Appendix I-3b

Air Quality & Odour Detailed Impact Assessment Report

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MEMORANDUM

DATE:	2026-07-02	**RWDI Reference No.:** 2402272
TO:	Darren Fry	**EMAIL:** DFry@walkerind.com
FROM:	Anthony Vanderheyden	**EMAIL:** Anthony.Vanderheyden@rwdi.com
RE:	**Draft Air Quality Detailed Impact Assessment Addendum for Adjusted Filling Rate Walker South Landfill Phase 2 Environmental Assessment Niagara Falls, Ontario**	

Dear Darren,

RWDI completed the draft Air Quality Detailed Impact Assessment Report in support of the Walker South Landfill Phase 2 Environmental Assessment. In the air quality assessment, the proposed South Landfill Phase 2 (SLF2) was assumed to operate based on an outdated waste filling programme in March 2026. The waste filling programme has since been refined after the detailed modelling assessment was completed. This addendum to the draft Air Quality Detailed Impact Assessment Report provides a sensitivity analysis to demonstrate the potential change in air quality impact associated with the updated waste filling programme.

CHANGE IN WASTE FILLING PROGRAMME

In the original programme, each of the 4 stages of SLF2 were assumed to take 4 years to complete, with the entire SLF2 having a life span of 16 years. Final capping would start 2 years after the filling of the first cell commences and end 2 years after the entire stage reaches its capacity. The annual waste receipt rate considered is 1,100,000 tonnes/year.

In the adjusted programme, the annual waste receipt remains unchanged. However, with the consideration of the capacity of different stages of SLF2, the filling duration of different stages has been updated. Each of Stages 1, 2 and 3 of SLF2 will take 5 years to complete filling, while Stage 4 will be completed in 3 years given its smaller capacity. The life span of the entire SLF2 will last 18 years. The same patten for final cap installation as the original programme was assumed for the adjusted programme (i.e., starting 2 years after the commencement and ending 2 years after all the filling activities at that Stage have been completed).

A comparison of the programmes is provided in **Table 1** below.

Table 1: Comparison of Waste Filling and Final Capping Programme

Year	Original Programme		Adjusted Programme	
	Waste Filling	Final Capping	Waste Filling	Final Capping
2030	Stage 1		Stage 1	
2031				
2032		Stage 1		Stage 1
2033 (Previous Scenario 1)				
2034 (New Scenario 1)	Stage 2		Stage 2	
2035				
2036		Stage 2		
2037				Stage 2
2038	Stage 3			
2039				
2040		Stage 3	Stage 3	
2041 (Previous Scenario 2)				
2042	Stage 4			Stage 3
2043				
2044 (New Scenario 2)		Stage 4		
2045 (Previous Scenario 3)			Stage 4	
2046				
2047 (New Scenario 3)				Stage 4
2048				
2049				

CHANGE IN POTENTIAL AIR QUALITY IMPACT

The air quality assessment considered various air quality impacts associated with the development of SLF2, including blowing litter, odour, landfill gas (LFG) and combustion byproducts, and dust.

Blowing litter impact was assessed qualitatively based on meteorological data and separation distance between the landfill and receptors. The change in the waste filling programme will have no influence on the blowing litter impact.

Dust impact is mainly associated with the filling operations and final capping installation and haul traffic. The only time-variable emission source is the tailpipe emission factors generated by U.S. EPA Motor Vehicle Emission Simulator (MOVES) to predict tailpipe emissions from haul traffic. Considering that the new waste filling programme generally extends the entire period, the emission rate obtained from the MOVES for a later year will be further reduced. Therefore, the update to the waste filling programme will yield more favourable air quality impacts. The original assessment is considered more conservative and further analysis is not warranted.

In the assessments of odour and fugitive emissions of LFG and combustion byproducts from the landfill mound, the emission rates for future years were scaled up based on the generated LFG volume predicted by Environment and Climate Change Canada (ECCC) Landfill Methane Modelling Tool (ECCC Tool), Version 1.3. The volume of LFG is directly dependent on the waste in place at the landfill and the time of decomposition. Extending the waste acceptance under the new waste filling programme will therefore result in a higher total volume of LFG generation over the lifecycle of the landfill. However, gas generation year after year is expected to remain the same, as the annual acceptance rate remains consistent between programmes. A sensitivity analysis was conducted in order to determine the potential quality impact at discrete receptors.

