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MEMORANDUM

May 20, 2014

TO: Norm Rankin
Regional Counsel

Alison Rodrigues
Issues Project Coordinator, Halton Peel District Office

FROM: Christina Trotter
Hydrogeologist, Water Resources Unit, Central Region

RE: **Burlington Executive Airpark
Groundwater Monitoring Program and Limited Phase II ESA**

As requested, I have reviewed the following document with respect to groundwater issues:

*“Groundwater Monitoring Program and Limited Phase II Environmental Site Assessment”
dated April 7, 2014, prepared by Pinchin Environmental Ltd. and signed by Melissa Gallagher,
Sarah Ferguson and Andy D. Vanin.*

For reference, this report is now posted online at www.burlingtonairpark.com.

In addition, I have reviewed the following documents to gain a better understanding of the area:

*“Phase I Environmental Site Assessment, Burlington Executive Airpark, 5342 Bell School Line,
Burlington, Ontario” dated July 19, 2012, prepared by Pinchin Environmental Ltd. and signed
by Melissa Gallagher and Andy Vanin.*

*“Phase II Environmental Site Assessment, 5342 Bell School Line, Burlington, Ontario” dated
July 16, 2013, prepared by Pinchin Environmental Ltd. and signed by Jason Laplante and Paul
Loney.*

and,

Letter addressed to Mr. Cary Clark regarding “Review of Environmental Reports, Imported Fill Quality, Burlington Executive Airpark” dated July 11, 2013, prepared by Terrapex Environmental Ltd. and signed by Jeff Stevenson.

Background

According to the Pinchin Environmental Ltd. (Pinchin) Phase I report and the Terrapex Environmental Ltd. (Terrapex) letter, fill was deposited at the property known as the Burlington Executive Airpark located at 5351 Appleby Line, 5260 Bell School Line and 5342 Bell School Line in Burlington, Ontario (collectively known as the Site) from 2008 or 2009 to 2013. Laboratory analyses completed for some of the fill material deposited at the Site indicated exceedences of the Site Condition Standards set out in Table 2 (potable) of O.Reg 153/04 for medium to fine textured soils and residential/parkland/institutional property uses (Table 2 SCSs). Soil exceedences of the Table 2 SCSs were documented for a number of parameters including some metals and polycyclic aromatic hydrocarbons (PAHs).

An Environmental Site Assessment (ESA) was completed at the Site to assess groundwater quality downgradient of areas where the fill was deposited. The 2014 Pinchin Report referenced above documents the findings of this ESA.

Summary of 2014 Pinchin Report

In order to assess whether fill deposited at the Site was impacting groundwater flowing from the Site, Pinchin installed nine (9) monitoring wells along the downgradient property boundaries of the Site. Water levels and groundwater samples were collected from all newly installed monitoring wells and one (1) existing monitoring well. The groundwater flow direction was determined to be towards the south and southeast. The groundwater samples were analysed for volatile organic compounds (VOCs), petroleum hydrocarbon fractions F1 to F4 (PHC F1 to F4), PAHs and metals. Pinchin compared groundwater quality to the Table 2 SCSs for fine to medium textured soils. Laboratory analyses indicated that groundwater collected from one (1) monitoring well (MW108) exceeded the Table 2 SCS for cobalt. In addition, groundwater collected from one (1) monitoring well (MW109) exceeded the Table 2 SCS for uranium. All other analysed parameters met the Table 2 SCSs in the collected groundwater samples.

In light of the two (2) documented groundwater exceedences, Pinchin conducted additional investigative work including groundwater re-sampling at monitoring wells MW108 and MW109 and installation of two (2) additional monitoring wells (MW109A and MW109B).

Two (2) additional groundwater samples collected at MW108 indicated concentrations of cobalt were less than the Table 2 SCSs. Pinchin concluded that groundwater concentrations of cobalt above the Table 2 SCSs in vicinity of MW108 did not represent steady state groundwater conditions and the average cobalt concentration in groundwater in the vicinity of MW108 is below the Table 2 SCSs.

Two (2) additional groundwater samples were collected at MW109 and analysed for uranium. Samples of the fill, native soil and groundwater were collected from the two (2) new monitoring wells MW109A and MW109B and were analysed for uranium. These laboratory analyses indicated that the concentration of uranium in the fill and native soil collected from MW109A and MW109B were less than the Table 2 SCSs. Groundwater samples collected from MW109 and MW109B exceeded the Table 2 SCS for uranium while the groundwater sample collected from MW109A met the Table 2 SCS for uranium. Pinchin concluded that since concentrations of uranium in the fill and native soil samples were below the Table 2 SCSs, the groundwater exceedences of uranium were unrelated to the fill deposited at the Site. Pinchin also stated that the uranium exceedences in groundwater were likely the result of the breakdown of naturally occurring uranium deposits within the shale bedrock. Finally Pinchin stated that other hydrogeological assessments in Halton Region identified elevated uranium concentrations in groundwater.

