Solicitation No. EQ447-180692/A

Project No. EQ447- 180692 Remediation/Disposal of Soil

Note to Bidders: When providing questions, please include a single specific point in each question. Do no combine multiple queries in the frame of one question.

Questions and Answers:

Question 1:

a) What concentrations of chlorinated solvents as mentioned and how treated- contact with an oxidant, such as sodium permanganate?

b) Specs talk of filtration, but that is standard language for sediment control.

c) No information on stratigraphy, hydrogeology, area of impact.

Response 1:

a) Concentrations of chlorinated solvents provided in specification, Appendix C, Groundwater Quality, Table C.2. Refer to drawing at commencement of the appendix to cross-reference concentrations with locations of the monitoring wells where samples were obtained. Treatment of dewatering water generated as per Section 31 23 19, which is performance based, not proscriptive. Bidder to meet the stipulated criteria, Ontario provincial Water Quality Objectives, as per Subsection 1.5.2 of Section 31 23 19.

b) Refer to addenda.

c) Appendix B, Borehole Logs, and Drawing C-03, both provide stratigraphy information. More stratigraphic information will be provided in this Addenda. See response to Question 6. The drawing at commencement of the Appendix C provides the locations of the monitoring wells and groundwater data that exceeds provincial water quality objectives. Additional hydrogeology drawings taken from historic reports are attached (Attachment 1). Drawings C-07, A to D, define area of soil impact.

Question 2: For the groundwater pumping is a permit to take water required since the pumping rate will exceed the 50,000 litres per day?

Response 2: Permits to Take Water as provided by the Government of Ontario are not required for this project. The site is subject to federal jurisdiction.

Question 3: For the groundwater treatment will the treatment process need to be completed under a Ministry of Environment and Climate Change (MOECC) mobile Environment Compliance Approval (ECA)?

Response 3: Mobile ECAs as provided by the Government of Ontario are not required for this project. The site is subject to federal jurisdiction.

Question 4: Would PWGSC accept treatment of the hazardous soils at the Site using a MOECC ECA and approved soil treatment system to reduce the hazardous soil concentrations to non-hazardous in accordance to regulations. This would provide potential cost savings for the project.

Response 4: If the Bidder wishes to propose treatment to change hazardous soil to non-hazardous soil, the Bidder can provide two cost sheets, one without treatment and one with treatment, accompanied by an explanation of the treatment process and its impact on schedule and the overall project.

Question 5: At the site meeting it was specified that there will be a large volume of clean overburden to be stockpiled and potentially be reused. However in the specifications or on the rate bid form there is no volume of clean overburden stockpiling or reuse provided. Can PWGSC please provide the expected volume of clean overburden to stockpile.

Response 5: Estimated volume of clean overburden for re-use as fill in noted in Section 02 50 00 (site remediation) and not in Section 31 00 01 (backfilling and grading). Note that Drawings C-07 A to C define the zones of clean overburden to be re-used as fill.

Question 6: At site meeting it was stated that stratigraphic logs for the monitoring wells to be abandoned will be provided. In order to properly price the abandonment work we need these stratigraphic logs. Can PWGSC please provide these and as many stratigraphic logs as possible?

Response 6: Borehole and monitoring wells logs have been included in this addenda for all the monitoring wells planned for abandonment. See Attachment 2. The following have been included:

Wells to be Decomissioned/Abandoned
Hangar 5/6: CFB Trenton

1	MW12	26		13	MW14	26	B
2	MW12	27		14	MW14	107	B
3	MW12	54	B	15	MW14	107	
4	MW12	54		16	MW14	108	B
5	MW12	61	A	17	MW14	108	
6	MW12	61	B	18	MW14	109	
7	MW12	61		19	MW14	118	
8	MW12	77		20	MW14	123	B
9	MW12	92	A	21	MW14	124	B
10	MW12	94		22	MW14	127	
11	MW12	95	A				
12	MW12	95	B				

Question 7: What are DND's proposed dewatering procedures over weekends? Is the contractor expected to maintain dewatering procedures over the weekend and ensure there is capacity to contain groundwater collected?

Response 7: The Contractor is to ensure the excavation remains dry (Section 31 23 19 subsection 1.1.1.2: "fully dewater the excavation zone") and that groundwater is managed to achieve this. PWGSC anticipates that weekend work will be required to ensure this objective is met during some of the excavation and backfilling tasks. The bidder can implement systems to minimize such weekend work by automation, monitoring and other measures, at their discretion. Note Section 31 23 19.1.6.1 notes a dewatering capacity of up to 100,000L/day where "day: refers to calendar days, not working week-days. Thus, system must remain operational on the weekends.

Question 8: Will DND allow access to other additional area (beyond limits outlined in Drawing C-02) to accommodate operational requirements including soil and groundwater storage capacity?

Response 8: For the purpose of this submission, please assume that the areas identified are the work areas to be used. Should the winning bidder present a strong argument for additional space, there may be some flexibility in adjusting the work area to a certain degree, but at this time, we cannot define the extent.

Question 9: Please provide borehole/monitoring well logs for all 22 of the monitoring wells to be decommissioned.

Response 9: See response to Question 6. Borehole/monitoring well logs have been provided for all monitoring wells planned for decommissioning.

Question 10: Since this is Federal Property, does the Water Treatment System require MOECC approval?

Response 10: See response to Question 3.

Question 11: With extracting 100,000 litres per day, is a Permit to Take required?

Response 11: See response to Question 2.

Question 12: 1.2 Measurement Procedures: .3 Supply and operation of vacuum truck to remove residual DNAPL/product from bedrock surface…Is this strictly to remove liquid form only or to remove residual soil material unable to be excavated due to contours of the bedrock surface?

Response 12: This activity is intended to remove residual soil from the bedrock surface to the degree practical as well as any groundwater and/or NAPL that is present on the surface of the bedrock, upwelling from the bed rock or present in the near surface cracks in the bedrock. This is not intended to be a long term activity but used judiciously before laying down the geotextile.

Question 13: 1.6 Water and Wastewater Storage Tanks: .1 .1 Allow the Departmental Representative to collect wastewater samples…prior to treatment. Is it required to obtain the analytical result first prior to treatment?

Response 13: Yes, water samples will be taken at a pre-treatment point, mid-treatment point and post treatment point on a daily basis as per Section 31 23 19.3.3.2.3, Water Treatment. Samples at the pre-treatment point and post treatment point should be taken from the tank contents directly (pretreatment holding tank and post-treatment holding tanks) and the Bidder should ensure the tanks are accessible to sampling in a safe manner that meets the provincial and federal occupational health and safety requirements and would not require working from heights measures (i.e. training) by providing stairs and railings. The bidder will facilitate that the mid-point can be sampled (i.e. such as providing a sampling valve).

Question 14: 2.1 Products: .2 Dewatering Well Points: Yes, the dewatering well points must be installed as per Reg 903 and a licenced well technician but is the installation required to be supervised by a qualified environmental practitioner? Are Borehole logs required to be submitted to the Departmental Representative as part of documentation? Or are both of the both enquiries going to be completed by the on-site Departmental Representative?

Response 14: The Departmental Representative will be present during the implementation of the work including the installation of dewatering well points. The Bidder will provide field personnel with knowledge and experience with respect to the installations of dewater well points as well as a licenced well technician in accordance with Ontario Regulation 903. With respect to borehole logs, please see the response to Question 6. The bidder is responsible for the installation of the dewatering well points in accordance with Ontario Regulation 903.

Question 15: 3.2 Dewatering: .1 Excavation Dewatering: The specs state that dewatering must maintain groundwater levels minimum 1 meter below excavation grade so this means 5 meters below grade. The schematic within Drawing C-06 illustrates that the well terminates at 5 meters below grade. Whatever pumping device the contractor decides will be sitting right on bottom and with normal well installations, silt generally build up on the bottom. Should these well points be taken to a greater depth of possibly 6 meters. Since this is a tender with basis of award on lowest bid price, all contractors should be bidding on the same specs.

Response 15: Refer to addenda for Section 31 23 19.3.2.1.1

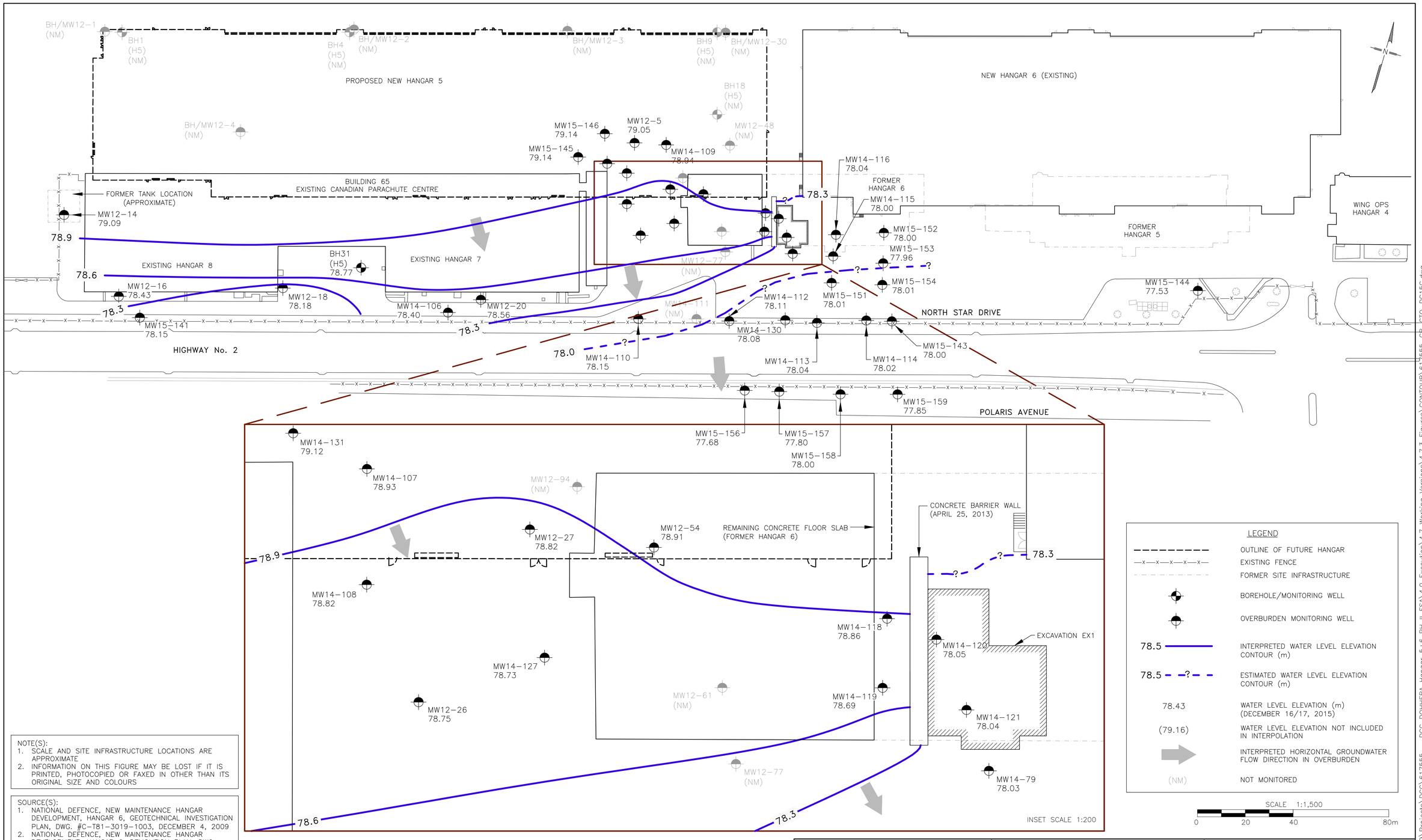
Question 16: Water Well Abandonment, Section 33 29 00: Is it possible to get a copy of the Borehole logs for all Monitoring Wells that require abandonment?

