



**THURBER** ENGINEERING LTD.



**FOUNDATION INVESTIGATION REPORT  
OVERHEAD SIGN SUPPORT  
CASSELMAN COMMERCIAL VEHICLE INSPECTION FACILITY  
UNITED COUNTIES OF PRESCOTT AND RUSSELL  
G.W.P. 4017-16-00  
ASSIGNMENT NUMBER: 4015-E-0015**

**GEOCRES NUMBER: 31D-258**

**SUBMITTED TO  
MCINTOSH PERRY CONSULTING ENGINEERS LTD. / LEA CONSULTING LTD.  
JOINT VENTURE**

**JUNE 2017  
18122**

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**PART 1: FACTUAL INFORMATION**

**1 INTRODUCTION**

This report presents the factual data obtained from a foundation investigation conducted by Thurber Engineering Ltd. (Thurber) for the design and construction of an overhead sign support for a traffic controller sign at the existing Casselman Commercial Vehicle Inspection Facility (CVIF). Thurber carried out the investigation as a subconsultant to McIntosh Perry Consulting Engineers Ltd. – Lea Consulting Ltd. Joint Venture (MPCE-LEA) under Assignment 11 of Agreement No. 4015-E-0015.

A base plan indicating the location of the proposed sign was provided by MPCE-LEA for the preparation of this report.

The purpose of this investigation was to explore the subsurface conditions at the site and, based on this data, provide a borehole location plan, record of borehole, a stratigraphic profile, laboratory test results and a written description of the subsurface conditions.

**2 SITE DESCRIPTION**

The CVIF is located on Highway 417 westbound, approximately 1.8 km west of the Highway 417 / County Road 138 interchange, in the United Counties of Prescott and Russell, Ontario. The location of the facility is shown on the inset Key Plan on Drawing No. 1 in Appendix A.

At present, the facility includes a scale house and vehicle scale, three at-grade inspection bays, a garage structure and associated paved lane ways. The proposed location of the traffic controller sign is approximately 50 m west of the existing vehicle scale in the grassed boulevard adjacent to the west entrance to the inspection facility. There is an existing traffic controller sign located approximately 30 m west of the vehicle scales. The lands surrounding the site are flat, poorly drained and consist of agriculture fields to the north and south of Highway 417.

The site is located within a physiographic region known as the Winchester Clay Plain. This is an area of low relief, lying almost entirely within the drainage basin of the South Nation River. Although the sensitive marine clay plains are dominant, the Leda clay in the area is underlain by a thin layer of glacial till and bedrock (Chapman and Putnam, 1984).

### 3 SITE INVESTIGATION

#### 3.1 Previous Investigations

##### 1976 Investigation

GEOCRE Report 31G-177 presents the results of the investigation carried out for the existing CVIF. The investigation was completed in 1976 and included three sampled boreholes, one dynamic cone test, and laboratory testing, located in the area of the proposed scale house and scales. The boreholes were advanced to refusal but bedrock was not proven as part of the investigation.

The stratigraphy in the area of the CVIF is generally described as very soft to firm sensitive clay overlying compact to very dense glacial till, underlain by limestone bedrock.

It should be noted that settlement issues were noted in the original Foundation Investigation Report and surcharge loading was recommended in the area of the buildings and scales.

##### 2016 Investigation

Thurber carried out an investigation for the design and construction of a low bay inspection bay at the existing CVIF in November 2016, that included two sampled boreholes and laboratory testing. In general, the stratigraphy in the boreholes is characterized by an asphalt pavement, overlying gravel and sand fill, overlying native clay, overlying glacial till, and underlain by inferred bedrock. This stratigraphy is generally consistent with the stratigraphy encountered in the previous MTO investigation.

#### 3.2 Field Investigation

The field investigation for the traffic control sign was carried out on March 24, 2017, and included advancing one borehole. The approximate location and elevation of the borehole is shown on Drawing No. 1 provided in Appendix A and are summarized in Table 3-1. It should be noted that due to a conflict with existing buried utilities at the proposed sign location, Borehole 17-1 was advanced approximately 2 m south of the proposed sign location within the asphalt laneway.

**Table 3-1: Borehole Summary**

<b>Borehole</b>	<b>Northing (m)</b>	<b>Easting (m)</b>	<b>Ground Surface Elevation (m)</b>	<b>Depth (m)</b>
17-1	5021341.4	186567.5	65.7	14.5

Due to the relatively low strength of the clay, the borehole was extended to auger refusal at a depth of approximately 14.5 m below surface.

As a component of our standard procedures and due diligence, Thurber contacted Ontario One Call, to obtain utility locates/clearances for the intended borehole location. In addition, MTO traffic operations was contacted to obtain ATMS Fibre utility locates and Black & McDonald Limited were contacted to obtain MTO electric locates for the intended borehole location.

