



**FOUNDATION INVESTIGATION REPORT  
for  
POTTAWATOMI RIVER TRIBUTARY CULVERT (SITE NO. 8-483C)  
HIGHWAY 6, STA. 10+445  
SPRINGMOUNT  
G.W.P. 43-00-00  
DISTRICT OF LONDON, ONTARIO**

PETO MacCALLUM LTD.  
165 CARTWRIGHT AVENUE  
TORONTO, ONTARIO  
M6A 1V5  
Phone: (416) 785-5110  
Fax: (416) 785-5120  
Email: toronto@petomaccallum.com

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**FOUNDATION INVESTIGATION REPORT**  
for  
Pottawatomi River Tributary Culvert (Site No. 8-483C)  
Highway 6, Sta. 10+445  
Springmount  
G.W.P. 43-00-00  
District of London, Ontario

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**1. INTRODUCTION**

This report summarizes the results of the foundation investigation carried out for the Pottawatomi River Tributary culvert replacement (Site No. 8-483C) as a part of rehabilitation of Highway 6, from Springmount to Hepworth. The study was carried out by Peto MacCallum Ltd. (PML) for McCormick Rankin (MRC), a member of MMM Group Ltd., on behalf of the Ministry of Transportation of Ontario (MTO).

The purpose of this report was to summarize the subsurface stratigraphy and groundwater conditions encountered in the boreholes advanced during the foundation investigation at the new culvert site.

**2. SITE DESCRIPTION AND GEOLOGY**

The existing culvert is located under the Highway 6 northbound and southbound lanes, about 500 m north of the intersection of Highway 6 and Highway 21 in the Town of Springmount. The existing culvert conveys the flow from a tributary of the Pottawatomi River.

Land use in the vicinity of the site includes the existing Highway 6 transportation corridor and commercial sites. The terrain includes level areas vegetated with grass, brush and scattered trees. The topography of the site is generally flat. Site photographs of the culvert location are attached in Appendix A.

Physiographically the site is located in the region referred to as the Bruce Peninsula. The surficial and bedrock geology consists of a relatively thin till soil cover less than 5 m thick over dolomite bedrock.



### **3. INVESTIGATION PROCEDURES**

The subsurface investigation was carried out on January 12, 2012. Two boreholes (CT1-1 and CT1-2) were drilled to depths of 4.1 and 4.6 m as shown on Drawing PRT-1, appended. In view of the wet conditions at the time of the field work, boreholes were not drilled beyond the highway platform. The data in the boreholes was consistent and considered to be representative for the purpose of this project.

The boreholes were advanced with a truck-mounted CME 45 drill rig using continuous flight hollow stem augers. The equipment was supplied and operated by a specialist drilling contractor, working under the full-time supervision of a PML field supervisor.

Soil samples were recovered from the boreholes at regular 0.75 and 1.5 m depth intervals using the standard penetration test method. Standard penetration tests were conducted to assess the strength characteristics of the substrata. Soils were identified in accordance with the MTO soil classification manual procedures. The groundwater conditions in the boreholes were assessed during drilling by visual examination of the soil, the sampler and drill rods as the samples were retrieved and, where encountered, by measuring the groundwater level in the open boreholes.

The boreholes were backfilled with a bentonite/cement mixture where required in accordance with the MTO guideline and MOE Reg. 903 for borehole abandonment procedures.

The co-ordinates and ground surface elevations at the boreholes were provided by MMM Group Ltd. All elevations are reported in metres.



The recovered soil samples were returned to our laboratory in Toronto for detailed visual examination, laboratory testing and classification. The laboratory testing program included the following tests:

- Natural moisture content determinations (7)
- Grain size distribution analyses (4)
- Atterberg limits tests (4)

The grain size distribution charts are presented in Figures CT1-GS-1 to CT1-GS-3. The plasticity charts are presented in Figures CT1-PC-1 to CT1-PC-3. All of the test results are shown on the Record of Borehole sheets.

#### **4. SUMMARIZED SUBSURFACE CONDITIONS**

Reference is made to the appended Record of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, standard penetration test results as well as groundwater observations. The results of grain size distributions, Atterberg limits tests and moisture content determinations are also shown on the Record of Borehole sheets.

The borehole locations and stratigraphic profile prepared from the borehole data are presented on the foundation Drawing PRT-1.

Boreholes CT1-1 and CT1-2 were drilled along the alignment of this culvert to depths of 4.1 and 4.6 m, elevation 231.8 and 231.2, respectively. The subsurface stratigraphy revealed in the boreholes generally comprised a road embankment fill underlain by native silty clay. Bedrock was inferred by auger refusal at depths of 4.1 and 4.6 m, elevation 231.8 and 231.2, respectively. Groundwater was observed on completion of drilling in both boreholes.



#### 4.1.1 Fill

From the ground surface, a 2.1 m thick fill extending to elevation 233.8 and 233.7 was encountered in boreholes CT1-1 and CT1-2 respectively. The fill layer includes a surficial 0.6 m thick compact sand and gravel from the Highway 6 shoulder pavement underlain by soft silty clay. The sand and gravel fill locally below the shoulder pavement contained asphalt pieces while the silty clay fill locally contained rootlets, topsoil and organic inclusions. SPT N values in the fill ranged from 2 to 21.

The results of grain size distribution analysis for the silty clay fill contacted in borehole CT1-1 are included in Figure CT1-GS-1. A plasticity chart of the silty clay fill sample is presented in Figure CT1-PC-1. The Atterberg liquid and plastic limits were 41 and 22 respectively, with a plasticity index of 19. The moisture content of the tested sample was 15%.

The results of grain size distribution analysis for the silty clay with organics fill contacted in borehole CT1-2 are included in Figure CT1-GS-2. A plasticity chart of the silty clay with organics fill sample is presented in Figure CT1-PC-2. The Atterberg liquid and plastic limits were 57 and 31 respectively, with a plasticity index of 26. The moisture content of the sample was 45% (elevated due to the presence of organics in the fill).

#### 4.1.2 Silty Clay

Below the fill in boreholes CT1-1 and CT1-2, a 2.0 and 2.5 m thick, firm silty clay stratum was contacted to the borehole termination depths of 4.1 m, elevation 231.8, and 4.6 m, elevation 231.2, respectively. SPT N values in this stratum were 7 and 8.

The results of grain size distribution analyses for the silty clay are included in Figure CT1-GS-3. A plasticity chart of the two silty clay samples is presented in Figure CT1-PC-3. The Atterberg liquid limits were 35 and 36, the plastic limit of both test samples was 20 and the plasticity indices were 15 and 16 respectively. The moisture content of the samples ranged from 21 to 23%.



#### 4.1.3 Bedrock

Bedrock was inferred by auger refusal in boreholes CT1-1 and CT1-2 at depths of 4.1 and 4.6 m, elevation 231.8 and 231.2, respectively. From the local geology, it is inferred that the bedrock consists of dolomite.

