WATERFRONT DEVELOPMENT
CORPORATION LTD.

TEST PIT INVESTIGATION
PROPOSED DEVELOPMENT OF
LOTS WDC-1 AND WDC-2
DARTMOUTH, NOVA SCOTIA

PROJECT NO. 10582

PROJECT NO. 10582

REPORT TO

WATERFRONT DEVELOPMENT CORPORATION LTD.

ON

TEST PIT INVESTIGATION
PROPOSED DEVELOPMENT OF
LOTS WDC-1 AND WDC-2
DARTMOUTH, N.S.

Jacques Whitford and Associates Limited
3 Spectacle Lake Drive
Dartmouth, NS B3B 1W8
Tel:(902)468-7777
Fax:(902)468-9009

June 27, 1995

Table of Contents

1.0 INTRODUCTION

At the request of Mr. Fred Were of Waterfront Development Corporation Limited, Jacques, Whitford and Associates Ltd. (JWA) has carried out a subsurface investigation for the proposed development of Dartmouth Lots WDC-1 and WDC-2. The purpose of the work was to obtain the subsurface information necessary for the development design of the proposed lots. This report has been prepared specifically and solely for this project; it contains all the information obtained during the field program and our recommendations for site preparation and for design parameters and construction of foundations.

2.0 SITE AND GEOLOGY

The sites investigated for this report is located on the north side of Alderney Drive, between Prince Street and King Street in the downtown area of Dartmouth NS. The lots are presently vacant. A concrete slab is located on the northern border of lot WDC-1 at the foot of a 2.5m high retaining wall.

Geological mapping and previous experience show that the overburden soils in the area consists of a silty sand with cobbles that are predominantly slate. Bedrock is Ordovician slate of the Halifax Formation.

3.0 FIELD PROCEDURES

The field work was conducted on May 25, 1995 and consisted of thirteen (13) test pits put down using a Case 410 rubber-tired backhoe. As shown on Drawing 10582-1, TP1 through TP9 was put down in lot WDC-1, TP10 through TP13 was put down in lot WDC-2.

All soil samples recovered were visually identified in the field by our personnel. Soil samples were stored in moisture proof containers and taken to our Dartmouth laboratory. Samples will be stored for a period of six months at which time they will be discarded unless we receive instructions on the contrary.

The locations of the pits were selected and laid out during the field program by JWA personnel. Elevations of the ground surface at the test pit locations are referenced to NSCM# 5450 with a published elevation of 6.71 m. (Canadian Geodetic Datum). Final locations and elevations were surveyed by JWA personnel

4.0 SOIL PROFILE

The strata encountered in the test pits are described in detail below, and on the Test Pit Records in the Appendix. Estimates of material relative density are based on visual observation and on excavation

effort.

4.1 Grass and Topsoil

The surficial cover at TP's 5,7 and 8 consists of grasses, rootmat, and topsoil. The thickness of the layer is approximately 0.2 m.

4.2 Fill

Fill was encountered at all test pit locations except TP 1,5 and 6 and ranged from a loose black silty sand with various building debris to a compact sandy gravel. Fill at TPs 2,3,9,10,12 and 13 contained some old foundations, bricks, and building debris. Four moisture content analyses were done on samples from the fill layer. The range of values obtained is from 6.4% to 26.8 % with an average of 16%. One grain size analysis from sample 1 TP9 gave 24 % gravel, 55 % sand, and 21 % silt and clay size particles.

4.3 Silty Sand with Gravel Till (SM)

In TP2, TP3, TP5, TP6 and TP12 a loose reddish brown silty sand with gravel was encountered underlying the fill or topsoil and rootmat layer. The thickness of this till layer ranges from 0.3 m as in TP6 to 1.1 m as in TP3. One moisture content analysis was performed on a sample from this layer giving a moisture content value of 13%. One grain size analysis from TP12 sample 1 gave 33 % gravel, 33 % sand, and 34 % silt and clay size particles. From observing the efforts of the backhoe the relative density of this layer was classified as compact.