Response 16: See response to Question 6.

Question 17: Backfilling and Grading, Section 31 00 01: 3.4 Field Quality Control: .1 Testing of material and compaction of backfill…by Departmental Representative. Is the contractor responsible for retaining the Geotechnical Engineer to perform the compaction testing and reporting?

Response 17: Refer to addenda.

Attachment 1: Additional Hydrogeological Information



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2. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 6, DEMOLITION PLAN, DWG. #C-T81-3019-6002, DECEMBER 4, 2009
3. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, GEOTECHNICAL INVESTIGATION PLAN, DWG. #C-T81-3018-1003, FEBRUARY 25, 2011
4. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, DEMOLITION & REMOVALS PLAN, DWG. #C-T81-3018-6002, FEBRUARY 25, 2011

LEGEND

- OUTLINE OF FUTURE HANGAR
- EXISTING FENCE
- FORMER SITE INFRASTRUCTURE
- BOREHOLE/MONITORING WELL
- OVERBURDEN MONITORING WELL
- 78.5 — INTERPRETED WATER LEVEL ELEVATION CONTOUR (m)
- 78.5 - -?- - ESTIMATED WATER LEVEL ELEVATION CONTOUR (m)
- 78.43 — WATER LEVEL ELEVATION (m) (DECEMBER 16/17, 2015)
- (79.16) — WATER LEVEL ELEVATION NOT INCLUDED IN INTERPOLATION
- INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN OVERBURDEN
- (NM) — NOT MONITORED

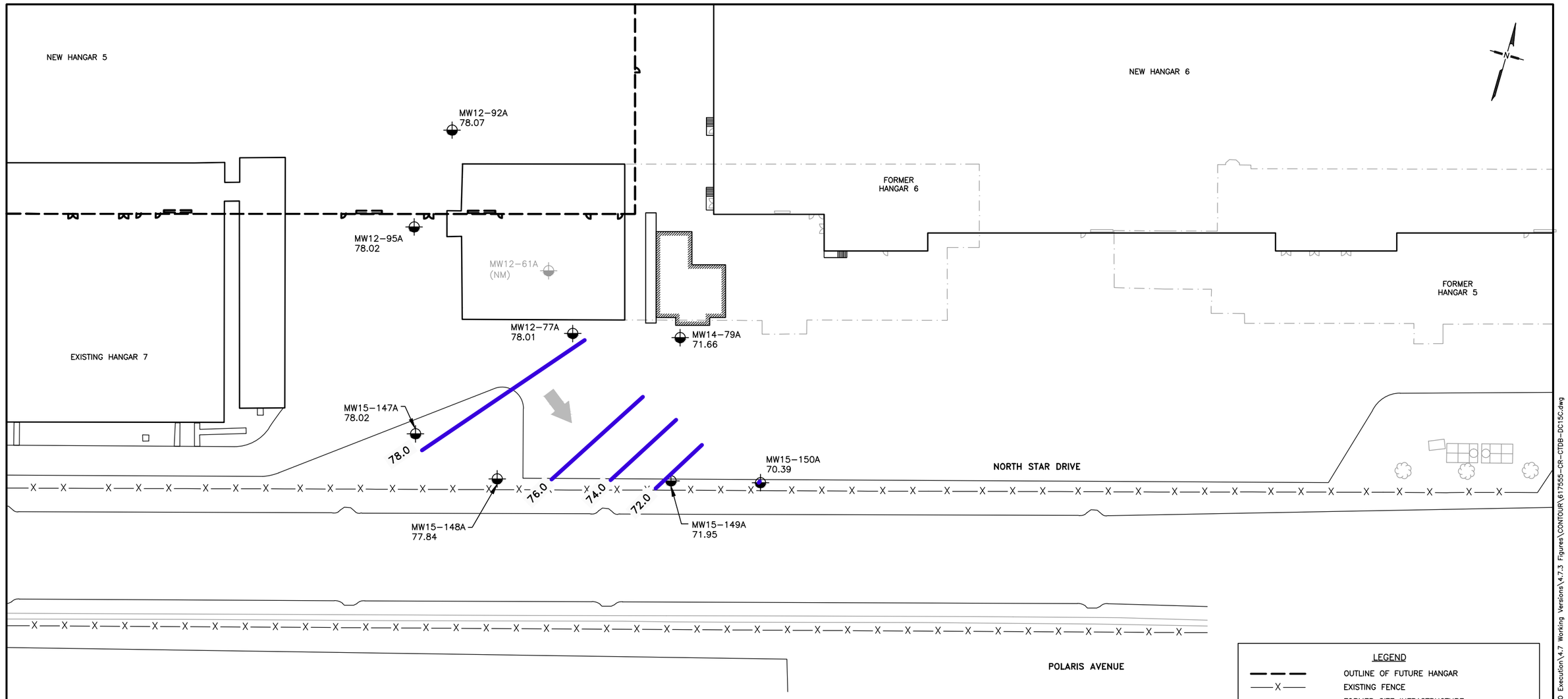
SCALE 1:1,500
0 20 40 80m

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN OVERBURDEN (DECEMBER 16/17, 2015)	
Project No: 617555	Filename: 617555-CR-CTO-DC15C	Date: AUGUST 2016	Dwg No: FIGURE 4A
Drawn: EM	Verified: EK	Project Manager: DT	

PAGE FORMAT: 11x17

FILENAME: \\SLI1779\Projects\DCC\617555 – DCC DQHHERA Hangar 5+6 PH II ESA\4.0 Execution\4.7 Working Versions\4.7.3 Figures\CONTOUR\617555-CR-CTO-DC15C.dwg



LEGEND

- OUTLINE OF FUTURE HANGAR
- EXISTING FENCE
- FORMER SITE INFRASTRUCTURE
- BEDROCK MONITORING WELL
- 78.5 — INTERPRETED WATER LEVEL ELEVATION CONTOUR (m)
- 78.43 — WATER LEVEL ELEVATION (m) (DECEMBER 16/17, 2015)
- (79.16) — WATER LEVEL ELEVATION NOT INCLUDED IN INTERPOLATION
- INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN DEEP BEDROCK
- (NM) — NOT MONITORED

SCALE 1:750

0 10 20 40m

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3. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, GEOTECHNICAL INVESTIGATION PLAN, DWG. #C–T81–3018–1003, FEBRUARY 25, 2011
4. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, DEMOLITION & REMOVALS PLAN, DWG. #C–T81–3018–6002, FEBRUARY 25, 2011

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN DEEP BEDROCK (DECEMBER 16/17, 2015)	
Project No: 617555	Filename: 617555–CR–CTDB–DC15C	Date: AUGUST 2016	Dwg No: FIGURE 4C
Drawn: EM	Verified: EK	Project Manager: DT	

PAGE FORMAT: 11x17

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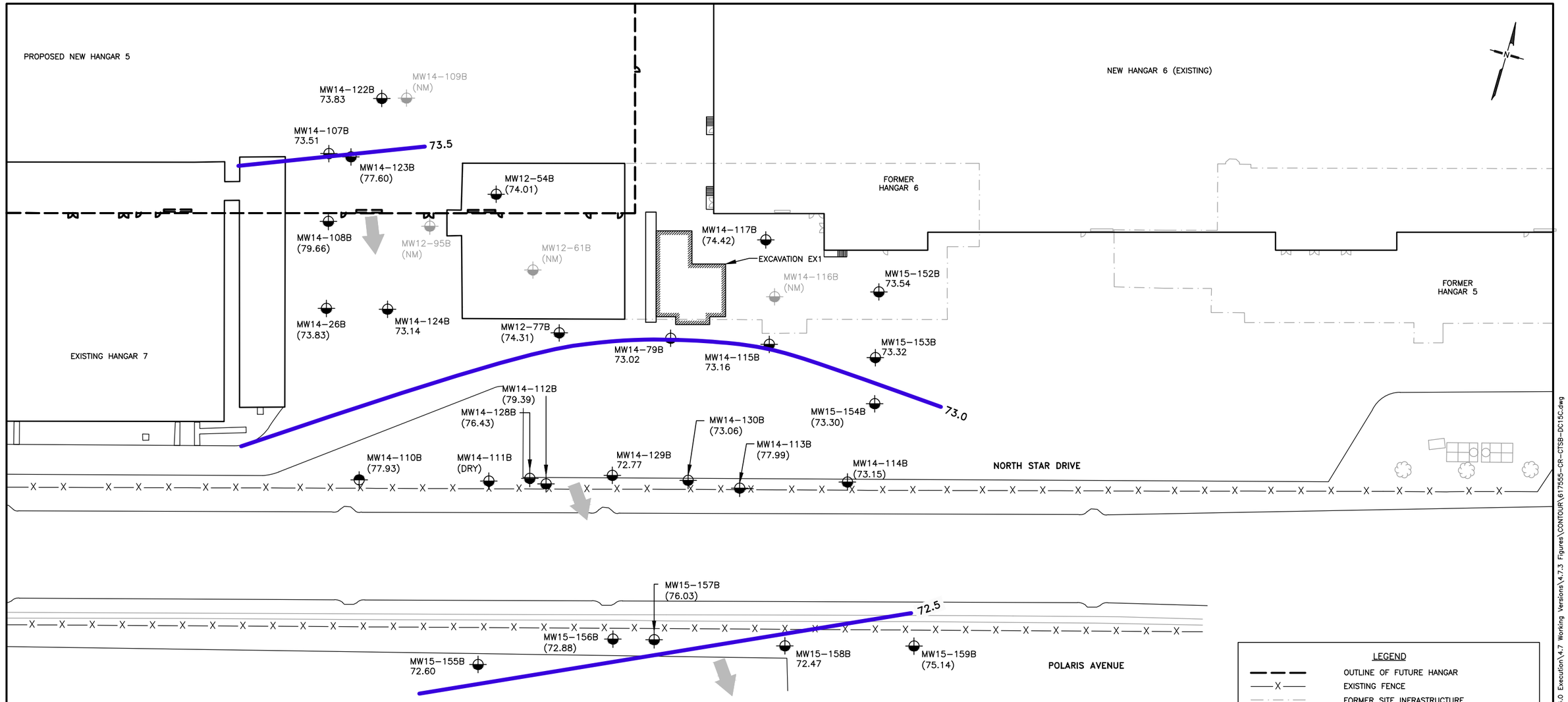

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4. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, DEMOLITION & REMOVALS PLAN, DWG. #C-T81-3018-6002, FEBRUARY 25, 2011