#### 4.1.4 Groundwater

During drilling, groundwater was only observed in borehole CT1-2 at 3.8 m depth, elevation 232.0. Groundwater was observed in boreholes CT1-1 and CT1-2 at respective depths of 4.1 and 3.4 m, elevation 231.8 and 232.4, on completion of drilling. The groundwater level is subject to seasonal fluctuations and rainfall patterns.

### 5. MISCELLANEOUS

Mr. Alan Lo carried out the field investigation for this study under the supervision of Mrs. N .S. Balakumaran, P. Eng. Aardvaark Drilling Ltd. supplied the drill rig for the subsurface exploration. The laboratory testing of the selected samples was carried out in the PML laboratory in Toronto.



## 6. CLOSURE

This Foundation Investigation Report was prepared by Mr. H. Gharegrat, P.Eng., and reviewed by Mr. G. Degil, PhD, P.Eng., Senior Foundation Engineer. Mr. C. M. P. Nascimento, P. Eng., Project Manager and MTO Designated Principal Contact, conducted an independent review of the report.

Yours very truly

Peto MacCallum Ltd.



Harry Gharegrat, MS, P.Eng.  
Project Engineer



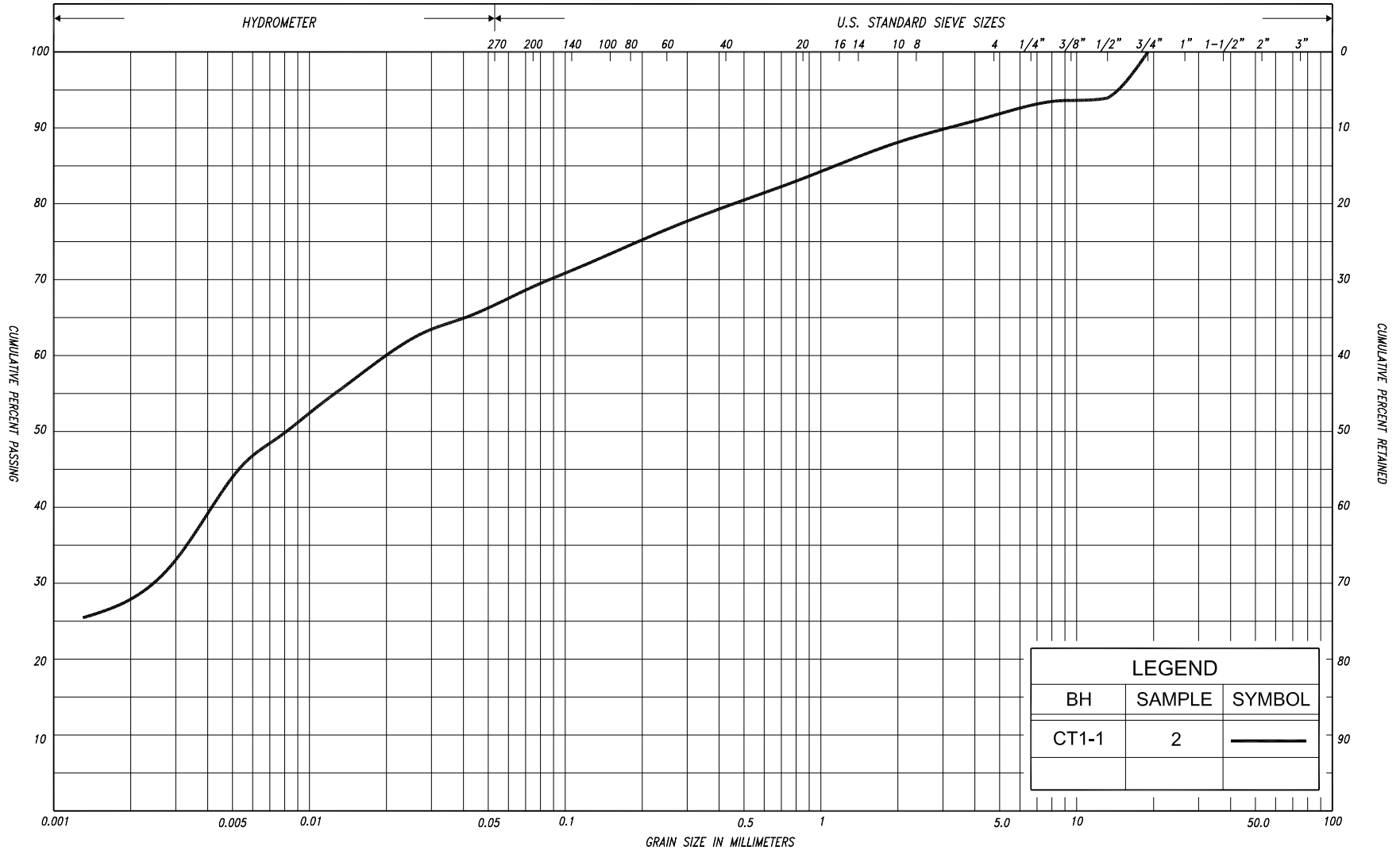
Grigory Degil, PhD, P.Eng.  
Senior Foundation Engineer



