

MEMORANDUM

TO: Mr. Greg Borduas
Township of Leeds and Thousand Islands
1233 Prince St.
Lansdowne, ON K0E 1L0

FROM: Malroz Engineering Inc.
308 Wellington Street, 2nd Floor
Kingston, ON K7K 7A8

Subject: 2015-2016 Groundwater Assessment Report
La Rue Mills WDS, Township of Leeds and the Thousand Islands

This letter presents results from a groundwater investigation completed in 2015 and 2016 at the closed La Rue Mills waste disposal site (WDS). Malroz Engineering Inc. (*Malroz*) was retained by the Township of Leeds and Thousand Islands (TLTI) to assess the groundwater results collected by TLTI staff and to provide a report on the results. We understand that the Ministry of Environment and Climate Change (MOECC) requested the completion of this groundwater assessment report in 2015.

Background

The La Rue Mills WDS is located on the east side of La Rue Mills Rd, on Lot 23, Concession 2 in the Township of Leeds and the Thousand Islands (former Township of Escott). We understand the Site is operated under Certificate of Approval (CofA) No. A441702, dated March 12, 1980, and that the Site is currently closed. According to a MOECC memorandum, dated Aug 2015 (see attached), the site has a licensed fill area of 1.2 hectares, and previously accepted domestic and commercial wastes. A site closure plan was submitted to the Ministry on April 10, 1975 and the dump closure was confirmed in September of 1980 (despite no mention of the Site's status in the ECA). We understand no environmental annual monitoring programs are conducted at the Site.

In August 2015, the MOECC received results of a surface water sampling event conducted by MOECC environmental scientist Sarah Baxter. The memorandum concluded that there were no adverse effects to the surface water at the WDS and that no monitoring program was required at the Site.

Site Description

La Rue Mills WDS is surrounded by agricultural fields, forest and wetlands. Two cabins are located on the property to the east of the subject site, and a house is located to the north west of the Site at 99 La Rue Mills Road. The monitoring network is shown in Figure 1. The property boundary and extent of the waste fill area are depicted in Figure 2.

Malroz attempted an inspection of the Site on June 13, 2017, however, the inspection could not be completed due to the presence of dense vegetation. *Malroz* has received notification that the vegetation has since been removed and that the pile of scrap metal located at the site is scheduled to be removed by the end of June 2017.

According to the MOECC surface water assessment, the overburden is comprised of silt and clay. The Site is located on Precambrian bedrock and glaciolacustrine deposits. Surface water drains north and east from the Site to join an un-named tributary to Jones Creek.

Groundwater Chemistry

Four groundwater wells were sampled in the fall of 2015 and spring of 2016: MW1, MW2, MW3 and MW4. The location of these wells are presented in Figure 1. Groundwater elevations recorded by Andrew Day in 2015 (Figure 1) suggest that groundwater is flowing towards the southeast. The inference is made based on limited data, and lacks control points to the north, and east of the subject site. The Site is located on a topographic high, compared to the surrounding properties. It is possible that groundwater mounding and radial flow may be occurring.

Background groundwater conditions have been based on results from MW1. Although potentially located near the waste fill area, MW1 appears to be up-gradient of the remaining wells and demonstrates the lowest concentrations of typical leachate indicators (Table 1).

Well MW2 is located in the southern portion of the waste fill area and shows elevated concentrations of the following typical leachate indicators: ammonia, DOC, conductivity, sulphate and boron. Concentrations of most of these parameters were lower in June 2016 compared to those reported in Nov 2015. The extent of impacts to the southeast of MW2 are unknown due to lack of wells.

Despite being located in the waste fill area, well MW1 shows little to no evidence of leachate. This implies that leachate impacts at MW2 are sourced somewhere between these two wells, suggesting that the northern boundary of the waste mound might be more southerly than depicted in Figure 2. However, without borehole logs and other Site details, it is difficult to determine whether this discrepancy can be attributed to geologic factors (for instance screening in a different lithology or aquifer than MW2).