4.4 Gravel with Silt and Sand Till (GM)

The test pit investigation encountered a gravel with silt and sand till in TPs 1,2 and 5 and TPs 7 through 11 and TP13. This till layer generally was found underlying the silty sand till. At some test pit locations this till was found underlying the fill or topsoil layers. Two grain size analyses were performed on samples from TP2 sample 2 and TP7 sample 1. The analyses from TP2 gave 60 percent gravel, 30 percent sand, and 10 percent silt and clay size particles. The analysis from TP7 gave 56 percent gravel, 38 percent sand, and 6 percent silt and clay size particles.

4.5 Bedrock

The glacial till deposit encountered in each TP is directly underlain by slate bedrock. The upper surface of the slate is generally weathered to a depth of at least 300 mm. Iron staining of the fractured faces was predominate in the upper layer and on the exposed rock face on the south end of the site. Bedrock

elevations range from 2.87 m to 13.70 m sloping downward from north to south.

5.0 GROUNDWATER CONDITIONS

The groundwater conditions were investigated by observing the level at which water seeped or flowed into the open test pits through the sidewalls. No groundwater seepage was observed in any of the test pits, however, seasonal fluctuation of groundwater may change the elevation of the groundwater from the levels observed during the test pit investigation.

6.0 DISCUSSION AND RECOMMENDATIONS

It is understood that the proposed construction may include residential/commercial/parking structure. We have not yet received an indication of proposed locations or final grades for buildings or parking structures. We therefor offer the following general recommendations on design and construction criteria. Further discussion of these items can be provided as the building layout is finalized.

The soils may be summarized as silty sand with gravel fill containing various building material debris, and sandy gravel till, overlying Halifax formation slate. The slate varies from very severely fractured to severely fractured. The slate has high levels of potentially acid producing minerals.

6.1 Site Preparation

The site is suitable for the use of conventional spread footings and slab-on-grade construction provided the following site preparations are carried out. The surficial rootmat and topsoil and any fill should be removed down to the underlying till from within the influence area of the building. The influence area should be taken as 1.5 m outside the building foundation line plus a horizontal distance equal to the depth of any structural fill to be placed below the footing.

The structural fill materials should be placed in layers and compacted with an appropriate vibratory roller under the supervision of competent geotechnical personnel. If any portion of the building (especially footings) is to be constructed over a test pit location, the soil should be re-excavated at that location and built back up as structural fill, i.e.compacted in layers with an approved material.

Structural fill materials should consist of a well-graded granular material. The soils at the site may be carefully selected and used as structural fill materials. The maximum particle sizes in a structural fill material should not exceed 150 mm.

All structural fill placed within the building area should be compacted to at least 100% of maximum Standard Proctor Dry Density (or 80% relative density in the case of rockfills). Lift thickness must be compatible with the compaction equipment used to ensure that the required density is achieved

throughout.

In paved roadway and parking areas, site preparation procedures should include removal of the surficial rootmat and topsoil. The surface of the excavated area should then be proof-rolled with a heavy vibratory roller and any soft areas should be removed and replaced with structural fill. Low areas should be brought back up to grade with structural fill materials, which must be capable of being compacted to at least 98% of Standard Proctor Density. Large boulders should be removed during site preparations so that there are no large boulders within 0.6 m of the asphalt surface.

Approval from the Nova Scotia Department of Environment is required if the total volume of excavated sulphide bearing material is greater than 500 m^3. Sulphide bearing material means aggregate having a sulphide sulphur content equal to or greater than 0.4%. The sulphide sulphur content of four slate bedrock samples is shown on the table below.

Sample	% Total Sulphur	% Sulphide	Acid Producing Potential kg/tonne
TP6 SA#2	1.90	1.87	57.26
TP7 SA#2	1.72	1.68	51.45
TP9 SA#2	1.02	0.99	30.16
PT12 SA#2	1.06	0.96	29.40

6.2 Spread Footings

Based on the information obtained at the test pit locations, we recommend that all foundations associated with the building structures be founded on undisturbed till, bedrock, or structural fill. The following table shows the allowable bearing capacity of each foundation material which will give total and differential settlements of less than 20mm.

