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telephone (519) 357-1521 **fax** (519) 357-3624 **web** www.rjburnside.com

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September 9, 2021

Via: Email <pws@acwtownship.ca>

Mr. Thomas McCarthy, C.E.T
Public Works Superintendent
Township of Ashfield-Colborne-Wawanosh
82133 Council Line, RR5
Goderich ON N7A 3Y2

Dear Mr. McCarthy:

Re: Guideline D-4 Study for 36651 Glen's Hill Road
Dungannon, Ontario
Project No.: 300053662.0000

1.0 Introduction

Further to our initial email correspondence on May 18, 2021 and your signed Authorization to Proceed dated June 15, 2021, R.J. Burnside & Associates Limited (Burnside) is pleased to provide a summary of the Guideline D-4 Study for the approximately 40.75 ha (100 ac) property at 36651 Glen's Hill Road, Dungannon, Township of Ashfield-Colborne-Wawanosh, Huron County ON (Site). The Site is located adjacent to the active Ashfield Landfill Site (Landfill). Refer to Figure 1 for location details.

It is our understanding that you wish to license the Site as a gravel pit and, due to the proximity of the Landfill, the Township of Ashfield-Colborne-Wawanosh (Township) Official Pan has development requirements. The Official Plan, Last Revised July 2021, Section 9.10 Waste Management states: "Proposed development within 500 metres of an active or closed landfill site will require a contaminant migration study and impact mitigation study completed by a qualified professional to the satisfaction of the Township."

The Township requires a D-4 Study be completed prior to any future development of the property given that it is within 500 m of an active landfill.

It is assumed that Site aggregate operations will not include washing or extracting aggregate below the water table. If this is not the case then the impacts of future Site operations such as installation of wash ponds, settling ponds, water supply wells, or aggregate extraction below the water table will have to be assessed in the context of the adjacent Landfill.

2.0 Scope of Work

2.1 Purpose

The purpose of this D-4 Study is to assess the potential for impacts related to the Landfill to affect the Site in accordance with the Ministry of Environment, Conservation and Parks (MECP) Guideline D-4: Land Use on or Near Landfills and Dumps.

This study incorporates both a desktop evaluation and inspection of the Site to determine the potential for impacts from the Landfill on the Site. The information has been used to:

- Assess whether the Site is within the Landfill impact zones for groundwater, surface water, landfill gas, and/or nuisance impacts (odours); and,
- Assess the potential for the Landfill to impact the Site while taking into consideration groundwater flow, surface water drainage, topography, soils, depth to water table, landfill gas migration, noise, wind, and nuisance impacts.

2.2 Site Inspection

An inspection of the Site was conducted on August 5, 2021. Site conditions were noted such as topography, drainage, surface cover and vegetation and general position of the Site relative to the landfill. Photographs taken during the inspection are included in Appendix A.

The inspection revealed the Site as an agricultural lot. Ground surface on the eastern side of the Site was generally flat and dipped westerly in the forested area. The overall drainage (surface water and shallow groundwater) is inferred to be directed westerly with a slight southwesterly trend toward Nine Mile River. The waste fill area of the Landfill is a visible mound above surrounding ground surface that can be seen from the Site. Blown litter was not observed between the fill area and the Site, there were no odours or stressed vegetation visible. A large flock of vultures was observed on the Landfill property.

2.3 Desktop Evaluation

The desktop evaluation considered:

- Geological and topographic mapping;
- MECP water well records;
- Historical air photos to assess historical Site alterations;
- Ashfield Landfill documents (e.g.: 2018 & 2019 Monitoring Report, Design and Operations Report, Hydrogeological Assessment, MECP Inspection Reports, MECP Comments);
- Interpreted groundwater/surface water flow directions;
- Soil and water table conditions;
- Wind directions; and
- Source Water Protection considerations.

The following information was collected regarding the active Ashfield Landfill, excerpts from the 2018 & 2019 Monitoring Report have been included as Appendix B:

- The active Ashfield Landfill operates under Environmental Compliance Approval (ECA) No. A161101 issued on May 2, 2012 and as amended by Notice No. 1 on April 19, 2016 is

located on Part Lot 10, Concession 6, East Division in the former Township of Ashfield (Ashfield Ward), Huron County (Appendix C);

- The Landfill is a rural municipal landfill that began accepting waste under a Plan of Development and Operation dated 1986, and has been monitored since 1989;
- The Site and Landfill are situated on limestone, dolostone and shale of the Dundee Formation[1]. Surficial Geology includes modern alluvial deposits along the Nine Mile River that flows through the middle of the Site, with glaciofluvial river deposits to the east and clay and silt till to the west. The Surficial Geology mapping is included on Figure 2 and cross-sections across the Landfill are included in Figure 3 and 4;
- Surface water (and shallow groundwater drainage) will follow the surface topography towards the middle of the Site eventually discharge into Nine Mile River and the surrounding wetland as shown in Figure 5;
- The depth to water table at the Site and Landfill is dictated by the topography of silt and clay soils below the surface sand and gravel. Based on the monitoring at the Landfill the water table is inferred to be roughly 10 m below the surface on the south end of the Site, and deeper towards the north;
- Groundwater below the Landfill is interpreted to flow west with a slight southwesterly trend towards the south part of the Site and discharge to Nine Mile River. Shallow groundwater monitoring for the Landfill identifies minor leachate impact at wells roughly 100 m east of the Site (OW5S and OW10S). The leachate is not interpreted to have left the landfill property. Since the Landfill is still active, the leachate plume can be expected to evolve as the position and composition of the waste changes over time. Surface water monitoring for the Landfill indicates that the Nine Mile River has not been impacted to date. Groundwater and surface water impacts from the landfill are not currently interpreted to be present at the Site;
- The Landfill is small with a relatively slow fill rate therefore methane gas generation would be minimal. Landfill gas travels from the waste fill area through the unsaturated soils. The depth to water table west of the fill area is approximately 0.3 to 2.1 m bgs. Landfill gas can travel 10 times the depth to water, therefore, the gas could migrate up to 21 m laterally.
- Landfill gas was not detected in the gas probes during the 2018 & 2019 reporting period. This suggests that very little horizontal migration of methane is occurring through the native soils and there is little risk to off-Site receptors at this time. It is expected that methane is venting out the side slopes of above grade fill areas. Landfill gas impacts are not currently interpreted to be at the Site;
- Nearby water supplies draw water from deep bedrock wells. The onsite well (3001843) and two neighbouring wells 3003606 and 3003826, are all 60 m deep and screened in the bedrock. It is therefore expected that a future water supply well drilled on Site would also be developed in a deep confined bedrock aquifer. (i.e., protected from surface activities such as landfilled waste). The well locations according to the MECP water well database are shown in Figure 1. A copy of nearby well records is included as Appendix D;
- Winds are predominately from the west with some variation, as such it is inferred that the Site is predominately upwind, not downwind of the Landfill (Appendix E); and,
- Waste is visible from the Site and vultures were noted on the landfill property during the Site visit. Landfill odours were not detected during the Site inspection.

[1] Ontario Geological Society, 2003. Surficial Geology of Southern Ontario (Map MRD128-revised)

3.0 Conclusions

The results of this investigation indicate that:

1. Groundwater, surface water, landfill gas and nuisance impacts from the active Ashfield Landfill Site are not currently affecting the Site at 36651 Glen's Hill Road.
2. Detailed Site-specific investigations such as drilling, well installation, water quality sampling, water level measurements, and gas readings are not required at this time given the monitoring history and ongoing monitoring program at the Landfill.

4.0 Recommendations

The following recommendations are presented based on the results of this investigation:

1. The Township should retain a qualified person to review the conclusions and recommendations presented in future Landfill Monitoring reports in the context of the Site and its future use as a gravel pit. The review would consider existing or potential future groundwater, surface water or landfill gas impacts at the Site to ensure that Landfill conditions do not change
2. It is assumed that Site aggregate operations will not include washing or extracting aggregate below the water table. If this is not the case then the impacts of future Site operations such as installation of wash ponds, settling ponds, water supply wells, or aggregate extraction below the water table will have to be assessed in the context of the Landfill.
3. As a precaution, any proposed buildings on Site should be equipped with methane gas detectors or equipped with proper ventilation to prevent gas build up in enclosed spaces.
4. No further Site-specific Guideline D-4 study is required at this time.
5. A copy of this letter report should be retained by the Township along with future development plans.

If you have any questions or require additional information, please feel free to contact the undersigned at your convenience.

Yours truly,

R.J. Burnside & Associates Limited

Alex Maenza, G.I.T.
Environmental Scientist
AM:tp

Kim Hawkes, P. Eng., B.E.S., QP_{ESA}
Project Engineer

Enclosure(s) Figures (Figures 1 to 5)
Appendix A: Site Photographs
Appendix B: 2018 & 2019 Monitoring Report Excerpts
Appendix C: Ashfield Landfill ESA
Appendix D: Water Well Records
Appendix E: Wind Rose

053662 D4 Study
09/09/2021 11:14 AM

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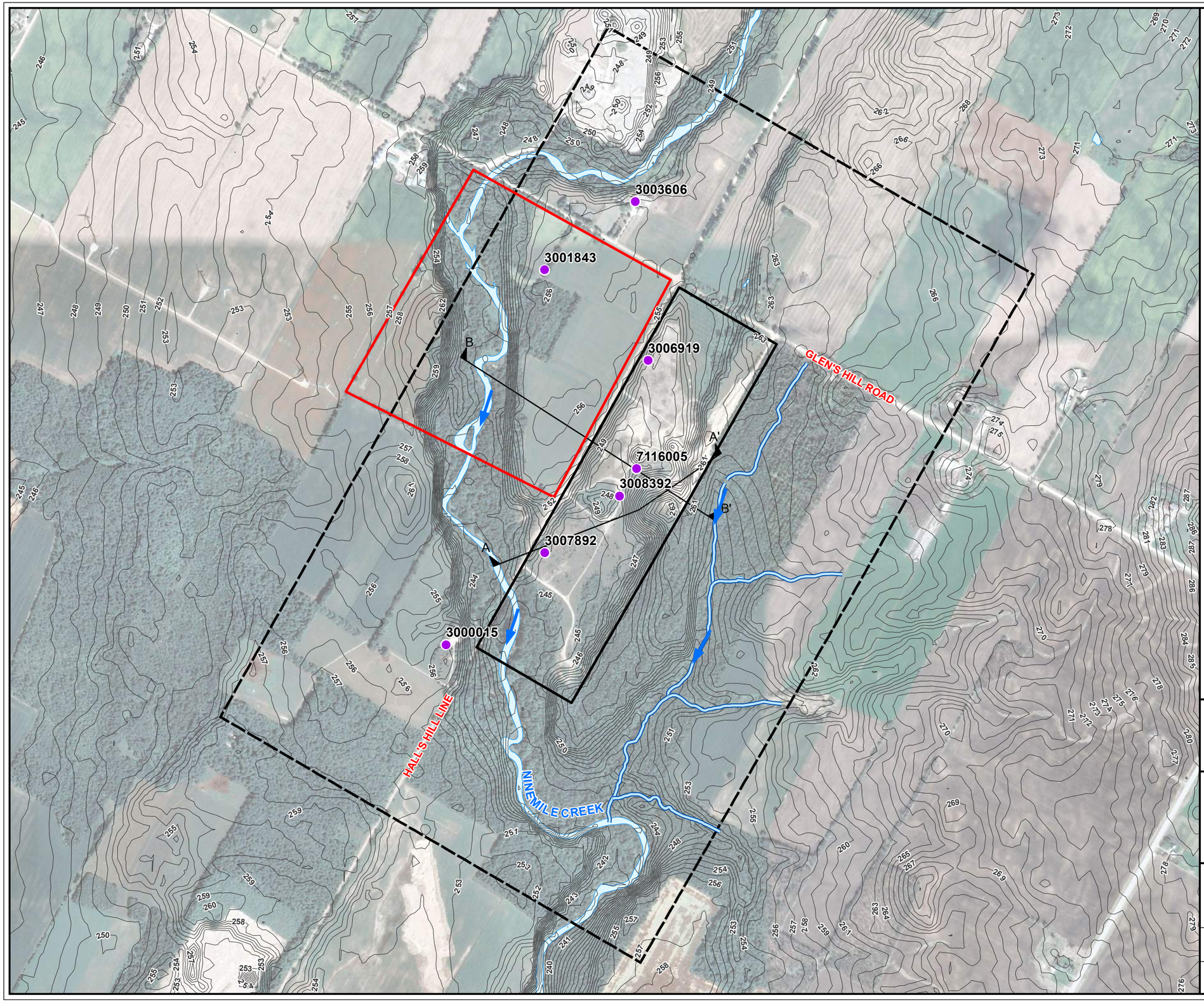
Figures



LEGEND

- SITE BOUNDARY
- LANDFILL BOUNDARY
- 500m BUFFER
- MECP WELL RECORD LOCATION
- CONTOUR (1m intervals - masl)
- OPEN WATER
- WATERCOURSE
- SURFACE WATER FLOW DIRECTION
- CROSS-SECTION LOCATION KEY

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

N

0 100 200 300 400 500 600 700 800

Metres

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TOWNSHIP OF
ASHFIELD - COLBORNE - WAWANOSH

36651 GLEN'S HILL ROAD D-4 STUDY

Figure Title

REGIONAL PLAN

Drawn	Checked	Date	Figure No.
SK	AM	SEPTEMBER 2021	1
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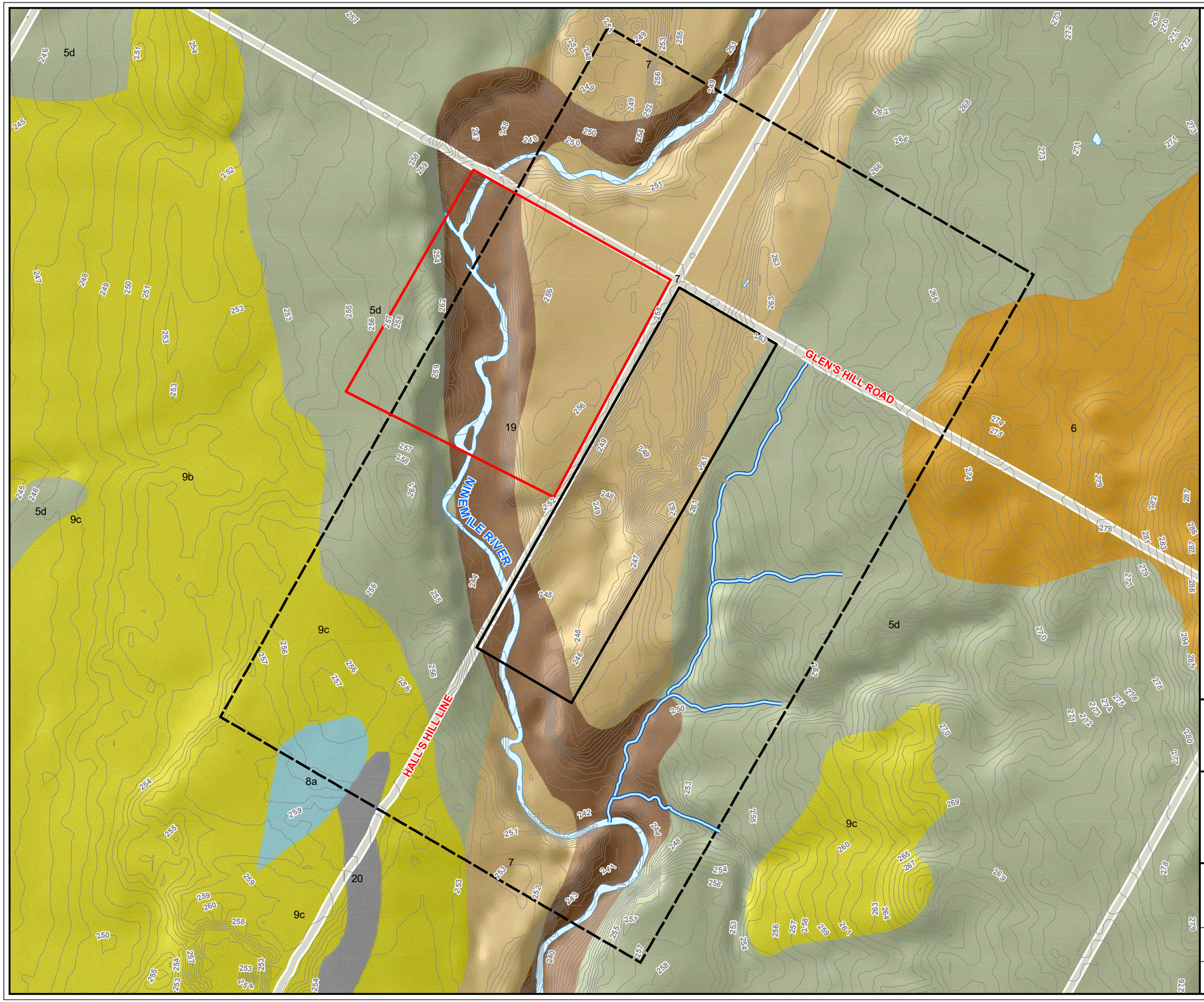

LEGEND

- SITE BOUNDARY
- LANDFILL BOUNDARY
- 500m BUFFER
- CONTOUR (1m intervals - masl)
- OPEN WATER
- WATERCOURSE
- 5d: Glaciolacustrine-derived silty to clayey till
- 6: Ice-contact stratified deposits
- 7: Glaciofluvial deposits
- 8a: Massive-well laminated
- 9b: Littoral-foreshore deposits
- 9c: Foreshore-basinal deposits
- 19: Modern alluvial deposits
- 20: Organic deposits

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

N

0 100 200 300 400 500 600 700 800

Metres

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TOWNSHIP OF
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36651 GLEN'S HILL ROAD D-4 STUDY

