted Soils
- CSA A23.2-14C Obtaining and testing drilled cores for compressive strength testing

The CBR tests were performed at 95% maximum dry density under soaked conditions. Prior to testing the concrete core samples for compressive strength, the cores were conditioned in water at room temperature for 48 hours. The moisture content results are shown on the borehole records, and the laboratory test reports are provided in **Appendix E**.

February 26, 2024 Ali Campbell Page 4 of 4

Reference: 24-R-02 Geotechnical Investigation

## CLOSURE

We appreciate the opportunity to assist you on this project. Please contact the undersigned if you have any questions regarding this report.

Regards,

STANTEC CONSULTING LTD.

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Attachment: Appendix A – Statement of General Conditions Appendix B – Borehole Location Plan Appendix C – Borehole Records Appendix D – Core Photographs Appendix E – Laboratory Test Reports • Atterberg Limits Test Reports

- Particle-Size Analysis Reports
- Standard Proctor Test Reports
- CBR Test Reports
- Concrete Core Compressive Strength Test Results

# **APPENDIX A**

**Statement of General Conditions** 

#### STATEMENT OF GENERAL CONDITIONS

USE OF THIS REPORT: This report has been prepared for the sole benefit of the Client or its agent and may not be used by any third party without the express written consent of Stantec and the Client. Any use which a third party makes of this report is the responsibility of such third party.

BASIS OF THE REPORT: The information, opinions, and/or recommendations made in this report are in accordance with Stantec's present understanding of the site-specific project as described by the Client. The applicability of these is restricted to the site conditions encountered at the time of the investigation or study. If the proposed site-specific project differs or is modified from what is described in this report or if the site conditions are altered, this report is no longer valid unless Stantec is requested by the Client to review and revise the report to reflect the differing or modified project specifics and/or the altered site conditions.

STANDARD OF CARE: Preparation of this report, and all associated work, was carried out in accordance with the normally accepted standard of care in the state or province of execution for the specific professional service provided to the Client. No other warranty is made.

INTERPRETATION OF SITE CONDITIONS: Soil, rock, or other material descriptions, and statements regarding their condition, made in this report are based on site conditions encountered by Stantec at the time of the work and at the specific testing and/or sampling locations. Classifications and statements of condition have been made in accordance with normally accepted practices which are judgmental in nature; no specific description should be considered exact, but rather reflective of the anticipated material behavior. Extrapolation of in situ conditions can only be made to some limited extent beyond the sampling or test points. The extent depends on variability of the soil, rock, and groundwater conditions as influenced by geological processes, construction activity, and site use.

VARYING OR UNEXPECTED CONDITIONS: Should any site or subsurface conditions be encountered that are different from those described in this report or encountered at the test locations, Stantec must be notified immediately to assess if the varying or unexpected conditions are substantial and if reassessments of the report conclusions or recommendations are required. Stantec will not be responsible to any party for damages incurred as a result of failing to notify Stantec that differing site or sub-surface conditions are present upon becoming aware of such conditions.

PLANNING, DESIGN, OR CONSTRUCTION: Development or design plans and specifications should be reviewed by Stantec, sufficiently ahead of initiating the next project stage (property acquisition, tender, construction, etc.), to confirm that this report completely addresses the elaborated project specifics and that the contents of this report have been properly interpreted. Specialty quality assurance services (field observations and testing) during construction are a necessary part of the evaluation of sub-subsurface conditions and site preparation works. Site work relating to the recommendations included in this report should only be carried out in the presence of a qualified geotechnical engineer; Stantec cannot be responsible for site work carried out without being present.

# **APPENDIX B**

**Borehole Location Plan** 
























































































# APPENDIX C

**Borehole Records** 

## SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

### SOIL DESCRIPTION

#### Terminology describing common soil genesis:

Rootmat	<ul> <li>vegetation, roots and moss with organic matter and topsoil typically forming a mattress at the ground surface</li> </ul>
Topsoil	- mixture of soil and humus capable of supporting vegetative growth
Peat	- mixture of visible and invisible fragments of decayed organic matter
Till	- unstratified glacial deposit which may range from clay to boulders
Fill	- material below the surface identified as placed by humans (excluding buried services)

#### Terminology describing soil structure:

Desiccated	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
Fissured	- having cracks, and hence a blocky structure
Varved	- composed of regular alternating layers of silt and clay
Stratified	- composed of alternating successions of different soil types, e.g. silt and sand
Layer	- > 75 mm in thickness
Seam	- 2 mm to 75 mm in thickness
Parting	- < 2 mm in thickness

#### Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Unified Soil Classification System (USCS) (ASTM D 2487 or D 2488) which excludes particles larger than 75 mm. For particles larger than 75 mm, and for defining percent clay fraction in hydrometer results, definitions proposed by Canadian Foundation Engineering Manual, 4<sup>th</sup> Edition are used. The USCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

#### Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 75 mm, visible organic matter, and construction debris) is based upon the proportion of these materials present:

Trace, or occasional	Less than 10%
Some	10-20%
Frequent	> 20%

#### Terminology describing compactness of cohesionless soils:

The standard terminology to describe cohesionless soils includes compactness (formerly "relative density"), as determined by the Standard Penetration Test (SPT) N-Value - also known as N-Index. The SPT N-Value is described further on page 3. A relationship between compactness condition and N-Value is shown in the following table.

<b>Compactness Condition</b>	SPT N-Value
Very Loose	<4
Loose	4-10
Compact	10-30
Dense	30-50
Very Dense	>50

#### Terminology describing consistency of cohesive soils:

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by *in situ* vane tests, penetrometer tests, or unconfined compression tests. Consistency may be crudely estimated from SPT N-Value based on the correlation shown in the following table (Terzaghi and Peck, 1967). The correlation to SPT N-Value is used with caution as it is only very approximate.

Consistency	Undrained SI	Approximate	
Consistency	kips/sq.ft.	kPa	SPT N-Value
Very Soft	<0.25	<12.5	<2
Soft	0.25 - 0.5	12.5 - 25	2-4
Firm	0.5 - 1.0	25 - 50	4-8
Stiff	1.0 - 2.0	50 – 100	8-15
Very Stiff	2.0 - 4.0	100 - 200	15-30
Hard	>4.0	>200	>30



### RECOVERY

BS

HQ, NQ, BQ, etc.

For soil samples, the recovery is recorded as the length of the soil sample recovered. For rock core, recovery is defined as the total cumulative length of all core recovered in the core barrel divided by the length drilled and is recorded as a percentage on a per run basis.

#### N-VALUE

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 140 pound (63.5 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (300 mm) into the soil. In accordance with ASTM D1586, the N-Value equals the sum of the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (610 mm) sampler is used, the number of blows (N) required to drive the sampler over the interval of 6 to 18 in. (150 to 450 mm). However, when a 24 in. (300 to 610 mm) may be reported if this value is lower. For split spoon samples where insufficient penetration was achieved and N-Values cannot be presented, the number of blows are reported over sampler penetration in millimetres (e.g. 50/75). Some design methods make use of N-values corrected for various factors such as overburden pressure, energy ratio, borehole diameter, etc. No corrections have been applied to the N-values presented on the log.

#### **DYNAMIC CONE PENETRATION TEST (DCPT)**

Bulk sample

Rock core samples obtained with the use

of standard size diamond coring bits.

Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to 'A' size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone one foot (300 mm) into the soil. The DCPT is used as a probe to assess soil variability.