Compared to background concentrations, MW3 showed elevated sulphate and boron, conductivity and ammonia. However, MW3 showed much lower concentrations of typical leachate parameters when compared to leachate well MW2.

Monitoring well MW4 showed elevated concentrations of the leachate indicator conductivity; however other leachate indicators (ammonia, DOC, sulphate, and boron) were consistent with

background concentrations. Monitoring well MW4 is located off-gradient from the leachate well (MW2). Based on the limited data available, it is unlikely leachate is impacting MW4.

The chemistry at well MW2 suggests weak leachate is present on Site however, due to incomplete data it is not possible to delineate the eastern, and western extents of contamination. A high TSS concentration is reported for all four wells on the first sampling event and at least one other event for MW2, MW3, and MW4, suggesting sedimentation and/or turbidity is potentially biasing the results.

There are several exceedances of Ontario Drinking Water Standards (ODWS) at the Site:

- Hardness – MW1, MW2, MW3, MW4 (all events)
- Alkalinity – MW2 (all events)
- DOC – MW2 (Nov 2, 2015 and Jun 23, 2016)
- TDS – MW2, MW4 (all events), and MW3 (Nov 2, Nov 30, 2015)
- Iron – MW2, MW4 (all events)
- Manganese – MW2, MW4 (all events)

Groundwater VOC's were analysed on November 30, 2015 and June 23, 2016. Results were below the method detection limits (Table 2).

Groundwater PAHs and PHCs were also analysed at the Site. Only one sampling event (November 2, 2015) at well MW1 showed detectable results. With the exception of benzo(a)pyrene, these were all below ODWS and Table 8 (O.Reg 153/04) criteria (Table 3). Considering the results for both follow-up sampling events were below detection limit, it is our opinion that PHCs and PAHs are not of concern at the Site.

Limitations

This report was prepared by Malroz Engineering Inc. (*Malroz*) for the exclusive use of the Township of Leeds and the Thousand Islands (TLTI). *Malroz* has relied upon Township staff for the collection of the data and reporting of all field activities. *Malroz* accepts no responsibility for the integrity of the data collected or missing data. Any third party use or reliance of this report, or decisions made based on this report, are the responsibilities of the third parties. *Malroz* accepts no responsibility for damages suffered by any third party as a result of decisions made or actions taken based on the contents of this report.

Conclusions and Recommendations

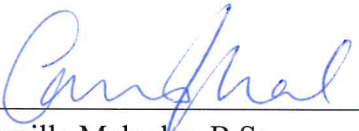
The groundwater analysis suggests leachate impacts at MW2. Some ODWS exceedances were observed at the Site, however without the ability to fully delineate potential leachate impacts and with evidence of impacted water quality off-site (MW4), it is difficult to assess if these exceedances are leachate related. If the MOECC requires future groundwater monitoring at the

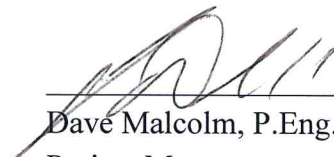
Site, we recommend that a new well, suitable to characterize the background groundwater quality, be installed.

If you have any questions or concerns regarding the above submission, please do not hesitate to contact the undersigned at (613) 548-3446.

Respectfully Submitted,

Reviewed by,


Camille Malcolm, B.Sc.
Environmental Geoscientist
Malroz Engineering Inc.


Dave Malcolm, P.Eng.
Project Manager
Malroz Engineering Inc.

Enclosed:

- Figure 1 Groundwater Network
- Figure 2 Front of Escott Con 2 Dump "La Rue Mills Dump"

- Table 1 Groundwater Chemistry Results
- Table 2 VOC Chemistry Results
- Table 3 Groundwater PHC and PAH Chemistry

La Rue Mills Dump (Closed) Surface Water Sampling Results. MOECC memorandum, August 15, 2015.