Figure Title

SURFICIAL GEOLOGY

Drawn	Checked	Date	Figure No.
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1:10,000		300053662	

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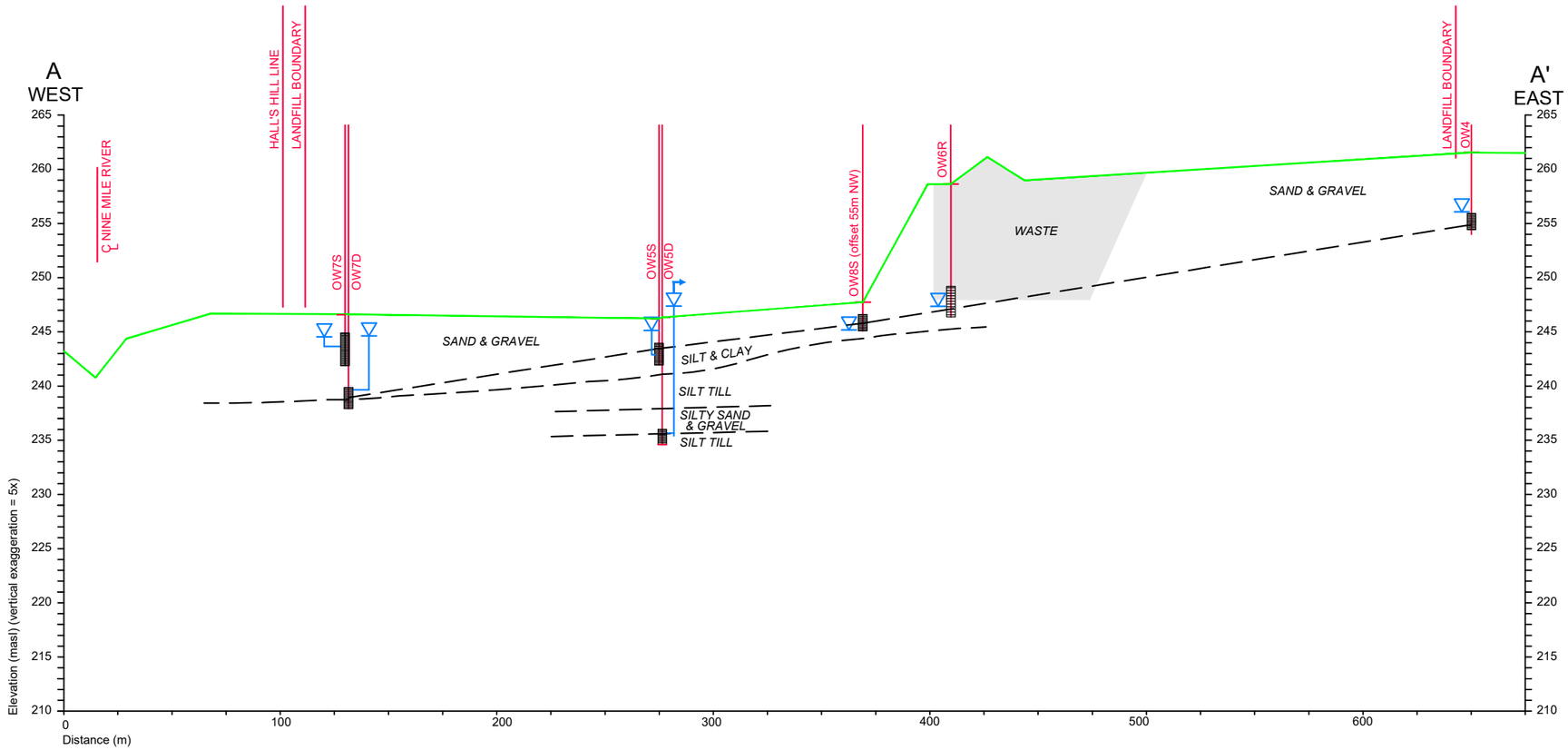

LEGEND

OW1 — OBSERVATION WELL LOCATION & NUMBER

APPROXIMATE GROUND SURFACE

GEOLOGICAL STRATIGRAPHY

WATER LEVEL (OCTOBER 2, 2018)

SCREEN

1. ALIGNMENT OF SECTION A-A' IS SHOWN ON FIGURE 1.

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TOWNSHIP OF
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36651 GLEN'S HILL ROAD D-4 STUDY

Figure Title

GEOLOGICAL CROSS SECTION A-A'

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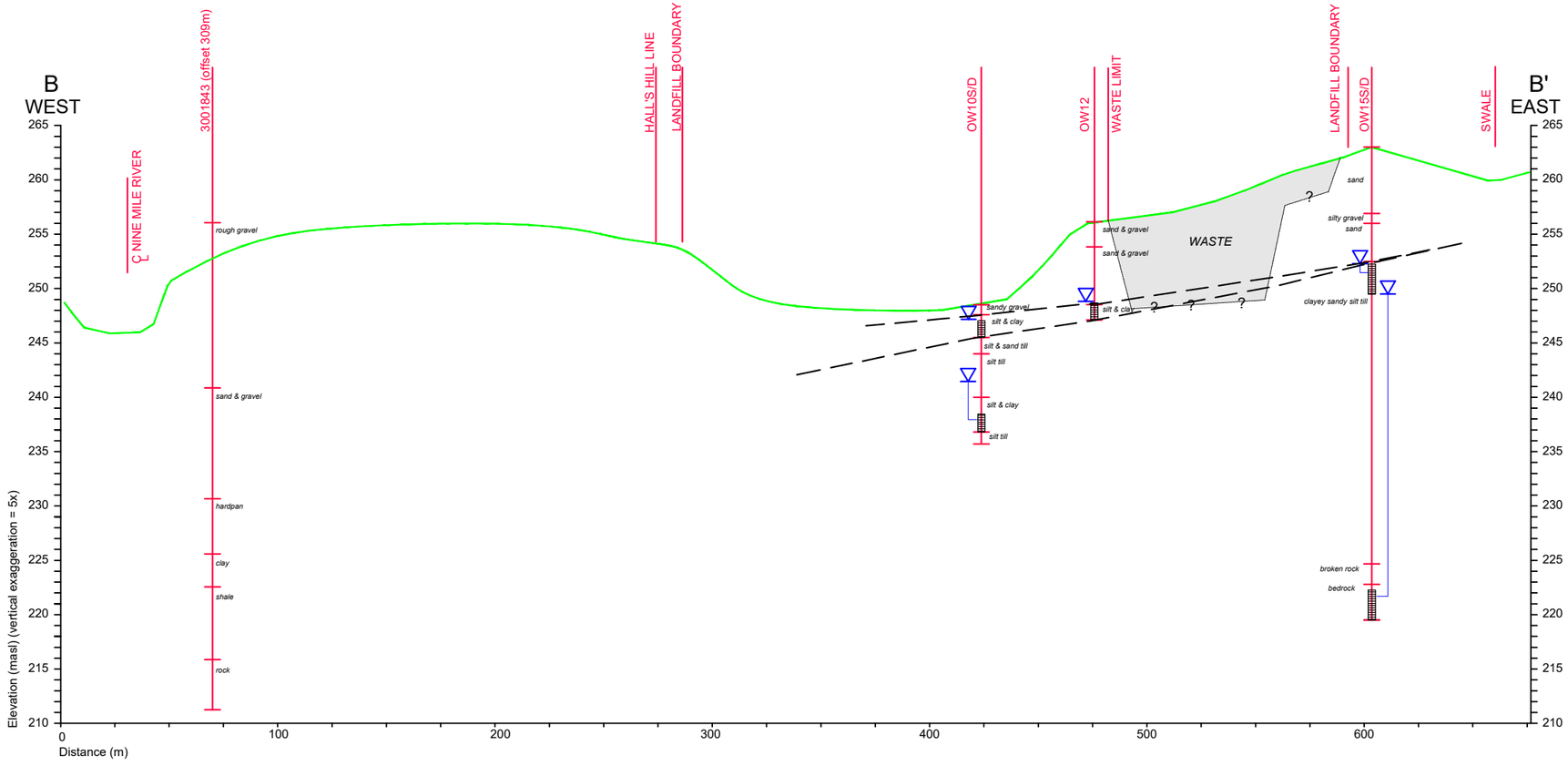

LEGEND

OW1 — OBSERVATION WELL LOCATION & NUMBER

APPROXIMATE GROUND SURFACE

GEOLOGICAL STRATIGRAPHY

WATER LEVEL (OCTOBER 2, 2018)

SCREEN

1. ALIGNMENT OF SECTION B-B' IS SHOWN ON FIGURE 1.

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TOWNSHIP OF
ASHFIELD - COLBORNE - WAWANOSH

36651 GLEN'S HILL ROAD D-4 STUDY

Figure Title

GEOLOGICAL CROSS SECTION B-B'

Drawn	Checked	Date	Figure No.
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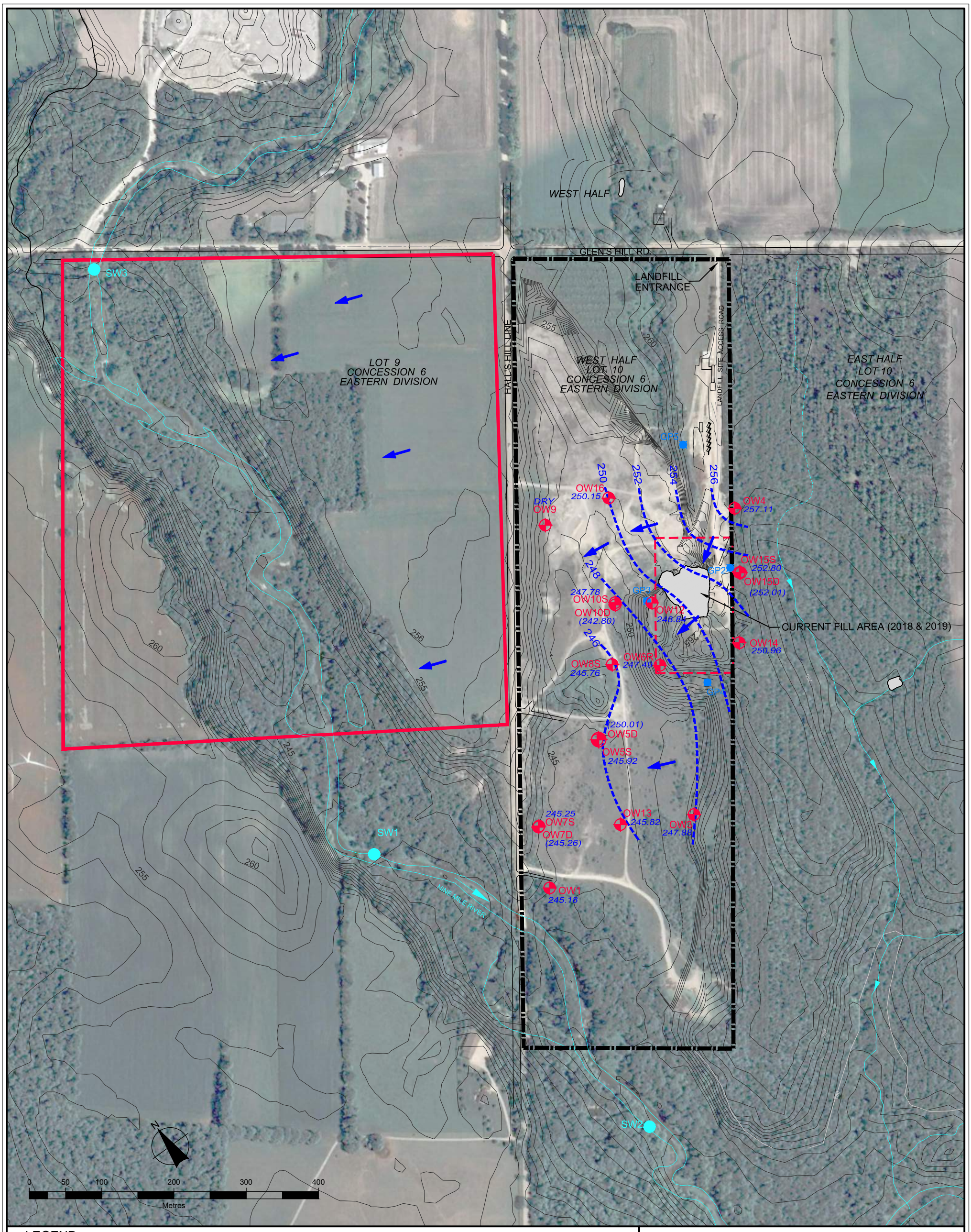

LEGEND

- TOTAL LANDFILL BOUNDARY
- SITE BOUNDARY
- LICENSED FILL BOUNDARY (based on 2010 D&O)
- OW5S — OBSERVATION WELL
- SW1 — SURFACE WATER STATION
- GP4 — LANDFILL GAS PROBE
- INTERPRETED SHALLOW GROUNDWATER CONTOUR (m asl)
- 245.75 — MEASURED WATER ELEVATION (masl - MAY 13, 2019)
- INTERPRETED SHALLOW GROUNDWATER FLOW DIRECTION

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TOWNSHIP OF
ASHFIELD - COLBORNE - WAWANOSH

36651 GLEN'S HILL ROAD D-4 STUDY

Figure Title

GROUNDWATER FLOW
MAY 2019

Drawn	Checked	Date	Figure No.
SK	AM	SEPTEMBER 2021	5
Scale		Project No.	
1:5,000		300053662	

File Name: 053662 Cross-Section A-A'.dwg Date Plotted: September 9, 2021 - 9:36 AM

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Appendix A

Site Photographs

Photo 1: Site entrance from Glen's Hill Road – Looking north.

Photo 2: Onsite well located – Looking south.

Photo 3: Onsite well non-functioning and inaccessible – No sample collected.

Photo 4: Soil at surface in past house footprint.

Photo 5: Boundary between landfill and Site – Looking south along Hall's Hill Line.

Photo 6: Ashfield Landfill waste area/vultures visible from Site boundary – Looking east.

Photo 7: Elevation change at Ashfield Landfill boundary – Looking north.

Photo 8: Site topography from south tree line – Looking east.

Photo 9: Site topography from south tree line – Looking north.

Photo 10: Site topography from south tree line – Looking west.

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Appendix B

2018 & 2019 Monitoring Report Excerpts

2018 & 2019 Operations and Monitoring Report Ashfield Landfill Site

Township of Ashfield-Colborne-Wawanosh

R.J. Burnside & Associates Limited
449 Josephine Street P.O. Box 10
Wingham ON N0G 2W0 CANADA

March 2020
LNE085130.2020

11.0 Conclusions

Based on the information contained in this report Burnside concludes that:

Site Operations

- Site operations followed the protocols outlined in the 2010 Design and Operations Report. Filling was above grade using the Area method.
- Observations made during site visits in 2018 indicated that the appearance and operation of the site were satisfactory. In 2019, the blown litter implies a need for more regular cover placement.
- The Township received no complaints from the public regarding landfill operations.
- Based on the estimated volume of waste generated from the entire Township, the estimated remaining lifespan of the site is approximately 42 years.
- The Township's recycling efforts in 2018 diverted approximately 419.9 tonnes of curbside recyclables, scrap metal, tires, asphalt shingles and E-waste from the Ashfield Landfill.
- The Township's recycling efforts in 2019 diverted approximately 593.3 tonnes of curbside recyclables, commercial recyclables, scrap metal, asphalt shingles and E-waste from the Ashfield Landfill.

Site Geology and Hydrogeology

- The site is located on glaciofluvial outwash (gravel and gravelly sand). This granular material has been excavated south and west of the landfill footprint by a Township owned and operated gravel pit.
- A silt/clay/till unit is found below the sand and gravel. The surface of this unit rises in elevation across the site from southwest to northeast, decreasing the thickness of the sand and gravel.
- The bedrock is estimated to be 21 to 23 m below the pit floor and the bottom of the waste. The soil between the bottom of the waste and the bedrock is a clayey sandy silt till with 20 to 25 percent clay content.
- The shallow groundwater flow direction is westerly.

2018 and 2019 Monitoring Results

- The chloride concentrations in all contingency trigger wells remain below Reasonable Use and there are no increasing trends. The site remains in compliance.
- There has historically been evidence of a slight leachate impact at OW5S, southwest of the fill area. This is still apparent although there are no increasing or decreasing trends. OW5S is located approximately 100 m from the site boundary.
- An increase in leachate indicator concentrations at OW10S in the last two years suggests the start of landfill impact at that well. DOC and alkalinity rose to exceed the RUG at OW10S. This well is 55 m west of the fill area and 135 m from the property boundary. OW10S will be monitored closely for the need to add a well between OW10S and the property boundary.
- There is no indication of significant leachate impact at OW8 or 10D, located in the silt/clay/till unit directly downgradient of the fill area.
- Water quality in the Nine Mile River is not impacted by the landfill.
- Landfill gas was not detected in the leachate well (OW6R) or any of the gas probes around the perimeter of the fill area.

12.0 Recommendations

Based on our review of the site inspections, water quality data, and discussions with Township representatives, Burnside provides the following recommendations:

- The operator should continue to ensure that cover remains adequate and litter control programs are maintained.
- The groundwater monitoring should continue in the spring and fall of each year, as required by the ECA.
- The surface water monitoring should be continued in the spring and fall of each year as required by the ECA.
- Landfill gas monitoring should be continued in the spring and fall of each year.

