

**Environmental Review Tribunal**  
Tribunal de l'environnement



**ISSUE DATE:** December 24, 2015

**CASE NO.:** 12-033

**PROCEEDING COMMENCED UNDER** section 41 of the *Environmental Bill of Rights, 1993*, S.O. 1993, c. 28, as amended

Appellant: Concerned Citizens Committee of Tyendinaga and Environs (CCCTE)  
Instrument Holder: Waste Management of Canada Corporation  
Respondent: Director, Ministry of the Environment and Climate Change  
Subject of appeal: Terms and conditions imposed under section 20.3 of the *Environmental Protection Act*, R.S.O. 1990, c. E.19, as amended, for an Amended Environmental Compliance Approval of the use, operation, and closure of the Richmond Landfill Site.  
Reference No.: A371203  
Property Address/Description: Lot Pt 1, 2, 3, Concession 4  
Municipality: Town of Greater Napanee  
Upper Tier: County of Lennox and Addington  
ERT Case No.: 12-033  
ERT Case Name: CCCTE v. Ontario (Environment and Climate Change)  
Heard: April 13 to 17, 20 to 24, 27 to 30, May 6 to 8, and June 9 and 22, 2015 in Belleville and Tyendinaga Township, Ontario

**APPEARANCES:**

**Parties**

**Counsel**

Concerned Citizens Committee of Tyendinaga and Environs

Richard D. Lindgren

Director, Ministry of the Environment and Climate Change	Paul McCulloch and Natalie MacDonnell, student-at-law
Waste Management of Canada Corporation	Harry Dahme and Julia Vizzaccaro
Mohawks of the Bay of Quinte	Eric Gillespie, Priya Vittal and Graham Andrews
Tom Touzel on behalf of Napanee Green Lights	Ian Miron and Will Amos

### **Participant**

Andrew Martin	Self-represented
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## **ORDER DELIVERED BY MAUREEN CARTER-WHITNEY**

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### **REASONS**

#### **Overview**

[1] This Order concerns an appeal by the Concerned Citizens Committee of Tyendinaga and Environs (“CCCTE”) of certain conditions of Amended Environmental Compliance Approval number A371203 (the “ECA”), in relation to the closure of the Richmond Landfill Site (the “Site”) in the Town of Greater Napanee.

[2] The Tribunal finds that there are gaps in understanding the hydrogeology of the Site and the extent of leachate contamination, which must still be addressed. Consequently, the Tribunal finds that additional investigations are needed and, therefore, further amendments should be made to the ECA in respect of the Environmental Monitoring Plan (“EMP”) and the contingency plans. These amendments are addressed in detail under Issue 1 below.

[3] The Tribunal also finds that a Reasonable Use limit (“RUL”) for 1,4-dioxane of 1 microgram per litre (“µg/L”) should be used: to determine the boundaries of the

contamination attenuation zone (“CAZ”); to expand the boundaries of the CAZ in the future, if needed; and as a trigger for further action to bring the Landfill into compliance with the applicable regulatory regime. This finding is addressed under Issue 2 below.

[4] As set out below under Issue 3, the Tribunal finds that, in deciding this matter, it is unnecessary to address and make findings respecting whether there is a common law public right to access uncontaminated groundwater and surface water or a common law requirement that the Director consider the public interest in protecting public water rights based on the *parens patriae* principle.

[5] Finally, the Tribunal determines that it is unnecessary for the Tribunal to maintain a further supervisory role in this matter after the wording of the ECA conditions and EMP provisions is finalized. Consequently, in this Order, the Tribunal provides its final determination of CCCTE’s appeal, subject only to the Tribunal’s determination of the final wording of the ECA conditions and EMP provisions, as discussed under Issue 4 below.

## **Background**

[6] On January 9, 2012, Ian Parrott, Director, Ministry of the Environment and Climate Change (“MOECC”) issued the ECA, under s. 20.3 of the *Environmental Protection Act* (“EPA”), to Waste Management of Canada Corporation (“WMC”) for the use, operation and closure of the Site, located at Lot Pt 1, 2, 3, Concession 4, Town of Greater Napanee, County of Lennox and Addington, Ontario. Notice of the Director’s decision to issue the ECA was posted on the Environmental Registry on January 16, 2012. WMC is the owner of the Richmond Landfill (“the Landfill”).

[7] On January 30, 2012, CCCTE sought leave to appeal the Director’s decision pursuant to s. 38 of the *Environmental Bill of Rights, 1993* (“EBR”). CCCTE is an Ontario incorporated not-for-profit corporation, whose membership consists of persons

living in the Township of Tyendinaga, Town of Greater Napanee, Town of Deseronto and other local communities.

[8] On March 30, 2012, the Tribunal granted CCCTE leave to appeal the following conditions in the ECA, under the *EBR*: Condition 8.5 (Monitoring Programs); Condition 9.1 (Groundwater and Surface Water Impact Contingency Plan); Condition 9.2 (Leachate Collection System Contingency Plan); Condition 9.5 (Public Notification Plan for Contingency Plans); and Conditions 14.1, 14.2 and 14.3 (Monitoring Reporting and Annual Reporting). The Tribunal lifted the automatic stay under s. 42(1) of the *EBR* until the Tribunal issues its decision on the appeal or until the Tribunal orders otherwise.

[9] On April 13, 2012, CCCTE (the “Appellant”) filed a notice of appeal with the Tribunal, pursuant to s. 139, s. 142 and s. 145.2 of the *EPA*, in respect of the above-noted ECA conditions.

[10] At the commencement of the preliminary hearing on June 25, 2012, held at Selby Community Hall, Selby, Ontario, the Tribunal granted party status in this proceeding to the Mohawks of the Bay of Quinte (“MBQ”) and to Dr. Tom Touzel as the representative of Napanee Green Lights (“NGL”). The MBQ are a First Nation Band occupying the Tyendinaga Mohawk Territory, which is also known as Tyendinaga Indian Reserve No. 38. NGL is an unincorporated association of 35 citizens living near the Site in the Napanee and Deseronto areas.

[11] The preliminary hearing was continued by telephone conference call (“TCC”) on numerous occasions, as well as in person at the Deseronto Community Centre, Deseronto, Ontario on April 12, 2013. At that time, the parties presented to the Tribunal the terms of two settlement agreements with respect to the amendment of certain conditions of the ECA, and certain further investigations and work to be done. The settlement agreements addressed groundwater monitoring wells, odour monitoring and abatement, public notification, and semi-annual and annual reporting, including the finalization of an Odour Survey Protocol and a Public Notification Plan (“PNP”). The

Appellant undertook to withdraw and discontinue the portions of its appeal relating to the provisions of the ECA amended as a result of the settlement agreements. In its Order dated April 26, 2013, the Tribunal accepted the settlements and the withdrawal of the related portions of the appeal and ordered the Director to amend the ECA accordingly, as agreed by the parties.

[12] The ECA conditions that remain under appeal are: Condition 8.5, which requires WMC to carry out monitoring programs for groundwater, surface water and landfill gas on an interim basis and to provide an addendum report to the EMP, including adequate details on groundwater and surface water monitoring locations, and monitoring frequencies and parameters; Condition 9.1, which requires that WMC submit, for the Director's approval, a Groundwater and Surface Water Impact Contingency Plan that incorporates the additional information collected from the groundwater investigations and includes trigger mechanisms associated with the groundwater and surface water monitoring programs; and Condition 9.2, which requires that the Leachate Collection System Contingency Plan be initiated when specified trigger mechanisms have been identified as occurring.

[13] The Tribunal also heard two motions in this matter prior to the commencement of the hearing. Additional background information about this proceeding is provided in the Tribunal's Orders of July 25 and October 5, 2012, April 3 and 26, and August 28, 2013, January 10, May 8 and 30, September 25, and October 2, 2014, and February 5, March 27, June 18, July 21, August 13 and October 29, 2015.

[14] On March 29, 2015, Andrew Martin wrote to the Tribunal to request participant status. He and his family live in the vicinity of the Site. In a TCC on March 30, 2015, Mr. Martin was granted participant status on the basis that he has a genuine interest in the subject matter of the proceeding and was likely to make a relevant contribution.

[15] The hearing of this appeal took place over 19 days from April to June 2015. At the commencement of hearing, WMC entered as an exhibit its proposed revised

Environmental Monitoring Plan, Revision No. 03, dated March 2015 (“proposed revised EMP”).

[16] On July 21, 2015, the Tribunal issued an interim Order to address conditions in relation to the fall 2015 monitoring season through a number of amendments to the ECA, including implementation of the proposed revised EMP. The interim Order, with reasons to follow, was made pending the Tribunal’s final decision in this matter. The interim Order stated that the requirement for any additional amendments to the ECA and further modifications to the EMP remained under consideration by the Tribunal and would be addressed by the Tribunal in its final decision. On August 13, 2015, the Tribunal issued an Order varying its interim Order of July 21, 2015 to extend a date set out in one of the conditions. On October 29, 2015, the Tribunal issued an additional Order varying its interim Order of July 21, 2015 to further extend that date.

[17] As described above, this Order provides the determination of the remaining portions of CCCTE’s appeal that were not disposed of in the Tribunal’s Order of April, 26, 2013, subject only to the Tribunal’s determination of the final wording of the ECA conditions and EMP provisions. This Order also provides the Tribunal’s reasons for its interim Order of July 21, 2015.

### **Relevant Legislation**

[18] The relevant legislation is:

#### *Environmental Protection Act*

20.2 (1) A person may apply to the Director for approval to engage in an activity mentioned in subsection 9 (1) or 27 (1) of this Act or subsection 53 (1) of the Ontario Water Resources Act if the activity has not been prescribed by the regulations for the purposes of subsection 20.21 (1).

20.3 (1) After consideration of an application for approval under section 20.2 in respect of one or more activities, the Director may,

- (a) issue or refuse to issue an environmental compliance approval in respect of one or more of the activities;
- (b) if the Director issues an environmental compliance approval,
  - (i) impose terms and conditions in the approval, and
  - (ii) incorporate any environmental compliance approvals that are in effect into the new approval and revoke the approvals that have been incorporated;
- (c) amend an environmental compliance approval that is in effect and impose, alter or revoke terms and conditions or expand the scope of the approval to other activities or sites;
- (d) revoke an environmental compliance approval in whole or in part, with or without issuing a new approval; and
- (e) suspend an environmental compliance approval in whole or in part.

145.2 (1) Subject to sections 145.3 and 145.4, a hearing by the Tribunal under this Part shall be a new hearing and the Tribunal may confirm, alter or revoke the action of the Director that is the subject-matter of the hearing and may by order direct the Director to take such action as the Tribunal considers the Director should take in accordance with this Act and the regulations, and, for such purposes, the Tribunal may substitute its opinion for that of the Director.

### *Statutory Powers Procedure Act*

16.1(1) A tribunal may make interim decisions and orders.

(2) A tribunal may impose conditions on an interim decision or order.

(3) An interim decision or order need not be accompanied by reasons.

### **Issues**

[19] The issues are:

1. whether the ECA conditions under appeal in respect of the EMP and the contingency plans should be amended and, if so, in what manner;
2. what value should be set as a site-specific water quality criterion for 1,4-dioxane;

3. whether the common law public rights in the environment and the potential for public nuisance should be considered when making decisions regarding the ECA and, if so, whether the precautionary principle requires the imposition of more stringent or protective conditions where there may be interference with any public rights in the environment; and
4. whether the Tribunal should maintain a further supervisory role in this matter after the wording of the ECA conditions and EMP provisions is finalized.

### **Agreed Facts**

[20] The Site is located at 1271 Beechwood Road in the Town of Greater Napanee, approximately 1 kilometre (“km”) north of Highway 401 and northeast of the intersection of County Road 10 and Beechwood Road, in a rural area that is not serviced by a municipal water system. Local residents, farms and business are dependent on groundwater as a source of drinking water. Many of the members of CCCTE live beside or near the Site and rely on private domestic wells for drinking water, and other household and agricultural purposes.

[21] The Richmond Landfill was first established in the 1950s and from 1954 to the early 1970s, it was unlicensed and primarily served local residents. In the 1970s, a series of Provisional Certificates of Approval under the *EPA* allowed for the disposal of domestic, commercial and non-hazardous solid industrial waste from a number of local municipalities. In August 1987, Provisional Certificate of Approval No. A371203 (now the ECA) was issued to permit expansion of the Landfill and increase the service area to include all of Ontario. Ownership of the Landfill changed over time until Canadian Waste Services, a corporate predecessor to WMC, purchased the Site in the mid-1990s.

[22] The Landfill was constructed in five phases. Phase 1 was not lined, Phases 2 and 3 have a clay liner and Phases 4 and 5 have a composite clay/geomembrane liner.



Peripheral drains collect leachate from the lined portions and from Phase 1, which is pumped into trucks for off-site treatment. Stormwater runoff from the Site is collected in a series of ditches and directed to one of three stormwater management ponds on site. Stormwater from ponds 1 and 2 is discharged to Marysville Creek, which flows east to west across the northern portion of the Site and then in a southwesterly direction until it discharges to Hungry Bay in the Bay of Quinte, Lake Ontario. Stormwater from pond 3 is discharged to a municipal ditch running along Beechwood Road on the southern boundary of the Site, which discharges into Marysville Creek a few kilometres to the southwest of the Site.

[23] In the late 1990s, WMC applied under the *Environmental Assessment Act* (“*EAA*”) to expand the footprint, capacity and lifespan of the Landfill to dispose of 750,000 tonnes per year of non-hazardous wastes for an additional 25 years. The MOECC approved the Terms of Reference for the Environmental Assessment (“*EA*”) in 1999. Following a court challenge that was not resolved until August 2004, WMC submitted its *EAA* application in 2005 and the MOECC’s government review of the *EA* document was published in 2006. On November 3, 2006, the Minister of the Environment refused WMC’s application for approval under the *EAA*.

[24] On June 21, 2007, WMC submitted a closure proposal for the Landfill, as required by the MOECC. On March 31, 2010, the Director issued an amendment to the *ECA*, which included a condition requiring that WMC cease accepting waste on June 30, 2011 and that the Landfill be capped with a final cover by September 30, 2011. As required by the MOECC, WMC submitted a number of reports on June 29, 2010, including the *EMP* and contingency plans, to satisfy conditions in the *ECA*. On January 9, 2012, the Director issued a further amendment to the *ECA* to incorporate the *EMP* and other reports. The Director’s decision with respect to this amendment is the subject of this appeal.

## Discussion, Analysis, and Findings

### Issue 1: Whether the ECA conditions under appeal in respect of the EMP and the contingency plans should be amended and, if so, in what manner?

#### *Evidence of CCCTE*

#### Michael Bossio

[25] Mr. Bossio, Chair and co-founder of CCCTE, provided factual evidence concerning the background of CCCTE and its concerns about the Landfill, including a chronology of the events that led to the commencement of this appeal. He stated that CCCTE, which was incorporated in 2000, is made up of a diverse range of individuals from a number of communities in the vicinity of the Landfill, and was originally organized to oppose the Landfill expansion proposal in 1998. He expressed concerns about the difficulty of obtaining information about the true impact of the Landfill in the past and he noted that CCCTE has been active in raising awareness and educating the public about the Landfill.

[26] Mr. Bossio described some of the impacts of the Landfill on the community, including the homes and farms along Beechwood Road, noting that the community relies on groundwater-fed wells as a source of drinking water. He testified that while there are no homes in the proposed CAZ area, there are many homes and farms south of Highway 401 and to the east, west, and south of the proposed CAZ that rely on groundwater.

[27] Mr. Bossio also testified about recent developments in relation to CCCTE's appeal, such as: the continuing off-site movement of leachate; the presence of 1,4-dioxane in the leachate and in off-site water wells and test holes; and WMC's inability to clearly delineate the outer boundary of the leachate plume for the proposed CAZ.

[28] Mr. Bossio stated that WMC's public notification of some recent developments had been deficient and unacceptable. He noted that CCCTE wrote to WMC in October 2013 to request that public notice of test results confirming the off-site movement of leachate from the Site be issued immediately in accordance with the PNP. Mr. Bossio added that, although WMC did not reply, a brief letter was distributed to some neighbours of the Site in November 2013. He said it did not appear to CCCTE that this letter satisfied the requirements of the PNP, and in April 2014, CCCTE asked the MOECC to investigate whether WMC had failed to comply with the public notification provisions in Condition 9.5 of the ECA, as amended in 2013. He noted that the MOECC conducted the requested investigation but determined that the contamination event had occurred prior to the date the PNP came into effect.

[29] Mr. Bossio further stated that, in January 2015, CCCTE wrote to WMC to request immediate public notification of groundwater test results that found 1,4-dioxane and RUL exceedances for certain parameters after the operative date of the PNP. He said that CCCTE received no reply from WMC but received a short written notice of the test results from WMC staff, which did not meet the requirements of the PNP in his view. Mr. Bossio emphasized that CCCTE negotiated the PNP in good faith and expected that WMC would comply with it and the MOECC would enforce it when triggered. Based on CCCTE's recent experiences with public notification, he recommended that any further terms and conditions imposed by the Tribunal in relation to the outstanding issues be crafted in an effective and enforceable manner to prevent or minimize further debates about compliance.

### Ian Munro

[30] Mr. Munro is a member of CCCTE and serves on its Technical Sub-Committee, which has involved attending meetings and reviewing and commenting on technical and regulatory documents. He provided additional background concerning CCCTE's activities in relation to the Landfill, noting the difficulty he experienced in trying to obtain information from the MOECC. Mr. Munro also addressed CCCTE's concerns about the

lack of adequate public notification to residents near the Site and the need for greater transparency and accountability. He gave examples of incidents where notice was lacking and pointed out deficiencies in WMC's website.

[31] Mr. Munro stated that, while a Community Liaison Committee ("CLC") has been established in relation to the Landfill, CCCTE is not a member of it and has had longstanding concerns about its mandate, independence and composition. He said he has attended two CLC meetings but did not find them helpful in advising the public of critical issues at the Landfill. He further stated that the existence of the CLC does not dispense with the need for an effective and comprehensive PNP for the Landfill.

[32] Mr. Munro gave evidence concerning the PNP, noting that he believes it is a good plan and, if implemented as written with goodwill, it will achieve the goal of prompt and effective notification. He stressed the importance of public notification regarding every action associated with the closure and long-term monitoring of the Landfill to ensure complete public confidence in the process.

#### Wilf Ruland

[33] Mr. Ruland is a hydrogeologist with a Master of Sciences in Earth Sciences from the University of Waterloo. Since 1988, he has been an Environmental Consultant with his own consulting firm, Citizens' Environmental Consulting, since 1988 and has been retained by CCCTE in relation to the Landfill since 2007. Mr. Ruland was qualified as a contaminant hydrogeologist to provide opinion evidence in assessing landfill impacts on groundwater and surface water.

[34] Mr. Ruland provided the Tribunal with evidence concerning the hydrogeology of the Site and surrounding area, the impacts of the Landfill on the groundwater and surface water in the area and his comments and recommendations based on his review of reports and technical documents in relation to the Landfill. He noted that the Landfill is located in an area where soils are very thin with an underlying fractured bedrock flow

system, which is permeable and allows for the transmission of groundwater through the fractures. He stated that the limestone bedrock is susceptible to slow dissolution over time, known as karst processes. He clarified that while such processes may create large caves or passages underground, that is not the situation here, and further noted that there is evidence of dissolution having made the rock somewhat permeable.

[35] Mr. Ruland also described the hydrogeology of the Site, noting that the following three zones have been identified: a shallow groundwater flow zone, where there is an overburden and shallow bedrock interface to a depth of approximately 2 metres (“m”); an intermediate bedrock flow zone from a depth of approximately 2 m to 30 m; and a deep bedrock flow zone at depths greater than 30 m. Mr. Ruland stated that groundwater moving through the shallow groundwater zone is influenced by the contours of the landscape, such as hills and valleys, and that the quality of water in the shallow groundwater zone is influenced by factors such as rain water, road salt, soil erosion and Landfill impacts. He added that groundwater in the intermediate bedrock zone moves through fractures in the bedrock that have opened as a result of dissolution. He said that groundwater in the deep bedrock zone is characterized as saline, corrosive water that is stagnant and tends to stay in the deep zone if not disturbed.

[36] Mr. Ruland testified that it is difficult to understand the hydrogeology of the shallow groundwater and intermediate bedrock zones because there is no way to know the location of the fractures through which water is moving. He said it is only possible to determine where the water is moving by drilling monitoring wells, and he noted that many such wells have been drilled in the vicinity of the Landfill because it is such a challenging environment. Mr. Ruland also noted that, although the predominant movement of groundwater is through horizontal fractures, there are also vertical fractures, which tend to connect the horizontal layers. He stated that high liquid levels in the Landfill have pushed contaminated groundwater through the shallow groundwater zone and into the fractures of the intermediate bedrock zone, where it has followed the most permeable routes.

[37] Mr. Ruland went on to discuss the leachate from the Landfill, noting in particular the practice of leachate recirculation that was conducted there for a number of years. He said that during this period the leachate was collected and pumped back into the Landfill, rather than being taken away to be treated at a wastewater plant. Mr. Ruland stated that this caused the leachate to become more heavily contaminated and increased the liquid level inside the Landfill. He characterized the recirculation of leachate as a questionable practice that should not have been done. He also noted that two leachate testing wells demonstrated that there is massive leachate mounding within the landfill.

[38] Mr. Ruland described the chemical composition of the leachate from the Landfill, noting that leachate from municipal waste contains thousands of chemicals, some of which are problematic or hazardous if they get into the environment. He said that landfill leachate is a noxious, potentially toxic liquid, which people should not have contact with or ingest. He testified that the chemical load in the Landfill leachate will eventually drop to a point where it is no longer a concern, but it is impossible to know what its contaminating lifespan will be.

[39] Mr. Ruland provided evidence identifying his concerns and comments regarding the history of investigations at the Landfill. He stated that, in the past, the hydrogeology of the Site was not well understood and the leachate was not well monitored. He noted that this resulted in the contamination of a large off-site area including several domestic wells. Mr. Ruland said that the precise size and extent of the off-site contamination plume are currently unknown, but his evidence was that it is a 600 m wide front at the Site's property boundary and extends at least 800 m from the Landfill and at least 350 m onto adjacent properties to the south and southeast of the Site.

[40] Mr. Ruland provided his opinion that 1,4-dioxane is the best leachate indicator parameter for the Landfill, describing it as far better than any other indicator parameter that has been used previously to track the leachate contamination of the groundwater

flow system. He characterized 1,4-dioxane as a critical contaminant for the Landfill and said that the focus of the off-site groundwater monitoring program should be on this parameter. In this regard, he testified that a RUL of 1 µg/L should be used, based on the evidence of Dr. Poh-Gek Forkert (summarized below). He added that alkalinity and tritium are the next best leachate indicator parameters.

[41] Mr. Ruland testified that Landfill leachate has contaminated off-site groundwater resources, which resulted in the contamination of domestic wells serving homes on Beechwood Road, south of the Site. His own assessment of six domestic wells, based on available data going back to the late 1990s, found exceedances of the RULs for a number of significant parameter indicators. Mr. Ruland provided his opinion that people living in these homes were exposed to and ingested contaminated well water for many years, stating that one well appears to have been contaminated by 2002 and another well between 2002 and 2006.

[42] Regarding David Harding's hypothesis that 1,4-dioxane detected in monitoring well OW 64-2 in 2014 came from the former Lewis Meats abattoir rather than the Landfill, Mr. Ruland provided his opinion that the Landfill was the only significant source of 1,4-dioxane contamination in the area. He stated that there was no evidence that Lewis Meats was a source of 1,4-dioxane, noting that any contamination from Lewis Meats while it was operating would have come from wastewater travelling to its septic system and then into shallow groundwater flow systems. Mr. Ruland's analysis indicated that if Lewis Meats were a significant source of 1,4-dioxane, a secondary spike in 1,4-dioxane levels would be expected in wells in the immediate vicinity and just downgradient of the former business, but no such spike was found.

[43] Mr. Ruland noted that test results in 2013 from monitoring well M170 indicated the detection of 1,4-dioxane and RUL exceedances of alkalinity north of Beechwood Road and east of the Landfill for the first time, on the property owned by Paul Martin (the "Paul Martin property"). He testified that further delineation of the leachate plume that extends onto the Paul Martin property is required and has not been done.

[44] Mr. Ruland also raised concerns about public notification and questioned the adequacy of the actions taken by WMC in this regard, referring to examples of what he considered to be incorrect or misleading public statements about the Landfill in WMC's reports and communications. He recommended that WMC notify in writing all current residents of the six homes along Beechwood Road that have had wells contaminated by the Landfill, as well as former residents dating back to 1997, about their potential exposure to leachate contamination.

[45] Noting that domestic water wells on properties south of Highway 401 are proposed to be monitored, Mr. Ruland agreed with Kyle Stephenson's recommendation that they be sampled once every two years as opposed to the frequency of once every five years proposed by WMC. In his opinion, the two year sampling cycle would be prudent given the lack of certainty regarding the delineation of the leachate plume. He stated that if a firm understanding of the hydrogeology and the leachate plume emerges, the frequency of sampling could be revisited. Mr. Ruland also recommended domestic well testing at residences further east on Beechwood and on Callahan Road.

[46] Mr. Ruland testified that, prior to finalizing the CAZ, there needs to be further delineation of the impacts of leachate on groundwater beyond the area already known to be impacted. In this regard, he provided detailed recommendations to conduct this delineation and to improve monitoring. Mr. Ruland made numerous recommendations with respect to: specific monitoring wells he said should be added in order to delineate the extent of the contaminant plume to the south, east and west; monitoring wells he said should be sampled in the intermediate bedrock and shallow groundwater zones; and "trigger" wells he said should be tested for 1,4-dioxane and other groundwater monitoring parameters once or twice per year. He testified that it would be prudent to space such trigger wells no more than 100 m apart to delineate the position of the plume.



[47] Having recommended that the M178 well nest be repaired or replaced and resampled, Mr. Ruland welcomed WMC's decision to replace the well nest with a new well nest nearby as long as this is done in a timely manner. He further recommended that the Tribunal revise the EMP only on an interim basis until further work is completed.

[48] Mr. Ruland noted that there is an existing pipeline, in a long excavated linear trench, at a depth of approximately 2 m, in a right-of-way that intersects with a line of plume monitoring wells south of Beechwood Road and along the northern part of the CAZ. He added that a future second, parallel pipeline is proposed. He expressed concern that it may provide a preferential pathway with high hydraulic conductivity for groundwater contaminated by leachate if there is a hydraulic connection between the plume and the pipeline trench.