#### OTHER TESTS

S	Sieve analysis
Н	Hydrometer analysis
k	Laboratory permeability
Y	Unit weight
Gs	Specific gravity of soil particles
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore
C0	pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct Shear
С	Consolidation
Qu	Unconfined compression
	Point Load Index (Ip on Borehole Record equals
lp	$I_p$ (50) in which the index is corrected to a
	reference diameter of 50 mm)

Ţ	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
Ŷ	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer

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Printed Feb 8 2024 15:11:46 SOIL 12331 6895\_24:R-02 GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

PR	ENT	Dillon Consulting Ltd.			E	BOR	EH	OLE RECOF	RD						I	PRC	JEC	1 ТС	NO.:	: _1	BH-4 2331689
	OJE	CT: 24-R-02 Geotechnical Inv	estigat	ion					_						I	BH E	ELE	/AT	ION	I:	N/A
LO	CATI	ON: McAdam Avenue							-						I	DAT	UM:		N/A		
DA	TE B	ORED: <u>January 17 2024</u>							_ W/	TER	LEVE	EL:	Ν	/ <b>A</b>						· · · ·	
	ē				SAM	PLES			UNDKAINED SHEAR STRENGTH, CU (KPa) ▲ LABORATORY TEST												
DEPTH (m)	EVATION (m	SOIL DESCRIPTION (MUSCS)	ATA PLOT	PE	ABER	ERY (mm) CR %	ALUE QD %	OTHER TESTS / REMARKS	▲ LABORATORY TEST     ◆     POCKET PENETROMETER     50 kPa     100 kPa								<ul> <li>◆ FIELD VANE TEST</li> <li>□ POCKET SHEAR VANE</li> <li>150 kPa</li> <li>200 kPa</li> </ul>				
	Щ		STF	F	NUN	RECOVE or T	N-N N-N R 10		WA <sup>⊤</sup> X SI	FER CO PT (N-v	DNTEN alue) E	NT & A	ATTE S/0.: r Conte	ERBE 3m ent (%) ar	RG L		S	₩P H	-ŏ-		E C
나		ASPHALT							1		<u>20</u>  :::	30	4	0 ::::	<u>50</u> :   : :	60	) :::	<u>/0</u> : ::	8	0	
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				AS							1:::				<u></u>						$\sim$
		End of Borehole • Borehole terminated at a depth of 2.1: • No groundwater seepage or soil sloug • Borehole backfilled with auger cutting • Borehole surface backfilled as per Cit	9 m. ghing was s and be ty of Winn	AS s obse ntonit	erved e chip Stree	durring s. t Cuts	ן Manu	on completion of dri al.	lling.		1				9						
		End of Borehole • Borehole terminated at a depth of 2.1 • No groundwater seepage or soil sloug • Borehole backfilled with auger cutting • Borehole surface backfilled as per Cit	9 m. gs and be ty of Winn	As s obse ntoniti hipeg	erved e chip Stree	during s. t Cuts	g or up	on completion of dri al. Drilling Cont	lling.	: <b>M</b> a	aple L	.eaf l	Drill	ina L							
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Printed Feb 8 2024 15:11:46 SOIL 123316895\_24:R-02 GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

C		Stantec			E	BOF	REH	OLE RECO	RD						Pf	ROJ	ECT	- NO	.: _1	BH- 233168	- <b>46</b> 95
PF	ROJE	CT: 24-R-02 Geotechnical Inv	<u>/estigat</u>	ion					_						Bł	H EL	EVA		N:	N/A	
LC	DCATI	ION: Gordon Avenue							-		/				D	ATU	M: _	N//	4		
	ATE B	ORED: <u>January 17 2024</u>											N/			kDe)					<u> </u>
DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION (MUSCS)	STRATA PLOT	ТҮРЕ	SAM	RECOVERY (mm) 374 or TCR % S	N-VALUE or RQD %	OTHER TESTS / REMARKS	UNL ★ P WA	ABORA OCKET 50 TER C PT (N-1	(TOR) PEN kPa H ONTE	TEST TEST TRO	NET 100   	ER (Pa ERBEI	+, Cu ( ◆ FII □ PC 1t RG LIN	KPA) ELD V DCKE 50 kP 	VANE ET SH Pa V	E TES <sup>-</sup> HEAR ' 200 V <sub>P</sub> W	T VANE ) kPa ↓ ₩L ■	BACKFILL	ELEVATION (m)
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-		CONCRETE	· <i>D</i> · A																		-
		Firm brown fat <b>CLAY (CH)</b> - silty, trace sand, trace gravel																			-
-				( AS				Sieve/Hydroat0.9 m G S M C 1% 4% 32% 63%			ŀ										-
- 1 -						-		170 470 3270 0370													-
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		Soft tan lean CLAY (CL)		AS							¢	/	Ø			· · · · · · · · · · · · · · · · · · ·					- - - -
- 2 -		Firm brown fat CLAY (CH)		( AS									· · · · · · · · · · · · · · · · · · ·				· · · · · · · · · · · · · · · · · · ·				-
- 3 -		End of Borehole • Borehole terminated at a depth of 2.2 • No groundwater seepage or soil slou • Borehole backfilled with auger cutting • Borehole surface backfilled as per Ci	255 m. Ighing was the sand be ty of Winn	s obsantonit	erved e chip Stree	during ss. t Cuts	g or up	bon completion of dr Ial.	illing.			<u>.  </u>				<del></del>					
								Drilling Cont	tractor	: M	aple l	_eaf I	Drilli	ing L	td.			L	ogged	By: K\	V
BAC	KFILL	. SYMBOL 🔜 ASPHALT	GR	JUT			ICRE	TE Drilling Meth	nod:	125 r	nm S	SA						R	leview	ed By:	GB
В	ENTC	DNITE	. SAN	١D		SLO	UGH	Completion	Depth		2.255	5 m						P	age	1 of 1	

Printed Feb 8 2024 15:11:47 SOIL 123316895\_24-R-02 GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

C		Stantec			E	BOR	REH	OLE RECOI	RD												BH-	-47
CL	IENT	Dillon Consulting Ltd.							_							Pf	ROJ	EC	T NO	.: _1	233168	<u>95</u>
PF	ROJEC	CT: 24-R-02 Geotechnical Inv	<u>estigat</u>	ion					_							Bł	H EL	EV	ATIO	N:	N/A	
LC	CATI	ON: Gordon Avenue							_							D	ATU	IM:	N//	4		
DA	ATE B	ORED: January 17 2024							W	ATE	R LE	VEL	.: _	N/A								
	-				SAM	PLES			UNE	DRAIN	IED S	SHEA	R STI	REN	GTH	, Cu (	kPa)			_		-
)ЕРТН (m)	EVATION (m	SOIL DESCRIPTION (MUSCS)	ATA PLOT	щ	BER	RY (mm) .R %	LUE 2D %	OTHER TESTS / REMARKS	ABOKATUKY TEST     ◆ FIELD VANE     * POCKET PENETROMETER     D POCKET SHE     50 kPa     100 kPa     150 kPa							E TES HEAR 20	I VANE ) kPa 	CKFILL	EVATION (m			
	ELE		STR	Т	NUM	RECOVEI or TC	N-VA or RG		WA XX S	TER PT (N	CONT I-value	TENT e) BL 2	C&AT OWS/ Water C	10.3m	RBEF			1	ν <sub>Ρ</sub> w Ι €	′ W∟ ⊢− <b>1</b>	BA	ELE
- 0 -		ASPHALT	, <b>P.A.</b>											<u>40</u> : :			<u>: </u> :	:::'				F
-		CONCRETE																				F I
- - - -		Firm brown fat <b>CLAY (CH)</b> - silty, trace gravel												· · · · · · · · · · · · · · · · · · ·			·         ·           ·         ·					-
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		End of Borehole • Borehole terminated at a depth of 2.17 • No groundwater seepage or soil sloug • Borehole backfilled with auger cutting • Borehole surface backfilled as per Cit	7 m. s and be y of Wini	s obse ntonit nipeg	erved e chip Stree	durinç ıs. t Cuts	g or up	on completion of dr al.	illing.													-
- - - 4 -								Drilling Cont	racto	r: N	Vaple	e Le	af Di	rillin	g Lt	d.			L	oggeo	By: K	- - - - V
BAC	KFILL	SYMBOL ASPHALT	GR	JUT	÷,		ICRE	TE Drilling Meth	od:	125	mm	SS	A						F	Review	ed By:	GB
В	ENTO	NITE XDRILL CUTTINGS	SAN	١D		SLO	UGH	Completion	Depth	1:	2.1	7 m							F	age	1 of 1	