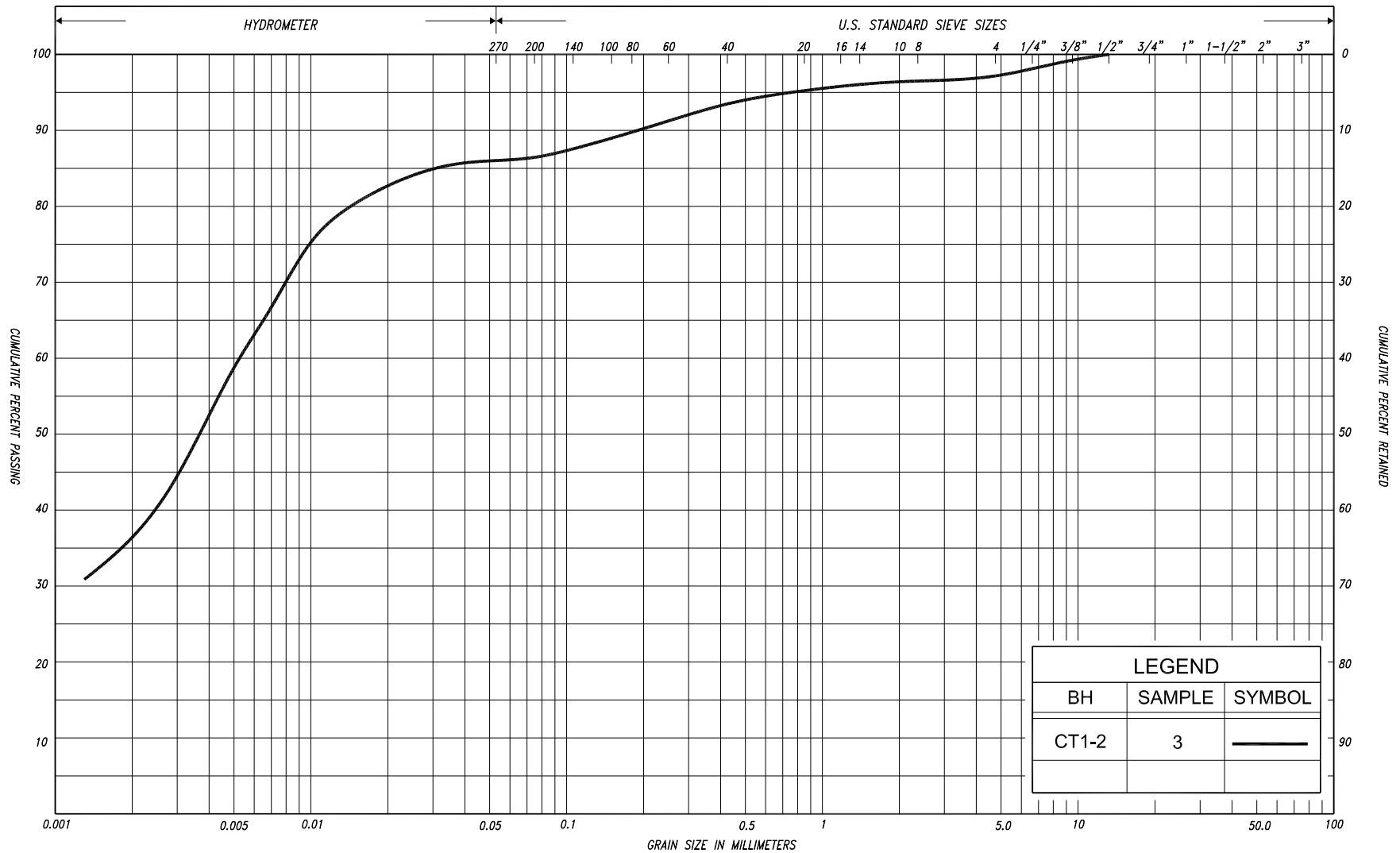
Carlos M.P. Nascimento, P.Eng  
Project Manager and  
MTO Designated Principal Contact

HG/GD/CN:hg-nk





SILT & CLAY					FINE		MEDIUM		COARSE		GRAVEL				COB BLES	UNIFIED		
					SAND													
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE		GRAVEL				COBBLES	M.I.T.
	SILT																	
CLAY			SILT			V. FINE	FINE	MED.	COARSE		GRAVEL							U.S. BUREAU
						SAND												



LEGEND		
BH	SAMPLE	SYMBOL
CT1-2	3	—

SILT & CLAY				FINE		MEDIUM		COARSE		GRAVEL				COBBLES	UNIFIED			
				SAND														
CLAY	FINE		MEDIUM		COARSE		FINE		MEDIUM		COARSE		GRAVEL				COBBLES	M.I.T.
	SILT																	
CLAY		SILT			V. FINE	FINE	MED.	COARSE		GRAVEL							U.S. BUREAU	
					SAND													

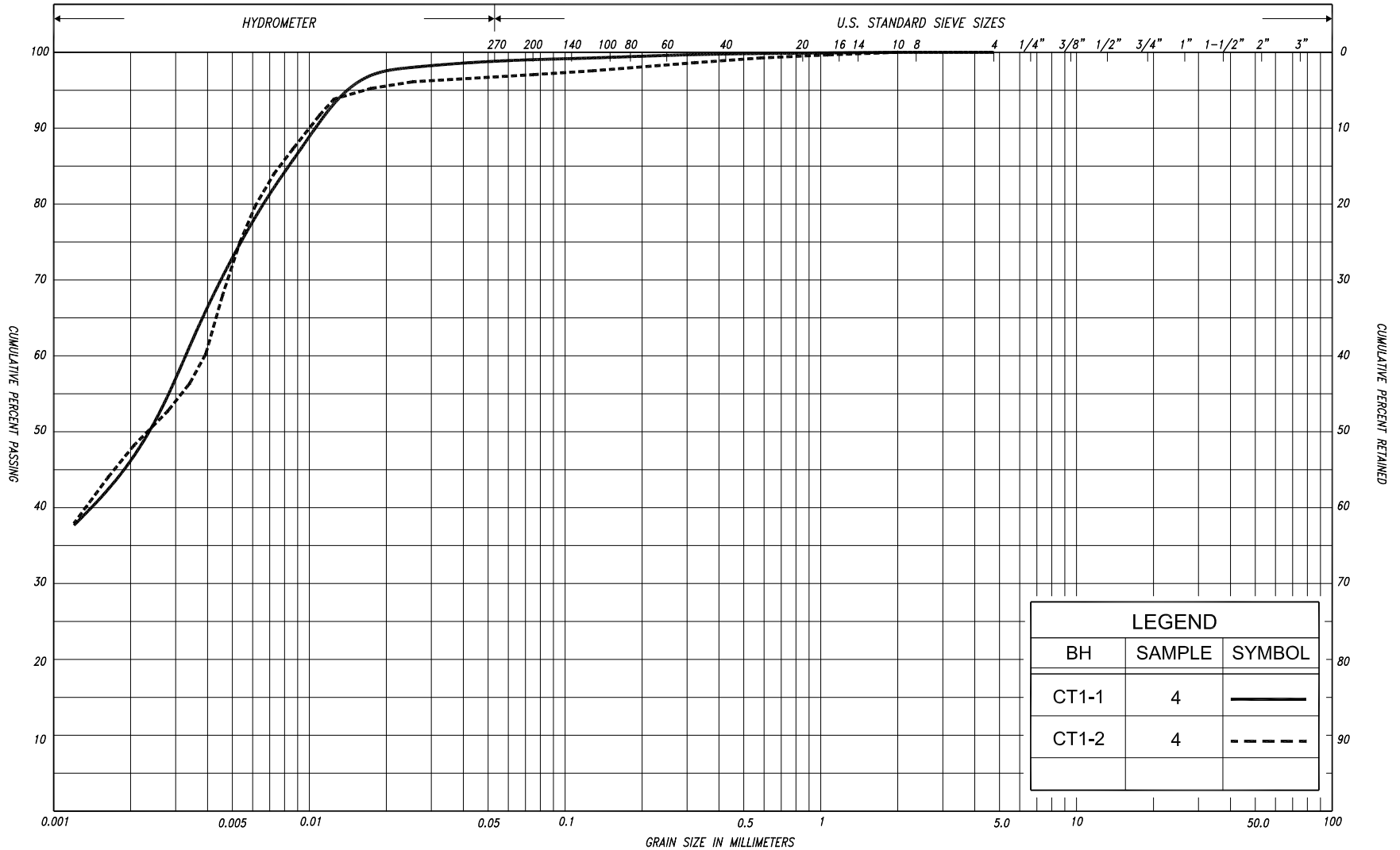


# GRAIN SIZE DISTRIBUTION SILTY CLAY, some sand, trace gravel, organics (CI/MH) (FILL)

FIG No. CT1-GS-2

HWY: 6

G.W.P. No. 43-00-00



SILT & CLAY					FINE		MEDIUM		COARSE	GRAVEL				COB BLES	UNIFIED		
					SAND												
CLAY	FINE		MEDIUM		COARSE	FINE		MEDIUM		COARSE		GRAVEL				COBBLES	M.I.T.
	SILT				SAND												
CLAY		SILT			V. FINE	FINE	MED.	COARSE		GRAVEL							U.S. BUREAU
					SAND												