[49] Mr. Ruland stated that he had walked in the area along the pipeline and found areas of thin soil and no soil, where the bedrock is exposed at the surface very close to the right-of-way. He expressed concern that the pipeline had gone into the bedrock and, stated that there could be a vertical connection in the bedrock through which leachate contaminated groundwater could be induced to move upward to the highly permeable area of the pipeline right-of-way. Therefore, he recommended that WMC conduct a comprehensive field and desktop investigation of the hydrogeological implications and potential impacts of the existing pipeline, as well as the proposed construction of a second pipeline.

[50] Mr. Ruland also stated that surface water monitoring should be improved, based on his opinion that the current surface water monitoring program is not adequate to allow a determination of the extent to which contaminated groundwater may be entering Marysville Creek. To obtain more information, he recommended that:

- 1,4-dioxane testing be commenced at all surface water monitoring stations on all regular sampling dates;

- surface water sampling be conducted three times per year during the spring high flows, late summer or fall lower flows, and once yearly within 12 hours after a major rain event of 25 millimetres (“mm”) or more; and
- continuous conductivity sampling be carried out in 2015 and 2016 on Marysville Creek, far enough upstream of Deseronto Road that there is no interference with road salt, as a simple and inexpensive method to monitor for occasional surges of contaminants.

[51] Mr. Ruland raised a number of concerns about the proposed groundwater and surface water contingency plans in the EMP, particularly with long timeframes that result in slow progress through the steps of the contingency plans. He recommended that, rather than merely presenting contingency options, WMC should provide more detailed contingency plans that address potential advantages and disadvantages of measures, particularly their feasibility and effectiveness within the existing hydrogeological context, as well as implementation time and scheduling considerations, and resource requirements including cost. Mr. Ruland expressed a specific concern in relation to a contingency measure in the Leachate Contingency Plan involving the use of blasting to install a fracture trench to contain leachate at the Site. He recommended that this option be removed from list of possible measures, noting that it could create further problems.

[52] In addition to his evidence concerning his key recommendations, Mr. Ruland provided a number of additional detailed recommendations concerning the ECA conditions and monitoring under the EMP.

### *Evidence of the MBQ*

#### Chief R. Donald Maracle

[53] Chief Maracle has been the elected Chief of the MBQ, a band within the meaning of the *Indian Act*, since 1993. Noting that the ancestors of the MBQ were allies of the

British Crown in the American War of Independence 1775 and the war of 1812, he said they settled along the Bay of Quinte in what is now known as the Tyendinaga Mohawk Territory (the "Territory"). Treaty 3½ assured the MBQ in perpetuity the free and undisturbed possession and enjoyment of the Territory under the protection of the Crown, as a safe and comfortable retreat. Chief Maracle said that this promise engages the honour of the Crown and that the MOECC cannot delegate performance of the Crown's promise to a commercial enterprise such as WMC.

[54] Chief Maracle stated that the Territory occupies 3.5 square km on the Bay of Quinte and is approximately 3.5 km southwest of the Landfill, which has been of grave concern to the MBQ community throughout his tenure as Chief. He testified that the community currently has 9,376 members with approximately 2,200 living on the Territory in about 1,100 households. He said that the MBQ are concerned about the Landfill's impact on human health, the environment and aquatic life, noting that his community's traditional practices and rights to hunt, fish and gather have been upheld by the Supreme Court of Canada.

[55] Chief Maracle testified that approximately 700 homes are on groundwater wells but, because the drinkable aquifer is relatively shallow and easily contaminated, 313 homes have municipal water and sewer services, and about 110 homes have holding tanks, to address water quality issues. He stated that almost all of the wells on the Territory are termed "Groundwater Under the Direct Influence of Surface Water" wells, and water in these wells is susceptible to both groundwater and surface water contamination. He acknowledged that there are intermittent issues with contamination in the wells on the Territory and stated that, due to such concerns, there has been ongoing monitoring of wells in the community since the 1970s.

[56] Chief Maracle noted that three waterbodies cross the Territory: Marysville Creek (known as Mud Creek on the Territory); Selby Creek (known as Sucker Creek on the Territory); and the Salmon River. He stated that these waterbodies play a vital role in MBQ community life as habitat for wildlife and fish, providing sustenance to members.

Chief Maracle said that, as a First Nation residing on their traditional lands, the MBQ cannot simply relocate in the event of contamination of the Territory. He further indicated areas where the MBQ have active land claims and noted a potential claim in an area adjacent to the Landfill.

[57] Chief Maracle indicated that the headwaters of Marysville Creek are located on the north side of the Landfill Site, from which the Creek flows to the southwest, also noting that flow from the Beechwood Road ditch empties into Marysville Creek. He added that Selby Creek and the Salmon River both flow through the area around the Landfill and into the MBQ Territory. As a result, he stated that the MBQ are concerned that any contamination from the Landfill that pollutes groundwater or surface water poses a risk of harm to their community. He further stated that the proposed closure conditions for the Landfill are not adequate to ensure the Territory will not become contaminated.

[58] Chief Maracle discussed the history of the Landfill and stated that the MBQ do not trust WMC to be good stewards of MBQ Territory, given past performance. He also expressed concern about the MOECC's ability to ensure compliance under the existing monitoring programs.

#### Kevin Shipley

[59] Mr. Shipley is a professional engineer who holds a Master of Applied Science in civil engineering from the University of Waterloo. He is also designated by the MOECC as a Qualified Person – Risk Assessment (“QPRA”) in the Province of Ontario. He is a Senior Environmental Engineer and Partner with XCG Consultants Ltd. (“XCG”), which he joined in 1992 after beginning to work as an engineer in 1986. He has been involved with the Landfill since 1999. The Tribunal qualified Mr. Shipley to provide opinion evidence as a professional engineer and QPRA, with expertise in groundwater and surface water as well as landfill approvals, compliance, monitoring and closure.

[60] Mr. Shipley provided his opinion that the leachate impacted groundwater in the vicinity of the Landfill poses an environmental threat to the Territory and lands that are the subject of active and potential land claims by the MBQ. He expressed concern that the groundwater could be released into Marysville Creek and flow downstream to the Territory where it could impact both surface water quality and drinking water supply wells of residents there, affecting human health. However, he acknowledged in cross-examination that there was no information indicating that leachate had migrated underground to the Territory or contaminated wells there. Mr. Shipley testified that there is also potential for leachate in the surface water to adversely impact fish, the birds and animals that consume those fish and, ultimately, the health of the MBQ who hunt and fish on the Territory. He estimated that it would only take a matter of hours for leachate, which finds its way into the surface water, to flow in Marysville Creek to the Territory.

[61] Noting that he first found evidence of off property leachate impacts in the intermediate bedrock aquifer in 2003, Mr. Shipley described XCG's investigations of groundwater impacts during the period from 2003 to 2007. He stated that despite XCG's findings in 2003 and 2006 of highly probable leachate impacts off-site to the southeast of the Landfill, WMC did not undertake an active investigation of off-property impacts until prompted by the MOECC in 2012, which he characterized as an unacceptably long delay.

[62] Mr. Shipley provided his opinion that it would be premature to finalize the CAZ area because the leachate impacts in groundwater have not been adequately delineated in the areas to the west, south and east of the zone where concentrations of leachate indicator parameters, such as 1,4-dioxane, have been identified. He stated that additional delineation is needed in the area east of monitoring well M170 and at the M178 well nest due to artesian conditions and high hydraulic conductivities, and he recommended another sampling location in that area. Mr. Shipley explained that, where there are artesian conditions in a well, hydraulic pressure is great enough that water flows up to the ground surface, at least during the spring when snow is melting. He

described this condition as a concern, because leachate impacted groundwater in this area may come to the surface and flow into a tributary of Marysville Creek near the M178 monitoring wells.

[63] Mr. Shipley noted that contaminant plumes can be very narrow, both vertically and horizontally in a fractured bedrock environment, where they tend to follow preferential pathways through a network of fractures. He added that fractured bedrock does not provide a great deal of attenuation of contaminants because it does not have the same filtering effects of many types of soil and, as a result, contaminants tend to travel a long way without much dilution occurring.

[64] Mr. Shipley stated that there is evidence that hydraulically connected intermediate bedrock wells cannot necessarily be relied on to provide useful information about the horizontal extent of a leachate plume. In his opinion, the existing intermediate aquifer monitoring well network is not adequate to identify areas where leachate impacts may extend beyond the boundary of the currently defined CAZ area due to the distances between wells. He also provided his opinion that there is a need for investigation of potential leachate impacts in the shallow bedrock aquifer in the area south of Beechwood Road. In addition to recommending the drilling of additional monitoring wells, Mr. Shipley said that quarterly sampling should be conducted. Relying on Dr. Forkert's evidence, he stated that a RUL of 1 µg/L for 1,4-dioxane would be an appropriately conservative detection limit.

[65] Mr. Shipley further stated that insufficient angled drilling was carried out at the Site to be certain that there are no significant vertical to sub-vertical fracture features that have not yet been identified. He also questioned the fracture aperture size used in the investigations. He recommended that additional angled borehole drilling be conducted south of Beechwood Road to try to identify whether there are other areas of vertical fracturing that could be providing preferential pathways for contaminated groundwater.

[66] Regarding surface water, Mr. Shipley also noted past incidents of stormwater escaping from the Site into the Beechwood ditch that flows into Marysville Creek. He acknowledged that there is now a much better stormwater facility in that area, but he noted that the stormwater ponds to the north of the Landfill near Marysville Creek have not been improved, which he said raises concerns that leachate could be released into the Creek from that area. Mr. Shipley also expressed concern about the potential for leachate to seep out of the surface of the Landfill and run off into surface water. He pointed out significant leachate impacts on groundwater quality in the area between the Landfill waste mound and Marysville Creek. He also said that there is a risk of shallow groundwater impacts from this area reaching the Creek, noting that there may be higher hydraulic conductivity features north of the Landfill.

[67] Mr. Shipley agreed with Mr. Ruland's recommendations regarding the immediate implementation of 1,4-dioxane testing of surface water, the completion of surface water sampling based on three sampling events per year, including a significant precipitation event, and the implementation of continuous electrical conductivity monitoring in Marysville Creek near the western boundary of the Site. He recommended that continuous conductivity monitoring combined with continuous flow monitoring be conducted for one year in Marysville Creek upstream of the Landfill and downstream east of Deseronto Road to avoid road salt impacts. He noted that such testing is not difficult or expensive. He added that a decision could be made regarding next steps if there is evidence of high conductivity events after one year.

#### Christopher Rancourt

[68] Mr. Rancourt has 15 years of experience as an environmental geoscientist/hydrogeologist and holds a Master of Science from the University of Toronto. He is now an Environmental Services Manager for EXP, and was formerly a Senior Project Manager with XCG. Mr. Rancourt was qualified to give opinion evidence as a professional geoscientist with expertise in geology and hydrogeology.

[69] Mr. Rancourt stated that, in order to develop an EMP, it is necessary to have a reasonable understanding of groundwater flow directions, the interplay of groundwater and surface water and contaminant interactions. In his opinion, there were significant gaps in the 2009 Site Conceptual Model Report (“SCM report”) prepared by B. Kueper & Associates Ltd. and WESA Group Inc. (“WESA”), a division of BluMetric Environmental Inc. (“BluMetric”), and an incomplete understanding of groundwater and contaminant transport at the Landfill.

[70] Mr. Rancourt determined from his review of the groundwater contour lines on potentiometric surface maps (also referred to as flow nets) in the SCM report that groundwater is discharging to the Marysville Creek, although contamination has not been detected in surface water sampling. He suggested hydrogeological techniques that could be used to test his interpretation and confirm where the groundwater is flowing, such as the installation of nested wells or hydraulic conductivity testing. Mr. Rancourt said that a series of nested wells drilled at different depths would indicate the vertical direction of groundwater flow. He also said that hydraulic conductivity testing will give an indication of whether there is karst-enhanced groundwater flow into the Creek that is not visible on the surface.

[71] Mr. Rancourt noted that more information is needed to delineate the extent of leachate impacts at the southeast edge of the Landfill boundary near monitoring wells M70 and M170. He also discussed the area of the M178 well nest, where there is evidence that groundwater is moving up towards the ground surface. He noted that surface water is being generated in the same area that is moving into a tributary of Marysville Creek. In his opinion, it is critical to understand where that water is coming from. Mr. Rancourt also recommended that the RUL for 1,4-dioxane be set at the lowest reasonably detected limit to understand the movement of leachate in the south and east.

[72] Mr. Rancourt observed that WMC’s fall 2014 semi-annual Landfill report found the presence of Provincial Water Quality Objectives (“PWQO”) exceedances for copper,



cobalt, iron, zinc and phosphorus, most of which are harmful to aquatic organisms, in multiple samples from the Creek. He stated that these exceedances had not been addressed or explained. Mr. Rancourt noted that the MBQ are most interested in the issue of surface water in Marysville Creek and its tributaries and it is important to understand the interactions occurring here. He concluded that the SCM report requires substantial additional investigations by WMC before a tenable EMP can be adopted.

*Evidence of Andrew Martin*

[73] Mr. Martin provided evidence as a participant in the hearing. He resides in a home on the south side of Beechwood Road to the south and east of the Landfill (the “Andrew Martin property”). He described his family’s history living in the area, noting that four generations of his family had lived on properties on Beechwood Road for several decades and that his father, Paul Martin, owns the property on the north side of Beechwood Road. Mr. Martin stated that his own property is located approximately 70 m from the boundary of the Landfill and approximately 500 m from the former fill area of the Landfill. He discussed some of the impacts of the Landfill while it was in operation, noting that some of those issues were resolved when it closed.

[74] Mr. Martin stated that he gave WMC permission to drill test wells on his property after being contacted in February 2013, and WMC informed him in late April 2013 that 1,4-dioxane and other parameters had been found in the test wells and his drinking water well. He noted that, although WMC said at that time that he should not be concerned, WMC installed a whole house water system in May 2013. Mr. Martin commented that, in May 2011, a representative of WMC informed him that bottled water would start being dropped off at his residence but Mr. Martin said that he was not told he should only consume the bottled water.

[75] Mr. Martin further stated that he and his family members experienced health problems, including headaches, stomach pains and skin rashes, while drinking the well water and that these problems disappeared when they were no longer exposed to the

well water. He testified to his concern when he read, in the witness statements of Mr. Harding and Mr. Stephenson, their statements that he had reported in 2010 that his household water was not being used for drinking purposes. Mr. Martin said that this claim is incorrect and he did not make such a statement. Instead, he stated that he and his family drank the well water from the tap until April 2013 and also used the water to shower, bathe, brush their teeth and water their garden. With respect to Brad McCallum's evidence that Andrew Martin had informed him in 2010 that the family was only using well water for brushing teeth and bathing, Mr. Martin said that this information was inaccurate and that he had not spoken to anyone at that time.

[76] Mr. Martin said that he and his family continue to reside on the Andrew Martin property, although they now lease it from WMC following the company's purchase of the property. Mr. Martin requested that the Tribunal set a site-specific water quality criterion for 1,4-dioxane at 3 µg/L in order to protect the drinking water of those living near the Site. He raised concerns that WMC had not taken adequate steps to protect his family's health and safety.

#### *Evidence of the Director*

##### Peter Taylor

[77] Mr. Taylor has been employed as Manager of the Technical Support Section of the MOECC Eastern Regional Office in Kingston since November 2011, and held other positions with the MOECC prior to that. He stated that, in his position, he is aware of the policies, procedures and regulatory framework relating to landfill sites and water resources management. Mr. Taylor provided the Tribunal with factual evidence on the interpretation and implementation of *Guideline B-7: Incorporation of the Reasonable Use Concept into MOEE Groundwater Management Activities* ("Guideline B-7"), last revised April 1994, as it relates to landfill sites in Eastern Ontario and is being applied to the Landfill Site. He noted that he has been involved with the Landfill since 2006.

[78] Mr. Taylor stated that Guideline B-7 establishes the basis for determining: the “Reasonable Use” of groundwater adjacent to sources of contaminants; and the levels of contaminant discharges considered acceptable by the MOECC. He further stated that Guideline B-7 supports the implementation of the MOECC’s broader water management procedures and, along with its accompanying *Procedure B-7-1: Determination of Contaminant Limits and Attenuation Zones* (“Procedure B-7-1”), provides the technical details for establishing limits on the discharge of contaminants from approved facilities, such as landfills, used for disposal of waste into the shallow subsurface. He said that the Regional Director normally is responsible for deciding what constitutes the Reasonable Use of the groundwater and what uses must be protected.

[79] Mr. Taylor noted that Guideline B-7 and Procedure B-7-1 support the use of a CAZ where suitable to permit limited impairment of off-property use while contaminants discharged into the subsurface of CAZ lands naturally decompose or attenuate to levels compatible with the Reasonable Use of the adjacent lands and to the RULs established by Guideline B-7. He stated that the owner of the disposal site must obtain the right to use the CAZ lands by reaching an agreement with the property owner that is registered on title.

[80] Mr. Taylor explained that the majority of landfills in eastern Ontario originated prior to modern concepts of environmental protection when land used for garbage disposal tended to be of little value to the community. He referred to these local, rural landfills, often called “dumps”, as “legacy” sites and noted that they were established on lands in and around wetland features, sand and gravel pits, and rocky, uneven terrain not suitable for farming. He observed that these sites were not designed to protect local groundwater and surface water, and landfill contaminants have been discharged into the subsurface, often migrating off-property and resulting in non-conformance with Guideline B-7.

[81] Noting that landfill owners must propose a means to come into conformance with Guideline B-7 where there is off-property migration of contaminants above RULs, Mr. Taylor stated that this is often done by establishing a CAZ, particularly in eastern Ontario. He set out the following factors that Eastern Region technical staff consider in deciding whether it is reasonable to incorporate a CAZ: the number and sensitivity of groundwater users in the potential CAZ lands; whether contaminated groundwater is discharging to a surface water feature (in which case CAZ lands cannot be used and engineering measures must be adopted to protect the surface water); the practicality of employing engineering measures to capture and treat landfill leachate in the context of legacy landfills; and the strength and chemical composition of the landfill leachate.

[82] Mr. Taylor stated that the MOECC has asked WMC to develop a plan to bring the Landfill into compliance with Guideline B-7 and WMC has proposed to acquire CAZ lands rather than utilize engineering measures to do so. He characterized this as a reasonable approach in the circumstances.

#### Dale Gable

[83] Mr. Gable holds a Bachelor of Science (Engineering) in Water Resource Engineering from the University of Guelph and has been licensed as a professional engineer since 1998. He is currently acting as the Supervisor of Team 1 of the MOECC Approval Services Unit and has worked for the MOECC since 2004. The Tribunal qualified Mr. Gable to provide opinion evidence as an engineer with expertise in landfill design and operations.

[84] Mr. Gable explained that Mr. Parrott was the signing Director who issued the ECA to WMC on January 9, 2012, but Mr. Parrott has since moved to a different position in the MOECC. Mr. Gable has now been assigned, on an acting basis, as the signing Director with respect to waste disposal sites under the *EPA* and has carriage of the file relating to this appeal. He testified concerning the ECA and EMP processes.

[85] Mr. Gable stated that he agrees with Mr. Taylor's evidence that it is appropriate to require WMC to establish a CAZ for the Site on the basis that: the only sensitive receptors immediately downgradient of the Landfill leachate plume are residential wells and the impacted homes have been vacated or provided with alternate water supplies; there is no evidence that the leachate plume will affect surface water features or other sensitive groundwater uses such as a municipal water supply; the exceedances of drinking water standards for off-site domestic wells are only for non-health related parameters (based on the assumption of a drinking water standard for 1,4-dioxane of 30 µg/L); and it is unlikely that intervention by active means such as a pump and treat system or the placement of purge wells will be very effective in the fractured bedrock environment and such techniques would be very expensive to implement.

[86] Mr. Gable said that the MOECC has issued at least 100 approvals to landfill sites in Ontario to require or authorize a CAZ, and provided an example of such an approval in a different municipality. He acknowledged that WMC does not have the right to expropriate land, as a municipality does, and that it would not be reasonable to require WMC to acquire a property by a specific date to conduct testing. Mr. Gable further noted that the CAZ for the Site cannot be finalized until the leachate plume from the Landfill has been fully delineated. He provided his opinion that the ECA should be amended to include a number of conditions set out in his witness statement. He stated that an interim EMP should be implemented that incorporates commitments made by WMC as well as the recommendations of Mr. Stephenson and Victor Castro (described below).

[87] Mr. Gable included suggested conditions that would require WMC to delineate the extent of the leachate impacted groundwater to the south and possibly the east of the Landfill through groundwater investigations, to the point that WMC is able to demonstrate that water within wells at the outer extent of the impacted area, hydraulically connected to the leachate plume, does not exceed any reasonable limits in Guideline B-7. He set out a proposed process for a groundwater investigation plan,

noting that the process would be repeated until the MOECC determines that delineation has occurred, and an application to amend the ECA would be made at that time.

[88] Under cross-examination, Mr. Gable acknowledged that the Director was aware that the initial EMP was deficient at the time it was conditionally approved in January 2012. However, he further noted that it was approved on the basis that further work was needed and WMC's acceptance that it would need to fully delineate the CAZ. He also agreed that ongoing work is needed in 2015 to delineate the leachate plume.

[89] Mr. Gable testified that contingency plans are high level documents that establish the procedures to be followed if trigger mechanisms are initiated, while contingency measures are components of a contingency plan to be followed if an exceedance is identified. He said that contingency measures are generally are not set out in detail in a plan. Instead, the appropriate measures are determined based on the source of an exceedance. Overall, Mr. Gable supported WMC's proposed contingency plans, although he recommended that confirmation re-sampling occur at the same time as a water quality conformance assessment is conducted, as opposed to delaying the re-sampling for 90 days.

#### Kyle Stephenson

[90] Mr. Stephenson is a professional engineer with a Master of Science in Civil Engineering from Queen's University, where he studied fractured rock hydrogeology. He has been a Hydrogeologist with the MOECC's Eastern Region Technical Support Section since 2005 and undertook a temporary assignment as a District Engineer for approximately one year during that time. Mr. Stephenson was qualified to provide opinion evidence as an engineer and hydrogeologist with expertise in groundwater contamination.

[91] Mr. Stephenson stated that he has been involved in the review of hydrogeological information related to the Landfill Site since 2006. He noted that it is

difficult to characterize groundwater flow direction and velocity and determine the impacts from contamination at the Site due to the thin overburden overlying fractured bedrock in the area. He said that there is a wide range in hydraulic conductivity at the Site, including some areas where the groundwater does not move quickly and other areas where there is higher hydraulic conductivity associated with fractured bedrock and groundwater moves rapidly. He testified that he would not characterize the limestone at the Site as karst, based on the drilling that has been done, but said there are fractures that have likely been enhanced by dissolution.

[92] Mr. Stephenson emphasized the need to identify the location of the high hydraulic conductivity zones because they allow the leachate plume to move further, which could impact receptors. He noted that, although it is difficult to characterize every fracture pathway at the Site, it is important to monitor as many as is practically possible in order to determine where the contamination is moving. He also noted that the background groundwater quality at the Site made it difficult to use typical leachate parameters, such as chloride, as contaminant indicators.

[93] Mr. Stephenson provided a summary of his involvement in reviewing WMC reports about the Landfill since he became involved, and took the Tribunal through his analysis of those reports in memoranda and correspondence. Specifically, he noted that he requested that additional work be done on the conceptual model of the Site due to a lack of information and a high degree of uncertainty, which led to the SCM report. He generally agreed with the SCM report and interpreted it to show that there was a groundwater flow and contaminant transport pathway from the Landfill towards the south, including the domestic wells, and that the Landfill was potentially a historic source of volatile organic compounds (“VOCs”). Mr. Stephenson stated that, based on this interpretation, the MOECC requested in March 2010 that WMC arrange for bottled water for residents near the Landfill, undertake an ongoing domestic well monitoring program and conduct further Site investigations.

[94] Mr. Stephenson stated that, in November 2010, he advised WMC that its original proposed EMP, submitted in June 2010, could not be accepted because it was not adequate to monitor current impacts at the Site due to complex groundwater flow and chemistry conditions, but could be used as an interim guide for groundwater monitoring until additional work was completed. Also in November 2010, Mr. Stephenson recommended to MOECC's Kingston District Office that WMC submit an action plan to further assess groundwater impacts at the Site, including installation of monitoring wells and additional groundwater monitoring. He said that he formed this opinion because he concluded that Landfill-impacted groundwater had migrated to the south of the waste fill area, based on increasing trends of several leachate indicator parameters at downgradient monitoring wells, including exceedances of Guideline B-7 limits for several non-health related parameters.

[95] Given his interpretation of the data, Mr. Stephenson also recommended in November 2010 that WMC provide whole-house water supply to residents near the southern downgradient property boundary pending further investigation. He said that he recommended whole-house water supply instead of bottled water due to the high levels of some non-health related parameters that would impact normal household use of the water, such as high iron levels that would stain clothing washed in the water.

[96] Mr. Stephenson noted that WMC disagreed with the recommendation to provide whole-house water to the Andrew Martin property due to lower levels of non-health based parameters at that well and no indication of leachate impacts. He said that the MOECC accepted that bottle water could be provided to the Andrew Martin property, and further noted that WMC indicated in May 2011 that several residences would be vacated as an alternative to the provision of whole-house water supply, and that bottled water was being supplied to the Andrew Martin property. He noted that whole-house water was provided to the Andrew Martin property beginning in May 2013.

[97] Mr. Stephenson stated that he later reviewed and analyzed the October 2012 Draft Groundwater Action Plan Investigation Report ("GAPI report"), prepared by B.



Kueper & Associates and WESA, and identified Guideline B-7 exceedances at seven monitoring wells. In November 2012, he concluded that: the Landfill had impacted groundwater at and beyond Beechwood Road, the southern property boundary of the Site; the Site was not in compliance with Guideline B-7; and his interpretation of impacts from the Site was significantly different than that of WMC. At that time, Mr. Stephenson recommended to the Kingston District Office that WMC should take action to bring the Site into compliance with Guideline B-7 through a compliance plan with proposed timelines.

[98] Mr. Stephenson testified that he continues to be concerned that the Landfill is not in compliance with Guideline B-7 and, despite additional work carried out to date, he is still of the opinion that the EMP cannot be finalized at this time because the extent of leachate impacts in the groundwater to the south and east of the Landfill have not been fully delineated. He stated that the appropriate monitoring wells to be used cannot be determined until this delineation has been completed, and that WMC must demonstrate that water within monitoring wells at the outer extent of the impacted area that are hydraulically connected to the defined leachate plume does not exceed any RULs in Guideline B-7 and Procedure B-7-1.