TABLE 6

2018 & 2019 Groundwater Chemistry

Ashfield Landfill

Well	Sampling Date	pH	Conductivity	Hardness	Chloride	DOC	TDS	Ammonia	Nitrate	Nitrite	TKN	Bromide	Fluoride	Sulphate	Orthophosphate	t-Alkalinity	Carbonate	Bicarbonate	Aluminum	Arsenic	Boron	Barium	Calcium	Cadmium	Chromium	Copper	Iron	Potassium	Magnesium	Manganese	Sodium	Lead	Selenium	Silicon	Zinc	Field Temp.	Field pH	Field Cond.	Field DO	Field E_h
Unit			uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		uS/cm	mg/L	SHE
RDL May 18		NA	2	0.5	0.20	0.5	20	0.02	0.10	0.10	0.10	0.10	0.10	0.20	0.20	5	5	5	0.004	0.003	0.010	0.002	0.05	0.002	0.003	0.003	0.010	0.05	0.05	0.002	0.05	0.001	0.004	0.05	0.004					
RDL Oct 18		NA	2	0.5	0.10	0.5	20	0.02	0.05	0.05	0.10	0.05	0.05	0.10	0.10	5	5	5	0.004	0.003	0.010	0.002	0.05	0.002	0.003	0.003	0.010	0.05	0.05	0.002	0.05	0.001	0.004	0.05	0.004					
RDL May 19		0.05	2	0.5	1	0.5	30	0.1	0.06	0.03	0.50	0.3	0.06	2	0.03	2	2	2	0.001	0.002	0.010	0.002	0.01	0.0001	0.003	0.003	0.010	0.05	0.05	0.002	0.01	0.001	0.004	0.02	0.002					
RDL Oct 19		0.05	2	0.5	1	0.5	30	0.1	0.06	0.03	0.50	0.3	0.06	2	0.03	2	2	2	0.001	0.002	0.010	0.002	0.01	0.0001	0.003	0.003	0.010	0.05	0.05	0.002	0.01	0.001	0.004	0.02	0.002					
ODWQS		6.5-8.5		80-100	250	5	500		10	1			1.5	500		30-500			0.1	0.01	5	1		0.005	0.05	1	0.3			0.05	200	0.01	0.05		5					
Reasonable Use (OW15S)				193	131	3.3	423		5.0	0.29			0.7	260		383			0.05	0.004	1.3	0.3		0.0020	0.015	0.5	0.16			0.026	102	0.003	0.016		2.5					
OW4	May-18	7.55	581	305	11.3	1.6	330	<0.02	3.97	<0.10	0.61	<0.10	0.10	8.28	<0.20	278	<5	278	0.009	<0.003	<0.010	0.048	84.8	<0.002	<0.003	<0.003	<0.010	5.51	22.7	<0.002	3.25	<0.001	<0.004	3.36	0.005	6.9	7.08	408	6.05	629.3
OW4	Oct-18	7.70	631	286	12.9	2.3	356	0.05	3.99	<0.05	0.31	<0.05	0.19	11.7	<0.10	264	<5	264	<0.004	<0.003	0.012	0.045	78.3	<0.002	<0.003	<0.003	<0.010	4.62	22.0	<0.002	3.21	<0.001	<0.004	2.99	<0.004	7.96	7.28	407	7.62	49.3
OW4	May-19	8.07	602	271	16	2.1	366	<0.1	5.78	<0.03	<0.5	<0.3	0.16	10	<0.03	279	<2	279	<0.001	<0.002	0.01	0.039	76.6	0.0005	<0.003	<0.003	<0.01	4.65	19.3	<0.002	3.26	<0.001	<0.004	2.74	0.003	6.1	6.87	468	7.33	408.1
OW4	Oct-19	8.12	574	301	14	1.8	366	<0.1	4.28	<0.03	<0.5	<0.3	0.16	9	<0.03	273	<2	273	0.035	<0.002	<0.01	0.045	83.6	0.0015	<0.003	<0.003	0.03	5.12	22.5	0.004	3.38	<0.001	<0.004	3.30	0.005	8.7	7.47	582	NA	NA
OW5S	May-18	7.07	1060	485	39.1	7.0	670	<0.02	9.66	<0.25	0.85	<0.25	0.34	125	<0.50	338	<5	338	0.011	<0.003	0.972	0.061	139	<0.002	<0.003	0.004	<0.010	22.9	33.6	<0.002	35.8	<0.001	<0.004	3.40	0.005	7.50	6.80	775	3.25	605.6
OW5S	Oct-18	7.81	1440	574	64.3	10.2	880	0.05	15.1	<0.25	1.20	<0.25	0.29	72.7	<0.50	519	<5	519	0.016	<0.003	1.10	0.095	164	<0.002	0.004	0.008	<0.010	32.4	40.0	0.131	45.9	<0.001	<0.004	4.60	0.008	14.40	6.89	1161	0.52	188.2
OW5S	May-19	7.92	1110	468	46	7.2	746	0.1	9.31	<0.03	<0.5	<0.3	0.33	100	<0.03	439	<2	439	<0.001	<0.002	0.69	0.052	136	<0.0001	<0.003	0.004	<0.01	22.9	31.0	<0.002	32.9	<0.001	<0.004	3.37	0.003	7.88	6.99	918	0.99	397.1
OW5S	Oct-19	8.20	823	424	21	7.5	514	<0.1	5.34	<0.03	<0.5	<0.3	0.43	21	0.05	400	<2	400	<0.001	<0.002	0.22	0.050	125	<0.0001	<0.003	0.003	<0.01	12.7	26.9	0.019	12.3	<0.001	<0.004	4.34	0.005	15.50	6.99	860	NA	NA
OW5D	May-18	7.53	489	257	12.4	0.7	300	0.04	<0.05	<0.05	0.24	<0.05	1.34	34.1	<0.10	207	<5	207	0.005	0.006	0.014	0.172	61.5	<0.002	<0.003	<0.003	0.401	1.13	25.0	0.012	5.61	<0.001	<0.004	6.97	<0.004	10.4	7.40	362	0.03	143.1
OW5D	Oct-18	7.67	540	244	13.6	1.1	328	0.06	<0.05	<0.05	<0.10	<0.05	1.53	35.7	<0.10	208	<5	208	0.008	0.006	0.014	0.195	58.2	<0.002	<0.003	<0.003	0.393	1.06	23.9	0.012	5.35	<0.001	<0.004	5.78	<0.004	10.4	7.32	387	2.36	-85.5
OW5D	May-19	8.13	522	231	14	0.7	329	<0.1	<0.06	<0.03	<0.5	<0.3	1.38	39	<0.03	233	<2	233	<0.001	0.005	0.02	0.160	56.5	<0.0001	<0.003	<0.003	0.40	0.86	21.8	0.010	4.93	<0.001	<0.004	5.89	<0.002	9.3	6.73	517	NA	NA
OW5D	Oct-19	8.33	541	273	14	1.6	331	<0.1	<0.06	<0.03	<0.5	<0.3	1.56	37	<0.03	222	4	217	<0.001	0.006	0.01	0.194	68.6	<0.0001	<0.003	<0.003	0.41	1.02	24.7	0.012	5.70	<0.001	<0.004	7.61	0.002	10.8	7.61	515	NA	NA
OW6R	May-18	6.89	2880	1100	243	11.7	2010	<0.02	81.4	<1.0	3.17	<1.0	<1.0	252	<2.0	693	<5	693	0.045	<0.003	1.80	0.180	208	<0.002	0.005	0.015	0.011	227	140	0.240	107	<0.001	<0.004	7.82	0.022	14.6	6.77	2151	3.47	398.1
OW6R	Oct-18	7.87	2930	967	285	15.2	1950	4.00	43.0	<0.5	7.26	3.8	2.9	280	<1.0	697	<5	697	0.012	<0.003	1.71	0.179	186	<0.002	0.010	0.017	<0.010	179	122	0.354	92.9	<0.001	0.004	7.18	0.027	14.3	6.72	2342	5.33	-2.3
OW6R	May-19	7.89	3040	977	260	6.4	2220	2.0	93.6	0.10	<0.5	<0.3	1.12	270	<0.03	699	<2	699	0.001	<0.002	1.50	0.120	202	0.0002	<0.003	0.014	<0.010	199	115	0.147	87.2	<0.001	<0.004	6.46	0.018	13.0	7.03	2829	1.76	260.2
OW6R	Oct-19	8.05	2750	1200	240	17	2030	3.5	65.7	0.04	0.8	3.5	1.10	270	<0.03	763	<2	763	0.002	<0.002	2.07	0.136	256	0.0013	<0.003	0.017	<0.010	200	135	0.295	98.3	<0.001	<0.004	8.41	0.025	14.4	6.76	2761	NA	NA
OW7S	May-18	7.52	479	237	11.5	2.0	264	<0.02	5.94	<0.05	0.21	<0.05	0.37	9.04	<0.10	205	<5	205	0.010	<0.003	0.011	0.024	66.2	<0.002	<0.003	<0.003	<0.010	1.84	17.5	<0.002	4.76	<0.001	<0.004	2.86	<0.004	9.8	7.00	347	9.98	566.2
OW7S	Oct-18	7.59	547	245	14.6	2.0	318	0.04	2.27	<0.05	0.99	<0.05	0.40	11.2	<0.10	222	<5	222	0.005	<0.003	0.027	0.028	67.3	<0.002	<0.003	<0.003	<0.010	1.90	18.6	<0.002	6.43	<0.001	<0.004	2.71	<0.004	9.4	5.95	377	0.56	21.1
OW7S	May-19	8.16	521	225	13	1.4	323	<0.1	6.40	<0.03	<0.5	<0.3	0.37	11	<0.03	245	<2	245	0.002	<0.002	0.03	0.021	64.4	<0.0001	<0.003	<0.003	<0.01	1.78	15.7	<0.002	4.49	<0.001	<0.004	2.52	<0.002	9.36	7.16	428	9.83	398.1
OW7S	Oct-19	8.29	512	266	14	2.6	320	<0.1	2.62	<0.03	<0.5	<0.3	0.44	7	<0.03	237	<2	236	0.001	<0.002	0.02	0.027	75.0	<0.0001	<0.003	<0.003	<0.01	1.98	19.2	<0.002	6.28	<0.001	<0.004	3.11	0.004	10.8	7.54	591	NA	NA
OW7D	May-18	7.90	469	242	11.1	1.6	266	<0.02	5.62	<0.10	0.26	<0.10	0.24	6.96	<0.20	202	<5	202	0.008	<0.003	<0.010	0.024	66.6	<0.002	<0.003	<0.003	<0.010	1.66	18.4	<0.002	5.16	<0.001	<0.004	3.09	<0.004	9.8	7.09	345	0.03	499.9
OW7D	Oct-18	7.80	541	241	14.4	1.7	304	0.04	2.21	<0.05	0.62	<0.05	0.44	11.1	<0.10	223	<5	223	0.005	<0.003	0.014	0.029	66.1	<0.002	<0.003	<0.003	<0.010	1.73	18.5	<0.002	6.30	<0.001	<0.004	2.65	<0.004	9.1	7.49	375	3.92	217.9
OW7D	May-19	8.12	515	226	14	1.4	354	<0.1	5.71	<0.03	<0.5	<0.3	0.40	12	<0.03	230	<2	230	<0.001	<0.002	0.01	0.022	64.0	<0.0001	<0.003	<0.003	<0.01	1.51	16.1	<0.002	4.84	<0.001	<0.004	2.61	0.005	9.48	7.19	440	7.85	417.8
OW7D	Oct-19	8.34	503	265	13	1.8	297	<0.1	2.57	<0.03	<0.5	<0.3	0.45	10	<0.03	239	5	233	0.002	<0.002	<0.01	0.027	74.4	<0.0001	<0.003	<0.003	<0.01	1.82	19.2	<0.002	6.44	<0.001	<0.004	3.18	0.006	9.3	7.61	503	NA	NA
OW8S	May-18	7.56	651	306	10.3	0.7	430	<0.02	<0.25	<0.25	0.20	<0.25	0.89	122	<0.50	199	<5	199	0.005	<0.003	0.058	0.070	76.0	<0.002	<0.003	<0.003	<0.010	1.46	28.2	<0.002	16.8	<0.001	<0.004	4.37	<0.004	6.9	7.31	445	1.80	599.7
OW8S	Oct-18	7.86	688	285	10.3	0.8	438	0.05	<0.25	<0.25	0.58	<0.25	1.15	109	<0.50	222	<5	222	0.007	<0.003	0.081	0.085	70.6	<0.002	<0.003	<0.003	<0.010	1.66	26.5	<0.002	15.5	<0.001	<0.004	4.57	<0.004	13.2	7.38	531	7.95	-9.2
OW8S	May-19	8.21	707	285	12	0.6	457	<0.1	<0.06	<0.03	<0.5	<0.3	1.03	120	<0.03	248	<2	248	<0.001	<0.002	0.04	0.062	74.5	<0.0001	<0.003	<0.003	<0.01	1.19	24.0	<0.002	15.5	<0.001	<0.004	3.84	0.002	7.1	6.81	533	1.76	465.4
OW8S	Oct-19	8.16	646	427	11	1.5	426	<0.1	<0.06	<0.03	<0.5	<0.3	1.24	93	<0.03	241	<2	241	0.002	<0.002	0.07	0.078	124	<0.0001	<0.003	<0.003	<0.01	1.64	28.3	<0.002	16.9	<0.001	<0.004	5.46	0.003	12.9	7.51	666	NA	NA
OW10S	May-18	8.17	978	258	29.6	2.6	632	<0.02	<0.25	<0.25	0.28	<0.25	0.62	167	<0.50	360	<5	360	0.004	<0.003	0.171	0.062	58.5	<0.002	<0.003	<0.003	<0.010	1.86	27.3	<0.002	129	<0.001	<0.004	5.14	<0.004	7.40	7.50	684	9.39	613.1
OW10S	Oct-18	7.93	1330	387	38.2	4.8	802	0.04	<0.25	<0.25	1.02	<0.25	0.68	141	<0.50	487	<5	487	<0.004	0.010	0.378	0.095	93.0	<0.002	0.005	<0.003	2.22	2.48	37.6	0.199	121	<0.001	<0.004	8.62	<0.004	15.88	NA	1085	1.67	535.8
OW10S	May-19	7.96	1050	349	57	12.1	726	<0.1	<0.06	<0.03	0.8	<0.3	0.63	140	0.05	375	<2	375	0.001	0.005	0.38	0.069	91.9	<0.0001	<0.003	<0.003	0.86	3.20	29.1	0.263	61.3	<0.001	<0.004	4.63	0.003	7.50	7.43	1019	NA	NA
OW10S	Oct-19	8.14	1170	548	74	7.0	789	0.2	0.06	<0.03	<0.5	<0.3	0.78	180	0.07	383	<2	383	0.001	0.006	0.59	0.105	148	<0.0001	<0.003	<0.003	1.15	6.03	43.3	0.283	77.5	<0.001	<0.004	7.64	0.003	14.60	7.15	1180	NA	NA
OW10D	May-18	8.00	526	178	1.63	0.8	346	<0.02	<0.05	<0.05	<0.10	<0.05	1.66	130	<0.10	121	<5	121	0.006	<0.003	0.227	0.032	36.0	<0.002	0.003	<0.003	<0.010	1.16	21.5	0.007	37.2	<0.001	<0.004	4.29	<0.004	10.3	7.77	331	0.11	451.3
OW10D	Oct-18	7.51	564	168	1.81	1.7	366	0.07	0.06	<0.05	0.67	<0.05	1.76	134	<0.10	133	<5	133	0.006	<0.003	0.227	0.034	33.9	<0.002	<0.003	<0.003	<0.010	1.05	20.3	0.003	35.3	<0.001	<0.004	3.69	<0.004	10.1	6.97	400	6.34	-1
OW10D	May-19	8.13	553	186	2.3	0.8	397	<0.1	<0.06	<0.03	<0.5	<0.3	1.52	140	<0.03	149	<2	149	<0.001	0.002	0.16	0.028	45.1	<0.0001	<0.003	<0.003	<0.01	0.88	17.9	0.006	30.8	<0.001	<0.004	3.81	0.002	10.1	7.81	469	1.55	381.1
OW10D	Oct-19	8.15	538	367	2.1	3.3	369	0.1	0.09	<0.03	<0.5	<0.3	1.76	120	0.05	142	<2	142	0.001	<0.002	0.23	0.034	112	<0.0001	<0.003	<0.003	<0.01	1.05	21.2	0.003	36.6	<0.001	<0.004	4.77	<0.002	10.2	8.03	531	NA	NA
OW12	May-18	7.25	2650	1100	172	33.9	1870	15.6	8.10	<0.5	17.9	<0.5	<0.5	585	<1.0	691	<5	691	0.015	0.005	4.76	0.113	287	<0.002	0.007	0.004	0.368	103	94.0	0.274	163	<0.001	<0.004	7.75	0.015	13.5	7.13	2145	0.10	337.4
OW12	Oct-18	7.79	3000	1000	214	54.7	1880	1.98	7.10	<0.5	28.6	1.0	<0.5	349	<1.0	917	<5	917	0.021	0.012	4.67	0.149	257	<0.002	0.018	<0.003	3.80	88.5	87.1	0.378	180	<0.001	0.019	9.73	0.009	16.8	6.90	2427	1.83	9.9
OW12	May-19	7.95	2500	851	190	54.1	1820	11.6	5.94	0.06	14.4	0.7	0.43	480	<0.03	748	<2	748	0.006	0.011	3.66	0.110	229	<0.0001	0.004	<0.003	3.97	74.1	67.9	0.171	136	<0.001	<0.004	7.57	0.005	15.8	7.30	1494	0.71	110.3
OW12	Oct-19	8.08	1960	840	140	21	1340	10.7	<0.06	<0.03	11.9	0.5	0.39	250	0.10	717	<2	717	0.008	0.005	2.96	0.097	232	<0.0001	<0.003	<0.003	6.12	53.8	63.0	0.415	114	<0.001	<0.004	9.69	0.004	16.7	6.75	1994	NA	NA