Legend

Groundwater monitoring well

87.01 2-Nov-2015 GW elevation

87.13 30-Nov-2015 GW elevation

Location	Northing (m)	Easting (m)	Elevation (mASL)
MW1	4922781	428583	91.543
MW2	4922739	428622	90.373
MW3	4922641	428621	87.224
MW4	4922630	428494	88.113

UTM NAD 83 Zone 18

Revisions

Number	Description	Initials



La Rue Mills Dump

Township of Leeds and the
Thousand Islands

A442103

Lot 23 Concession 2 (Escott)

Figure 1 – Groundwater Network

Drawn by: A. Day

Checked by: A. Day

Date: December 2015



99 La Rue Mills Road

About 136 metres

Approximate
Waste Fill Area

Vacant Lot

Shed and
Trailer
observed 14-
May-2015

Wet Area observed
14-May-2015

Dug Foundation of
house never built

Site Access

 Land Currently owned by TLTI
2014 Image from L&G County GIS

Front of Escott Con 2 Dump "La Rue Mills
Dump"

Figure 2

Township of Leeds and the Thousand Islands

Drawn By: A. Day

Date: December 2014

Table 1
Groundwater Chemistry Results

Parameter	Units	MDL	MW1			MW2			MW3			MW4			ODWS	
			2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16		
Alkalinity, total	mg/L	5	229	213	234	651	654	585	166	182	187	347	345	349	30-500	OG
Ammonia as N	mg/L	0.01	0.13	0.05	0.02	0.70	0.32	0.29	0.30	0.21	0.22	0.11	0.03	0.01		
BOD	mg/L	2	<6	<	<	<40	<	<	<6	<	<	<6	<	<		
Chemical Oxygen Demand	mg/L	10	64	<	11	242	16	21	129	17	<	155	13	<		
Dissolved Organic Carbon	mg/L	0.5	3.2	2.5	2.6	8.1	5.0	5.8	2.1	0.6	1.4	1.4	0.8	1.2	5	AO
Conductivity	uS/cm	5	464	455	485	1420	1420	1280	818	802	795	1240	1210	1240		
Hardness	mg/L	1.0	225	238	242	901	844	681	176	182	173	700	639	571	80-100	OG
pH	pH	0.1	7.4	7.2	7.2	7.4	7.1	7.1	7.8	7.7	7.8	7.8	7.6	7.5	6.5-8.5	OG
Phenolics	mg/L	0.001	<	<	<	0.003	<	<	<	<	<	<	<	<		
Phosphorus, total	mg/L	0.01	2.80	0.02	<	8.87	0.05	0.05	4.27	0.22	0.03	4.26	0.12	0.02		