Printed Feb 8 2024 15:11:48 SOIL 123316895\_24:R-02 GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

IEN	Stantec			E	BOR	REH	OLE RECOF	RD							PR	OJE	СТ	NC	D.: _	B 12331	H-4 <u>689</u> :		
OJE	ECT: 24-R-02 Geotechnical Inv	vestigati	ion					_							BH	ELE	EVA	TIO	N: _	N/.	<u>A</u>		
CAT	TION: Gordon Avenue							_							DA	TUN	Л: _	N//	A				
TE	BORED: January 17 2024							WA	ATER	LEV	EL:	_N	/ <b>A</b>					1	_				
ELEVATION (m)	SOIL DESCRIPTION (MUSCS)	STRATA PLOT	ТҮРЕ	SAM	tecovery (mm) a	N-VALUE or RQD %	OTHER TESTS / REMARKS	UND	RAINE ABOR/ DCKE 5 TER C PT (N-	ED SH ATOR' T PEN 0 kPa + ONTE value)	EAR Y TE ETR	STRI OME 100 ATT NS/0.	ENGT TER kPa ERBI	FH, C ● □ ERG	Cu (kf FIEL POC 150	Pa) LD V/ CKET ) kPa <del> </del> TS	ANE F SH M	ETES IEAR 20	GT VANE 0 kPa ↓ V W → <b>1</b>	BACKFILL			
					Ľ			1	0	20.	<u>30</u>	ater Cont	tent (%) a	and Blo	w Count	50	7(	)	<u>80</u>				
	ASPHALT																						
	CONCRETE																						
	- silty, trace sand, trace gravel																· · · · · · · · · · · · · · · · · · ·						
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							Sieve/Hydro at 0.8 m G S M C 2% 7% 48% 43%																
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	Soft tan lean CLAV (CL)		AS																		$\otimes$		
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	Firm brown fat CLAY (CH)																				$\otimes$		
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	End of Borehole • Borehole terminated at a depth of 2.1 • No groundwater seepage or soil slou • Borehole backfilled with auger cutting • Borehole surface backfilled as per Ci	9 m. ghing was gs and bei ty of Winr	s obsentonit	erved e chip Stree	during s. t Cuts	, or up Manu	oon completion of dri al.	illing.			•••	• • •		Ð	• • • •	1	••1				-		
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							Drilling Cost	ractor	· M	aple	Lea	Dril	ling	Ltd					-000	ed Bv:	- - - - - - -		
							Drilling Cont	ractor iod:	: M 125	aple mm S	Lea	<sup>†</sup> Dril	ling	Ltd.				L	_ogge	ed By: wed By			

Printed Feb 8 2024 15:11:49 SOIL 123316895\_24:R-02 GEOTECHNICAL INVESTIGATION.GPJ NEW TEMPLATE TEST PROJECT.GPJ 2/8/24

# APPENDIX D

**Core Photographs** 





Figure 1 – Core No. 40 (Carruthers Ave)



Figure 3 – Core No. 42 (Carruthers Ave)



Figure 2 – Core No. 41 (Carruthers Ave)



Figure 4 – Core No. 43 (McAdam Ave)





Figure 5 – Core No. 44 (McAdam Ave)



Figure 7 - Core No. 46 (Gordon Ave)



Figure 6 – Core No. 45 (McAdam Ave)



Figure 8 – Core No. 47 (Gordon Ave)





Figure 9 – Core No. 48 (Gordon Ave)



Figure 11 – Core No. 50 (Rudolph Bay)





Figure 12 – Core No. 51 (Rudolph Bay)







Figure 15 - Core No. 54 (Dahlia Alley)



Figure 14 – Core No. 53 (Dahlia Alley)



Figure 16 – Core No. 55 (Hood Ave)





Figure 17 – Core No. 56 (Hood Ave)



Figure 19 - Core No. 58 (Fortier Ave)



Figure 18 – Core No. 57 (Fortier Ave)



Figure 20 – Core No. 59 (Summerfield Way)





Figure 21 – Core No. 60 (Summerfield Way)



Figure 23 - Core No. 62 (Summerfield Way)





Figure 24 - Core No. 63 (Summerfield Way)





Figure 25 – Core No. 64 (Summerfield Way)



Figure 27 – Core No. 66 (Tranquility Cove)








Figure 29 – Core No. 68 (Tranquility Cove)



Figure 31 – Core No. 70 (Snowdon Ave)





Figure 32 – Core No. 71 (Snowdon Ave)





Figure 33 – Core No. 72 (Snowdon Ave)



Figure 35 – Core No. 74 (Dearborn Ave)



Figure 34 – Core No. 73 (Snowdon Ave)







Figure 37 – Core No. 76 (Lacy St)



Figure 39 – Core No. 78 (Norilyn Bay)



Figure 38 – Core No. 77 (Lacy St)







Figure 41 – Core No. 80 (Norilyn Bay)



Figure 43 - Core No. 82 (Kullman St)





Figure 44 – Core No. 83 (Kullman St)