[99] However, Mr. Stephenson further stated that an interim EMP can be put into place that uses many of the new wells drilled in the past few years and puts in place additional monitoring measures. He noted that, once the extent of leachate impacted groundwater has been delineated, WMC should be required to amend the ECA to establish a CAZ and include revised and additional trigger wells as required.

[100] Mr. Stephenson set out the work required to delineate impacts in the areas of the Landfill, describing it as an iterative and time-consuming process. He recommended a step-wise approach of drilling and monitoring wells to determine if they are hydraulically connected to the interconnected rock fracture system through which groundwater flows, noting that only hydraulically connected wells can provide information on groundwater levels and quality. Mr. Stephenson explained the process for developing wells,

including the completion of downhole geophysics and hydraulic testing to determine which wells are appropriate for monitoring. He noted that, where monitoring results indicate unacceptable leachate impacts at new monitoring wells, new boreholes need to be drilled downgradient to determine the extent of the leachate plume. He also discussed the importance of obtaining sufficient data to analyze trends of concentrations of different parameters in wells over time. He testified that he expects that the off-site contamination from the Landfill will reach some sort of steady state at some point in the future due to natural attenuation processes, after which the leachate plume will decay and shrink.

[101] In his evidence, Mr. Stephenson made a number of specific recommendations in relation to the content of an interim EMP. He recommended that 1,4-dioxane be added as a test parameter in respect of both groundwater and surface water quality monitoring using a detection limit of 1 µg/L. He also recommended that recently established leachate wells be monitored for leachate levels and quality and that all groundwater sampling locations recently used as monitoring wells be sampled twice per year in spring and fall. Mr. Stephenson further recommended that new monitoring wells should be tested on a quarterly basis for the first year to determine baseline conditions, after which the frequency of monitoring might be reduced. He also noted that monitoring wells M110-1 and M172, should be added to the list of wells to be monitored. He stated that M110-1 is close to the source of contamination along the toe of the Landfill, and that the MOECC has monitored and observed changes at M172.

[102] Mr. Stephenson recommended that the domestic wells located south of Highway 401 be tested for 1,4-dioxane every two years for the next six years as a precautionary measure because these homes could be the next receptors downgradient of the Landfill. He noted that groundwater flow velocity can be fairly high in this area.

[103] Regarding the monitoring well nest at M178, Mr. Stephenson suggested further testing in that area to determine if artesian conditions are causing contamination in the shallow groundwater zone or if there is a more widespread problem there. He noted the

need to address issues relating to improper construction identified at the M178 well nest.

[104] Mr. Stephenson supported a number of Mr. Ruland's recommendations, including the following: impacts at the southeast border of the Landfill in the area of monitoring well M170 should be addressed; the activation of a trigger mechanism should require contingency action; investigation of the hydrogeological implications and potential impacts of the existing and planned pipeline running across the CAZ should be completed; and monitoring wells M70-2, M176 and M182 should be added to the intermediate zone groundwater level monitoring list.

[105] With respect to the concerns raised about the potential for surface water contamination of Marysville Creek, Mr. Stephenson stated that there is no evidence of any groundwater impacts in proximity to the Creek that would suggest the Landfill is causing any impacts, noting that the rock is tighter in this area. He testified that the discharge evident where the Creek intersects with Deseronto Road is likely due to a wetland further to the north rather than the Landfill. Mr. Stephenson agreed that additional sampling for 1,4-dioxane is needed at monitoring well M82-2. He also stated that he had observed stagnant water in the area of monitoring well M178 but determined that there was no surface water pathway from M178 to the potential intermittent tributary to Marysville Creek.

[106] Mr. Stephenson testified that the proposed contingency plans are typical of what the MOECC expects in contingency planning documents and that this is the level of detail generally provided. However, he stated that the proposed contingency action to construct a shallow fracture trench in bedrock may not be effective and may allow impacted water to bypass the proposed remediation method.

Victor Castro

[107] Mr. Castro has a Bachelor of Science in Physical Geography and a Master of Urban and Regional Planning, both from Queen's University. He works as a Surface Water Scientist with the MOECC's Technical Support Section of Eastern Region. The Tribunal qualified Mr. Castro to provide opinion evidence as a surface water scientist.

[108] Mr. Castro, who has been involved with the Site since 1999, said that historic surface water monitoring at the Landfill has focused on Marysville Creek, the Beechwood Road ditch and discharges from the three stormwater detention ponds. He noted that the Beechwood Road ditch is a municipal stormwater ditch running along Beechwood Road at the south boundary of the Site, to a culvert that crosses the road. He further noted that stormwater detention ponds on the Site operate under Environmental Compliance Approval No. 1688-8HZNJG ("ECA No. 1688-8HZNJG"), a separate environmental compliance approval from that of the Landfill.

[109] Mr. Castro noted that the headwaters of Marysville Creek originate immediately to the northeast of the Landfill, although they are intermittent in that area. He said the Creek starts to pick up flow around Deseronto Road, where there is a discharge zone for groundwater, and noted that the Creek is stagnant and influenced by seasonal conditions immediately north of the Landfill Site. Mr. Castro noted that during the spring there would be continuous flow north of the Landfill but that it commonly would be characterized as dry in the summer, sometimes even after a storm event.

[110] Having reviewed monitoring reports from 1997 to 2014, Mr. Castro stated that he found no evidence to suggest that the Landfill had impaired Marysville Creek. He noted that, given the original, unlined phase of the Landfill is at the northwest near the Creek, there is a question as to whether leachate will be found in the groundwater discharge zone around surface water monitoring station S3. However, he testified that monitoring for leachate has not shown any adverse impacts on the Creek. Mr. Castro provided his

opinion that there is currently no evidence to suggest that the surface water features surrounding the Site are being adversely impacted by the Landfill.

[111] Mr. Castro noted that around 1999, impacted surface water was observed to be discharging from the former southwest sedimentation pond, which was used as a holding cell to store stormwater, to the Beechwood Road ditch. He added that WMC closed the outlet of that pond and hauled excess water away for several years until it was replaced by two new stormwater ponds that operate as free-flowing systems, which means that water levels are allowed to rise slowly and discharge through an outlet structure when a certain water level is reached. Mr. Castro said this system is permitted under ECA No. 1688-8HZNJG, which requires quarterly sampling for specific parameters and toxicity testing. He stated that there has been an improvement in stormwater quality discharging to the Beechwood Road ditch since the new ponds were constructed, and there have been no concerns in relation to adverse impacts to surface water.

[112] Mr. Castro acknowledged under cross-examination that if shallow groundwater impacted by 1,4-dioxane were to come to the surface in the area of monitoring well M178 and make its way to the surface water feature observed in that area, there is potential that it could flow to the west through the culvert into Marysville Creek. He also agreed that surface water sampling at the culvert could be done, although he stated that it would have to be done seasonally when water is flowing in that area.

[113] Mr. Castro stated that he had reviewed Mr. Ruland's concerns and agreed with his recommendation that 1,4-dioxane be included in the future surface water monitoring program at the Landfill. He also stated that he had no concerns with Mr. Ruland's recommendation that future surface water sampling be conducted three times per year, as opposed to the current two times, with the additional sampling event occurring within 12 hours after a significant rain event of 25 mm or more. Under cross-examination, he acknowledged that it would be impractical to sample after a summer rain event that did

not result in flow but maintained that it would be appropriate to take a sample where there is a flow following the rain event.

[114] Regarding Mr. Ruland's recommendation that continuous conductivity measurements be carried out in 2015 and 2016 on Marysville Creek, far enough upstream of Deseronto Road that there is no interference from road salt, Mr. Castro stated that he did not see the value of implementing this type of testing. He expressed the following concerns: as there is no measurable flow in Marysville Creek upstream of Deseronto Road for much of the year, a continuous conductivity logger would be in stagnant or dry conditions; the current surface water sampling program would detect any leachate impacted groundwater discharging to the Creek due to its low flow nature; a second logger that would be required upstream of the Landfill to detect background influences would likely only be operational in the spring and late fall due to intermittent flows; and it is unclear what levels of conductivity would trigger a response or what that response would be. However, Mr. Castro acknowledged in cross-examination that continuous conductivity measurements would not be expensive to conduct.

[115] Mr. Castro stated that exceedances of the PWQOs for copper, cobalt, iron, zinc and phosphorus were noted in the fall of 2014 at surface water monitoring station S6 downstream on Marysville Creek. He provided his opinion that these exceedances were not due to the Landfill, noting that copper, cobalt and zinc are not generally considered good leachate indicators, are not found at high levels in the leachate results for the Site, and are not the most mobile leachate indicators that would be expected to appear first. He also noted that iron and phosphorus are common parameters that routinely appear in surface water samples for the Creek and Beechwood Road ditch and have been attributed to agricultural and stormwater run-off. Mr. Castro attributed the exceedances to elevated suspended solids due to limited flows in the Creek.

*Evidence of WMC*Tim Murphy

[116] Mr. Murphy has been the Director of Environmental Management for WMC in Eastern Canada since 2004. He stated that he is responsible for WMC's environmental compliance and environmental affairs. Mr. Murphy provided evidence on the PNP and other matters with respect to public consultation.

[117] Mr. Murphy stated that throughout the time it has owned the Landfill, WMC has engaged in dialogue in numerous ways with immediate neighbours, the Town of Greater Napanee and surrounding communities, the MOECC and interested community groups. He noted that the CLC was formed in 2009 to provide a public forum for the review and exchange of information for interested parties, including CCCTE and the MBQ. Mr. Murphy added that WMC provided CCCTE and the MBQ with technical and regulatory information and reports related to monitoring and operations at the Landfill, in spite of their refusal to participate in the CLC. He stated in cross-examination that he was aware of rumours of community concerns about shortcomings in the CLC process, but said no one came to him directly.

[118] Mr. Murphy also noted that WMC maintains a website that it uses to post technical and regulatory reports concerning the Landfill for public review and information. He said the website is intended to provide open and transparent access to information, but acknowledged under cross-examination that certain information posted on the website in the past had been incorrect. Mr. Murphy further stated that WMC had at times issued Landfill Manager's letters to immediate neighbours of the Site.

[119] Mr. Murphy addressed concerns raised by Mr. Bossio and Mr. Munro regarding the implementation of the PNP with respect to recent events. Regarding the 2013 test results, Mr. Murphy observed that the MOECC conducted an investigation and determined that the contamination events in question had occurred prior to the effective

date of the PNP, and that WMC had taken steps to provide notification to neighbours through Manager's Letters. Regarding the 2015 test results, Mr. Murphy explained that WMC considered that the investigative work was subject to mediation confidentiality, and that the exceedances were for aesthetic parameters similar to others in the area and did not affect additional area residents. He noted that WMC did, however, issue a voluntary written notice to stakeholders in January 2015.

[120] Mr. Murphy stated that WMC has responded to a recommendation by Mr. Ruland by providing the operators of the wastewater treatment plant that receives landfill leachate with notice of the presence of 1,4-dioxane and N-Nitrosodimethylamine ("NDMA") in the leachate. He further stated that WMC will provide area municipalities with a copy of the map delineating the CAZ for inclusion in land use planning and other related documents, once the CAZ is approved.

#### Reid Cleland

[121] Mr. Cleland is WMC's Director of Operations Post Collection for the Eastern Canada area and is responsible for operations at Ontario landfills, including the closed Landfill Site. He noted that the Site is now being operated and maintained for the duration of the post closure period in accordance with the relevant conditions of the ECA, subject to any future amendments. He acknowledged that the Site does not generate any revenue.

[122] Mr. Cleland described post-closure site operations and maintenance, noting that WMC's operations manual for the Site that deals with matters such as Landfill inspections and surface water and stormwater management. He stated that routine inspections to detect leachate seep locations are carried out by the Landfill Technician, as required by the operations manual. While the operations manual requires weekly observations of the Landfill cap for leachate seeps, Mr. Cleland testified that inspections are generally conducted on a daily basis and any seepage identified is repaired within



48 hours or less, so that there is only a small likelihood of leachate seeps entering surface water.

[123] Mr. Cleland stated that once a landfill enters its post-closure period, the potential for surface water impacts from leachate seeps diminishes over time. However, he acknowledged that leachate seeps continue to occur approximately once or twice per year even though the Landfill has been capped, normally right after spring melt when frost comes out of the Landfill cap. He also acknowledged in cross-examination that the stormwater ponds to the north of the Landfill discharge to Marysville Creek.

William McDonough

[124] Mr. McDonough has been a Senior Project Manager for WMC in the Eastern Canada area since 2011. He assists in managing operational issues at WMC's facilities, including the acquisition of property. He has also been involved in EAs for landfill expansions and in groundwater clean-up projects.

[125] Mr. McDonough described his role in dealing with the Martin family in 2013 in relation to contamination due to Landfill leachate that was found on the Andrew Martin property. He noted that he met with Andrew Martin and Paul Martin in early 2013 and received permission to drill monitoring wells on the Andrew Martin property, which were drilled in March 2013. He said that the domestic well water on the Andrew Martin property, which was tested in late April/early May of 2013, was found to have a 1,4-dioxane concentration of 9.7 µg/L. He added that no detection of 1,4-dioxane was found in the water at the Paul Martin property.

[126] Mr. McDonough stated that he met with the Martins again to share the results of the testing and provided copies of fact sheets on 1,4-dioxane. He noted that during this meeting he was given permission to install whole house water supplies at both the Andrew Martin and Paul Martin properties and this was done in May 2013. He said that whole house water was installed on the Paul Martin property as a precaution. Mr.

McDonough further stated that results from the newly installed monitoring wells on the Andrew Martin property later in 2013 also indicated the presence of 1,4-dioxane. He noted that additional monitoring wells drilled subsequently have not detected 1,4-dioxane.

[127] Mr. McDonough stated that, in August 2014, WMC entered into a purchase agreement with Paul Martin to acquire the three parcels of property he owns south of Beechwood Road, including the Andrew Martin property. He added that the purchase agreement included a groundwater easement that gave WMC immediate rights to the groundwater on the property. He noted that WMC completed the purchase of the property on April 8, 2015.

[128] Mr. McDonough further testified that Paul Martin has refused WMC permission to access the Paul Martin property north of Beechwood Road in order to drill additional monitoring wells.

[129] At the hearing, Mr. McDonough offered an apology to Andrew Martin for the inconvenience caused to his family.

#### Brad McCallum

[130] Mr. McCallum is a Certified Engineering Technologist and Environmental Technologist with BluMetric. He was involved in the residential sampling program conducted by WESA on behalf of WMC at the Landfill that commenced in April 2010.

[131] Mr. McCallum stated that, on April 14, 2010, a groundwater sample was collected from the well at the Andrew Martin property, noting that the well head is housed in an outbuilding 70 m east of the residence. He said that a well survey assessment form was completed on the same day, which required an interview with the resident of the property. It was Mr. McCallum's evidence that Mr. Martin provided the information

collected on the well survey assessment form and also provided access to the water system components.

[132] Mr. McCallum stated that the information from the well survey assessment forms completed at that time was transferred into digital format, which his office still has in its records, but he said that his office could not locate the field copy versions. He provided the digital information, which states that the family living on the Andrew Martin property said they only used well water for teeth brushing and bathing.

[133] Mr. McCallum testified that he had no independent recollection of whether he or his colleague completed the well survey assessment form on April 14, 2010. He also stated that he recalled having spoken to Andrew Martin that day, but testified that he has no recollection of their conversation or of Mr. Martin saying that the family only used well water for teeth brushing and bathing.

#### Dr. Bernard Kueper

[134] Dr. Kueper holds an undergraduate degree in civil engineering and a Ph.D. in Earth Sciences specializing in contaminant hydrogeology, both from the University of Waterloo. He is a Professor at Queen's University and also provides technical consulting services. The Tribunal qualified Dr. Kueper to provide opinion evidence as a hydrogeologist with expertise in soil and groundwater contamination, groundwater hydraulics and subsurface remediation. He was retained by WMC in 2008 to assist in the design of field characterization programs, interpretation of data and meeting with the MOECC. He was a co-author of the SCM report and the GAPI report.

[135] Dr. Kueper discussed the history of the field investigations at the Site from 1979 to 2009 as well as the field investigations performed for the SCM and GAPI reports. In his opinion, the additional investigations undertaken for the SCM and GAPI report used state-of-the-practice methods, such as: the drilling of angled borings to observe vertical and high angle fractures in bedrock; the use of down-hole optical and acoustic

televiwer surveys to determine fracture occurrence, spacing and orientation; the use of discrete interval hydraulic testing methods to measure hydraulic conductivity as a function of depth in borings; and the use of hydraulic interference tests to establish the monitoring well network for water level gauging and groundwater sampling. Dr. Kueper stated that hydraulic interference tests involve pumping groundwater for several days from a single well while gauging water level responses in several surrounding monitoring wells, noting that monitoring wells in which water level declines in response to pumping are known to be hydraulically connected.

[136] Dr. Kueper provided his overall opinion that, based on the 30 years of field investigations and data collection at the Site, the bedrock is well characterized and the directions of groundwater flow and solute transport are well understood. He stated that it is unlikely that further Site characterization efforts would add significantly to the current understanding of Site conditions, and that it is appropriate to rely on the current SCM report in developing the proposed CAZ and EMP.

[137] Dr. Kueper explained that groundwater flows from regions of high water level to regions of low water level in porous and fractured media, and that water level contour maps are appropriate to establish groundwater flow directions, particularly for the Site because hydraulically connected wells within the active groundwater flow zone have been identified at appropriate locations through hydraulic interference testing. He added that even a monitoring well that does not respond to pumping can be hydraulically connected to the groundwater flow system, if the water level in the well recovers to its original level after a water sample is taken.

[138] In Dr. Kueper's opinion, there is no evidence of karst features at the Site given that there have been no observations of sinkholes, caverns or sinking streams, or of subsurface karst features such as caves. He said that, to the extent that there may have been some enlargement of fracture apertures due to dissolution over time, this has been quantified through the hydraulic conductivity measurements that have been performed at the Site. He stated that this enlargement of fracture apertures does not

alter his opinion that water levels can be relied on to determine groundwater flow directions, as groundwater flow directions at the Site are defined and the Site can be appropriately monitored to delineate leachate impacts.

[139] Dr. Kueper stated that groundwater level contour maps indicate that groundwater flow directions at the Site vary with the season, and that this provides a dilution mechanism that acts to lower solute concentrations in groundwater. In his opinion, the varying flow directions also increase the probability of detecting leachate impacts in groundwater, and the monitoring well network can be relied on to detect these impacts. It was Dr. Kueper's evidence in the SCM report that Landfill impacts are likely to be detected in the shallow groundwater zone monitoring wells prior to being detected in the intermediate zone monitoring wells. While the SCM report stated that there was no suggestion of widespread groundwater impacts in the intermediate bedrock at distances greater than 100 m from the Landfill, Dr. Kueper acknowledged in cross-examination that impacts have now been detected at a distance of 500 m from the Landfill.

[140] Dr. Kueper stated that 1,4-dioxane and alkalinity are appropriate indicators of the presence of leachate in the groundwater, and provided his opinion that the distribution of 1,4-dioxane in the intermediate groundwater flow zone south of the Site shows progressively decreasing concentrations towards the south. He explained that this is a typical pattern of leachate plumes in groundwater due to changing seasonal groundwater flow directions and hydrodynamic dispersion, which is a natural mixing process in porous and fractured media. Dr. Kueper noted that due to this pattern of decreasing concentration with distance, a leachate plume eventually will become naturally attenuated and reach a steady state, at which point it will stop expanding in the direction of groundwater flow. He said that this process is fundamental to the adoption of the CAZ as it defines the region within which the naturally attenuated plume develops.

[141] Dr. Kueper testified that he would currently characterize the leachate plume as "well behaved", noting that it is well defined because the groundwater flow directions

change at times, and the concentrations of parameters decrease with distance from the Landfill. However, he acknowledged in cross-examination that more work may be needed due to a lack of understanding of results at some monitoring wells, including the M178 well nest. Dr. Kueper also agreed under cross-examination that further investigation is needed on the Paul Martin property east of monitoring well M170 to define the Landfill leachate impact in that area, and recommended locations for approximately two additional wells.

[142] Dr. Kueper stated in cross-examination that the shallow and intermediate groundwater zones are connected and there is groundwater interaction between them. He agreed that Marysville Creek is a low hydraulic head region in relation to the Site, and that there has been some leachate impact northwest of the Landfill, likely from the unlined portion. He also agreed that it is prudent to monitor Marysville Creek for leachate at specific locations.

[143] Also in cross-examination, Dr. Kueper agreed that the SCM report did not provide any warning to residents on Beechwood Road that leachate was being carried into their domestic wells, noting that the focus of the SCM report was on understanding the direction of groundwater flow and not whether leachate was present.

[144] Dr. Kueper further discussed the GAPI report prepared at the request of the MOECC, noting that the draft GAPI report has not been finalized because the MOECC wishes to see more data collected. He stated that the GAPI report concluded that groundwater north of Beechwood Road flows onto the Landfill property from the properties south of Beechwood Road, and groundwater south of the road flows southward. He noted that it also concluded that Landfill leachate impacts were evident in selected monitoring wells northwest and south of the Landfill footprint, and there was no evidence of Landfill leachate impacts in any of the monitoring wells south of the Landfill footprint.

[145] Dr. Kueper also noted that the GAPI report further stated that monitoring wells M10-1 and M53-2 were impacted by contaminated groundwater flowing from south of Beechwood Road rather than from the Landfill. He testified that the evidence suggested that the Lewis Meats site was the source of VOCs found in the groundwater immediately south of the Landfill. In particular, he stated that a high concentration of 1,1,1-trichloroethane was found in the area of the former abattoir and noted that 1,4-dioxane is a stabilizer for solvents such as 1,1,1-trichloroethane. He said that it was difficult to distinguish whether the source of 1,4-dioxane in groundwater was the Landfill or Lewis Meats. In cross-examination, however, Dr. Kueper said that any contamination from Lewis Meats would have decayed over time and acknowledged that it is now known that 1,4-dioxane came from the Landfill. He further stated that it was not his opinion that Lewis Meats caused the contamination in the domestic well at the Andrew Martin property.

#### David Harding

[146] Mr. Harding is a professional engineer who holds a Master of Science in engineering geology from the University of Waterloo. He has been employed by WESA for over 25 years, where he currently works as a Senior Geo-Environmental Engineer. Mr. Harding was qualified to provide opinion evidence as a hydrogeologist and consulting engineer with expertise in physical and contaminant hydrogeology.

[147] Mr. Harding was first retained by WMC in 2008 to study the hydrogeology of the Site and was involved in designing and completing the SCM and GAPI reports and the proposed revised EMP, as well as the investigations in support of establishing a CAZ. He provided background information about the Landfill, as well as evidence concerning the hydrogeological work undertaken at the Site. He described the groundwater monitoring wells that have been installed over time and types of testing and analysis that have been used to delineate offsite Landfill impacts.

[148] In particular, Mr. Harding noted that, in response to the SCM report, the MOECC required that the addition of monitoring wells, in locations proposed by WMC, to obtain information about the potential groundwater flow path to the southeast of the Site. He noted that subsequent work included the installation and testing of thirteen new monitoring wells at the south end of the Landfill property and south of Beechwood Road on the Lewis Meats property. He also said that work was done to address exceedances of the Guideline B-7 RULs. Mr. Harding agreed, in cross-examination, that the area of the Landfill Site is a complex hydrogeological setting.

[149] Mr. Harding provided a summary of his opinions and conclusions concerning the hydrogeology of the Site. In his opinion, groundwater flow in the bedrock occurs through a well-connected network of fractures in the upper 30 m of the bedrock and the overall directions of groundwater flow at the Site have been defined and are understood. He said that the Site can be appropriately monitored through the monitoring well network to detect the presence of Landfill leachate impacts to groundwater. Mr. Harding stated that there are an adequate number of suitably located monitoring wells to observe the fluctuation of groundwater flow directions during periods of higher and lower levels and determine groundwater flow directions. He further stated that the groundwater flow nets based on the observed water levels can be used to make decisions regarding potential impacts on the downgradient groundwater flow system.

[150] Mr. Harding stated that leachate indicator parameters have been selected for the Site based on their elevated concentrations in leachate samples, as compared to low background concentrations. He indicated that the primary indicators used to delineate impacts from the Landfill leachate are 1,4-dioxane and alkalinity. Mr. Harding testified that the proposed sampling frequency for monitoring wells varies depending on location and type of monitoring wells, noting that some wells would be sampled once per year, other wells sampled twice per year for 1,4-dioxane and alkalinity and once per year for other parameters, and wells closer to the Landfill would be sampled once every two years. He said the focus of sampling would be on the most critical trigger wells in low head areas.



[151] Mr. Harding noted that Landfill leachate impacts are evident in selected monitoring wells to the north and west of the unlined Phase 1 portion of the Landfill and south of Marysville Creek, and impacts are consistently observed within approximately 50 m of the Landfill footprint. He testified that this has been identified through pumping tests at an area with tighter rock fractures, lower hydraulic conductivity and slower groundwater movement. He acknowledged under cross-examination that there is groundwater discharge in the low head area near the Creek and agreed that monitoring wells M82-1 and M82-2 are important wells to monitor the Creek.

[152] However, Mr. Harding testified that there is no evidence of leachate impacted groundwater flowing into Marysville Creek, suggesting the relatively slow groundwater flow allows for some amount of the contaminated groundwater to be collected by the perimeter toe drain around the unlined Phase 1 portion and taken off site for disposal. Mr. Harding addressed the concern that, at periods of high groundwater levels above ground surface such as occurs in the spring, there could be movement of impacted groundwater up, across and into the Creek. He testified that, in such circumstances, impacted groundwater would be expected to be present in the shallow and intermediate monitoring wells installed along the Creek. He stated, however, that this mechanism has not been observed despite numerous tests of those wells.

[153] Mr. Harding provided his opinion that additional nested monitoring wells in that area are unnecessary because there are enough existing monitoring wells in appropriate locations in the shallow and intermediate groundwater zones between the Landfill and the Creek, which are providing sufficient information. However, he acknowledged in cross-examination that there has been testing for 1,4-dioxane only once in the surface water at monitoring station S3 and once at monitoring well M82-1, and that M82-2 has never been tested for 1,4-dioxane.