Total Dissolved Solids	mg/L	10	268	278	270	770	910	818	660	528	498	660	754	782	500	AO
Total Suspended Solids	mg/L	2	4710	3	<	23100	47	261	14800	381	5	4240	115	13		
Total Kjeldahl Nitrogen	mg/L	0.1	1.0	0.2	0.2	3.5	0.6	0.5	0.9	0.4	0.2	0.5	0.2	<		
Chloride	mg/L	1	1	2	2	5	4	5	15	14	13	193	184	189	250	AO
Nitrate as N	mg/L	0.1	0.4	1.4	1.5	<	<	0.2	<	<	<	<	<	<	10	CS
Nitrite as N	mg/L	0.05	<	<	<	<	<	<	<	<	<	<	<	<	1	CS
Sulphate	mg/L	1	21	23	25	211	210	186	226	206	209	30	30	30	500	AO
Mercury	ug/L	0.1	<	<	<	<	<	<	<	<	<	<	<	<	1	CS
Aluminum	ug/L	1	<	2	<	<	<	<	<	<	<	<	2	<	100	OG
Arsenic	ug/L	1	<	<	<	<	<	<	<	1	<	<	<	<	25	CS
Barium	ug/L	1	47	42	36	108	108	101	19	22	17	485	452	419	1000	CS
Boron	ug/L	10	140	163	163	396	431	286	1100	1410	1110	25	27	21	5000	CS
Cadmium	ug/L	0.1	<	<	<	<	<	<	<	<	<	<	<	<	5	CS
Calcium	ug/L	100	55100	60200	61100	170000	165000	166000	42200	43900	43300	144000	130000	128000		
Chromium	ug/L	1	<	<	<	<	<	<	<	<	<	<	<	<	50	CS
Cobalt	ug/L	0.5	<	<	<	2.3	1.2	1.1	<	<	<	<	<	<		
Copper	ug/L	0.5	<	<	<	<	<	<	<	<	<	<	<	<	1000	AO
Iron	ug/L	100	<	<	<	2940	2070	2730	<	<	<	1330	727	1530	300	AO
Lead	ug/L	0.1	<	<	<	<	<	<	<	<	<	<	<	<	10	CS
Magnesium	ug/L	200	21100	21300	21700	116000	104000	64900	17100	17500	15800	82800	76100	60800		
Manganese	ug/L	5	25	<	<	2390	2220	1380	27	39	24	87	116	75	50	AO
Potassium	ug/L	100	1720	1620	1570	4670	5590	6220	2850	2800	2770	2550	2510	2130		
Silver	ug/L	0.1	<	<	<	<	<	<	<	<	<	<	<	<		
Sodium	ug/L	200	3850	3650	3910	50300	39600	19300	133000	118000	89100	17500	16700	16600	200000	AO
Strontium	ug/L	10	170	179	180	1770	1930	2710	2160	2450	2370	274	287	266		
Uranium	ug/L	0.1	1.0	1.3	1.5	1.9	2.6	2.1	<	0.3	<	1.0	1.2	1.0	20	CS
Vanadium	ug/L	0.5	<	<	<	<	0.5	<	<	<	<	<	<	<		
Zinc	ug/L	5	<	5	<	<	<	<	<	<	<	<	12	<	5000	AO