The borehole was advanced with a truck mounted CME drill rig equipped with hollow stem augers. The subsurface stratigraphy encountered in the borehole was recorded in the field by Thurber personnel. Split spoon samples were collected at regular depth intervals in the borehole via the

completion of Standard Penetration Tests (SPT), following the methods described in ASTM Standard D1586-11. In-situ shear vane testing was carried out within the cohesive strata. All soil samples recovered from the borehole were placed in moisture-proof containers and the samples were transported to Thurber's Ottawa geotechnical laboratory for further examination and testing.

Groundwater inflow was not encountered in the open borehole prior to backfilling. The borehole was backfilled with a low-permeability combination of auger cuttings and bentonite pellets in general accordance with the intent of Ontario MOE Regulation 903. The borehole was capped with 150 mm of cold patch asphalt.

The as-drilled location of the borehole and ground surface elevation at the borehole location was surveyed by Thurber on March 24, 2017. The temporary benchmark (TBM) used was the southwest corner of the existing garage structure. The location of the TBM is indicated on Drawing No. 1 in Appendix A. The geodetic elevation of the TBM was indicated on the drawings provided by MPCE-LEA as 65.787 m.

### **3.3 Laboratory Testing**

Geotechnical laboratory testing consisted of natural moisture content determination and visual identification of all soil samples in accordance with the current MTO standards. Grain size distribution analyses and Atterberg Limits testing were also carried out on selected samples to MTO and ASTM standards. Chemical analysis for determination of pH, resistivity, soluble sulphate and chloride concentrations was carried out on a soil sample of the native clay material. A copy of the chemical analysis results is provided in Appendix C.

The laboratory test results are presented on the Record of Borehole sheet in Appendix B and are illustrated on the figures in Appendix C.

## **4 DESCRIPTION OF SUBSURFACE CONDITIONS**

### **4.1 Overview / General**

Reference is made to the Record of Borehole sheet in Appendix B for details of the soil stratigraphy encountered in the borehole. A stratigraphic profile for the site is presented on the Drawing No. 1 in Appendix A for illustrative purposes. An overall description of the stratigraphy is given in the following paragraphs; however, the factual data presented in the Record of Borehole governs any interpretation of the site conditions.

In general, the stratigraphy in the borehole is characterized by an asphalt pavement, overlying gravel and sand fill, overlying native clay, and underlain by inferred bedrock. This stratigraphy is generally consistent with the stratigraphy encountered in the previous investigations at this site.

More detailed descriptions of the individual strata are presented below.

### **4.2 Asphalt**

The thickness of the asphalt measured at the borehole location was 100 mm.

### **4.3 Fill**

#### **Silty Sand with Gravel**

A fill layer consisting predominantly of sand and gravel with varying amounts of silt was encountered below the asphalt surface in the borehole. The fill material became clayey below a depth of 1.5 m. The top of this layer has an elevation of 65.6 m. The thickness of this layer is 2.6 m. The SPT 'N' values were 33 and 34 indicating a dense condition.

The moisture content of the samples tested ranged from 3% to 9%. The results of grain size analysis completed on samples of this material indicated a gravel content of 15% and 27%, a sand content of 43% and 50%, and a fines content (combined silt and clay size particles) of 30% and 35%. The results of the grain size analysis are illustrated on Figure 1 in Appendix C.

### **4.4 Clay**

#### **Clay Crust**

A brown clay crust deposit was encountered below the granular fill layer in the borehole. The top of this layer was identified at elevation 63.0 m. The thickness of this layer was 1.0 m. The SPT 'N' value was 4.

The moisture content of the samples tested was 34% and 58%. The results of grain size analysis testing completed on a sample of this material indicated a gravel content of 0%, a sand content of 0%, a silt content of 27%, and a clay content of 73%. The results of the grain size analysis are illustrated on Figure 2 in Appendix C.

The results of Atterberg Limits testing completed on a sample of this material indicated a liquid limit of 71, a plastic limit of 21, and plasticity index of 50, indicating a clay of high plasticity. Atterberg Limits analysis results are illustrated on Figure 3 in Appendix C.

#### **Clay**

A grey clay deposit was encountered below the clay crust. The top of this layer had an elevation of 62.1 m. The thickness of this layer was 10.7 m. In-situ shear vane test results indicated an undrained shear strength ranging from 25 kPa to 45 kPa; indicating a firm consistency.

The moisture content of the samples tested ranged from 55% to 82%. The results of grain size analysis completed on samples of this material indicated a gravel content of 0%, a sand content of 2% and 7%, silt content of 21% and 24%, and clay content of 69% and 77%. The results of the grain size analysis testing are illustrated on Figure 2 in Appendix C.

The results of Atterberg Limits testing completed on samples of this material indicated a liquid limit of 53 and 60, a plastic limit of 25 and 26, and plasticity index of 28 and 34, indicating a clay of high plasticity. Atterberg Limits analysis results are illustrated on Figure 3 in Appendix C.

### **4.5 Refusal and Inferred Bedrock**

Auger refusal was encountered beneath the clay stratum. The auger refusal has been inferred to be probable bedrock. The inferred bedrock surface was encountered at elevation 51.3 m.

## **4.6 Groundwater**

Groundwater inflow was not encountered in the open borehole during drilling.