# **APPENDIX E**

Laboratory Test Reports





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 1
DATE SAMPLED: 2024.Jan.16 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.16 DATE TESTED: 2024.Jan.30 SUBMITTED BY: Stantec Consulting Ltd. TESTED BY: Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-41, 775 mm	STANTEC SAMPLE NO. 2982
LIQUID LIMIT TRIAL 1 2 BLOWS 22 22 MC (%) 91 94	PLASTIC LIMITLIQUID LIMIT, LL91TRIAL12PLASTIC LIMIT, PL29MC (%)2930PLASTICITY INDEX, PI61AS REC'D MC (%)41.77
	Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrate       Image: constrate     Ima
COMMENTS No comments.	
PEPOPT DATE 2024 Jon 31	REVIEWED BY Chillenmo Boquico P Eng
REFORT DATE 2024.JUII.31	Geotechnical Engineer - Materials Testing Services
Reporting of these test results constitutes a testing service only, E stipulated above. Stantec is not responsible, nor can be held lia	gineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client e, for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 2
DATE SAMPLED: 2024.Jan.16 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.16DATE TESTED: 2024.Jan.30SUBMITTED BY:Stantec Consulting Ltd.TESTED BY:Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-42, 740 mm	STANTEC SAMPLE NO. 2983
LIQUID LIMIT       TRIAL     1     2       BLOWS     24     24       MC (%)     49     50	PLASTIC LIMITLIQUID LIMIT, LL49TRIAL12PLASTIC LIMIT, PL16MC (%)1615PLASTICITY INDEX, PI33AS REC'D MC (%)26.33
	Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrate       Image: constrate     Ima
COMMENTS No comments.	
REPORT DATE 2024.Jan.31	REVIEWED BY Guillaume Beauce, P.Eng.
Reporting of these test results constitutes a testing service only. E stipulated above. Stantec is not responsible, nor can be held lia	gineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client e, for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 3
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.17DATE TESTED: 2024.Jan.31SUBMITTED BY:Stantec Consulting Ltd.TESTED BY:Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-43, 775 mm	STANTEC SAMPLE NO. 4002
LIQUID LIMIT       TRIAL     1     2       BLOWS     23     23       MC (%)     26     26	PLASTIC LIMITLIQUID LIMIT, LL26TRIAL12PLASTIC LIMIT, PL15MC (%)1514PLASTICITY INDEX, PI11AS REC'D MC (%)13.60
	Image: constrained of the second of the s
COMMENTS No comments.	
	Setuce
KEPORI DAIE 2024.Feb.01	KEVIEWED BY Guillaume Beauce, P.Eng. Geotechnical Engineer - Materials Testing Services
Reporting of these test results constitutes a testing service only. E stipulated above. Stantec is not responsible, nor can be held lia	ngineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client ole, for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 4
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.17DATE TESTED: 2024.Feb.01SUBMITTED BY:Stantec Consulting Ltd.TESTED BY:Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-45, 790 mm	STANTEC SAMPLE NO. 4003
LIQUID LIMIT       TRIAL     1     2       BLOWS     22     22       MC (%)     75     75	PLASTIC LIMITLIQUID LIMIT, LL74TRIAL12PLASTIC LIMIT, PL22MC (%)2222PLASTICITY INDEX, PI52AS REC'D MC (%)39.60
	Image: constrained of the second of the s
COMMENTS No comments.	
	Betuce
REPORT DATE 2024.Feb.02	REVIEWED BY Guillaume Beauce, P.Eng. Geotechnical Engineer - Materials Testing Services
Reporting of these test results constitutes a testing service only. E stipulated above. Stantec is not responsible, nor can be held lial	neering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client , for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 5
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.17DATE TESTED: 2024.Feb.01SUBMITTED BY:Stantec Consulting Ltd.TESTED BY:Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-46, 855 mm	STANTEC SAMPLE NO. 4004
LIQUID LIMIT           TRIAL         1         2           BLOWS         27         28           MC (%)         69         68	PLASTIC LIMITLIQUID LIMIT, LL69TRIAL12PLASTIC LIMIT, PL24MC (%)2424PLASTICITY INDEX, PI45AS REC'D MC (%)34.70
	60     60     60     60     60     60     60     60     60     60     60     60     60     70     80     90     100       10     10     20     30     40     50     60     70     80     90     100
COMMENTS No comments.	
	Betuce
REPORT DATE 2024.Feb.02	REVIEWED BY Guillaume Beauce, P.Eng. Geotechnical Engineer - Materials Testing Services
Reporting of these test results constitutes a testing service only. E stipulated above. Stantec is not responsible, nor can be held lia	gineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client le, for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT 24-R-02 - Local Street Package - Geotechnical Investigation
R3T 6A8	PROJECT NO. 123316892
ATTN Ali Campbell	REPORT NO. 6
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd.	DATE RECEIVED: 2024.Jan.17DATE TESTED: 2024.Feb.01SUBMITTED BY:Stantec Consulting Ltd.TESTED BY:Larry Presado
MATERIAL IDENTIFICATION CLIENT FIELD ID BH-48, 790 mm	STANTEC SAMPLE NO. 4005
LIQUID LIMIT       TRIAL     1     2       BLOWS     25     26       MC (%)     52     52	PLASTIC LIMITLIQUID LIMIT, LL52TRIAL12PLASTIC LIMIT, PL18MC (%)1918PLASTICITY INDEX, PI34AS REC'D MC (%)34.00
	Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrained state       Image: constrained state     Image: constrained state     Image: constrained state     Image: constrate       Image: constrate     Ima
COMMENTS No comments.	
	Betuce
REPORT DATE 2024.Feb.02	REVIEWED BY Guillaume Beauce, P.Eng. Geotechnical Engineer - Materials Testing Services
Reporting of these test results constitutes a testing service only. E stipulated above. Stantec is not responsible, nor can be held lia	gineering interpretation or evaluation of the test results is provided on written request. The data presented is for sole use of client e, for the use of this report by any other party, with or without the knowledge of Stantec.





TO Dillon Con 300 - 100 lr Winninga	sulting Ltd. nnovation Driv Manitoba	ve		PRC	DJECT	24-R-02 - Lo Geotechni	ocal Streets ical Investig	Package - ation	
R3T 6A8	Marinoba			PRC	DJECT NO.	123316895			
ATTN Ali	Campbell			REP	PORT NO.	1			
DATE SAMPLED SAMPLED BY:	: 2024.Jan.16 Stantec Cor	nsulting Ltd.	DATE RE SUBMITT	ECEIVED: 202 ED BY: Star	4.Jan.16 ntec Consu	lting Ltd.	Date tes tested b'	TED: 2024.Jan.2 Y: Larry Presa	3 do
MATERIAL IDENTI CLIENT FIELD II	FICATION D BH-41, 77	'5 mm		\$1	ANTEC SAMF	PLE NO. 298	32		
10	0	***	<b>↔ ♦</b> ♦					Sieve Size (mm)	% Passing
9	о 🚻 —							50.0	100.0
8	0							40.0	100.0
								25.0	100.0
8	0							20.0	100.0
sing 6	0						— <b>1</b>	16.0	100.0
စို 5	o							9.5	100.0
tu 4	ο							4.75	100.0
								2.36	100.0
e 3								2.00	100.0
2	0 ++++++++							1.18	99.9
1	o <del>            </del>						_	0.600	99.7
	о ЏШШ							0.300	99.4
	100	10	1	0.1	(	0.01	0.001	0.150	99.1
								0.075	98.6
			Particle	Size (mm)				0.005	75.7
								0.002	64.1
		Sand					7	0.001	04.1
Gravel	Coarse	Medium	Fine	Silt	Clay	Colloids			
0.0	0.0	0.5	0.9	28.4	70.2	64.1			
COMMENTS No comments.							$\bigcirc$		
REPORT DATE	2024.Jan.25				REVIEW	( ED BY Gui Ge	illaume Beau otechnical Er	SC ce, P.Eng. ngineer - Materials	Testing Services