SENSITIVITY ANALYSIS

Methodology

As discussed above, a sensitivity analysis was conducted for both odour and LFG, including combustion byproducts. The same methodology follows the original assessment adjusted only for the new filling programme. Scenario 3 (i.e., the end of Stage 3) will happen 2 years later than the original assessment. Emission factors generated by the MOVES were assumed to be unchanged for a conservative assessment. The only change in the modelling was the annual waste receipt input in the ECCC Tool and the resulting prediction of LFG volume, which is shown in **Table 2**. The updated LFG volume was used in adjusting the odour flux / emission rate for different modelled years. It should be noted that given the same annual waste receipt for the landfill, the total LFG volume generated in the same year remains unchanged, with the exception of the 1 year after the extended period of filling at the end (i.e., beyond 2046), but the distribution of generated LFG among the various stages of SLF2 differs.

Table 2 provides the volume of methane generation in each year, while **Table 3** summarizes the changes in methane volume under the selected model scenarios.

Scenario 3 has a slightly lower change in methane generation when compared to Scenarios 1 and 2. However, as shown in **Table 3**, the change in gas generation does not change significantly between scenarios. Since Scenario 3 has the highest methane volume generated, it will have the highest impact on the discrete receptors. Scenario 3 was therefore selected for the sensitivity test.

Table 2: Methane Generation under Each Year

Year	Methane Generation (Tonnes/year)		Notes
	Original Programme	Adjusted Programme	
2030	37,153	37,153	
2031	38,007	38,007	
2032	38,678	38,678	
2033	39,178	39,178	Previous Stage 1
2034	39,648	39,648	New Stage 1
2035	40,846	40,845	
2036	40,950	40,950	
2037	41,055	41,055	
2038	41,155	41,155	
2039	41,255	41,254	
2040	41,350	41,349	
2041	41,443	41,444	Previous Stage 2
2042	41,536	41,536	
2043	41,625	41,624	
2044	41,711	41,711	New Stage 2
2045	41,794	41,793	Previous Stage 3
2046	41,877	41,877	
2047	39,181	41,956	New Stage 3

Table 3: Changes in Methane Generation under Selected Model Scenarios

Scenario	Methane Generation (Tonnes/year)		Difference (Tonnes/year)
	Original Programme	Adjusted Programme	
Scenario 1	39,178	39,648	470
Scenario 2	41,443	41,711	268
Scenario 3	41,794	41,956	162

Other than odour, hydrogen sulphide (H_2S) was selected for the sensitivity test as its predicted concentration is the highest relative to its criteria compared with the other LFG and combustion by-products.

Results

The resulting comparisons for 10-minute odour and 10-minute and 24-hour H_2S are provided in **Table 4**Error! Reference source not found. through**Table *6***. Findings show that with the updated waste filling programme, all discrete receptors will experience a drop in the 10-minute odour impact from -1% to -9%. In particular, one of the discrete receptors, R08, which had predicted exceedances of the 1 OU/m^3 detection threshold for over 0.5% of time under original waste filling programme, will have a lower frequency of exceedance (less than 0.5% of time) under the update waste filling programme. This indicates that the original assessment provides a conservative estimate of the potential odour impacts. Therefore, the updated waste filling programme will result in a decrease in predicted odour impacts on the discrete receptors.

For LFG contaminant, findings show that the impacts on the predicted H2S concentrations are relatively limited. Without background included, the 10-minute and 24-hour H2S concentrations at discrete receptors are increased to a maximum of 1.08% and 0.99%, respectively, with predicted concentrations increasing at some receptors, while decreasing at others. This shift in predicted concentrations is a result of the change in the distribution of waste within the SLF2 as a result of the updated waste filling programme.

Therefore, the sensitivity analysis determined there will be no substantial change in air quality impacts on discrete receptors as a result of the updated waste filling programme associated with SLF2.