[154] Mr. Harding provided his opinion that it is adequate to sample the surface water in Marysville Creek twice per year in the spring and fall, when there is potential for

groundwater to flow in and discharge to the Creek, as opposed to the three times per year proposed by Mr. Ruland. He noted that this is a closed, physically stable Landfill Site with an inspection and maintenance program, and controls for stormwater. Mr. Harding also stated that surface water testing was attempted twice in 2013 following 25 mm rainfalls. He observed the ground soaked up the water from the first rainfall and, after the second rainfall, samples were collected but the flow was very low. He added that it is unlikely that groundwater will discharge to the Creek in the summer when water levels are low.

[155] Mr. Harding opposed the recommendation for continuous conductivity testing in Marysville Creek, saying that it would not provide useful information. He stated that conductivity is a non-specific parameter and there are many potential activities occurring upstream, including the use of fertilizers, manure and pesticides, that may affect the results of this type of testing. He also said that it would be necessary to place a second continuous conductivity logger further upstream to ascertain background levels, which would be in a dry ditch for much of the year. Mr. Harding recommended that it would be preferable to put resources towards collecting data that would help to solve potential problems.

[156] Mr. Harding stated that there is no evidence of Landfill leachate impacts in any of the monitoring wells located west of the Site access road, south of the Landfill footprint.

[157] Mr. Harding acknowledged that leachate impacts may extend onto the Paul Martin property east of monitoring well M170, but said that the area of impact on that property would be limited to the southwest corner because the groundwater flows to the south-southeast across Beechwood Road and onto the proposed CAZ. He stated that the concentrations that exceed the RULs at M170 are restricted to aesthetic related parameters, and that there is no groundwater use on the Paul Martin property as whole-house water is in place. He concluded that the boundary of the CAZ does not extend onto the Paul Martin property. However, he testified that additional investigations

downgradient of M170 would be useful to confirm whether there is any Landfill leachate impacting the property.

[158] Mr. Harding noted that Landfill leachate impacts are evident in several monitoring wells in the intermediate bedrock zone south and southeast of the Site, and that these impacts extend south of Beechwood Road onto the area proposed for use as a CAZ. He stated that the conceptual model for groundwater flow in intermediate bedrock shows that a sufficient number of interconnected, hydraulically active fractures exist to allow flow nets to be relied upon to determine the directions of groundwater flow, and the proposed extent of the CAZ is sufficient to encompass the area of known leachate impacts. Mr. Harding testified that the extent of the proposed CAZ is adequate if a compliance standard of 30 µg/L or a RUL of 7.5 µg/L is applied. He further testified that, even if a RUL of 1 µg/L is applied, the extent of the CAZ is adequate if subject to the need for additional investigations, including delineation of impacts east of monitoring well M170 along the eastern boundary of the Site north of Beechwood.

[159] However, Mr. Harding also acknowledged that further work is required, noting that investigations are ongoing with respect to five open boreholes, M187 to M191, which he expects will provide more information on water levels in the area, help to better define the flow directions and confirm concentrations of 1,4-dioxane. In cross-examination, Mr. Harding agreed that there may be vertical, as well as horizontal, fractures in the bedrock in the area of the monitoring well nest at M178, and that 1,4-dioxane has been detected at all three levels of this well. In correspondence filed with the Tribunal at the end of the hearing, WESA indicated that all three monitoring wells at the M178 nest would be decommissioned and replaced.

[160] Mr. Harding acknowledged that there has been groundwater discharge in the area of Deseronto Road and Marysville Creek where the Creek crosses under the culvert. Regarding the overland flow of water in the area of monitoring well M178, he recommended that further study be done to confirm the potential for groundwater discharge to the surface before determining whether this would be an appropriate

monitoring location. He said it should not be incorporated into the EMP until there is sufficient data.

[161] Regarding the former Lewis Meats property, Mr. Harding stated that the abattoir, and not the Landfill, appeared to be the most reasonable source of 1,4-dioxane detected in monitoring well M64-2, subject to further investigation, although he acknowledged abattoir activities had ended fifteen years ago.

[162] Mr. Harding testified that, as a precaution, WMC is proposing to sample a number of drilled bedrock domestic wells along County Road 1 south of the 401, as well as two wells west of Road 10 on Belleville Road. He said that the proposal is to sample these wells for 1,4-dioxane once every five years. Mr. Harding also stated that further investigation of the existing and proposed underground pipeline is warranted.

[163] With respect to the proposed contingency plans, Mr. Harding noted that a contingency plan is a set of procedures providing a defined framework of steps to go through in response to potential future problems, and that a contingency measure is a specific remedial action that may need to be taken. He said that once it is determined that the degree of impact warrants a corrective action plan, the best approach will be selected and implemented.

#### *Submissions of CCCTE*

[164] CCCTE submits that, under, s. 145.2 of the *EPA*, the Tribunal must now decide, on a balance of probabilities and based on the evidence presented at the hearing, whether the ECA conditions should be confirmed, altered or revoked, and whether the Director should be ordered to take other actions the Tribunal considers appropriate.

[165] CCCTE states that the Tribunal is not necessarily limited to considering the record that was before the Director when he made the his decision on the ECA in January 2012, and that the Tribunal can and should consider the additional data,

information and analysis that has been generated by the parties since January 2012. Citing the Tribunal's decision in *Strite Industries v. Ontario (Director, Ministry of the Environment)*, 2010 CarswellOnt 4550, at para. 31, CCCTE says it is important for the Tribunal to have "the best information available in order to make the most well-informed decision possible."

[166] CCCTE submits that the Director's decision on the ECA conditions under appeal is inconsistent with, or does not conform to, the purposes and provisions of the applicable law and policy framework. CCCTE says that ECA Conditions 8.5, 9.1 and 9.2 are unreasonable and inadequate to protect the environment or public health, and do not establish sufficiently rigorous monitoring or contingency planning requirements in relation to the Landfill over its lifespan. CCCTE asserts that the new information obtained over the past three years corroborates the concerns that led it to seek leave to appeal, particularly with respect to the results of WMC's investigations of the Landfill's off-site contamination of groundwater resources south of the Landfill and domestic wells along Beechwood Road.

[167] CCCTE therefore submits that these conditions should be wholly revoked and replaced with more effective, extensive and enforceable conditions in relation to the issues in dispute, as set out in CCCTE's written submissions. CCCTE acknowledges that some progress has been made in relation to the EMP since its appeal was filed, but submits that the proposed EMP remains deficient in several aspects and cannot be regarded as finalized until WMC conducts and reports on further field work. Relying on Mr. Ruland's opinion evidence, CCCTE asserts that the proposed revised EMP continues to have serious gaps and problems. CCCTE notes that Mr. Rancourt agrees that more work needs to be conducted before adopting the EMP and Mr. Shipley also concurs that it is premature to issue a finalized EMP. CCCTE further notes that the MOECC's witnesses, Mr. Stephenson and Mr. Gable, also have stated that it is premature to finalize the EMP.

[168] CCCTE states that only WMC is in favour of approving the proposed revised EMP in its current form, based on the opinion evidence of Mr. Harding of WESA, the consulting firm that has developed the EMP. CCCTE asserts that the Tribunal should prefer the evidence of CCCTE, MBQ and MOECC witnesses on this question, over the opinion of Mr. Harding.

[169] CCCTE submits that the proposed EMP should be further revised to incorporate a number of additional requirements and should only be approved by the Tribunal on an interim basis pending the results of further groundwater and surface water investigations by WMC.

[170] In particular, CCCTE highlights the following revisions and improvements that Mr. Ruland has identified as necessary, on an interim basis:

- a site-specific water quality criterion for 1,4-dioxane should be set at 3 µg/L, and the RUL for this substance should be designated as 1 µg/L;
- the RUL for 1,4-dioxane of 1 µg/L should be used as a trigger for further action to bring the Landfill into compliance with Guideline B-7 and the ECA;
- the RUL for 1,4-dioxane of 1 µg/L should be used to delineate the boundaries of the proposed CAZ (and any necessary future expansions of the CAZ);
- the updated CAZ application should be filed by WMC with the MOECC and provided to the parties by the end of December 2015;
- an updated Interim EMP should be prepared by WMC and provided to the parties by the end of June 2015, and any outstanding EMP issues that cannot be resolved through mediation should be referred back to the Tribunal for a hearing and decision in 2016;
- the precautionary testing of drilled residential and farm wells on Belleville Road and County Road 1 West should occur every two years;
- by the end of December 2015, WMC should undertake and report upon a comprehensive investigation of the hydrogeological implications and potential

impacts of the pipeline right-of-way that bisects the northern portion of the proposed CAZ;

- WMC's surface water monitoring should be amended to ensure: immediate 1,4-dioxane testing at all surface water monitoring stations on all regular sampling dates; extended surface water sampling to three times per year, during spring high flows, late summer/fall low flows, and within 12 hours of a major rain event (<25 mm); and continuous conductivity sampling at an appropriate location on Marysville Creek in 2015 and 2016.

[171] CCCTE states that some of these recommendations were also made or supported, in whole or in part, by MOECC and MBQ witnesses at the hearing. CCCTE also notes that Mr. Ruland testified concerning his other recommendations regarding monitoring and related matters, such as adding more well locations in the monitoring program. CCCTE submits that, if the Tribunal adopts Mr. Ruland's proposal to issue an interim approval of an amended EMP, it is not necessary for the Tribunal to rule on each of these secondary recommendations at this time and the Tribunal may instead defer these items to further discussions between the parties. In the alternative, if the Tribunal does not issue an interim order, CCCTE submits that the Tribunal should consider and adopt all of Mr. Ruland's primary and secondary recommendations in its disposition of this appeal.

[172] Regarding the proposed contingency plans, CCCTE notes that since Condition 9.1 (Groundwater and Surface Water Impact Contingency Plan) and Condition 9.2 (Leachate Collection System Contingency Plan) were first imposed by the Director in January 2012, there have been a number of significant developments, additional investigations and important new monitoring data, particularly off-site, and WMC has undertaken certain remedial measures, proposed to establish a CAZ south of Beechwood Road and produced an updated contingency planning process within the proposed EMP.

[173] CCCTE submits, however, that both the proposed CAZ and proposed contingency planning process are deficient and incomplete despite the fact that an urgent contingency situation now exists, because leachate from the Site has moved well off-site, impacting groundwater resources and contaminating domestic wells. CCCTE, therefore, submits that further work and opportunity for meaningful public review and comment are required before the proposed CAZ and contingency planning process are finalized.

[174] CCCTE asserts that representatives of WMC have made a variety of erroneous or misleading public statements over the years with respect to the impacts of the Landfill, citing examples provided by Mr. Ruland and noting, in particular, claims made in the SCM report that the directions of groundwater flow were well understood. Based on the hydrogeological evidence of Mr. Ruland, Mr. Stephenson, Mr. Shipley and Mr. Rancourt, CCCTE submits that almost all of these claims have been proven to be inaccurate and unreliable, and that there was sufficient information available in 2009 to indicate that leachate was likely moving beyond the southern boundary of the Site. CCCTE says that WMC knew, or reasonably ought to have known, by October 2009 that the Landfill was already impacting off-site groundwater resources and nearby domestic wells, and that the SCM report failed to clearly identify or assess the Landfill as a major threat to downgradient groundwater resources and domestic wells.

[175] CCCTE submits that the GAPI report also failed to predict or warn that off-site groundwater resources and domestic wells were being impacted by leachate from the Landfill even though, by this point in time, the MOECC had been requiring WMC to provide alternate water supplies to certain residences for approximately two years. Regarding the suggestion in the GAPI report and in Mr. Harding's testimony that the Lewis Meats abattoir was the source of VOCs and 1,4-dioxane found in groundwater south of the Landfill, CCCTE asserts that no evidence was presented to substantiate this allegation and that Mr. Ruland's reply evidence disproved that theory. CCCTE also states that the GAPI report failed to specify 1,4-dioxane or another parameter as the best leachate indicator for the Landfill.



[176] CCCTE observes that, although four new monitoring wells were installed for the GAPI report investigations, the GAPI report did not discuss the sampling results obtained from these wells and did not conduct a Reasonable Use assessment of these results. CCCTE notes that it was Mr. Stephenson who took it upon himself to conduct a Reasonable Use assessment of the monitoring results obtained by WMC from the new wells installed along Beechwood Road, which led him to conclude that the Landfill had impacted groundwater at and beyond the southern property boundary of the Site. CCCTE further notes that Mr. Ruland then conducted his own Reasonable Use assessment of the private domestic wells along Beechwood Road, using data collected by WMC, and found that a number of them contained Landfill parameters in excess of RULs.

[177] CCCTE asserts that, despite the above-noted deficiencies and misstatements in the SCM report and the GAPI report, Dr. Kueper testified at the hearing that the Landfill Site is “well understood” and “well characterized”, and that “it is unlikely that further site characterization efforts will add significantly to the understanding of site conditions.” CCCTE notes, however, that Dr. Kueper did acknowledge in cross-examination that: the SCM and GAPI reports failed to adequately address a number of groundwater issues; the extent of the leachate plume on the Paul Martin property east of the Site is currently not well understood and requires further field work to delineate it; and the shallow portion of the intermediate bedrock zone in the area of the pipeline right-of-way is also not well understood at the present time.

[178] CCCTE further states that Dr. Kueper, while describing the leachate plume as “well behaved”, was unable to explain why the plume is detected south of Beechwood Road at approximately 25 m below bedrock surface (“mbbs”) in well M168 and approximately 22 to 27 mbbs at wells M121 through 167, but then at three different zones at M-178-1 (30 mbbs), M-178-2 (13 mbbs), and M-178-3 (4-6 mbbs). CCCTE submits that Mr. Stephenson and Mr. Ruland identified problems with the wells. CCCTE notes that WMC subsequently committed to replace the well nest.

[179] CCCTE submits that the Tribunal should give little or no weight to assertions by WMC that the Landfill's hydrogeological setting is well characterized or that further investigative work is unnecessary or redundant. CCCTE states that while the overall understanding of the Site and its impacts have improved in recent years, it is clear that considerable further work is required, particularly in relation to delineating the proposed CAZ boundaries.

[180] CCCTE asserts that additional public notification measures are required in relation to the Landfill in addition to the PNP. Assuming that the M170 monitoring results may have fallen outside the scope of the PNP, CCCTE submits that the Tribunal should impose a further condition which ensures that proper and timely public notification is provided by WMC in such situations. In addition, CCCTE submits that an additional Condition is required to ensure that prompt notification is provided by WMC to all current and former residents of the six homes on Beechwood Road, and to advise them that they may have been exposed to leachate chemicals in their well water. CCCTE does not seek to change Condition 9.5 or the PNP, but proposes that additional notification conditions should be added. CCCTE submits that WMC should provide public notification of any detection of 1,4-dioxane in any domestic or agricultural well not previously known to contain 1,4-dioxane, whether the well was tested by WMC, the MOECC or any other party,

[181] On the question of the extent to which Andrew Martin and his family used water from their domestic well, CCCTE submits that the Tribunal should prefer the evidence of Mr. Martin over that of Mr. McCallum. CCCTE further submits that, in light of WMC's response to the contamination of the domestic well on the Andrew Martin property, it has no confidence in the ability of WMC's proposed contingency plan to expeditiously and effectively address any similar situations that may arise in the future. CCCTE also says it is unconscionable for the Director to suggest that the condition of the well on the Andrew Martin property may be the cause of the health symptoms experienced by his family.

[182] Therefore, CCCTE recommends that the Tribunal implement Mr. Ruland's recommendations with respect to improving the contingency planning portions of the EMP, as set out in his testimony. In particular, CCCTE submits that the blast-induced fracture trench concept identified in the 2010 leachate collection system contingency plan should be expressly prohibited as an option. CCCTE asserts that all parties now agree that this is not appropriate at the Site and requests that the ECA be amended to expressly prohibit this type of contingency measure.

[183] In summary, CCCTE submits that the proposed EMP, including the contingency planning process, should only be approved by the Tribunal on an interim basis, but amended to reflect the significant concerns identified by Mr. Ruland and other witnesses at the hearing. In its written submissions, CCCTE requests that the Tribunal make a number of specific findings and amendments. CCCTE further asks the Tribunal to consider and adopt all of Mr. Ruland's primary and secondary recommendations in its disposition of CCCTE's appeal.

#### *Submissions of the MBQ*

[184] The MBQ submit that their primary concern is the leachate impacts that can enter the MBQ's Reserve Territories and traditional lands through surface water and groundwater contamination, based on the proximity and connections of these lands to the Landfill. The MBQ note the significant role that the surface water and groundwater play in the community. The MBQ state that leachate contamination will jeopardize the health, safety, well-being and way of life for the MBQ community, as well as the natural environment. The MBQ note that they have opposed the Landfill in the past and remain concerned about adverse impacts from contaminants.

[185] The MBQ assert that Treaty 3½ assures it, in perpetuity, the undisturbed quiet enjoyment of the land under the protection of the Crown and that, in addition to *Charter Rights*, this promise directly engages the Honour of the Crown, which MBQ assert must

be addressed by both the MOECC and the Tribunal. The MBQ say that by allowing WMC's potentially harmful commercial practices to continue, both the undisturbed, quiet enjoyment of the land and the Honour of the Crown are compromised when MBQ territory is contaminated by pollution from the Landfill. The MBQ state that they doubt the efficacy of the current monitoring, reporting and contingency conditions put forward by the Director and WMC.

[186] The MBQ further assert that, unlike residents who can sell or abandon their residential and commercial properties, they do not have the ability to simply sell their property and move elsewhere. The MBQ also observe that they are engaged in land claims discussion with the Crown and that it is possible that leachate may have migrated onto lands subject to these future land claims immediately to the west of Deseronto Road.

[187] The MBQ support and adopt the recommendations by CCCTE and the evidence put forth by their experts. The MBQ say that their views are reflected in the submissions by CCCTE but add that the Landfill has unique implications for the MBQ and their territory, especially with respect to impacts on Marysville Creek, its tributaries, and the groundwater and surface water that flows into and across the MBQ lands. The MBQ state that the use of a CAZ for the Site is a reasonable approach, but the CAZ boundary should be based on the recommendations of CCCTE and the MBQ.

[188] The MBQ note that the SCM report failed to recognize the complexity and unpredictability of the geological and hydrogeological environment at the Site, and the GAPI report failed to recognize that the data collected were clearly showing evidence of off-site leachate impacts in the groundwater south of the property boundary along Beechwood Road. The MBQ submit that further work is needed to delineate the extent of the leachate impacts on both groundwater and surface water. The MBQ question the credibility of Dr. Kueper, arguing that he repeatedly failed to recognize the risks posed by the vulnerable shallow fractured bedrock geology at the site and the evidence of off-

site leachate impacts to the south of the Landfill property, where MBQ lands are also located and where water is admitted to flow to MBQ lands.

[189] The MBQ highlight the vulnerability of Marysville Creek to becoming impacted by leachate through groundwater discharge, based on the evidence that it could take only a matter of hours for leachate contaminants to flow to the reserve through surface water. The MBQ note that the area of Marysville Creek near Deseronto Road is a groundwater discharge zone situation and that groundwater reaching this location comes from the area of the unlined portion of the Landfill. The MBQ submit that dissolution-enhanced fractures in the limestone in this area due to karstic processes have the potential to carry groundwater at a rapid rate through the sub-surface, making it critical to ensure that adequate characterization be carried out in the area along Marysville Creek.

[190] The MBQ also indicate that Dr. Kueper agreed that Marysville Creek is a low head zone, that groundwater from the unlined portion flows towards the Creek in both the intermediate and shallow groundwater flow zones and that additional testing in Marysville Creek was appropriate. The MBQ further note Mr. Harding's testimony that there has been very limited 1,4-dioxane testing in this area, emphasizing the need for more investigations of potential leachate impacts in this area where many of the experts agreed that groundwater discharge to surface water regularly occurs.

[191] The MBQ note Mr. Castro's testimony that stormwater ponds discharge freely at all times, submitting that this increases the vulnerability of Marysville Creek to surface water quality impacts in the event of leachate entering a pond and subsequently discharging directly to the Creek. The MBQ also note Mr. Cleland's testimony that leachate can impact Marysville Creek by seeping out of the Landfill waste mound and running off with melt water or rain water directly to the Creek or into stormwater ponds and then into the Creek. The MBQ observe that Mr. Castro agreed that further surface water sampling should be done in the area of the nested M178 wells south of Beechwood Road.

[192] The MBQ submit that there is a lack of nested monitoring wells in the area between the Landfill and Marysville Creek, meaning that the potential for upwelling and discharge of leachate impacted groundwater into the Creek cannot be adequately evaluated. Given the possible risks to surface water, the MBQ assert that a rigorous program of surface water testing must be in place at the site, including a technique for daily monitoring of surface water quality to help protect the safety of downstream human and ecological receptors along Marysville Creek. In particular, the MBQ support the installation of additional monitoring wells in the area of monitoring well M82-2 to more accurately delineate the CAZ and prevent the spread of leachate impact. The MBQ state that there is not enough data to determine with confidence how Marysville Creek is or will be affected by leachate contamination based on the current known hydrogeological information.

[193] The MBQ assert that continuous conductivity testing in Marysville Creek should be implemented, based on the recommendations of both Mr. Ruland and Mr. Rancourt, stating that it would provide a better understanding of whether there is leachate in the Creek using a feasible, low cost technology. The MBQ observe that Mr. Castro conceded in cross-examination that continuous conductivity in Marysville Creek could be done for a relatively low cost if a suitable monitoring location was determined.

[194] The MBQ state that the public consultation regarding the Landfill has been lacking and the dialogue between the MBQ and WMC is often severely lacking or unclear. The MBQ say that their lack of engagement in the voluntary CLC program should not be taken as a lack of interest in engaging with WMC but a lack of interest in engaging in an unsatisfactory consultation process. The MBQ submit that WMC should adapt better public communication practices that engage the MBQ and community groups such as CCCTE in meaningful ways, and should engage independent technical expert advisors to assist the CLC.

[195] The MBQ note the impacts of the Landfill on Andrew Martin and his family, and say that WMC's failure to provide adequate information to the Martin family and ensure their health by providing them alternative drinking water in a more timely manner shows a clear disregard for human health and safety. The MBQ assert that Mr. Martin's story is a disturbing example of possible future implications for the MBQ if the Landfill is not properly monitored or lacks an adequate contingency plan, or if there is inadequate communication between WMC and the public. In light of this example, the MBQ ask the Tribunal to carefully review the communication practices in relation to the Landfill.

[196] In conclusion, the MBQ submit that virtually nothing is known regarding the impacts to Marysville Creek and its tributaries to the north, despite many years of testing, and that not enough information to determine how far the leachate plume has spread and what the future implications are for the MBQ community. The MBQ state that the ECA conditions being appealed are insufficient to ensure the environmental and human health of the MBQ, and offer a number of specific recommendations to the Tribunal.

#### *Submissions of Andrew Martin*

[197] Mr. Martin submits that additional monitoring wells are necessary but he does not believe a high number of wells is necessary as long as those drilled are hydraulically connected and provide clean results. He says that more work is needed north of Beechwood Road on the Paul Martin property and that all efforts should be made to remediate any contamination in that area within one year of the Tribunal's decision.

[198] Mr. Martin commends WMC for the work done so far to investigate where the leachate is moving and for its recognition of 1,4-dioxane as a key parameter. He submits that the RUL for 1,4-dioxane should be set at 1 µg/L, noting that WMC has taken measures to ensure that the parameter can be detected at 1 µg/L.

[199] Mr. Martin expresses concern about the lack of information he received regarding the contamination of his well water and asserts that, in future, information should be shared with the individuals directly affected by it. He submits that the Tribunal should consider the residents downgradient of the Landfill in making decisions with respect to the Site, and urges the parties to work to ensure that people and communities around the Site are protected.

#### *Submissions of the Director*

[200] The Director generally agrees with CCCTE's position that the Tribunal steps into the shoes of the Director in making its decision on this appeal, adding that the Tribunal's authority is limited by the scope of the appeal. The Director cites *RPL Recycling & Transfer Ltd. v. Ontario (Director, Ministry of the Environment)* (2006), 21 C.E.L.R. (3d) 80 ("*RPL*"), at para. 20, which states that the Tribunal's actions must still remain within the overall subject matter of a proceeding. He further states that the Tribunal must consider any applicable policies and guidelines that governed the Director in making his decision, including Guideline B-7. The Director further agrees that the Tribunal can make its decision based on the most recent and best available evidence.

[201] The Director submits that the proposed revised EMP is a significant improvement over the 2010 EMP and should be implemented immediately, subject to the further modifications proposed by the MOECC. He acknowledges that, at this point in time, the extent of the leachate impacted groundwater has not been completely delineated. The Director further submits that, once the delineation is completed, the ECA must be amended to incorporate lands for the establishment of a CAZ in accordance with Guideline B-7, and the EMP must be updated to further expand the proposed revised EMP. The Director recognizes the need for an updated and more robust EMP.

[202] The Director notes that the issue in this matter is not whether the Landfill is leaking contaminants, but whether the concentrations of the contaminants are unreasonable, submitting that the evaluation as to whether the contaminants are being



attenuated in a reasonable manner should be made in accordance with Guideline B-7. He submits that the provincial government has made a policy decision that, in appropriate circumstances, it is preferable to use the natural environment to naturally attenuate contamination from a landfill as opposed to requiring expensive and uncertain remediation methods. The Director says that a factor used in making this determination is whether the Landfill is a legacy landfill, asserting that where society as a whole created the waste dumped into legacy landfills, it is not unreasonable that society share responsibility for its aftermath.

[203] The Director says that, in deciding this matter, the Tribunal must take into account any applicable policies and guidelines that govern the Director in making his decision. He says that it is a principle of administrative law that a policy or guideline should generally be followed unless there are unique circumstances or otherwise good reasons to deviate from the policy, in which case the departure should be explained. The Director asserts that the actions it proposes to the Tribunal are consistent with Guideline B-7.

[204] Relying on Mr. Stephenson's testimony, the Director asserts that most groundwater sampling locations listed in the EMP should be sampled twice per year in the spring and fall, at least for the next few years. He acknowledges, however, that not all of the groundwater monitoring wells need to be sampled twice a year and maintains that some wells, such as those used to assess background concentration levels, may be sampled less frequently. The Director proposes the sampling frequency for each group of specific wells as well as two additional wells. The Director puts forward Mr. Stephenson's recommendations that any new well should be tested quarterly for one year and that any recently drilled well that has already been sampled once or twice should be sampled at least four times.

