

Founded in 1927

1810 North 12th Street Registered Toledo, Ohio 43624 (419) 241-7175

Engineers, Chemists and Geologists

Jerry Chabler, president Neil R. Blaksley, P.E., general manager

Toledo Testing Laboratory, Inc.

January 28, 1980

City of Napoleon 255 Riverview Avenue Napoleon, Ohio 43545

MUNCIPAL SERVICE & STORAGE BUILDING

NAPOLEON, OHIO

Attention: Mr. Von Eric Berlin, P.E.

City Engineer

JOB NO. DR-3771

Gentlemen:

We are submitting our Report of Subsurface Ground Investigation and Laboratory Test Results for the above indicated project (site).

The exploration included seven (7) soil borings placed according to the locations noted on the boring logs. Descriptive classifications of the soil substrata, recordings of groundwater observations, sampling depths, laboratory test results and other pertinent data are shown on the boring logs. Sampling depths and identifications with laboratory test results are shown in tabular form. Graphical representations of moisture-density relationship and loadpenetration test performances are included in the report.

As can be seen in the boring logs the subsurface conditions encountered at the site did not vary appreciably with boring location. In general aside from the thin layer of topsoil (8" - 12" thick) silty clay of varying color and consistency was encountered. The blow counts obtained in this material indicate it is stiff to hard in consistency. Groundwater observations made at the time of the boring operation indicate the water table level corresponds roughly to the coloration change from brown to grey.

Allowable bearing capacities for this site depend on the depth of bearing. For spread footings founded on soil which is between 3'6" and 6'6" below grade we recommend an allowable bearing capacity of 3,000 psf be utilized. If greater bearing capacities are needed the footings can be founded in the hard silty clay which lie about 7 feet below grade and proportioned using a bearing capacity of 5,000 psf.

Only one (1) CBR test was performed as only one (1) type soil was encountered.

No problems are forseen in the construction of the foundation or other earthwark activities on this site that would be caused by subsurface conditions.



Toledo Testing Laboratory, Inc.

January 28, 1980

City of Napoleon Napoleon, Ohio 43545

MUNCIPAL SERVICE & STORAGE BUILDING NAPOLEON, OHIO

JOB NO. DR-3771

We hope the report inclusions will be serviceable to the planning of the project. Your inquiry or requests for additional services will be promptly acknowledged.

Very truly yours,

TOLEDO TESTING LABORATORY, INC.

Peter J. Jarey,

Chief Soils Engineer

PJC/dr 3 - Mr. Von Eric Berlin, P.E.



Toledo Testing Laboratory, Inc. 1810 North 12th Street

Toledo, Ohio 43624 (419) 241-7175

		235' north of property line	_ Date	No _JAN	DR-3 UARY 1	1, 1980	Soll Bo	ring No.
	Depth (Ft -In.)	Soil Description Topsoil			Moisture Content		Unconfined	Allowa Bearin Streng (P.S.F.
	0,6,5	1 10h2011						(P.S.F.
NO.1 J	3'0"	Stiff to hard brown silt and clay, trace of gravel	I					
6	'0"		ŀ					
			ļ					
		24						
		•						
of Sample uger (Disturbed lift Tube Samp lift-walled (Hou libe-Undisturbed r-Disturbed elby Tube-Und ck Core licates "No Ret	ling— usel) d fisturbed	Remarks Fotal Footage: 6'0" Overburden Drilled: 6'0" Rock Cored: NONE Orillers: NW-TB			ater Obse	ervations our: None		

Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test — number of blows per foot of penetration