Notes:

MDL: method detection limit

"<" denotes result is below method detection limit

"MW #": monitoring well ID

exceedance of Ontario Drinking Water Standards

CS indicates chemical standard

AO indicates aesthetic objective

OG indicates operational guideline

Input: MH

Checked: CM

Table 2
VOC Chemistry Results

Parameter	Units	MDL	MW1		MW2		MW3		MW4		ODWS	
			30-Nov-15	23-Jun-16	30-Nov-15	23-Jun-16	30-Nov-15	23-Jun-16	30-Nov-15	23-Jun-16		
Acetone	ug/L	5.0	<	<	<	<	<	<	<	<	1	CS
Benzene	ug/L	0.5	<	<	<	<	<	<	<	<		
Bromodichloromethane	ug/L	0.5	<	<	<	<	<	<	<	<		
Bromoform	ug/L	0.5	<	<	<	<	<	<	<	<	2	CS
Bromomethane	ug/L	0.5	<	<	<	<	<	<	<	<		
Carbon Tetrachloride	ug/L	0.2	<	<	<	<	<	<	<	<		
Chlorobenzene	ug/L	0.5	<	<	<	<	<	<	<	<	200	CS
Chloroethane	ug/L	1.0	<	<	<	<	<	<	<	<		
Chloroform	ug/L	0.5	<	<	<	<	<	<	<	<		
Chloromethane	ug/L	3.0	<	<	<	<	<	<	<	<	5	CS
Dibromochloromethane	ug/L	0.5	<	<	<	<	<	<	<	<		
Dichlorodifluoromethane	ug/L	1.0	<	<	<	<	<	<	<	<		
Ethylene dibromide (dibromoethane, 1,2-)	ug/L	0.2	<	<	<	<	<	<	<	<	5	CS
1,2-Dichlorobenzene	ug/L	0.5	<	<	<	<	<	<	<	<		
1,3-Dichlorobenzene	ug/L	0.5	<	<	<	<	<	<	<	<		
1,4-Dichlorobenzene	ug/L	0.5	<	<	<	<	<	<	<	<	14	CS
1,1-Dichloroethane	ug/L	0.5	<	<	<	<	<	<	<	<		
1,2-Dichloroethane	ug/L	0.5	<	<	<	<	<	<	<	<		
1,1-Dichloroethylene	ug/L	0.5	<	<	<	<	<	<	<	<	30	CS
cis-1,2-Dichloroethylene	ug/L	0.5	<	<	<	<	<	<	<	<		
trans-1,2-Dichloroethylene	ug/L	0.5	<	<	<	<	<	<	<	<		
1,2-Dichloroethylene, total	ug/L	0.5	<	<	<	<	<	<	<	<	24	AO
1,2-Dichloropropane	ug/L	0.5	<	<	<	<	<	<	<	<		
cis-1,3-Dichloropropylene	ug/L	0.5	<	<	<	<	<	<	<	<		
trans-1,3-Dichloropropylene	ug/L	0.5	<	<	<	<	<	<	<	<	5	CS
1,3-Dichloropropene, total	ug/L	0.5	<	<	<	<	<	<	<	<		
Ethylbenzene	ug/L	0.5	<	<	<	<	<	<	<	<		
Hexane	ug/L	1.0	<	<	<	<	<	<	<	<	1	CS
Methyl Ethyl Ketone (2-Butanone)	ug/L	5.0	<	<	<	<	<	<	<	<		
Methyl Butyl Ketone (2-Hexanone)	ug/L	10.0	<	<	<	<	<	<	<	<		
Methyl Isobutyl Ketone	ug/L	5.0	<	<	<	<	<	<	<	<	300	AO
Methyl tert-butyl ether	ug/L	2.0	<	<	<	<	<	<	<	<		
Methylene Chloride	ug/L	5.0	<	<	<	<	<	<	<	<		
Styrene	ug/L	0.5	<	<	<	<	<	<	<	<	30	CS
1,1,1,2-Tetrachloroethane	ug/L	0.5	<	<	<	<	<	<	<	<		
1,1,2,2-Tetrachloroethane	ug/L	0.5	<	<	<	<	<	<	<	<		
Tetrachloroethylene	ug/L	0.5	<	<	<	<	<	<	<	<	5	CS
Toluene	ug/L	0.5	<	<	<	<	<	<	<	<		
1,1,1-Trichloroethane	ug/L	0.5	<	<	<	<	<	<	<	<		
1,1,2-Trichloroethane	ug/L	0.5	<	<	<	<	<	<	<	<	1	CS
Trichloroethylene	ug/L	0.5	<	<	<	<	<	<	<	<		
Trichlorofluoromethane	ug/L	1.0	<	<	<	<	<	<	<	<		
1,3,5-Trimethylbenzene	ug/L	0.5	<	<	<	<	<	<	<	<	300	AO
Vinyl Chloride	ug/L	0.5	<	<	<	<	<	<	<	<		
m/p-Xylene	ug/L	0.5	<	<	<	<	<	<	<	<		
o-Xylene	ug/L	0.5	<	<	<	<	<	<	<	<	300	AO
Xylenes, total	ug/L	0.5	<	<	<	<	<	<	<	<		

Notes:

MDL: method detection limit

"<" denotes result is below method detection limit

"MW #" : monitoring well ID

exceedance of Ontario Drinking Water Standards

CS indicates chemical standard

OG indicates operational guideline

Input: MH
Checked: CM

Table 3
Groundwater PHC and PAH Chemistry

Location			MW1			MW2			MW3			MW4			ODWS		O-Reg 153/04 Table 8
Parameter	Units	MDL	2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16	2-Nov-15	30-Nov-15	23-Jun-16			
F1 PHCs (C6-C10)	ug/L	25	<	<	<	<	<	<	<	<	<	<	<	<	0.01	CS	-
F2 PHCs (C10-C16)	ug/L	100	<	<	<	<	<	<	<	<	<	<	-	<			-
F3 PHCs (C16-C34)	ug/L	100	<	<	<	<	<	<	<	<	<	<	-	<			0.22
F4 PHCs (C34-C50)	ug/L	100	<	<	<	<	<	<	<	<	<	<	-	<			0.32
Acenaphthene	ug/L	0.05	0.09	<	<	<	<	<	<	<	<	<	<	<			0.37
Acenaphthylene	ug/L	0.05	<	<	<	<	<	<	<	<	<	<	<	<			-
Anthracene	ug/L	0.01	0.11	<	<	<	<	<	<	<	<	<	<	<			0.17
Benzo[a]anthracene	ug/L	0.01	0.15	<	<	<	<	<	<	<	<	<	<	<			0.24
Benzo[a]pyrene	ug/L	0.01	0.13	<	<	<	<	<	<	<	<	<	<	<			-
Benzo[b]fluoranthene	ug/L	0.05	0.20	<	<	<	<	<	<	<	<	<	<	<			0.34
Benzo[g,h,i]perylene	ug/L	0.05	0.09	<	<	<	<	<	<	<	<	<	<	<			0.06
Benzo[k]fluoranthene	ug/L	0.05	0.09	<	<	<	<	<	<	<	<	<	<	<			0.75
1,1-Biphenyl	ug/L	0.05	<	<	<	<	<	<	<	<	<	<	<	<			0.19
Chrysene	ug/L	0.05	0.14	<	<	<	<	<	<	<	<	<	<	<			0.2
Dibenzo[a,h]anthracene	ug/L	0.05	<	<	<	<	<	<	<	<	<	<	<	<			-
Fluoranthene	ug/L	0.01	0.42	<	<	<	<	<	<	<	<	<	<	<			-
Fluorene	ug/L	0.05	0.10	<	<	<	<	<	<	<	<	<	<	<			0.56
Indeno[1,2,3-cd]pyrene	ug/L	0.05	0.08	<	<	<	<	<	<	<	<	<	<	<			0.49
1-Methylnaphthalene	ug/L	0.05	<	<	<	<	<	<	<	<	<	<	<	<			
2-Methylnaphthalene	ug/L	0.05	0.07	<	<	<	<	<	<	<	<	<	<	<			
Methylnaphthalene (1&2)	ug/L	0.10	<	<	<	<	<	<	<	<	<	<	<	<			
Naphthalene	ug/L	0.05	0.25	<	<	<	<	<	<	<	<	<	<	<			
Phenanthrene	ug/L	0.05	0.47	<	<	<	<	<	<	<	<	<	<	<			
Pyrene	ug/L	0.01	0.35	<	<	<	<	<	<	<	<	<	<	<			

Notes:

MDL: method detection limit

"<" denotes result is below method detection limit

"MW #" : monitoring well ID

 notes exceedance of Ontario Drinking Water Standards

 notes exceedance of Table 8

CS indicates chemical standard

Input: MH

Checked: CM



MEMORANDUM

13 August 2015

TO: Nathalie Matthews
Senior Environmental Officer
Kingston District Office
Eastern Region

FROM: Sarah Baxter
Environmental Scientist
Technical Support Section
Eastern Region

Victor Castro
Surface Water Scientist
Technical Support Section
Eastern Region

RE: La Rue Mills Dump (Closed)
Surface Water Sampling Results
Township of Leeds and the Thousand Islands, United Counties of Leeds and
Grenville
Provisional Environmental Compliance #A441702
IDS #6437-9XBRHL

I have reviewed the analytical results from the surface water sampling conducted at the La Rue Mills Dump (Closed) on June 2, 2015 and provide the following comments, relative to surface water impact concerns, for your consideration.

Background

The La Rue Mills Dump (Closed) is located on the east side of La Rue Mills Road, Lot 23, Concession 2 in the geographic Township of Escott. The site is licenced under Provisional Environmental Compliance Approval #A441702 and is owned by the Corporation of the Township of Leeds and the Thousands Islands (formerly the Township of Front of Escott). The licenced landfill area was approximately 1.2 hectares. The site was approved to receive domestic and commercial waste.

A site closure plan was submitted to the Ministry on April 10, 1975 and the dump closure was confirmed on September 25, 1980. It is my understanding that the dump was closed because capacity was reached. During the operational period, compliance issues at the site included burning of garbage, rats, poor covering practices, litter and poor grading.

No environmental monitoring program is conducted at the site.