[205] The Director recommends that beginning in 2015, the series of domestic wells located south of Highway 401 should be tested every two years for at least the next six years, or until the extent of the leachate contaminated groundwater is delineated if that

takes longer than six years, as opposed to being tested every five years as proposed in the proposed revised EMP. The Director suggests that once the delineation is complete, these tests may be carried out every five years.

[206] Regarding surface water sampling, the Director submits that the EMP should be modified to add a third sampling and testing event to be conducted once during the summer within twelve hours after a significant rain event of 25 mm or more, as proposed by Mr. Ruland.

[207] With respect to additional modifications proposed by CCCTE and the MBQ, the Director submits that they are not necessary. The Director submits that additional monitoring wells are not needed to monitor groundwater between the Landfill mound and Marysville Creek because there is low hydraulic conductivity in the area and the upwelling that has been observed is most likely coming from the north. The Director further argues that the one-year conductivity study on Marysville Creek requested by the MBQ is unnecessary because such a study would not provide useful information and there has been no indication of impacts. He also asserts that additional surface water measures and monitoring are not required because: the surface water quality has improved since the installation of a new stormwater pond and no exceedances can be attributed to the Landfill; the stormwater ponds at the Site are approved under a separate environmental compliance approval that is not under appeal; and there is no evidence of a surface water pathway from monitoring well M178 flowing under Deseronto Road to the Beechwood Road Ditch and then to Marysville Creek.

[208] The Director submits that: the ECA should be amended to require that WMC make the Director's proposed modifications; the amended EMP should be submitted to the parties prior to August 31, 2015; and WMC should, thereafter, carry out monitoring in accordance with the proposed revised EMP to ensure that the fall sampling is conducted in accordance with the 2015 EMP, rather than the outdated 2010 EMP. He further submits that to reflect the importance of 1,4-dioxane testing as an early warning system, a separate reporting requirement is proposed requiring WMC to report any

detection of 1,4-dioxane in surface water, or any time it is detected in a monitoring well, where it has not been detected before.

[209] The Director emphasizes that the proposed revised EMP, if amended as proposed, will again need to be updated once the delineation of the off-site leachate impacted groundwater to the south and east of the Site and other pending work on wells in the proposed CAZ area is completed. He submits that new trigger wells will be required in order to monitor the furthest extent of the leachate as described below.

[210] The Director observes that the parties agree that leachate impacted groundwater above the RULs has been identified to the south and likely to the east of the Site boundary, and notes that WMC has suggested that the delineation of these off-site impacts is essentially finished, pending completing some work on five additional wells that have been recently been drilled and obtaining further results of testing from these wells. He disagrees and maintains that, while this further work will provide important additional information, it will be inconclusive until enough data is generated over time. The Director also asserts that the further work will likely result in the need for further wells to be drilled, sampled and tested. He submits that impacts cannot be delineated simply on the results of one or two rounds of sampling and testing from certain wells indicating that the concentrations fall below the RUL for those parameters, maintaining that information must be properly assessed and considered.

[211] The Director notes that all experts agreed that two or three more monitoring wells are required to the east of the most southerly portion of the eastern boundary of the Site to determine whether the Paul Martin property has also been unreasonably impacted.

[212] The Director submits that the ECA should be amended to require WMC to continue to delineate the extent of the leachate plume until it is demonstrated that water within monitoring wells at the outer extent of the impacted area, which are hydraulically connected to the defined leachate impacted groundwater, does not exceed any RULs as defined in Guideline B-7 and Procedure B-7-1, or any RUL set out in the ECA. He

submits that WMC must demonstrate that wells that fall below the RULs are hydraulically connected to the defined impacted area, and that leachate following a higher conductivity preferential pathway is not overlooked. The Director submits that it is not sufficient for WMC to rely on the broad scale information depicted by the flow nets as set out in the SCM report, to support WMC's claim that the impacts have been delineated. In support of this submission, he maintains that such general characterizations do not capture localized variability in hydraulic conductivity, aperture sizes and preferential pathways.

[213] The Director further notes that: WMC has acknowledged that it must complete the work on monitoring wells M187 to M191, which were recently drilled in the CAZ area to the south of the Site; and WMC has indicated on the last day of evidence at the hearing that it will be replacing monitoring well M178, which is a key monitoring well in determining the extent of the impacts to the south.

[214] The Director submits that further angled drilling, in addition to that which was done in developing the SCM report to identify whether vertical fracturing existed at the Site, is unnecessary. He submits that, since vertical fracturing is now confirmed, it is more important to monitor the leachate impacted groundwater to delineate its outer boundary than to identify every fracture.

[215] Therefore, the Director submits that amendments should be made to Condition 8.5(c) of the ECA to require WMC to: submit a proposal to replace M178 and replace and test the well in accordance with directions issued by the MOECC after considering the input from the parties; submit a proposal to drill and test two or three new wells to the east in accordance with a directions issued by the MOECC after considering the input from the parties; complete the work and testing required for the five new wells and other specific wells outlined above; submit a report detailing the work carried out and results of testing; and facilitate public consultation on the report. The Director states that the MOECC's technical support section will review the conclusions of the report and

make a recommendation to the MOECC district manager as to whether the delineation has been completed or whether further work is required.

[216] The Director observes that, in a fractured bedrock setting, it is not unusual that the delineation of the extent of leachate groundwater impacts has taken some time, because it is an iterative and time-consuming process. He maintains that WMC must work expeditiously to carry out any further necessary work but asserts that the situation is not as urgent as suggested by CCCTE.

[217] The Director submits that WMC must take steps to bring the Landfill back into compliance once the extent of the off-site leachate impacts are delineated, noting that while there are a variety of remedial initiatives that may be undertaken, the CAZ approach is the most common, especially for legacy sites. He submits that a CAZ may be appropriate in this case because: impacted domestic wells have been vacated or provided with alternate water supplies; the evidence indicates that leachate will not affect surface water features or other sensitive groundwater uses, such as a municipal water supply; exceedances of drinking-water standards for off-site domestic wells are only for non-health related parameters; and intervention by active means such as a pump and treat system or the placement of purge wells would be very expensive, and likely be ineffective in the fractured bedrock environment.

[218] The Director asserts that once the delineation of off-site leachate impacts is complete, WMC will be in a position to determine whether it wants to proceed with establishing a CAZ or take some other course of action either on its own or in conjunction with a CAZ to bring the landfill into compliance. He submits that, based on the information currently available, WMC's proposed CAZ appears reasonable, with the exception of the eastern boundary which will need to be addressed. The Director maintains that, in order to establish a CAZ, the company will need to acquire the water rights for the properties in the CAZ, generally by acquiring title to the properties or an easement.

[219] The Director submits that the ECA should be amended to require that WMC, after completion of the delineation, submit an application to amend the ECA that addresses the non-compliance with Condition 8.6 of the ECA (leachate impacted groundwater that exceeds the RULs at the site boundary). He maintains that this application should include an outline of options which were considered for bringing the landfill site into compliance with Guideline B-7, including the rationale for the preferred option, complete with all necessary supporting documentation to complete the application to amend the ECA.

[220] The Director notes that Mr. Gable has reviewed WMC's proposed contingency plans and, with one exception, found them acceptable and generally in accordance with the MOECC's expectations of a contingency plan, which is less detailed than contingency measures. He asserts that the first two steps in the contingency plan could be combined so as not to delay resampling, and also submits that a shallow fracture trench should be prohibited as a contingency option.

[221] The Director further notes that the groundwater evaluation and trigger mechanisms described in s. 7.1 of the EMP are a default procedure that is triggered when testing indicates that a boundary well has reached 75% of an RUL, but Condition 8.5(e) requires any off-site exceedances of any parameter, including 1,4-dioxane, to be reported to the MOECC within 48 hours. He states that MOECC staff will consider whether far more urgent action is required in accordance with the Ministry's compliance policy.

[222] The Director agrees with CCCTE's recommendation that WMC should: conduct a hydrogeological investigation of the existing pipeline that runs across the northern part of the proposed CAZ to determine whether the pipeline right-of-way may be impacted by leachate impacted groundwater; and provide a report detailing its findings and conclusions.

[223] The Director recognizes that Andrew Martin and his family have experienced significant stress as a result of the circumstances in this case and have had to sell the property to WMC due to the groundwater contamination. However, the Director also submits that there is no medical evidence linking his family's symptoms to the potential leachate impacts and that many of the symptoms described are consistent with other types of contamination, particularly microbiological. He further submits that the well on the Andrew Martin property could be susceptible to surface water contamination given that the well-head is below grade, at the bottom of a slope and appears not to have been properly capped. Nonetheless, the Director acknowledges that the well has been impacted by leachate and should no longer be used, and submits that the provision of whole house replacement water supplies to Andrew Martin's residence should be a condition of the ECA.

[224] Regarding the application of the precautionary approach in this case, the Director notes that the MOECC's Statement of Environmental Values ("SEV") states that it will use a "precautionary, science-based approach in its decision-making to protect human health and the environment," and submits that the Tribunal has interpreted this statement to incorporate the precautionary principle in a number of decisions. The Director cites the Tribunal's decision in *Orgaworld Canada Ltd. v. Ontario (Director, Ministry of the Environment)* (2011), 65 C.E.L.R. (3d) 161 ("*Orgaworld*"), at para. 199 to 206, which reviewed recent cases in which the Tribunal interpreted this statement. Based on these cases, he submits that the application of the precautionary approach varies depending on the extent of the scientific uncertainty involved, and that the principle must be read in conjunction with the statutory requirements governing the Director's decision.

[225] The Director further submits that the Tribunal, in *McIntosh v. Ontario (MOE)*, (2010), 50 C.E.L.R. (3d) 161 ("*McIntosh*"), at para. 63, indicated that the precautionary approach may be applied differently between existing activities and future activities, stating that: scientific uncertainty about environmental harm from an existing activity should not prevent the adoption of measures to protect the environment; and where

there is significant uncertainty about the risk of a future activity, a precautionary approach presumes the existence of environmental risk in the absence of proof to the contrary and places the onus of establishing the absence of environmental harm upon the source of the risk.

[226] The Director asserts that while some uncertainty remains in this case as to the delineation of the leachate impacted groundwater to the south and east of the landfill site, the more recent groundwater investigations have provided a better picture of the general extent and the location of the impacts, providing important information to determine the need for and location of additional monitoring wells. The Director further notes that the use of 1,4-dioxane as a leachate indicator parameter has also increased the confidence in the analysis. He submits that, as the Landfill is an existing activity related to past events, the focus should be on the adoption of measures to protect the environment as opposed to preventing the activity from occurring altogether.

[227] The Director asserts that the MOECC's proposed ECA conditions are consistent with the precautionary principle based on a number of reasons. For example, the Landfill has been closed and must carry out an environmental monitoring program. Another reason is that the requirement to sample and test the domestic wells south of Highway 401 is designed to act as an early warning system to ensure action is taken, if the next potential sensitive receptors are impacted by the Landfill. The Director also submits that the precautionary approach is incorporated into Guideline B-7 and Procedure B-7-1, in that an RUL is calculated as 25% of the Ontario Drinking Water Quality Standard ("ODWQS"), and is inherent in the development of drinking water standards.

[228] Regarding the PNP concerns raised by CCCTE and the MBQ, and CCCTE's request that additional public notification requirements be added to the ECA, it is the Director's position that issues related to public notification are beyond the scope of this hearing. The Director observes that the appeal related to Condition 9.5 was withdrawn



and the Tribunal dismissed that part of the appeal when it accepted the settlement and issued its April 26, 2013 Order.

[229] With respect to the allegations by some witnesses that the Director has failed to enforce the public notification requirements, he emphasizes that it has tendered evidence that written responses were provided in each case indicating why it determined that enforcement action would not be taken. The Director observes that it cannot enforce the spirit of the PNP, only an actual contravention. He asserts that putting in place a clear enforceable EMP will remove much of the uncertainty as to how the requirements of the PNP should be applied. The Director further asserts that other demands for public notification, such as requiring WMC to publicize that it is providing water to a particular residence, are likely inconsistent with privacy protection provisions in the *Freedom of Information and Protection of Privacy Act*.

[230] The Director submits that Mr. Ruland's suggestion that WMC be required to notify former residents that have lived in the six homes along Beechwood Road since 1997 is beyond the scope of the Tribunal's jurisdiction in this matter. However, he does not object to the Tribunal making a recommendation that the MOECC facilitate a meeting with the office of the local Medical Officer of Health ("MOH") to provide the Health Unit with any information that is available so that the Health Unit can determine the appropriate course of action.

[231] The Director notes that the MBQ's main concern is the potential contamination of Marysville (or Mud) Creek and groundwater contamination of lands that may be subject to a potential land claim. He submits that there was no evidence to suggest any potential that the two other creeks (Sucker/Selby Creek or the Salmon River) are being impacted by the Landfill.

[232] With respect to evidence at the hearing concerning past events in connection with the Landfill, the Director contends that this evidence is relevant because it provides a useful context for the Tribunal to situate the current circumstances and assess what

the next steps should be. However, he submits that it is not the Tribunal's role to determine whether there is any fault for past actions. The Director argues that this is beyond the Tribunal's mandate at this hearing, submitting that the Tribunal's mandate is to determine what the appropriate monitoring conditions and contingency plans should be for the Landfill going forward. The Director maintains that numerous more witnesses and hearing days would have been required to properly assess fault for past actions. He notes that other legal processes are available to address such issues, should any of the parties or other persons wish to pursue them.

[233] The Director recommends amendments to the ECA conditions to demonstrate what should happen, but suggests that in rendering its decision in this matter, the Tribunal should consider allowing the parties a period of time either to negotiate an agreement or provide the Tribunal with submissions as to the precise wording of the final conditions.

[234] The Director also requests that the Tribunal consider issuing an interim order, pending its decision on this appeal, to ensure that the conditions in relation to the upcoming fall 2015 monitoring season will be more rigorous than those that currently apply pursuant to the ECA. In particular, he suggests that the proposals for new monitoring wells to replace the M178 nested wells and monitoring wells on the Paul Martin property be implemented for the fall 2015 monitoring season, and that WMC include a report on these wells with its semi-annual report due on January 15, 2016.

#### *Submissions of WMC*

[235] WMC submits that the leachate plume from the Landfill has been sufficiently delineated such that the proposed CAZ is properly defined and the EMP can be approved. WMC states that enough work has been completed at the Landfill to support the conclusion that the hydrogeology of the Landfill and surrounding areas is reasonably well understood and the leachate plume is well behaved, capable of being monitored, and is contained within the proposed CAZ. In support, WMC refers to the evidence of

its expert witnesses concerning the work completed at the Landfill, noting in particular the new monitoring wells that have been installed and the use of “state-of-the-practice” methods.

[236] WMC asserts that the data accumulated from the investigations and testing that have been completed at and in the vicinity of the Landfill has generated a good understanding of the hydrogeology at the Site and the surrounding area. WMC submits that, although further investigations are ongoing, it is not necessary to complete that work to understand the hydrogeology of the Site. WMC further asserts that there is no evidence of karst or karst-like features in the area of the Landfill or the proposed CAZ.

[237] WMC submits that, based on its understanding of the hydrogeology at the Landfill and the surrounding area, the extent of the leachate plume has been sufficiently delineated for the EMP to be approved by the Tribunal and for the purposes of the defining the proposed CAZ. WMC addresses the delineation of the plume by dividing the Landfill and surrounding area into four quadrants – north, south, east and west of the Landfill footprint.

[238] WMC submits that the area north of the Landfill and south of Marysville Creek is an area with lower hydraulic conductivity and slower moving groundwater, and that there are 37 monitoring wells located in this area. WMC submits that additional nested wells in the northwest corner of the Landfill Site are not required because the data from such wells would not significantly supplement the understanding of this area. WMC further submits that it is not necessary to install additional angled boreholes to obtain additional information with respect to the presence of vertical and sub-vertical fracturing under the Creek, noting that it is not necessary to identify every such fracture and that a significant amount of information already has been obtained in relation to this area due to the high density of monitoring wells at or near the Creek. WMC, therefore, submits that the leachate plume is defined to the north of the Landfill.

[239] With respect to the area west of the Landfill, WMC states that it has also been described as having lower hydraulic conductivity and slower moving groundwater, and asserts that the only leachate impacts detected to the west of the Landfill footprint are in the shallow groundwater flow zone within a limited distance of the Landfill. WMC maintains that there is little groundwater flow to the west of the Landfill and it is not expected that any leachate impacts will be observed further west. Therefore, WMC submits that the extent of the leachate plume to the west of the Landfill has been delineated.

[240] WMC asserts that there is no evidence of leachate impact in the area south of the Landfill footprint and north of Beechwood Road, to the west of the access road. WMC notes that 1,4-dioxane results for the monitoring wells located furthest to the south (M173, M181-1, M181-2, M185-2, M179 and M176) are all non-detect, confirming that the leachate plume does not extend that far to the south, and says that the only issue is the identification of the southernmost extent of the leachate plume in the area directly south of wells M121 to M167 and between M173, M181-1, M181-2, M185-2, M179 and M176. WMC argues that the evidence demonstrates that the southernmost extent of the leachate plume does not extend to the southernmost extent of the proposed CAZ and submits that the additional work to be completed, such as confirmation of the absence of detection of 1,4-dioxane at M177 and at the open boreholes, and testing of the replacement wells for M178, will not alter this fact.

[241] WMC further submits that the need to conduct further investigations to delineate the leachate plume will depend on the site-specific standard for 1,4-dioxane identified by the Tribunal, noting that if the Tribunal determines that a compliance standard of 30 µg/L or RUL of 7.5 µg/L is applicable, the extent of the leachate plume in this area will have been sufficiently delineated to finalize the EMP without the installation of additional monitoring wells, and the EMP can be amended as required. WMC contends that there is no need to delineate the plume to non-detect. WMC notes that the report on the M178 replacement wells will be completed but argues that it is unnecessary to define the leachate plume sufficiently for the EMP because the results of the investigations,

which have been conducted to date, confirm the adequacy and appropriateness of the proposed CAZ.

[242] WMC asserts that responsiveness to pumping should not be determinative of whether monitoring wells are hydraulically connected and useful for assessing delineation of the leachate plume. WMC notes that Mr. Stephenson relies on the response of a monitoring well to pumping in determining whether a monitoring well is hydraulically connected and concluding whether or not the well is part of the groundwater flow system, indicating where the leachate plume has travelled. WMC submits, however, that a monitoring well can be hydraulically connected to the groundwater flow system even if it does not respond to pumping. WMC states that a monitoring well should be considered to be connected to the groundwater flow system if the water level in that well recovers to static conditions when a water sample is taken from the well. WMC observes that Mr. Stephenson agreed under cross-examination that the higher permeability zone observed south of the Landfill and Beechwood Road may not extend further south.

[243] As with the area north of the Landfill, WMC says that angled boreholes were only installed initially to confirm whether or not there were vertical or sub-vertical fractures and not to identify every such fracture. WMC submits that sufficient information has been obtained in relation to the area south of the Landfill to identify the potential for any significant pathway for groundwater to travel horizontally through the subsurface, and that additional angled boreholes south of Beechwood Road are unnecessary and unreasonable. WMC contends that Mr. Shipley did not raise this issue again after first expressing his concern in 2010 or provide any evidence showing that the work done since 2010 south of Beechwood Road is inadequate.

[244] WMC further states that it is currently conducting a review of the design of the existing and potential underground pipelines in the northern portion of the proposed CAZ south of the Landfill but submits that a detailed investigation, as proposed by Mr. Ruland, is unnecessary and unreasonable. WMC submits that the depth of the leachate

impacted groundwater in the intermediate bedrock in the area of the current pipeline is approximately 22 m below ground surface, well below the 2 m depth of the pipeline.

[245] WMC submits that there has been no evidence of any leachate impact in the area directly to the east or to the northeast of the Landfill, noting that it has been described as having tighter rock, lower hydraulic conductivity and slower moving groundwater. WMC says that no additional work has been recommended or proposed by the parties in these areas.

[246] WMC notes that the results of testing conducted at monitoring well M170, in the area to the southeast of the Landfill, revealed the presence of 1,4-dioxane at approximately 1.97 µg/L and alkalinity slightly above the RUL of 400 milligrams per litre ("mg/L"). WMC submits that, if the site-specific standard for 1,4-dioxane is set at 30 µg/L with a RUL of 7.5 µg/L, then the extent of the leachate plume in this area has been sufficiently delineated and no further work is required. WMC further states that the Director is entitled to exercise his discretion to find the site is in compliance with Guideline B-7 despite the minor exceedance of the RUL for alkalinity because alkalinity is a non-health based parameter and only slightly elevated.

[247] However, WMC recognizes that additional investigations on the Paul Martin property located downgradient of M170 would be useful to confirm the location of any leachate impacts on the property. WMC asserts that it has made efforts to conduct confirmatory testing but has been denied access to the land. Regardless, WMC argues that such testing is unnecessary because WMC maintains that the leachate plume has been sufficiently delineated.

[248] In summary, WMC submits that the leachate plume has been sufficiently delineated to the north, south, east and west of the Landfill if a compliance standard of 30 µg/L or a RUL of 7.5 µg/L is applied. WMC asserts that the plume results of the confirmatory testing in the open boreholes located south of the Landfill and testing of the replacement well nest in or around the decommissioned M178 well nest will

determine whether the full extent of the leachate plume has been sufficiently delineated to the south of the Landfill. On that basis, WMC asserts that the proposed revised EMP represents a comprehensive monitoring program sufficient to monitor the potential for adverse effects from the Landfill.

[249] Regarding Condition 8.5 of the ECA, WMC provides its recommendations concerning the groundwater monitoring program for the Landfill. WMC notes that the only concerns raised by other parties in relation to the groundwater elevation monitoring program (s. 3.1 of the proposed revised EMP) were with respect to the inclusion of various monitoring wells in the intermediate bedrock groundwater zone. Regarding the recommendation that monitoring wells M70-2, M176 and M182 be added, WMC states that these wells are already included as monitoring locations. Stating that no further recommendations were made by the parties about the groundwater elevation monitoring program, WMC submits that it can be finalized.

[250] With respect to the groundwater quality monitoring program (s. 3.2 of the proposed revised EMP), WMC asserts that that the monitoring locations set out in Table 2 of the proposed revised EMP are sufficient to appropriately monitor the groundwater quality such that movement of leachate impacted groundwater can be determined and evaluations of potential impacts can be made. WMC submits that the addition of monitoring wells M110 and M172, as proposed by Mr. Stephenson, are unnecessary on the basis that: M109-1, which is included in the program, is adjacent to M110 and any information it provides only duplicates information from M109; and groundwater migrating to the south across Beechwood Road is already being monitored at M114-1, which is located in close proximity to M172.

[251] WMC maintains that it is unnecessary to locate a new monitoring well between wells M55-4 and M66-2 because any leachate impacts in this area will be identified at M46-2 and M75, which are in close proximity, and the surface water monitoring locations along the Creek. WMC further asserts that monitoring wells M52-2, M64-2, M109-1, M178-1, M178-2 and M178-3 (for which Mr. Ruland recommended yearly

monitoring for 1,4-dioxane and other groundwater monitoring parameters) are already included as part of the groundwater monitoring program in the proposed revised EMP, and that there is no supportable rationale for the inclusion of M63-2, M70-2 or M174. WMC also notes that monitoring wells M85 and M86 have been included as monitoring locations in the proposed revised EMP.

[252] Noting that sampling frequency for each groundwater quality monitoring location is set out in Table 2 of the proposed revised EMP, WMC observes that the reference in Table 2 to the M178 well nest will refer to the replacement wells to be installed in that location, submitting that no amendment to the proposed revised EMP should be required. WMC refers to Mr. Stephenson's recommended changes to sampling frequency, which entail an increase in frequency to twice per year (from once a year, or in some cases from once every two years) for: groundwater inorganic and general VOCs in the shallow groundwater low head groundwater flow zone; groundwater inorganic, general VOCs and 1,4-dioxane in the areas between low head regions and landfill footprint in the shallow groundwater flow zone; groundwater inorganic and general VOCs in the low head regions north and south of the Landfill in the intermediate bedrock groundwater flow zone; and groundwater inorganic, general VOCs and 1,4-dioxane in the areas between low head regions and the Landfill.

[253] WMC observes that Mr. Stephenson's recommendations are based on his desire to look at trends in the data obtained from such sampling. WMC disagrees, maintaining that, as there are many years of sampling data from these wells, this provides more than sufficient data to establish trends. As a result, WMC submits the additional sampling recommended by Mr. Stephenson is unnecessary. Regarding Mr. Stephenson's recommendation with respect to groundwater inorganic, general VOCs and 1,4-dioxane in the areas between low head regions and the Landfill, WMC says that he indicated that this recommendation was premised on the lack of a site-specific standard for 1,4-dioxane and the work to be completed with respect to the newly installed boreholes. In response, WMC notes that these wells are located well inside the edges of the identified leachate plume where 1,4-dioxane concentrations are well



below the RUL for 1,4-dioxane of 7.5 µg/L proposed by the Director and, therefore, the recommended sampling frequency is unnecessary and unreasonable.

[254] WMC notes that Mr. Stephenson recommends increasing the frequency of testing for the off-site domestic wells south of Highway 401 from every five years to every two years. WMC disagrees with Mr. Stephenson's proposed increased sampling frequency for the off-site domestic wells because: they are a considerable distance from the Landfill; 1,4-dioxane has only migrated 500 m from the Landfill and there are sufficient monitoring wells within the proposed CAZ to provide more than adequate notice of any potential migration of leachate outside the proposed CAZ; monitoring wells M181-1, M181-2 and M183 located in the area of the proposed CAZ north of Highway 401 are all non-detect for 1,4-dioxane; and the application of the precautionary principle does not require unnecessary testing where there is adequate information to warn of any potential adverse impact and to allow sufficient time for any necessary remedial steps to be taken.

[255] WMC states that the groundwater samples taken from the monitoring locations will be analyzed for the list of parameters included in Table 2 of the proposed revised EMP, and that the specific parameters included in the Groundwater Inorganic and General List and VOC list are provided in Tables 3 and 4 of the proposed revised EMP. WMC submits that no issues have been raised by the parties with respect to the use of these parameters.

[256] Regarding groundwater quality monitoring assessment limits, WMC notes that the RULs will be used to support the evaluation of whether groundwater quality on properties downgradient from the Landfill would be considered acceptable and that, due to the variability of groundwater geochemistry across the site, a review of water quality trends over time at individual wells will also be conducted to better evaluate whether the downgradient groundwater is impacted with leachate. WMC says that no issues have been raised by the parties with respect to the use of this methodology, and proposes the use of a compliance standard of 30 µg/L for determining whether implementation of

the groundwater evaluation procedures described in s. 7.1 of the proposed revised EMP is necessary.

