Associated Environmental

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REPORT

Municipality of Crowsnest Pass

Preliminary Phase II Environmental Site Assessment
Hillcrest Ball Diamond Road
SW-20-007-03 W5M

NOVEMBER 2023

EXECUTIVE SUMMARY

The Municipality of Crowsnest Pass (MCNP) retained Associated Environmental Consultants Inc. (Associated) to conduct a preliminary Phase II Environmental Site Assessment (ESA) at the Hillcrest Ball Diamond Road nuisance ground (Site) within the MCNP. The Site is located in Hillcrest, Alberta, at SW-20-007-03 W5M, south of 4 Avenue.

In 2022, Associated completed an Environmental Overview of nuisance grounds within the MCNP to determine whether setback variances were needed for previous and future developments within 300 metres (m) of multiple landfill sites per the Guideline for Setback Reviews [Waste Facility] document. There is a potential neighbourhood expansion planned 160 m east of the waste. Results indicated that the Site was used for waste disposal since prior to 1949 and stopped being used between 1969-1978. The Site is relatively flat and is in the vicinity of a former waterbody that was filled in by an unknown company around the 1970s. Locally, the ground slopes gently to the north/northeast. There is an adjacent commercial/recreational property immediately west of the Site with a shop. Buried waste consists of metals, car parts, glass, wood, tires, cloth, crushed brick, coal slag and layers of ash, which indicate evidence of burning.

This Phase II ESA was initiated to confirm whether there are impacts to human and ecological health receptors. The objectives of the preliminary Phase II ESA at the Hillcrest nuisance ground were:

- Initial characterization of buried waste and soil quality;
- Installation of groundwater monitoring wells and assess groundwater quality; and
- Installation of soil vapour monitoring wells and assess for landfill gas (methane).

The Phase II ESA actions and conclusions are:

- On June 21 and 22, 2023, six (6) boreholes were advanced using ODEX drilling by Core Drilling. Three (3) boreholes were completed as groundwater monitoring wells (23HCMW01 through 23HCMW03) to a maximum depth of 7.4 metres below ground surface (mbgs) around the outer perimeter of the buried waste. Three (3) boreholes completed as soil vapour monitoring wells (23HCSV01 through 23HCSV03) were advanced to a maximum depth of 1.55 mbgs, adjacent to the respective groundwater monitoring wells.
- On June 26, 2022, three test pits (23HC09 through 23HC11) were advanced using a backhoe supplied by the MCNP in locations with the highest electromagnetic values and waste concentrations according to geophysical surveys conducted in 2022. Two soil samples were collected from each test pit within the waste. Waste extended to the maximum depth of investigation (3.6 mbgs) and could not be delineated due to groundwater seeping into the test pits.
- Mixed waste primarily consisted of ash layers, coal slag, car parts, metals, glass, crushed brick, cables, tires, and wood, and extended to at least 3.6 mbgs.
- Soil contaminants of concern were identified in all three test pits, including various metals (antimony, arsenic, barium, chromium, copper, lead, molybdenum, nickel, tin, and/or zinc), benzene, toluene, polycyclic aromatic hydrocarbons (PAH) (anthracene, naphthalene, and/or phenanthrene), perfluorooctanesulfonic acid (PFOS), perfluorooctanoic acid (PFOA), and/or dioxins.
- All contaminants identified were not horizontally or vertically delineated within the soil. Contamination in soil is interpreted to be from buried waste and burning.

- Shallow groundwater depths ranged between 3.56 mbgs (23HCMW01) and 5.08 mbgs (23HCMW03) on July 11, 2023. The inferred groundwater flow is to the north, with an estimated horizontal hydraulic gradient of 0.0002. The hydraulic gradient is shallow because a former on-site waterbody was filled with waste and coal slag.
- Groundwater parameters exceeding applicable guidelines included TDS in 23HCMW02, and dissolved manganese and dissolved iron in 23HCMW01 and 23HCMW02. TDS is not an environmental concern for the Site. Elevated dissolved manganese is unlikely to be an environmental concern for the Site, as it is not associated with landfills. The source of elevated dissolved iron in 23HCMW02 may be buried waste.
- Most contaminants of concern identified in soil mixed with waste were not identified in groundwater. Therefore, it is likely that most soil contaminants are confined to areas with waste. However, further delineation is required, and groundwater should be analyzed for dioxins and furans. Confirmation sampling and analysis of PFOS and PFOA is needed to confirm its presence and if it is a concern.
- Methane concentrations were below detection limits in all monitoring wells. Although methane was not detected, volatile parameters were detected in the soil, and soil vapour sampling for those parameters was not completed. The potential for soil vapour concerns remains. However, as there is coarse-grained material throughout the Site and surrounding area and considering that the detected volatile concentrations in soil are relatively low, there is a lower potential for lateral migration of soil vapours to nearby structures.
- There is currently insufficient information to eliminate exposure pathways to modify AT1 Guidelines.

Based on the limited results, there is low to moderate potential environmental concern for the building located in the adjacent property to the west. There is low potential environmental concern for the other existing properties within 300 m of the Site. . It is the MCNP's discretion to permit renovations and infill housing, including houses with basements for existing properties and structures. The MCNP may want to consider the requirement of soil vapour barriers for new basements until further soil vapour assessment can be completed. For proposed new developments within 300 m of the Site, the MCNP should thoroughly review development applications and mandate that developers conduct an environmental assessment of the proposed development property to verify the absence of potential contamination and soil vapours.

Associated recommends the following:

- Notify Alberta Environment and Protected Areas of the Site and its reported impacts, as per requirements under Alberta's *Environmental Protection and Enhancement Act* and Alberta's Contaminated Sites Policy Framework (ESRD 2014).
- Limit public access to the Site and zone the entire landfill area and the adjacent lots as commercial and/or industrial. This will protect direct human exposure and will assist in risk management of the Site.
- Conduct additional groundwater and soil vapour monitoring to confirm the initial results. Alberta Environmental and Protected Areas typically prefers to see a minimum of four sampling events over different seasons to assess for seasonal variability and trends.
- Advance additional test pits and collect soil samples to delineate nuisance ground impacts in soil, including background locations and beneath waste.
- Install additional groundwater monitoring wells to determine the vertical gradient and to confirm shallow groundwater flow direction.
- Conduct hydraulic conductivity tests to assess the hydrogeologic conditions for site-specific modification of AT1 Guidelines.

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