MOE Technical Support Request for Additional Information for 2014 Pinchin Report

In order to further evaluate Pinchin's conclusions, I requested some additional information from Pinchin, via McMillian LLP, including:

1. An analysis of all existing laboratory analyses for the fill deposited at the Site for exceedences of uranium.
2. Additional stratigraphic information, including the water well records, for the initial nine (9) monitoring wells.
3. Specific assessments and reports completed in Halton Region that documented uranium concentrations in groundwater above the Table 2 SCS.

Pinchin, via McMillian LLP, provided me with this information on April 14 and April 25, 2014.

The reports provided were:

“Hydrogeological Study, Merton Tertiary Planning Area, Town of Oakville, Ontario” dated December 2013, prepared by R.J. Burnside & Associates Limited and signed by Jackie Shaw and Joanne Thompson.

“Andrin Milton Properties Limited, Soil and Groundwater Investigation and Ground Water Monitoring for Proposed Watercourse Realignment, Addendum” dated November 13, 2013, prepared by exp Services Inc. and signed by Carla Reynolds and Jim Phimister.

and,

“Hydrogeological Assessment, Winston Park West, Oakville, Ontario” dated May 2013, prepared by Conestoga-Rovers and Associates and signed by Philip J. Smart and Thomas Guoth.

Comments and Recommendations

Based on my review of the available information, I have the following comments and recommendations:

1. In my opinion, the ESA completed by Pinchin adequately characterizes groundwater quality downgradient from the fill deposited at the Site.
2. I agree with Pinchin that the cobalt exceedence in groundwater collected from MW108 is not likely representative of groundwater quality in the vicinity of MW108.
3. I agree with Pinchin that the uranium exceedences in groundwater in the vicinity of MW109 and MW109B are likely due to natural processes in the shale unit. This shale unit is commonly known as the Queenston shale. I base my opinion on the following:
 - a. As Pinchin stated, uranium concentrations in the fill and native soil collected from the vicinity of MW109 and MW109B were below the Table 2 SCS.
 - b. Groundwater samples collected at MW109 and MW109B were collected from the shale unit.
 - c. The additional reports provided by Pinchin documented elevated uranium concentrations in groundwater collected within or above the Queenston shale in Halton Region.
 - d. Both Terrapex and Pinchin showed there were no exceedences of the Table 2 SCS for uranium in any of the fill samples submitted for laboratory analysis. Terrapex stated in their report that compared to the amount of fill imported to the Site, insufficient fill samples were submitted for laboratory analysis and therefore the quality of the fill as a whole is not well determined. While I agree it cannot be conclusively stated that all the fill meets the Table 2 SCS for uranium, there is no current indication the fill deposited at the Site exceeds the Table 2 SCS for uranium.
4. I recommend an on-going groundwater monitoring program be implemented at the Site to document groundwater quality over time and confirm the cobalt and uranium groundwater

results. The groundwater monitoring program should include the following:

- a. Hydraulic conductivity estimates and groundwater velocity estimates of each of the documented stratigraphic units including the fill, the native soil and the shale.
 - b. Identification of potential aquifers and aquitards.
 - c. Analysis of vertical and horizontal hydraulic gradients.
 - d. Analysis of potential groundwater contaminant transport pathways within the documented stratigraphic units including the identification of potential receptors.
5. I recommend a groundwater monitoring proposal for the Site be submitted to the Ministry of the Environment (the Ministry) for review. The frequency and duration of the monitoring program should be based on the hydrogeological analysis recommended above.
6. I recommend the Table 2 SCSs for coarse textured soils also be used for comparison of the groundwater data where provided as the majority of the monitoring wells are completed in the shale. The Ministry considers the Table 2 SCSs for coarse textured soils the appropriate SCSs for comparison when dealing with contaminant transport in fractured shale. Comparison of the data collected to date to the Table 2 SCSs for coarse textured soils does not identify any additional groundwater exceedences.

If you have any questions please contact me by phone at (416) 325-6970 or by e-mail at Christina.Trotter@ontario.ca.

Regards,

Original Signed By:

Christina Trotter, M.Sc., P.Geo.
Hydrogeologist