[257] With respect to the surface water monitoring program (s. 4.0 of the proposed revised EMP), WMC notes that no issue has been taken with the surface water elevation monitoring set out in the EMP. Therefore, WMC addresses only the surface water quality monitoring program. WMC states that there are four surface water monitoring stations located on the Creek and three surface water monitoring stations located on or adjacent to the ditch. WMC says that none of the parties disagree with these monitoring locations and submits that they are sufficient to detect any potential surface water discharges of leachate.

[258] Regarding Mr. Shipley's recommendation for an additional sampling location where the overland flow from the area around the M-178 well nest reaches Deseronto Road, WMC responds by noting that this is an intermittent watercourse where there is only some overland flow and only at certain times of the year, and that there has been no evidence of groundwater discharge to surface in this area. WMC argues that there is no rationale to support the inclusion of this sampling location unless evidence is adduced in the future that there is such discharge and, therefore, submits that this proposed monitoring location should not be included in the EMP.

[259] On the issue of sampling frequency in the surface water monitoring program, WMC relies on Mr. Castro's evidence, asserting that there is no indication of any adverse impacts from the Landfill to the surface water features surrounding it. WMC further asserts, on the basis of Mr. Harding's evidence, that it is sufficient to sample the surface water monitoring locations twice each year, in the spring and fall, to capture the periods of high water level and flow. WMC submits that Mr. Ruland's recommendation, which Mr. Castro endorsed, to sample three times per year (in spring and fall and after a rain event) is unnecessary, impractical and unreasonable given the nature of the water features in the area. WMC noted that Mr. Castro recognized the practical difficulties associated with obtaining a sample if there is little or no resulting flow and

acknowledged that sampling surface water twice per year is a standard practice at landfills.

[260] WMC notes that the surface water quality monitoring parameters, including 1,4-dioxane and alkalinity, allow for the evaluation of potential Landfill impacts and that there is no disagreement between the parties regarding the use of these parameters.

[261] WMC states that there are three stormwater management ponds located to the northeast, northwest and south of the Landfill and used to collect stormwater runoff from the Landfill. WMC further states that the stormwater management ponds are approved under ECA No. 1688-8HZNJG, which is not under appeal and under which samples are collected on a quarterly basis.

[262] WMC submits that continuous conductivity testing for a one-year period, as part of the surface water monitoring program, is unnecessary. WMC states that such testing will not provide any additional useful information with respect to potential impacts from the Landfill because: conductivity is a non-specific parameter and multiple sources contribute to the surface water in the Creek; and there is no measurable flow upstream in the Creek for a significant portion of the year. WMC reiterates its position that there is little to no risk of leachate seeps running off the Landfill and impacting surface water, maintaining that no impacts have been shown in almost three decades of testing. WMC submits that there is an insufficient basis to warrant the implementation of continuous conductivity testing.

[263] WMC submits that the groundwater and surface water contingency plans for the Landfill are appropriate, establish a process for the implementation of a contingency plan and are protective of the environment and human health and safety. WMC says that a contingency plan is a general procedure to be followed in response to potential future environmental impacts associated with the Landfill. WMC notes that Mr. Stephenson found the general contingency plan process to be sufficiently precautionary and agreed with the timing of the contingency plans, including the requirement to report

any off-site exceedances of parameters for groundwater and surface water within 48 hours. WMC indicates that there are deadlines in the proposed revised EMP within which each step of the contingency plan must be completed.

[264] Noting that a contingency measure is a specific remedial action to be taken if an environmental impact triggers a contingency plan, WMC states that some, but not all, of the potential groundwater and surface water contingency measures are set out in the proposed revised EMP. WMC asserts that it cannot provide additional details regarding the implementation of a specific appropriate contingency measure until sufficient data regarding a potential impact becomes known. WMC proposes the use of a CAZ as a contingency measure for groundwater in response to the RUL exceedances of the Landfill.

[265] Addressing the leachate collection system contingency plan, WMC confirms that it agrees to delete the reference to blast-induced fracture trench as a contingency measure in the proposed revised EMP, and observes that the parties have not raised other issues concerning this contingency plan.

[266] WMC submits that the proposed CAZ is the preferred groundwater impact contingency measure due to the detection of leachate contaminated groundwater migrating from the Landfill. WMC notes that a CAZ is often used for the attenuation of contamination from a landfill site to a level that will not have an unacceptable impact beyond the boundary of the zone, and that the proposed CAZ is supported in this case by MOECC witnesses Mr. Taylor, Mr. Gable and Mr. Stephenson. WMC maintains that the risk of human exposure to leachate impacted groundwater is minimal in the proposed CAZ because the only sensitive receptors at the Landfill were residential wells and these impacted homes have either been vacated or provided with an alternative water supply. WMC, therefore, requests that the Tribunal approve the form and content of the proposed CAZ while noting that an application process is still required to obtain final approval of the proposed CAZ.

[267] As noted above, WMC submits that the leachate plume has been sufficiently delineated and, depending on the site-specific standard chosen for 1,4-dioxane, no additional work is required to delineate the extent of the leachate plume. WMC contends that: if a compliance standard of 30 µg/L is used, the leachate plume is contained within the proposed CAZ; if a RUL of 7.5 µg/L is used, the leachate plume is contained within the proposed CAZ provided the testing to be completed in the open boreholes and the new well nest at or near the decommissioned M178 well nest does not show the presence of 1,4-dioxane; and if a RUL of 1 µg/L is used, the proposed CAZ is likely sufficient if the results for 1,4-dioxane obtained from the open borehole are confirmed.

[268] WMC asserts that, even if the Tribunal finds that additional work is required to delineate the extent of the leachate plume to the south and southeast of the Landfill, the content and form of the proposed CAZ may still be approved. WMC states that the proposed CAZ has a large buffer area to the south, further noting that it has been unable to obtain access to the Paul Martin property to conduct testing to the southeast. WMC says that the ECA can be amended to expand the CAZ to include the Paul Martin property if, at a future date, WMC is provided with access to this property and exceedances are found. WMC submits that, given that it has no right to expropriate land, it would be unreasonable to set a date by which WMC would be required to obtain access to the Paul Martin property in order to conduct testing.

[269] WMC notes that, although the parties negotiated the elements of the PNP in Condition 9.5 of the ECA prior to the hearing, CCCTE has raised the issue of WMC's compliance with the PNP and recommended amendments to the EMP and ECA with respect to public notification. WMC says this is effectively a request for an amendment to Condition 9.5. Regarding allegations of non-compliance with the PNP, WMC argues that they are outside the scope of the hearing, that the Tribunal has no jurisdiction to make a determination on this issue and that if it determines that it is prepared to comment on the allegations, it must have regard to the results of the MOECC's investigations, which concluded that there was no non-compliance.

[270] WMC opposes CCCTE's requests that the EMP be amended to explicitly require public notification for various events (i.e. the exceedance of PWQO for any landfill indicator parameter in any surface water monitoring locations), and that further notification be provided to the current and former residents of those homes on Beechwood Road. WMC contends that the parties have negotiated the terms and language of the PNP and CCCTE should not attempt to amend it. Citing a number of examples, WMC further contends that it has been diligent in its efforts to provide accurate and timely information with respect to the Landfill. Therefore, WMC submits that it is unnecessary to include additional terms in the EMP with respect to public notification.

[271] However, in the event that the Tribunal intends to consider whether such amendments are necessary, WMC submits that the current PNP is sufficient to provide for public notification in cases where compliance point monitoring results indicate new exceedances of any provincial regulatory standards or guidelines regarding groundwater or surface water quality, including the standard to be set for 1,4-dioxane. WMC notes that under Condition 8.1 of the EMP, WMC is required to report any off-site exceedance of parameters for groundwater, surface water or odour to the MOECC District Manager within 48 hours of the determination of the exceedance. WMC also notes that the current PNP requires the provision of notification where monitoring results may indicate a new exceedance of assessment parameters at the surface water monitoring locations. WMC submits that this is sufficient and that notification for any exceedance would be redundant.

[272] WMC notes that testing of off-site domestic and agricultural wells is included as part of the EMP and that such testing is conducted exclusively to detect the presence of 1,4-dioxane. WMC asserts that it is unnecessary to provide public notification for any detection of 1,4-dioxane in domestic and agricultural wells, particularly if the Tribunal determines that the compliance limit for 1,4-dioxane should be 30 µg/L or that the applicable drinking water standard should be 30 µg/L. WMC notes that the PNP

currently requires the provision of notice where analytical results obtained by the MOECC may indicate a new exceedance, and submits that there is insufficient oversight to require WMC to provide notification where analytical results are obtained by CCCTE or the MBQ. WMC further asserts that the terms of the PNP are sufficiently broad to encompass CCCTE's proposed conditions with respect to providing notification of any and all detections of 1,4-dioxane in any well at or near the Landfill.

[273] WMC states that the following two recommendations made by Mr. Ruland have been satisfied: notice has been provided to the operators of the wastewater treatment plant that receives landfill leachate of the presence of 1,4-dioxane and NDMA in the leachate; and a copy of the map delineating the CAZ for inclusion in land use planning and other related documents will be provided to the Town of Greater Napanee and the Township of Tyendinaga once approved by the MOECC. WMC notes that notification has been provided to the current and former residents of Beechwood Road with respect to the contamination caused by the Landfill, making the provision of further notification unnecessary.

[274] WMC says that the only current residents of homes on Beechwood Road are Paul Martin and Andrew Martin, and the other homes on the road impacted by the Landfill are vacant. WMC states that, if the Tribunal orders the provision of further notification to former residents of the homes on Beechwood Road, the contents of the notification do not need to be provided to all parties for review and comment, noting that CCCTE has set out the information that it deems necessary to provide. WMC disagrees that it should be required to provide an estimate of the timeframe in which wells became contaminated, asserting that it is difficult to accurately determine and that there would be little or no benefit to including this information. WMC further disagrees with the need to include contact information for CCCTE professionals, arguing that the inclusion of contact information for WMC and the MOECC is sufficient. In the alternative, however, WMC agrees with the provision of this contact information to the MOH.

[275] With respect to Mr. Martin's evidence that WMC has not taken responsibility for the health and safety of his family despite awareness of potential Landfill impacts on his domestic well, WMC disagrees with his characterization of its actions. WMC maintains that the retroactive application of the current understanding of the hydrogeology and groundwater chemistry at the Site cannot be used to suggest that WMC did not take appropriate action to monitor the Landfill for potential leachate impacts. WMC submits that it has taken responsibility for the health and safety of residents in the surrounding area upon confirmation that there was an offsite leachate impact. WMC relies on Mr. McCallum's evidence in disputing Mr. Martin's evidence that he never met with anyone at WESA. WMC, therefore, asserts that Mr. Martin could not have indicated that he and his family were only using the well water for bathing and brushing teeth.

[276] WMC also addresses the MBQ's concerns regarding potential impacts on lands adjacent to the Landfill that may be subject to "future land claims" by noting that a potential or "future" land claim has no legal status and that consideration of such "future land claims" is irrelevant to this hearing. Citing *Sutcliffe v Ontario (Minister of Environment)* (2003), 65 OR (3d) 457 (Divisional Court), at para. 48, WMC asserts that the Tribunal would be exceeding its jurisdiction if it were to have regard to such "future land claims".

[277] WMC agrees with the Director that it would be appropriate for the Tribunal to issue its decision and then request submissions of parties regarding feasible conditions that reflect its decision. Regarding the Director's request that the Tribunal issue an interim order, WMC asks that the Tribunal approve the proposed revised EMP in its current form and order that work on the replacement for the M178 well nest and additional bore holes be completed by January 2016.

#### *Findings on Issue 1*

[278] As noted by CCCTE and the Director in their submissions, the Tribunal's jurisdiction in this matter is pursuant to s. 145.2 of the *EPA*. The Tribunal stands in the



“shoes” of the Director and has the authority to make any decision or impose any conditions that the Director has authority to make under the *EPA*, so long as the Tribunal’s actions are within the overall subject matter of the proceeding, as stated in the *RPL* decision. As further noted by CCCTE and the Director, a great deal of the evidence presented during the hearing was more recent than the evidence considered by the Director in making his January 2012 decision under review in this appeal. The Tribunal’s decision is based on this most recent evidence, which was the best evidence available at the time of the hearing. The Tribunal further notes that it has considered all recommendations made by the parties, including Mr. Ruland’s secondary recommendations referenced by CCCTE, and the Tribunal has incorporated all appropriate recommendations.

[279] The Tribunal has considered the evidence and submissions of the MBQ regarding the possibility of impacts to land subject to future or potential land claims. The issue of any potential land claims was not before the Tribunal in this appeal and is outside of the Tribunal’s jurisdiction.

[280] The parties provided a statement of agreed facts at the outset of the hearing, and the Tribunal accepts that factual evidence. In addition, the Tribunal makes the following factual findings based on the evidence it heard over the course of the hearing:

- The hydrogeological conditions of the area in which the Landfill is situated include a shallow groundwater flow zone, an intermediate bedrock groundwater flow zone and a deep bedrock flow zone.
- The hydrogeological setting is described as complex, and there is evidence of the existence of both horizontal and vertical fracture networks in the bedrock.
- There is evidence of leachate-contaminated groundwater in certain monitoring wells to the north and northwest of the Landfill footprint and to the south and southeast of the Landfill footprint extending to south of Beechwood Road. There is evidence that suggests an emerging concern that there may

be contaminated groundwater to the east of the Site, north of Beechwood Road.

- The evidence does not suggest that there is off-site contamination of the groundwater to the southwest or the northeast of the Landfill Site.
- The leachate impacted groundwater has caused the contamination of a number of domestic wells along Beechwood Road, including the well on the Andrew Martin property.
- The Landfill is not currently in compliance with Guideline B-7.
- The primary leachate indicator parameter to use in delineating the extent of leachate contamination due to the Landfill is 1,4-dioxane, and other useful parameters are alkalinity and tritium.
- The vast majority of the evidence demonstrates that the contamination originated from the Landfill and not from the former abattoir at the Lewis Meats property.
- Groundwater from the unlined portion of the Landfill flows towards Marysville Creek in both the intermediate and shallow groundwater flow zones.

[281] The Tribunal observes that a recurring theme in the evidence was the difficulty experienced in correctly arriving at a conceptual model for the Site through the investigations that produced the SCM and GAPI reports, as well as the more recent semi-annual monitoring reports. This has been a challenging and time consuming undertaking due to the complexity of the Site. Although it is now better understood, there continues to be a significant degree of uncertainty regarding the hydrogeological conditions at the Site and the extent of contamination from the Landfill. The Tribunal notes that, at different points in time, WMC's consultants have believed the Site to be adequately characterized, but review by other experts has raised questions that have led to further investigations and an evolving understanding of the hydrogeological conditions and the impacts of the Landfill. During this time, the contaminated groundwater has entered domestic wells in the vicinity of the Landfill and affected residents in the area.

[282] The Tribunal notes Mr. Martin's evidence about the contamination of his well, and his resulting concerns for the health and safety of his family. The Tribunal agrees with the Director's assertion that it is not necessary for the Tribunal to determine whether there is any fault for past actions, as the focus of this appeal is on the conditions of the ECA, which will govern the future operation of the Site. However, the Tribunal has carefully considered the evidence concerning the past history of the Landfill as context for its findings in this proceeding.

[283] Regarding the range of opinion concerning the hydrogeological evidence, the Tribunal observes that achieving a full understanding of hydrogeological conditions involves modelling based on the data obtained through installing groundwater monitoring wells and conducting tests and analysis. While each of the experts qualified to give opinion evidence on hydrogeology provided the Tribunal with their interpretation of the data that has been accumulated at the Site so far, hydrogeology is not an exact science and it is impossible to predict the movement of groundwater with absolutely certainty. In this case, the understanding of the Site has evolved and past predictions in the SCM and GAPI reports have had to be reassessed as part of the ongoing efforts to delineate offsite impacts.

[284] In *114957 Canada Ltée (Spraytech, Société d'arrosage) v. Hudson (Town)*, [2001] 2 SCR 241 ("*Spraytech*"), at para. 31, the Supreme Court of Canada noted the precautionary principle in international law, set out at para. 7 of the Bergen Ministerial Declaration on Sustainable Development (1990), which states that environmental measures must anticipate, prevent and attack the causes of environmental degradation and, where there are threats of serious or irreversible damage, a lack of full scientific certainty should not be used as a reason to postpone measures to prevent environmental degradation. In *McIntosh*, at para. 63, the Tribunal discussed the precautionary principle as follows:

A precautionary approach applies when there is scientific uncertainty about the risk of environmental harm from an activity. In essence, the approach provides that scientific uncertainty about environmental harm

from an existing activity should not prevent the adoption of measures to protect the environment. In a situation where there is significant uncertainty about the risk of a future activity, the Tribunal has held that a precautionary approach “presumes the existence of environmental risk in the absence of proof to the contrary. It places the onus of establishing the absence of environmental harm upon the source of the risk.” (*Davidson v. Ontario (Director, Ministry of the Environment)* (2006), 24 C.E.L.R. (3d) 165, para. 44).

[285] Although, in this case, the uncertainty does not relate to the risk of a future activity, there is scientific uncertainty in relation to the future movement of the contaminant plume. Given the historic problems at the Site and the evolving understanding of the Site, as demonstrated by the evidence, the Tribunal finds that the hydrogeological evidence of all the experts, considered in its totality, indicates that some uncertainty remains regarding the understanding of the hydrogeology of the Site and the extent of leachate contamination. While it is possible that Dr. Kueper is correct that the plume is well behaved and the extent of the CAZ can be determined using existing data, this cannot be said with certainty in light of the contrary views of other experts. Given the circumstances of this matter, the Tribunal must apply the precautionary principle and so cannot ignore the additional opinions and proposed measures of the other experts. The Tribunal observes that their opinions were based on reasoned analyses made within the scope of their fields of expertise, and many of their recommendations are supported by their analyses and are feasible to implement. Therefore, the Tribunal has accepted the opinions and applied the precautionary principle by adopting the recommendations of various experts as set out below.

[286] The Tribunal finds that additional investigations are needed, and that amendments should be made to the ECA in respect of the EMP and the contingency plans. The Tribunal now turns to its findings in relation to the adoption and delineation of the CAZ, sampling of groundwater and surface water, contingency plan conditions, public notification conditions and the interim status of the EMP. The Tribunal observes that a number of the findings below address provisions in its July 21, 2015 interim Order, which was issued to ensure that the fall 2015 sampling would be conducted in accordance with updated EMP provisions, as requested by the Director.

### The adoption and delineation of the CAZ

[287] The Tribunal finds that it is appropriate for WMC to propose the use of a CAZ to bring the Landfill into compliance with the RULs in Guideline B-7 once it has completed the delineation of off-site leachate impacts. The Tribunal notes Mr. Taylor's evidence that Guideline B-7 and Procedure B-7-1 support the use of a CAZ where suitable, and that it would be a reasonable approach in this case. The Tribunal accepts that a CAZ is commonly used for legacy sites and finds that it is warranted in this case based on the evidence that: the residences with impacted domestic wells have been vacated or provided with alternate water supplies; there is no municipal water supply in the vicinity; and other mechanisms may not be effective given the Site's fractured bedrock setting. The Tribunal observes that CCCTE and the MBQ did not oppose the use of a CAZ at the Site, although they raised concerns about the boundaries of a proposed CAZ and the schedule for additional CAZ work to be completed, which are further addressed below.

[288] Although WMC requested that the Tribunal approve the form and content of the proposed CAZ, the Tribunal finds that it would be premature to do so at this time. Mr. Gable stated that the leachate plume must be fully delineated before the CAZ is finalized. It is of the utmost importance that thorough investigations be undertaken to ensure that the CAZ is accurately delineated and that there is no threat of further contamination to surface water or downgradient domestic wells. This will be further addressed later in these reasons.

[289] Therefore, the Tribunal finds that the ECA should be amended to require that, once the extent of the leachate impacted groundwater has been delineated, WMC submit an application to amend the ECA to establish a CAZ, with revised and additional trigger wells as required. As noted by the Director, the application should outline the options that were considered for bringing the Site into compliance with Guideline B-7

and the rationale for the preferred option, and include all necessary supporting documentation.

[290] With respect to the delineation of the CAZ, the Tribunal accepts the Director's submission that the ECA should be amended to require WMC to continue investigations to delineate the plume until it has demonstrated that water within monitoring wells at the outer extent of the defined impacted area, which are hydraulically connected to the leachate impacted groundwater that has been identified, does not exceed any RULs for parameters defined in Guideline B-7 and Procedure B-7-1, or any RUL set out in the ECA. The Tribunal finds that a RUL for 1,4-dioxane of 1 µg/L shall be used: to determine the boundaries of the CAZ; to expand the boundaries of the CAZ in the future, if needed; and as a trigger for further action to bring the Landfill into compliance with Guideline B-7 and the ECA. The Tribunal's reasons for establishing a RUL of 1 µg/L are set out below under Issue 2.

[291] The Tribunal finds that delineation of the CAZ will require that WMC demonstrate that wells that fall below the RUL are hydraulically connected to the impacted area that has been defined to ensure that leachate is not missed because it is flowing through a preferential pathway with higher conductivity. The Tribunal does not agree with WMC's submission that the fact that 1,4-dioxane was not detected in monitoring wells located furthest to the south, confirms that the leachate plume does not extend that far to the south. The Tribunal accepts the evidence of Mr. Stephenson, with which Mr. Ruland agreed, concerning the need to determine where the high hydraulic conductivity zones are, as they allow the leachate plume to move further. It must be established that these monitoring wells are hydraulically connected to the impacted groundwater flow pathways, and this will require the installation of a sufficient number of trigger wells to ensure that the boundary of the leachate plume has been delineated.

[292] However, the Tribunal does not find that the maximum spacing between trigger wells at the CAZ boundary must be no more than 100 m, as recommended by Mr. Ruland. The Tribunal notes Mr. Stephenson's evidence that it is important to monitor as

many fracture pathways as is practically possible to determine where the contamination is moving. While it may not be practically possible to locate all trigger wells a maximum of 100 m apart, the Tribunal is satisfied that effective monitoring of the plume can be achieved through the step-wise approach recommended by Mr. Stephenson, in which wells are drilled and monitored to determine if they are hydraulically connected.

[293] The Tribunal agrees with the Director's submission that this further work will be inconclusive until sufficient data is generated over time and likely will result in the need for further wells to be drilled, sampled and tested. The Tribunal accepts that the leachate impacts cannot be delineated on the results of only one or two rounds of sampling and testing from certain wells indicating that the concentrations fall below the RUL for those parameters, and ongoing data must continue to be assessed and considered over time.

[294] Therefore, the Tribunal finds that amendments should be made to Condition 8.5(c) of the ECA to require WMC to complete further investigative work and testing to delineate the plume, including installation of new trigger wells to monitor the furthest extent of the leachate, and to submit a report on these investigations and facilitate public consultation on the report. The Tribunal observes that the proposed revised EMP will need to be updated again once the delineation of the off-site leachate impacted groundwater to the south and east of the Site and other pending work on wells in the proposed CAZ area is completed.

[295] The Tribunal finds that it is not necessary for WMC to conduct any further angled drilling, as recommended by Mr. Shipley, given that vertical fracturing has been confirmed. The Tribunal is satisfied that it is not necessary to identify every instance of vertical fracturing in the area of the Site. The Tribunal notes CCCTE's desire for a binding schedule to complete the delineation of the CAZ, and finds that timeframes should be set by the MOECC that are realistic and practical to allow the necessary work to be conducted but also ensure that the CAZ is delineated as soon as is reasonably possible.

### Sampling of groundwater and surface water

[296] The Tribunal heard extensive evidence and submissions with respect to further monitoring that should be required through the groundwater quality monitoring program in specific areas and individual wells around the Site. The Tribunal now turns to these questions, noting that it has considered the many recommendations it received concerning the installation and monitoring of specific wells. However, the Tribunal will address in these reasons only those changes that the Tribunal has found necessary and appropriate to order, based on the evidence before it.

[297] The Tribunal finds that there is a need for additional investigations to be undertaken to the east of the Landfill Site, north of Beechwood Road to determine whether there have been leachate impacts on the Paul Martin property. The relevant expert witnesses agreed that such investigations are needed. It was WMC's submission that it has been denied access to this property to conduct testing and has no right to expropriate land to gain such access. However, Andrew Martin agreed in his submissions that work is needed on the Paul Martin property.

[298] The Tribunal finds that it would be appropriate to install at least two new monitoring wells in appropriate locations north of Beechwood Road east of monitoring well M170. Therefore, in its July 21, 2015 interim Order, the Tribunal ordered WMC to submit a proposal by August 14, 2015 to install two or three new monitoring wells to the east of the southern part of the eastern landfill boundary and, subject to acquiring the legal right to do so, install the wells in accordance with directions issued by the District Manager after considering input from the parties.

[299] The Tribunal received evidence and submissions with respect to a range of specific wells and issues of concern in the area south and south east of the landfill footprint, including lands south of Beechwood Road. It became clear in the evidence provided at the hearing that there were problems with contamination at the M178



monitoring well nest, possibly due to artesian conditions. After WMC announced on the last day of evidence that it would replace the M178 monitoring wells, the Director recommended that this be implemented for the fall 2015 monitoring season. Based on this evidence, the Tribunal finds that it is necessary to replace the M178 well nest with a new well nest nearby and, in its July 21, 2015 interim Order, the Tribunal ordered WMC to submit a proposal to the District Manager and the parties by August 14, 2015 to replace monitoring well M178 and then replace and test the well in accordance with directions issued by the District Manager after considering input from the parties.

[300] Regarding the MBQ's submission that further surface water sampling should be done at the culvert into Marysville Creek in relation to potential surface water from the area of the nested M178 wells, the Tribunal accepts Mr. Castro's evidence that such testing could be done but only seasonally when water is flowing in it. On this basis, the Tribunal finds that WMC should conduct surface water sampling at the culvert annually in the spring when water is flowing through it into Marysville Creek.

[301] The Tribunal also ordered, in its July 21, 2015 interim Order, that WMC complete all further work and testing required for monitoring wells M187 to M191 by September 30, 2015, a deadline that was subsequently extended to December 1, 2015. WMC acknowledged that it needed to complete work on the row of monitoring wells from M187 to M191, which had been recently drilled in the CAZ area south of the Site prior to the hearing. The Tribunal finds that it is appropriate for WMC to complete this work as part of the ongoing investigations required to delineate the CAZ, as noted above.