Foundation Soil	Allowable Bearing Capacity (kPa)
Structural fill	200
Till	200
Highly Weathered Bedrock	500
Sound Bedrock	1500

6.3 Floor Slabs

For slab-on-grade construction, it is recommended that all fill be removed. Any fill required for establishing grade for slabs should be approved granular material, placed in lifts and compacted to 100 percent of Standard Proctor density. Slabs-on-grade should be founded on a gravel blanket consisting of a minimum thickness of 200 mm of 25 mm clear stone or Class "B" material conforming to Nova Scotia Department of Transportation specifications. Slabs below exterior grade should be bedded on the clear stone and provided with positive drainage or sumps. Perimeter drains would only be required where the floor slab is located below final exterior grade.

6.4 Retaining Wall

Retaining walls which are tied into floor slabs, will be fixed against lateral movements and hence should be designed for earth pressures corresponding to at rest conditions. The following parameters are recommended for walls backfilled with on-site till:

Total unit weight		=	2240 kg/m^3
	ø'	=	32 degrees
	K_o	=	0.50

Earth pressure can be reduced by using clean granular backfill within a wedge bounded by a 45° line inclined upwards from the edge of the wall footing. For this case, the following parameters are recommended:

Total unit weight		=	2100 kg/m^3
	ø"	=	36 degrees
	K_o	=	0.40

These parameters pertain where good drainage is provided so that no hydrostatic pressures act on the walls. It is necessary, therefore, to plan a minimum 0.6m thick zone of free-draining granular material as backfill against walls with associated perimeter drains leading to positive outlets or sumps.

7.0 CLOSING COMMENTS

The recommendations made in this report are in accordance with our present understanding of your project. a soils investigation is a random limited sampling of a site. Should any conditions at the site be encountered which are different from those observed at the test locations, we require that we be notified immediately in order to permit reassessment of our recommendations and comments.

We trust that this report contains all the information required at this stage. If you have any questions or comments please contact us at your convenience.

Yours sincerely,

JACQUES, WHITFORD AND ASSOCIATES LIMITED

Jared McGinn, P.Eng.

JMdisk#2/10582.rpt

SYMBOLS AND TERMS USED ON BOREHOLE AND TEST PIT RECORDS

SOIL DESCRIPTION

Terminology describing common soil genesis:

Topsoil	-	mixture of soil and humus capable of supporting good vegetative growth
Peat	-	fibrous aggregate of visible and invisible fragments of decayed organic matter
Till	-	unstratified glacial deposit which may range from clay to boulders
Fill	-	any materials 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
Seam	-	2 mm to 75 mm
Parting	-	< 2 mm
Well Graded	-	having wide range in grain sizes and substantial amounts of all intermediate particle sizes
Uniformly Graded	-	predominantly of one grain size

Terminology describing soils on the basis of grain size and plasticity is based on the Unified Soil Classification System (USCS) (ASTM D-2488). The classification excludes particles larger than 76 mm (3 inches). This system provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter, construction debris) is based upon the proportion of these materials present:

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

The standard terminology to describe cohesionless soils includes the compactness (formerly "relative density"), as determined by laboratory test or by the Standard Penetration Test 'N' - value.

Relative Density	'N' Value	Compactness %
Very Loose	<4	<15
Loose	4-10	15-35
Compact	10-30	35-65
Dense	30-50	65-85
Very Dense	>50	>85

The standard terminology to describe cohesive soils includes the consistency, which is based on undrained shear strength as measured by insitu vane tests, penetrometer tests, unconfined compression tests, or occasionally by standard penetration tests.

Consistency	Undrained Shear Strength		'N' Value
	kips/sq.ft.	kPa	
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

ROCK DESCRIPTION

Rock Quality Designation (RQD)

The classification is based on a modified core recovery percentage in which all pieces of sound core over 100 mm long are counted as recovery. The smaller pieces are considered to be due to close shearing, jointing, faulting, or weathering in the rock mass and are not counted. RQD was originally intended to be done on NW core; however, it can be used on different core sizes if the bulk of the fractures caused by drilling stresses are easily distinguishable from *in situ* fractures.