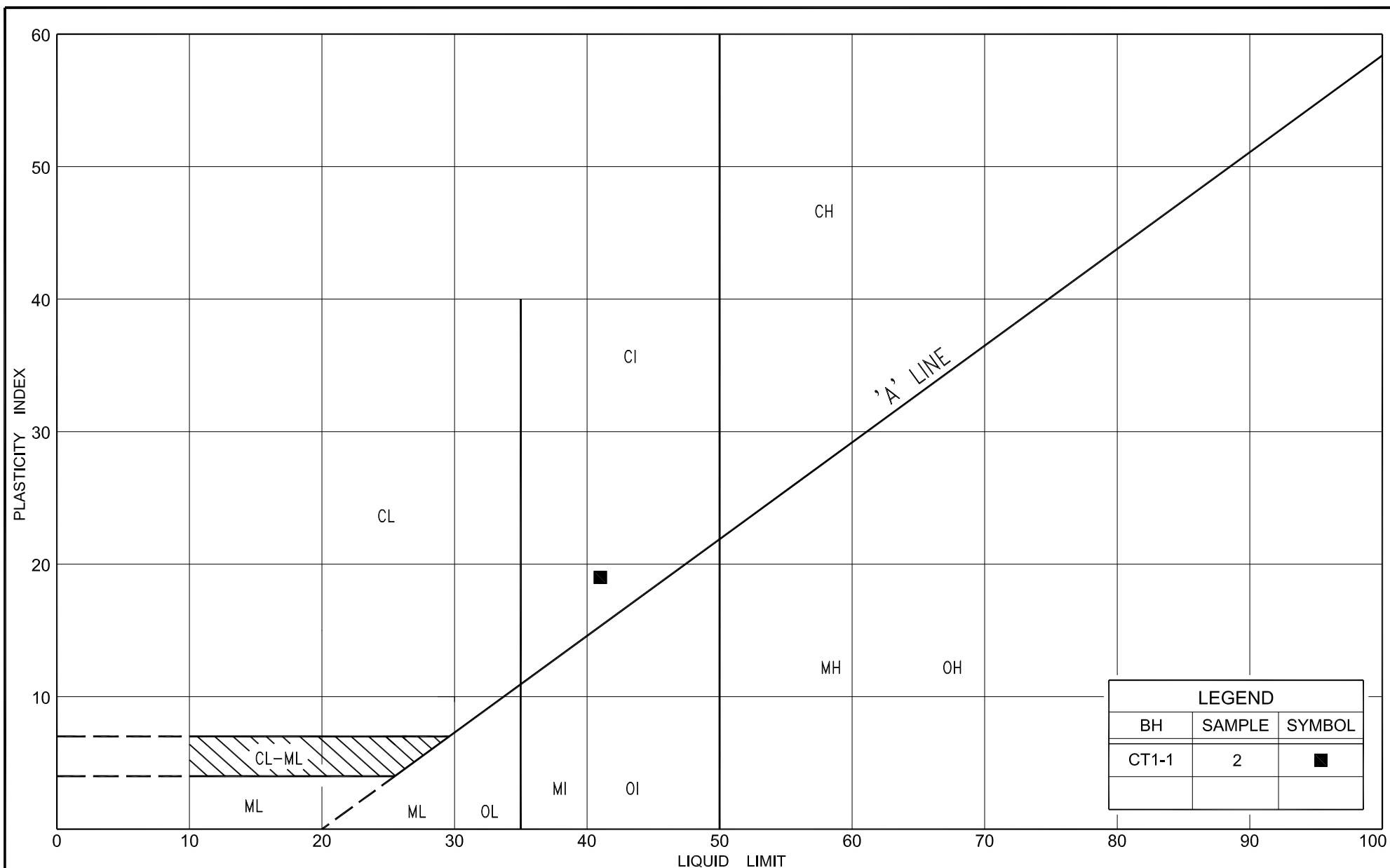
## GRAIN SIZE DISTRIBUTION

SILTY CLAY, trace sand (CL-CI)