TABLE 6

2018 & 2019 Groundwater Chemistry

Ashfield Landfill

Well	Sampling Date	pH	Conductivity	Hardness	Chloride	DOC	TDS	Ammonia	Nitrate	Nitrite	TKN	Bromide	Fluoride	Sulphate	Orthophosphate	t-Alkalinity	Carbonate	Bicarbonate	Aluminum	Arsenic	Boron	Barium	Calcium	Cadmium	Chromium	Copper	Iron	Potassium	Magnesium	Manganese	Sodium	Lead	Selenium	Silicon	Zinc	Field Temp.	Field pH	Field Cond.	Field DO	Field E_h
Unit			uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C		uS/cm	mg/L	SHE
RDL May 18		NA	2	0.5	0.20	0.5	20	0.02	0.10	0.10	0.10	0.10	0.10	0.20	0.20	5	5	5	0.004	0.003	0.010	0.002	0.05	0.002	0.003	0.003	0.010	0.05	0.05	0.002	0.05	0.001	0.004	0.05	0.004					
RDL Oct 18		NA	2	0.5	0.10	0.5	20	0.02	0.05	0.05	0.10	0.05	0.05	0.10	0.10	5	5	5	0.004	0.003	0.010	0.002	0.05	0.002	0.003	0.003	0.010	0.05	0.05	0.002	0.05	0.001	0.004	0.05	0.004					
RDL May 19		0.05	2	0.5	1	0.5	30	0.1	0.06	0.03	0.50	0.3	0.06	2	0.03	2	2	2	0.001	0.002	0.010	0.002	0.01	0.0001	0.003	0.003	0.010	0.05	0.05	0.002	0.01	0.001	0.004	0.02	0.002					
RDL Oct 19		0.05	2	0.5	1	0.5	30	0.1	0.06	0.03	0.50	0.3	0.06	2	0.03	2	2	2	0.001	0.002	0.010	0.002	0.01	0.0001	0.003	0.003	0.010	0.05	0.05	0.002	0.01	0.001	0.004	0.02	0.002					
ODWQS		6.5-8.5		80-100	250	5	500		10	1			1.5	500		30-500			0.1	0.01	5	1		0.005	0.05	1	0.3			0.05	200	0.01	0.05		5					
Reasonable Use (OW15S)				193	131	3.3	423		5.0	0.29			0.7	260		383			0.05	0.004	1.3	0.3		0.0020	0.015	0.5	0.16			0.026	102	0.003	0.016		2.5					
OW13	May-18	7.54	535	279	7.19	2.2	312	<0.02	2.32	<0.10	0.33	<0.10	0.31	17.1	<0.20	252	<5	252	0.006	<0.003	0.037	0.033	79.3	<0.002	<0.003	<0.003	<0.010	2.65	19.6	<0.002	4.66	<0.001	<0.004	2.87	<0.004	8.2	7.15	382	10.14	588.0
OW13	Oct-18	7.57	568	256	5.42	3.0	340	0.04	0.14	<0.05	1.02	<0.05	0.48	23.9	<0.10	242	<5	242	<0.004	<0.003	0.062	0.046	72.2	<0.002	<0.003	<0.003	<0.010	2.12	18.5	0.011	7.49	<0.001	<0.004	3.32	<0.004	16.9		476	4.52	387.4
OW13	May-19	8.02	509	221	6	2.0	309	<0.1	1.88	<0.03	<0.5	<0.3	0.38	12	<0.03	268	<2	268	<0.001	<0.002	0.06	0.026	64.4	<0.0001	<0.003	<0.003	<0.010	1.65	14.6	<0.002	2.32	<0.001	<0.004	2.35	<0.002	8.39	6.86	419	8.72	454.8
OW13	Oct-19	8.22	537	297	3.6	4.1	334	<0.1	<0.06	<0.03	<0.5	<0.3	0.54	13	0.06	279	<2	279	0.002	<0.002	0.04	0.036	86.4	<0.0001	<0.003	<0.003	0.02	0.94	19.8	0.016	5.52	<0.001	<0.004	3.40	0.003	15.7	7.41	531	NA	NA
OW14	May-18	7.33	500	226	2.21	1.2	322	<0.02	0.18	<0.10	0.18	<0.10	1.34	65.2	<0.20	212	<5	212	0.008	<0.003	0.081	0.073	62.7	<0.002	<0.003	<0.003	<0.010	2.74	16.8	0.009	13.4	<0.001	<0.004	4.91	<0.004	8.3	7.13	372	2.61	602.9
OW14	Oct-18	7.75	546	215	2.71	2.0	324	0.08	0.29	<0.05	0.37	<0.05	1.75	66.5	<0.10	197	<5	197	0.016	<0.003	0.089	0.084	59.2	<0.002	<0.003	<0.003	<0.010	2.42	16.4	0.007	12.4	<0.001	<0.004	4.13	<0.004	7.86	6.8	375	4.29	-15.2
OW14	May-19	8.05	548	244	4.0	0.8	363	<0.1	0.34	<0.03	<0.5	<0.3	1.40	68	<0.03	232	<2	232	0.003	<0.002	0.06	0.064	73.1	<0.0001	<0.003	<0.003	<0.01	2.26	15.0	0.004	9.68	<0.001	<0.004	3.96	<0.002	7.67	6.67	455	2.24	351.2
OW14	Oct-19	8.28	521	418	3.1	0.9	334	<0.1	0.28	<0.03	<0.5	<0.3	1.70	67	0.06	207	<2	207	0.018	<0.002	0.08	0.074	139	<0.0001	<0.003	<0.003	<0.01	2.42	17.3	0.006	12.6	<0.001	<0.004	4.99	0.002	8.2	7.64	529	NA	NA
OW15S	May-18	7.42	560	291	10.9	1.5	308	<0.02	3.66	<0.10	0.19	<0.10	0.36	15.5	<0.20	258	<5	258	0.006	<0.003	0.012	0.038	78.6	<0.002	<0.003	<0.003	<0.010	3.46	23.0	<0.002	4.45	<0.001	<0.004	4.43	<0.004	6.4	7.09	379	5.56	627.3
OW15S	Oct-18	7.90	619	282	12.2	1.7	370	0.04	2.96	<0.05	0.32	<0.05	0.43	20.7	<0.10	255	<5	255	<0.004	<0.003	0.019	0.045	74.8	<0.002	<0.003	<0.003	<0.010	3.18	23.2	<0.002	4.39	<0.001	<0.004	4.13	<0.004	6.29	6.38	389	7.10	61.2
OW15S	May-19	8.09	583	245	12	1.3	369	<0.1	3.89	<0.03	<0.5	<0.3	0.35	17	<0.03	276	<2	276	<0.001	<0.002	0.02	0.030	67.1	<0.0001	<0.003	<0.003	<0.01	2.93	18.9	<0.002	3.63	<0.001	<0.004	3.46	<0.002	4.85	6.09	431	5.20	430.4
OW15S	Oct-19	8.19	584	326	14	1.5	340	<0.1	2.62	<0.03	<0.5	<0.3	0.48	24	<0.03	273	<2	273	0.001	<0.002	0.02	0.042	89.8	<0.0001	<0.003	<0.003	<0.01	3.12	24.7	<0.002	4.65	<0.001	<0.004	5.34	0.002	6.1	7.56	592	NA	NA
OW16	May-18	7.72	488	251	12.5	0.9	290	<0.02	0.59	<0.10	<0.10	<0.10	0.92	36.9	<0.20	186	<5	186	0.009	<0.003	0.012	0.075	60.9	<0.002	<0.003	<0.003	<0.010	1.80	24.1	<0.002	3.31	<0.001	<0.004	4.82	<0.004	7.5	7.55	340	3.30	590.3
OW16	Oct-18	7.97	542	251	13.3	1.7	330	0.04	0.31	<0.05	0.48	<0.05	1.40	36.5	<0.10	205	<5	205	0.009	<0.003	0.025	0.107	61.5	<0.002	<0.003	<0.003	<0.010	2.13	23.7	<0.002	3.66	<0.001	<0.004	4.97	<0.004	16.5	7.33	426	3.42	88.1
OW16	May-19	8.12	497	209	12	0.5	311	<0.1	0.40	<0.03	<0.5	<0.3	1.17	36	<0.03	215	<2	215	<0.001	<0.002	0.01	0.062	53.2	<0.0001	<0.003	<0.003	<0.01	1.18	18.4	<0.002	2.62	<0.001	<0.004	3.74	<0.002	4.85	6.09	431	5.20	430.4
OW16	Oct-19	8.24	482	255	12	4.0	303	<0.1	0.36	<0.03	<0.5	<0.3	1.40	29	<0.03	210	<2	210	0.003	<0.002	0.02	0.079	66.2	<0.0001	<0.003	<0.003	<0.01	1.59	21.7	<0.002	3.38	<0.001	<0.004	5.98	0.005	16.1	7.66	480	NA	NA
OW7D Rep	May-18	7.87	480	243	11.1	1.5	274	<0.02	5.59	<0.10	0.21	<0.10	0.28	6.94	<0.20	191	<5	191	0.008	<0.003	<0.010	0.025	66.8	<0.002	<0.003	<0.003	<0.010	1.76	18.5	<0.002	5.19	<0.001	<0.004	2.95	<0.004					
OW7D Rep	Oct-18	7.90	540	244	14.4	1.9	300	0.04	2.20	<0.05	0.68	<0.05	0.38	11.2	<0.10	224	<5	224	0.009	<0.003	0.012	0.030	66.9	<0.002	<0.003	<0.003	<0.010	1.68	18.6	<0.002	6.38	<0.001	<0.004	2.70	<0.004					
OW13 Rep	May-19	8.16	508	223	6	2.1	340	<0.1	1.82	<0.03	<0.5	<0.3	0.40	11	0.04	256	<2	256	<0.001	<0.002	0.01	0.025	64.6	<0.0001	<0.003	<0.003	<0.01	1.64	14.9	<0.002	2.35	<0.001	<0.004	2.27	0.003					
OW5S Rep	Oct-19	8.15	832	430	21	3.7	534	<0.1	5.43	<0.03	<0.5	<0.3	0.45	19	<0.03	399	<2	399	<0.001	<0.002	0.23	0.050	127	<0.0001	<0.003	<0.003	<0.01	12.9	27.3	0.020	12.3	<0.001	<0.004	4.39	0.003					

Notes:

mg/L	milligrams per litre
uS/cm	micro-siemens per centimetre
mV	millivolts
SHE	standard hydrogen electrode (converted from field ORP measurement in mV)
RDL	reported detection limit
NA	not available
Rep	replicate sample for quality assurance and quality control

350	exceeds reasonable use
350	exceeds ODWQS
ODWQS	Ontario Drinking Water Quality Standards
Reasonable Use	maximum allowable concentration, MOE Guideline B-7
Reasonable Use	calculations are based on reported detection limited if reported result is less than detection
Background	concentration is average of the 2018/2019 results from OW15S
Field DO/Field Eh	discontinued in 2019 due to changing field equipment

TABLE 7

2018 & 2019 Surface Water Chemistry
Ashfield Landfill

Location	Sampling Date	pH	Conductivity	Hardness	Chloride	DOC/TOC*	TDS	Turbidity	Ammonia	Nitrate	Nitrite	Bromide	Fluoride	Sulphate	Phosphate	t-Alkalinity	Carbonate	Bicarbonate	Silver	Aluminum	Arsenic	Boron	Barium	Beryllium	Calcium	Cadmium	Cobalt	Chromium	Copper	Iron	Potassium	Magnesium	Molybdenum	Sodium	Nickel	Lead	Vanadium	Zinc	Phenols	Total Phosphorus	Field Temperature	Field pH	Field Conductivity	Field DO	Field E_h	Un-ionized Ammonia
	Unit		uS/cm	mg/L	mg/L	mg/L	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	°C	N/A	uS/cm	mg/L	SHE	ug/L
	RDL May 18	NA	2	0.5	0.20	0.5	20	0.5	0.02	0.10	0.10	0.10	0.10	0.20	0.20	5	5	5	0.0001	0.004	0.003	0.010	0.002	0.002	0.05	0.0001	0.0005	0.003	0.002	0.01	0.05	0.05	0.002	0.05	0.003	0.001	0.002	0.005	0.001	0.02						
	RDL Oct 18	NA	2	0.5	0.20	0.5	20	0.5	0.02	0.10	0.10	0.10	0.10	0.20	0.20	5	5	5	0.0001	0.004	0.003	0.010	0.002	0.002	0.05	0.0001	0.0005	0.003	0.002	0.01	0.05	0.05	0.002	0.05	0.003	0.001	0.002	0.005	0.001	0.02						
	RDL May 19	0.05	2	0.5	1	1	30	0.1	0.1	0.03	0.3	0.06	2.00	0.03	2	2	2	2	0.0001	0.001	0.002	0.010	0.002	0.002	0.01	0.0001	0.0005	0.003	0.003	0.01	0.05	0.05	0.002	0.01	0.003	0.001	0.002	0.002	0.002	0.003						
	RDL Oct 19	0.05	2	0.5	1	1	30	0.1	0.1	0.03	0.3	0.06	2.00	0.03	2	2	2	2	0.0001	0.001	0.002	0.010	0.002	0.002	0.01	0.0001	0.0005	0.003	0.003	0.01	0.05	0.05	0.002	0.01	0.003	0.001	0.002	0.002	0.002	0.003						
	CWQG	6.5-9								2.9	0.06								0.0001	0.1	0.005					0.000017		0.0089	0.004	0.3			0.073		0.15	0.007		0.03	0.004	0.02	5.5-9.5					19
	APV				180														0.00012		0.015	3.55	2.3	0.0053		0.00021	0.0052	0.064	0.0069				0.73	180	0.039	0.002	0.02	0.089	0.961							
	PWQO	6.5-8.5																	0.0001	0.075	0.005	0.2		1.1		0.0005	0.0009	0.0089	0.005	0.3			0.04		0.025	0.005	0.006	0.02	0.001	0.03						20
SW1	8-May-18	8.28	500	268	14.6	5.9	306	1.8	<0.02	1.73	<0.10	<0.10	<0.10	9.77	<0.20	269	<5	269	<0.0001	<0.004	<0.003	0.012	0.027	<0.002	73.2	<0.0001	<0.0005	<0.003	<0.002	<0.01	1.61	20.8	<0.002	7.30	<0.003	<0.001	<0.002	<0.005	<0.001	0.08	16.1	8.40	423	NA	NA	1.39
SW1	2-Oct-18	8.19	574	258	19.6	4.3	344	3.5	0.05	1.16	<0.10	<0.10	0.41	14.3	<0.20	228	<5	228	<0.0001	0.007	<0.003	0.017	0.042	<0.002	68.6	<0.0001	<0.0005	0.007	<0.002	0.07	1.72	21.0	<0.002	12.3	<0.003	<0.001	0.002	<0.005	<0.001	<0.02	12.2	NA	440	7.84	345.0	NA
SW1	13-May-19	8.34	526	222	15	5	329	1.02	<0.1	1.83	<0.03	<0.3	0.39	12	<0.03	261	4	256	<0.0001	0.013	<0.002	<0.010	0.021	<0.002	61.3	<0.0001	<0.0005	<0.003	<0.003	0.08	1.10	16.7	<0.002	6.23	<0.003	<0.001	<0.002	<0.002	<0.002	0.010	9.3	8.32	443	11.36	378.6	3.54
SW1	2-Oct-19	8.47	448	297	20	4	329	1.42	<0.1	1.08	<0.03	<0.3	0.68	20	<0.03	258	12	246	<0.0001	0.006	<0.002	0.02	0.043	<0.002	80.3	<0.0001	<0.0005	<0.003	<0.003	0.09	2.00	23.6	<0.002	10.7	<0.003	<0.001	<0.002	0.007	0.002	0.013	16.8	8.57	539	NA	NA	10.41
SW2	8-May-18	8.20	501	267	14.6	5.6	310	1.9	0.02	1.76	<0.10	<0.10	<0.10	9.75	<0.20	274	<5	274	<0.0001	<0.004	<0.003	0.013	0.027	<0.002	73.1	<0.0001	<0.0005	<0.003	<0.002	<0.01	1.61	20.6	<0.002	7.26	<0.003	<0.001	<0.002	0.021	<0.001	0.05	15.7	8.40	420	NA	391.9	1.35
SW2	2-Oct-18	8.04	576	258	19.0	4.4	354	4.9	0.05	1.17	<0.10	<0.10	0.39	14.4	<0.20	233	<5	233	<0.0001	0.008	<0.003	0.015	0.043	<0.002	68.9	<0.0001	<0.0005	0.005	<0.002	0.06	1.72	20.8	<0.002	11.8	<0.003	<0.001	0.004	0.007	<0.001	<0.02	12.14	8.54	436	7.47	204.2	3.53
SW2	13-May-19	8.38	521	235	14	4	326	1.20	<0.1	1.85	<0.03	<0.3	0.40	11	<0.03	260	7	254	<0.0001	0.008	<0.002	<0.010	0.022	<0.002	64.5	<0.0001	<0.0005	<0.003	<0.003	0.08	1.16	18.0	<0.002	6.75	<0.003	<0.001	<0.002	<0.002	<0.002	0.008	9.24	8.26	442	11.57	373.1	3.09
SW2	2-Oct-19	8.36	458	288	19	3	331	1.29	<0.1	1.07	<0.03	<0.3	0.66	20	<0.03	256	6	250	<0.0001	0.004	<0.002	0.01	0.041	<0.002	77.7	<0.0001	<0.0005	<0.003	<0.003	0.08	1.91	22.8	<0.002	10.2	<0.003	<0.001	<0.002	0.005	0.002	0.006	16.2	8.49	545	NA	NA	8.46
SW3	8-May-18	8.21	499	268	14.6	5.6	314	2.0	<0.02	1.76	<0.10	<0.10	<0.10	9.77	<0.20	273	<5	273	<0.0001	0.006	<0.003	0.011	0.027	<0.002	73.2	<0.0001	<0.0005	<0.003	<0.002	<0.01	1.58	20.7	<0.002	7.27	<0.003	<0.001	<0.002	<0.005	<0.001	0.04	15.9	8.33	425	NA	435.5	1.18
SW3	2-Oct-18	8.03	587	263	20.2	4.3	324	4.9	0.05	1.20	<0.10	<0.10	0.42	14.8	<0.20	239	<5	239	<0.0001	0.009	<0.003	0.014	0.042	<0.002	70.1	<0.0001	<0.0005	0.005	<0.002	0.07	1.70	21.3	<0.002	12.7	<0.003	<0.001	0.002	<0.005	<0.001	<0.02	12.2	8.41	447	7.99	213.4	2.68
SW3	13-May-19	8.36	529	242	14	5	320	1.01	<0.1	1.84	<0.03	<0.3	0.39	10	<0.03	265	6	259	<0.0001	0.005	<0.002	<0.010	0.023	<0.002	66.7	<0.0001	<0.0005	<0.003	<0.003	0.09	1.19	18.2	<0.002	6.76	<0.003	<0.001	<0.002	0.003	0.003	0.009	9.2	8.26	443	11.40	383.6	3.08
SW3	2-Oct-19	8.48	419	297	20	4	463	1.04	<0.1	1.03	<0.03	<0.3	0.67	20	<0.03	250	14	236	<0.0001	0.004	<0.002	0.02	0.042	<0.002	80.0	<0.0001	<0.0005	<0.003	<0.003	0.11	2.01	23.5	<0.002	10.9	<0.003	<0.001	<0.002	0.005	<0.002	0.007	16.8	8.54	548	NA	NA	9.78

Notes

mg/L	milligrams per litre
µg/L	micrograms per litre
µS/cm	micro-siemens per centimetre
mV	millivolts
SHE	standard hydrogen electrode (converted from field ORP measurement in mV)
RDL	reported detection limit
NA	not available
CWQG	Canadian Water Quality Guideline for the Protection of Aquatic Life
APV	Aquatic Protection Value: Table 3.1 Rationale for the Development of Soil and Groundwater Standards for Use at Contaminated Sites in Ontario
PWQO	Provincial Water Quality Objectives. Were both a PWQO and an interim PWQO exist, the interim is provide.
350	exceeds CWQG
350	exceeds PWQO
350	exceeds APV
DOC/TOC*	the parameter name reported by the lab changed to TOC in Fall 2014; however, the analysis method did not change
Un-ionized ammonia calculated using lab reported ammonia, field temperature and field pH	

Table 8
Landfill Gas
Ashfield Landfill Site

Methane Concentration (% Vol in air).