RQD	ROCK QUALITY
90-100	Excellent, intact, very sound
75-90	Good, massive, moderately jointed or sound
50-75	Fair, blocky and seamy, fractured
25-50	Poor, shattered and very seamy or blocky, severely fractured
0-25	Very poor, crushed, very severely fractured

Terminology describing rock mass:

Spacing (mm)	Bedding, Laminations, Bands	Discontinuities
2000-6000	*Very Thick*	*Very Wide*
600-2000	*Thick*	*Wide*
200-600	*Medium*	*Moderate*
60-200	*Thin*	*Close*
20-60	*Very Thin*	*Very Close*
<20	*Laminated*	*Extremely Close*
<6	*Thinly Laminated*	

Strength Classification	Uniaxial Compressive Strength (MPa)
Very Low	1-25
Low	25-50
Medium	50-100
High	100-200
Very High	>200

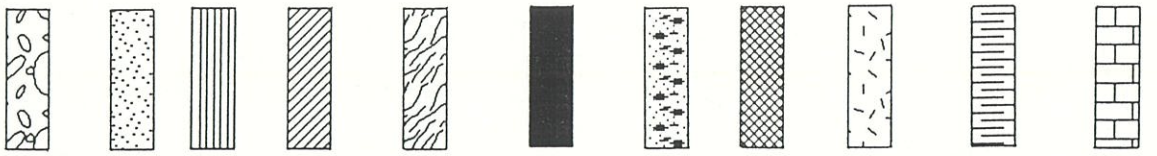
Terminology describing weathering:

Slight - Weathering limited to the surface of major discontinuities. Typically iron stained.

Moderate	-	Weathering extends throughout rock mass. Rock is not friable.
High	-	Weathering extends throughout rock mass. Rock is friable.

STRATA PLOT

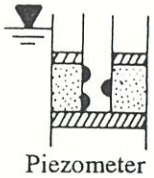
Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols:



Boulders Cobbles Gravel | Sand | Silt | Clay | Organics | Asphalt | Concrete | Fill | Igneous Bedrock | Metamorphic Bedrock | Sedimentary Bedrock

WATER LEVEL MEASUREMENT

Borehole or Standpipe



Piezometer

SAMPLE TYPE

SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ, etc.	Rock core samples obtained with the use of standard size diamond drilling bits.

N - VALUE

Numbers in this column are the results of the Standard Penetration Test: the number of blows of a 140 pound (64 kg) hammer falling 30 inches (760 mm), required to drive a 2 inch (50.8 mm) O.D. split spoon sampler one foot (305 mm) into the soil. 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).

OTHER TESTS

S	Sieve analysis
G_s	Specific gravity of soil particles
k	Permeability (cm/sec)
	Single packer permeability test; test interval from depth shown to bottom of borehole
	Double packer permeability test; test interval as indicated
	Falling head permeability test using casing
	Falling head permeability test using well point or piezometer
H	Hydrometer analysis
γ	Unit weight
C	Consolidation
CD	Consolidated drained triaxial
CU	Consolidated undrained triaxial with pore pressure measurements
UU	Unconsolidated undrained triaxial
DS	Direct shear
Q_u	Unconfined compression
I_p	Point Load Index (I_p on Borehole Record equals $I_p(50)$; the index corrected to a reference diameter of 50 mm)

TEST PIT RECORD

1

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 1

DATES: DUG 95/05/25 WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	14.30						
		TOPSOIL					
	14.0						
		Compact to dense brown GRAVEL with silt and sand (GM)			BS	1	
	13.7	-some boulders					
		End of Test Pit Practical refusal on inferred bedrock					
		* No seepage observed					
1							
2							
3							
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

2

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.
PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.
TEST PIT No. 2

DATES: DUG 95/05/25
WATER LEVEL 95/05/25 *
DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	13.97						
	13.9	TOPSOIL/ROOTMAT					
		Loose grey to black silty sand : FILL -building debris in fill includes wood brick, piping, cloth bags, plastic, glass and iron			BS	1	S
1	12.5						
		Compact to dense reddish brown silty sand with gravel : TILL (SM)					
2	12.0						
		Dense brown gravel with silt and sand : TILL (GM) -some boulders			BS	2	
	11.1						
3		End of Test Pit Practical refusal on inferred bedrock * No seepage observed					
4							