[302] The Tribunal further finds that monitoring wells M110-1 and M172 should be added to the list of wells to be monitored, based on Mr. Stephenson's reasons as conveyed in his evidence. These monitoring wells were added in the Tribunal's July 21, 2015 interim Order, which replaced Table 2 of the proposed revised EMP with an amended Table 2.

[303] With respect to the area to the north and northwest of the Landfill footprint, the Tribunal accepts that additional testing in Marysville Creek is appropriate, specifically in relation to 1,4-dioxane. The Tribunal finds that there should be tested for 1,4-dioxane at all surface water monitoring locations when sampling occurs, and notes that 1,4-dioxane has been listed as a surface water parameter in the proposed revised EMP and that the parties agree with this requirement. The Tribunal also accepts Mr. Stephenson's recommendation that additional sampling for 1,4-dioxane be conducted at monitoring well M82-2. The Tribunal's July 21, 2015 interim Order included a requirement that M82-2 be tested at least two more times over and above the twice yearly sampling required by table 2 of the EMP, prior to December 31, 2015.

[304] Based on the precautionary principle, the Tribunal finds that it is appropriate to increase the frequency of surface water sampling to three times each year, taking place: once during the spring; once during the summer within 12 hours after a rainfall of more than 25 mm, where summer flow conditions permit; and once during the fall. In making this finding, the Tribunal accepts Mr. Ruland's opinion that the current surface water monitoring program is not adequate to allow a determination of the extent to which contaminated groundwater may be entering Marysville Creek. The Tribunal notes that Mr. Shipley agreed that it would be useful to add the requirement to obtain a third sample and Mr. Castro did not oppose this recommendation. In its July 21, 2015 interim Order, the Tribunal added one surface water monitoring event to s. 4 of the EMP to occur at one point in time during the summer months after a rainfall of more than 25 mm.

[305] The Tribunal finds that continuous conductivity monitoring on Marysville Creek should be implemented for one year, with continuous conductivity loggers placed at: an appropriate location on the Creek, far enough upstream of Deseronto Road to ensure no interference from road salt; and a second location upstream of the Landfill to detect background influences. This finding is based on Mr. Ruland's evidence that conductivity monitoring would be a simple, inexpensive method to monitor for sudden surges of contaminants during periods of run-off and Mr. Rancourt's evidence that it would give an

indication of whether there is groundwater flow into the Creek that is not visible on the surface. While Mr. Castro and Mr. Harding expressed concern that there would not be measurable flow in the Creek upstream of Deseronto Road for much of the year, Mr. Castro agreed that continuous conductivity measurements would not be expensive to conduct. Given that the proposed testing is not costly or difficult to conduct, the Tribunal finds that it is prudent and in keeping with the precautionary principle to undertake it for one year to determine whether it yields further information about the potential for contaminants in Marysville Creek.

[306] Regarding the proposal for additional nested wells in the area of Marysville Creek and the Landfill, the Tribunal accepts Mr. Harding's evidence that there is low hydraulic conductivity and slower groundwater movement in that area and that further wells are not needed due to the numerous monitoring wells already in the area. The Tribunal notes that the surface water quality has improved since the installation of a new stormwater pond, and finds that the monitoring requirements in the proposed revised EMP, as amended by this decision, will provide sufficient information to monitor for potential contamination. Should 1,4-dioxane or another listed parameter be detected, the need for further monitoring wells may be determined at that time.

[307] With respect to the other specific recommendations that were made by the parties concerning monitoring well locations, the Tribunal finds it appropriate to put in place the process recommended by the Director, in which the MOECC would consult with CCCTE, the MBQ and NGL before making a determination on whether delineation of the CAZ has been completed, rather than making detailed findings concerning the location of each monitoring well. The Tribunal recognizes that additional monitoring wells may be required as a result of an iterative process during the ongoing investigations.

[308] The Tribunal finds that the parameters specified in Table 2 of the revised EMP, as amended by its Order of July 21, 2015, are appropriate for use in the analysis of groundwater samples taken from the monitoring locations, based on the agreement

among the parties that these are the best parameters to assess the potential for Landfill impacts at the Site.

[309] Regarding the sampling frequency for groundwater monitoring wells, the Tribunal agrees with the Director's recommendations, based on Mr. Stephenson's testimony, that: the majority of groundwater sampling locations listed in Table 2 of the EMP shall be sampled for all listed parameters twice each year, in the spring and fall; monitoring wells listed in Table 2 that are in background locations shall be sampled once each year in the spring; any new well shall be tested quarterly for one year; and any recently drilled well that has already been sampled once or twice shall be sampled at least four times during the first year after being drilled. These amendments were ordered in the Tribunal's interim Order of July 21, 2015, which replaced Table 2 of the proposed revised EMP with an amended Table 2, and are to remain in place. Regardless of the past sampling data available, the Tribunal finds that it is necessary to require sampling at a frequency that will assist in achieving the best possible understanding of trends in the data.

[310] Regarding the groundwater elevation monitoring program, the Tribunal notes that monitoring wells M70-2, M176 and M182 have been added to the table of monitoring locations, as recommended by Mr. Ruland. The Tribunal finds that no further amendments are required to the groundwater elevation monitoring program, on the basis that WMC has responded to the only concerns raised by other parties in relation to this program by including monitoring wells M70-2, M176 and M182 as monitoring locations.

[311] The Tribunal finds that the domestic and agricultural wells at properties located south of Highway 401 on County Road 1 West and Belleville Road, at the addresses noted at the hearing, should be tested for 1,4-dioxane every two years for at least the next six years, or until the extent of the leachate contaminated groundwater is delineated if that takes longer than six years, and then every five years once the delineation is complete. The Tribunal bases this finding on Mr. Stephenson's evidence

that this frequency should be required as a precautionary measure because groundwater flow velocity can be fairly high. The Tribunal finds that this frequency of testing is necessary because of the continuing uncertainty concerning the delineation of the leachate plume.

[312] Based on the fact that there is no dispute on this point among the parties, the Tribunal also finds it appropriate to continue the requirement that WMC provide whole house replacement water supplies for the residences located along Beechwood Road south of the Landfill unless otherwise agreed in writing to by the residents of the residences on those properties, and unless the residence is vacant and likely to remain vacant.

[313] Regarding the existing pipeline that runs across the northern part of the proposed CAZ, the Tribunal accepts Mr. Ruland's evidence that he had observed exposed bedrock near the pipeline right-of-way and his opinion that there is a possible vertical connection in the bedrock by which contaminated groundwater could move into the permeable pipeline right-of-way. The Tribunal notes that Mr. Stephenson supported Mr. Ruland's recommendation that there be hydrogeological investigation in this area, and Mr. Harding agreed that some form of further investigation of the pipeline is warranted. The Tribunal, therefore, finds that WMC should conduct a comprehensive investigation of the hydrogeological implications and potential impacts of the pipeline, to determine whether the pipeline right-of-way may be impacted by leachate impacted groundwater, and provide a report on the findings and conclusions of this investigation.

[314] The Tribunal further agrees with the Director's proposed addition of a separate requirement that WMC report to the MOECC any detection of 1,4-dioxane in surface water or any time it is detected in a monitoring well where it has not been detected before, within 48 hours of determination of the exceedance. The Tribunal finds that this condition will assist in ensuring that the MOECC will be made aware of information concerning any new detection of 1,4-dioxane as promptly as possible. This condition was included in the Tribunal's July 21, 2015 interim Order.

### Contingency plan conditions

[315] Turning to Conditions 9.1 and 9.2 concerning the contingency plans, the Tribunal accepts the evidence of Mr. Stephenson, Mr. Gable and Mr. Harding that a contingency plan is a high level framework document that sets out the steps to be followed if trigger mechanisms are initiated, while the contingency measures are the range of potential remedial actions that may be taken if an exceedance is identified, depending on the source of an exceedance. The Tribunal further notes that the MOECC typically expects that contingency measures will be determined as appropriate based on the source of an exceedance, but will not be set out in detail in a contingency plan.

[316] The Tribunal, therefore, finds the steps and levels of detail in the proposed contingency plans in the EMP to be appropriate, with the following two revisions: confirmation re-sampling (Step 2 under the groundwater evaluation methods and trigger mechanisms set out at 7.1 of the proposed revised EMP) is to occur at the same time as a water quality conformance assessment (Step 1), as the Tribunal finds there is no reason to delay the re-sampling; and a shallow fracture trench is prohibited as a contingency measure in the leachate collection system contingency plan, as agreed by the parties.

### Public notification conditions

[317] The Tribunal notes that CCCTE and the MBQ seek additional public notification measures relating to a number of concerns that they and Mr. Martin raised with respect to transparency and prompt public notification about the spread of contamination from the Landfill. They are not satisfied with the implementation of the PNP provisions in the amended Condition 9.5 of the ECA that came into effect following the settlements reached by the parties in 2013. While CCCTE and the MBQ do not seek to further amend Condition 9.5 or the PNP, they are requesting the addition of several further notification conditions, including the posting of data on-line, improved public

consultation with community groups and immediate written notification of all former and current residents of the impacted residences on Beechwood Road.

[318] The Tribunal finds, however, that the issue of public notification is no longer before it in this matter. As the Director and WMC submitted, CCCTE withdrew and discontinued the portion of its appeal related to Condition 9.5 pursuant to the 2013 settlement agreements, and the Tribunal accepted the withdrawal of that portion of its appeal. Therefore, the Tribunal finds that the relief requested by CCCTE and the MBQ with respect to public notification is beyond the scope of its remaining jurisdiction in this matter. However, the Director and WMC had no objection to the Tribunal recommending that the MOECC facilitate a meeting with the local MOH to provide available information and allow the MOH to determine the appropriate course of action. The Tribunal is satisfied that it is appropriate that the Tribunal make this recommendation.

[319] The Tribunal further notes Mr. Murphy's testimony that WMC has responded to recommendations made by Mr. Ruland, first by providing the operators of the wastewater treatment plant that receives landfill leachate with notice of the presence of 1,4-dioxane and NDMA in the leachate. WMC will also provide area municipalities with a copy of the map delineating the CAZ for inclusion in land use planning and other related documents, once the CAZ is approved.

#### Conclusion on Issue 1

[320] In summary, The Tribunal finds that there are gaps in understanding the hydrogeology of the Site and the extent of leachate contamination, which must still be addressed. Consequently, the Tribunal finds that additional investigations are needed and, therefore, further amendments should be made to the ECA in respect of the EMP and the contingency plans.

[321] Therefore, the Tribunal finds that the amendments set out above should be made to the ECA conditions that are the subject of this appeal. The Tribunal notes that the proposed revised EMP shall be implemented, subject to the modifications resulting from this decision, on an interim basis. Once the MOECC determines that the delineation of the CAZ has been completed, the ECA will be further amended to establish the CAZ and adopt an updated EMP.

[322] The Tribunal agrees with the Director's submission that it is appropriate for the Tribunal to issue these reasons but withhold its final decision in this matter, pending the finalization by the Tribunal of the wording of the ECA conditions and EMP provisions consistent with these reasons. The finalization of the wording will follow receipt of either agreed-upon final wording from the parties or submissions from the parties.

## **Issue 2: What value should be set as a site-specific water quality criterion for 1,4-dioxane**

### *Evidence of CCCTE and the MBQ*

#### Dr. Poh-Gek Forkert

[323] Dr. Forkert holds a Ph.D. in anatomy from the University of Manitoba and is a Professor Emerita of the Department of Biomedical and Molecular Sciences at Queen's University, where she began her career as a professor in 1982. At Queen's, she was cross-appointed to the Department of Pharmacology and Toxicology and the Department of Medicine. Dr. Forkert was qualified to provide opinion evidence in relation to toxic chemicals which cause tissue damage, including cancer.

[324] Dr. Forkert said that 1,4-dioxane, which was first produced in the 1980s, is a synthetic industrial chemical used most widely as a stabilizer and corrosion inhibitor for 1,1,1-trichloroethane, a degreasing solvent, and is used in a large number of industrial and commercial processes, including textile processing, cosmetics, shampoos,



deodorants, dyes, paints, pesticides, foods and pharmaceuticals. She stated that 1,4-dioxane is found in ambient air, surface water and groundwater to a limited extent, and more commonly in wastewater, landfill leachate and landfill gas. Dr. Forkert said that 1,4-dioxane is a persistent environmental contaminant that is completely miscible in water (i.e. forms a homogenous mixture), highly mobile, stable in water and does not break down. She noted that 1,4-dioxane migrates rapidly in groundwater ahead of other contaminants, does not volatilize (i.e. evaporate or disperse in vapour) rapidly from surface waterbodies, does not adhere to soil particles and may move rapidly from soil to groundwater.

[325] Dr. Forkert stated that while exposure to 1,4-dioxane may occur through the inhalation of vapours, ingestion of contaminated food and water, or dermal contact, the primary exposure routes leading to 1,4-dioxane toxicity are ingestion of contaminated drinking water and inhalation, including inhalation of water used for showering or bathing. Dr. Forkert testified that, in evaluating exposure to 1,4-dioxane and setting guidelines for exposure levels, one should take into account not only drinking water but also exposures through bathing, showering and ingesting food. She indicated that, as a result, the guideline for drinking water should be kept as low as possible to minimize human exposure.

[326] It was Dr. Forkert's evidence that 1,4-dioxane is readily absorbed through the lungs, skin and gastrointestinal tract, and rapidly and uniformly distributed in lung, liver, kidney, spleen, colon and skeletal muscle. She stated the primary non-cancer health effects of 1,4-dioxane are liver and kidney toxicities, noting that occupational exposure resulted in liver and kidney damage. She further addressed the cancer health effects of 1,4-dioxane, stating that various agencies have classified it as "possibly", "likely", and "reasonably anticipated to be" carcinogenic to humans.

[327] Dr. Forkert stated that young children and individuals with low enzyme levels may be more susceptible than adults to 1,4-dioxane-induced toxicity due to a lack of capacity to metabolize the chemical, and should be taken into account in any risk

assessment. She testified that there is no direct evidence to demonstrate that 1,4-dioxane causes more severe injury in children, but said that once there is a suggestion that children may be more susceptible, they should be protected until there is evidence to the contrary.

[328] Dr. Forkert described the three stages of cancer development in humans: initiation, in which deoxyribonucleic acid (“DNA”) is damaged or altered resulting in mutation of the cell; promotion, in which the mutated cell that has been initiated is stimulated to grow; and progression, in which the cell that has been promoted and grown from the mutated cell progresses to tumours that may become malignant. She noted that evidence suggests that 1,4-dioxane does not initiate the formation of tumours (and is therefore not considered genotoxic) but is a strong promoter of tumour growth.

[329] Dr. Forkert observed that there is some debate as to whether 1,4-dioxane causes cancer by way of a linear or threshold mode of action (“MOA”), explaining that: with a linear MOA, the risk decreases in a linear manner as the dose decreases; and with a threshold MOA, as the dose increases, an effect such as cancer is not seen until a high enough concentration, or threshold, is reached. She testified that she concurs with the linear approach to 1,4-dioxane taken by the Integrated Risk Information System (“IRIS”) database maintained by the United States Environmental Protection Agency (“USEPA”), which provides science-based human health assessments of the effects of exposure to environmental contaminants. The most recent IRIS document on 1,4-dioxane, updated October 31, 2014, states that:

The available evidence in support of the hypothesized MOAs for 1,4-dioxane is not conclusive. In the absence of a MOA(s) for the observed tumor types associated with exposure to 1,4-dioxane, a linear low-dose extrapolation approach was used to estimate human carcinogenic risk associated with 1,4-dioxane exposure.

[330] Dr. Forkert noted that the linear versus threshold MOA debate has been ongoing for decades, not just for 1,4-dioxane but for all chemicals. She said that the way in

which chemicals cause cancer is not fully understood and that it is difficult to ascertain a threshold below which a cancer causing agent will have no impact on humans.

[331] Dr. Forkert stated that the most recent IRIS document has defined specific theoretical lifetime cancer risk levels for 1,4-dioxane at various drinking water concentrations as follows: a risk level of 1 in 10,000, where the lower bound on concentration estimate is 35 µg/L; a risk level of 1 in 100,000 where the lower bound on concentration estimate is 3.5 µg/L; and a risk level of 1 in 1,000,000 (also stated below as  $1 \times 10^{-6}$ ) where the lower bound on concentration estimate is 0.35 µg/L. She indicated that the unit risk and concentration estimates assume water consumption of 2 litres per day (“L/day”) by a 70 kilogram (“kg”) human.

[332] Dr. Forkert stated that a number of US states have developed limits, standards and guidelines for 1,4-dioxane in drinking water and groundwater on the basis of the IRIS document. She cited examples from a number of states (with corresponding lifetime cancer risks provided for certain states, in parentheses), including: a 1 µg/L drinking water notification level in California ( $3 \times 10^{-6}$ ); a 3.2 µg/L groundwater quality standard in Colorado ( $1 \times 10^{-6}$ ); a 3 µg/L drinking water action level in Connecticut ( $1 \times 10^{-6}$ ); a 4 µg/L maximum exposure level in Maine; a 0.3 µg/L regulatory limit in Massachusetts ( $1 \times 10^{-6}$ ); a 34 µg/L surface water guideline in Michigan; a 1 µg/L drinking water guidance value in Minnesota; a 3 µg/L ambient groundwater quality standard in New Hampshire ( $1 \times 10^{-6}$ ); a 3 µg/L interim specific groundwater criterion in New Jersey ( $1 \times 10^{-6}$ ); a 7 µg/L groundwater quality criteria in Washington ( $1 \times 10^{-6}$ ); and a 3 µg/L groundwater quality enforcement standard in Wisconsin.

[333] Dr. Forkert noted that the provincial government has not established an ODWQS for 1,4-dioxane in Ontario Regulation (“O. Reg.”) 169/03, which sets out such standards under the *Safe Drinking Water Act* (“SDWA”). She indicated that Health Canada (“HC”) issued a drinking water guidance value (“DWGV”) of 30 µg/L for 1,4-dioxane in a document dated August 23, 2005, in response to a request from the MOECC, but did not include a cancer risk level for the guidance value. Dr. Forkert stated that, in issuing

the guidance value, HC noted that the value was established based on the scientific information available at the time and not on thorough research of all available studies. She also testified that a risk level of 1 in 100,000 was commonly used at that time, but that a risk level of one in 1,000,000 is currently regarded as an acceptable risk. In her opinion, the 2005 guidance value is outdated and should be updated.

[334] With respect to an updated memorandum on 1,4-dioxane prepared by Dr. Satish Deshpande of the MOECC in January 2014, Dr. Forkert noted that it cited a 2005 World Health Organization (“WHO”) drinking water guidance level for 1,4-dioxane of 50 µg/L, for a cancer risk level of 1 in 100,000. Dr. Forkert addressed differences in the development of the WHO guidance level, noting for example that it assumes an individual body weight of 60 kg, as opposed to 70 kg, and daily water consumption of 1 L/day, as opposed to 2 L/day, and stated that changing these critical parameters had resulted in different guidelines.

[335] Dr. Forkert pointed out that the January 2014 memorandum did not cite the 2013 IRIS document that provided for a level of 0.35 µg/L for a lifetime cancer risk of 1 in 1,000,000. In her opinion, a comprehensive review of data from the last decade is required, as well as a re-evaluation of current approaches to risk assessment of cancer and non-cancer effects.

[336] Dr. Forkert directed the Tribunal to a letter from HC to the MOECC’s Standards Development Branch, dated February 5, 2009, which provided clarification of HC’s target cancer risk in soil, water and air standards. HC stated that:

For drinking water guidelines, Maximum Acceptable Concentrations (MACs) for carcinogens are set as close to zero as reasonably practicable. The guideline for a carcinogen is normally established at a level at which the increased cancer risk is “essentially negligible” when a person is exposed at that level in drinking water over a lifetime. In the context of drinking water guidelines, Health Canada has defined this term as a range from one new cancer above background levels per 100 000 people to one new cancer above background levels per 1 million people (i.e.,  $10^{-5}$ - $10^{-6}$ ). Where exposure to a carcinogen is limited to drinking water, then a target risk of  $10^{-5}$  would be acceptable, whereas in

cases where exposure from other media (e.g., food, air, soil, consumer products) is significant, the target cancer risk associated with the MAC should be less than or equal to  $10^{-6}$ .

[337] Regarding Dr. Michael Dourson's proposed limit of 350 µg/L, Dr. Forkert testified that 350 µg/L would not be protective of public health and would not even be consistent with HC's guidance value of 30 µg/L. She provided her opinion that exposure to a carcinogen should be as close to zero as is achievable. Dr. Forkert further testified that 1,4-dioxane, while the indicator chemical, is not the only chemical of concern in the leachate and it may interact and metabolize with many other toxic chemicals, resulting in additive effects on health. She also noted that carcinogens produce irreversible effects that accumulate and that safe threshold levels do not exist for carcinogens, so that exposure levels should be as low as possible.

[338] In summary, it was Dr. Forkert's recommendation that the guidance value for 1,4-dioxane in the vicinity of the Site be set at 3.0 µg/L for a lifetime cancer risk of 1 in 1,000,000. She noted that, based on this value, the RUL for the site would be calculated at 0.75 µg/L but due to technical testing limitations, would be detectable only at 1 µg/L. She stated that this would be the most precautionary and protective RUL.

#### *Evidence of the MBQ*

#### Kevin Shipley

[339] Mr. Shipley, on the basis of his experience as a QPRA, stated that the adoption of a compliance standard of 30 µg/L for 1,4-dioxane in groundwater is inappropriate for the purposes of the EMP. He noted that multiple jurisdictions in the United States have identified drinking water standards for 1,4-dioxane in the order of 3 µg/L. He said that, as a QPRA, it would be an appropriately conservative approach to select a similar drinking water standard for use at the Site, with the corresponding RUL being the detection limit for 1,4-dioxane, which is typically 1 µg/L.

*Evidence of WMC*

Dr. Michael Dourson

[340] Dr. Dourson has a Ph.D. in toxicology from the University of Cincinnati and has practised in the field of toxicology for approximately 30 years, including time spent in leadership roles with the USEPA. He is currently President and founder of Toxicology Excellence for Risk Assessment (“TERA”), a non-profit corporation that uses toxicity data in risk assessment. Dr. Dourson was qualified to provide opinion evidence as a toxicologist specialized in risk assessment of chemical substances.

[341] Dr. Dourson noted the relevant potential exposure sources of water, air, soil, food and consumer products, and the potential pathways of ingestion of water, dermal contact with consumer products, water used in bathing and inhaled air. He also agreed with several aspects of Dr. Forkert’s evidence, including her statements that young children and individuals with low enzyme levels may have enhanced susceptibility to 1,4-dioxane toxicity. He stated that any risk assessment value needs to address sensitive subgroups. Dr. Dourson characterized 1,4-dioxane as a simple chemical that is not very toxic and which the body can metabolize easily and excrete. He said that 1,4-dioxane causes damage when the amount taken in exceeds the body’s ability to metabolize it, which may lead to liver and nasal tumours in particular.

[342] Dr. Dourson referred the Tribunal to a 2014 paper published in the journal *Regulatory Toxicology and Pharmacology*, entitled “Mode of action analysis for liver tumours from oral 1,4-dioxane exposures and evidence-based dose response assessment”, of which he was lead author along with several other authors (“Dourson paper”). Under cross-examination, he acknowledged that he has been on the editorial board of *Regulatory Toxicology and Pharmacology* since approximately 1995.

[343] The Dourson paper reported on a reread of mouse liver slides from a 1978 National Cancer Institute (“NCI”) study on the effects of 1,4-dioxane. The Dourson

paper also evaluated data on nasal tumours. The reread identified dose-related changes in the liver and found that 1,4-dioxane did not cause point mutations, DNA repair or initiation, but did appear to promote tumours and stimulate DNA synthesis. The Dourson paper concluded that the weight of the evidence suggests that 1,4-dioxane causes liver tumours in rats and mice through cytotoxicity followed by regenerative hyperplasia. Dr. Dourson said that, in relation to 1,4-dioxane, liver tumours appear with the most frequency and severity.

[344] Dr. Dourson testified that the 1978 NCI study looked only for tumours, but the recent reread of the slides looked for other kinds of toxicity. He said that the reread found other toxicity that suggested conclusively that non-cancer toxicity occurred before the tumours, indicating a threshold MOA. On this basis, Dr. Dourson provided his opinion that 1,4-dioxane is a carcinogen with a threshold MOA. He stated that this means that a certain amount of 1,4-dioxane must be present in the body in order to stimulate the process that initiates formation of a tumour, and, below that threshold, the enzymes are not saturated and 1,4-dioxane is capable of being metabolized. He testified that if the amount of 1,4-dioxane in the body is metabolized and does not exceed the threshold, there is no tumour formation and no cancer risk. The Dourson paper stated that human environmental exposures to 1,4-dioxane are unlikely to approach doses that saturate metabolizing enzymes and produce liver and nasal tumors in rats. It went on to note that the nasal tumour response is not as severe as for liver, and that

since any assessment based on liver effects would clearly be protective of nasal effects and tumors evoked in both organs appear to have the same regenerative hyperplasia MOA, we did not further analyze these tumors.

[345] The Dourson paper proposed a reference dose approach to the assessment of 1,4-dioxane toxicity. Dr. Dourson explained that a reference dose is an estimate, with some uncertainty, of daily exposure to humans (including sensitive populations) that is likely not to have deleterious effects. The Dourson paper proposed a reference dose of 0.05 milligrams per kilogram per day (“mg/kg day”). Dr. Dourson testified that this would

protect for both cancer and non-cancer effects. He stated that this value had undergone a peer review by the referees of the journal in which it was published, as well as independent quality assurance.

[346] Based on the 0.05 mg/kg day value, the Dourson paper provided a maximum contaminant level goal (“MCLG”) for 1,4-dioxane in drinking water of 350 µg/L. Dr. Dourson said this is the concentration below which there is no cancer risk for daily exposure to 1,4-dioxane, including for sensitive sub-groups. He explained that the USEPA considers the MCLG to be a goal rather than an enforceable standard, and that it is calculated based on relative source contribution, body weight and exposure. Dr. Dourson stated that the MCLG calculation of 350 µg/L for 1,4-dioxane was based on multiplying the reference dose by a determined average lifetime body weight of 70 kg, apportioning the result into different environmental media and dividing the result by a high-end daily lifetime drinking water intake of 2 L/day. He said the MCLG calculation assumed that 20% of exposure to 1,4-dioxane is from drinking water and 80% from other media, and applied an uncertainty factor to protect sensitive subgroups.

