



## MEMO

**TO:** WAYNE JACKSON, CRAIG SIMMONS

**FROM:** PAUL MULHOLLAND, JOE OVCIJAK

**DATE:** MARCH 14, 2014

**RE:** CELL 2 REMAINING CAPACITY AND CELL 3 CONSTRUCTION

The annual survey of the Peterborough County/City Waste Management Facility was completed in January 2014. This survey included updated contours in Cell 2 of the North Fill Area (NFA). Using survey information, Table 2.3 (attached) for the 2013 Annual Monitoring Report was completed to summarize the current state of Cell 2. The following reviews timing for construction of Cell 3.

### Cell 2 Operational Capacity

Cell 2 has a useable capacity of approximately 363,000 m<sup>3</sup> (referred to as “operational capacity”) that can be used before Cell 3 is constructed. Once Cell 3 is constructed additional capacity on the West slope of Cell 2 will be accessible.

As of January 2014, 114,010 m<sup>3</sup> of waste and daily cover was placed in Cell 2 leaving operational capacity of approximately 248,990 m<sup>3</sup>. Assuming a range of incoming waste tonnages and waste densities, the table below estimates the remaining operational life for Cell 2 starting in January 2014.

Assumed Annual Incoming Waste (tonnes)	Assumed Waste Density (tonnes/m <sup>3</sup> )	Estimated Annual Volume Required (m <sup>3</sup> )	Remaining Cell 2 Operational Life (Years)
50,000	0.65	76,923	3.24
<b>50,000</b>	<b>0.76</b>	<b>65,789</b>	<b>3.78</b>
50,000	0.90	55,556	4.48
60,000	0.65	92,308	2.70
60,000	0.76	78,947	3.15
60,000	0.90	66,667	3.73
70,000	0.65	107,692	2.31
70,000	0.76	92,105	2.70
70,000	0.90	77,778	3.20

The bolded values represent the most likely scenario based on historic information from Cell 2. Incoming waste in 2013 was 51,380 tonnes and is expected to decrease assuming BFI will no longer haul material to the site. The apparent waste density in Cell 2 was calculated by UEM to be 0.76 tonnes/m<sup>3</sup>. Assuming the above, the remaining operational life of Cell 2 is 3.78 years and Cell 3 would need to be operational by September 2017.

In the worst case scenario, if 70,000 tonnes/year of waste are received and compacted to a conservative apparent waste density of 0.65 tonnes/m<sup>3</sup>, the operational life of Cell 2 is decreased to 2.31 years and Cell 3 would need to be available no later than March 2016.

Tomlinson recently achieved an apparent waste density of almost 1.0 tonnes/m<sup>3</sup>. If this higher apparent waste density continues to be achieved in the future, the life of each cell will be extended.

### Cell 3 Construction Timeline

Draft Cell 3 drawings and specifications are under review by the City. Finalizing the drawings and specifications following review should have minimal effect on the overall timeline for Cell 3 construction. The following table describes the tasks and time required for each task to tender and construct Cell 3.

<u>Event</u>	<u>Approximate Time Needed</u>
1. Cell 3 Tender	1 month
2. Cell 3 Award and Contract Signing	1 month
3. Cell 3 Construction	4 to 6 months
4. Cell 3 Waste (1 m thick) placed over liner	1 month
5. Total	7 to 9 months

Tendering of Cell 3 should begin no later than February or March so that liner construction and waste placement (1 m thick) in Cell 3 can be completed before frost (December 15 typically).

Assuming the worst case scenario (earliest time when Cell 2 reaches operational capacity) Cell 2 would be at capacity by spring of 2016. Under these circumstances, tendering the Cell 3 contract should take place in early 2015. However, should incoming waste quantities continue to decline and the apparent waste density continue to be high (0.9 tonnes/m<sup>3</sup>) consideration could be given to further deferring Cell 3 construction.