LEGEND

- OUTLINE OF FUTURE HANGAR
- X EXISTING FENCE
- FORMER SITE INFRASTRUCTURE
- BEDROCK MONITORING WELL
- 78.5 INTERPRETED WATER LEVEL ELEVATION CONTOUR (m)
- 78.43 WATER LEVEL ELEVATION (m) (DECEMBER 16/17, 2015)
- (79.16) WATER LEVEL ELEVATION NOT INCLUDED IN INTERPOLATION
- INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN DEEP BEDROCK
- (NM) NOT MONITORED

SCALE 1:750
0 10 20 40m

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: INTERPRETED HORIZONTAL GROUNDWATER FLOW DIRECTION IN SHALLOW BEDROCK (DECEMBER 16/17, 2015)	
Project No: 617555	Filename: 617555-CR-CTSB-DC15C	Date: AUGUST 2016	Dwg No: FIGURE 4B
Drawn: EM	Verified: EK	Project Manager: DT	

PAGE FORMAT: 22x34

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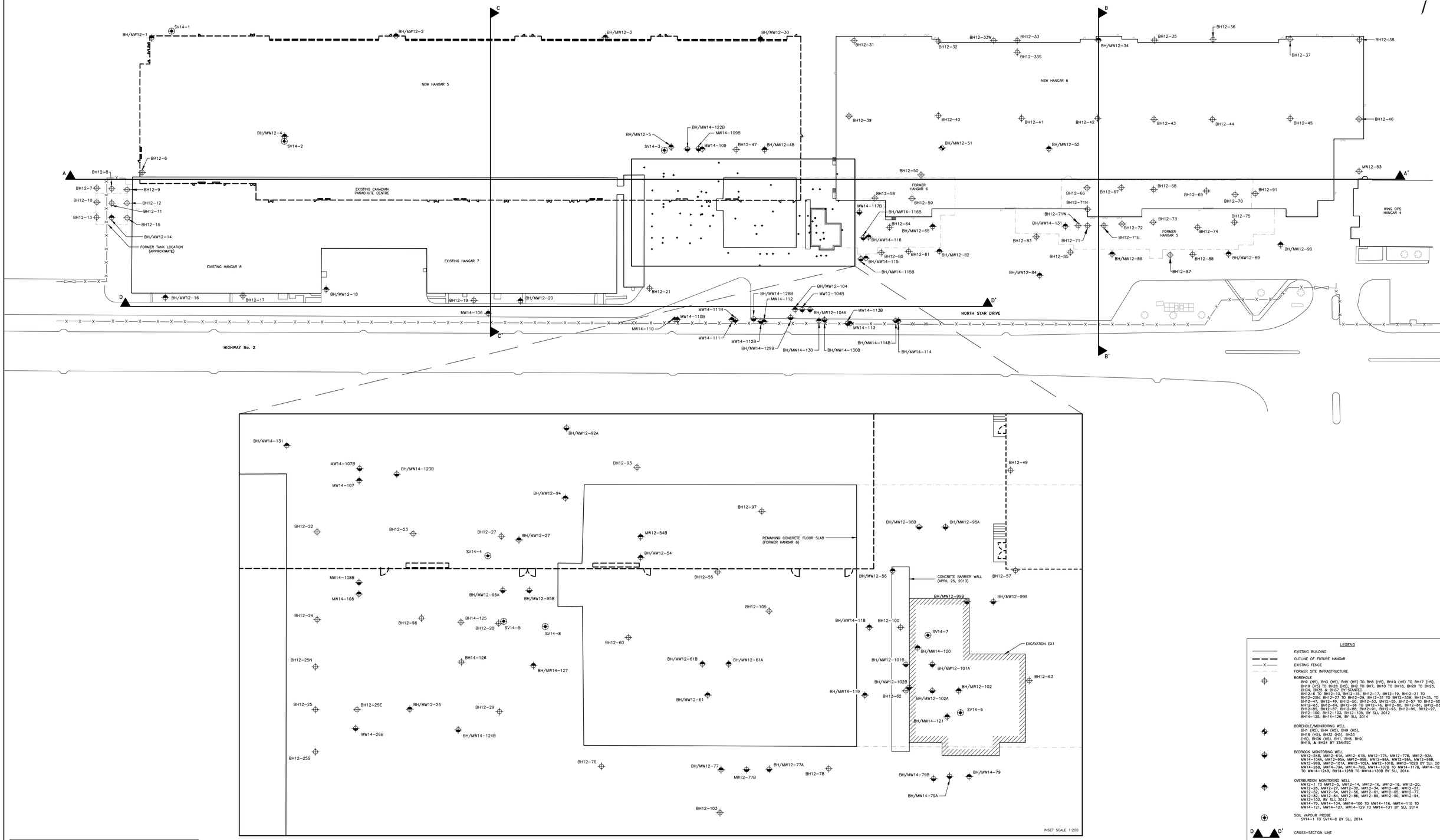

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3. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, GEOTECHNICAL INVESTIGATION PLAN, DWG. #C-TB1-3018-1003, FEBRUARY 25, 2011
4. NATIONAL DEFENCE, NEW MAINTENANCE HANGAR DEVELOPMENT, HANGAR 5, DEMOLITION & REMOVALS PLAN, DWG. #C-TB1-3018-6002, FEBRUARY 25, 2011

LEGEND

- EXISTING BUILDING
- OUTLINE OF FUTURE HANGAR
- EXISTING FENCE
- FORMER SITE INFRASTRUCTURE
- BOREHOLE: BH2 (HS), BH3 (HS), BH5 (HS) TO BH8 (HS), BH10 (HS) TO BH17 (HS), BH19 (HS) TO BH28 (HS), BH2 TO BH7, BH10 TO BH18, BH20 TO BH23, BH34, BH35 & BH37 BY STANTEC; BH12-6 TO BH12-13, BH12-15, BH12-17, BH12-19, BH12-21 TO BH12-25N, BH12-27 TO BH12-29, BH12-31 TO BH12-33W, BH12-35, TO BH12-47, BH12-49, BH12-50, BH12-53, BH12-55, BH12-57 TO BH12-60, BH12-62 TO BH12-63, BH12-66 TO BH12-76, BH12-78 TO BH12-80, BH12-81, BH12-83, BH12-85, BH12-87, BH12-88, BH12-91, BH12-93, BH12-96, BH12-97, BH12-100, BH12-103, BH12-105 BY SLI, 2012; BH14-125, BH14-126, BY SLI, 2014
- BOREHOLE/MONITORING WELL: BH1 (HS), BH4 (HS), BH9 (HS), BH18 (HS), BH32 (HS), BH33 (HS), BH36 (HS), BH1, BH8, BH9, BH19, & BH24 BY STANTEC
- BEDROCK MONITORING WELL: MW12-54B, MW12-61B, MW12-77A, MW12-77B, MW12-92A, MW14-104A, MW12-95A, MW12-95B, MW12-98A, MW12-99A, MW12-99B, MW12-99B, MW12-101A, MW12-102A, MW12-101B, MW12-102B BY SLI, 2012; MW14-26B, MW14-79A, MW14-79B, MW14-107B TO MW14-117B, MW14-122B TO MW14-124B, BH14-128B TO MW14-130B BY SLI, 2014
- OVERBURDEN MONITORING WELL: MW12-1 TO MW12-5, MW12-14, MW12-16, MW12-18, MW12-20, MW12-26, MW12-27, MW12-30, MW12-34, MW12-48, MW12-51, MW12-52, MW12-54, MW12-56, MW12-61, MW12-65, MW12-77, MW12-78, MW12-85, MW12-86, MW12-89, MW12-90, MW12-94, MW12-103, BY SLI, 2012; MW14-79, MW14-104, MW14-106 TO MW14-116, MW14-118 TO MW14-121, MW14-127, MW14-129 TO MW14-131 BY SLI, 2014
- SOIL VAPOUR PROBE: SV14-1 TO SV14-8 BY SLI, 2014
- D D' CROSS-SECTION LINE

SCALE 1:750
0 10 20 40m

SNC·LAVALIN

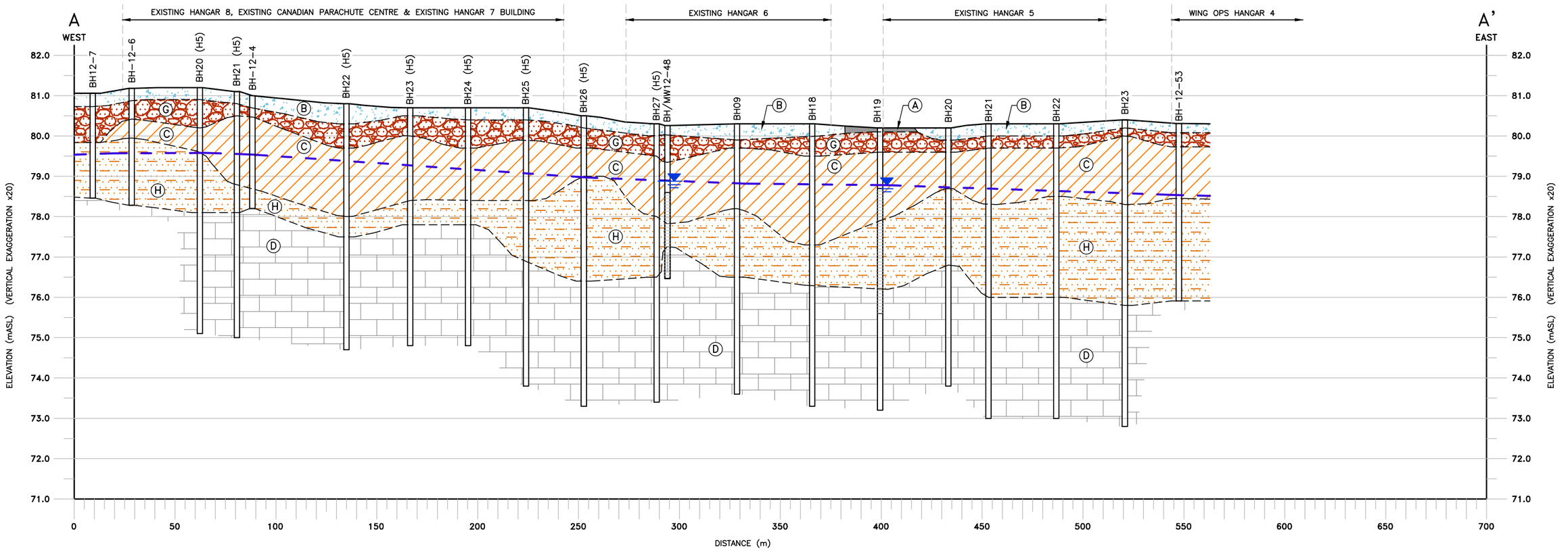
Client/Location: DCC — NEW HANGAR 5 & 6 – 8 WING CFB TRENTON — TRENTON, ONTARIO

Title: GEOLOGICAL CROSS SECTION LOCATIONS

Project No: 617555 | Filename: 617555-LN-XS-1A.DWG | Date: JANUARY 2015 | Dwg No: FIGURE A-1