This observation is considered a short-term reading and seasonal fluctuations of the groundwater level are to be expected. The groundwater level may be at a higher elevation after the spring snowmelt or after periods of heavy rainfall. It is noted that free water was observed within the granular base and subbase material during a pavement investigation at this site. As such, it should be noted that perched groundwater could be encountered during excavation activities at a higher elevation than noted above.

## 5 MISCELLANEOUS

Thurber staked and/or marked the borehole location in the field and obtained utility clearances prior to drilling. Thurber surveyed the borehole location, and provided the ground surface elevation based on contract drawings provided by MPCE-LEA. George Downing Estate Drilling Ltd. of Hawkesbury, Ontario, supplied and operated the drill rig to carry out the drilling, sampling, and in-situ testing. The drilling, and sampling operations in the field were supervised on a full-time basis by Mr. Sean O'Bryan of Thurber. Laboratory testing was carried out by Thurber in its MTO-approved laboratory in Ottawa.

Overall project management and direction of the field program was provided by Paul Carnaffan, P.Eng. Interpretation of the field data and preparation of this report was completed by Kenton Power, P.Eng. The report was reviewed by Paul Carnaffan, P.Eng. and Dr. P.K. Chatterji, P.Eng., the Designated Principal Contact for MTO Foundations Projects.



Kenton C. Power, P.Eng.  
Geotechnical Engineer

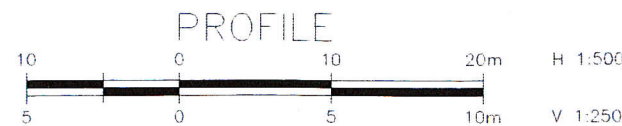
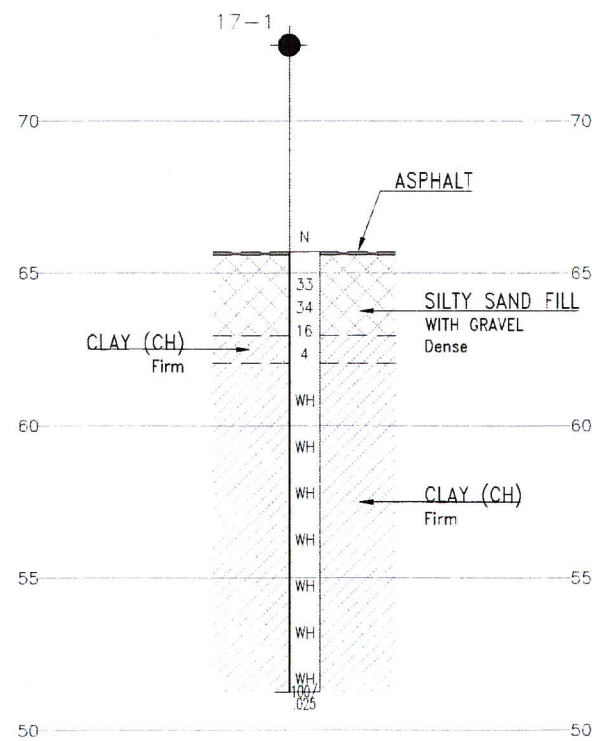
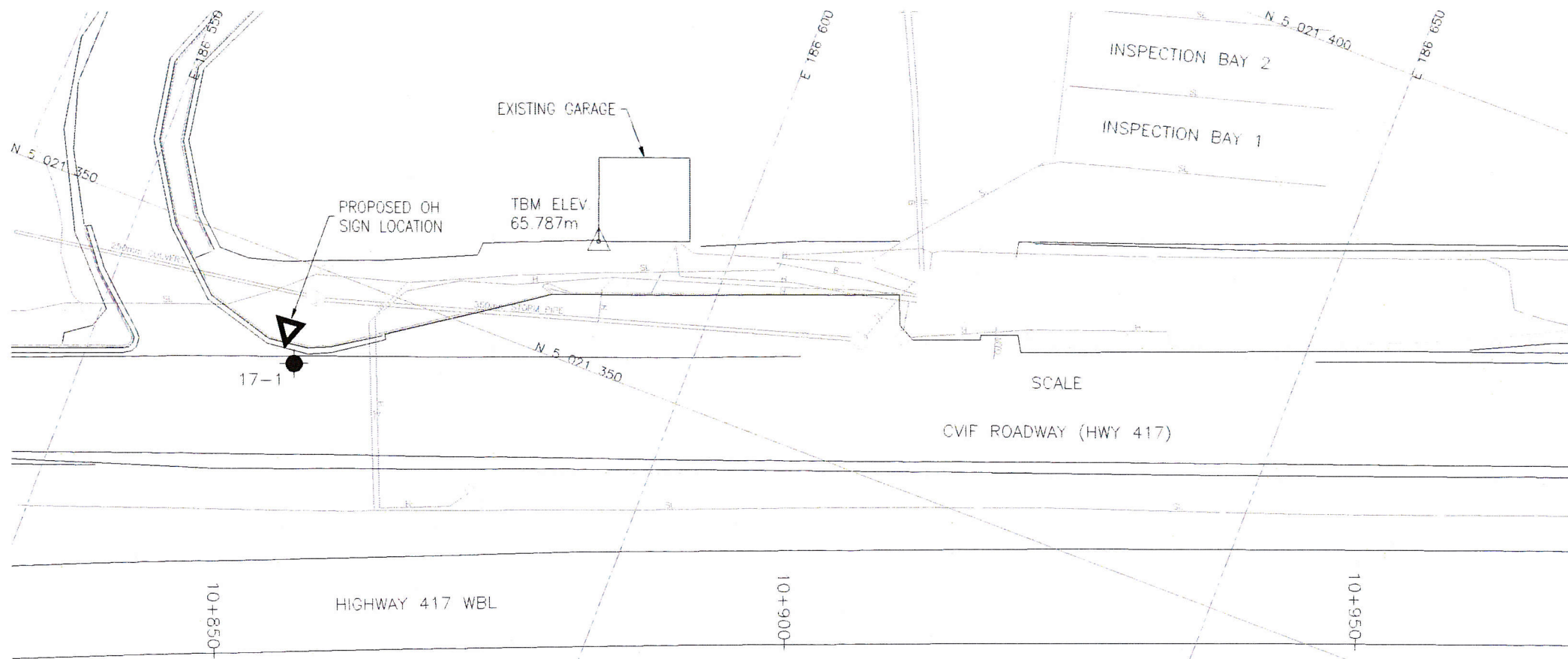
Paul Carnaffan, P.Eng.  
Principal, Senior Geotechnical Engineer