Table 4: Comparison of Odour Impact

AQ Receptor ID	Common Receptor ID	Original Waste Filling Programme							Updated Waste Filling Programme							Difference (%)
		Max. 10-Minute Odour Conc. (OU)	Event > 1 OU		Event > 3 OU		Event > 5 OU		Max. 10-Minute Odour Conc. (OU)	Event > 1 OU		Event > 3 OU		Event > 5 OU		Max. 10-Minute Odour Conc. (OU)
			Count	Freq.	Count	Freq.	Count	Freq.		Count	Freq.	Count	Freq.	Count	Freq.	
R01	--	2.4	106	**1.2%**	0	0.0%	0	0.0%	2.3	97	**1.1%**	0	0.0%	0	0.0%	-3.2%
R02	CR17	4.3	201	**2.3%**	24	0.3%	0	0.0%	4.1	193	**2.2%**	21	0.2%	0	0.0%	-4.3%
R03	CR19	4.4	124	**1.4%**	12	0.1%	0	0.0%	4.0	112	**1.3%**	9	0.1%	0	0.0%	-7.4%
R04	--	2.8	183	**2.1%**	0	0.0%	0	0.0%	2.8	165	**1.9%**	0	0.0%	0	0.0%	-2.1%
R05	--	2.6	147	**1.7%**	0	0.0%	0	0.0%	2.6	139	**1.6%**	0	0.0%	0	0.0%	-2.0%
R06	--	2.6	152	**1.7%**	0	0.0%	0	0.0%	2.5	144	**1.6%**	0	0.0%	0	0.0%	-2.7%
R07	--	2.1	99	**1.1%**	0	0.0%	0	0.0%	2.1	86	**1.0%**	0	0.0%	0	0.0%	-3.1%
R08	--	1.8	46	**0.5%**	0	0.0%	0	0.0%	1.8	40	0.5%	0	0.0%	0	0.0%	-1.8%
R09	CR18	1.8	34	0.4%	0	0.0%	0	0.0%	1.8	27	0.3%	0	0.0%	0	0.0%	-3.2%
R10	CR05	2.9	58	**0.7%**	0	0.0%	0	0.0%	2.7	50	**0.6%**	0	0.0%	0	0.0%	-6.2%
R11	--	2.8	59	**0.7%**	0	0.0%	0	0.0%	2.6	53	**0.6%**	0	0.0%	0	0.0%	-6.0%
R12	--	3.2	52	**0.6%**	3	0.03%	0	0.0%	3.0	51	**0.6%**	1	0.01%	0	0.0%	-6.6%
R13	--	3.0	43	0.5%	2	0.02%	0	0.0%	2.8	35	0.4%	0	0.0%	0	0.0%	-6.6%
R14	--	2.4	33	0.4%	0	0.0%	0	0.0%	2.3	32	0.4%	0	0.0%	0	0.0%	-6.2%
R15	CR10	3.4	122	**1.4%**	3	0.03%	0	0.0%	3.1	108	**1.2%**	1	0.01%	0	0.0%	-9.2%
R16	--	3.5	91	**1.0%**	3	0.03%	0	0.0%	3.2	78	**0.9%**	1	0.01%	0	0.0%	-7.9%
R17	CR01	2.9	106	**1.2%**	0	0.0%	0	0.0%	2.8	94	**1.1%**	0	0.0%	0	0.0%	-4.2%
R18	CR04	2.5	143	**1.6%**	0	0.0%	0	0.0%	2.4	128	**1.5%**	0	0.0%	0	0.0%	-2.8%
R19	CR06	2.6	37	0.4%	0	0.0%	0	0.0%	2.6	33	0.4%	0	0.0%	0	0.0%	-2.4%
R20	CR07	1.3	11	0.1%	0	0.0%	0	0.0%	1.3	7	0.1%	0	0.0%	0	0.0%	-2.3%
R21	CR8	4.5	191	**2.2%**	11	0.1%	0	0.0%	4.3	167	**1.9%**	8	0.1%	0	0.0%	-3.9%
R22	CR11	2.3	94	**1.1%**	0	0.0%	0	0.0%	2.2	84	**1.0%**	0	0.0%	0	0.0%	-3.2%
R23	CR12	2.3	38	0.4%	0	0.0%	0	0.0%	2.3	36	0.4%	0	0.0%	0	0.0%	-2.5%
R24	CR13	1.9	17	0.2%	0	0.0%	0	0.0%	1.8	11	0.1%	0	0.0%	0	0.0%	-5.5%
R25	CR14	2.8	62	**0.7%**	0	0.0%	0	0.0%	2.8	59	**0.7%**	0	0.0%	0	0.0%	-1.1%
R26	CR15	1.7	31	0.4%	0	0.0%	0	0.0%	1.7	28	0.3%	0	0.0%	0	0.0%	-3.2%
R27	CR16	1.3	12	0.1%	0	0.0%	0	0.0%	1.3	10	0.1%	0	0.0%	0	0.0%	-0.7%
R28	CR20	1.7	38	0.4%	0	0.0%	0	0.0%	1.6	32	0.4%	0	0.0%	0	0.0%	-1.3%
R29	CR21	2.8	143	**1.6%**	0	0.0%	0	0.0%	2.7	137	**1.6%**	0	0.0%	0	0.0%	-4.4%