Drawn: EM | Verified: EH/SC | Project Manager: SW

PAGE FORMAT: 22x34



LEGEND

- PROPERTY LINE
- GROUNDWATER LINE
- WATER LEVEL MEASURED IN DECEMBER 2010
- (A) ASPHALT
- (B) CONCRETE
- (C) CLAY
- (D) LIMESTONE
- (E) SAND
- (F) SAND FILL
- (G) SAND & GRAVEL FILL
- (H) SILTY SAND
- (I) TOPSOIL
- BOREHOLE
- MONITORING WELL WITH SCREEN INTERVAL

SCALE 1:2000 (HORIZONTAL)

0 40 80m

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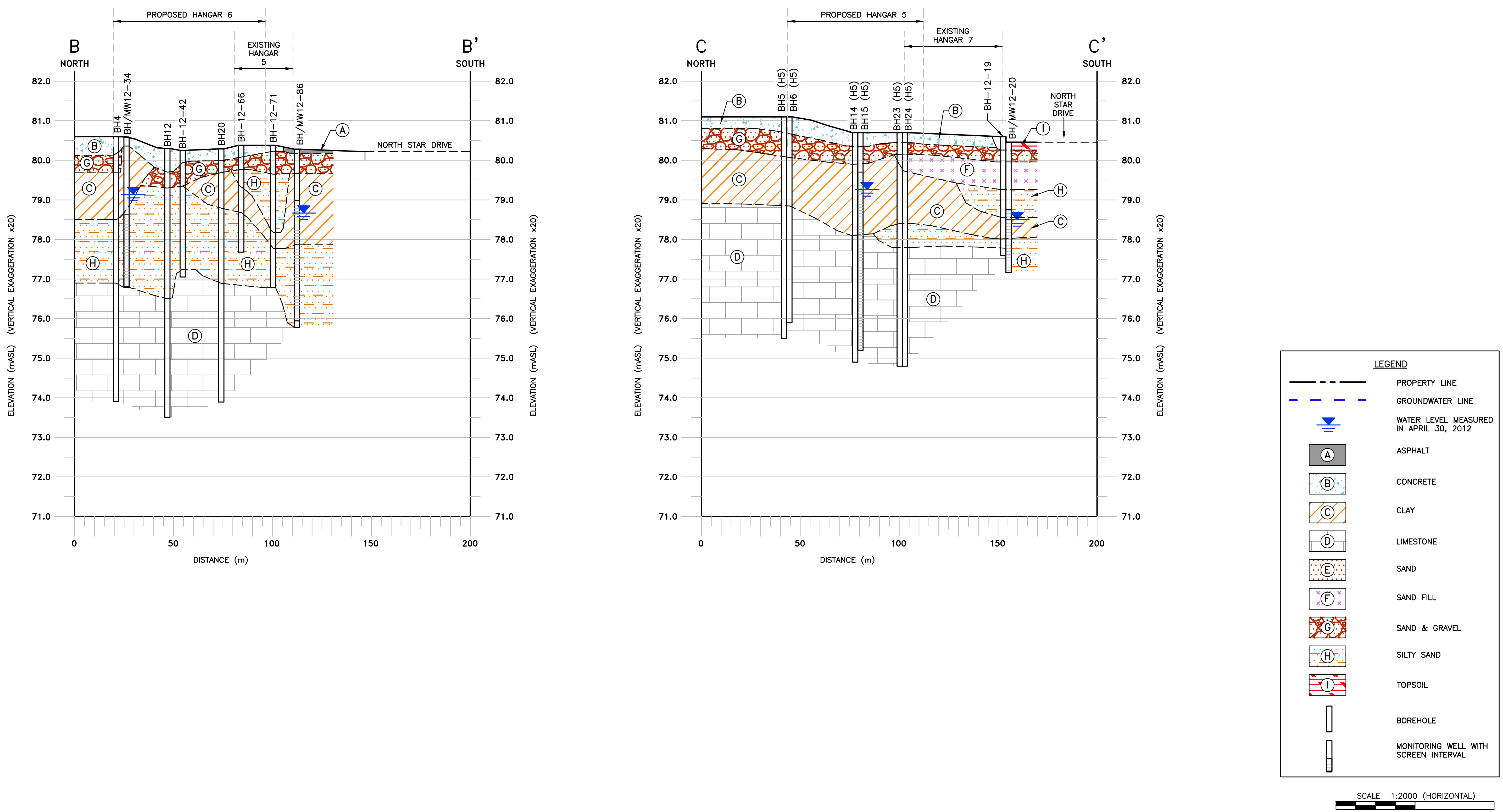
3. BOREHOLE/MONITORING WELL DIAMETERS ARE EXAGGERATED FOR REPRESENTATION
4. 'm' : METRES

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: GEOLOGICAL CROSS SECTION A–A'	
Project No: 617555	Filename: 617555–XS–AA–1.DWG	Date: FEBRUARY 2015	Dwg No: FIGURE A–2
Drawn: EM	Verified: SC	Project Manager: SW	

PAGE FORMAT: 11x17



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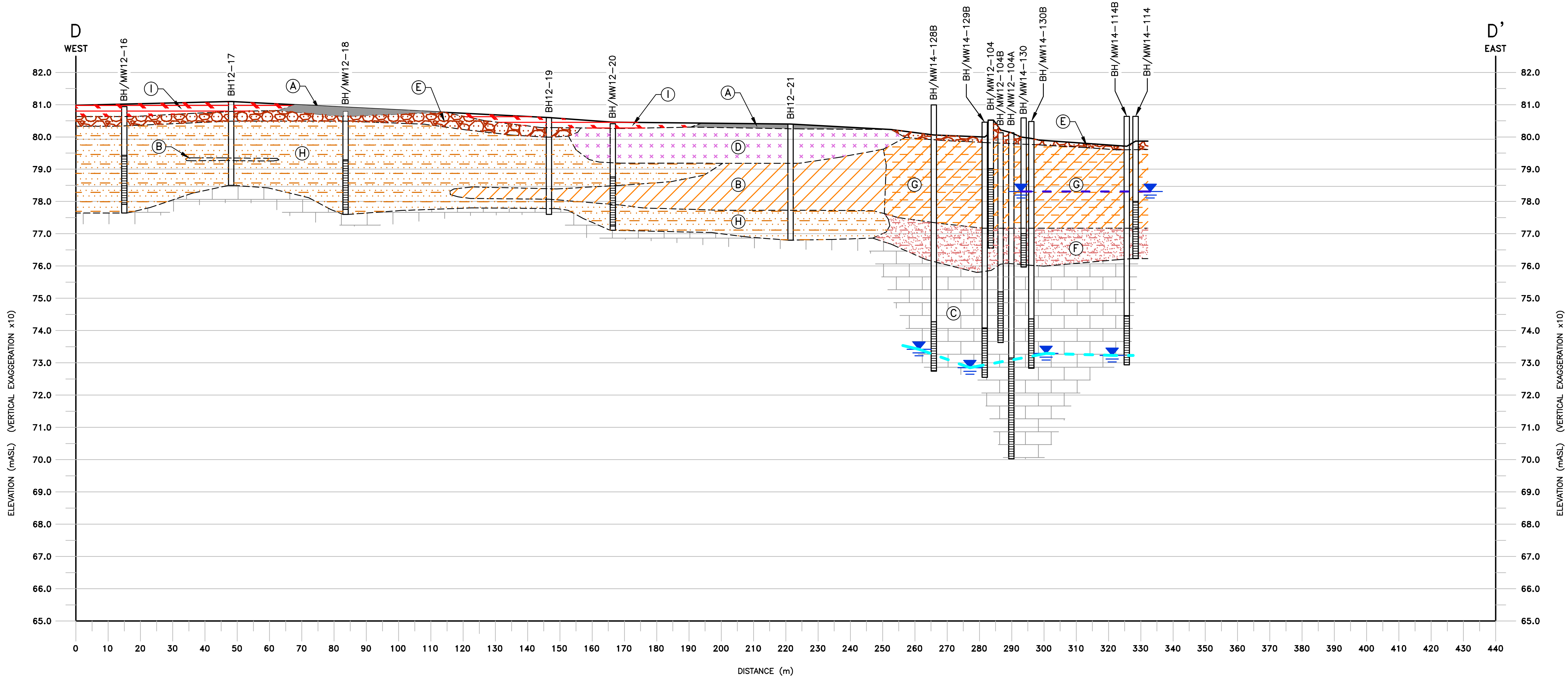
3. BOREHOLE/MONITORING WELL DIAMETERS ARE EXAGGERATED FOR REPRESENTATION
4. 'm' : METRES

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: GEOLOGICAL CROSS-SECTIONS B-B' & C-C'	
Project No: 617555	Filename: 617555-XS-BBCC-1.DWG	Date: FEBRUARY 2015	Dwg No: FIGURE A-3
Drawn: EM	Verified: SC	Project Manager: SW	

PAGE FORMAT: 11x17



LEGEND

Symbol	Description	Symbol	Description	Symbol	Description	Symbol	Description
(blue dashed line)	GROUNDWATER LINE IN OVERBURDEN	(C)	LIMESTONE	(G)	SILTY CLAY	(well)	MONITORING WELL WITH SCREEN INTERVAL
(cyan dashed line)	GROUNDWATER LINE IN BEDROCK	(D)	SAND FILL	(H)	SILTY SAND/ SILTY SAND FILL	(green)	ANALYSED SAMPLE – ALL ANALYSED PARAMETERS SATISFY THE SELECTED STANDARDS
(symbol)	WATER LEVEL MEASURED IN NOVEMBER 27, 2014	(E)	SAND & GRAVEL FILL	(I)	TOPSOIL	(red)	ANALYSED SAMPLE – AT LEAST ONE ANALYSED PARAMETER EXCEEDS THE SELECTED STANDARD
(A)	ASPHALT	(F)	SILTY TILL	(borehole)	BOREHOLE		
(B)	CLAY						

SCALE 1:1250 (HORIZONTAL)
0 25 50m

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3. BOREHOLE/MONITORING WELL DIAMETERS ARE EXAGGERATED FOR REPRESENTATION

SNC·LAVALIN

Client/Location: DCC NEW HANGAR 5 & 6 – 8 WING CFB TRENTON TRENTON, ONTARIO		Title: GEOLOGICAL CROSS SECTION D–D'	
Project No: 617555	Filename: 617555-XS-DD-1A.DWG	Date: FEBRUARY 2015	Dwg No: FIGURE A-4
Drawn: EM	Verified: EH	Project Manager: SW	

PAGE FORMAT: 11x17

Attachment 2: Borehole and Monitoring Well Logs of Wells to be Decommissioned

SNC·LAVALIN Environment

Borehole ID: BH12-26

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: August 9 2012
Site Datum: Geodetic

SLE Supervisor: Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe
OVM: RKI Eagle
PID: RKI Eagle

DEPTH (ft)	DEPTH (m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
									Ground Surface	80.60
0	0								ASPHALT	
1			BH12-26 (0-1)				52%		SAND AND GRAVEL FILL dry, grey	
			BH12-26 (1-2				52%			
2									SAND black, coarse, no odour	80.00
3	1		BH12-23 (2-4)				52%		SAND, SILT, AND GRAVEL brown, compact	
4									CLAYEY SILT black to dark grey, compact	
5										
6	2								End of hole at 1.52 m bgs	79.00
7										
8										
9										78.00
10	3									
11										
12										77.00
13	4									
14										
15										

