

**RESPONSES TO DECEMBER 16, 2011 COMMENTS FROM MOE REGARDING
CRA'S DESIGN AND OPERATIONS REPORT, DATED DECEMBER 8, 2011
WOOLWICH BIO-EN INC. FACILITY
ELMIRA, ONTARIO**

Comment 1:

Page 24 – 4th paragraph

The report provides some information about the proposed transformer spill containment area. The information provided is insufficient and does not meet the MOE requirements for a transformer substation spill containment area. In order to comply with the requirements of the Ontario Water Resources Act (OWRA) for establishing a sewage works, I am offering you the following options for your consideration. The option that Woolwich Bio-En chooses will be included as a condition of Woolwich Bio-En's REA document, should the Director's decision be in favour of approving the facility. Two options are: [options removed]

Response 1:

Bio-En accepts Option 1 as a condition of the REA document.

Comment 2:

Page 32, under Sections 64 and 65 of O. Reg. 267/03 – 1st paragraph.

The report states that soil samples were collected immediately adjacent to boreholes BH-3, BH-4, and BH-5 immediately below the proposed base elevation of the tanks of 360 m AMSL.

- i. Location of the new boreholes has not been identified in any of the diagrams provided with either D&O report or the Geotechnical Investigation report. Please provide a diagram that shows the location of these boreholes and also provide their borehole logs.*
- ii. Since the proposed tanks will be made of reinforced concrete, section 65(1) (a) of O. Reg. 267/03 requires that a site characterization study that consists of a stage one hydrogeologic or geotechnical investigation of the site of the proposed facility should be carried out to identify the soil types and the presence of any aquifer or bedrock, all to a depth of at least 1.5 metres below the lowest elevation of the excavation required for a structure made of concrete. However, according to both the D&O report and Geotechnical Investigation report, soil samples were collected immediately below the proposed elevation of the tanks of 360m AMSL. Please confirm if samples collected meet section the requirements of 65(1)(a) of O. Reg. 267/03 as identified above.*

Response 2:

- i. The locations of the boreholes (BH-3, BH-4, and BH-5) advanced by CRA on October 6, 2011 were completed immediately adjacent to the CVD boreholes of the same nomenclature. The purpose of the CRA boreholes was to collect soil samples for additional geotechnical parameters (grain size distribution including hydrometer, and permeability testing). Soil samples had been collected by CVD for total silt and clay content without the hydrometer component to differentiate between the silt and clay content.

Specific CRA borehole location identifiers were not generated since the boreholes were completed directly adjacent to the corresponding previously completed borehole by CVD.

Notwithstanding this, all CRA borehole locations references will be amended with an "A" (e.g., "BH-5A") to indicate they were completed at a different, although very close proximity locations.

Figures and references are revised to show the location nomenclature (e.g., "BH-5/BH-5A") to indicate both CVD and CRA boreholes were completed at this location. These figures are provided in Attachment 1 and are included in the revised Geotechnical Report.

Borehole logs for boreholes BH-3A, BH-4A, and BH-5A, completed immediately adjacent to boreholes BH-3, BH-4, and BH5 are provided in Attachment 1 and in the revised Geotechnical Report.

- ii. Boreholes BH-3A, BH-4A, and BH-5A were completed immediately adjacent to boreholes BH-3, BH-4, and BH-5 for the sole purpose of collecting the additional geotechnical data, namely the Shelby tubes and hydrometer (clay) portion of the grain-size distribution data. Boreholes BH-3, BH-4, and BH-5 provide site characterization data to depths of 12.1 m, 9.4 m and 9.7 m below the lowest elevation of the excavation required for a structure made of concrete.

One Shelby tube sample was collected from each location, BH-3A, BH-4A, and BH-5A at depths of 2.5 m, 3.5 m, 2.0 m, respectively. One soil sample was also collected in a split-spoon sampler at depths below the Shelby tube at each of the borehole locations BH-3A (3.0-3.6 m), BH-4A (4.0-4.6 m), and BH-5A (2.5-3.1 m) and analyzed for grain size distribution including hydrometer to separate and quantify the amount silt and clay.