FIG No. CT1-GS-3

HWY: 6

G.W.P. No. 43-00-00

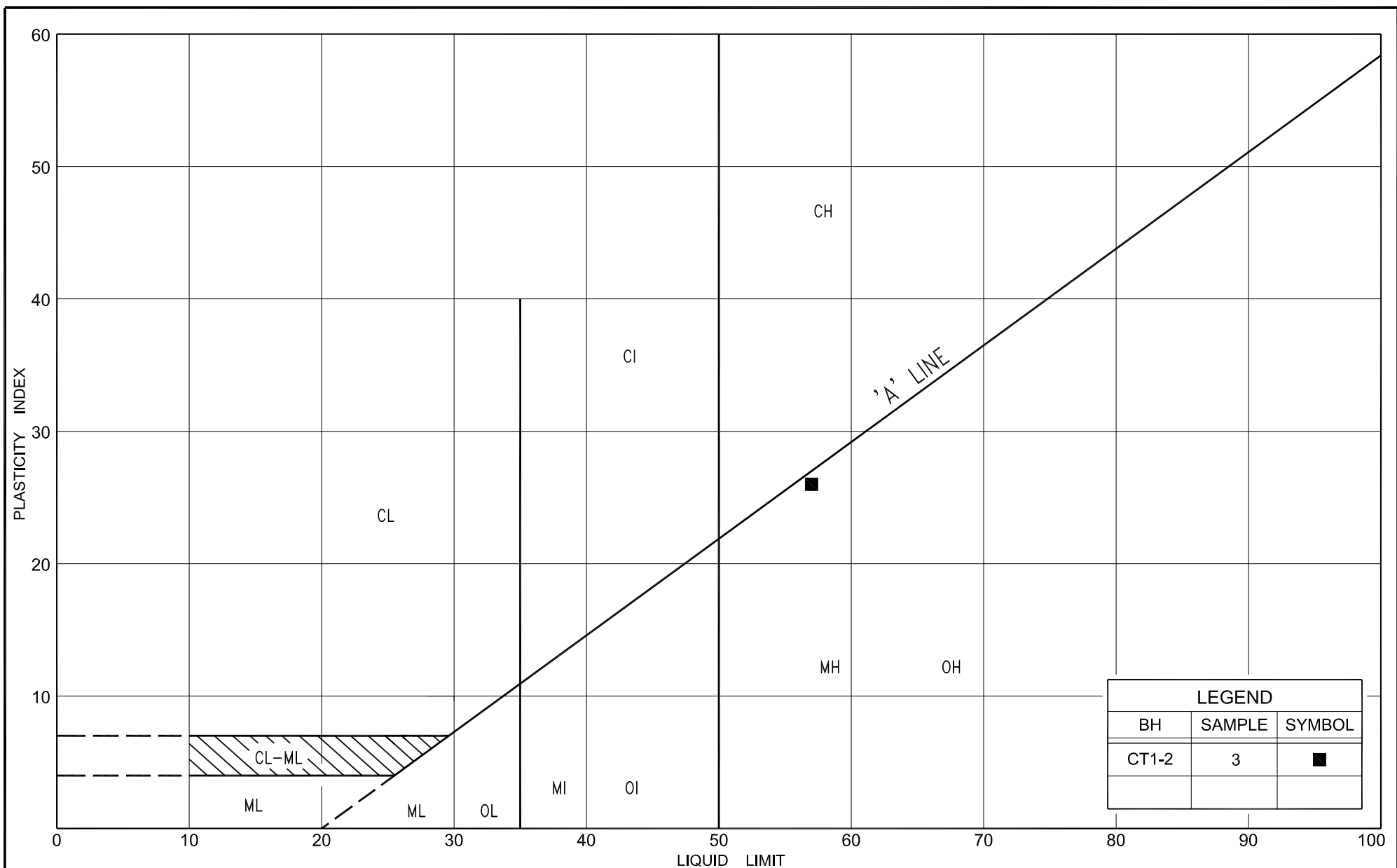


**PLASTICITY CHART**  
 SILTY CLAY, with sand, trace gravel (CI)  
 (FILL)

FIG No. CT1-PC-1

HWY: 6

G.W.P. No. 43-00-00

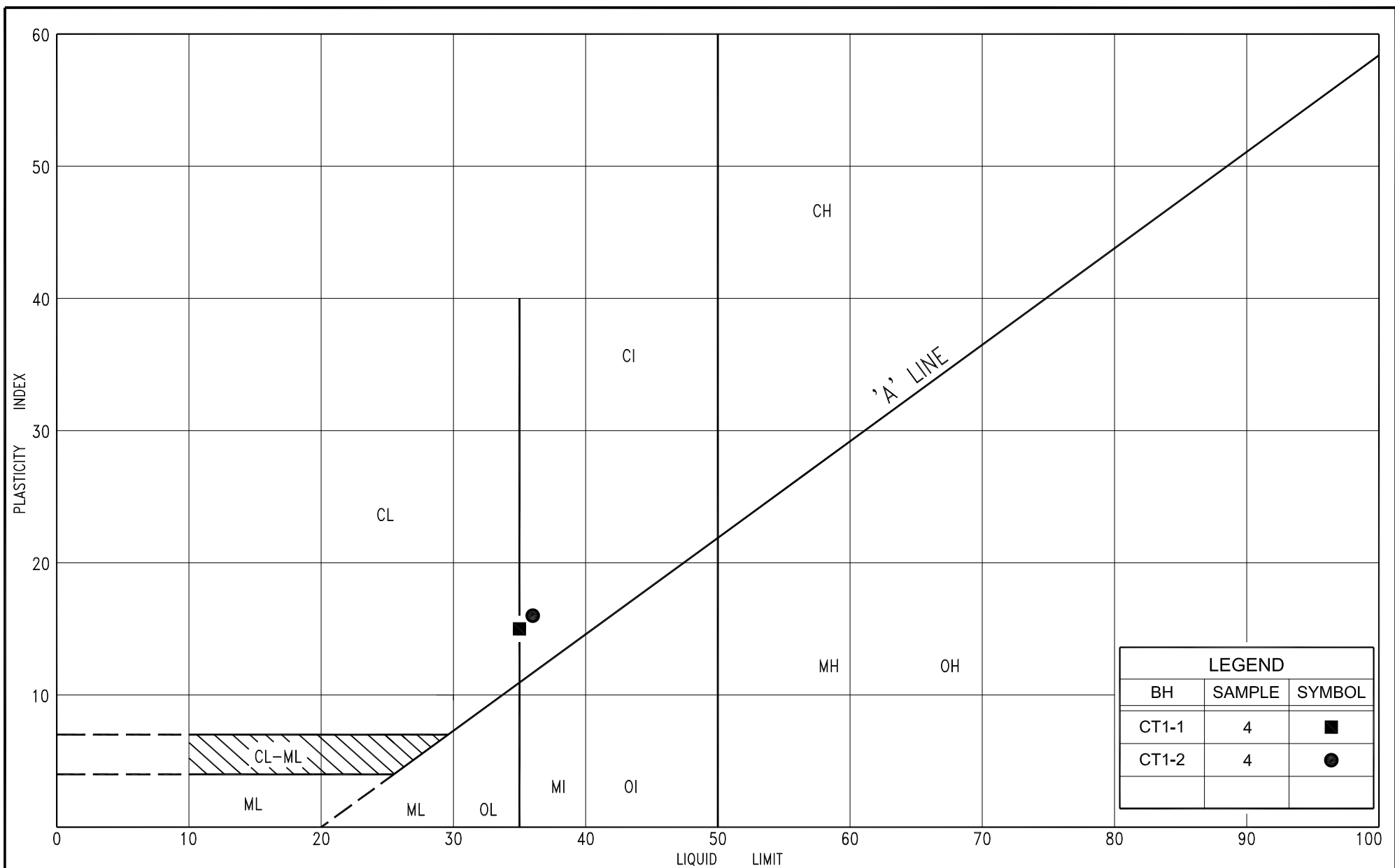


**PLASTICITY CHART**  
 SILTY CLAY, some sand, trace gravel, organics (CI/MH)  
 (FILL)

FIG No. CT1-PC-2

HWY: 6

G.W.P. No. 43-00-00



# PLASTICITY CHART SILTY CLAY, trace sand (CL-CI)

FIG No. CT1-PC-3

HWY: 6

G.W.P. No. 43-00-00

## EXPLANATION OF TERMS USED IN REPORT

**N VALUE:** THE STANDARD PENETRATION TEST (SPT) N VALUE IS THE NUMBER OF BLOWS REQUIRED TO CAUSE A STANDARD 51mm O.D. SPLIT BARREL SAMPLER TO PENETRATE 0.3m INTO UNDISTURBED GROUND IN A BOREHOLE WHEN DRIVEN BY A HAMMER WITH A MASS OF 63.5kg, FALLING FREELY A DISTANCE OF 0.76m. FOR PENETRATIONS OF LESS THAN 0.3m N VALUES ARE INDICATED AS THE NUMBER OF BLOWS FOR THE PENETRATION ACHIEVED. AVERAGE N VALUE IS DENOTED THUS  $\bar{N}$ .