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L
10 20 30 40 50 60 70 80 90

TEST PIT RECORD

3

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 3

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	13.75						
	13.7	TOPSOIL/ROOTMAT					
		Loose dark grey gravelly sand : FILL -some building debris includes piping bricks, stone foundation and iron			BS	1	
	12.3	Compact reddish brown silty sand with gravel : TILL (SM) -some cobbles and boulders			BS	2	
	11.2	Highly weathered severely fractured slate BEDROCK			BS	3	
	10.6	End of Test Pit Refusal in bedrock * No seepage observed					

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

4

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 4

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	14.30						
		Loose gravel : FILL			BS	1	
	14.1						
	14.0	Slate BEDROCK					
		End of Test Pit Refusal on bedrock					
		* No seepage observed					
1							
2							
3							
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

5

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 5

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	14.37						
	14.2	TOPSOIL/ROOTMAT					
		Loose reddish brown silty sand with gravel : TILL (SM)			BS	1	
	13.8						
		Compact to dense grey brown gravel with silt and sand : TILL (GM)			BS	2	
1	13.5						
		Highly weathered severely fractured slate BEDROCK			BS	3	
	12.9						
		End of Test Pit Refusal in bedrock					
2		* No seepage observed					
3							
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

6

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 6

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	12.29						
		Compact reddish brown silty sand with gravel : TILL (SM)			BS	1	
	12.0	Very weathered severely fractured slate BEDROCK					
1					BS	2	
	11.1	End of Test Pit Refusal in bedrock * No seepage observed					
2							
3							
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

7

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.
PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.
TEST PIT No. 7

DATES: DUG 95/05/25
WATER LEVEL 95/05/25 *
DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	13.16						
		Compact brown sandy gravel with silt : FILL					
	12.6						
		Dense reddish to grey brown gravel with silt and sand : TILL (GM)					
1					BS	1	S
	11.7						
		Very severely fractured highly weathered slate BEDROCK					
2					BS	2	
	10.8						
		End of Test Pit Refusal in bedrock * No seepage observed					
3							
4							

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L
10 20 30 40 50 60 70 80 90

TEST PIT RECORD

8

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-1, DARTMOUTH, N.S.

TEST PIT No. 8

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	12.64						
		Compact brown sandy gravel with silt : FILL					
	12.3						
		Compact to dense dark grey to brown gravel with silt and sand : TILL (GM)			BS	1	
1							
	11.1						
		Very severely fractured highly weathered slate BEDROCK					
2							
	9.6				BS	2	
3		End of Test Pit Refusal in bedrock * No seepage observed					
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

9

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.
LOCATION LOT WDC-1, DARTMOUTH, N.S.
DATES: DUG 95/05/25 WATER LEVEL 95/05/25 *

PROJECT No. 10582
TEST PIT No. 9
DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	11.76						
		Loose to compact brown silty sand with gravel : FILL -some boulders, wood debris, wire, pipe			BS	1	S
	9.4						
		Compact to dense reddish brown gravel with silt and sand: TILL (GM)					
	8.8						
		Highly weathered severely fractured slate: BEDROCK			BS	2	
	8.1						
		End of Test Pit Refusal in bedrock * No seepage observed					

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80
WATER CONTENT & ATTERBERG LIMITS W_P W W_L
10 20 30 40 50 60 70 80 90

TEST PIT RECORD

10

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-2, DARTMOUTH, N.S.

TEST PIT No. 10

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
0	6.90						
		Loose to compact sandy gravel: FILL -some large concrete pieces, wire, wood			BS	1	
1	5.1						
		Compact to dense reddish brown gravel with silt and sand : TILL (GM)			BS	2	
2							
3	3.6						
		Severely fractured highly weathered slate BEDROCK			BS	3	
	3.3						
		End of Test Pit Refusal on inferred bedrock * No seepage observed					
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

11

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.