At BH 3/BH-3A the characterization study extended to a minimum depth of 12.1 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No underlying aquifer or bedrock were encountered to a depth of at least 12.1 m below the lowest elevation of the excavation required for a structure made of concrete.

At BH 4/BH-4A the characterization study extended to a minimum depth of 9.4 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No underlying aquifer or bedrock were encountered to a depth of at least 9.4 m below the lowest elevation of the excavation required for a structure made of concrete.

At BH 5/BH-5A the characterization study extended to a minimum depth of 9.7 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No underlying aquifer or bedrock were encountered to a depth of at least 9.7 m below the lowest elevation of the excavation required for a structure made of concrete.

All the samples collected meet the requirements of 65(1)(a) of O. Reg. 267/03.

Comment 3:

Page 4 – top of the page – As identified in item 2 above, section 65(1) (a) of O. Reg. 267/03 requires that a site characterization study should be carried out to identify the soil types and the presence of any aquifer or bedrock, all to a depth of at least 1.5 metres below the lowest elevation of the excavation required for a structure made of concrete. However, the depths of samples collected from BH-3, BH4, and BH-5, corresponding to 360 metres AMSL is from 2.5 m, 3.5 m, and 2.0 m bellow surface grade, respectively. Please confirm if samples collected meet section the requirements of 65(1)(a) of O. Reg. 267/03 as identified above.

Response 3:

As noted in the Response to Comment No. 2, boreholes BH-3A, BH-4A, and BH-5A were completed immediately adjacent to boreholes BH-3, BH-4, and BH-5 for the sole purpose of collecting the additional geotechnical data, namely the Shelby tubes and hydrometer (clay) portion of the grain-size distribution data. Boreholes BH-3, BH-4, and BH-5 provide site characterization data to depths of 12.1 m, 9.4 m and 9.7 m below the lowest elevation of the excavation required for a structure made of concrete.

One Shelby tube sample was collected from each location, BH-3A, BH-4A, and BH-5A at depths of 2.5 m, 3.5 m, 2.0 m, respectively. One soil sample was also collected in a split-spoon sampler at depths below the Shelby tube at each of the borehole locations BH-3A (3.0-3.6 m), BH-4A (4.0-4.6 m), and BH-5A (2.5-3.1 m) and analyzed for grain size distribution including hydrometer to separate and quantify the amount silt and clay.

At BH-3/BH-3A the characterization study extended to a minimum depth of 12.1 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No underlying aquifer or bedrock were encountered to a depth of at least 12.1 m below the lowest elevation of the excavation required for a structure made of concrete.