Darren Fry
Walker Environmental Group
RWDI #2402272
JULY 2, 2026

Table 5: Comparison of 10-minute H_2S Impact

AQ Receptor ID	Common Receptor ID	Criteria (µg/m³)	Background (µg/m³)	Max. 10-Minute H_2S Conc. (µg/m³)					
				Original Waste Filling Programme		Updated Waste Filling Programme		Difference (%)	
				Without Background	With Background	Without Background	With Background	Without Background	With Background
R01	--	13	2.4	0.4	2.8	0.3	2.8	-0.2%	-1.2%
R02	CR17	13	2.4	0.5	2.9	0.5	2.9	-0.1%	-0.4%
R03	CR19	13	2.4	1.1	3.5	1.1	3.5	0.3%	1.1%
R04	--	13	2.4	0.4	2.9	0.4	2.9	-0.2%	-1.7%
R05	--	13	2.4	0.4	2.8	0.4	2.8	-0.1%	-0.9%
R06	--	13	2.4	0.4	2.8	0.4	2.8	-0.2%	-1.6%
R07	--	13	2.4	0.4	2.8	0.4	2.8	0.004%	0.03%
R08	--	13	2.4	0.4	2.8	0.4	2.8	0.0%	0.0%
R09	CR18	13	2.4	0.4	2.8	0.4	2.8	0.009%	0.07%
R10	CR05	13	2.4	0.4	2.8	0.4	2.8	-0.03%	-0.3%
R11	--	13	2.4	0.4	2.9	0.5	2.9	0.2%	1.0%
R12	--	13	2.4	0.5	2.9	0.5	3.0	0.2%	0.9%
R13	--	13	2.4	0.4	2.8	0.4	2.8	0.1%	0.4%
R14	--	13	2.4	0.4	2.8	0.4	2.8	-0.1%	-1.0%
R15	CR10	13	2.4	1.0	3.4	1.0	3.5	0.3%	1.1%
R16	--	13	2.4	0.8	3.3	0.8	3.3	0.3%	1.1%
R17	CR01	13	2.4	0.4	2.8	0.4	2.8	-0.2%	-1.3%
R18	CR04	13	2.4	0.4	2.8	0.4	2.8	-0.2%	-1.1%
R19	CR06	13	2.4	0.4	2.8	0.4	2.8	0.0%	0.0%
R20	CR07	13	2.4	0.4	2.8	0.4	2.8	0.03%	0.2%
R21	CR8	13	2.4	1.3	3.7	1.3	3.7	0.4%	1.1%
R22	CR11	13	2.4	0.3	2.8	0.3	2.8	-0.2%	-1.9%
R23	CR12	13	2.4	0.4	2.8	0.4	2.8	-0.1%	-0.7%
R24	CR13	13	2.4	0.4	2.8	0.4	2.8	0.0%	-0.2%
R25	CR14	13	2.4	0.4	2.8	0.4	2.8	-0.1%	-0.7%
R26	CR15	13	2.4	0.3	2.8	0.3	2.8	-0.1%	-0.5%
R27	CR16	13	2.4	0.3	2.7	0.3	2.7	0.04%	0.4%
R28	CR20	13	2.4	0.4	2.8	0.4	2.8	-0.04%	-0.3%
R29	CR21	13	2.4	0.3	2.8	0.3	2.8	-0.1%	-1.0%