(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-26

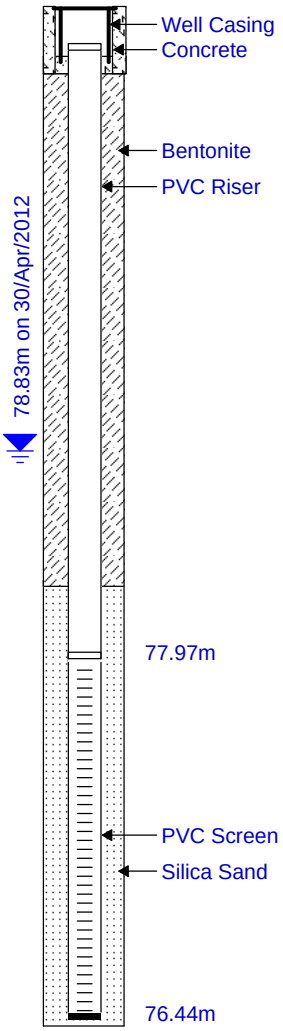
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 26 April 2012
Site Datum: Geodetic

SLE Supervisor: Brian S.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm
Monitoring Well Diameter: 32 mm

Drilling Company: Downing`
Drilling Equipment: Geoprobe
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.71
0 / 0								ASPHALT	
1		BH12-26 (1-2)		40	0	25%		SAND FILL moist, brown	
2									
3 / 1		BH12-26 (2-4)	◆	45	0	25%			80.00
4									
5		BH12-26 (4-6)		55	0	35%			
6 / 2									79.00
7		BH12-26 (6-8)		45	0	30%		CLAY moist, brown	
8									
9		BH12-26 (8-10)	◆	50	0	-		slight PHC odor	78.00
10 / 3									
11		BH12-26 (10-12)		-	-	-		Note: used HSA for well installation and geoprobe for stratigraphy	
12									77.00
13 / 4		BH12-26 (12-14)		-	-	-			
14									
15								Refusal at 4.3 m bgs using HSA	

Top of Riser Elev.= 80.52 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole ID: BH12-27

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 20 April 2012 / July 25 2012
Site Datum: Geodetic

SLE Supervisor: Brian S. / Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm

Drilling Company: Downing / Strata
Drilling Equipment: Geoprobe
OVM: RKI Eagle
PID: RKI Eagle

DEPTH (ft)	DEPTH (m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
									Ground Surface	80.54
0	0		BH12-27 (0-1)		140	0	100%		ASPHALT	
1			BH12-27 (1-2)		140	0	100%		SAND AND GRAVEL FILL dry, brown/black	
2			BH12-27 (2-4)		210	42	100%		SILTY SAND FILL moist, black, PHC odors	80.00
3	1									
4			BH12-27 (4-6)		165	42	70%		brown/grey	
5									CLAY moist, grey	79.00
6			BH12-27 (6-8)		140	32	70%			
7	2									
8			BH12-27 (8-10)		160	8	40%		SILTY SAND moist, grey	78.00
9										
10	3		BH12-27 (10-11)		150	2	40%			
11									Refusal at 3.4 m bgs	77.00
12										
13	4									
14										
15										76.00

(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-27

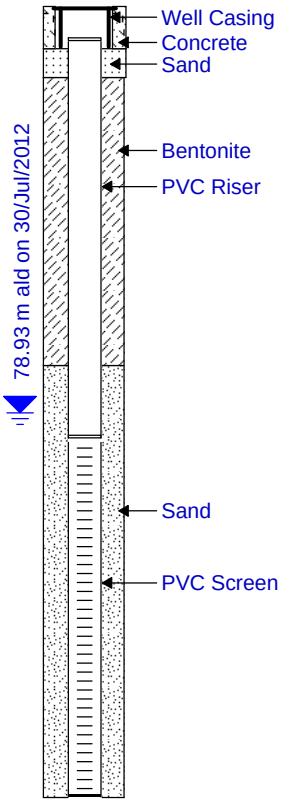
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 25 July 2012
Site Datum: Geodetic

SLE Supervisor: EV
Drilling Method: Direct-Push
Borehole Diameter: 83 mm
Monitoring Well Diameter: 51mm (2")

Drilling Company: Strata
Drilling Equipment: Geoprobe
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.65
0 – 2 ft / 0 – 1 m		BH12-27		-	-	-		refer to BH12-27	
8 – 10 ft / 2 – 3 m		BH12-27 (8-11)		0	21	86%		GRAVELLY CLAY brown, moist, odour at 2.4 mbgs SILTY SAND AND GRAVEL brown, moist, very dense	78.00
11 – 15 ft / 3 – 4 m								Refusal at 3.35m bgs	77.00

Top of Riser Elev.= 80.52 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-54

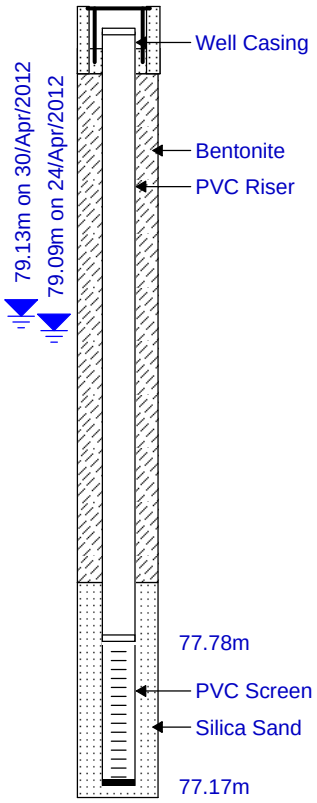
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 20 April 2012
Site Datum: Geodetic

SLE Supervisor: Brian S.
Drilling Method: Direct-Push
Borehole Diameter: 250 mm
Monitoring Well Diameter: 32 mm

Drilling Company: Downing
Drilling Equipment: Geoprobe
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.47
								CONCRETE	
0–1 / 0	-	BH12-54 (0-2)		140	0	100%		SAND AND GRAVEL FILL dry, brown	
								SILTY SAND FILL dry, brown	80.00
2–3 / 1	-	BH12-54 (2-4)		135	0	100%		moist	
4–5	-	BH12-54 (4-6)		130	0	100%			79.00
6–7 / 2	-	BH12-54 (6-8)		155	8	100%		CLAY moist, brown	
8–9	-	BH12-54 (8-10)	◆	300	290	100%		SILTY SAND moist, brown, solvent odors	78.00
10 / 3	-	BH12-54 (10-11)		300	270	100%			
11–12								Refusal at 3.4 m bgs	77.00
13 / 4									
14–15									76.00

Top of Riser Elev.= 80.40 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-54B

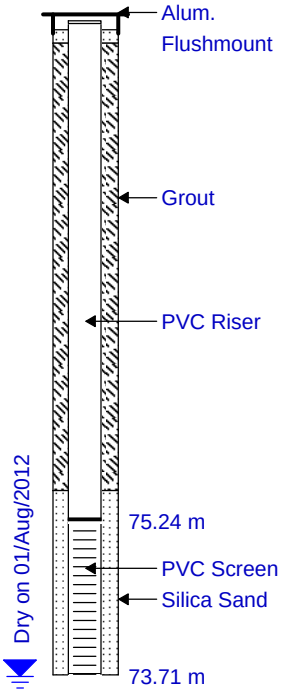
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 31 July 2012
Site Datum: Geodetic

SLE Supervisor: E. Kelly
Drilling Method: Air Rotary
Borehole Diameter: 84 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: N/A

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.43
0–1 ft / 0 m	-	BH/MW12-54B (0-1)		0	0	100%		CONCRETE	
1–3 ft / 0–1 m	-	BH/MW12-54B (1-3.5)		0	2	100%		SAND FILL dry, brown, some gravel and clay	
3–6 ft / 1–2 m	-	BH/MW12-54B (3.5-6)		-	-	100%		SANDY CLAY dry to moist, brown	79.00
6–13 ft / 2–4 m	-	-		-	-	-		Soil Lithology/Sampling not conducted.	78.00 77.00
13–20 ft / 4–6 m	-	-		-	-	-		LIMESTONE	76.00 75.00
20–35 ft / 6–10 m								End of Borehole at 6.55 m bgs.	74.00 73.00 72.00 71.00 70.00

Top of Riser Elev.= 80.33 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole ID: BH12-61

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 27 April 2012
Site Datum: Geodetic

SLE Supervisor: Brian S.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm

Drilling Company: Downing
Drilling Equipment: Geoprobe
OVM: RKI Eagle
PID: RKI Eagle

DEPTH (ft)	DEPTH (m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
									Ground Surface	80.26
0	0								CONCRETE	
1			BH12-61 (0-2)		50	0	85%		SAND AND GRAVEL FILL dry, brown	80.00
2										
3	1		BH12-61 (2-4)		65	0	85%		SILTY SAND FILL moist, grey, with some clay	
4										
5			BH12-61 (4-6)		55	0	100%			79.00
6										
7	2		BH12-61 (6-8)		55	0	100%		CLAY moist, brown	78.00
8										
9			BH12-61 (8-10)		55	6	100%		solvent odors	
10	3		BH12-61 (10-11)	◆	70	12	100%		SILTY SAND moist, brown, solvent odors	77.00
11									Refusal at 3.4 m bgs	
12										
13	4									
14										76.00
15										

(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-61

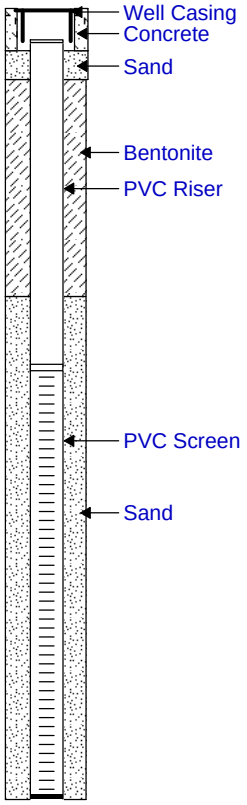
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 27 July 2012
Site Datum: Geodetic

SLE Supervisor: Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm
Monitoring Well Diameter: 51mm (2")

Drilling Company: Strata
Drilling Equipment: Geoprobe
Well Casing:
Well Screen:
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.71
0–1 / 0		BH12-61 (0-2)		0	1	74%		ASPHALT SAND AND GRAVEL moist, brown SILTY CLAY moist, dark brown, trace rocks	
1–2 / 0–1		BH12-61 (2-4)		0	1	74%		orange to brown, trace rocks	80.00
2–3 / 1		BH12-61 (4-6)		0	1	100%		moist, light brown to grey, dense	79.00
3–4 / 1–2		BH12-104 (6-8)		0	14	100%		soft	
3 / 2		BH12-61 (8-9)		0	29	87%		dark grey, extreme odour	78.00
3–4 / 2		BH12-61 (9-10)		0	17	87%		light grey to olive, trong odour	
4 / 2–3								Refusal at 3.35m bgs	77.00

Top of Riser Elev.= 80.52 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-61A