Date	Steady State					Static	
	GP1	GP2	GP3	GP4	GP5	OW6	OW6R
Apr-07	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	
Oct-07	< 0.3	< 0.3	< 0.3	< 0.3		3.7	
May-08	< 0.3	< 0.3	< 0.3	< 0.3		1.7	
Oct-08	< 0.3	< 0.3	< 0.3	< 0.3		**6.5**	
May-09	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	
Oct-09	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	
May-10	< 0.3	< 0.3	< 0.3	< 0.3		0.1	
Oct-10	< 0.3	< 0.3	< 0.3	< 0.3		2.1	
May-11	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	
Oct-11	< 0.3	< 0.3	< 0.3	< 0.3		< 0.3	
May-12	< 0.3	< 0.3	< 0.3	< 0.3		0.3	
Oct-12	< 0.3	< 0.3	< 0.3	< 0.3		0.8	
May-13	0.0	0.0	0.0	0.0		0.1	
Oct-13	removed	0.0	0.0	0.0		0.8	
May-14		0.0	0.0	0.0	0.0	Decom	NA
Oct-14		0.0	0.0	0.0	0.0		0.1
May-15		0.0	0.0	0.0	0.0		0.9
Oct-15		0.1	0.0	0.0	0.0		0.7
May-16		0.0	0.0	0.0	0.0		0.0
Oct-16		0.0	0.0	0.0	0.0		0.0
May-17		0.0	0.0	0.0	0.0		0.0
Oct-17		0.0	0.0	0.0	0.0		0.4
May-18		0.0	0.0	0.0	0.0		0.0
Oct-18		0.0	0.0	0.0	0.0		0.0
May-19		0.0	0.0	0.0	0.0		0.0
Oct-19		0.0	0.0	0.0	0.0		0.0

Notes:

1) **Bold** values indicate methane exceeded the Lower Explosive Limit of 5% volume in air.

2) Steady state methane concentrations were obtained after purging the probe of accumulated gas and continuing to monitor until the methane concentration appeared stable.

3) Static methane concentrations were obtained from the well headspace immediately after opening.

4) From 2007 to 2012: The GEM 2000 used for gas monitoring was reported with a detection limit of 0.3 % methane in air.

5) 2013 - present: The GEM 2000 has a detection limit of 0.0% methane in air, with the following accuracy:

+/- 0.3% for 0 - 5% CH_4

+/- 1.0% for 5 - 15% CH_4

+/- 3.0% for 15% - Full Scale CH_4

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Ashfield Landfill ESA

Ontario

Ministry of the Environment and Climate Change
Ministère de l'Environnement et de l'Action en matière de changement climatique

AMENDMENT TO ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A161101
Notice No. 1
Issue Date: April 19, 2016

The Corporation of the Township of Ashfield-Colborne-Wawanosh
82133 Council Line
Rural Route, No. 5
Goderich, Ontario
N7A 3Y2

Site Location: Ashfield Landfill Site
Part Lot 10, Concession 6, East Division
Township of Ashfield-Colborne-Wawanosh, County of Huron

You are hereby notified that I have amended Approval No. A161101 issued on May 2, 2012 for a use and operation of a 3.4 hectares landfilling site within a total site areas of 36.0 hectares, having a maximum capacity of 224,000 cubic meters including waste and daily cover , as follows:

Condition 25 is hereby revoked and replaced by the following:

Biennial Report:

25. On a biennial basis, on March 31st of every second calendar year commencing on March 31, 2018, the *Owner* shall submit to the *District Manger* , a written Report prepared by a licensed professional engineer or a geoscientist on the development, operation and monitoring of the *Site* . The Report shall include, but not be limited to the following:

    a. *Site* plans showing the existing conditions and contours, areas of intended operation during the next reporting period, areas of excavation during the reporting period, the progress of final cover, vegetative cover and any intermediate cover applications, and any other *Site* activities;

    b. a summary of the type and quantity of all wastes received and or rejected at the *Site* ;

    c. calculations of the volume of waste, daily, intermediate and final cover deposited or placed at the *Site* during the reporting period;

    d. a calculation of the utilized capacity, the remaining capacity and an estimate for the closure date;

e. the results and an interpretive analysis of the results of all groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs and compliance with Provincial Water Quality Objectives and Guideline B-7, Incorporation of the Reasonable Use Concept Into MOEE Groundwater Management Activities (MOE 1994);

f. any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the *Site* and during the facility inspections and any mitigative actions taken;

g. a report on the status of all monitoring wells, with a statement as to compliance with O. Regulation 903;

h. any complaints from the public received by the *Owner* and a description of the action taken by the *Owner* in response;

i. a record of any inspections of any control, treatment, disposal or monitoring facilities; and

j. any recommendations to minimize environmental impacts from the operation of the *Site* and to improve *Site* operations and monitoring programs in this regard.

The following items form Schedule A:

4. Application for an Environmental Compliance Approval for a Waste Disposal Site, dated October 20, 2015, signed by Brian Van Osch, Director of Public Works, submitted to the MOECC. with the supporting documents.

5. Report entitled "2014 Annual Operations and Monitoring Report Ashfield Landfill Site, Township of Ashfield- Colborne- Wawanosh", dated March 2015, prepared by Joy Rutherford, P.Geo., Hydrogeologist, and signed by Kent Hunter, P. Eng, Project Manager, R.J. Burnside & Associates Ltd..

The reason for this amendment to the Environmental Compliance Approval is as follows:

The reason for the Condition 25 to amend to Biennial, due to the consistency of the *Site* monitoring. This change will not effect the monitoring frequency at the site.

This Notice shall constitute part of the approval issued under Approval No. A161101 dated May 2, 2012

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;

2. The grounds on which you intend to rely at the hearing in relation to each portion appealed.

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in.

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of Part II.1 of the Environmental Protection Act
Ministry of the Environment and Climate Change
135 St. Clair Avenue West, 1st Floor
Toronto, Ontario
M4V 1P5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 326-5370 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 19th day of April, 2016

THIS NOTICE WAS MAILED
ON April 28, 2016
(Signed)

Dale D. Gable

Dale Gable, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

NB/

c: District Manager, MOECC Owen Sound
Kent Hunter/Joy Rutherford, R.J. Burnside & Associates Ltd.

Ontario

Ministry of the Environment
Ministère de l'Environnement

AMENDED ENVIRONMENTAL COMPLIANCE APPROVAL
NUMBER A161101
Issue Date: May 2, 2012

The Corporation of the Township of Ashfield- Colborne- Wawanosh
82133 Council Line
Rural Route, No. 5
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Site Location: Ashfield Landfill Site
Lot P.Lot 10, Concession 6, East Division
Ashfield- Colborne- Wawanosh Township, County of Huron

You have applied under section 20.2 of Part II.1 of the Environmental Protection Act, R.S.O. 1990, c. E. 19 (Environmental Protection Act) for approval of:

use and operation of a 3.4 ha landfilling site within a total site area of 36.0 ha, having a maximum capacity of 224,000 cubic meters including waste and daily cover

For the purpose of this environmental compliance approval, the following definitions apply:

a. "Approval" means this entire Environmental Compliance Approval including its schedules, if any, issued in accordance with Section 27 of the *Environmental Protection Act* , R.S.O. 1990 (the "Act" or the "E.P.A.");

b. "Owner" means The Corporation of the Township of Ashfield- Colborne- Wawanosh;

c. "District Manager" means the District Manager of the appropriate local District Office of the Ministry, where the Site is geographically located;

d. "District Office" means the local office of the Ministry where the Site is geographically located;

e. "Ministry" means the Ministry of the Environment;

f. "Site" means landfill site known as Ashfield Landfill Site located at Lot P.Lot 10, Concession 6, East Division, Ashfield-Colborne-Wawanosh Township, County of Huron

You are hereby notified that this environmental compliance approval is issued to you subject to the terms and

conditions outlined below:

General:

1. Except as otherwise provided by these conditions, the Site shall be designed, developed, used, maintained and operated, and all facilities, equipment and fixtures shall be built and installed, in accordance supporting documentation and plans and specifications listed in Schedule A.

2. The requirements specified in this Approval are the requirements under the Environmental Protection Act, R.S.O. 1990. The issuance of this Approval in no way abrogates the Owner's legal obligations to take all reasonable steps to avoid violating other applicable provisions of this legislation and other legislation and regulations.

3. The requirements of this Approval are severable. If any requirement of this Approval, or the application of any requirement of this Approval to any circumstance, is held invalid, the application of such requirement to other circumstances and the remainder of this Approval shall not be affected in any way.

4. The Owner shall ensure compliance with all the terms and conditions of this Approval. Any non-compliance constitutes a violation of the Environmental Protection Act, R.S.O. 1990 and is grounds for enforcement.

5. a. The Owner shall, forthwith upon request of the Director, District Manager, or Provincial Officer (as defined in the Act), furnish any information requested by such persons with respect to compliance with this Approval, including but not limited to, any records required to be kept under this Approval; and

   b. In the event the Owner provides the Ministry with information, records, documentation or notification in accordance with this Approval (for the purposes of this condition referred to as "Information"),

      (i) the receipt of Information by the Ministry;
      (ii) the acceptance by the Ministry of the Information's completeness or accuracy; or
      (iii) the failure of the Ministry to prosecute the Owner, or to require the Owner to take any action, under this Approval or any statute or regulation in relation to the Information;

   shall not be construed as an approval, excuse or justification by the Ministry of any act or omission of the Owner relating to the Information, amounting to non-compliance with this Approval or any statute or regulation.

6. The Owner shall allow Ministry personnel, or a Ministry authorized representative(s), upon presentation of credentials, to:

   a. carry out any and all inspections authorized by Section 156, 157 or 158 of the Environmental Protection Act, R.S.O. 1990, Section 15, 16 or 17 of the Ontario Water

Resources Act, R.S.O. 1990, or Section 19 or 20 of the Pesticides Act, R.S.O. 1990, as amended from time to time, of any place to which this Approval relates; and,

without restricting the generality of the foregoing, to:

b. (i) enter upon the premises where the records required by the conditions of this Approval are kept;

(ii) have access to and copy, at reasonable times, any records required by the conditions of this Approval;

(iii) inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations required by the conditions of this Approval; and

(iv) sample and monitor at reasonable times for the purposes of assuring compliance with the conditions of this Approval.

7. a. Where there is a conflict between a provision of any document referred to in Schedule "A", and the conditions of this Approval, the conditions in this Approval shall take precedence; and

b. Where there is a conflict between documents listed in Schedule "A", the document bearing the most recent date shall prevail.

8. The Owner shall ensure that all communications/correspondence made pursuant to this Approval includes reference to the Approval number.

9. The Owner shall notify the Director in writing of any of the following changes within thirty (30) days of the change occurring:

a. change of Applicant or operator of the Site or both;

b. change of address or address of the new Owner;

c. change of partners where the Owner or operator is or at any time becomes a partnership, and a copy of the most recent declaration filed under the Business Names Act, 1991 shall be included in the notification to the Director;

d. any change of name of the corporation where the Owner or operator is or at any time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" (form 1 or 2 of O. Reg. 182, Chapter C-39, R.R.O. 1990 as amended from time to time), filed under the Corporations Information Act shall be included in the notification to the Director; and

e. change in directors or officers of the corporation where the Owner or operator is or at any

time becomes a corporation, and a copy of the most current "Initial Notice or Notice of Change" as referred to in 9(d), supra.

10. In the event of any change in ownership of the Site, the Owner shall notify, in writing, the succeeding owner of the existence of this Approval, and a copy of such notice shall be forwarded to the Director.

11. Any information relating to this Approval and contained in Ministry files may be made available to the public in accordance with the provisions of the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, C. F-31.

12. All records and monitoring data required by the conditions of this Approval must be kept on the Owner's premises for a minimum period of two (2) years from the date of their creation.

13. A sign shall be installed and maintained at the main entrance/exit to the Site on which is legibly displayed the following information:

    a. the name of the Site, Owner and Operator;
    b. the number of the Approval;
    c. the normal hours of operation;
    d. the allowable and prohibited waste types;
    e. the telephone number to which complaints may be directed;
    f. a twenty four hour emergency telephone number (if different from above); and
    g. a warning against dumping outside the Site.

14. A training program for all employees that operate any aspect of the Site shall be developed and implemented by the Owner. Only trained employees shall operate any aspect of the Site or carry out any activity required under this Approval. For the purpose of this Approval "trained" means knowledgeable either through instruction or practice in:

    a. the relevant waste management legislation, regulations, guidelines and requirements of this Approval;
    b. major environmental concerns pertaining to the waste to be handled;
    c. the proper handling of wastes;
    d. the management procedures including the use and operation of equipment for the processes and wastes to be handled;
    e. the emergency response procedures; and
    f. the specific written procedures for the control of nuisance conditions.

15. a. An inspection of the waste area, Site perimeter and all equipment on the Site, shall be conducted each day the Site is in operation to ensure that the Site is being operated in compliance with this Approval. Any deficiencies discovered as a result of the inspection shall be remedied immediately, including temporarily ceasing operations at the Site if needed.

b. A record of the inspections shall kept in a daily log book that includes:

i. the name and signature of person that conducted the inspection;
ii. the date and time of the inspection;
iii. the list of any deficiencies discovered;
iv. the recommendations for remedial action; and
v. the date, time and description of actions taken.

16. The Owner must conduct, on each operating day, a visual inspection of the waste area and Site perimeter to ensure that the Site is secure and that no off-site nuisance impacts such as vermin, vectors, odour, dust, litter, noise and traffic, result from the operation of the Site.

17. If at any time, the Owner receives complaints regarding the operation of the Site, the Owner shall respond to these complaints according to the following procedure:

a. The Owner shall record each complaint on a formal complaint form entered in a sequentially numbered log book. The information recorded shall include the nature of the complaint, the name, address and the telephone number of the complainant and the time and date of the complaint;

b. The Owner, upon notification of the complaint shall initiate appropriate steps to determine all possible causes of the complaint, proceed to take the necessary actions to eliminate the cause of the complaint and forward a formal reply to the complainant; and

c. The Owner shall include a summary of all complaints received in the Annual Report to be submitted to the Ministry.

Site Design, Development and Operation:

18. The Site shall be designed, developed and operated in accordance with the *Township of Ashfield-Colborne- Wawanosh, Ashfield Landfill Site, Design and Operations Report* , dated November 2010, prepared by R. J. Burnside & Associates Limited, signed by Kent Hunter, P. Eng. , terms and conditions of this Approval and items listed in Schedule A.

19. a. Only solid non-hazardous waste generated within the Township of Ashfield- Colborne-Wawanosh shall be accepted at the Site.

b. The Owner shall ensure that waste accepted at the Site is of the type and source approved under this Approval.

c. The Owner shall clearly mark limits of the approved landfilling footprint and take all measures to prevent landfilling beyond approved limits.

20. Cover material shall be applied as follows:

a. Operational Cover: On a weekly basis, the entire working face shall be covered with a minimum thickness of 150 mm of soil cover or approved alternative cover material;

b. Intermediate Cover: In areas where landfilling has been temporarily discontinued for 2 months or more, a minimum thickness of 300 mm of soil cover shall be placed; and

c. Final Cover: In areas where landfilling has been completed to final contours, a minimum of 600 mm of low permeability soils (hydraulic conductivity of 1×10^{-6} cm/s), 150 mm of top soil and vegetative cover shall be applied. Fill areas shall be progressively capped and rehabilitated as landfill development reaches final contours.