Toledo Testing Laboratory, Inc. 1810 North 12th Street

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Industri	ial Dr	MUNICIPAL SERVICE AND STORAGE I	Job	No.	DR-37	71		
		33 west of centerline of 3 160' north of south property ne	Date	JAN	UARY 1	0, 1980	Call D.	
le	1				T		Unconfined	ring No.
In -	Depth (Ft -In.)	Soil Description		Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P.C.F.)	Compressive Strength	Allowa Bearin Streng
	0,8,,	Topsoil				(1.01.)	(P.S.F.)	(P.S.F.
NO.1	'0"	Stiff brown silty clay, trace of fine sand and gravel	(2) 5) 9)				
NO. 2 J	7'0"	Hard brown silty clay, trace of fine sand and gravel	(1	(4) (9) (31)				
0.3 J 15'	0"	Very stiff grey silty clay, trace of fine sand and gravel NOTE: Brown silty clay veins in strata	(9) (12) (16)	2)				
).4 J		Hard grey silty clay, trace of fine sand and gravel	(12					
of Sample Uger (Disturbed bilt Tube Samplin-walled (Hou- tibe-Undisturbed r-Disturbed elby Tube-Und ck Core ficates "No Rec	t) ling— isel) d	STRATA CONTINUES ON PAGE 3 Remarks Total Footage: Overburden Drilled: Rock Cored: Drillers: SEE PAGE 3	(16)(21 Gro)		SEE PAGE	. 3	

Number of Blows (Standard Penetration Test) — Numbers in parentheses not used for bearing strength determinations Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test — number of blows per foot of penetration





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J. 101. a	160' north of south property line	Date	JA	DR-37 NUARY	10, 1980	C-II D	
Sample Depth & Type (FtIn.)	Soil Description MATCH INF: 20) II		Moisture Content		Unconfined	Allowa Bearin Streng
	STRATA CONTINUED FROM PAGE	2				(F.3.F,)	(P.S.F.
23'6"	Hard grey silty clay, trace of fine sand and gravel						
N0.5			(11)				
25'0"		ļ	(19)				
		-	3007				
		Ī					
		-					
		_					
	2						
of Sample uger (Disturbed) blit Tube Sampling— nin-walled (Housel)	Remarks Total Footage: 25 '0"	G	oundw	ater Obs	ervations		
ibe-Undisturbed r-Disturbed elby Tube-Undisturbe ck Core ficates "No Recovery"	Overburden Drilled: 25 0" Rock Cored: NONE Drillers: NW-TB	_ A	fter	4 1/2	hours: 1	5'1" .	

Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test—number of blows per foot of penetration



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	; north of south property line	Date	JAN	WARY 1	.0, 1980	Soil Bo	ring No
Sample Depth (Ft -in)	Soil Description Topsoil		Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P.C.F.)	Unconfined	Allowab Bearing Strength (P.S.F.)
NO.1 J 5'0"	Stiff brown and grey mottled silty clay, trace of fine sand and gravel	į	(4) (4) (4) (9)				
8'6" 8'6" 10.2 J 10'0"	Hard brown silty clay, trace of fine sand and gravel	(11) 15) 21)				
13'6" 0.3 15'0" 18'6" 1.4 J 20'0"	Hard grey silty clay, trace of fine sand and gravel NOTE: Brown silty clay viens in upper portion of strata	(1	/				
uger (Disturbed) plit Tube Sampling— nin-walled (Housel) ple-Undisturbed pr-Disturbed pick Core dicates "No Recovery"	Remarks Total Footage: 20'0" Overburden Drilled: 20'0" Rock Cored: NONE Drillers: NW-TB	G	roundw		hours:	None	

Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test — number of blows per foot of penetration





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		north of south property line	Date	JA	DR-37 NUARY	10,	1980	Soll E	oring No.
	Peptn Ft -In.)	Soil Description		Blows Per 6"	Moisture Content (%)	Dry Unit (P.C	Weight	Unconfined Compressive Strength (P.S.F.)	Streng
	0,8,	Topsoil				11.0	,	(P.S.F.)	(P.S.F
NO.1	0"	Stiff brown and grey mottled silty clay, trace of sand and gravel	i	(4) (6) (7)					
	7'0"	Hard brown silty clay, trace of fine sand and gravel	7	15) 28) 37)					
0.3 J 15'	0"	Hard grey silty clay, trace of sand and gravel	(9)	5) 2)					
of Sample Uger (Disturbed Joint Tube Sampl Jin-walled (Hou Joint Tube-Undisturbed Joint Tube-Und Joint T	ing— sel) 1	Remarks Total Footage: 20'0" Overburden Drilled: 20'0" Rock Cored: NONE Drillers: NW-TB	1	undw	ater Obse				

Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test -- number of blows per foot of penetration





Toledo Testing Laboratory, Inc.