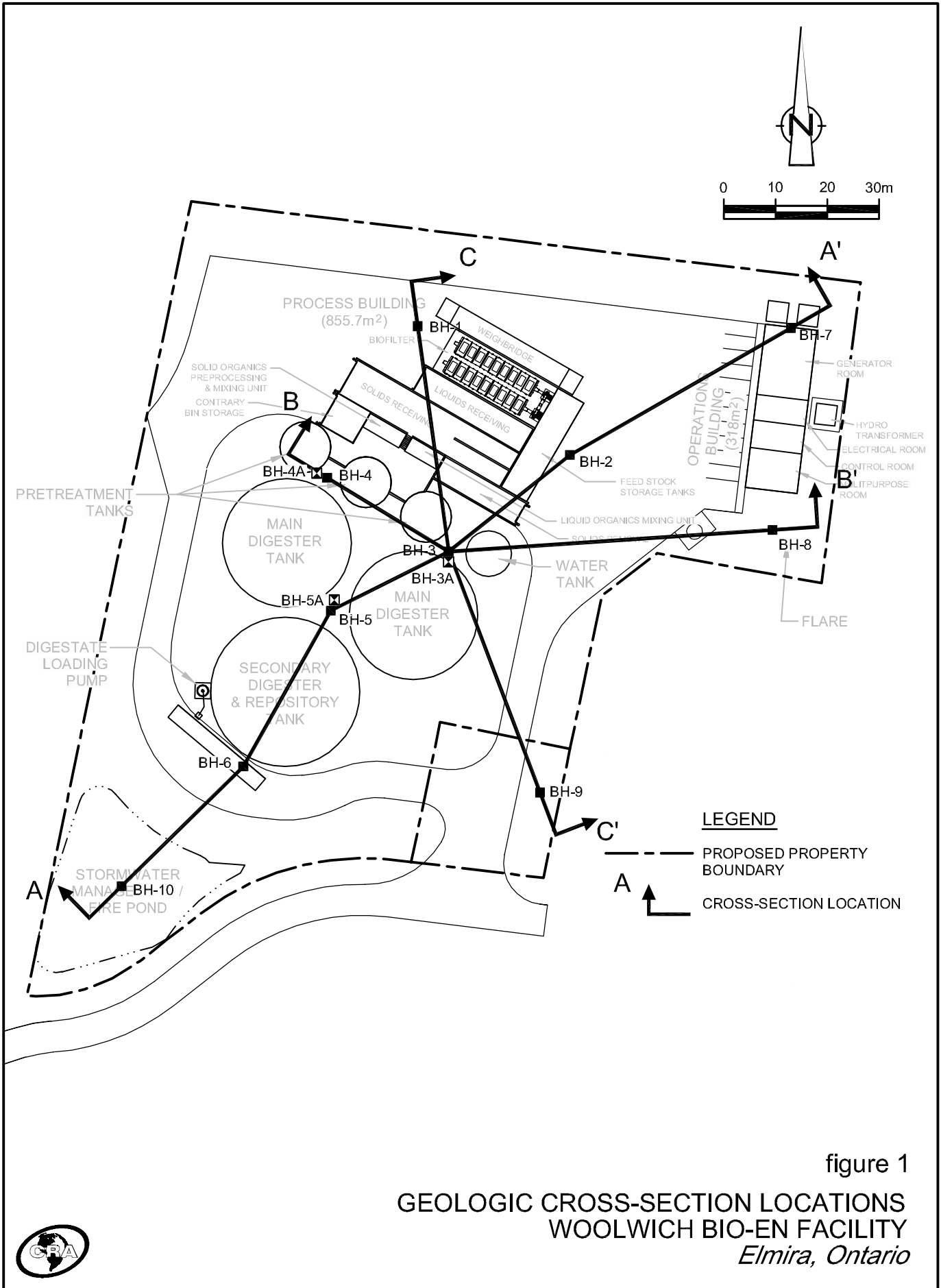
At BH-4/BH-4A the characterization study extended to a minimum depth of 9.4 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No

underlying aquifer or bedrock were encountered to a depth of at least 9.4 m below the lowest elevation of the excavation required for a structure made of concrete.

At BH-5/BH-5A the characterization study extended to a minimum depth of 9.7 m below the lowest elevation (360 m AMSL) of the excavation required for a structure made of concrete. No underlying aquifer or bedrock were encountered to a depth of at least 9.7 m below the lowest elevation of the excavation required for a structure made of concrete.

All the samples collected meet the requirements of 65(1)(a) of O. Reg. 267/03.