21. a. The Owner shall not excavate any deeper than the base contours shown in Figure RSP-2, Item 3, Schedule A, and shall maintain a minimum of one meter separation distance between the groundwater table and the base of the landfill Site.

b. The Owner shall ensure that appropriate fill material and proper compaction techniques are used for landfill base preparation.

22. The Owner shall adhere to final contours in Figure 9, Item 2, Schedule A, with final contours not exceeding 4H:1V and 20H:1V.

23. All recycling activities at the Site shall be maintained in a safe and orderly manner and material shall be removed from the Site for final destination on a regular basis.

Groundwater, Surface Water and Landfill Gas Monitoring:

24. a. The Owner shall ensure that the monitoring program as outlined in Section 7.1, Item 2, Schedule A, and modifications listed in Item 3, Schedule A, is carried out by a qualified person.

b. All groundwater and leachate monitoring wells shall be constructed, maintained and decommissioned as per Ontario Regulation 903, at all times.

c. The Owner may request and obtain written consensus of the District Manager, for any proposed changes to the monitoring program, prior to these changes taking effect.

d. The Owner shall apply trigger levels and contingency plans outlined in Sections 7.2 and 7.3, Item 2, Schedule A.

Annual Report:

25. On an annual basis, on March 31st of each calendar year, the Owner shall submit to the District

Manger, a written Annual Report prepared by a licensed professional engineer on the development, operation and monitoring of the Site. The Annual Report shall include, but not be limited to the following:

a. Site plans showing the existing conditions and contours, areas of intended operation during the next reporting period, areas of excavation during the reporting period, the progress of final cover, vegetative cover and any intermediate cover applications, and any other Site activities;

b. a summary of the type and quantity of all wastes received and or rejected at the Site;

c. calculations of the volume of waste, daily, intermediate and final cover deposited or placed at the Site during the reporting period;

d. a calculation of the utilized capacity, the remaining capacity and an estimate for the closure date;

e. the results and an interpretive analysis of the results of all groundwater, surface water and landfill gas monitoring, including an assessment of the need to amend the monitoring programs and compliance with Provincial Water Quality Objectives and Guideline B-7, Incorporation of the Reasonable Use Concept Into MOEE Groundwater Management Activities (MOE 1994);

f. any environmental and operational problems, that could negatively impact the environment, encountered during the operation of the Site and during the facility inspections and any mitigative actions taken;

g. a report on the status of all monitoring wells, with a statement as to compliance with O. Regulation 903;

h. any complaints from the public received by the Application and a description of the action taken by the Applicant in response;

i. a record of any inspections of any control, treatment, disposal or monitoring facilities; and

j. any recommendations to minimize environmental impacts from the operation of the Site and to improve Site operations and monitoring programs in this regard.

Closure Plan:

26. At least two years prior to the anticipated date of closure of this Site, the Owner shall submit to the Director for approval a detailed Site closure plan pertaining to the termination of landfilling operations at this Site, post-closure inspection, maintenance and monitoring, and end use. The plan shall include but not be limited to the following:

    a. a plan showing Site appearance after closure;
    b. a description of the proposed end use of the Site;
    c. a descriptions of the procedures for closure of the Site, including:

i. advance notification of the public of the landfill closure;
ii. posting of a sign at the Site entrance indicating that the landfill is closed and identifying any alternative waste disposal arrangements;
iii. completion, inspection and maintenance of the final cover and landscaping;
iv. site security;
v. removal of unnecessary landfill related structures, buildings and facilities;
vi. final construction of any control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas; and
vii. a schedule indicating the time period for implementing sub-conditions i) to vi) above.

d. descriptions of the procedures for post-closure care of the Site, including:
   i. operation, inspection and maintenance of the control, treatment, disposal and monitoring facilities for leachate, groundwater, surface water and landfill gas;
   ii. record keeping and reporting; and
   iii. complaint contact and response procedures;

e. an assessment of the adequacy of and need to implement the contingency plans for leachate and methane gas; and
f. an updated estimate of the contaminating life span of the Site, based on the results of the monitoring programs to date.

28. The Site shall be closed in accordance with the closure plan as approved by the Director.

The following items form Schedule A:

1. Application for a Certificate of Approval for a Waste Disposal Site, dated June 9, 1972.

2. Township of Ashfield- Colborne- Wawanosh, Ashfield Landfill Site, Design and Operations Report, dated Nov. 2010, prepared by R. J. Burnside & Associates Limited, signed by Kent Hunter, P. Eng.

3. Letter package dated April 5, 2012, from Kent Hunter, P. Eng. of R. J. Burnside & Associates Limited, in response to the MOE comments.

The reasons for the imposition of these terms and conditions are as follows:

1. The reason for Condition 1 is to ensure that the Site is operated in accordance with the application and supporting documentation submitted by the Owner, and not in a manner which the Director has not been asked to consider.

2. The reason for Conditions 2, 3, 4, 7, 8, 9, 10, 11,12 and 13 is to clarify the legal rights and responsibilities of the Applicant.

3. The reason for Condition 5 and 6 is to ensure that the appropriate Ministry staff have ready access to information and the operations of the Site which are approved under this Approval. Condition 6 is supplementary to the powers of entry afforded a Provincial Officer pursuant to the Environmental Protection Act, the Ontario Water Resources Act, and the Pesticides Act, as amended.

4. The reason for Condition 14 is to ensure that staff are properly trained in the operation of the Site.

5. The reason for Condition 15 and 16 is to ensure that the Site is operated in a manner which does not result in a nuisance or a hazard to the health and safety of the environment or people.

6. The reason for Condition 17 is to ensure that complaints are properly and quickly resolved, and that the complaints and follow-up actions have been documented.

7. The reason for Condition 18 is to ensure that the Site is operated in accordance with the application and supporting information submitted by the Owner, and not in a manner which the Director has not been asked to consider.

8. The reason for Condition 19 is to limit the type of waste, waste footprint and area that may be served by the Site.

9. The reason for Condition 20 is to ensure waste is covered at regular intervals and the Site is progressively capped with acceptable final contours.

10. The reason for Condition 21 and 22 is to ensure waste is deposited within the approved limits.

12. The reason for Condition 23 is to ensure recyclables temporarily stored at the Site do not cause adverse impact and that they are frequently removed from the Site.

13. The reason for Condition 24 is to ensure that an appropriate monitoring program is in place and is carried out to prevent adverse impact.

14. The reason for Condition 25 is to ensure regular monitoring and reporting of the information.

15. The reason for Condition 26 and 27 is to ensure that the Site is closed in accordance with Ministry standards and to protect the health and safety of the public and the environment.

Upon issuance of the environmental compliance approval, I hereby revoke Approval No(s). A161101 issued on February 29, 1998 and all subsequent amendments.

In accordance with Section 139 of the Environmental Protection Act, you may by written Notice served upon me and the Environmental Review Tribunal within 15 days after receipt of this Notice, require a hearing by the Tribunal. Section 142 of the Environmental Protection Act provides that the Notice requiring the hearing shall state:

1. The portions of the environmental compliance approval or each term or condition in the environmental compliance approval in respect of which the hearing is required, and;
2. The grounds on which you intend to rely at the hearing in relation to each portion appealed

Pursuant to subsection 139(3) of the Environmental Protection Act, a hearing may not be required with respect to any terms and conditions in this environmental compliance approval, if the terms and conditions are substantially the same as those contained in an approval that is amended or revoked by this environmental compliance approval.

The Notice should also include:

3. The name of the appellant;
4. The address of the appellant;
5. The environmental compliance approval number;
6. The date of the environmental compliance approval;
7. The name of the Director, and;
8. The municipality or municipalities within which the project is to be engaged in

And the Notice should be signed and dated by the appellant.

This Notice must be served upon:

The Secretary*
Environmental Review Tribunal
655 Bay Street, Suite 1500
Toronto, Ontario
M5G 1E5

AND

The Director appointed for the purposes of
Part II.1 of the Environmental Protection Act
Ministry of the Environment
2 St. Clair Avenue West, Floor 12A
Toronto, Ontario
M4V 1L5

*** Further information on the Environmental Review Tribunal's requirements for an appeal can be obtained directly from the Tribunal at: Tel: (416) 212-6349, Fax: (416) 314-4506 or www.ert.gov.on.ca**

The above noted activity is approved under s.20.3 of Part II.1 of the Environmental Protection Act.

DATED AT TORONTO this 2nd day of May, 2012

THIS APPROVAL WAS MAILED
ON May 4, 2012
9C
(Signed)

Tesfaye Gebrezghi, P.Eng.
Director
appointed for the purposes of Part II.1 of the
Environmental Protection Act

NP/
c: District Manager, MOE Owen Sound
Kent Hunter, P.Eng., R.J. Burnside & Associates Limited √

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

Water Well Records

EASTERN DIVISION

UTM 17 Z 450950 E
CON. VI LOT 9

17 R 4857980 N

Elev. 17 R 10825

Basin 22

8

40P/13E

30 No 015

RECEIVED
JUL 12 1949
GEOLOGICAL BRANCH
DEPARTMENT OF MINES

ONTARIO

The Well Drillers Act

Department of Mines, Province of Ontario

Water Well Record

Eastern Division

[redacted] Con. 6 ED Lot SH (9) Pt. Lot ....

[redacted] Acres 100

[redacted] including pump) ....

Pipe and Casing Record		Pumping Test	
Casing diameter(s)	4	Date	
Length(s) of casing(s)		Developed Capacity	
Length of screen		Duration of Test	
Type of screen		Pumping Rate	6 gal
Type of pump		Drawdown	20 ft
Capacity of pump		Static level of completed well	84 ft
Depth of pump setting		Is well a gravel-wall type?	

Water Record

Kind (fresh or mineral) .... fresh

Quality (hard, soft, contains iron, sulphur etc.) .... hard

....

Appearance (clear, cloudy, coloured) .... clear

For what purpose(s) is the water to be used? Domestic & Stock

....

How far is well from possible source of contamination? ——

What is source of contamination? ——

Enclose a copy of any mineral analysis that has been made of water

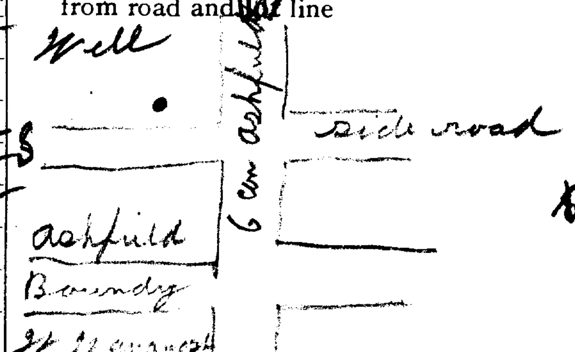
Depth(s) to Water Horizon(s)	Kind of Water	No. of Feet Water Rises
		111

Well Log

Drift and Bedrock Record	From	To
Dug well	0 ft.	18 ft.
sand	18	65
gravel	65	80
clay	80	122
Till	122	135
rock	135	195

Location of Well

In diagram below show distances of well from road and lot line



85 ft from side road

3/4 mile from 6 con ashfield

60 rod from 11 line

125 South of River

Situation: Is well on upland, in valley, or on hillside? ....

Drilling Firm Wm. Davidson & Son

Address Wingham

Recorded by Edwin Thompson Whitley Address Wingham

Date June 6 - 1949 Licence Number ....

CSS.S8

40P/13E

Coded

3001843

UTM 17 Z 4512110
5 R 4858970
Elev. 5 R 1085
Basin 22

Water management in Ontario

The Ontario Water Resources Commission Act

WATER WELL RECORD

County or District: Huron | Township, Village, Town or City: Ashfield

Con. 6 DIV. E. | Lot N.H. 9 | Date completed 6 (day) Nov. (month) 1968 (year)

[redacted] dress R. R. 1, Dungannon, Ontario.

Casing and Screen Record

Inside diameter of casing	5-3/16"
Total length of casing	147-8
Type of screen	----
Length of screen	----
Depth to top of screen	----
Diameter of finished hole	5-3/16"

Pumping Test

Static level	97'
Test-pumping rate	10 G.P.M.
Pumping level	101'
Duration of test pumping	5 hrs.
Water clear or cloudy at end of test	clear
Recommended pumping rate	10 G.P.M.
with pump setting of	120 feet below ground surface

Well Log / Water Record

Overburden and Bedrock Record	From ft.	To ft.	Depth(s) at which water(s) found	Kind of water (fresh, salty, sulphur)
Rough Gravel	0	50		
Sand & Gravel	50	80		
Hardpan	80	110		
Clay, brown	110	132		
Shale, brown	132	147		
Rock, grey	147	197	197	fresh

For what purpose(s) is the water to be used? D - S

Is well on upland, in valley, or on hillside? Upland

Drilling or Boring Firm G. L. Davidson "Davidson Well Drilling"

Address Box 486 Wingham, Ont.

Licence Number 2801

Name of Driller or Borer Fred Sturdy

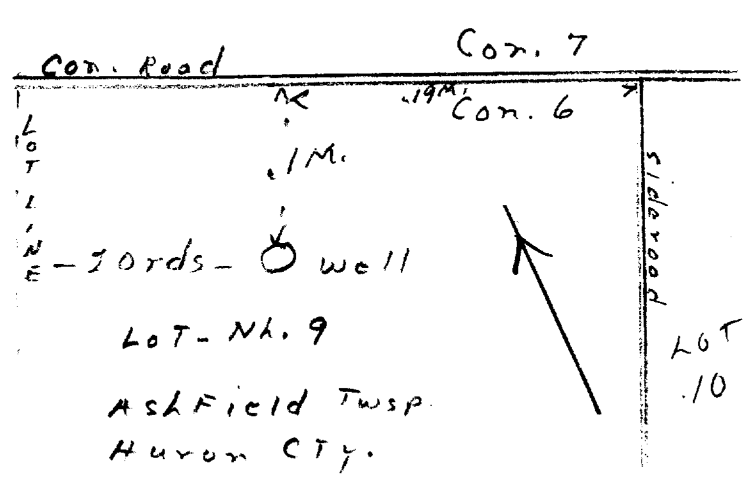
Address Wingham, Ont.

Date Nov. 9/68

G. L. Davidson
(Signature of Licensed Drilling or Boring Contractor)

Location of Well

In diagram below show distances of well from road and lot line. Indicate north by arrow.



Form 7

OWRC COPY

CSS.S8

Ministry of the Environment

Ontario

The Ontario Water Resources Act

WATER WELL RECORD

40P/13E

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 3003606 MUNICIP. 30001 CON. ED 07

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 009
Huron	Ashfield E.D. Twp.	Con. 7	S½ 9

[redacted] # 1, Dungannon, Ont.

DATE COMPLETED 02 DAY 15 MO [illegible] YR. 78

59150 RC 5 ELEVATION 0830 RC 5 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
	Topsoil			0	1
	Gravel			1	16
	Sand	Gravel		16	21
Brown	Clay	Sand, gravel streaks		21	48
Brown	Clay		Sandy	48	76
Grey	Hardpan	Stones		76	98
	Sand	Gravel, clay		98	108
Br.-White	Shale		Soft	108	117
Grey-Br.	Limestone		Hard	117	144
Brown	Limestone	Blue shale streaks	Medium	144	152
Lt.Brown	Limestone		Hard	152	201

31 0001 02 0016 11 0021 28 11 0048 60 528 11 0076 60 581 0098 2 14 12 1

32 0108 28 11 05 0117 6 17 85 75 0144 2 15 73 0152 6 15 17 74 0201 6 15 75 73

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0132 ~~133~~ ~~201~~	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
0193	1 ~~☒~~ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	0119 ~~119-4~~
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		119-4	0201
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER INCHES	LENGTH FEET

MATERIAL AND TYPE | DEPTH TO TOP OF SCREEN FEET

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT LEAD PACKER, ETC.)

71 PUMPING TEST

PUMPING TEST METHOD: 1 ☒ PUMP ~~2 ☒ BAILER~~ | PUMPING RATE: 0010 GPM | DURATION OF PUMPING: 01 HOURS 10 MINS

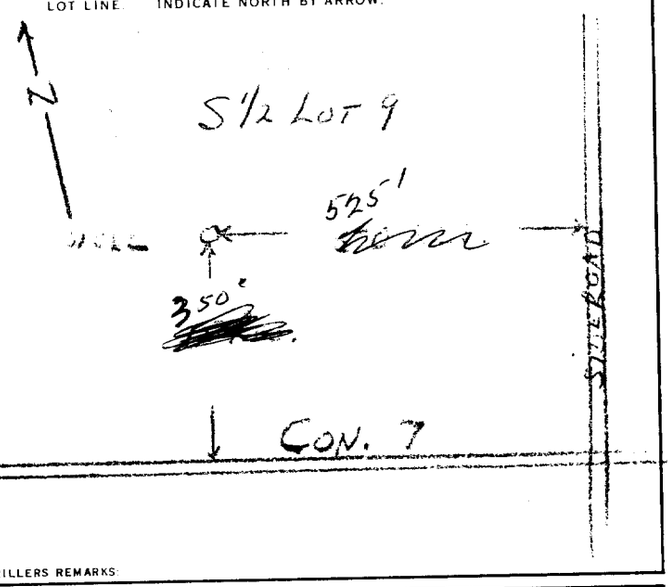
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
064 FEET	090 FEET		082 FEET	087 FEET	090 FEET	090 FEET

IF FLOWING, GIVE RATE: GPM | PUMP INTAKE SET AT: 190 FEET | WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY

RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP | RECOMMENDED PUMP SETTING: 110 FEET | RECOMMENDED PUMPING RATE: 0010 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1 ☒ WATER SUPPLY; 2 ☐ OBSERVATION WELL; 3 ☐ TEST HOLE; 4 ☐ RECHARGE WELL; 5 ☐ ABANDONED, INSUFFICIENT SUPPLY; 6 ☐ ABANDONED, POOR QUALITY; 7 ☐ UNFINISHED

WATER USE 55-56 12: 1 ☒ DOMESTIC; 2 ☒ STOCK; 3 ☐ IRRIGATION; 4 ☐ INDUSTRIAL; ☐ OTHER; 5 ☐ COMMERCIAL; 6 ☐ MUNICIPAL; 7 ☐ PUBLIC SUPPLY; 8 ☐ COOLING OR AIR CONDITIONING; 9 ☐ NOT USED

METHOD OF DRILLING 57 2: 1 ☐ CABLE TOOL; 2 ☒ ROTARY (CONVENTIONAL); 3 ☐ ROTARY (REVERSE); 4 ☐ ROTARY (AIR); 5 ☐ AIR PERCUSSION; 6 ☐ BORING; 7 ☐ DIAMOND; 8 ☐ JETTING; 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Davidson Well Drilling Limited | LICENCE NUMBER: 1737

ADDRESS: Box 486, Wingham, Ontario.