TO Dillon Cons 300 - 100 Ir Winninga		PRC	DJECT	24-R-02 - Lo Geotechni	ocal Streets I cal Investigo	Package - ation			
R3T 6A8	Marinoba			PRC	DJECT NO.	123316895			
ATTN Ali	Campbell			REP	ORT NO.	2			
DATE SAMPLED SAMPLED BY:	: 2024.Jan.16 Stantec Co	nsulting Ltd.	date re Submitt	ECEIVED: 202 ED BY: Star	4.Jan.16 ntec Consu	Iting Ltd.	DATE TES TESTED B	TED: 2024.Jan.2 Y: Larry Presa	3 do
MATERIAL IDENTII CLIENT FIELD ID	FICATION ) BH-42, 74	40 mm		ST	ANTEC SAME	PLE NO. 298	3		
100			� - ◆\\	┯┿┯┿┯╣				Sieve Size (mm)	% Passing
90	о <del>         </del>							50.0	100.0
80	n IIIII							40.0	100.0
								25.0	100.0
	J <b>11111</b>							20.0	100.0
00 Ui	о <del>      </del> с							16.0	100.0
ဗိ 50	о							12.5	100.0
t d	n ########							7.5	100.0
e c								236	100.0
	J							2.00	100.0
20	o <del>         </del> c							1.18	99.9
10	о							0.600	99.7
	n <u>       </u>							0.300	99.5
	100	10	1	0.1	(		0.001	0.150	99.2
								0.075	98.2
			Particle	Size (mm)				0.005	68.8
								0.002	63.8
							7	0.001	58.3
Gravel		Sand		Silt	Clay	Colloids			
0.0	Coarse	Medium	Fine	24.4	42.0	50.2	-		
0.0	0.0	0.4	1.4	34.4	63.0	56.5	J		
COMMENTS No comments.									
REPORT DATE	2024.Jan.25				REVIEW	C ED BY Gui Geo	Betu illaume Beau otechnical Er	Ce, P.Eng. ngineer - Materials	Testing Services





TO	Dillon Col 300 - 100 Winningg	nsulting Ltd. Innovation	Drive		PRC	DJECT	.ocal Streets P nical Investiga	ackage - tion		
	R3T 6A8	<i>, M</i> arinoba			PRC	DJECT NO.	12331689	5		
	ATTN A	li Campbell			REP	ORT NO.	3			
Dat San	E SAMPLE	D: 2024.Jan Stantec (	.17 Consulting Ltd.	DATE RE SUBMIT	ECEIVED: 202 TED BY: Star	4.Jan.17 ntec Consul	lting Ltd.	Date testi tested by	ED: 2024.Jan.2 : Larry Presa	5 do
MAT Cl	erial iden Lient field	ITIFICATION ID BH-43	, 775 mm		ST	ANTEC SAMP	PLE NO. 40	002		
	1	00		<b>↔</b> • •					Sieve Size (mm)	% Passing
		90							50.0	100.0
						$ \mathbf{N} $			40.0	100.0
		80							25.0	100.0
	(%)	70							20.0	100.0
	Du	60 +++++++							16.0	100.0
	assi	50				\			12.5	100.0
	t Pc	50 1111							9.5	100.0
	eu	40 +++++++					$\mathbb{N}$	+	4.75	100.0
	0 0	30 ++++++							2.36	100.0
	طّ	20							2.00	100.0
		20							1.18	99.9
		10							0.600	99.8
		o ++++++++++++++++++++++++++++++++++++							0.300	99.6
		100	10	1	0.1	C	0.01	0.001	0.150	99.3
									0.075	93.5
				Particle	e Size (mm)				0.005	23.2
									0.002	17.6
r		- 1			1	r	1		0.001	14.0
	Gravel		Sand		Silt	Clay	Colloids			
		Coarse	Medium	Fine	75.0	17.4	1.1.0	_		
	0.0	0.0	0.4	6.1	/5.9	17.6	14.0			
CON No c	MMENTS comments.									
								Betu	Ce	
REPC	ORT DATE	2024.Jan.2	29			REVIEW	ED BY G	uillaume Beauc	e, P.Eng.	
							G	eotechnical Eng	gineer - Materials	Elesting Services





TO Dillon Con 300 - 100 Ir Winninga	sulting Ltd. nnovation Driv Manitoba	PROJECT 24-R-02 - Local Stree Geotechnical Inve					Package - ation		
R3T 6A8	Mannoba			PRC	DJECT NO.	123316895			
ATTN Ali	Campbell			REP	ORT NO.	4			
Date Sampled Sampled by:	: 2024.Jan.17 Stantec Co	nsulting Ltd.	DATE RE SUBMITT	ECEIVED: 202 ED BY: Star	4.Jan.17 ntec Consu	lting Ltd.	Date tes tested b`	TED: 2024.Jan.2 Y: Larry Presa	5 do
MATERIAL IDENTI CLIENT FIELD IE	FICATION D BH-45, 79	20 mm		ST	ANTEC SAMP	PLE NO. 400	3		
10	0		<b>०० - ०</b> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					Sieve Size (mm)	% Passing
9	o <del>          </del>							50.0	100.0
8	0							40.0	100.0
								25.0	100.0
8								20.0	100.0
6 gi	0 +++++++++++++++++++++++++++++++++++++							16.0	100.0
5 5	o							12.5	100.0
								9.5	100.0
								4.75	100.0
Ler 3	0 +++++++++++++++++++++++++++++++++++++							2.38	100.0
2	o <del>          </del>							1.18	99.9
1	ο							0.600	99.8
								0.300	99.6
	100	10	1	01	·····		0.001	0.150	99.3
	100	10	I	0.1	(	0.01	0.001	0.075	96.6
			Particle	Size (mm)				0.005	63.3
				\ /				0.002	57.9
					-		-	0.001	57.1
Gravel		Sand		Silt	Clay	Colloids			
	Coarse	Medium	Fine						
0.0	0.0	0.3	3.1	38.7	57.9	57.1			
COMMENTS No comments.									
REPORT DATE	2024.Jan.29				REVIEWI	C ED BY Gui Geo	BBUU Ilaume Beau otechnical Er	CC ce, P.Eng. ngineer - Materials	Testing Services





TO Dillon Consulting Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba					PRC	DJECT	24-R-02 - Lo Geotechn	ocal Streets ical Investig	cal Streets Package - cal Investigation			
R3T 6A8	}				PRC	DJECT NO.	123316895					
ATTN	Ali C	ampbell			REP	ORT NO.	5					
date samp sampled b'	LED: 2 Y: S	2024.Jan.17 Stantec Co	nsulting Ltd.	DATE RE SUBMITI	ECEIVED: 202 TED BY: Star	4.Jan.17 ntec Consul	lting Ltd.	date tes tested b	TED: 2024.Jan.2 Y: Larry Presa	5 do		
MATERIAL IDI CLIENT FIEL	ENTIFIC .D ID	CATION BH-46, 85	55 mm		ST	ANTEC SAMP	'LE NO. 400	)4				
	100			<b>**-</b>					Sieve Size (mm)	% Passing		
	90								50.0	100.0		
	80								40.0	100.0		
(2	70								25.0	100.0		
6	70								20.0	100.0		
sinç	60								16.0	100.0		
Pas	50								9.5	99.3		
ant	40								4.75	98.7		
PLC6	30								2.36	97.7		
Pe	50								2.00	97.5		
	20								1.18	97.2		
	10								0.600	96.9		
	0	<u>        </u>							0.300	96.6		
	1	00	10	1	0.1	C	0.01	0.001	0.150	96.3		
					. <i>.</i> .				0.075	94.9		
				Particle	e Size (mm)				0.003	67.5		
									0.002	61.6		
			Sand						0.001	0110		
Grav	el –	Coarse	Medium	Fine	Silt	Clay	Colloids					
1.3		1.2	0.8	1.8	32.3	62.6	61.6					
COMMENTS No commen	ts.							A				
REPORT DATE	= 2	2024.Jan.29				REVIEW	( ED BY Gu Ge	illaume Beau otechnical E	UCE, P.Eng. ngineer - Materials	Testing Services		