ATTACHMENT 1



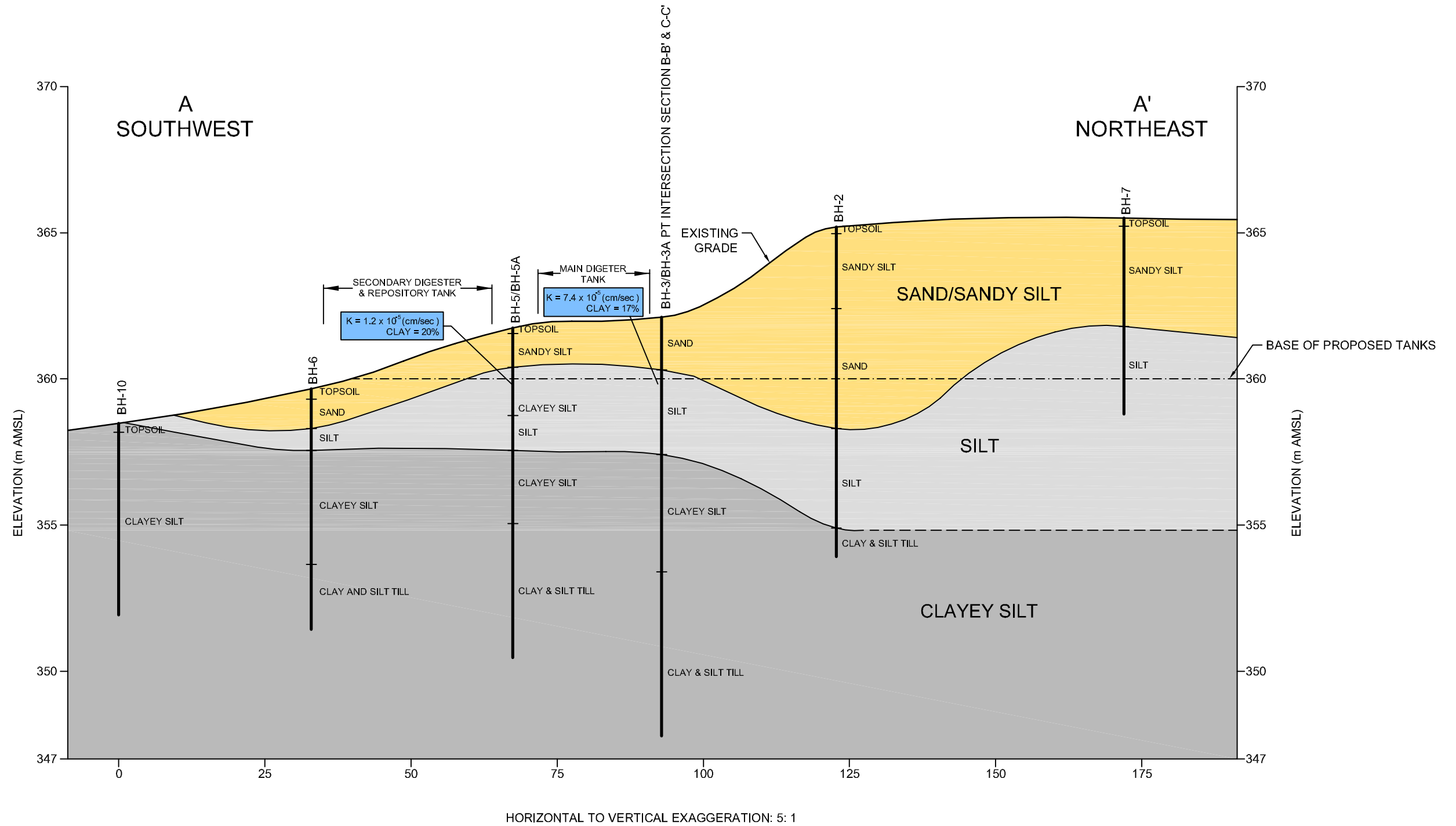


figure 2
GEOLOGIC CROSS-SECTION A-A'
WOOLWHICH BIO-EN FACILITY
Elmira, Ontario



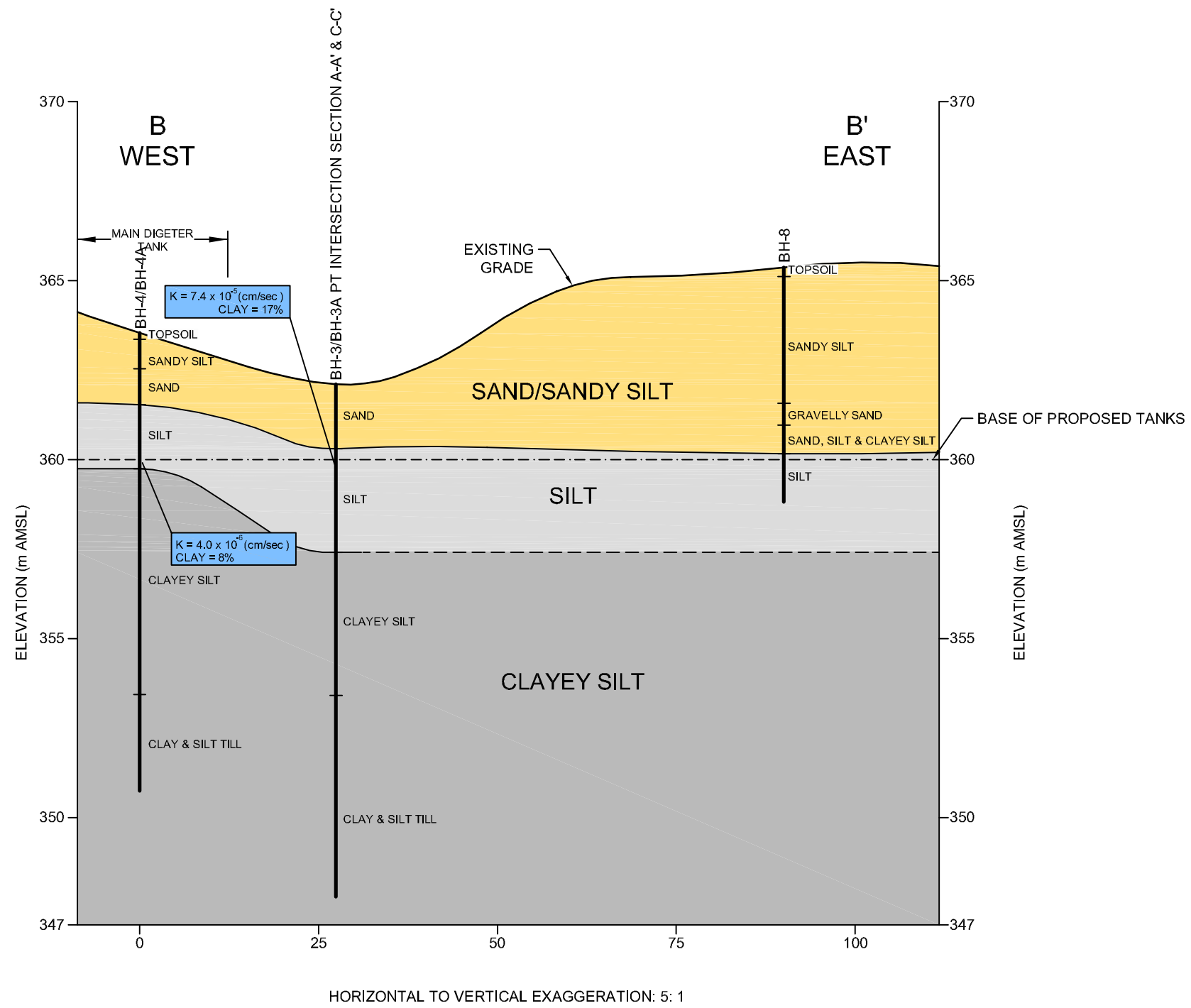


figure 3