1810 North 12th Street Toledo, Ohio 43624 (419) 241-7175

trial Dr. & 60'	west of centerline of Indus- north of south property line	Job I Date	No JAI	DR-37	/1 0, 1980	Soll Bo	ring No
Sample Depth & Type (Ft -In.)	Soil Description		Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P.C.F.)	Unconfined Compressive Strength (P.S.F.)	Allowat Bearing Strengt
0'9"	Topsoil					(ion i)	(P.S.F.)
NO.1 J 5'0"	Stiff brown and grey mottled silty clay, trace of sand and gravel	1	(4) (4) (9)				
8'6" 8'6" NO.2 J 9'6"	Hard brown silty clay, trace of fine sand and gravel	(3	9)				
13'6" J	Hard grey silty clay, trace of sand and gravel	(6					
15'0"	or sand and grave;	(1)					
J 20'0"	STRATA CONTINUES ON PAGE 7	(12	2)				
e of Sample suger (Disturbed) plit Tube Sampling— hin-walled (Housel) ube-Undisturbed ar-Disturbed helby Tube-Undisturbed ock Core dicates "No Recovery"	Remarks Total Footage: Overburden Drilled: Rock Cored: Drillers: SEE PAGE 7	-			ervations SEE PAGE	7	,

Number of Blows (Standard Penetration Test) — Numbers in parentheses not used for bearing strength determinations Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test - number of blows per foot of penetration





Toledo Testing Laboratory, Inc. 1810 North 12th Street

1810 North 12th Street Toledo, Ohio 43624 (419) 241-7175

	north of south property line	Date JAN	101/1(1 1	0, 1980	Soll Bo	ring No
Sample Depth & Type (Ft -In)	Soil Description MATCH LINE: 20'0" STRATA CONTINUED FROM PAGE 6	Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P,C.F.)	Unconfined Compressive Strength (P.S.F.)	Allowab Bearing Strength (P.S.F.)
	Hard grey silty clay, trace					
NO.5	of sand and gravel					
J 25'0"		(10) (20)				
25 0		-(32)				
					·	
10						
	2					
of Sample	Remarks					
uger (Disturbed) plit Tube Sampling— hin-walled (Housel)	Total Footage: 25'0"	Groundy	vater Obs	ervations		
ube-Undisturbed tr-Disturbed nelby Tube-Undisturbed	Overburden Drilled: 25 '0" Rock Cored: NONE	After	² 7 hou	rs: 13'2	2"	
ock Core dicates "No Recovery"	Drillers: NW-TB					



Toledo Testing Laboratory, Inc. 1810 North 12th Street

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		orth of south property line	Date JA	NUARY 9	, 1980	Soll Bo	ring No
Sample & Type	Depth (Ft -In.)	Soil Description Topsoil	Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P.C F.)	Unconfined	Allowab Bearing Strength (P.S.F.)
	0'10"	Topsuti		-			(* 104) 17
NO.1 J	3'6"	Stiff brown and grey mottled silty clay, trace of fine sand	(6) (6) (7)				
NO.2	7'6"= 8'6" 10'0"	Hard brown silty clay, trace of fine sand and gravel	(19) (26) (35)				
0.3 J	3'6"	Hard grey silty clay, trace of fine sand and gravel	(11) (19) (27)				
of Sample	and)	STRATA CONTINUES ON PAGE 9 Remarks	(12) (19) (25) Groundw	vater Obs	ervations		
plit Tube San hin-walled (H ube-Undistur ar-Disturbed nelby Tube-U ock Core dicates "No F	npling— lousel) bed Indisturbed	Total Footage: Overburden Drilled: Rock Cored: Drillers: SEE PAGE 9			SEE PA	GE 9	

s (Standard Penetration Test) — Numbers in parentheses not used for bearing strength determinations Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test - number of blows per foot of penetration