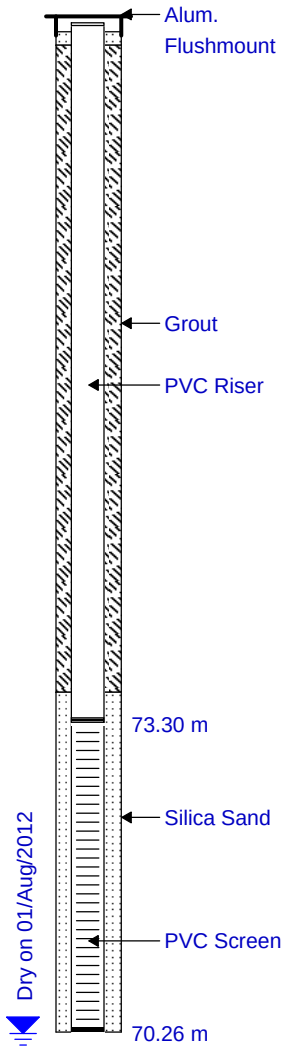
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 31 July 2012
Site Datum: Geodetic

SLE Supervisor: E. Kelly
Drilling Method: Air Rotary
Borehole Diameter: 84 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: N/A

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	80.44
0–13 / 0–4	-	-		-	-	-		Soil Lithology/Sampling not conducted.	79.00 – 78.00 – 77.00
13–33 / 4–10	-	-		-	-	-		LIMESTONE	76.00 – 75.00 – 74.00 – 73.00 – 72.00 – 71.00
33 / 10								End of Borehole at 10.1 m bgs.	70.00

Top of Riser Elev.= 80.34 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-61B

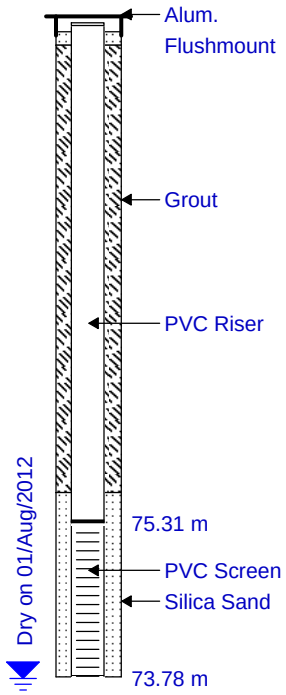
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 31 July 2012
Site Datum: Geodetic

SLE Supervisor: E. Kelly
Drilling Method: Air Rotary
Borehole Diameter: 84 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: N/A

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.40
0–4 / 0–1	-	-		-	-	-		Soil Lithology/Sampling not conducted.	79.00
4–8 / 1–2	-	-		-	-	-			78.00
8–12 / 2–3									77.00
12–16 / 3–4									76.00
16–20 / 4–5	-	-		-	-	-		LIMESTONE	75.00
20–24 / 5–6									74.00
24–28 / 6–7								End of Borehole at 6.55 m bgs.	73.00
28–32 / 7–8									72.00
32–35 / 8–10									71.00
									70.00

Top of Riser Elev.= 80.24 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-77

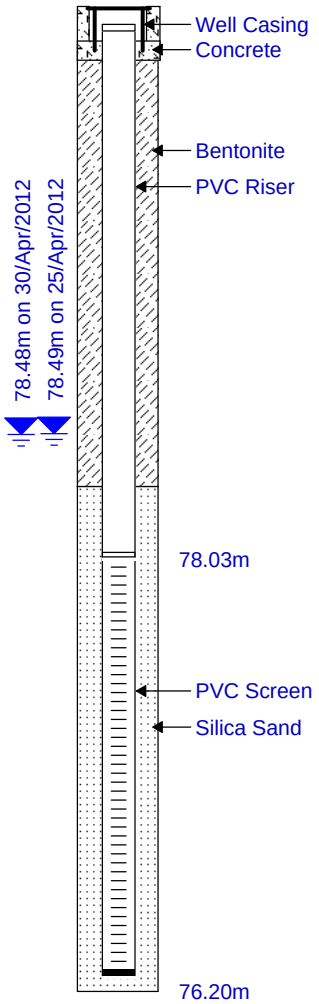
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 18 April 2012
Site Datum: Geodetic

SLE Supervisor: Brian S.
Drilling Method: HSA
Borehole Diameter: 250 mm
Monitoring Well Diameter: 50 mm

Drilling Company: Downing`
Drilling Equipment: CME 55 Truckmount
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.29
0 – 1 / 0	3 6 12 10	BH12-77 (0-2)		60	0	40%		TOPSOIL SAND AND GRAVEL FILL dry, brown	80.00
2 – 3 / 1	4 8 8 4	BH12-77 (2-4)		70	0	25%			
4 – 5 / 1	4 3 4 8	BH12-77 (4-6)		65	0	50%		SILTY SAND moist, brown	79.00
6 – 7 / 2	10 11 13 15	BH12-77 (6-8)	◆	65	0	100%		CLAY moist, grey/brown, stiff	78.00
8 – 9 / 2	5 8 10 13	BH12-77 (8-10)	◆	65	4	100%		firm to soft SILTY SAND solvent odor	
10 – 11 / 3	50 for 127 mm	BH12-77 (10-11)		60	0	5%		SAND traces of rock	77.00
12 – 13 / 4	50 for 127 mm	BH12-77 (12-14)		-	-	10%		LIMESTONE	
14 – 15								Refusal at 4.2 m bgs	76.00

Top of Riser Elev.= 80.18 m ald



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-92A

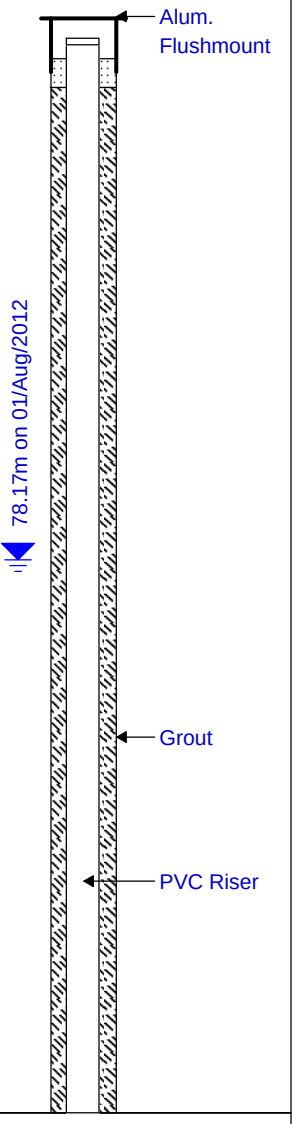
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 9 August 2012
Site Datum: Geodetic

SLE Supervisor: Emily V./E. Kelly
Drilling Method: Direct-Push/Air Rotary
Borehole Diameter: 83 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe/Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: RKI Eagle/MiniRae

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	80.47
1	-	BH-12-92A (0-2)		5	0.9	53%		SAND AND GRAVEL FILL light brown and grey	
2								SAND coarse	80.00
3 / 1								CLAYEY SILT black, compact	
4		BH-12-92A (2-4)		0	0.2	53%		olive, compact	
5									79.00
6		BH-12-92A (4-6)		5	0	95%		black and olive SAND coarse	
7 / 2								SAND AND GRAVEL FILL SILTY CLAY moist, grey with orange streaks, trace pebbles, compact to soft	
8									78.00
9		BH-12-92A (6-8)		5	0	95%		TILL (SILT, SAND, CLAY) wet	
10 / 3		BH-12-92A (8-9)		5	0	52%		CLAYEY SILT black and olive	
		BH-12-92A (9-10)		0	0	52%			
11								SILTY CLAY grey with orange streaks, pebbles	77.00
12								TILL (SILT, SAND, CLAY) wet, light brown with semi-rounded pebbles, soft	
13 / 4								Limestone	
14									
15									76.00

Top of Riser Elev.= 80.40 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

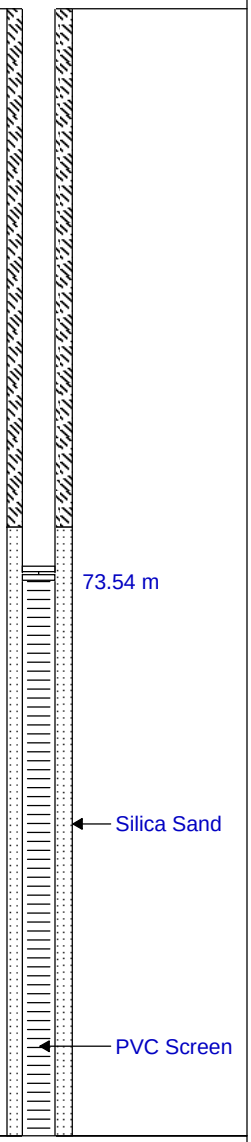
Borehole/Monitoring Well ID: BH/MW12-92A

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 9 August 2012
Site Datum: Geodetic

SLE Supervisor: Emily V./E. Kelly
Drilling Method: Direct-Push/Air Rotary
Borehole Diameter: 83 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe/Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: RKI Eagle/MiniRae

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
16								Limestone	
17	5								
18									75.00
19									
20	6								
21									74.00
22									
23	7								
24									
25									73.00
26	8								
27									
28									72.00
29	9								
30									



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

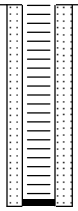
Borehole/Monitoring Well ID: BH/MW12-92A

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 9 August 2012
Site Datum: Geodetic

SLE Supervisor: Emily V./E. Kelly
Drilling Method: Direct-Push/Air Rotary
Borehole Diameter: 83 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe/Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: RKI Eagle/MiniRae

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
31								Limestone	71.00
32									
33	10							End of Borehole at 9.98 m bgs.	
34									70.00
35									
36	11								
37									
38									69.00
39									
40	12								
41									68.00
42									
43	13								
44									67.00
45									



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole ID: BH12-92A

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 9 August 2012
Site Datum: Geodetic

SLE Supervisor: Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe
OVM: RKI Eagle
PID: MiniRae

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	81.18
0 – 1 / 0		BH12-92A (0-2)		5 ppm	0.9 ppm	53%		SAND AND GRAVEL FILL light brown and grey	
								SAND coarse	
2 – 3 / 1		BH12-92A (2-4)		0 ppm	0.2 ppm	53%		CLAYEY SILT black, compact olive, compact	80.00
4 – 5 / 1		BH12-92A (4-6)		5 ppm	0 ppm	95%		back and olive SAND coarse SAND AND GRAVEL FILL	
6 – 7 / 2								SILTY CLAY moist. grey with orange streaks, trace papbbles, compact to soft	79.00
8 – 9 / 2		BH12-92A (6-8)		5 ppm	0 ppm	95%		TILL (SILT, SAND, CLAY) wet	
10 / 3		BH12-92A (8-9)		5 ppm	0 ppm	52%		CLAYEY SILT black and olive	78.00
10 – 11 / 3		BH12-92A (9-10)		0 ppm	0 ppm	52%		SILTY CLAY grey with orange streaks, pebbles	
12 – 13 / 4								TILL (SILT, SAND, CLAY) wet, light brown with semi-rounded pebbles, soft	
13 – 14 / 4								Refusal at 3.3m bgs	77.00
14 – 15									