 GEOLOGIC CROSS-SECTION B-B'
 WOOLWICH BIO-EN FACILITY
 Elmira, Ontario



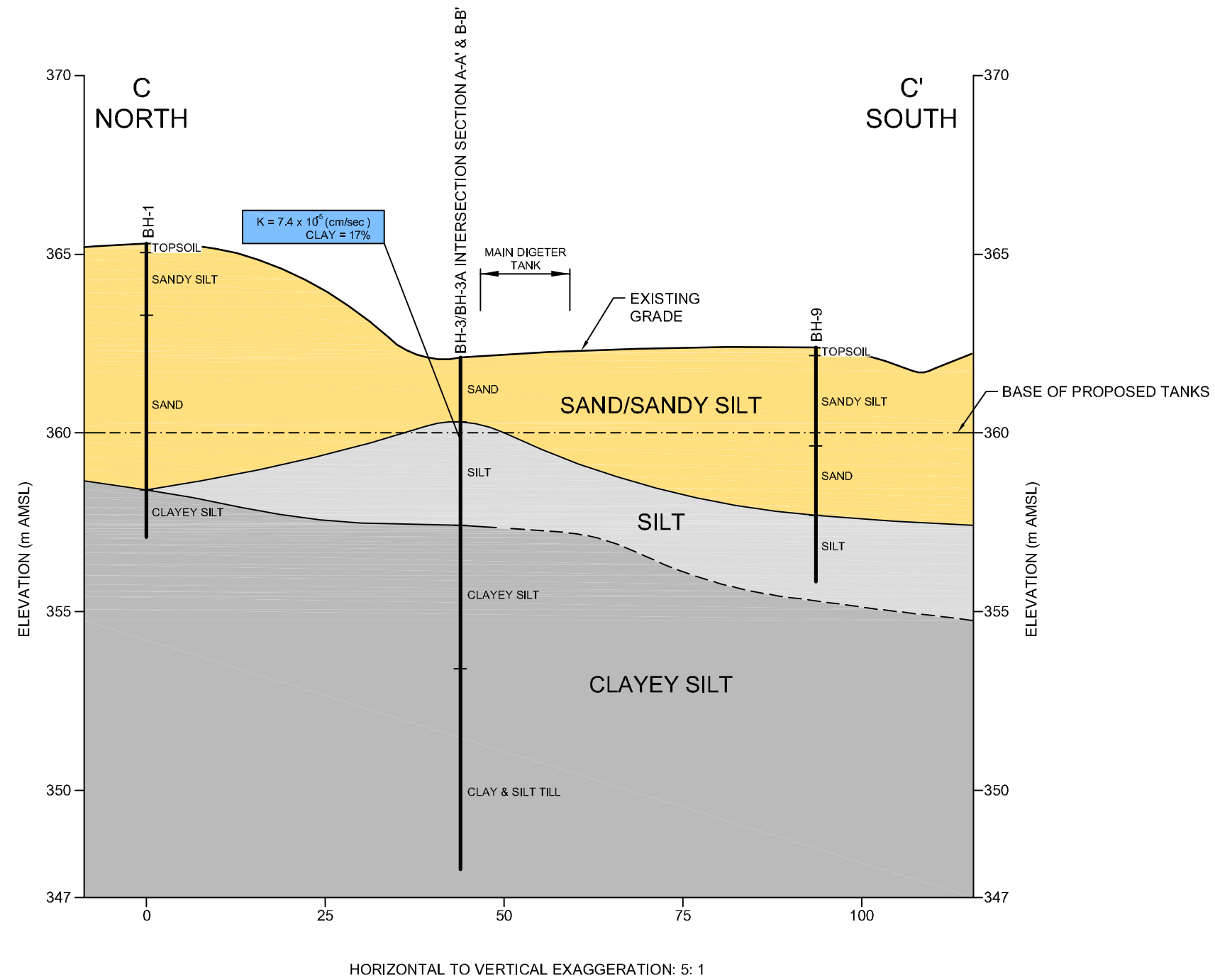


figure 4
 GEOLOGIC CROSS-SECTION C-C'
 WOOLWICH BIO-EN FACILITY
 Elmira, Ontario

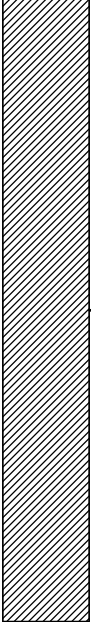




STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: BIO-EN Inc. Facility
 PROJECT NUMBER: 046254
 CLIENT: BIO-EN Inc. Facility
 LOCATION: Elmira, Ontario