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	O' west of centerline of Indus- ' north of south property line	Date	_JAI	VUARY 9	, 1980	Soll Bo	oring No
Sample Depth & Type (Ft-In.)	Soil Description MATCH LINE: 20'0"		Blows Per 6"	Moisture Content (%)	Dry Unit Weight (P.C.F.)	Unconfined Compressive Strength (P.S.F.)	Allowa Bearing Strengt (P.S.F.)
	STRATA CONTINUED FROM PAGE 8						(1.0.1.)
23'6"	Hard grey silty clay, trace of fine sand and gravel						-
NO.5 J 25'0"		7	13) 15) 23)				
			237				
		L					
	(C) 0						
of Sample	Remarks	Gre	undw	ater Ohe	ervations		
olit Tube Sampling— hin-walled (Housel) be-Undisturbed r-Disturbed lelby Tube-Undisturbed lick Core dicates "No Recovery"	Total Footage: 25 '0" Overburden Drilled: 25 '0" Rock Cored: NONE Drillers: NW-TB				ervations punst: 714	4 "	

Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

*Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test - number of blows per foot of penetration





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	7' west of centerline of Indus- ' north of south property line	Date _	JA	NUARY !	9, 1980	Soil Ro	ring No
Sample Deptn & Type (Ft -In.)	Soil Description	В		Maistura		Unconfined	Allowab Bearing Strength (P.S.F.)
1'0"	Topsoil	-					
NO.1 J 5'0"	Stiff brown and grey mottled silty clay, trace of fine sand	(6 (5 (6)				
8'6" NO.2 J 10'0"	Hard brown clay, trace of fine sand and gravel	(18)))				
13'6" 0.3 J 15'0" 18'6" J 20'0"	Hard grey silty clay, trace of fine sand and gravel NOTE: Brown silty clay veins in upper portion of strata	(10 (14 (26) (15) (15))				
of Sample Uger (Disturbed) Ult Tube Sampling— inin-walled (Housel) ube-Undisturbed r-Disturbed selby Tube-Undisturbed	Remarks Total Footage: Overburden Drilled: Rock Cored: Drillers: SEE PAGE 11	Grou	indw		ervations SEE PAGE	11	

s (Standard Penetration Test) — Numbers in parentheses not used for bearing strength determinations Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity

'Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test - number of blows per foot of penetration

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	187' west of centerline of Indus. O' north of south property line	Date	JA	NUARY	9, 1980	Soil Bo	ring No.
Sample Depth (FtIn.)	Soil Description MATCH LINE: 20'C	ıtı	Blows Per 6"	Moisture		Unconfined	Allowa Bearing Streng
	THOLD I KOM PAGE	10					(P.S.F.)
23'6"	Hard grey silty clay, trace of fine sand and gravel						
NO.5 J 25'0"			10) 18)				
	1	(28)				
		-					
	· ·						
	¥						
		-					
of Sample uger (Disturbed)	Remarks						
by the control of the	Total Footage: 25 '0" Overburden Drilled: 25 '0" Rock Cored: NONE Drillers: NW-TB	W.		ter Obser 24 hou	rvations	s	

Number of Blows (Standard Penetration Test) — Numbers in parentheses not used for bearing strength determinations Unconfined Compressive Strength is considered approximately equal to the allowable bearing capacity *Allowable Bearing Strength (an approximation) is based on the Standard Penetration Test — number of blows per foot of penetration

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Toledo Testing Laboratory, Inc. Engineers • Chemists • Geologists