PROJECT No. 10582

LOCATION LOT WDC-2, DARTMOUTH, N.S.

TEST PIT No. 11

DATES: DUG 95/05/25

WATER LEVEL 95/05/25 *

DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
	7.56						
0		Loose black silty sand with gravel: FILL -some organics					
	7.1						
	6.9	Compact reddish brown gravel with silt and sand : TILL (GM)			BS	1	
	6.6	Moderately fractured highly weathered slate BEDROCK					
1		End of Test Pit Refusal in inferred bedrock * No seepage observed					
2							
3							
4							

UNDRAINED SHEAR STRENGTH - kPa

20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L

10 20 30 40 50 60 70 80 90

TEST PIT RECORD

12

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.
PROJECT No. 10582

LOCATION LOT WDC-2, DARTMOUTH, N.S.
TEST PIT No. 12

DATES: DUG 95/05/25
WATER LEVEL 95/05/25 *
DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
	6.57						
0		Loose to compact silty sand with gravel: FILL -some building debris					
1							
	4.8						
		Compact silty sand with gravel : TILL (SM)					
2					BS	1	S
3							
	3.3						
		Severely fractured highly weathered slate BEDROCK			BS	2	
	3.0						
		End of Test Pit Refusal in inferred bedrock * No seepage observed					
4							

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L
10 20 30 40 50 60 70 80 90

TEST PIT RECORD

13

CLIENT WATERFRONT DEVELOPMENT CORPORATION LTD.
PROJECT No. 10582

LOCATION LOT WDC-2, DARTMOUTH, N.S.
TEST PIT No. 13

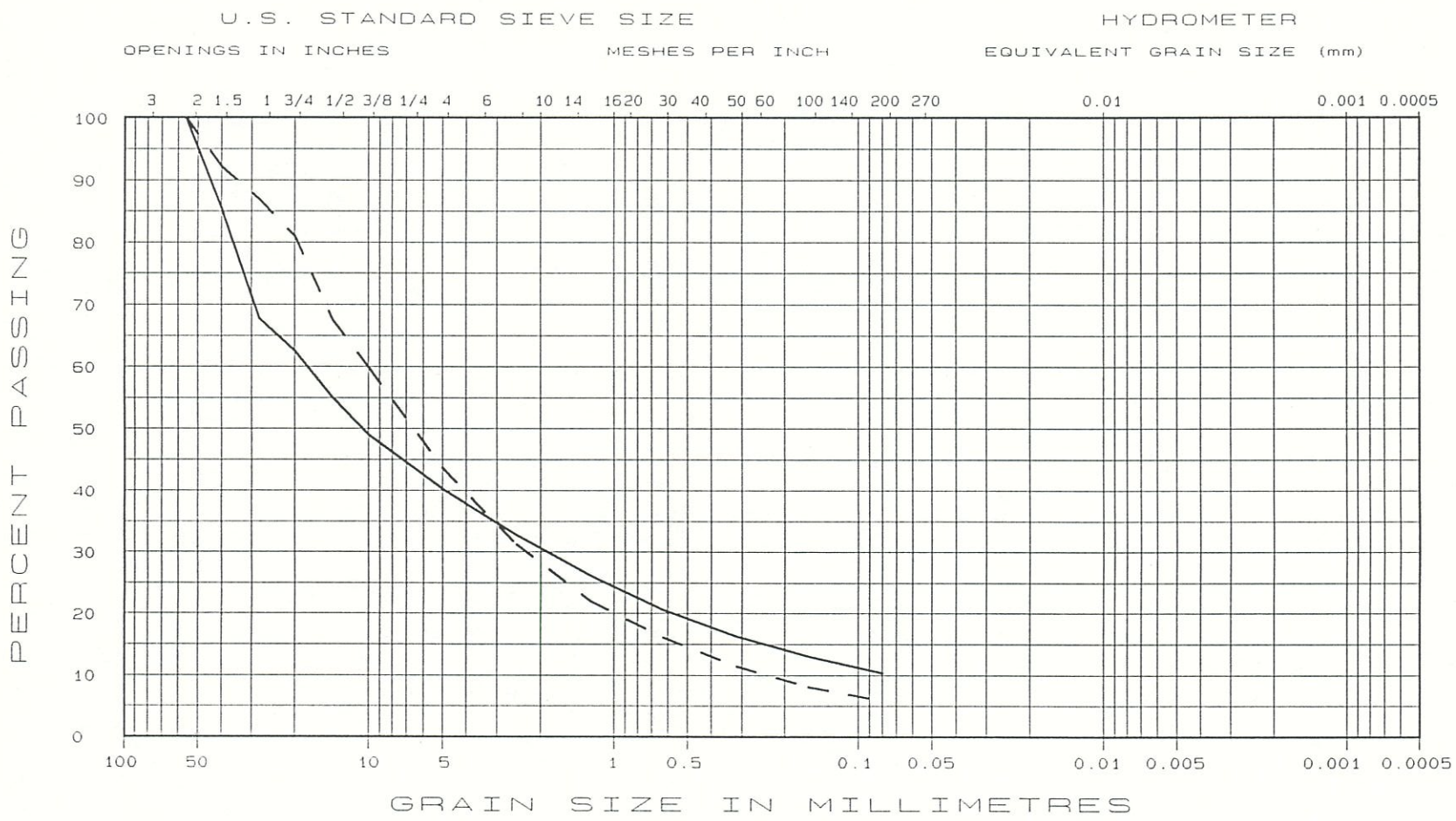
DATES: DUG 95/05/25
WATER LEVEL 95/05/25 *
DATUM GEODETIC