**DYNAMIC CONE PENETRATION TEST:** CONTINUOUS PENETRATION OF A CONICAL STEEL POINT (51mm O.D. 60° CONE ANGLE) DRIVEN BY 475 J IMPACT ENERGY ON 'A' SIZE DRILL RODS. THE RESISTANCE TO CONE PENETRATION IS MEASURED AS THE NUMBER OF BLOWS FOR EACH 0.3m ADVANCE OF THE CONICAL POINT INTO THE UNDISTURBED GROUND.

SOILS ARE DESCRIBED BY THEIR COMPOSITION AND CONSISTENCY OR DENSENESS.

**COMPOSITION:** SECONDARY SOIL COMPONENTS ARE DESCRIBED ON THE BASIS OF PERCENTAGE BY MASS OF THE WHOLE SAMPLE AS FOLLOWS:

PERCENT BY MASS	0 - 10	10 - 20	20 - 30	30 - 40	> 40
	TRACE	SOME	WITH	ADJECTIVE (SILTY)	AND (AND SILT)

**CONSISTENCY:** COHESIVE SOILS ARE DESCRIBED ON THE BASIS OF THEIR UNDRAINED SHEAR STRENGTH ( $c_u$ ) AS FOLLOWS:

$c_u$ (kPa)	0 - 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD

**DENSENESS:** COHESIONLESS SOILS ARE DESCRIBED ON THE BASIS OF DENSENESS AS INDICATED BY SPT N VALUES AS FOLLOWS:

N (BLOWS/0.3m)	0 - 5	5 - 10	10 - 30	30 - 50	> 50
	VERY LOOSE	LOOSE	COMPACT	DENSE	VERY DENSE

ROCKS ARE DESCRIBED BY THEIR COMPOSITION AND STRUCTURAL FEATURES AND / OR STRENGTH.

**RECOVERY:** SUM OF ALL RECOVERED ROCK CORE PIECES FROM A CORING RUN EXPRESSED AS A PERCENT OF THE TOTAL LENGTH OF THE CORING RUN.

**MODIFIED RECOVERY:** SUM OF THOSE INTACT CORE PIECES, 100mm+ IN LENGTH EXPRESSED AS A PERCENT OF THE LENGTH OF THE CORING RUN. THE ROCK QUALITY DESIGNATION (R Q D), FOR MODIFIED RECOVERY, IS:

R Q D (%)	0 - 25	25 - 50	50 - 75	75 - 90	90 - 100
	VERY POOR	POOR	FAIR	GOOD	EXCELLENT

**JOINTING AND BEDDING:**

SPACING	50mm	50 - 300mm	0.3m - 1m	1m - 3m	> 3m
JOINTING	VERY CLOSE	CLOSE	MOD. CLOSE	WIDE	VERY WIDE
BEDDING	VERY THIN	THIN	MEDIUM	THICK	VERY THICK

## ABBREVIATIONS AND SYMBOLS

### FIELD SAMPLING

S S	SPLIT SPOON	T P	THINWALL PISTON
W S	WASH SAMPLE	O S	OSTERBERG SAMPLE
S T	SLOTTED TUBE SAMPLE	R C	ROCK CORE
B S	BLOCK SAMPLE	P H	T W ADVANCED HYDRAULICALLY
C S	CHUNK SAMPLE	P M	T W ADVANCED MANUALLY
T W	THINWALL OPEN	F S	FOIL SAMPLE
F V	FIELD VANE		

### STRESS AND STRAIN

$u_w$	kPa	PORE WATER PRESSURE
$u$	1	PORE PRESSURE RATIO
$\sigma$	kPa	TOTAL NORMAL STRESS
$\sigma'$	kPa	EFFECTIVE NORMAL STRESS
$\tau$	kPa	SHEAR STRESS
$\sigma_1, \sigma_2, \sigma_3$	kPa	PRINCIPAL STRESSES
$\epsilon$	%	LINEAR STRAIN
$\epsilon_1, \epsilon_2, \epsilon_3$	%	PRINCIPAL STRAINS
$E$	kPa	MODULUS OF LINEAR DEFORMATION
$G$	kPa	MODULUS OF SHEAR DEFORMATION
$\mu$	1	COEFFICIENT OF FRICTION

### MECHANICAL PROPERTIES OF SOIL

$m_v$	kPa <sup>-1</sup>	COEFFICIENT OF VOLUME CHANGE
$C_c$	1	COMPRESSION INDEX
$C_s$	1	SWELLING INDEX
$C_\alpha$	1	RATE OF SECONDARY CONSOLIDATION
$c_v$	m <sup>2</sup> /s	COEFFICIENT OF CONSOLIDATION
$H$	m	DRAINAGE PATH
$T_v$	1	TIME FACTOR
$U$	%	DEGREE OF CONSOLIDATION
$\sigma'_{vo}$	kPa	EFFECTIVE OVERBURDEN PRESSURE
$\sigma'_p$	kPa	PRECONSOLIDATION PRESSURE
$\tau_f$	kPa	SHEAR STRENGTH
$c'$	kPa	EFFECTIVE COHESION INTERCEPT
$\phi'$	-°	EFFECTIVE ANGLE OF INTERNAL FRICTION
$c_u$	kPa	APPARENT COHESION INTERCEPT
$\phi_u$	-°	APPARENT ANGLE OF INTERNAL FRICTION
$\tau_R$	kPa	RESIDUAL SHEAR STRENGTH
$\tau_r$	kPa	REMOULDED SHEAR STRENGTH
$S_i$	1	SENSITIVITY = $\frac{c_u}{\tau_r}$