(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

SNC·LAVALIN Environment

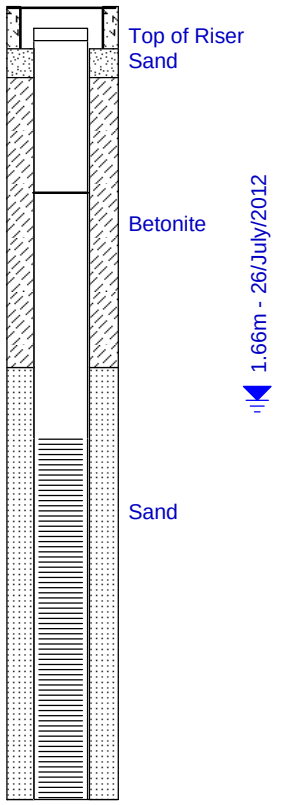
Borehole ID: BH12-94

Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 25 July 2012
Site Datum: Geodetic

SLE Supervisor: Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm

Drilling Company: Strata
Drilling Equipment: Geoprobe
OVM: RKI Eagle
PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.54
0		BH12-94 (0-2)				50%		ASPHALT SAND AND GRAVEL FILL dry, black dry, brown	80.00
3 / 1		BH12-94 (2-4)		15 ppm	9ppm	50%		SILTY CLAY moist, black-brown	
6 / 2		BH12-94 (4-6)	◆	55 ppm	9 ppm	85%		SITLY SAND AND GRAVEL moist, brown	79.00
8 / 9 / 3		BH12-94 (6-8)	◆	85 ppm	501 ppm	85%		CLAY wet, black stain, strong odour wet, dark grey, strong odour	78.00
10 / 11 / 12 / 13 / 4 / 14 / 15								Refusal at 3.05m bgs	77.00 76.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

The data represented in this borehole log requires interpretation by SNC-Lavalin Environment personnel. Third parties using this log do so at their own risk.

All elevations and locations are approximate.

◆ Sample submitted for laboratory analysis.

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-94

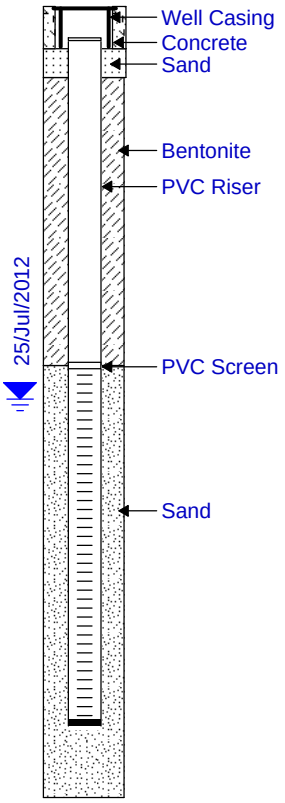
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 25 July 2012
Site Datum: Geodetic

SLE Supervisor: Emily V.
Drilling Method: Direct-Push
Borehole Diameter: 83 mm
Monitoring Well Diameter: 51mm (2")

Drilling Company: Strata
Drilling Equipment: Geoprobe
Well Casing:
Well Screen:
OVM/PID: RKI Eagle

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.71
0 – 1 ft		BH12-94 (0-2)				50%		ASPHALT SAND AND GRAVEL FILL dry, black	
1 – 2 ft								dry, brown	
2 – 3 ft		BH12-94 (2-4)		15	9	50%		SILTY CLAY moist, black to brown	80.00
3 – 4 ft									
4 – 5 ft		BH12-94 (4-6)	◆	55	9	85%		SILT, SAND AND GRAVEL moist, brown	79.00
5 – 6 ft									
6 – 7 ft		BH12-94 (6-8)	◆	85	501	85%		CLAY wet, black stain, strong odour	78.00
7 – 8 ft								dark grey, strong odour	
8 – 9 ft								Refusal at 3.05m bgs	
9 – 10 ft									77.00
10 – 11 ft									
11 – 12 ft									
12 – 13 ft									
13 – 14 ft									
14 – 15 ft									

Top of Riser Elev.= 80.52 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-95A

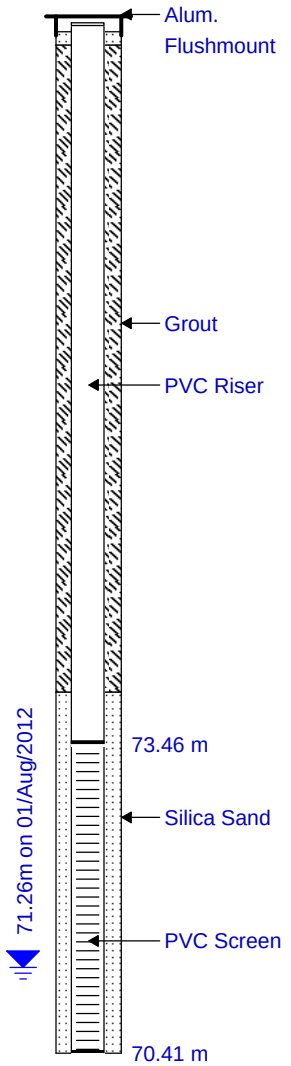
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 26 July 2012
Site Datum: Geodetic

SLE Supervisor: E. Kelly
Drilling Method: Air Rotary
Borehole Diameter: 84 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: N/A

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	80.67
0–12 / 0–3	-	-		-	-	-		Soil Lithology/Sampling not conducted.	80.00 – 77.00
13–33 / 4–10	-	-		-	-	-		Limestone	77.00 – 70.00
34 / 10								End of Borehole at 10.3 m bgs.	70.00

Top of Riser Elev.= 80.57 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN Environment

Borehole/Monitoring Well ID: BH/MW12-95B

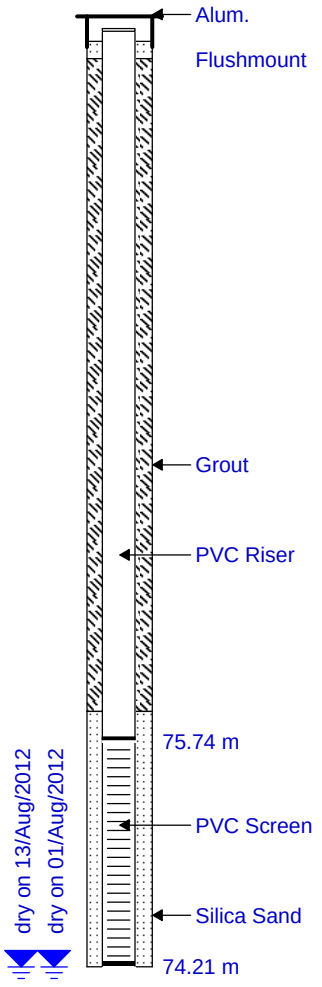
Project No.: 12-308
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: 27 July 2012
Site Datum: Geodetic

SLE Supervisor: E. Kelly
Drilling Method: Air Rotary
Borehole Diameter: 84 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geomachine
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 40 Slot 10 PVC
OVM/PID: N/A

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	80.66
0–12 / 0–3.5	-	-		-	-	-		Soil Lithology/Sampling not conducted.	80.66 – 77.00
12–21 / 3.5–6.5	-	-		-	-	-		Limestone Dry, brown/orange product present.	77.00 – 74.00
21 / 6.5								End of Borehole at 6.5 m bgs.	74.00

Top of Riser Elev.= 80.58 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

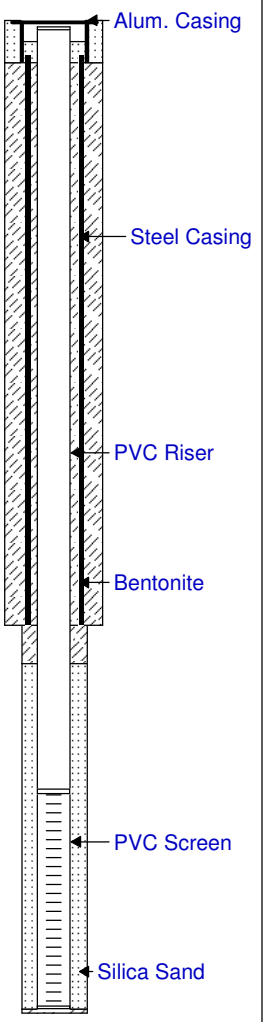
Borehole/Monitoring Well ID: MW14-26B

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 20/22, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 114 mm/89 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	0.00
								CONCRETE	
								Soil lithology/sampling not conducted.	
3 / 1									-1.00
6 / 2									-2.00
10 / 3									-3.00
13 / 4								BEDROCK (Limestone)	-4.00
16 / 5									-5.00
20 / 6									-6.00
23 / 7								End of Borehole at 7.0 m bgs	-7.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

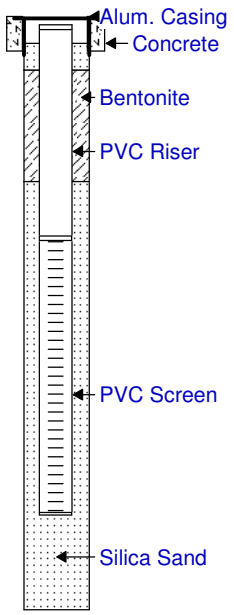
Borehole/Monitoring Well ID: MW14-107

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 10, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 152 mm
Monitoring Well Diameter: 51 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	0.00
								CONCRETE	
1								Soil lithology/sampling not conducted.	
2									
3 / 1									-1.00
4									
5									
6									
7 / 2									-2.00
8									
9									
10 / 3									-3.00
11								Refusal at 3.3 m bgs	
12									
13 / 4									-4.00
14									
15									
16 / 5									-5.00
17									
18									
19									
20 / 6									-6.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

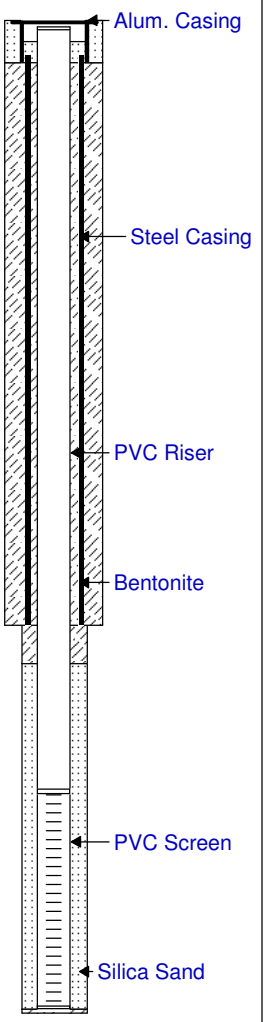
Borehole/Monitoring Well ID: MW14-107B

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 9/22, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 114 mm/89 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft / m								Ground Surface	0.00
								CONCRETE	
								Soil lithology/sampling not conducted.	-1.00
									-2.00
									-3.00
									-4.00
								BEDROCK (Limestone)	-5.00
									-6.00
								End of Borehole at 7.0 m bgs	-7.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