TO Dillon Co 300 - 100 Winniped	nsulting Ltd. Innovation Driv	ve		PRC	DJECT	24-R-02 - L Geotechn	ocal Streets I ical Investigo	Package - ation	
R3T 6A8	, Marinoba			PRC	JECT NO.	123316895	i		
ATTN A	Ni Campbell			REP	ORT NO.	6			
DATE SAMPLE SAMPLED BY:	D: 2024.Jan.17 Stantec Co	nsulting Ltd.	DATE RE	CEIVED: 202 ED BY: Star	4.Jan.17 ntec Consul	ting Ltd.	DATE TES TESTED B	TED: 2024.Jan.2 Y: Larry Presa	5 .do
MATERIAL IDEN CLIENT FIELD	ITIFICATION ID BH-48, 79	20 mm		ST	antec samp	LE NO. 40	05		
1	00							Sieve Size (mm)	% Passing
	90							50.0	100.0
	80							40.0	100.0
	80							25.0	100.0
%	70							20.0	100.0
ing	60							16.0	100.0
dss	50							12.5	100.0
E P								9.5	100.0
Cer	40							4.75	98.5
erc	30							2.36	98.0
	20							2.00	97.9
								1.18	96./
								0.800	95.5
	0 +							0.300	94.1
	100	10	1	0.1	C	0.01	0.001	0.075	91.3
			Dartiala	Size (mm)				0.005	51.8
			Funicie	size (mm)				0.002	43.2
								0.001	40.0
		Sand					7		<u> </u>
Gravel	Coarse	Medium	Fine	Silt	Clay	Colloids			
1.5	0.6	3.3	3.3	48.1	43.2	40.0			
COMMENTS No comments.							QD al.		
REPORT DATE	2024.Jan.29				REVIEWI	( ED BY Gu Ge	villaume Beau eotechnical Er	ce, P.Eng. ngineer - Materials	Testing Services





# **PROCTOR TEST REPORT**

Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

#### ATTN: Ali Campbell

#### CLIENT Dillon Consulting Ltd. C.C.

PROJECT 24-R-02 Local Streets Package







# **PROCTOR TEST REPORT**

TO Dillon Consulting Ltd. 300 - 100 Innovation Dr. Winnipeg, MB R3T 6A8

#### ATTN: Ali Campbell

#### CLIENT Dillon Consulting Ltd. c.c.

PROJECT 24-R-02 Local Streets Package

PROJECT N PROCTOR	10. NO.	1233 2	16895 Date S	AMPLED	2024.Jo	an.16	DATE REC	EIVED	2024.Jan	.16	DATE TESTED	2024.Jan.26	
INSITU MOI TESTED BY	STURE		22.5 % Donald Fliazar				COMPACTION	stand	ARD	Stan D698	dard Proctor, A 3	STM	
MATERIAL		TION					COMPACTION	PROCE	EDURE	A: 10	)1.6mm Mold,		
MAJOR		ENT	Subgrad	Subgrade				Pc			ssing 4.75mm		
SIZE							RAMMER TYPE			Auto	omatic		
DESCRIP <sup>®</sup>	[ION		Lean Cl	AY (CL)			PREPARATION			Dry			
SUPPLIER			Existing	Material			OVERSIZE CORF	RECTIO	N METHOD	Non	e		
SOURCE			Carruth	ers Ave - B	H-42, 0.74	0 m	RETAINED 4.75n	nm SCI	REEN	N/A	%		
DRY DENSITY (kg/m3)	1775 - 1750 - 1725 - 1700 - 1675 -				3				TRIAL NUMBER 1 2 3 4	WET DENSITY (kg/m³) 1782 1903 2007 2027	DRY DENSITY (kg/m³) 1647 1695 1726 1685	MOISTURE CONTENT (%) 8.2 12.3 16.3 20.3	
	1650+ 1625+										MAXIMUM DRY DENSITY (kg/m³)	OPTIMUM MOISTURE CONTENT (%)	
	6	6	8.5 1	1 13	.5 1	6 18	3.5 21	Γ	CALCULATED		1720	1/5	
MOISTURE CONTENT (%)					%)	F			1/30	16.5			
COMMENT	2							L	UVERSIZE CORI	RECIED			
Stantec	<b>.</b> Samole	no. 🤉	2983.										

Page 1 of 1 2024. Jan. 31 Stantec Consulting Ltd. REVIEWED BY: Jason Thompson, C.E.T.





# **PROCTOR TEST REPORT**

Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

#### ATTN: Ali Campbell

#### CLIENT Dillon Consulting Ltd. C.C.

PROJECT 24-R-02 Local Streets Package







# **PROCTOR TEST REPORT**

Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

ATTN: Ali Campbell

# CLIENT Dillon Consulting Ltd. C.C.

PROJECT 24-R-02 Local Streets Package







# **PROCTOR TEST REPORT**

Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

#### ATTN: Ali Campbell

#### CLIENT Dillon Consulting Ltd. C.C.

PROJECT 24-R-02 Local Streets Package







# **PROCTOR TEST REPORT**

Dillon Consulting Ltd.
 300 - 100 Innovation Dr.
 Winnipeg, MB
 R3T 6A8

#### ATTN: Ali Campbell

#### CLIENT Dillon Consulting Ltd. C.C.

PROJECT 24-R-02 Local Streets Package







TO Dillon Consutling Ltd. 300 - 100 Innovation Drive Winnipea, Manitoba	PROJECT	24-R-02 - Local Streets Package - Geotechnical Investigation
R3T 6A8	PROJECT NO.	123316895
ATTN Ali Campbell	REPORT NO.	1
DATE SAMPLED: 2024.Jan.16 DATE RECEIVED SAMPLED BY: Stantec Consulting Ltd. SUBMITTED BY:	): 2024.Jan.16 Stantec Consul	DATE TESTED: 2024.Feb.02 ting Ltd. TESTED BY: Donald Eliazar
MATERIAL IDENTIFICATIONMATERIAL USESubgradeMAX. NOMINAL SIZE4.75 mmMATERIAL TYPEFat CLAY (CH)SPECIFICATION IDNot ApplicableIMMERSION PERIOD96 ± 2 hrCONDITION OF SAMPLESoakedSURCHARGE MASS4.54 kg	SUPPLIER SOURCE SAMPLE LOCAT STANTEC SAMPL TARGET MAX. D TARGET OPTIMU	Existing Material Existing Material ION Carruthers Ave - BH-41, 0.775 m LE NO. 2982 RY DENSITY 1460 kg/m <sup>3</sup> JM MOISTURE 24.5 %
+19 mm OVERSIZE0 %SWELL OF SAMPLE4.13 %POST-TEST MOISTURE38.1 %	AS-COMPACTE AS-COMPACTE AS-COMPACTE	D DRY DENSITY         1388 kg/m <sup>3</sup> D MOISTURE         24.4 %           D % COMPACTION         95 %
500 $(\overline{v} 450)$ $(\underline{v} 400)$ $\underline{v} 350$ $(\overline{v} 300)$		CBR VALUE AT 2.54 mm PENETRATION 2.5
5 000 a 250 b 200 e 150 x 100 e 50 b 200 c 2		PENETRATION 2.0
0 <b>6</b>	10.0 12.0	14.0
COMMENTS Sample prepared to 95% of the maximum dry density at the optim	um moisture contei	nt as determined from ASTM D698.
REPORT DATE 2024.Feb.12 Reporting of these test results constitutes a testing service only. Engineering interpretation	REVIEWE	ED BY Jason Thompson, C.E.T. Principal - Manager of Materials Testing Services
stipulated above. Stantec is not responsible, nor can be held liable, for the use of this rep	ort by any other party, wit	h or without the knowledge of Stantec.