### PHYSICAL PROPERTIES OF SOIL

$\rho_s$	kg/m <sup>3</sup>	DENSITY OF SOLID PARTICLES	$n$	1, %	POROSITY	$e_{max}$	1, %	VOID RATIO IN LOOSEST STATE
$\gamma_s$	kN/m <sup>3</sup>	UNIT WEIGHT OF SOLID PARTICLES	$w$	1, %	WATER CONTENT	$e_{min}$	1, %	VOID RATIO IN DENSEST STATE
$\rho_w$	kg/m <sup>3</sup>	DENSITY OF WATER	$S_r$	%	DEGREE OF SATURATION	$I_D$	1	DENSITY INDEX = $\frac{e_{max} - e}{e_{max} - e_{min}}$
$\gamma_w$	kN/m <sup>3</sup>	UNIT WEIGHT OF WATER	$w_L$	%	LIQUID LIMIT	$D$	mm	GRAIN DIAMETER
$\rho$	kg/m <sup>3</sup>	DENSITY OF SOIL	$w_p$	%	PLASTIC LIMIT	$D_n$	mm	n PERCENT - DIAMETER
$\gamma$	kN/m <sup>3</sup>	UNIT WEIGHT OF SOIL	$w_s$	%	SHRINKAGE LIMIT	$C_u$	1	UNIFORMITY COEFFICIENT
$\rho_d$	kg/m <sup>3</sup>	DENSITY OF DRY SOIL	$I_p$	%	PLASTICITY INDEX = $w_L - w_p$	$h$	m	HYDRAULIC HEAD OR POTENTIAL
$\gamma_d$	kN/m <sup>3</sup>	UNIT WEIGHT OF DRY SOIL	$I_L$	1	LIQUIDITY INDEX = $\frac{w - w_p}{I_p}$	$q$	m <sup>3</sup> /s	RATE OF DISCHARGE
$\rho_{sat}$	kg/m <sup>3</sup>	DENSITY OF SATURATED SOIL	$I_C$	1	CONSISTENCY INDEX = $\frac{w_L - w}{I_p}$	$v$	m/s	DISCHARGE VELOCITY
$\gamma_{sat}$	kN/m <sup>3</sup>	UNIT WEIGHT OF SATURATED SOIL				$i$	1	HYDRAULIC GRADIENT
$\rho'$	kg/m <sup>3</sup>	DENSITY OF SUBMERGED SOIL	DTPL		DRIER THAN PLASTIC LIMIT	$k$	m/s	HYDRAULIC CONDUCTIVITY
$\gamma'$	kN/m <sup>3</sup>	UNIT WEIGHT OF SUBMERGED SOIL	APL		ABOUT PLASTIC LIMIT	$j$	kN/m <sup>3</sup>	SEEPAGE FORCE
$e$	1, %	VOID RATIO	WTPL		WETTER THAN PLASTIC LIMIT			

**RECORD OF BOREHOLE No CT1-1**

1 of 1

**METRIC**

**G.W.P.** 43-00-00      **LOCATION** Co-ords: 4 936 978.6 N ; 424 607.9 E      **ORIGINATED BY** A.L.  
**DIST** London      **HWY** 6      **BOREHOLE TYPE** Continuous Flight Hollow Stem Augers      **COMPILED BY** H.G.  
**DATUM** Geodetic      **DATE** January 12, 2012      **CHECKED BY** C.N.

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT					PLASTIC LIMIT W <sub>p</sub>	NATURAL MOISTURE CONTENT W	LIQUID LIMIT W <sub>L</sub>	UNIT WEIGHT  γ  kN/m³	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL			
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa										WATER CONTENT (%)		
								○ UNCONFINED + FIELD VANE										○		
								● QUICK TRIAXIAL × LAB VANE												
235.9 0.0	Ground Surface							20	40	60	80	100								
235.3 0.6	Sand and gravel		1	SS	21	235														
	Compact Brown (FILL)																			
	Silty clay with sand, trace gravel rootlets, topsoil inclusions		2	SS	3															
	Soft Dark grey moist (FILL)		3	SS	2															
233.8 2.1	Silty clay, trace sand						234													
	Firm Greyish Moist brown		4	SS	8															
	Grey		5	SS	7															
231.8 4.1	End of borehole						233													
	Refusal on probable bedrock																			
							232													



## RECORD OF BOREHOLE No CT1-2

1 of 1

METRIC

<b>G.W.P.</b> 43-00-00	<b>LOCATION</b>	Co-ords: 4 936 967.4 N ; 424 619.5 E	<b>ORIGINATED BY</b> A.L.
------------------------	-----------------	--------------------------------------	---------------------------

<b>DIST</b>	London	<b>HWY</b>	6	<b>BOREHOLE TYPE</b>	Continuous Flight Hollow Stem Augers	<b>COMPILED BY</b>	H.G.
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**DATUM** Geodetic **DATE** January 12, 2012 **CHECKED BY** C.N.

SOIL PROFILE			SAMPLES		
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
235.8 0.0	Ground Surface				
235.2 0.6	Sand and gravel		1	SS	12
	Compact Brown (FILL)				
	Sand and gravel mixed with asphalt pieces		2	SS	15
	Silty clay, some sand trace gravel, rootlets topsoil, organic inclusions		3	SS	2
233.7 2.1	Soft Dark moist grey (FILL)				
	Silty clay, trace sand		4	SS	8
	Firm Grey Moist				
			5	SS	7
231.2 4.6	End of borehole		6	SS	50 / 0cm
	Refusal on probable bedrock				
	*      2012    01    12				
	▽ Water level observed during drilling				
	▼ Water level measured after drilling				

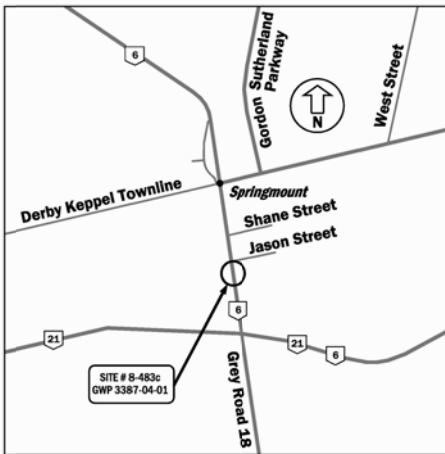
CONT No  
GWP No 43-00-00



POTTAWATOMI RIVER TRIBUTARY CULVERT  
HIGHWAY 6 Sta. 10+445  
SPRINGMOUNT  
BOREHOLE LOCATIONS AND SOIL STRATA

SHEET

**PML Peto MacCallum Ltd.**  
CONSULTING ENGINEERS



KEY PLAN

NOT TO SCALE

LEGEND

- Borehole
- N Blows/0.3m (Std. Pen Test, 475 J/blow)
- CONE Blows/0.3m (60 Cone, 475 J/blow)
- WL at time of investigation Jan. 2012
- \* Water level not established
- Head
- ARTESIAN WATER
- Encountered
- PIEZOMETER