Table 6: Comparison of 24-Hour H_2S Impact

AQ Receptor ID	Common Receptor ID	Criteria (µg/m³)	Background (µg/m³)	Max. 24-Hour H_2S Conc. (µg/m³)					
				Original Waste Filling Programme		Updated Waste Filling Programme		Difference (%)	
				Without Background	With Background	Without Background	With Background	Without Background	With Background
R01	--	7	2.20	0.04	2.24	0.04	2.24	0.3%	0.01%
R02	CR17	7	2.20	0.06	2.26	0.06	2.26	-1.4%	-0.04%
R03	CR19	7	2.20	0.30	2.50	0.30	2.50	0.9%	0.11%
R04	--	7	2.20	0.09	2.29	0.09	2.29	-0.03%	0.00%
R05	--	7	2.20	0.08	2.28	0.08	2.28	0.2%	0.01%
R06	--	7	2.20	0.08	2.28	0.08	2.28	0.2%	0.01%
R07	--	7	2.20	0.06	2.25	0.06	2.25	0.4%	0.01%
R08	--	7	2.20	0.06	2.25	0.06	2.25	0.9%	0.02%
R09	CR18	7	2.20	0.05	2.25	0.05	2.25	0.3%	0.01%
R10	CR05	7	2.20	0.10	2.29	0.10	2.29	0.6%	0.02%
R11	--	7	2.20	0.12	2.32	0.12	2.32	1.0%	0.05%
R12	--	7	2.20	0.11	2.31	0.11	2.31	0.6%	0.03%
R13	--	7	2.20	0.12	2.32	0.12	2.32	0.6%	0.03%
R14	--	7	2.20	0.06	2.26	0.06	2.26	0.5%	0.01%
R15	CR10	7	2.20	0.34	2.54	0.34	2.54	1.0%	0.13%
R16	--	7	2.20	0.17	2.37	0.17	2.37	0.8%	0.06%
R17	CR01	7	2.20	0.05	2.24	0.04	2.24	-3.4%	-0.07%
R18	CR04	7	2.20	0.07	2.27	0.07	2.27	0.1%	0.002%
R19	CR06	7	2.20	0.07	2.26	0.07	2.27	0.7%	0.02%
R20	CR07	7	2.20	0.03	2.23	0.03	2.23	0.3%	0.004%
R21	CR8	7	2.20	0.25	2.45	0.26	2.45	0.9%	0.09%
R22	CR11	7	2.20	0.04	2.24	0.04	2.24	0.3%	0.005%
R23	CR12	7	2.20	0.04	2.24	0.04	2.24	-1.0%	-0.02%
R24	CR13	7	2.20	0.05	2.25	0.05	2.25	0.8%	0.02%
R25	CR14	7	2.20	0.04	2.24	0.04	2.24	-0.3%	-0.01%
R26	CR15	7	2.20	0.03	2.23	0.03	2.23	-0.4%	-0.01%
R27	CR16	7	2.20	0.03	2.23	0.03	2.22	-0.8%	-0.01%
R28	CR20	7	2.20	0.04	2.24	0.04	2.24	0.4%	0.01%
R29	CR21	7	2.20	0.05	2.25	0.05	2.25	0.1%	0.002%

CONCLUSIONS

The sensitivity analysis was conducted to evaluate the influence of the updated waste filling programme on predicted air quality impacts. Findings show that the selected contaminants (including 10-minute odour, 10-minute H_2S and 24-hour H_2S) have limited impacts on the predicted concentrations at discrete receptors and would not change the conclusions of the draft Air Quality Detailed Impact Assessment Report. For completeness and consistency with other disciplines' assessments of the SLF2, the air quality assessment will be updated based on the latest waste filling programme in the Final Effects Assessment Report.

Yours truly,

RWDI AIR Inc.

Anthony Vanderheyden, P.Eng.
Senior Project Manager

AUV/kta

STATEMENT OF LIMITATIONS

This report entitled "Draft Air Quality Detailed Impact Assessment Addendum for Adjusted Filling Rate, Walker South Landfill Phase 2 Environmental Assessment" was prepared by RWDI AIR Inc. ("RWDI") for Walker Environmental Group. The findings and conclusions presented in this report have been prepared for the Client and are specific to the project described herein ("Project"). The conclusions and recommendations contained in this report are based on the information available to RWDI when this report was prepared. Because the contents of this report may not reflect the final design of the Project or subsequent changes made after the date of this report, RWDI recommends that it be retained by Client during the final stages of the project to verify that the results and recommendations provided in this report have been correctly interpreted in the final design of the Project.

The conclusions and recommendations contained in this report have also been made for the specific purpose(s) set out herein. Should the Client or any other third party utilize the report and/or implement the conclusions and recommendations contained therein for any other purpose or project without the involvement of RWDI, the Client or such third party assumes any and all risk of any and all consequences arising from such use and RWDI accepts no responsibility for any liability, loss, or damage of any kind suffered by Client or any other third party arising therefrom.

Finally, it is imperative that the Client and/or any party relying on the conclusions and recommendations in this report carefully review the stated assumptions contained herein and to understand the different factors which may impact the conclusions and recommendations provided.