NAME OF DRILLER OR BORER: T.Thompson & D. Casemore | LICENCE NUMBER:

SIGNATURE OF CONTRACTOR | SUBMISSION DATE: DAY 17 MO. Feb. YR. 78

OFFICE USE ONLY

DATA SOURCE 58: 1 | CONTRACTOR 59-62: 1737 | DATE RECEIVED 63-68: 050578 80

DATE OF INSPECTION: 11/5/79 | INSPECTOR: J

REMARKS: Pitless P/P WI D

CSS.S8

FORM NO. 0506-4-77

MINISTRY OF THE ENVIRONMENT COPY

Ministry of the Environment
Ontario

The Ontario Water Resources Act 40 P/13 E

WATER WELL RECORD

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

(11) 3003826 MUNICIP. 30001 CON. ED 06

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT 25-27
Huron	Ashfield ~~E.D.~~	Con. ~~7~~ E.D. ~~VI~~	008

[redacted]R. # 1, Dungannon, Ontario.

DATE COMPLETED 48-53: DAY 23 MO. 03 ~~Mar.~~ YR. 79

[redacted]59300 RC 5 ELEVATION 0825 RC 5 BASIN CODE 22

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	TO
	Topsoil			0	1
Brown	Clay		Soft	1	6
Blue	Clay		Hard	6	34
Blue	Clay	Sand	Soft, mixed	34	70
Blue	Clay		Hard	70	132
Grey	Hardpan	Stones	Hard	132	151
Brown	Broken Lime		Soft	151	161
Lt.Brown	Limestone	White shale	Medium	161	201

(31) 0001 02 | 0006 05 85 | 0034 05 73 | 0070 05 28 85 | 0132 05 73 | 0151 21 41 273 | 1

(32) 0161 15 71 85 | 0201 61 51 778

(41) WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0178 ~~201~~	1 ☒ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
15-18	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
20-23	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
25-28	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL
30-33	1 ☐ FRESH 3 ☐ SULPHUR 2 ☐ SALTY 4 ☐ MINERAL

(51) CASING & OPEN HOLE RECORD

INSIDE DIAM INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	TO
05	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE	.188	0	~~162-1~~ 0162
05	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☒ OPEN HOLE		162-1	0201
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.) — DIAMETER INCHES — LENGTH FEET
MATERIAL AND TYPE — DEPTH TO TOP OF SCREEN FEET

(61) PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

(71) PUMPING TEST

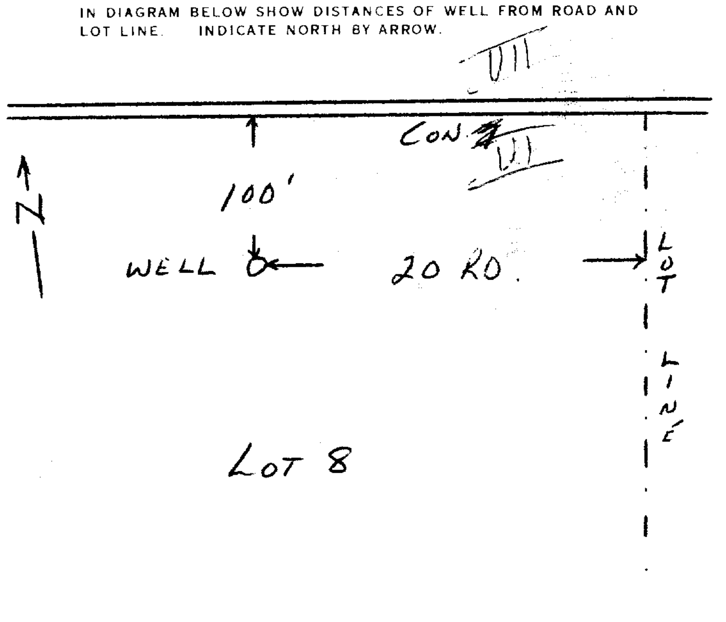
PUMPING TEST METHOD: air — 1 ☒ PUMP 2 ☐ BAILER
PUMPING RATE: 0010 GPM
DURATION OF PUMPING: 01 HOURS 30 MINS

STATIC LEVEL	WATER LEVEL END OF PUMPING	15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
083 FEET	088 FEET	085 FEET	087 FEET	088 FEET	088 FEET

WATER LEVELS DURING: 1 ☒ PUMPING 2 ☐ RECOVERY
IF FLOWING, GIVE RATE: GPM
PUMP INTAKE SET AT: 160 FEET
WATER AT END OF TEST: 1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☐ SHALLOW ☒ DEEP
RECOMMENDED PUMP SETTING: 110 FEET
RECOMMENDED PUMPING RATE: 0010 GPM

LOCATION OF WELL

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL: 1

1 ☒ WATER SUPPLY
2 ☐ OBSERVATION WELL
3 ☐ TEST HOLE
4 ☐ RECHARGE WELL
5 ☐ ABANDONED, INSUFFICIENT SUPPLY
6 ☐ ABANDONED, POOR QUALITY
7 ☐ UNFINISHED

WATER USE: 12

1 ☒ DOMESTIC
2 ☒ STOCK
3 ☐ IRRIGATION
4 ☐ INDUSTRIAL
☐ OTHER
5 ☐ COMMERCIAL
6 ☐ MUNICIPAL
7 ☐ PUBLIC SUPPLY
8 ☐ COOLING OR AIR CONDITIONING
9 ☐ NOT USED

METHOD OF DRILLING: 2

1 ☐ CABLE TOOL
2 ☒ ROTARY (CONVENTIONAL)
3 ☐ ROTARY (REVERSE)
4 ☐ ROTARY (AIR)
5 ☐ AIR PERCUSSION
6 ☐ BORING
7 ☐ DIAMOND
8 ☐ JETTING
9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Davidson Well Drilling Limited — LICENCE NUMBER: 1737
ADDRESS: Box 486, Wingham, Ontario.
NAME OF DRILLER OR BORER: D. Casemore — LICENCE NUMBER:
SIGNATURE OF CONTRACTOR: D. Davidson — SUBMISSION DATE: DAY 26 MO. Mar. YR. 79

OFFICE USE ONLY

DATA SOURCE: 1 — CONTRACTOR: 1737 — DATE RECEIVED: 080579
DATE OF INSPECTION: 11/9/80 — INSPECTOR:
REMARKS: CSS.S8 P/P W/P

MINISTRY OF THE ENVIRONMENT COPY

FORM NO. 0506-4-77

Ontario Ministry of the Environment

The Ontario Water Resources Act
WATER WELL RECORD

Print only in spaces provided.
Mark correct box with a checkmark, where applicable.

11 (1 2) **3006919** Municipality 30001 (10 14) Con. ED (15 22 23 24) 06

County or District	Township/Borough/City/Town/Village	Con block tract survey, etc.	Lot (25-27)
Huron	Ashfield E.D. Twp.	Con. 6	W½ 10

Owner's surname (28-47) First Name	Address	Date completed (48-53)
Township of Ashfield Colborne Wawanosh	82213 Council Line R.R. 5, Goderich, Ontario	6 day July month 01 year

21 (1 2) UTM Zone (10) Easting (12-17) Northing (18-24) RC (25) DC (26) Basin Code (31-47) i ii iii iv

LOG OF OVERBURDEN AND BEDROCK MATERIALS (see instructions)

General colour	Most common material	Other materials	General description	Depth - feet From	Depth - feet To
	Abandoned O.W. 2				
	2" Observation Well 14 feet deep				

31 (10 14 15 21 32 43 54 65 75 80)
32

41 WATER RECORD

Water found at - feet	Kind of water
10-13	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (14)
15-18	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (19)
20-23	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerels 6 ☐ Gas (24)
25-28	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (29)
30-33	1 ☐ Fresh 2 ☐ Salty 3 ☐ Sulphur 4 ☐ Minerals 6 ☐ Gas (34) (60)

51 CASING & OPEN HOLE RECORD

Inside diam inches	Materiel	Wall thickness inches	Depth - feet From	Depth - feet To
10-11	1 ☐ Steel 2 ☐ Galvenized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic (12)			13-16
17-18	1 ☐ Steel 2 ☐ Galvanized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plastic (19)			20-23
24-25	1 ☐ Steel 2 ☐ Galvenized 3 ☐ Concrete 4 ☐ Open hole 5 ☐ Plestic (26)			27-30

SCREEN

Sizes of opening (Slot No.) (31-33)	Diameter (34-38) inches	Length (39-40) feet
Meteriel and type	Depth at top of screen (41-44) feet	(30)

61 PLUGGING & SEALING RECORD

☐ Annuler space ☒ Abandonment

Depth set et - feet From	Depth set et - feet To	Meteriel end type (Cement grout, bentonite, etc.)
0 (10-13)	14 (14-17)	Holeplug
(18-21)	(22-25)	
(26-29)	(30-33) (80)	

71 PUMPING TEST

Pumping test method (10) 1 ☐ Pump 2 ☐ Bailer

Pumping rete (11-14) GPM

Duretion of pumping (15-16) Hours (17-18) Mins

Static level (19-21) feet

Water level end of pumping (22-24) feet

(25) Water levels during 1 ☐ Pumping 2 ☐ Recovery

15 minutes (26-28)	30 minutes (29-31)	45 minutes (32-34)	60 minutes (35-37)
feet	feet	feet	feet

If flowing give rate (38-41) GPM

Pump intake set at feet

Weter at end of test (42) ☐ Clear ☐ Cloudy

Recommended pump type ☐ Shallow ☐ Deep

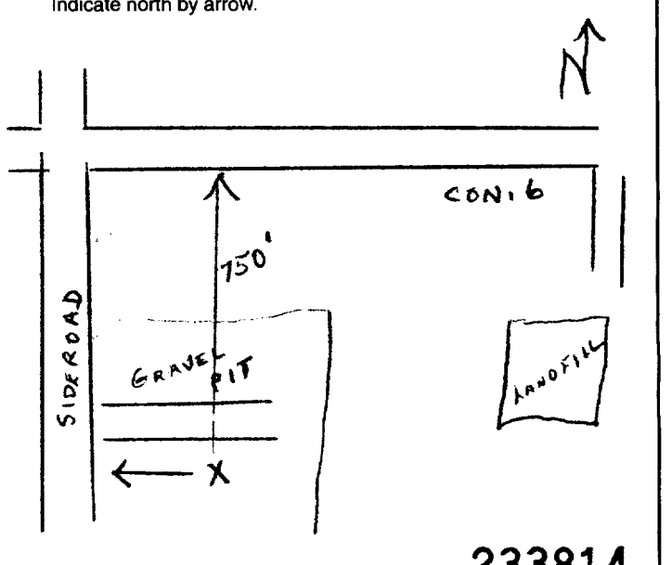
Recommended pump setting (43-45) feet

Recommended pump rate (46-49) GPM

(50-53)

LOCATION OF WELL

In diagram below show distances of well from road and lot line. Indicate north by arrow.



233814

FINAL STATUS OF WELL (54)

1 ☐ Water supply
2 ☐ Observation well
3 ☐ Test hole
4 ☐ Recharge well
5 ☐ Abandoned, insufficient supply
6 ☐ Abandoned, poor quelity
7 ☒ Abendoned (Other)
8 ☐ Dewatering
9 ☐ Unfinished
10 ☐ Replacement well

WATER USE (55-56)

1 ☐ Domestic
2 ☐ Stock
3 ☐ Irrigation
4 ☐ Industrial
5 ☐ Commercial
6 ☐ Municipel
7 ☐ Public supply
8 ☐ Cooling & eir conditioning
9 ☐ Not use
10 ☐ Other

METHOD OF CONSTRUCTION (57)

1 ☐ Cable tool
2 ☐ Rotary (conventional)
3 ☐ Rotary (reverse)
4 ☐ Rotary (air)
5 ☐ Air percussion
6 ☐ Boring
7 ☐ Diamond
8 ☐ Jetting
9 ☐ Driving
10 ☐ Digging
11 ☐ Other

Name of Well Contractor	Well Contractor's Licence No.
Davidson Well Drilling Ltd	1737
Address: Box 486, Wingham, Ontario N0G 2W0	
Name of Well Technician: G. Reavie	Well Technician's Licence No.: T0156
Signature of Technician/Contractor: D.W. DAVIDSON per: G.C. Davidson	Submission date: day 17 July yr 01

MINISTRY USE ONLY

Data source (58)	Contractor (59-62)	Date received (63-68) (80)
	1737	OCT 26 2001
Date of inspection	Inspector	
Remarks		

OSS.ES

2 - MINISTRY OF THE ENVIRONMENT COPY

0506 (07/00) Front Form 9

Ontario Ministry of the Environment

Well Tag No. (Sticker below) A 035692

A 035692

Well Record

Regulation 903 Ontario Water Resources Act

page 1 of 1

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Management Coordinator at 416-235-6203.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

ASHFIELD LANDFILL — RR#/Street Number/Name

ASHFIELD (WAWANOSH) — City/Town/Village

Site/Compartment/Block/Tract etc.

GLEN'S HILL ROAD

GPS Reading: NAD 83 | Zone 17 | Easting 045142 | Northing 4858596

Unit Make/Model

Mode of Operation: ☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (FEET)	Depth To (Metres)
BROWN	SAND AND GRAVEL			0	5'
BROWN	SILT CLAY TILL			5'	7'
GREY	SILT CLAY TILL			7'	12'6"

Hole Diameter

Depth From	Metres To	Diameter Centimetres
0	8 1/4	6"

Water Record

Water found at ___ Metres / Kind of Water

- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other:
- ___ m ☐ Fresh ☐ Sulphur ☐ Gas ☐ Salty ☐ Minerals ☐ Other: N/A

After test of well yield, water was
☐ Clear and sediment free
☐ Other, specify

Chlorinated ☐ Yes ☐ No

Construction Record

Inside diam centimetres	Material	Wall thickness centimetres	Depth From	Metres To
Casing				
2	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	SCH 40	0'	7'6"
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
	☐ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized			
Screen				
Outside diam 2	☐ Steel ☐ Fibreglass ☑ Plastic ☐ Concrete ☐ Galvanized	Slot No. .10	7'6"	12'6"
No Casing or Screen	☐ Open hole			

Test of Well Yield

Pumping test method	Draw Down Time min	Draw Down Water Level Metres	Recovery Time min	Recovery Water Level Metres
Pump intake set at - (metres)	Static Level			
Pumping rate - (litres/min)	1		1	
Duration of pumping ___hrs +___ min	2		2	
Final water level end of pumping ___metres	3		3	
Recommended pump type. ☐ Shallow ☐ Deep	4	N/A	4	
Recommended pump depth. ___metres	5		5	
Recommended pump rate. (litres/min)	10		10	
	15		15	
If flowing give rate - (litres/min)	20		20	
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record

(FEET) ☑ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0	1'	CEMENT	
1'	5'6"	BENTONITE HOLEPLUG	
5'6"	12'6"	SILICA SAND	

Method of Construction

☐ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☑ Boring ☐ Driving

Water Use

☐ Domestic ☐ Industrial ☐ Public Supply ☑ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

Final Status of Well

☐ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☑ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☑ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: LANTECH DRILLING SERVICES — Well Contractor's Licence No.: 6809

Business Address (street name, number, city etc.): 2161 MT. ALBERT RD., SHARON, ON

Name of Well Technician (last name, first name): JEREMY LYNCH — Well Technician's Licence No.: T-3019

Signature of Technician/Contractor: X — Date Submitted: 2006 08 31

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.