P.K. Chatterji, P.Eng.  
Review Principal, Designated MTO Contact



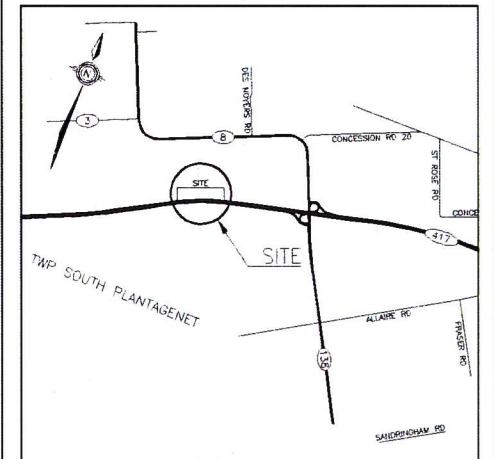
**APPENDIX A**  
**BOREHOLE LOCATIONS AND SOIL STRATA DRAWINGS**



METRIC  
DIMENSIONS ARE IN METRES  
AND/OR MILLIMETRES  
UNLESS OTHERWISE SHOWN

CONT No  
GWP No 4017-16-00

CASSELMAN VEHICLE  
INSPECTION FACILITY  
OVERHEAD SIGN SUPPORT  
BOREHOLE LOCATIONS AND SOIL STRATA



# KEYPLAN LEGEND

●	Borehole by Thurber
+	Borehole by Others
N	Blows /0.3m (Std Pen Test, 475J/blow)
CONE	Blows /0.3m (60 Cone, 475J/blow)
PH	Pressure, Hydraulic
W	Water Level
HA	Head Artesian Water
P	Piezometer
90%	Rock Quality Designation (RQD)
A/R	Auger Refusal

NO	ELEVATION	NORTHING	EASTING
17-1	65.700	5021341.373	186567.486

## NOTES

- The boundaries between soil strata have been established only at Borehole locations. Between Boreholes the boundaries are assumed from geological evidence.
- This drawing is for subsurface information only. Surface details and features are for conceptual illustration.
- Borehole locations are shown in MTM Zone 8 coordinates.

GEOCRES No.

REVISIONS	DATE	BY	DESCRIPTION
DESIGN	JM	CHK -	CODE
DRAWN	MFA	CHK KCP	SITE
			LOAD
			DATE
			JUNE 2017
			STRUCT
			DWG 1

**APPENDIX B**  
**RECORD OF BOREHOLE SHEET**

## SYMBOLS, ABBREVIATIONS AND TERMS USED ON TEST HOLE RECORDS

### TERMINOLOGY DESCRIBING COMMON SOIL GENESIS

Topsoil	mixture of soil and humus capable of supporting vegetative growth
Peat	mixture of fragments of decayed organic matter
Till	unstratified glacial deposit which may include particles ranging in sizes from clay to boulder
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 materials, shrinkage cracks, etc.
Fissured	having cracks, and hence a blocky structure
Varved	composed of 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

### RECOVERY:

For soil samples, the recovery is recorded as the length of the soil sample recovered.

### N-VALUE:

Numbers in this column are the field results of the Standard Penetration Test: the number of blows of a 63.5 kg hammer falling 0.76 m, required to drive a 50 mm O.D. split spoon sampler 0.3 m into undisturbed soil. For samples where insufficient penetration was achieved and N-value cannot be presented, the number of blows are reported over the sampler penetration in millimetres (e.g. 50/75).