BH No	ELEVATION	NORTHINGS	EASTINGS
CT1-1	235.9	4 936 978.6	424 607.9
CT1-2	235.8	4 936 967.4	424 619.5

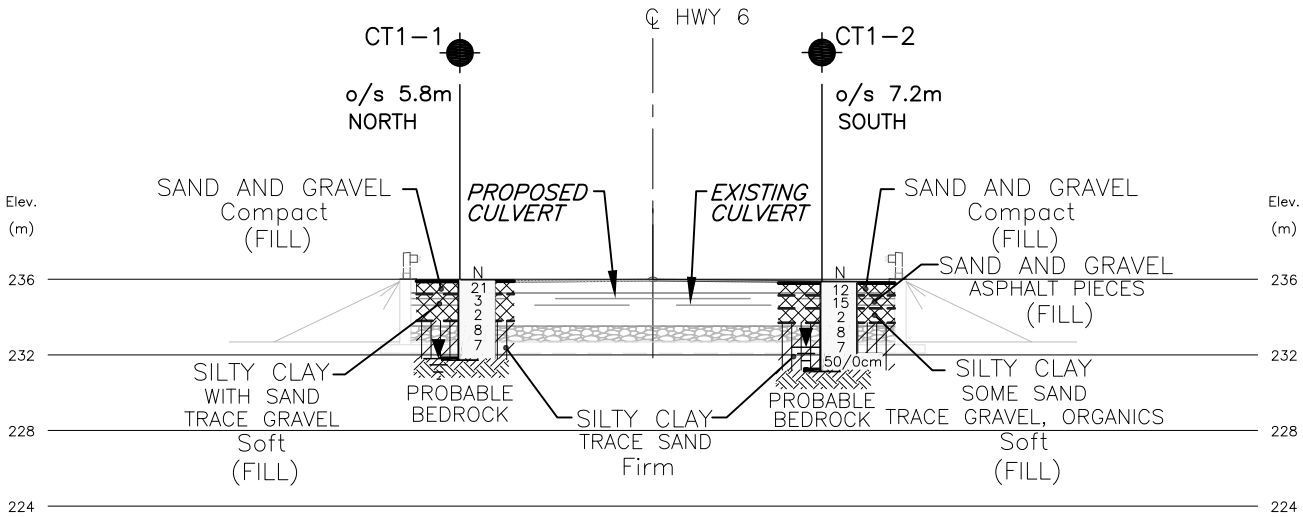
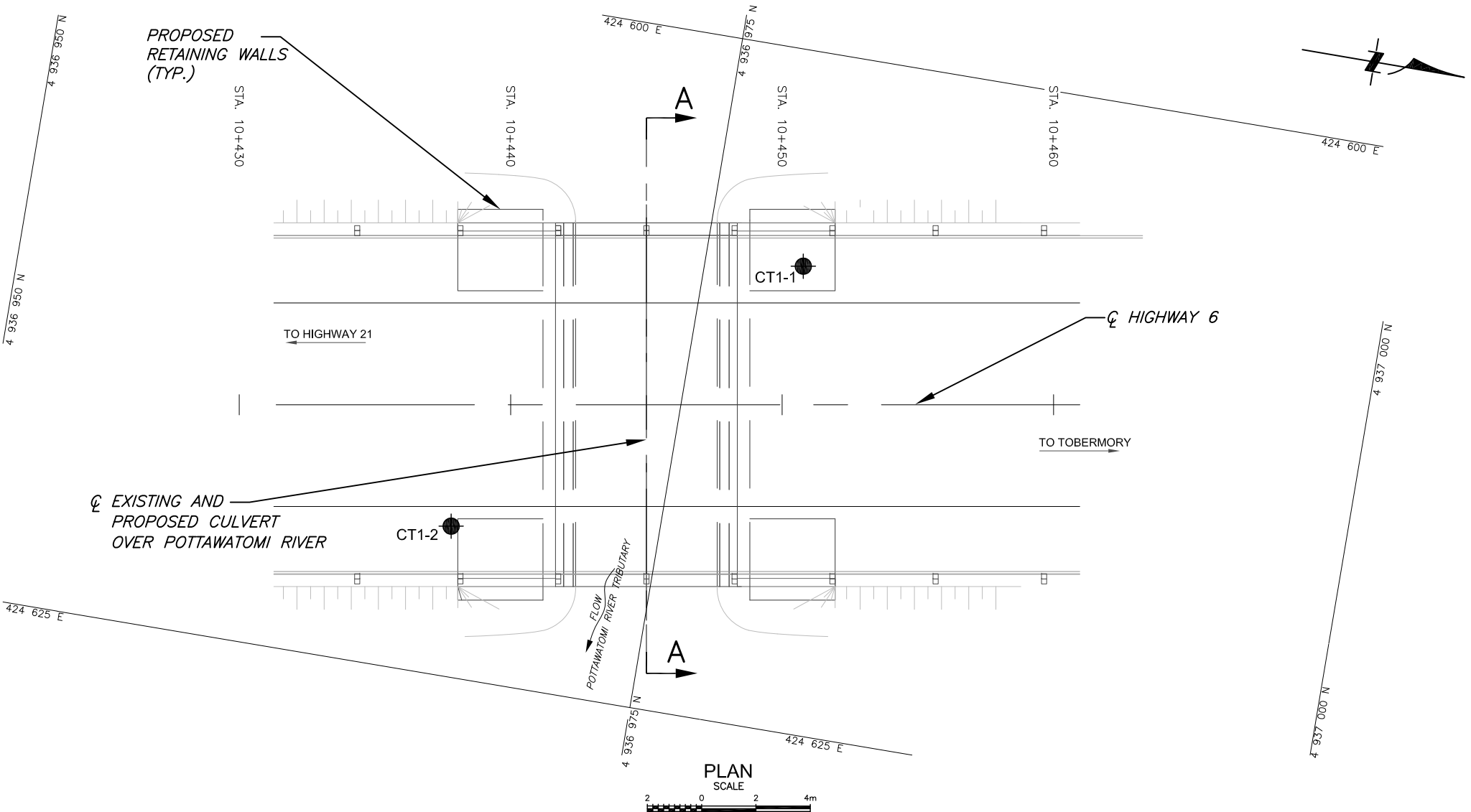
NOTE

The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.

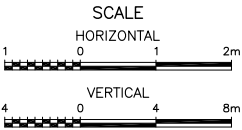
REVISIONS	DATE	BY	DESCRIPTION

Geocres No. 41A-225

HWY No	6	CHECKED	HG	DATE	NOV. 16, 2012	DIST	London
SUBM'D	NA	CHECKED	GD	APPROVED	CN	SITE	8-483C
DRAWN	NA	CHECKED	GD	APPROVED	CN	DWG	PRT-1



PROFILE A-A ALONG CULVERT C



NOTES:

- THIS DRAWING SHOULD BE READ IN CONJUNCTION WITH THE TEXT OF THE REPORT AND RECORD OF BOREHOLE LOGS.
- THIS DRAWING IS FOR SUBSURFACE INFORMATION ONLY. SURFACE DETAILS AND FEATURES ARE FOR CONCEPTUAL ILLUSTRATION.
- DIMENSIONS ARE IN METRES AND/OR MILLIMETRES UNLESS OTHERWISE SHOWN. STATIONS ARE IN KILOMETRES AND METRES.



REF MRC Drawing: 3811011-340-001GA\_D.dwg dated May 2012



## **APPENDIX A**

### Site Photographs



**Photograph 1:** Facing north from east side of Highway 6 towards culvert.  
(January 2012)



**Photograph 3:** Looking south from west side of Highway 6 towards the culvert.  
(January 2012)