HOLE DESIGNATION: BH-3A
 DATE COMPLETED: October 6, 2011
 DRILLING METHOD: Geoprobe
 FIELD PERSONNEL: R. Waller

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Borehole	SAMPLE			
				NUMBER	INTERVAL	REC (%)	N' VALUE
	GROUND SURFACE	362.10					
0.5	SP-SAND, fine to medium grained, compact, brown - trace silt, occasional gravel and cobbles at 0.50m BGS		 ← Bentonite	1	X		
1.0				2	X		
1.5	- damp to saturated at 1.50m BGS			3	X		
2.0	ML-SILT, compact, brown to grey	360.30		4	X		
2.5	- occasional sand and clayey lenses at 2.50m BGS			5	X		
3.0				6	█		
3.5		358.50		7	X		
	END OF BOREHOLE @ 3.60m BGS						

OVERBURDEN LOG 46254 - BH3, BH4, BH5.GPJ CRA_CORP.GDT 12/21/11

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GEOTECHNICAL ANALYSIS GRAIN SIZE ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: BIO-EN Inc. Facility
 PROJECT NUMBER: 046254
 CLIENT: BIO-EN Inc. Facility
 LOCATION: Elmira, Ontario

HOLE DESIGNATION: BH-4A
 DATE COMPLETED: October 6, 2011
 DRILLING METHOD: Geoprobe
 FIELD PERSONNEL: R. Waller

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Borehole	SAMPLE			
				NUMBER	INTERVAL	REC (%)	'N' VALUE
	GROUND SURFACE	363.50					
0.5	TOPSOIL SANDY SILT, loose, brown - some clay, trace gravel at 0.75m BGS - moist at 0.90m BGS	363.32	 ← Bentonite	1	X		
1.0	SP-SAND, very loose, brown - trace silt at 1.70m BGS - damp to moist at 1.90m BGS	362.50		2	X		
1.5				3	X		
2.0	ML-SILT, compact, brown - occasional clayey lenses at 2.50m BGS	361.50		4	X		
2.5				5	X		
3.0				6	X		
3.5	- moist to wet at 3.60m BGS			7	█		
4.0	CL-ML-CLAYEY SILT, stiff, grey - occasional sand and silt lenses at 4.50m BGS	359.70		8	X		
4.5	END OF BOREHOLE @ 4.60m BGS	358.90					

OVERBURDEN LOG 46254 - BH3, BH4, BH5.GPJ CRA_CORP.GDT 12/21/11

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GEOTECHNICAL ANALYSIS
 GRAIN SIZE ANALYSIS



STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: BIO-EN Inc. Facility
 PROJECT NUMBER: 046254
 CLIENT: BIO-EN Inc. Facility
 LOCATION: Elmira, Ontario

HOLE DESIGNATION: BH-5A
 DATE COMPLETED: October 6, 2011
 DRILLING METHOD: Geoprobe
 FIELD PERSONNEL: R. Waller

DEPTH m BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. m AMSL	Borehole	SAMPLE			
				NUMBER	INTERVAL	REC (%)	N' VALUE
	GROUND SURFACE	361.80					
0.5	TOPSOIL MLS-SANDY SILT, very loose, brown - some clay, trace gravel at 0.65m BGS - moist to wet at 1.00m BGS	361.60		1	X		
1.0				2	X		
1.5	CL-ML-CLAYEY SILT, stiff, brown - occasional silt lenses at 1.75m BGS - moist to very moist at 2.00m BGS	360.45		3	X		
2.0				4	X		
2.5	- grey, wet at 2.50m BGS			5	█		
3.0	ML-SILT, compact, brown END OF BOREHOLE @ 3.10m BGS	358.80 358.70		6	X		