### DYNAMIC CONE PENETRATION TEST (DCPT):

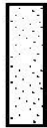
Dynamic cone penetration tests are performed using a standard 60 degree apex cone connected to an "A" size drill rods with the same standard fall height and weight as the Standard Penetration Test. The DCPT value is the number of blows of the hammer required to drive the cone 0.3 m into the soil. The DCPT is used as a probe to assess soil variability.

### STRATA PLOT:

Strata plots symbolize the soil and bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



Boulders  
Cobbles  
Gravel



Sand



Silt



Clay



Organics



Asphalt



Concrete



Fill



Bedrock

### TEXTURING CLASSIFICATION OF SOILS

Classification	Particle Size
Boulders	Greater than 200 mm
Cobbles	75 – 200 mm
Gravel	4.75 – 75 mm
Sand	0.075 – 4.75 mm
Silt	0.002 – 0.075 mm
Clay	Less than 0.002 mm

### SAMPLE TYPES

SS	Split spoon samples
ST	Shelby tube or thin wall tube
DP	Direct push sample
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ, NQ, BQ etc.	Rock core sample obtained with the use of standard size diamond coring equipment

### TERMS DESCRIBING CONSISTENCY (COHESIVE SOILS ONLY)

Descriptive Term	Undrained Shear Strength (kPa)
Very Soft	12 or less
Soft	12 – 25
Firm	25 – 50
Stiff	50 – 100
Very Stiff	100 – 200
Hard	Greater than 200

NOTE: Clay sensitivity is defined as the ratio of the undisturbed strength over the remolded strength.

### TERMS DESCRIBING CONSISTENCY (COHESIONLESS SOILS ONLY)

Descriptive Term	SPT "N" Value
Very Loose	Less than 4
Loose	4 – 10
Compact	10 – 30
Dense	30 – 50
Very Dense	Greater than 50

### MODIFIED UNIFIED SOIL CLASSIFICATION

Major Divisions		Group Symbol	Typical Description
COARSE GRAINED SOIL	GRAVEL AND GRAVELLY SOILS	GW	Well-graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly-graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SAND AND SANDY SOILS	SW	Well-graded sands or gravelly sands, little or no fines.
		SP	Poorly-graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS	SILT AND CLAY SOILS $W_L < 35\%$	ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty-clays of low plasticity.
	SILT AND CLAY SOILS $35\% < W_L < 50\%$	MI	Inorganic compressible fine sandy silt with clay of medium plasticity, clayey silts.
		CI	Inorganic clays of medium plasticity, silty clays.
		OI	Organic silty clays of medium plasticity.
	SILT AND CLAY SOILS $W_L > 50\%$	MH	Inorganic silts, micaceous or diatomaceous fine sandy of silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of high plasticity, organic silts.
HIGHLY ORGANIC SOILS		Pt	Peat and other organic soils.

Note -  $W_L$  = Liquid Limit

## EXPLANATION OF ROCK LOGGING TERMS

### ROCK WEATHERING CLASSIFICATION

Fresh (FR)	No visible signs of weathering.
Fresh Jointed (FJ)	Weathering limited to surface of major discontinuities.
Slightly Weathered (SW)	Penetrative weathering developed on open discontinuity surfaces, but only slight weathering of rock materials.
Moderately Weathered (MW)	Weathering extends throughout the rock mass, but the rock material is not friable.
Highly Weathered (HW)	Weathering extends throughout the rock mass and the rock is partly friable.
Completely Weathered (CW)	Rock is wholly decomposed and in a friable condition, but the rock texture and structures are preserved.

### TERMS

Total Core Recovery: (TCR)	Core recovered as a percentage of total core run length.
Solid Core Recovery: (SCR)	Percent ratio of solid core of full cylindrical shape recovered. Expressed with respect to the total length of core run.
Rock Quality Designation: (RQD)	Total length of sound core recovered in pieces 0.1 m in length or larger, as a percentage of total core length
Unconfined Compressive Strength: (UCS)	Axial stress required to break the specimen.
Fracture Index: (FI)	Frequency of natural fractures per 0.3 m of core run.

### DISCONTINUITY SPACING

Bedding	Bedding Plane Spacing
Very thickly bedded	Greater than 2 m
Thickly bedded	0.6 to 2 m
Medium bedded	0.2 to 0.6 m
Thinly bedded	60 mm to 0.2 m
Very thinly bedded	20 to 60 mm
Laminated	6 to 20 mm
Thinly laminated	Less than 6 mm

### STRENGTH CLASSIFICATION

Rock Strength	Approximate Uniaxial Compressive Strength (MPa)
Extremely Strong	Greater than 250
Very Strong	100 – 250
Strong	50 – 100
Medium Strong	25 – 50
Weak	5 – 25
Very Weak	1 – 5
Extremely Weak	0.25 – 1

