

11.0 RECOMMENDATIONS

Recommendations are given below for the main topics addressed, including landfill gas, leachate monitoring, groundwater and surface water monitoring, topography and cover, site utilization and institutional issues. A summary of the main work priorities description, and budget cost estimates are given on Table 24.

11.1 LANDFILL GAS

1. Revise landfill gas policy to address the following issues as discussed in Section 5.3.
 - Landfill gas at waste and Property Boundaries
 - Construction on landfill waste
 - Construction adjacent to landfill waste
 - Landfill gas in buildings
 - Non-methane gas emissions
 - Landfill gas monitoring
 - Incorporation of existing and revised design guidelines in policy, as discussed in Section 5.7.5 and Figures 11, 12 and 13.

2. Request that Manitoba Environment either accept the City of Winnipeg Methane Gas Policy (in lieu of the Provincial 400 m setback), or specify how the City should comply with the regulation. An official letter from the province should be obtained on this matter to clarify regulatory responsibility.

Data Management

2. Create a computerized data base for landfill monitoring data and update as data is collected.

Landfill Gas Management Strategies

3. Verify or improve strategies used to control landfill gas migration at sites where methane has been found in the control zone at concentrations greater than 20% LEL, as described on Table 6.
4. Investigate recent increases in gas concentrations at Kilcona Landfill beneath the scale house and adjacent to Springfield Road. Increase monitoring frequency and install additional gas probes around the west cell, on the west and northwest sides. Examine the need for gas venting and collection in the future.
5. Develop a contingency plan for the Kimberly Landfill in the event of sudden gas migration caused by a change in environmental conditions. Increase monitoring of select probes and test membrane barrier periodically.
6. Develop landfill gas control measures and/or adjust development plans around Leila Avenue West Landfill to protect future residences. Evaluate feasibility of removal and alternate disposal of waste.

Building Monitoring

7. Develop a contingency plan for Garden City Eatons in the event of a watermain break which may cause methane migration.
8. Clear crawlspace adjacent to/and beneath Gateway Community Centre to allow ventilation.
9. Review and specify requirements for inspection, monitoring frequency and enforcement at buildings constructed adjacent to or on waste.
10. Riel Dump
 - Prepare emergency response plans to be used in the event of a water main or natural gas break.
 - Increase frequency of (seasonal) monitoring at select gas probes
 - Increase homeowner/tenant notification and education.
 - Install gas collection and venting in weeping tile systems around select homes in areas where landfill gas concentrations in soil are high
 - Investigate adequacy of clay barrier at Riel site.
 - Investigate the quantities of methane migrating near homes (flux).
 - Evaluate the need for additional measures such as interceptor trenches in the landfill

Energy Production Potential

11. Review energy production potential in Winnipeg, as the Brady Road landfill develops. Consider flexibility in design and construction, to incorporate possible future gas generation facilities and/or compatible power users.

Monitoring

12. Follow the strategy outlined in Section 5.9.1 for probe location, monitoring frequency, laboratory analysis and special investigations.
13. Conduct a site specific evaluation to select new probe locations and to identify probes to be monitored.
14. Implement the proposed landfill gas monitoring program on Table 10, including increased monitoring frequency at sites with higher gas migration.
15. Conduct landfill gas analysis for non-methane organic compounds (NMOCS) periodically at Kilcona, Brady and Summit Landfill.

11.2 LEACHATE

Landfill Design

1. Review landfill design issues at Brady Road Landfill as discussed in Section 6.3.3.

Leachate Probes

2. Install and/or repair leachate probes at Kilcona, Kimberly, Cordite, Cadboro East and West Landfills, to define leachate head buildup distribution near the centre and across the site.

3. Evaluate leachate migration in the upper silts and clays when development is proposed in or adjacent to landfill control zones.

Leachate Extraction

4. Consider leachate extraction programs at sites with high and moderate potential for groundwater contamination, beginning with priority sites discussed in Table 13 and 14.
5. Expand leachate extraction program at Summit Road Landfill to include the entire site. Increase pumping frequency and volumes to reduce leachate heads.
6. Expand leachate extraction program at Brady Road Landfill to include all cells without leachate collection.
7. Evaluate the need for additional leachate extraction at Kilcona Landfill, based on leachate probe results and slope stability studies.
8. Resolve land use conflicts by relocating snow dumping at McPhillips Street and St. Boniface Landfills. Consider leachate extraction after snow dumping stops.
9. Monitor the effects of leachate extraction programs on landfill gas migration and take steps to prevent excess landfill gas migration.

Monitoring

10. Follow the leachate monitoring strategy presented in Section 6.5.3.
11. Expand organic characterization for leachate at select sites as described on Table 16.
12. Implement the proposed leachate monitoring program presented in Table 15, including selection of representative site probes.

11.3 GROUNDWATER AND SURFACE WATER MONITORING

Groundwater Pollution Potential

1. Re-evaluate groundwater pollution potential of sites periodically with changes in bedrock piezometric surface or additional site specific information.

Data Management

2. Perform a data quality review to identify possible errors in reporting or transcription.
3. Utilize data base files to store water quality data and allow flexible data retrieval (i.e. tables, graphs, statistical calculations).
4. Update files annually to provide early warning of changes in groundwater quality.