TO Dillon Consutling Ltd. 300 - 100 Innovation Drive Winnipeg, Manitoba	PROJECT	24-R-02 - Local Streets Package - Geotechnical Investigation
R3T 6A8	PROJECT NO.	123316895
ATTN Ali Campbell	REPORT NO.	2
DATE SAMPLED: 2024.Jan.16 DATE R SAMPLED BY: Stantec Consulting Ltd. SUBMIT	RECEIVED: 2024.Jan.16 TTED BY: Stantec Consult	DATE TESTED: 2024.Feb.02 ting Ltd. TESTED BY: Donald Eliazar
MATERIAL IDENTIFICATION MATERIAL USE Subgrade MAX. NOMINAL SIZE 4.75 mm MATERIAL TYPE Lean CLAY (CL) SPECIFICATION ID Not Applicable IMMERSION PERIOD 96 ± 2 hr CONDITION OF SAMPLE Soaked SURCHARGE MASS 4.54 kg +19 mm OVERSIZE 0 % SWELL OF SAMPLE 2.60 % POST-TEST MOISTURE 23.8 %	SUPPLIER SOURCE SAMPLE LOCATI STANTEC SAMPL TARGET MAX. D TARGET OPTIMU AS-COMPACTED AS-COMPACTE	Existing Material Existing Material ION Carruthers Ave - BH-42, 0.740 m LE NO. 2983 INY DENSITY 1730 kg/m <sup>3</sup> JM MOISTURE 16.5 % D DRY DENSITY 1644 kg/m <sup>3</sup> D MOISTURE 16.4 % D MOISTURE 16.4 % D % COMPACTION 95 % CBR VALUE AT 2.54 mm PENETRATION 3.5 CBR VALUE AT 5.08 mm PENETRATION 3.2
COMMENTS Sample prepared to 95% of the maximum dry density at t	he optimum moisture conter	nt as determined from ASTM D698.
REPORT DATE 2024.Feb.12	REVIEWE	ED BY Jason Thompson, C.E.T. Principal - Manager of Materials Testing Services
Reporting of these test results constitutes a testing service only. Engineering in stipulated above. Stantec is not responsible, nor can be held liable, for the us	terpretation or evaluation of the test re- se of this report by any other party, with	esults is provided on written request. The data presented is for sole use of client h or without the knowledge of Stantec.





TO Dillon Consutling Ltd. 300 - 100 Innovation Drive Winnipeg, Manitoba		PROJECT	24-R-02 - Loc Geotechnice	cal Streets Package - al Investigation	
R3T 6A8		PROJECT NO.	123316895		
ATTN Ali Campbell		REPORT NO.	3		
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd	DATE RECEIVED SUBMITTED BY:	: 2024.Jan.17 Stantec Consul	ting Ltd.	DATE TESTED: 2024.Feb.19 TESTED BY: Donald Eliazar	
MATERIAL IDENTIFICATION MATERIAL USE Subgrade MAX. NOMINAL SIZE 4.75 mm MATERIAL TYPE Lean CLAY (CL) SPECIFICATION ID Not Applicable		SUPPLIER SOURCE SAMPLE LOCAT STANTEC SAMPI	Existir Existir ION MCA LE NO. 2983	ng Material ng Material dam Ave - BH-43, 0.775 m	
IMMERSION PERIOD96 ± 2 hrCONDITION OF SAMPLESoakedSURCHARGE MASS4.54 kg		TARGET MAX. D TARGET OPTIMU	DRY DENSITY JM MOISTURE	1700 kg/m <sup>3</sup> 20.0 %	
+19 mm OVERSIZE SWELL OF SAMPLE POST-TEST MOISTURE	0 % 1.56 % 26.6 %	AS-COMPACTED DRY DENSIT AS-COMPACTED MOISTURE AS-COMPACTED % COMPAC		1617 kg/m <sup>3</sup> 19.8 % ION 95 %	
1000 $\overrightarrow{v}$ 900 800 $\overleftarrow{v}$ 700				CBR VALUE AT 2.54 mm PENETRATION 4.3	
00         600           01         500           02         0           03         00           04         0           05         0				CBR VALUE AT 5.08 mm PENETRATION 4.1	
0.0 2.0 4.0	6.0 8.0 Penetration (mm)	10.0 12.0	14.0		
COMMENTS Sample prepared to 95% of the maximum c	ry density at the optimu	m moisture contei	nt as determine	ed from ASTM D698.	
REPORT DATE 2024.Feb.26 Reporting of these test results constitutes a testing service of stipulated above. Stantec is not responsible, nor can be he	nly. Engineering interpretation c Id liable, for the use of this repoi	REVIEWS	ED BY Jason Princ esults is provided on h or without the know	n Thompson, C.E.T. Eipal - Manager of Materials Testing Services written request. The data presented is for sole use of client wledge of Stantec.	





TO Dillon Consutling Ltd. 300 - 100 Innovation Drive Winnipeg, Manitoba		PROJECT	24-R-02 - Loc Geotechnic	cal Streets Package - al Investigation
R3T 6A8		PROJECT NO.	123316895	
ATTN Ali Campbell		REPORT NO.	4	
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltd	DATE RECEIVED 3. SUBMITTED BY:	: 2024.Jan.17 Stantec Consul	ting Ltd.	DATE TESTED: 2024.Feb.19 TESTED BY: Donald Eliazar
MATERIAL IDENTIFICATION MATERIAL USE Subgrade MAX. NOMINAL SIZE 4.75 mm MATERIAL TYPE Fat CLAY (CH) SPECIFICATION ID Not Applicable IMMERSION PERIOD 96 ± 2 hr CONDITION OF SAMPLE Soaked SURCHARGE MASS 4.54 kg +19 mm OVERSIZE SWELL OF SAMPLE POST-TEST MOISTURE 500 20 250 250 250 20 20 20 20 20 20 20 20 20 2	0 % 3.25 % 37.7 %	SUPPLIER SOURCE SAMPLE LOCAT STANTEC SAMPI TARGET MAX. D TARGET OPTIMU AS-COMPACTEI AS-COMPACTEI AS-COMPACTEI	Existi Existi ION MCA LE NO. 4003 MRY DENSITY JM MOISTURE D DRY DENSITY D MOISTURE D % COMPACT	ng Material ng Material Adam Ave - BH-45, 0.790 m 1510 kg/m <sup>3</sup> 25.0 % 1435 kg/m <sup>3</sup> 25.0 % 10N 95 % CBR VALUE AT 2.54 mm PENETRATION 1.9 CBR VALUE AT 5.08 mm PENETRATION 1.8
0.0 2.0 4.0	6.0 8.0 Penetration (mm)	10.0 12.0	14.0	
COMMENTS Sample prepared to 95% of the maximum REPORT DATE 2024.Feb.26	dry density at the optimu	um moisture conter REVIEWE	nt as determine ED BY Jaso Princ	ed from ASTM D698. In Thompson, C.E.T. Cipal - Manager of Materials Testing Services
stipulated above. Stantec is not responsible, nor can be h	eld liable, for the use of this repo	rt by any other party, wit	h or without the kno	wledge of Stantec.