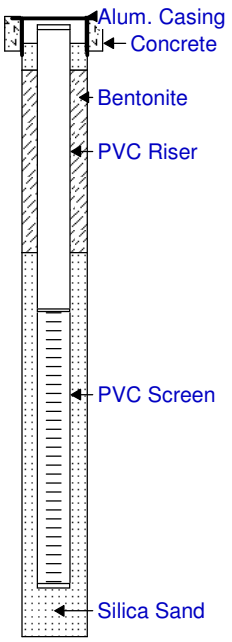
Borehole/Monitoring Well ID: MW14-108

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 10, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 152 mm
Monitoring Well Diameter: 51 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft / m								Ground Surface	0.00
								CONCRETE	
								Soil lithology/sampling not conducted.	
								Refusal at 3.5 m bgs	-1.00
									-2.00
									-3.00
									-4.00
									-5.00
									-6.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

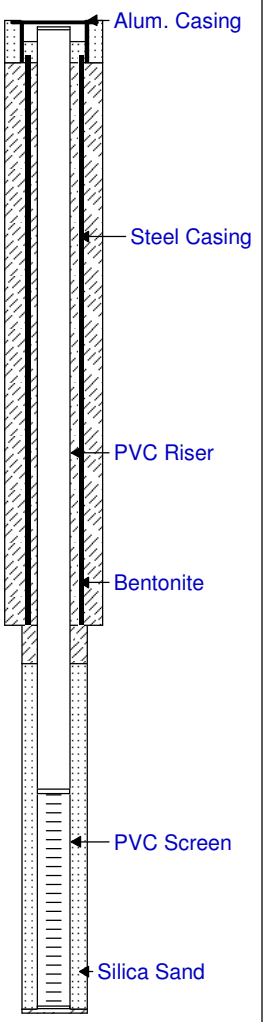
Borehole/Monitoring Well ID: MW14-108B

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 9/22, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 114 mm/89 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft / m								Ground Surface	0.00
								CONCRETE	
								Soil lithology/sampling not conducted.	-1.00
									-2.00
									-3.00
									-4.00
								BEDROCK (Limestone)	-5.00
									-6.00
								End of Borehole at 7.0 m bgs	-7.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

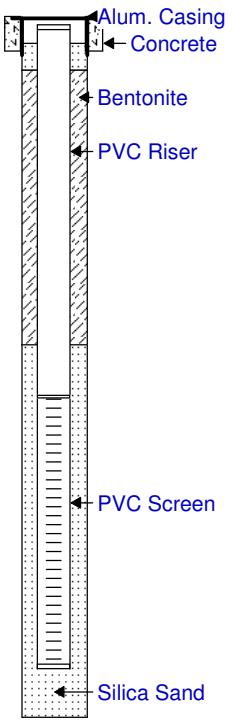
Borehole/Monitoring Well ID: MW14-109

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 9, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 152 mm
Monitoring Well Diameter: 51 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: Geoprobe 7822DT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	0.00
								CONCRETE	
1								Soil lithology/sampling not conducted.	
2									
3 / 1									-1.00
4									
5									
6 / 2									-2.00
7									
8									
9 / 3									-3.00
10									
11									
12 / 4									-4.00
13								Refusal at 4.0 m bgs	
14									
15 / 5									-5.00
16									
17									
18 / 6									-6.00
19									
20									



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

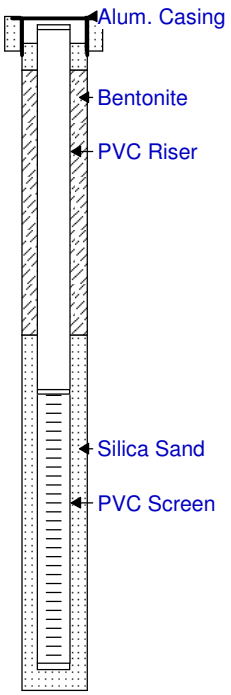
Borehole/Monitoring Well ID: MW14-118

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: February 8, 2014
Site Datum: Geodetic

SLI Supervisor: Eric K.
Drilling Method: Air Percussion
Borehole Diameter: 114 mm
Monitoring Well Diameter: 51 mm

Drilling Company: Strata Soil Inc.
Drilling Equipment: GeoMachine 100 GT
Well Casing: 152 mm Alum. Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
0 / 0								Ground Surface	0.00
								SAND AND GRAVEL FILL	
1								Soil lithology/sampling not conducted.	
2									
3 / 1									-1.00
4									
5									
6									
7 / 2									-2.00
8									
9									
10 / 3									-3.00
11									
12									
13 / 4								Refusal at 3.8 m bgs	-4.00
14									
15									
16 / 5									-5.00
17									
18									
19									
20 / 6									-6.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

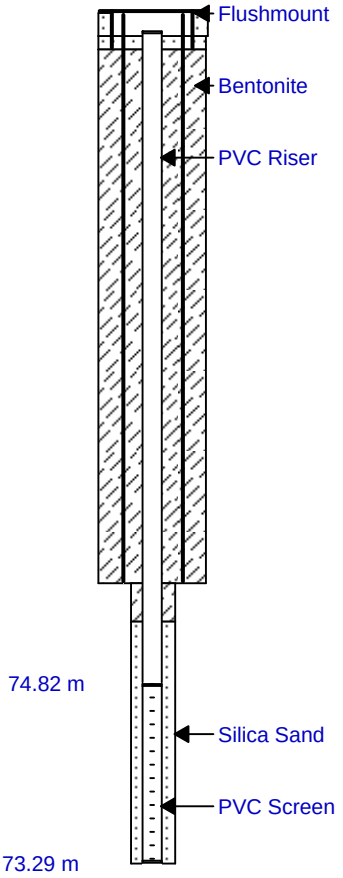
Borehole/Monitoring Well ID: MW14-123B

Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: November 7, 2014
Site Datum: Geodetic

SLI Supervisor: Alex B.
Drilling Method: HSA/DHH
Borehole Diameter: 203 mm/96 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Downing Drilling Ltd.
Drilling Equipment: CME 55 Truckmount
Well Casing: Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft / m								Ground surface (elev.) = 80.48 m Top of riser (elev.) = 80.33 m	
								Ground Surface	80.48
								CONCRETE	
								Soil lithology/sampling not conducted.	80.00
									79.00
									78.00
									77.00
									76.00
								BEDROCK (limestone)	75.00
									74.00
								End of Borehole at 7.2 m bgs	73.00



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

Borehole/Monitoring Well ID: MW14-124B

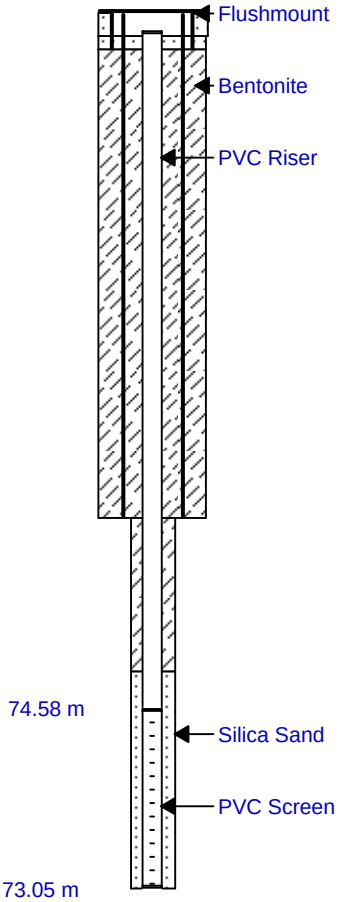
Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: November 10, 2014
Site Datum: Geodetic

SLI Supervisor: Alex B.
Drilling Method: HSA/DHH
Borehole Diameter: 203 mm/96 mm
Monitoring Well Diameter: 38 mm

Drilling Company: Downing Drilling Ltd.
Drilling Equipment: CME 55 Truckmount
Well Casing: Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
ft / m								Ground Surface	80.47
								Soil lithology/sampling not conducted.	80.00
									79.00
									78.00
									77.00
								BEDROCK (limestone)	76.00
									75.00
									74.00
								End of Borehole at 7.4 m bgs	73.00

Ground surface (elev.) = 80.47 m
Top of riser (elev.) = 80.32 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis

SNC·LAVALIN

Borehole/Monitoring Well ID: MW14-127

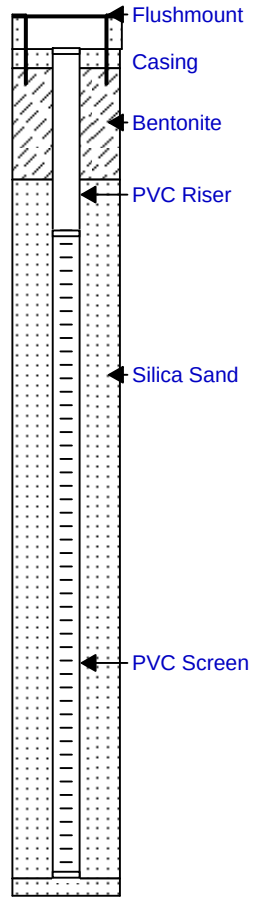
Project No.: 617555
Client: Defence Construction Canada
Location: CFB Trenton, Trenton, ON
Date Completed: November 6, 2014
Site Datum: Geodetic

SLI Supervisor: Chris R.
Drilling Method: HSA
Borehole Diameter: 203 mm
Monitoring Well Diameter: 51 mm

Drilling Company: Downing Drilling Ltd.
Drilling Equipment: CME 55 Truckmount
Well Casing: Flushmount
Well Screen: Schedule 10 Slot 40 PVC
OVM/PID: na

DEPTH (ft / m)	BLOW COUNT (1)	SAMPLE ID	LOCATION	OVM (2)	PID (3)	RECOVERY (%)	GRAPHIC LOG	DESCRIPTION	ELEVATION (m)
								Ground Surface	80.26
								ASPHALT	
								GRAVEL FILL.	80.00
0–1 / 0	13, 21 17, 8	BH14-127-1 (0-2)		<5	-	25%		GRAVELLY SAND dry, dark brown	
2–3 / 1	6, 6 6, 5	BH14-127-2 (2-4)		<5	-	29%		SANDY SILT moist, dark brown, some gravel	
4–5 / 1–2	3, 4 5, 8	BH14-127-3 (4-6)		<5	-	67%		CLAYEY SILT moist to wet, olive	79.00
6–7 / 2	10, 15 15, 19	BH14-127-4 (6-8)		<5	-	92%			78.00
8–9 / 2–3	3,6 12, 6	BH14-127-5 (8-10)		<5	-	100%		SANDY SILT wet, olive, with gravel (VOC odour)	
10–11 / 3	50 per 5"	BH14-127-6 (10-12)		<5	-	0%		boulder at 3.05 m bgs; no recovery	77.00
12 / 3–4	50 per 3"	BH14-127-7 (12)		<5	-	12%		SANDY SILT wet, olive, some clayey silt	76.80 m
13–15 / 4								Refusal at 3.7 m bgs	76.00

Ground surface (elev.) = 80.46 m
Top of riser (elev.) = 80.32 m



(1) Blow count per 0.15 m using conventional hammer and split spoons
(2) Organic Vapour Meter (OVM) reading (ppmv unless noted)
(3) Photo Ionization Detector (PID) reading (ppmv)

All elevations and locations are approximate.

Monitoring well equipped with dedicated inertial foot valve and polyethylene tubing for sampling.

◆ = Sample submitted for laboratory analysis