1810 North 12th Street Toledo, Ohio 43624

JANUARY 28, 1980

JOB NO. DR-3771

TABLE NO. 1

NATURAL MOISTURE CONTENT, MECHANICAL ANALYSIS (SIEVE AND HYDROMETER) AND COMPOSITION OF SOIL

BORING NUMBER	DEPTH	NATURAL MOISTURE CONTENT		S I E PERCENT PA	EVE AN ISSING SIEV	I A L Y S I E SIZES AN	S ID NUMBERS	
CBR-1	(FTIN.)	(%)	_1/2"	3/8"	NO.4	NO.10	NO.40	NO.20(
CDR-1	1'0"-6'0"	14.6	100.00	100.00	100.00	100.00	98.62	91.38

COMPOSITION OF SOIL

BOR ING NUMBER	GRAVEL (%)	SAND (%)	SILT (%)	S CLAY (%)
CBR-1	0	8.62	43.52	47.86

TABLE NO. 2

ATTERBERG LIMITS (L.L., P.L., P.I.), GROUP DESIGANTION AND GROUP INDEX

BORING NUMBER CBR-1	DEPTH (FTIN.) 1'0"-6'0"	LIQUID LIMIT L.L. (%)	PLASTIC LIMIT P.L. (%) 21.4	PLASTICITY INDEX P.I. 12.0	GROUP DESIGNATION, GROUP INDEX AND SOIL DESCRIPTION A-6a (8.9) Brown silt and clay, trace of gravel
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JANUARY 28, 1980

JOB NO. DR-3771

TABLE NO. 3

MOISTURE-DENSITY RELATIONSHIP (STANDARD PROCTOR) ASTM D 698

BORING NUMBER	DEPTH (FTIN.)	COMPATION CH MAXIMUM DRY DENSITY (LBS./CU.FT.)	IARACTERISTICS OPTIMUM MOISTURE CONTENT (%)
CBR-1	1'0"-6'0"	104.9	17.0

TABLE NO. 4

CALIFORNIA BEARING RATIO LOAD-PENETRATION DETERMINATIONS (ASTM D 1883)

BORING NUMBER OF BLOWS STANDARD PROCTOR (LBS./CU.FT.) CBR-1 56 104.9	<u>SWELL</u> (%) 0.87	AT IN	VALUES DICATED RATION 0.2" (%) 5.78	MOISTURE CONTENT AFTER PENETRATION (%) 19.1
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BORING NO. CBR-1 DEPTH: 1.0"-6.0" CALIFORNIA BEARING RATIO (ASTM D 1883) MUNCIPAL SERVICE AND STORAGE BUILDING 0.4 Buttalo New York Printed in U.S.A. PISTON PENETRATION IN INCHES 0.3 JOB NO. DR-3771 NAPOLEON, OHIO 0.2 0.1 PROJECT: POUNDS SQUARE INCH **DER PRESSURE** NI 0.0 140 ...120 100 40 20

TO X TO TO THE HALF INCH AS 3313 -53

SQUARE

GRAPHIC CONTROLS CORPORATION

G GRAPH DAPER

Project: MUNCIPAL NAPOLEON	SERVICE AND STORAGE BUILDING , OHIO	Toledo Testing Laboratory, 1810 North 12th Street Toledo, Ohio 43624
		(419) 241-7175
Type Test:	STANDARD PROCTOR NO. 1 - ASTM D	698
Sample Description:	BROWN SILT AND CLAY, TRACE OF SA	AND AND CDAYEL
Source:	BORING NO. CBR-1 DEPTH- 11011 4	CLOH
Maximum Dry Density:	104.9 PCF Optimum Moist	turo Contanti 17 0%
~		
	MOISTURE-DENSITY RELA	ATIONSHIP
06		
04 8	DRY DENSITY	
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02		
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8		
	MOISTURE CONTENT IN PERCE	NT
	14 16 18	20 22 24

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