DEPTH (m)	ELEVATION (m)	SOIL DESCRIPTION	STRATA PLOT	WATER LEVEL	SAMPLE TYPE	SAMPLE NUMBER	OTHER TESTS
	6.17						
0		Compact dark brown sandy gravel with silt: FILL -some wood, concrete, brick -foundation wall to 3.3m			BS	1	
1							
2							
3	2.9						
		Severely fractured highly weathered slate BEDROCK					
	2.6						
		End of Test Pit Refusal in inferred bedrock * No seepage observed					
4							

UNDRAINED SHEAR STRENGTH - kPa
20 40 60 80

WATER CONTENT & ATTERBERG LIMITS W_P W W_L
10 20 30 40 50 60 70 80 90

10582



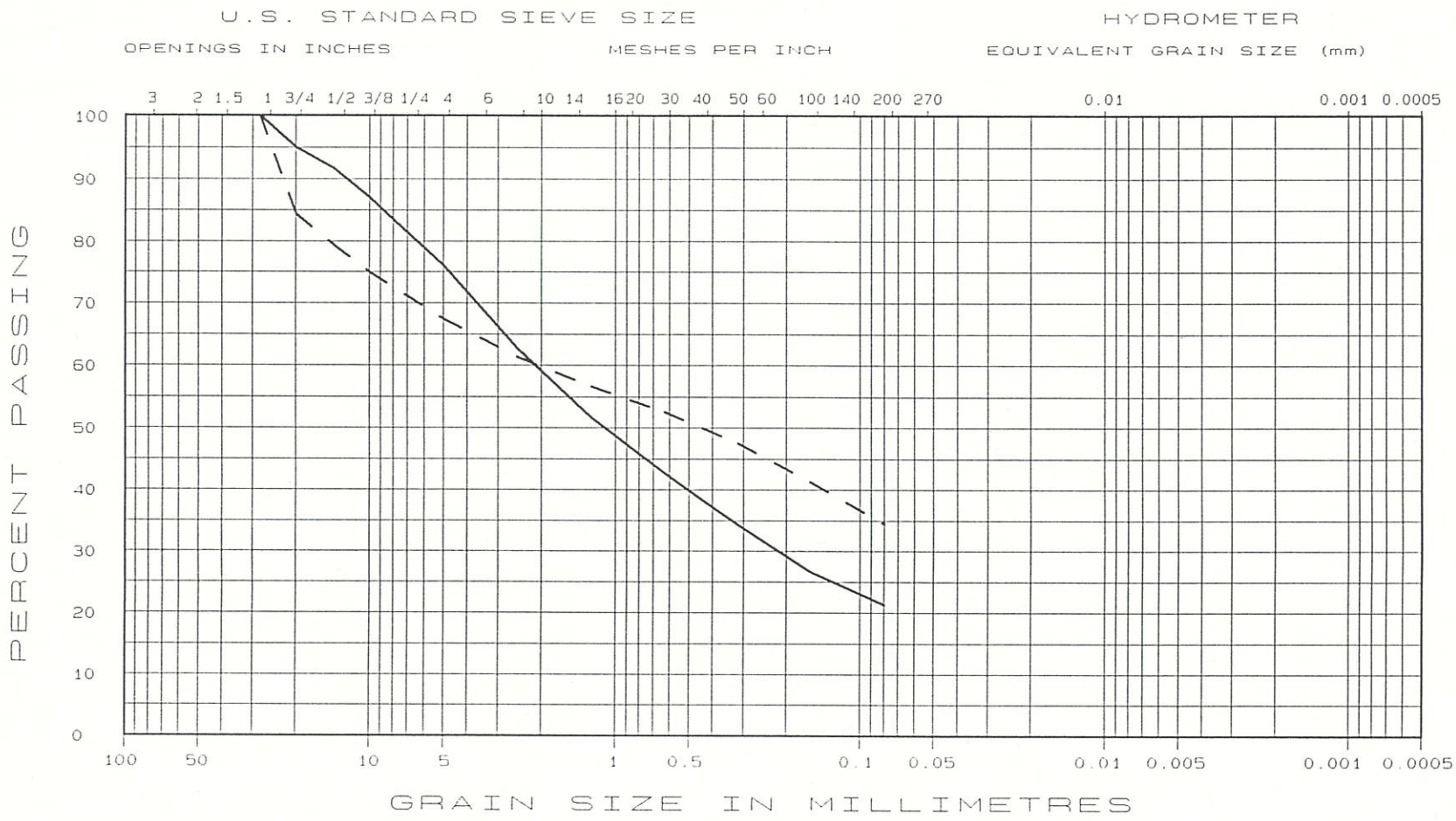
GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

Unified Soil Classification

	LOCATION	SAMPLE	DEPTH	DESCRIPTION OF STRATUM
———	TP2	SA2	8 ft.	GRAVEL with silt and sand (GM)
— — —	TP7	SA1	5 ft.	GRAVEL with silt and sand (GM)

FIGURE

10582



GRAVEL		SAND			SILT & CLAY
Coarse	Fine	Coarse	Medium	Fine	