# RECORD OF BOREHOLE No 17-1

1 OF 2

METRIC

GWP# 4017-16-00 LOCATION Casselman CVIF N 5 021 341.4 E 186 567.5 ORIGINATED BY SOB  
 HWY 417 BOREHOLE TYPE HSA COMPILED BY JM  
 DATUM Geodetic DATE 2017.03.24 - 2017.03.24 CHECKED BY KP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT  $\gamma$ kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa					
								20 40 60 80 100					
								○ UNCONFINED + FIELD VANE ● QUICK TRIAXIAL × LAB VANE					
							WATER CONTENT (%)						
							PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT W <sub>p</sub> W W <sub>L</sub>						
65.7													
0.0													
0.1	100 mm ASPHALT												
	Silty sand with gravel		1	GS									
	Dense												
	Brown												
	FILL												
	- Clayey below 1.5 m		1	SS	33								27 43 30 (SI+CL)
			2	SS	34								15 50 35 (SI+CL)
63.0			3	SS	16								
2.7	CLAY (CH) Firm Brown												
			4	SS	4								0 0 27 73
62.1													
3.7	CLAY (CH to Cl) Firm Grey												
			5	SS	WH								
			6	SS	WH								
			7	SS	WH								0 2 21 77
			8	SS	WH								

Continued Next Page

+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity  
 20  
15  
10  
(%) STRAIN AT FAILURE

ONTMT4S 18122 - CASSELMAN CVIF - FOUNDATION.GPJ 2012TEMPLATE(MTO).GDT 9/6/17



# RECORD OF BOREHOLE No 17-1

2 OF 2

METRIC

GWP# 4017-16-00 LOCATION Casselman CVIF N 5 021 341.4 E 186 567.5 ORIGINATED BY SOB  
 HWY 417 BOREHOLE TYPE HSA COMPILED BY JM  
 DATUM Geodetic DATE 2017.03.24 - 2017.03.24 CHECKED BY KP

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION SCALE	DYNAMIC CONE PENETRATION RESISTANCE PLOT				UNIT WEIGHT  γ  kN/m <sup>3</sup>	REMARKS & GRAIN SIZE DISTRIBUTION (%)  GR SA SI CL	
ELEV DEPTH	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES			SHEAR STRENGTH kPa						
								○ UNCONFINED + FIELD VANE						
								● QUICK TRIAXIAL × LAB VANE						
Continued From Previous Page							20 40 60 80 100				PLASTIC LIMIT W <sub>P</sub> NATURAL MOISTURE CONTENT W LIQUID LIMIT W <sub>L</sub>			
							20 40 60 80 100				WATER CONTENT (%) 20 40 60			
51.3  <														

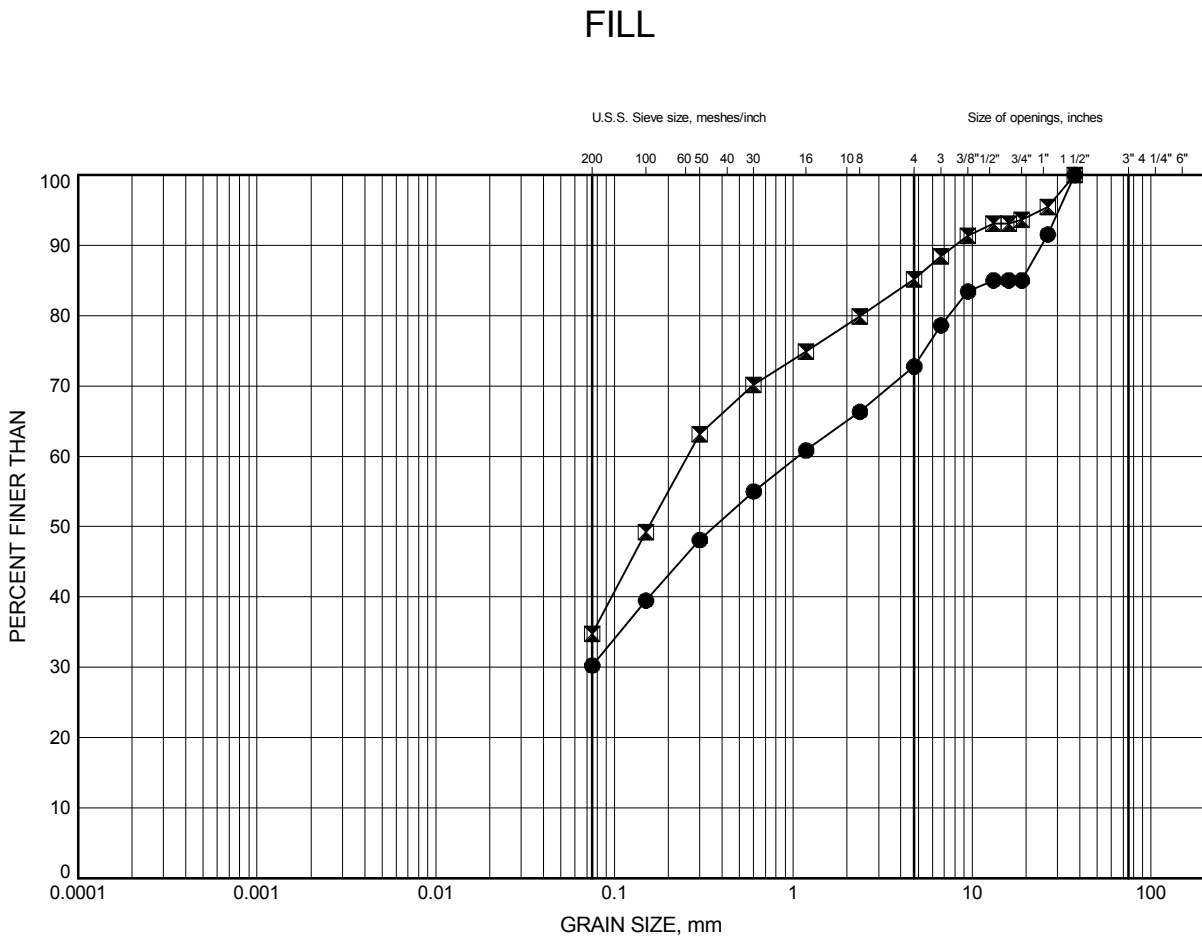
+<sup>3</sup>, ×<sup>3</sup>: Numbers refer to Sensitivity  
 20  
 15  
 10  
 (%) STRAIN AT FAILURE