TO Dillon Consutting Ltd. 300 - 100 Innovation Driv Winninga Manitoba	/e		PROJECT	24-R-02 - Loco Geotechnicc	al Streets Package - al Investigation
R3T 6A8			PROJECT NO.	123316895	
ATTN Ali Campbell			REPORT NO.	5	
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Co	, nsulting Ltd.	DATE RECEIVED: SUBMITTED BY:	: 2024.Jan.17 Stantec Consult	ting Ltd.	DATE TESTED: 2024.Feb.19 TESTED BY: Donald Eliazar
MATERIAL IDENTIFICATION MATERIAL USE Sub MAX. NOMINAL SIZE 4.75 MATERIAL TYPE Fat SPECIFICATION ID Not	grade 5 mm CLAY (CH) Applicable		SUPPLIER SOURCE SAMPLE LOCATI STANTEC SAMPL	Existin Existin ION Gorda .E NO. 4004	g Material g Material on Ave - BH-46, 0.855 m
IMMERSION PERIOD CONDITION OF SAMPLE SURCHARGE MASS	96 ± 2 hr Soaked 4.54 kg		TARGET MAX. D TARGET OPTIMU	ry density Im moisture	1540 kg/m <sup>3</sup> 24.5 %
+19 mm OVERSIZE SWELL OF SAMPLE POST-TEST MOISTURE	( 1.6( 31.8	) % ) % 3 %	AS-COMPACTED AS-COMPACTED AS-COMPACTED	D DRY DENSITY D MOISTURE D % COMPACTIO	1465 kg/m <sup>3</sup> 24.4 % DN 95 %
700 (D) 600 4) 500					CBR VALUE AT 2.54 mm PENETRATION 4.8
Dunid 400 Lo 300 200 200					CBR VALUE AT 5.08 mm PENETRATION 4.0
0.0 2.0	4.0 6 Pen	.0 8.0 etration (mm)	10.0 12.0	14.0	
COMMENTS Sample prepared to 95% of the	maximum dry de	nsity at the optimu	m moisture conter	nt as determined	d from ASTM D698.
REPORT DATE 2024.Feb.26			REVIEWE	ED BY Jason Princip	Thompson, C.E.T. pal - Manager of Materials Testing Services
stipulated above. Stantec is not responsible	le, nor can be held liabl	gineering interpretation o e, for the use of this repor	t evaluation of the test re t by any other party, with	n or without the know	vinien request. The data presented is for sole use of client ledge of Stantec.





TO Dillon Consutling Ltd. 300 - 100 Innovation Drive Winniped, Manitoba		PROJECT	24-R-02 - Local Streets Package - Geotechnical Investigation
R3T 6A8		PROJECT NO.	123316895
ATTN Ali Campbell		REPORT NO.	6
DATE SAMPLED: 2024.Jan.17 SAMPLED BY: Stantec Consulting Ltc	DATE RECEIVED I. SUBMITTED BY:	: 2024.Jan.17 Stantec Consul	DATE TESTED: 2024.Feb.19 Ulting Ltd. TESTED BY: Donald Eliazar
MATERIAL IDENTIFICATION MATERIAL USE Subgrade MAX. NOMINAL SIZE 4.75 mm MATERIAL TYPE Fat CLAY (CH) SPECIFICATION ID Not Applicable		SUPPLIER SOURCE SAMPLE LOCAT STANTEC SAMPI	Existing Material Existing Material ATION Gordon Ave - BH-48, 0.790 m PLE NO. 4005
IMMERSION PERIOD96 ± 2 hrCONDITION OF SAMPLESoakedSURCHARGE MASS4.54 kg+19 mm OVERSIZESWELL OF SAMPLESWELL OF SAMPLESOUTHERST	0 % 2.17 %	TARGET MAX. D TARGET OPTIMU AS-COMPACTEI AS-COMPACTEI	DRY DENSITY1550 kg/m³AUM MOISTURE24.0 %YED DRY DENSITY1472 kg/m³YED MOISTURE24.1 %YED MOISTURE24.1 %
700       100       100       100       100       0       2.0       4.0	6.0 8.0		CBR VALUE AT 2.54 mm PENETRATION 4.0 CBR VALUE AT 5.08 mm PENETRATION 3.4
COMMENTS Sample prepared to 95% of the maximum of	Penetration (mm)	Im moisture conter	ent as determined from ASTM D698.
Reporting of these test results constitutes a testing service of stipulated above. Stantec is not responsible, nor can be here.	only. Engineering interpretation c eld liable, for the use of this repo	KEVIEWE or evaluation of the test r rt by any other party, wit	Tresults is provided on written request. The data presented is for sole use of client with or without the knowledge of Stantec.



Stantec Consulting Ltd. 199 Henlow Bay, Winnipeg MB R3Y 1G4

Street	Core	Diameter (mm)	Length (mm)	L/D Ratio	Correction	Peak Load	Compressive Strength (MPa)	
	U				Factor	(kN)	Measured	Corrected
Rudolph Bay	BH-51	75.35	175.20	2.325	1.0000	201.72	45.24	45.24
Rudolph Bay	BH-52	75.50	133.64	1.770	0.9816	231.47	51.70	50.75
Dahlia Alley	BH-53	75.62	125.62	1.661	0.9729	138.6	30.86	30.02
Dahlia Alley	BH-54	75.53	115.58	1.530	0.9624	237.66	53.04	51.05
Hood Ave	BH-55	75.42	151.09	2.003	1.0000	275.38	61.64	61.64
Hood Ave	BH-56	99.05	161.44	1.630	0.9704	404.01	52.43	50.88
Fortier Ave	BH-57	75.81	172.52	2.276	1.0000	185.3	41.05	41.05
Fortier Ave	BH-58	75.82	152.24	2.008	1.0000	195.4	43.28	43.28
Summerfield Way	BH-60	75.39	151.17	2.005	1.0000	191.4	42.88	42.88
Summerfield Way	BH-64	75.63	157.72	2.085	1.0000	191.75	42.68	42.68
Tranquility Cove	BH-66	75.13	164.16	2.185	1.0000	207.05	46.70	46.70
Tranquility Cove	BH-68	75.69	159.83	2.112	1.0000	160.97	35.77	35.77
Snowdon Ave	BH-70	75.81	145.08	1.914	0.9931	237.48	52.61	52.25
Snowdon Ave	BH-71	75.93	177.83	2.342	1.0000	269.99	59.63	59.63
Dearborn Ave	BH-74	75.78	155.87	2.057	1.0000	196.47	43.56	43.56
Dearborn Ave	BH-75	75.44	149.82	1.986	0.9989	161.2	36.06	36.02
Lacy St	BH-76	75.90	161.18	2.124	1.0000	97.41	21.53	21.53
Lacy St	BH-77	75.66	189.34	2.503	1.0000	249.89	55.58	55.58
Norilyn Bay	BH-78	75.78	169.81	2.241	1.0000	185.88	41.21	41.21
Norilyn Bay	BH-80	75.63	147.56	1.951	0.9961	248.2	55.25	55.03
Kullman St	BH-82	75.84	154.72	2.040	1.0000	189.93	42.04	42.04
Kullman St	BH-83	75.81	163.75	2.160	1.0000	199.63	44.23	44.23

### Table 2 - Compressive Strength Test Data