Unified Soil Classification

	LOCATION	SAMPLE	DEPTH	DESCRIPTION OF STRATUM
———	TP9	SA1	6 ft.	silty SAND with gravel (SM)
— — —	TP12	SA1	7 ft.	silty SAND with gravel (SM)

FIGURE

HALIFAX HARBOUR

HALIFAX–DARTMOUTH
INDUSTRIES LIMITED

CNR

ALDERNEY DRIVE

ALDERNEY DRIVE

PRINCE STREET

KING STREET

PORTLAND STREET

QUEEN STREET

TP 1
TP 2
TP 3
TP 4
TP 5
TP 6
TP 7
TP 8
TP 9
TP 10
TP 11
TP 12
TP 13

BURIED FOUNDATION

BURIED FOUNDATION

BURIED FOUNDATION

LOT WDC–1

LOT WDC–2

BENCHMARK :
N.S.C.M. No. 5450, ELEVATION
6.71 m, GEODETIC DATUM.

Jacques Whitford

REFERENCE
NOVA SCOTIA TOPOGRAPHIC SERIES MAPS
NO. 5P11/06–SW & 5P11/06–SE
DATED MAY, 1972.

SCALE : 1"=100'
DATE : 95/06/28
DRAWN BY : J.M.CORBETT
APPROVED BY : J.M.

WATERFRONT DEVELOPMENT CORPORATION LTD.

LOTS WDC–1 AND WDC–2 INVESTIGATION

ALDERNEY DRIVE, DARTMOUTH, N.S.

TEST PIT LOCATIONS

DRAWING NO.
10582–1