## **APPENDIX C LABORATORY TEST RESULTS**

Casselman Commercial Vehicle Inspection Facility

# GRAIN SIZE DISTRIBUTION

FIGURE 1



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

## LEGEND

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	17-1	1.07	64.66
⊠	17-1	1.83	63.90

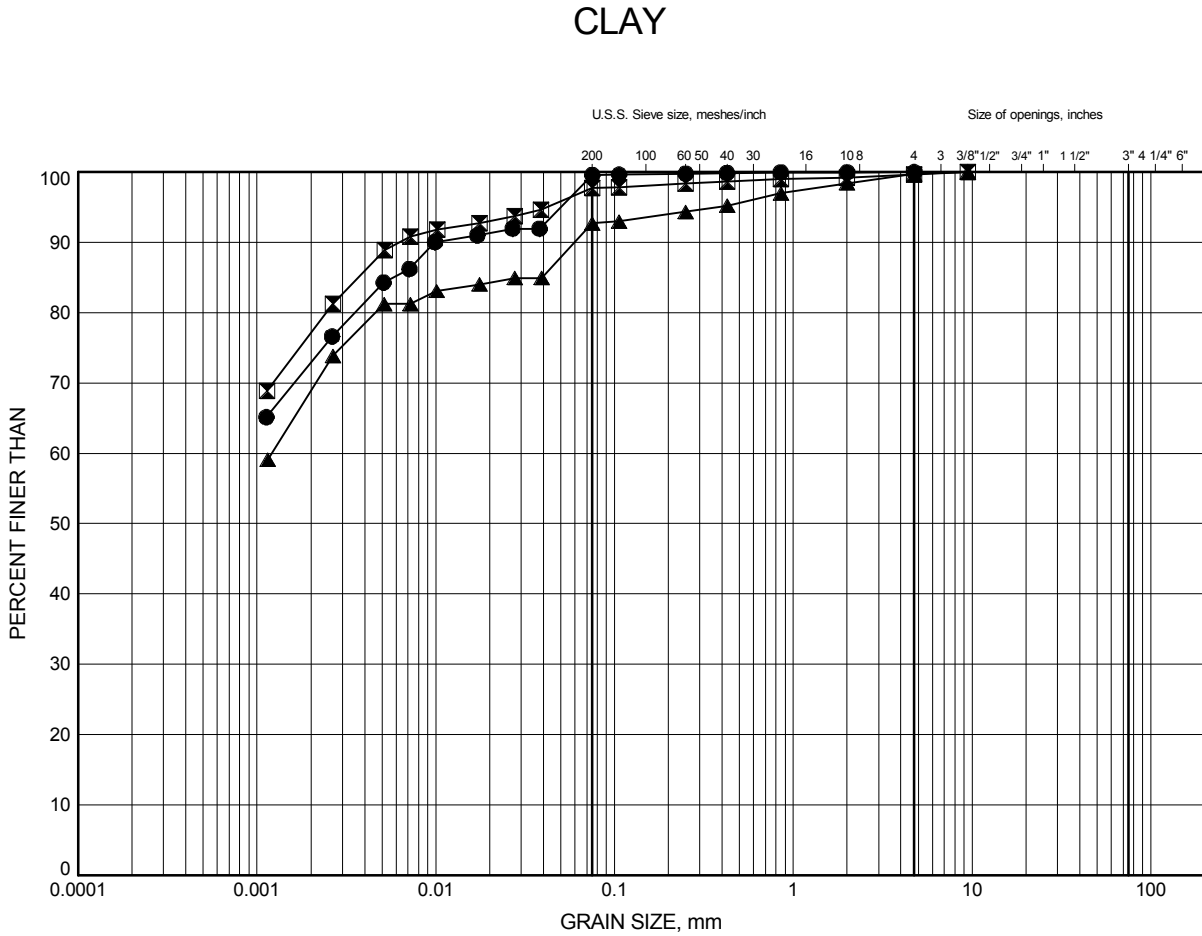
Date May 2017  
GWP# 4017-16-00



Prep'd KE  
Chkd. KP

Casselman Commercial Vehicle Inspection Facility  
GRAIN SIZE DISTRIBUTION

FIGURE 2



SILT and CLAY	FINE	MEDIUM	COARSE	FINE	COARSE	COBBLE SIZE