OVERBURDEN LOG 46254 - BH3, BH4, BH5.GPJ CRA_CORP.GDT 12/21/11

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

GEOTECHNICAL ANALYSIS
 GRAIN SIZE ANALYSIS

Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter

**Falling Head Raising Tail (Method C)
(ASTM D-5084)**

Project Name:	CRA Lab Testing Services
Project No.:	T050123-B1 (CRA # 046254)
Project Location:	15 Martins Lane, Elmira, Ontario (Woolwich Bio-En Inc.)
Client:	Conestoga Rovers & Associates

Sample Location and Type	BH 3 Shelby Tube
Date Sampled	6-Oct-11
Date Tested	10/7/2011-10/14/2011
Lab #	WLA 0072-1

Type of material	SILT
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Sample Parameters	Initial	Final
Diameter, cm	5.0	
Length, cm	4.9	
Dry Density, kg/m ³	1788	
Moisture, %	19.9	20.6

Permeation Condition		
Cell pressure	kPa	300.0
Head pressure	kPa	288.6
Back pressure	kPa	284.5
Volume under steady flow	cm ³	4.86
Hydraulic gradient, l	-	8.5

Hydraulic Conductivity:	<i>cm/s</i>	<i>7.4E-05</i>
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REPORTED BY: Michael Braverman
VERIFIED BY: Ali Nasser-Moghaddam, Ph.D., P.Eng.

DATE: October 19, 2011
DATE: October 19, 2011

Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter

**Falling Head Raising Tail (Method C)
(ASTM D-5084)**

Project Name:	CRA Lab Testing Services
Project No.:	T050123-B1 (CRA # 046254)
Project Location:	15 Martins Lane, Elmira, Ontario (Woolwich Bio-En Inc.)
Client:	Conestoga Rovers & Associates

Sample Location and Type	BH 4 Shelby Tube
Date Sampled	6-Oct-11
Date Tested	10/7/2011-10/14/2011
Lab #	WLA 0072-2

Type of material	SILT
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Sample Parameters	Initial	Final
Diameter, cm	5.0	
Length, cm	5.0	
Dry Density, kg/m ³	1627	
Moisture, %	21.1	17.6

Permeation Condition		
Cell pressure	kPa	300
Head pressure	kPa	287.8
Back pressure	kPa	281.8
Volume under steady flow	cm ³	6.01
Hydraulic gradient, l	-	12.2

Hydraulic Conductivity:	<i>cm/s</i>	<i>4.0E-06</i>
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REPORTED BY: Michael Braverman
VERIFIED BY: Ali Nasser-Moghaddam, Ph.D., P.Eng.

DATE: October 19, 2011
DATE: October 19, 2011

Measurement of Hydraulic Conductivity of Saturated Porous Material Using a Flexible Wall Permeameter

**Falling Head Raising Tail (Method C)
(ASTM D-5084)**

Project Name:	CRA Lab Testing Services
Project No.:	T050123-B1 (CRA # 046254)
Project Location:	15 Martins Lane, Elmira, Ontario (Woolwich Bio-En Inc.)
Client:	Conestoga Rovers & Associates

Sample Location and Type	BH 5 Shelby Tube
Date Sampled	6-Oct-11
Date Tested	10/7/2011-10/14/2011
Lab #	WLA 0072-3

Type of material	SILT
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Sample Parameters	Initial	Final
Diameter, cm	5.0	
Length, cm	5.2	
Dry Density, kg/m ³	1803	
Moisture, %	22.5	17.1

Permeation Condition		
Cell pressure	kPa	300
Head pressure	kPa	288.0
Back pressure	kPa	281.0
Volume under steady flow	cm ³	8.28
Hydraulic gradient, l	-	13.7

Hydraulic Conductivity:	cm/s	1.2E-05
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REPORTED BY: Michael Braverman
VERIFIED BY: Ali Nasseri-Moghaddam, Ph.D., P.Eng.

DATE: October 19, 2011
DATE: October 19, 2011