### Benefits of Delaying Cell Construction

There are a number of benefits to delaying construction of Cell 3, including but not limited to:

- Deferring capital costs
- Delaying leachate generation and management in Cell 3
- Soil stockpiled in Cell 3, and possibly native soil within Cell 3, can be used for daily cover in Cell 2 to reduce Cell 3 soil relocation and cell excavation costs.

### Conclusion

Tendering and construction of Cell 3 should be delayed until early 2015 or later depending on actual landfill capacity utilization, waste quantities received and apparent waste density.

Please feel free to contact me with any questions or comments. I can be reached at (519) 752-8686 Ext 22.

Yours very truly,

**Urban and Environmental Management Inc.**



Joseph Ovcjak, P. Eng  
Project Manager



Paul Mulholland, P. Eng.

**TABLE 2.3**  
**SUMMARY OF REMAINING LANDFILL CAPACITY, SOIL QUANTITIES AND SITE LIFE**  
**CELL 2, 3 AND 4 COMBINED - NORTH FILL AREA - PETERBOROUGH COUNTY/CITY WASTE MANAGEMENT FACILITY**  
*The County and The City of Peterborough*

No.	Description	Unit	Jan-13	Jan-14
1	Approved 9.5 ha NFA volume (including final cover)	m <sup>3</sup>	1,622,000	1,622,000
2	Volume of final cover for 9.5 ha NFA	m <sup>3</sup>	95,000	95,000
3	Approved 9.5 ha NFA volume (excluding final cover)	m <sup>3</sup>	1,527,000	1,527,000
4	Cell 2 - volume utilized (excluding final cover)	m <sup>3</sup>	74,600	114,010
5	Cell 2 - Volume operational airspace* remaining (excluding final cover)	m <sup>3</sup>	288,400	248,990
6	Cell 2 - Cumulative quantity of waste landfilled	tonne	35,710	87,090
7	Cell 2 - Final cover placed	ha	0.00	0.00
8	Cell 2 - Remaining area requiring final cover	ha	3.22	3.22
9	Cell 2 - Total fill area	ha	3.22	3.22
10	Cell 2 - Volume required for final cover	m <sup>3</sup>	32,200	32,200
11	Cell 2 - Volume remaining daily/intermediate cover required	m <sup>3</sup>	57,680	49,798
12	Cell 2 - Apparent waste density	tonnes/m <sup>3</sup>	0.48	0.76
13	Estimated annual volume required	m <sup>3</sup> /yr	76,923	76,923
14	Cell 2 Remaining operational site life	yr	3.7	3.2
15	NFA - Cells 2, 3 and 4 - Total site life remaining	yr	18.9	18.4

\* "Operational air space" is defined as the volume of waste and daily cover than can be placed within the engineered part of the landfill allowing for volume constraints due to space required for future cell construction (e.g. Cells 3 and 4)

**Row No.**

- 1 From design of NFA.
- 2 From design of NFA.
- 3 Equal to total NFA Volume (Row 1) minus Volume of Final Cover for NFA (Row 2)
- 4 From topographic mapping.
- 5 From topographic mapping.
- 6 From City weighscale records.
- 7-8-9 From topographic mapping.
- 10 Based on depth of 0.85m of clean fill and 0.15m of topsoil.
- 11 1/5<sup>th</sup> of total air space remaining for waste and daily cover (i.e. waste to daily cover ratio = 4:1).
- 12 Total waste placed divided by total volume utilized from site opening for waste and daily cover only (Row 6 / Row 4)
- 13 Assuming 50,000 tonnes of waste per year and apparent waste density of 0.65 tonnes/cubic metre
- 14 Volume remaining for waste and daily cover in Cell 2 (Row 8) divided by estimated volume required per year (Row 11).
- 15 Total Volume of NFA excluding final cover (Row 3) minus Landfill Volume Utilized (Row 4) divided by estimated volume required per year (Row 13).