SEE ATTACHED

Audit No. Z 51187

Date Well Completed: 2006 08 23

Was the well owner's information package delivered? ☐ Yes ☑ No

Date Delivered

Ministry Use Only

Data Source

Contractor: 6809

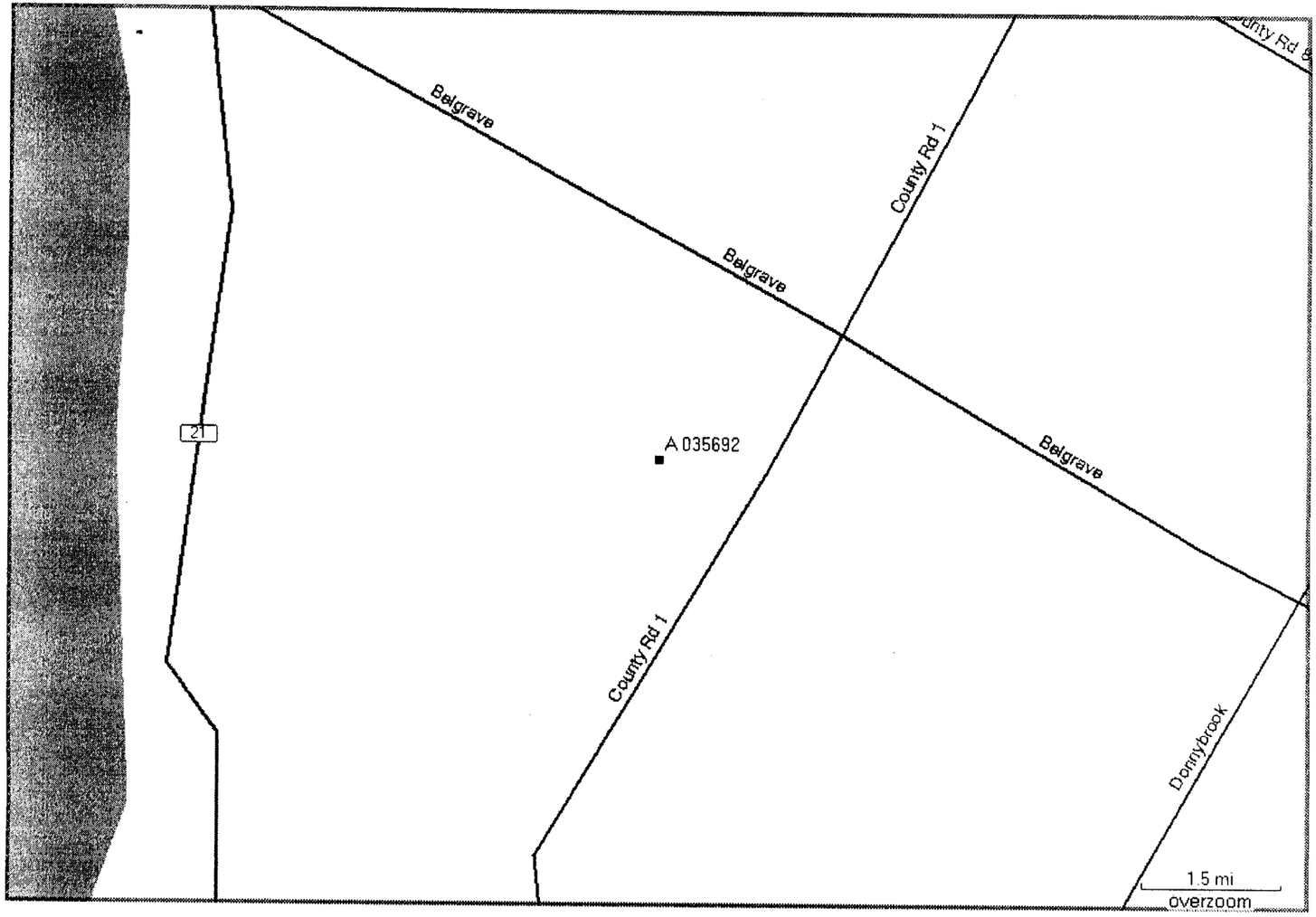
Date Received: OCT 04 2006

Date of Inspection

Remarks

Well Record Number

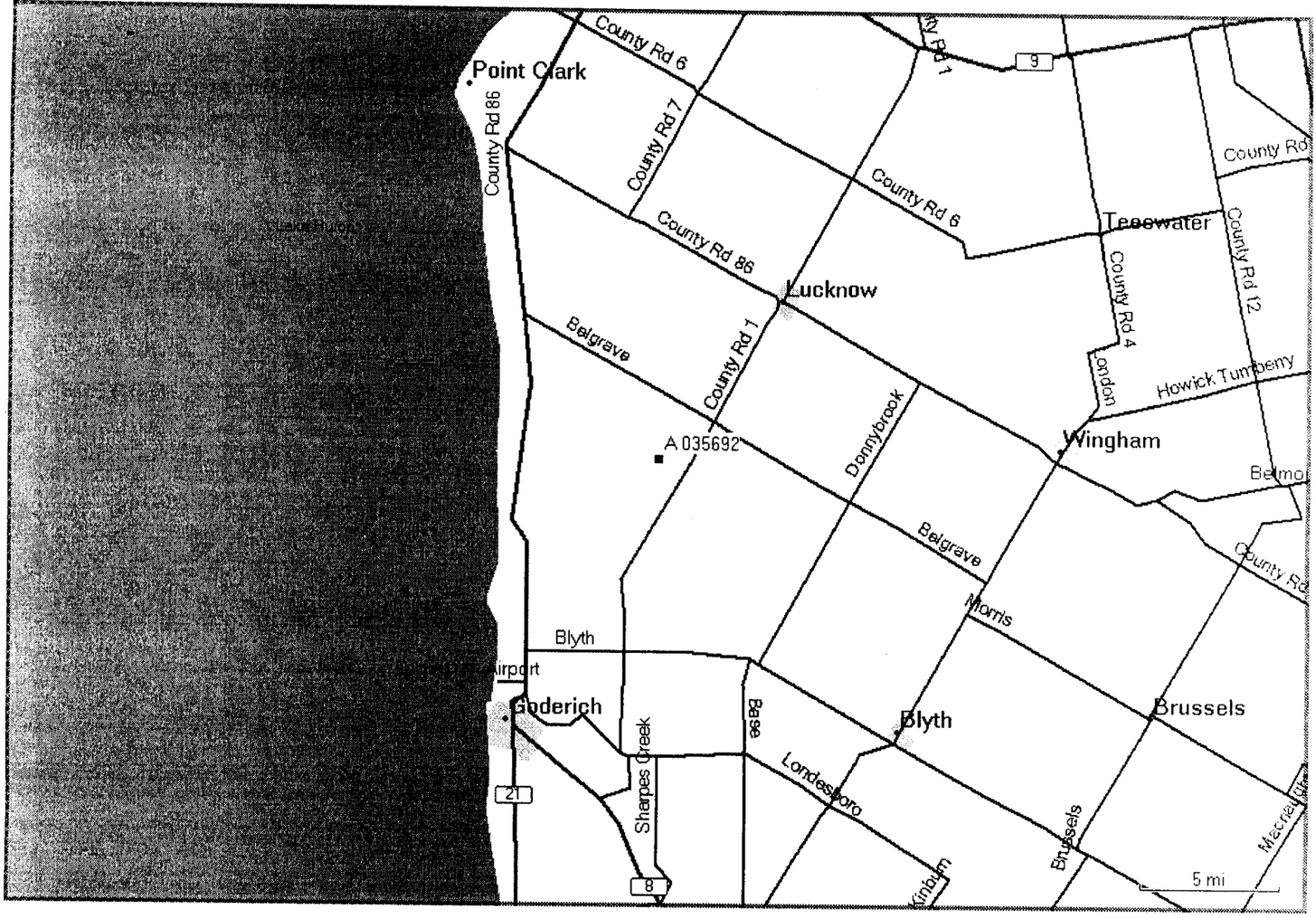
0506E (09/03) Contractor's Copy ☐ Ministry's Copy ☑ Well Owner's Copy ☐ *Cette formule est disponible en français*



OCT 0 4 2006

Z 51187

6809



OCT 0 4 2006

Z51187

6809

Ontario Ministry of the Environment

Well Tag No. **A 077567** (Print Below)

A077567

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page 1 of 2

Master Well Owner's and Land Owner's Information

First Name	Last Name	Email Address
TOWNSHIP OF ASHFIELD-COLBORNE-WAWANOSH	(% R.J. BURNSIDE & ASSOCIATES LTD.)	

Mailing Address (Street Number/Name, RR)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
82133 COUNCIL LINE	GODERICH	ONTARIO	N7A3Y2	

Location and Construction of the Master Well in the Cluster

Address of Well Location (Street Number/Name, RR)	Township	Lot	Concession
ASHFIELD LANDFILL, 36739 GLEN'S HILL RD.	ASHFIELD	10	6

County/District/Municipality	City/Town/Village	Province	Postal Code
	ASHFIELD	Ontario	

UTM Coordinates	Zone	Easting	Northing	GPS Unit Make	Model	Mode of Operation
NAD 83	17	451467	4858668			☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials *(see instructions on the back of this form)* ~~FT.~~ FT.

General Colour	Most Common Material	Other Materials	General Description	Depth (~~Metres~~) From	To
BROWN	SAND	GRAVEL, COBBLES		0	10'
GREY	SAND	GRAVEL		10'	32'
GREY	SILT	CLAY		32'	38'

Hole Details

Depth (~~Metres~~) From	To	Diameter (~~Centimetres~~)	
0	38'	8"	H.S. AUGER

Water Use

☐ Public ☐ Industrial ☐ Not used ☐ Other, specify
☐ Domestic ☐ Commercial ☐ Dewatering
☐ Livestock ☐ Municipal ☑ Monitoring
☐ Irrigation ☑ Test Hole ☐ Cooling & Air Conditioning

Method of Construction

☐ Cable Tool ☐ Air Percussion ☐ Digging
☐ Rotary (Conventional) ☐ Diamond ☐ Boring
☐ Rotary (Reverse) ☐ Jetting ☑ Other, specify
☐ Rotary (Air) ☐ Driving AUGER

Status of Well

☑ Test Hole ☐ Abandoned, Insufficient Supply
☐ Replacement Well ☐ Abandoned, Poor Water Quality
☐ Dewatering Well ☐ Other, specify
☐ Alteration (Construction) ☐ Abandoned, other, specify

Construction Details

FT.

Inside Diameter (~~Centimetres~~)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (~~Metres~~) From	To
2"	PLASTIC RISER	SCH40	0	33'
2"	PLASTIC SCREEN	SCH40	33'	38'

No Casing and Screen Used

Open Hole ☐ Yes ☑ No

Static Water Level Test

Metres

Screen

☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Concrete ☑ Plastic

Outside Diameter (~~Centimetres~~)	Slot No.
2"	0.010

Annular Space/Abandonment Sealing Record

FT.

Depth Set at (~~Metres~~) From	To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	10'	BENTONITE HOLEPLUG	
10'	29'	BENTONITE GROUT	
29'	31'	BENTONITE HOLEPLUG	
31'	38'	SILICA SAND	

Water Details

Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
Water found at Depth	Kind of Water
Metres ☐ Gas	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Disinfected ☐ Yes ☑ No If no, provide reason:	Date Master Well Completed (yyyy/mm/dd)
TEST HOLE	2008/10/16

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluster.)*

Total Wells in Cluster	Please indicate Number of Cluster Well Information Log Sheets Submitted
5	
Total Wells on this Property	1

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.

☑ Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the cluster to the Director upon request

[redacted]

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
LANTECH DRILLING SERVICES INC.	6809

Business Address (Street No./Name, number, RR)	Municipality
3661 MT. ALBERT ROAD	SHARON

Province	Postal Code	Business E-mail Address
ONTARIO	L0G1V0	

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
9054782243	TODD PASCO

Well Technician's Licence No.	Signature of Technician	Date Submitted (yyyy/mm/dd)
2252		2008/10/20

Audit No.	Well Contractor No.
M 02971	
Date Received (yyyy/mm/dd) DEC 11 2008	Date of Inspection (yyyy/mm/dd)
Remarks	

1992 (11/2006)

Ministry's Copy

Ontario

Ministry of the Environment

Well Tag No. for Master Well *(Print Well Tag No.)*

A 077567

Cluster Well Information for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

[redacted]

Address of Well Location (Street Number/Name, RR)	Lot	Concession	Township	County/District/Municipality
ASHFIELD LANDFILL, 36739 GLEN'S HILL RD.	10	6	ASHFIELD	

City/Town/Village	Province	Postal Code	GPS Unit Make	Model	Unit Mode of Operation
ASHFIELD	Ontario				☐ Undifferentiated ☐ Averaged ☐ Differentiated, specify:

upon request

Signature of Technician/Contractor

Date (yyyy/mm/dd): 2008/10/16

Well # on Sketch	UTM Coordinates Zone	Easting	Northing	Full Depth of Hole (metres)	Hole Diameter (cm)	Method of Construction	Casing Material	Casing Length (metres)	Screen Interval (metres) From	To	Annular Space Sealant Used	Static Water Level (metres)	Abandonment Sealant Used	Comments	Date of Completion (yyyy/mm/dd)
002	17	451435	4858814	10'	8"	AUGER	PLASTIC	5'	5'	10'	BENTONITE				2008/10/14
003	17	451468	4858671	10'	8"	AUGER	PLASTIC	5'	5'	10'	BENTONITE				2008/10/15
004	17	451661	4858740	30'	8"	AUGER	PLASTIC	25'	25'	30'	BENTONITE				2008/10/15
005	17	451514	4858649	30'	8"	AUGER	PLASTIC	25'	25'	30'	BENTONITE				2008/10/16

Well Contractor and Well Technician Information

Business Name of Well Contractor	Business Address (Street Number/Name, RR)	Municipality	Province
LANTECH DRILLING SERVICES INC.	3661 MT. ALBERT ROAD	SHARON	ONTARIO

Postal Code	Business Telephone No. (inc. area code)	Well Contractor's Licence No.	Business E-mail Address
L0G1V0	9054782243	6809	

Name of Well Technician (First Name, Last Name)	Well Technician's Licence No.	Date Submitted (yyyy/mm/dd)	Signature of Technician
TODD PASCO	2252	2008/10/20	

Date 1st Well in Cluster Constructed (yyyy/mm/dd)	Date Last Well in Cluster Constructed (yyyy/mm/dd)
2008/10/14	2008/10/16

Ministry Use Only

Date Received (yyyy/mm/dd)	Date Inspected (yyyy/mm/dd)
Audit No. C 04720	**Remarks** M02971

1991 (11/2006)

Ministry's Copy

C-6809
M02971
C04720.

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix E

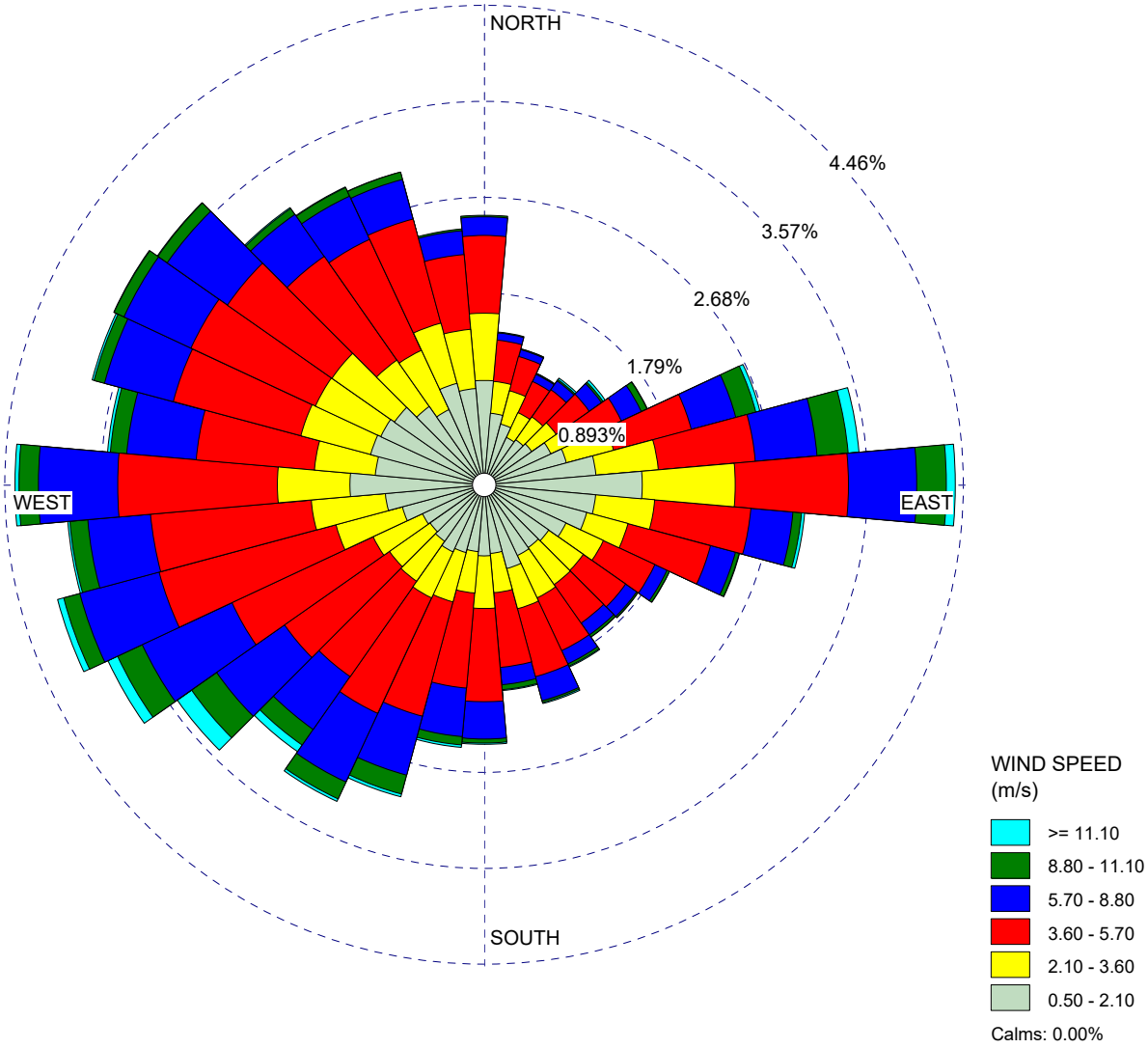
Wind Rose

WIND ROSE PLOT:

Station #61444 - LONDON, ON

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/1/1996 - 00:00** **End Date: 12/31/2000 - 23:59**	COMPANY NAME: **R.J. Burnside & Associates Limited**	
		MODELER: **KZ**	BURNSIDE
	CALM WINDS: **0.00%**	TOTAL COUNT: **43027 hrs.**	
	AVG. WIND SPEED: **3.69 m/s**	DATE: **7/26/2021**	PROJECT NO.: **300053662.0000**