FINE GRAINED	SAND			GRAVEL		

**LEGEND**

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	17-1	3.35	62.37
⊠	17-1	7.92	57.80
▲	17-1	14.02	51.71

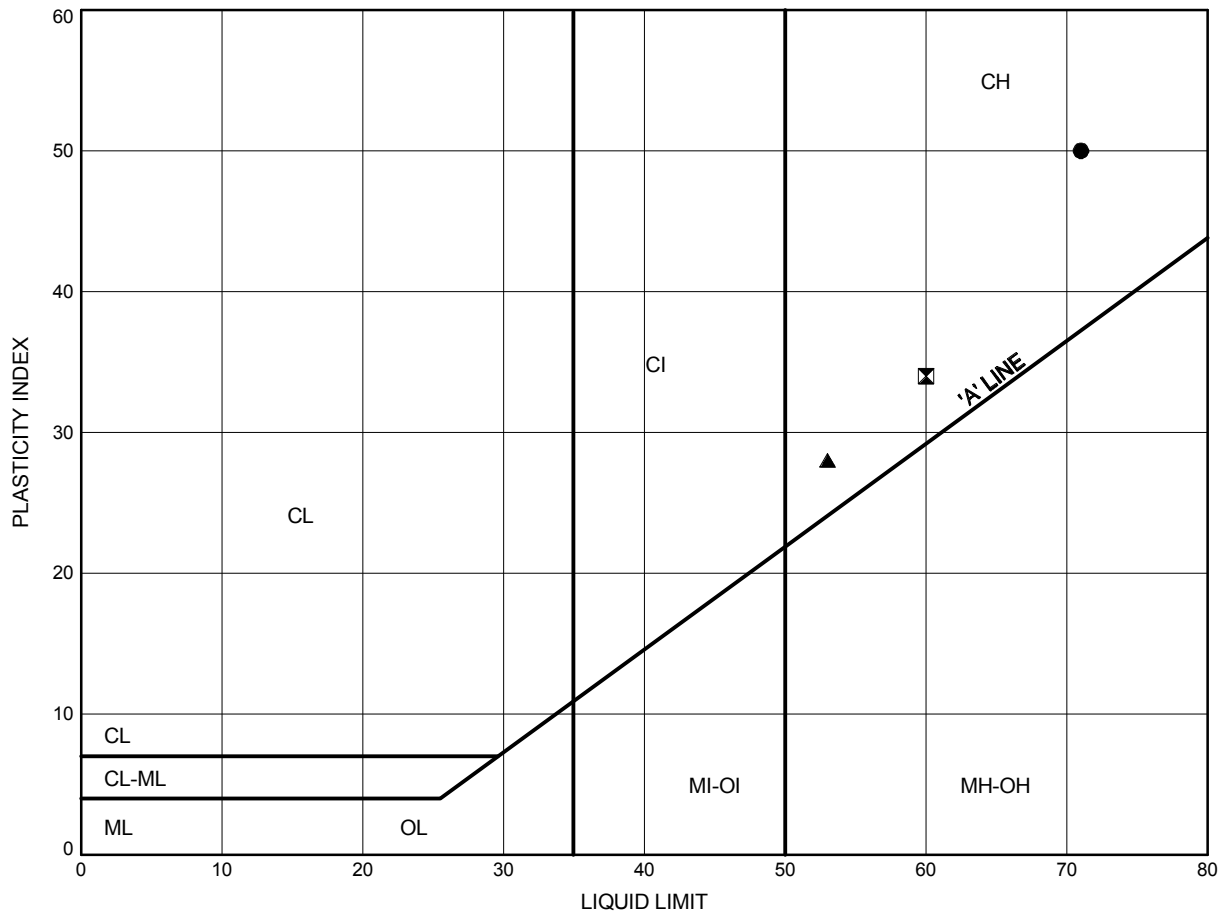
Date May 2017  
GWP# 4017-16-00



Prep'd KE  
Chkd. KP

Casselman Commercial Vehicle Inspection Facility  
**ATTERBERG LIMITS TEST RESULTS**

FIGURE 3



**LEGEND**

SYMBOL	BOREHOLE	DEPTH (m)	ELEV. (m)
●	17-1	3.35	62.37
⊠	17-1	7.92	57.80
▲	17-1	14.02	51.71

Date May 2017  
 GWP# 4017-16-00



Prep'd KE  
 Chkd. KP