Site Description

The La Rue Mills Dump (Closed) is surrounded by agricultural areas to the east, south and west and bordered by forest and wetland to the north. Regional drainage is towards the St. Lawrence River. Surface water drainage from the site occurs via overland flow to an unnamed creek that originates northwest of the site (south of Quabbin Road) and flows east along the northern toe of the landfill, then turns and flows southward towards Mud Creek (which eventually drains to Jones Creek and the St. Lawrence River).

Bedrock and soils mapping indicate that the site is located on Precambrian bedrock and glaciolactustrine deposits. More specifically, the surficial overburden is primarily silt and clay and the bedrock beneath is igneous.

During the site visit, it was observed that the waste mound was relatively well covered and vegetation had established. Small pieces of uncovered waste were observed on the mound but no waste was observed in the unnamed creek.

Surface Water Monitoring

On June 2, 2015 I visited the site with Surface Water Scientist Victor Castro. Surface water samples were collected at two locations:

- SW-1 – unnamed creek, upstream (northwest) of the dump
- SW-2 – unnamed creek, downstream (east) of the dump

SW-1 was located in a marshy area, approximately 250 metres upstream of the dump to provide a background surface water sample.

SW-2 was located downstream of the mound to assess if downstream surface water was impacted by the dump.

Water at both sampling stations was flowing. No evidence of landfill-related impacts was noted at SW-2 (e.g. sheen, discolouration).

Samples were submitted to the Ministry of the Environment and Climate Change lab in Toronto for analysis of volatile organic compounds (VOCs), metals, nutrients, petroleum hydrocarbons (PHCs), polycyclic aromatic hydrocarbons (PAHs), phenols and other common leachate parameters (e.g. chloride, sulphate, alkalinity).

Surface Water Impact Assessment

All analyzed VOCs, PAHs and PHCs were non-detect or less than the method detection limit (MDL) at both sampling stations.

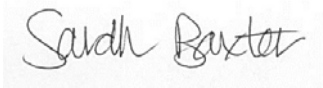
Concentrations of several common landfill leachate parameters (i.e. chloride, sulphate, phenols, total dissolved solids (TDS), conductivity, alkalinity, hardness, chemical oxygen demand (COD), barium, calcium, potassium, magnesium) were nearly identical upstream and downstream of the mound.

Measured levels of cadmium, iron and total phosphorus (TP) exceeded their respective Provincial Water Quality Objectives (PWQOs) downgradient of the dump. However, these guideline exceedances were mirrored at background station SW-1, indicating that these downstream parameter elevations are not landfill-related.

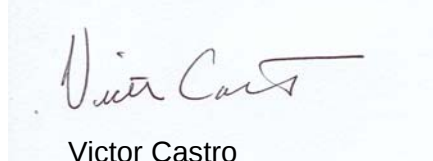
Conclusions and Recommendations

1. Surface water east and downstream of the La Rue Mills Dump (closed) does not appear to be impacted by landfill leachate. VOCs, PAHs and PHCs were non-detect at SW-1 and SW-2. Concentrations of common leachate parameters, nutrients and metals were very similar upgradient versus downgradient of the mound.
2. Some parameter concentrations exceeded their respective PWQO at SW-2 (e.g. cadmium, iron, TP), but such elevated concentrations were also noted at SW-1. This suggests that the parameter elevations are not landfill-related.
3. Based on the results of one sampling event, no adverse effect to surface water has been detected at the dump. Considering the size and age of the site, the establishment of a surface water monitoring program at the site is not required at this time.
4. It is my understanding that MOECC Regional Hydrogeologist Shawn Kinney has recommended that leachate strength be determined and if applicable, the magnitude and extent of contamination delineated. If leachate is determined to be flowing towards and/or discharging to surface water, further surface water review and/or sampling is recommended.

If you have any questions regarding the above, I would be pleased to discuss them with you.



Sarah Baxter
SB/sh



Victor Castro

ec: Victor Castro
Shawn Kinney
Greg Faaren
Peter Taylor

c: File SW LG LT 03 06 (La Rue Mills Dump (Closed))