[347] In addition to the Dourson paper, Dr. Dourson referred to two Japanese laboratory reports studying 1,4-dioxane in rats and mice from which only a small excerpt had been translated into English. He said that TERA obtained and translated full copies of the studies, which included additional information that contributed to his more comprehensive MOA analysis. He added that representatives of several US states supported TERA’s request for the studies.

[348] Dr. Dourson said that the conclusion that 1,4-dioxane causes cancer by way of a threshold MOA, is consistent with other organizations, including HC. He provided an explanation of how HC reached its value of 30 µg/L, noting that HC included an uncertainty factor of ten for the possibility of carcinogenicity. He said he did not apply such a factor on the basis of the analysis in the Dourson paper. Dr. Dourson stated that that this results in the tenfold difference between the 30 µg/L and 350 µg/L values.



[349] Dr. Dourson noted that the USEPA is the only organization that still adopts the default linear approach for 1,4-dioxane rather than the threshold approach. Dr. Dourson stated that the most recent IRIS document did not consider the findings of the Dourson paper or the translated Japanese studies. Dr. Dourson further stated that the IRIS database includes a large proportion of outdated and incorrect information. He said that incorrect values have recently been uncovered on the IRIS database and he encourages the use of other available sources of toxicological information in addition to IRIS.

[350] Dr. Dourson stated that the IRIS cancer risk levels referred to by Dr. Forkert are upper bounds that maximize the risk to humans, further indicating that the risk levels are likely to be less and may even be zero. Dr. Dourson explained that the lower bound estimates of concentration are all associated with upper bound risk levels, stating that the upper bound on risk is the lower bound on dose. He said that this set of numbers indicates the upper bound risk at the stated concentrations. He added that this is presented in a linear approach and once a substance has been shown to be a threshold carcinogen, there are no risks at these levels. With respect to the US state standards provided by Dr. Forkert, Dr. Dourson indicated that certain states have higher values, such as Michigan and Ohio.

[351] Regarding Dr. Forkert's testimony that 1,4-dioxane may interact with other toxic chemicals, Dr. Dourson stated that there are methods for estimating the risk from chemical mixtures. He said it is necessary to conduct an assessment of 1,4-dioxane unencumbered by other mixtures and then evaluate it together with other chemicals known to be present. With respect to Dr. Forkert's statement that carcinogens produce irreversible effects, Dr. Dourson's response was that while some genotoxic chemicals can cause irreversible effects, other ways that chemicals cause cancer are not irreversible.

*Evidence of the Director*

Dr. Satish Deshpande

[352] Dr. Deshpande holds a Ph.D. in biophysics from the University of Guelph and is employed as a Team Leader with the Water Quality Standards Unit, Standards Development Branch of the MOECC. He has worked in various capacities for the Ontario government since 1999, following post-doctoral work at the University of Toronto and several years as a research associate at the University of Guelph. Dr. Deshpande was qualified to provide opinion evidence as a toxicologist with expertise in risk assessment and drinking water standards.

[353] Dr. Deshpande stated that the ODWQS set limits for microbiological, chemical and radiological parameters that must be met by owners and operators of regulated drinking water systems in Ontario. He said that the provincial government creates or revises a standard through a long complex process that involves consultation with a number of external agencies and partners over many years, including the Federal-Provincial-Territorial Committee on Drinking Water (“FPTCDW”), which publishes and updates Canadian Drinking Water Quality Guidelines (“CDWQGs”) that set a Maximum Acceptable Concentration (“MAC”) for each parameter or substance. Dr. Deshpande described the process for developing a CDWQG, noting that for carcinogenic substances MACs are set as close to zero as reasonably practicable, as described above in the summary of Dr. Forkert’s testimony. He said that once the MOECC decides that a CDWQG is appropriate to adopt as a standard for Ontario, stakeholder and public consultation is undertaken.

[354] Dr. Deshpande noted that there is currently no ODWQS for 1,4-dioxane, although FPTCDW has begun the process of developing a CDWQG and HC staff are evaluating scientific literature concerning exposure to 1,4-dioxane and considering a broad range of interim guidelines. He explained that, where there is no ODWQS or CDWQG for a contaminant, the MOECC consults HC to request a DWGV based on a

review of the best available science to provide a conservative guidance value. He added that the MOECC then reviews the DWGV to ensure its approach is consistent with ministry policies.

[355] Dr. Deshpande stated that in 2005, a regional municipality in Ontario found 1,4-dioxane in one of its groundwater aquifers and asked the MOECC to provide a value for which it would need to treat the water to continue to use the aquifer. He said that at the MOECC's request, HC provided a DWGV in the 2005 document referred to above, noting that it took approximately six to eight weeks to prepare that document. Dr. Deshpande testified that a DWGV does not undergo public consultation as a CDWQG does and is based on a review of the most readily available scientific literature, going back only five years.

[356] It was Dr. Deshpande's evidence that the DWGV for 1,4-dioxane is a conservative limit calculated on the basis of a "no observable adverse effect limit" with the following safety and uncertainty factors applied: a factor of 10 each to account for inter- and intra-species difference; a factor of 10 to account for the possibility of carcinogenicity; and a factor of 3 to account for the limitations in the toxicological database. Dr. Deshpande further noted that the calculation of the DWGV applies an allocation factor of 20% to exposure from drinking water and the remaining 80% to other environmental media such as food, air, soil and consumer products. He stated that it is unlikely that the ODWQS for 1,4-dioxane, once developed, will be more conservative than the DWGV because the risk assessment for the DWGV is very conservative and takes a precautionary approach to protect the public where there has not yet been a full scientific review.

[357] Dr. Deshpande testified that HC adopted a threshold approach to MOA, based on the studies cited in the 2005 memorandum. After being contacted by Mr. Stephenson about a rationale for the use of the DWGV for 1,4-dioxane at the Site, Dr. Deshpande said he prepared a memorandum dated January 8, 2014, which provided his opinion that HC's DWGV of 30 µg/L remains scientifically supportable and

represents the best assessment at that time, and that the application of Guideline B-7 will result in a RUL of 7.5 µg/L, further reducing the risk. He noted that the WHO drinking water quality guidance level of 50 µg/L for 1,4-dioxane, which was used in the MOECC's Brownfields Regulation (O. Reg. 153/04) for groundwater site condition standards, stating that this value was of the same magnitude as HC's DWGV.

[358] Regarding his January 8, 2014 memorandum to Mr. Stephenson, Dr. Deshpande noted his discussion regarding the screening level of 0.67 µg/L in tap water for 1,4-dioxane, published in the USEPA 2013 Fact Sheet on 1,4-dioxane. He stated that this screening level could not be considered an enforceable drinking water value, noting that the USEPA has not published a MCLG or developed an enforceable maximum contaminant level for 1,4-dioxane at this time. He also stated in this memorandum that the USEPA's assessment is more stringent than supported by the science.

[359] Dr. Deshpande agreed with Dr. Forkert's description of the applications of 1,4-dioxane but differed on other aspects of her testimony. Regarding susceptible populations, Dr. Deshpande said that possible effects are hypothesized, citing the USEPA's assessment that there is no direct evidence to establish that certain populations and life stages may be susceptible to 1,4-dioxane. He also stated that many of the numbers provided in Dr. Forkert's evidence on standards and guidelines for 1,4-dioxane are for groundwater rather than drinking water, and that the guidance values corresponding to a lifetime risk of 1 in 1,000,000 ( $1 \times 10^{-6}$ ) range from 0.3 to 7 µg/L. Dr. Deshpande said he had looked into the Colorado value and found that it was a groundwater cleanup standard rather than a drinking water regulation.

[360] Dr. Deshpande noted that HC has defined "essentially negligible" as a range from one new cancer above background levels per 100,000 people to one new cancer above background levels per 1,000,000 people, meaning that the lifetime risk levels set out in Dr. Forkert's evidence correspond to this "essentially negligible" risk range. He stated that the Director's proposed RUL of 7.5 µg/L is just slightly above the State of Washington's groundwater quality criteria of 7 µg/L, cited by Dr. Forkert as having a 1 in

1,000,000 cancer risk range, commenting that a groundwater limit would be akin to a RUL. In cross-examination, Dr. Deshpande agreed that where there is potential for multi-media exposure to a carcinogen from drinking water, food, soil, air or consumer products, the lifetime cancer risk level of 1 in 1,000,000 should be used in a drinking water guideline.

[361] Dr. Deshpande noted the implication in the Dourson paper that 1,4-dioxane is a threshold carcinogen and said that this supports HC's DWGV and threshold approach. He acknowledged under cross-examination that the lifetime cancer risk levels provided by Dr. Forkert seem to be based on the assumption that the 1,4-dioxane MOA operates in a linear fashion, and further acknowledged that if 1,4-dioxane is a threshold carcinogen, the lifetime cancer risk level figures would not mean anything. Dr. Deshpande further agreed that Dr. Dourson's threshold approach, based on the more reliable recent reread of the 1978 mouse liver slides, is appropriate if Dr. Dourson is correct that the liver is the more sensitive endpoint. At the same time, Dr. Deshpande also acknowledged in cross-examination that the Dourson paper's theory had not been confirmed or corroborated, and the ongoing debate as to whether 1,4-dioxane has a linear or threshold MOA has not been resolved.

[362] However, Dr. Deshpande testified that he was not ready to accept Dr. Dourson's proposed MCLG of 350 µg/L for 1,4-dioxane but continued to prefer the HC DWGV of 30 µg/L, noting that there are other considerations in establishing a drinking water standard such as odour and taste. Under cross-examination, Dr. Deshpande testified that, even if 1,4-dioxane appears to be a threshold carcinogen, he would maintain an uncertainty factor of ten to account for the possibility of carcinogenicity in calculating the DWGL in order to build the precautionary principle into the standard. He also stated, however, that he would be open to removing the current uncertainty factor of three for the limitations in the toxicological database, which would result in a potential value of 90 µg/L.

*Submissions of CCCTE*

[363] CCCTE notes that the parties agree that 1,4-dioxane is the best leachate indicator parameter for the Site and that a site-specific numerical limit for 1,4-dioxane should be established. It submits that the Tribunal should establish a site-specific water quality criterion for 1,4-dioxane of 3 µg/L, resulting in a RUL of 1 µg/L. CCCTE asserts that its proposed limit would be precautionary in nature and clearly protective of human health in comparison with the higher limits proposed by the Director and WMC. It further asserts that its proposed limit is practical, commercially feasible and already in use at the Site, and is supported by the hydrogeological evidence of CCCTE and the MBQ.

[364] CCCTE submits that the ingestion and inhalation of 1,4-dioxane is likely to have occurred. As an example, CCCTE notes that Andrew Martin and his family used water from a domestic well contaminated by Landfill leachate for a number of years prior to whole house water being installed after testing found their well to be contaminated by 1,4-dioxane at a concentration of 9.1 µg/L.

[365] CCCTE asserts that it is not necessary for the Tribunal to resolve the scientific debate on the MOA of 1,4-dioxane in order to adjudicate this appeal, but rather to set a site-specific water quality criterion for 1,4-dioxane that is protective and precautionary in light of the uncertainty about the MOA. CCCTE submits that the Tribunal should prefer the linear MOA approach in the IRIS document over Dr. Dourson's threshold MOA hypothesis for the following reasons:

- IRIS is comprehensive, constantly updated and widely reviewed by the public, scientists and regulators while the Dourson paper received limited peer review before being published in a journal last year;
- the Dourson paper did not involve the collection or analysis of new data or laboratory-based research, but reread certain mouse slides from a 1978 National Cancer Institute study;

- the results of this reread have not undergone any agency or public review;
- the data underpinning the Dourson paper have not been published in a peer-reviewed journal;
- the Dourson paper focused only on liver tumours and did not address other tumour types associated with exposure to 1,4-dioxane;
- it is unknown whether the 1,4-dioxane MOA hypothesized by Dr. Dourson for liver tumours is the same MOA for other tumour types;
- Dr. Dourson's MOA hypothesis remains under debate, requires further study and has not been confirmed by other independent scientific research; and
- the Dourson paper has not been widely accepted by other researchers or regulators to date.

[366] Based on these considerations, CCCTE submits that the Tribunal should not accept Dr. Dourson's evidence that a limit of 350 µg/L for 1,4-dioxane in water would be sufficient to protect human health. It notes that Dr. Deshpande did not endorse or support this value in this testimony, and observes that the 350 µg/L limit would be a sevenfold increase of the WHO guideline and a tenfold increase of the HC guidance value. CCCTE observes that WMC is not proposing a limit of 350 µg/L and that Dr. Dourson did not know of any jurisdiction that has set or propose such a limit.

[367] CCCTE asserts that the Tribunal should look to the cancer risk estimates for various concentrations of 1,4-dioxane in drinking water set out in the IRIS document in determining the limit. In particular, CCCTE states that the IRIS document indicates that the concentration of 1,4-dioxane in drinking water should not exceed 0.35 µg/L in order to achieve a risk level of 1 in 1,000,000. CCCTE submits that where there is multi-media exposure to toxic chemicals, the target cancer risk level should be 1 in 1,000,000. It notes that the 3 µg/L limit it proposes falls within the range of 1,4-dioxane levels established by leading US jurisdictions.

[368] With respect to the 2005 HC memorandum on 1,4-dioxane, CCCTE submits that it was generated in a matter of weeks, not subject to public consultation or review and

not updated since 2005. It further submits that the 2005 HC memorandum was not based on a thorough review of all available studies at the time and is now superseded by the current conclusions in the IRIS document. CCCTE notes that the 2005 HC memorandum did not specify which target cancer risk was used to derive the recommended guidance value of 30 µg/L but assumes that it was 1 in 100,000. Regarding the 2005 WHO guidance level, CCCTE states that it is out of date and superseded by the more recent IRIS information, and that it is based on significantly different assumptions concerning body weight and water intake.

[369] CCCTE submits that WMC's recommended compliance limit for 1,4-dioxane of 30 µg/L is unreasonable and unacceptable, and should be rejected for the following reasons: the term "compliance limit" is not used in Guideline B-7 or the *EPA*; allowing 1,4-dioxane concentrations of up to 30 µg/L is inconsistent with HC's policy of setting MACs as close to zero as reasonably practicable; WMC has not specified the cancer risk consequences of its recommended limit; and using a limit of 30 µg/L would mean that WMC would not be required to establish a CAZ in relation to 1,4-dioxane.

[370] Based on the evidence that 1,4-dioxane exposure can occur through ingestion of drinking water, inhalation and dermal contact when showering or bathing and from food and personal care products, CCCTE asserts that the appropriate target cancer risk level to apply is 1 in 1,000,000, resulting in a drinking water limit of 3 µg/L and a RUL of 1.0 µg/L. CCCTE provides a comparative chart of the different numerical limits recommended by the parties for 1,4-dioxane in support of this submission.

[371] CCCTE submits that setting the drinking water limit at 3 µg/L is precautionary because 1,4-dioxane is only one of numerous toxic and carcinogenic chemicals known to be contained within landfill leachate, which may interact with one another in synergistic manner, resulting in human health risk. CCCTE states that Dr. Forkert was not cross-examined on her opinion evidence on the issue of synergistic effects and asserts that her evidence stands uncontradicted.



[372] In conclusion, CCCTE submits that if the RUL is set at 1 µg/L, any detection of 1,4-dioxane in any CAZ boundary well will indicate that Landfill leachate has arrived in the groundwater, that there is potential for adverse impacts to human health or the environment and that PNP provisions and contingency planning requirements should be triggered.

*Submissions of the MBQ*

[373] The MBQ adopt the expert evidence of Dr. Forkert and recommends a drinking water standard of 3 µg/L for 1,4-dioxane at the Site, and a RUL of 0.75 µg/L, noting that for practical reasons the RUL should be set at 1 µg/L as the achievable detection limit. The MBQ further submit that exposures to 1,4-dioxane should be kept to a level as low as possible at a value consistent with the precautionary principle that is sufficiently protective of public health and safety. The MBQ also rely on the expert opinion of Mr. Shipley, based on his qualification as a QPRA.

[374] The MBQ submit that most recent science in the Dourson paper has not been proven, is speculative in nature and differs dramatically from the more protective standard of 3 µg/L. The MBQ note that multiple jurisdictions in US have set a 3 µg/L limit, which it says is a reasonable value. The MBQ say that Dr. Dourson's recommended standard of 350 µg/L lacks consideration of the precautionary principle.

*Submissions of the Director*

[375] The Director notes that 1,4-dioxane has been included in the EMP as a testing parameter because all parties agree that it is an excellent leachate indicator parameter. He further states that a RUL must be calculated for 1,4-dioxane in order to determine whether the Landfill is in compliance with Guideline B-7, either at the Landfill boundary or at the boundary of the CAZ, if established. The Director submits that, in the absence of an ODWQS for 1,4-dioxane, the federal DWGV of 30 µg/L should be used to calculate a RUL of 7.5 µg/L. He further submits that the Tribunal does not need to set a

site-specific drinking water standard in this case, but need only set a RUL, calculated based on an appropriate drinking water standard.

[376] The Director asserts that the DWGV of 30 µg/L for 1,4-dioxane is based on HC's determination in 2005 that it is a threshold carcinogen, which is supported by Dr. Dourson's recent research. He submits that the 30 µg/L value is a conservative standard developed using extra uncertainty factors and, therefore, protective of human health and reflective of the precautionary approach. The Director notes that when a permanent ODWQS is set, it is often higher in concentration and less strict than a DWGV because some of safety factors are no longer required because far more conservatism goes into developing the DWGV. He states that the DWGV currently in place was developed through the MOECC standard setting process and should be applied accordingly to result in an appropriate RUL of 7.5 µg/L.

[377] In response to CCCTE's submission that the Tribunal should adopt a drinking water standard of 3 µg/L, resulting in a RUL of 0.75 µg/L (or 1 µg/L based on the detection limit), the Director says that this position is based on information in the IRIS document, which is not the only authoritative source. He notes that it is within HC's jurisdiction to disagree with the authors of the IRIS document, and that Ontario's Standards Development Branch agrees with HC's assessment. The Director observes that Dr. Forkert acknowledged that 1,4-dioxane is non-genotoxic, and asserts that a threshold approach is therefore appropriate.

[378] The Director submits 1,4-dioxane standards in different US states, put forward by Dr. Forkert, are likely not drinking water standards based on their names. He notes that Dr. Forkert did not outline the specific meaning of each of these standards in their regulatory context, and says that it is important to know this context in considering whether to adopt them. The Director further submits that, based on their names, these are groundwater standards that are more akin to a RUL than a drinking water standard. Therefore, the Director asserts that it does not make sense to apply the 25% safety

factor set out in the B-7-1 procedure for calculating a RUL to groundwater standards, as it would result in applying the 25% safety factor twice.

[379] The Director notes that Dr. Forkert was qualified as an expert in toxic chemicals that cause tissue damage, including cancer, but not as an expert in drinking water standards. He maintains that her lack of experience with standards is evident in her reference to the chart in the IRIS document, which she said indicated the lower bound on concentration estimate correlated to cancer risk levels. The Director asserts that the lower bound reflects the results of the most conservative study, noting the evidence of Dr. Dourson who was involved in establishing the IRIS database.

[380] The Director observes that the only witness to be qualified as an expert in drinking water standards was Dr. Deshpande, who stated that there is little difference between a RUL of 7.5 µg/L and the range of 3 to 7 µg/L standards provided by Dr. Forkert. The Director also notes that Dr. Deshpande did not endorse Dr. Dourson's proposed drinking water standard of 350 µg/L, but pointed out that the Dourson paper does not take into account considerations such as treatment achievability, odour and taste.

[381] The Director submits that when the DWGV for 1,4-dioxane is finalized and becomes an ODWQS, the additional safety factor of 10 will likely be removed and the resulting standard may be 300 µg/L, which would be close to Dr. Dourson's proposal. He says, however, that the safety factor should continue to apply until a final ODWQS is set.

[382] The Director asserts that the precautionary approach is inherently incorporated into the standard setting process used by HC and the MOECC. He also notes that the precautionary approach does not mean simply finding the strictest standard from another jurisdiction and applying it in Ontario. The Director submits that the Tribunal should render its decision in accordance with the standard setting process followed in Ontario.

[383] Regarding CCCTE's argument that the presence of many other chemicals in the Landfill leachate justify the RUL being set at 1 µg/L on a precautionary basis, the Director submits that this position ignores the following factors: it is standard MOECC policy to sample and test for particular parameters known to be good leachate indicators to ascertain whether leachate is present; it is not practical to test for all potential substances and not possible for many that have no accredited testing methodology; 1,4-dioxane is an excellent indicator that should provide an early warning system and one would not expect many other substances to be present when it is first detected; and setting the RUL conservatively at 25% of the ODWQS ensures action can be taken before there is any significant effect on human health and minimizes the possibility of any synergistic effects.

[384] Stating that there is no reason to set the RUL for 1,4-dioxane differently than for any other parameter, the Director submits that the EMP should be amended to reflect an RUL of 7.5 µg/L and recommends that the Tribunal add conditions to the ECA to ensure that this value is used to determine compliance with the MOECC's Guideline B-7.

#### *Submissions of WMC*

[385] WMC proposes that a site-specific "compliance standard" of 30 µg/L for 1,4-dioxane should be set for the Site, based on Dr. Dourson's evidence that a concentration of 1,4-dioxane in drinking water of 350 µg/L presents no risk to human health. WMC submits that it would be incorrect for the Tribunal, in setting a site-specific standard for 1,4-dioxane, to prefer Dr. Forkert's evidence, which is based on the IRIS document. WMC asserts that the Tribunal should prefer the recent, credible and relevant information provided by Dr. Dourson.

[386] WMC submits that Dr. Dourson applied adjustment factors taking into account exposure from drinking water and other media to ensure that the MCLG was

conservative and protective of human health, including susceptible populations. WMC, therefore, submits that the Tribunal should disregard Dr. Forkert's evidence that these factors were not considered and that the MCLG is not conservative. WMC further submits that HC used a similar approach to that of Dr. Dourson in calculating its DWGV for 1,4-dioxane, with the main difference being the safety factor of 10 to account for possible carcinogenicity.

[387] WMC asserts that, contrary to CCCTE's assertion, Dr. Deshpande did not refuse to endorse or support Dr. Dourson's MCLG calculation of 350 µg/L but maintained the safety factor of 10 for risk management purposes, stating that the safety factor of 3 to account for the toxicological database limitations would not need to be applied, and otherwise agreed with the MCLG calculation. WMC also notes that Dr. Deshpande agreed that Dr. Dourson's threshold MOA approach is appropriate, if the liver is the most sensitive endpoint. WMC submits that the weight of evidence indicates that 1,4-dioxane is a threshold carcinogen and there is no cancer risk where exposure to 1,4-dioxane occurs in concentrations below the threshold represented by the MCLG. WMC further submits that it is inappropriate to apply upper bound lifetime cancer risks, identified by the USEPA and recommended by Dr. Forkert, to establish an appropriate standard for 1,4-dioxane.

[388] WMC proposes that, instead of calculating a site-specific RUL for 1,4-dioxane based on the MCLG calculated by Dr. Dourson, a compliance limit of 30 µg/L should be used in the EMP and to delineate the CAZ. WMC asserts that a compliance standard of 30 µg/L is protective of human health and has no associated cancer risk, and states that CCCTE's submission that 1,4-dioxane is a non-threshold carcinogen is contrary to the weight of evidence. WMC says that CCCTE's comparison of the cancer risk of its proposed compliance limit and Dr. Dourson's MCLG to the RULs proposed by CCCTE and the Director is misleading and should be given no weight. WMC submits that Dr. Forkert's proposed site-specific drinking water standard of 3 µg/L is no more precautionary or protective of human health than a standard of 30 µg/L or 350 µg/L, asserting that the cancer risk for any of the proposed standards is zero.

[389] Regarding Dr. Forkert's reliance on the IRIS document and limits used by certain US states, WMC submits that: the IRIS does not take into account the most current evidence on the MOA for 1,4-dioxane; no evidence was introduced to demonstrate that the US states with 1,4-dioxane standards conducted independent assessments to confirm the appropriateness of the IRIS standards; and there is concern about the adequacy of the IRIS database in supporting TERA's request for the full Japanese studies.

[390] With respect to the Director's adoption of Dr. Deshpande's evidence that the appropriate drinking water standard is 30 µg/L, WMC observes that the Tribunal is being requested to establish a site-specific standard and not a drinking water standard. WMC submits that, accordingly, Guideline B-7 should not apply to require that a RUL less than the site-specific standard be set. WMC asserts that, if there is no cancer risk at 30 µg/L, the precautionary principle does not require a further reduction to 7.5 µg/L. WMC cites *Greenspace Alliance of Canada's Capital v. Ontario (Director, Ministry of the Environment)*, 2009 CarswellOnt 4533 (Ont. Env. Rev. Trib.), at para. 140, as authority for the propositions that the application of the precautionary principle does not require that there be absolute proof of no harm, and that not every expert must agree on a safe standard. Nevertheless, WMC asserts that a compliance limit of 30 µg/L presents no harm.

[391] In summary, WMC submits that the application of a precautionary approach does not require a site-specific standard for 1,4-dioxane as low as Dr. Forkert's proposal. Instead, WMC says there is sufficient evidence to provide confidence that a compliance standard of 30 µg/L is protective of human health and therefore appropriate. In the alternative, WMC submits that if the Tribunal agrees with the Director on the application of Guideline B-7, the appropriate RUL is 7.5 µg/L, based on the site-specific standard of 30 µg/L proposed by the Director.

*Findings on Issue 2*

[392] As noted in the findings above with respect to Issue 1, the Tribunal finds that a RUL for 1,4-dioxane of 1 µg/L shall be used: to determine the boundaries of the CAZ; to expand the boundaries of the CAZ in the future, if needed; and to act as a trigger for further action to bring the Landfill into compliance with Guideline B-7 and the ECA. While it is necessary for the Tribunal to set a site-specific RUL for 1,4-dioxane for use in monitoring, the Tribunal agrees with the Director that the Tribunal need not set a site-specific drinking water standard in this case. The Tribunal need only set a site-specific RUL, calculated based on the evidence concerning an appropriate drinking water standard. As noted earlier in this decision, the Tribunal finds that a site-specific RUL for 1,4-dioxane of 1 µg/L should be used to monitor contamination from the Landfill. The Tribunal bases this finding on its consideration of the range of expert opinions concerning the appropriate value.

[393] Dr. Deshpande's opinion that the appropriate RUL for 1,4-dioxane is 7.5 µg/L is derived from the DWGV of 30 µg/L provided by HC in 2005, based on treating 1,4-dioxane as a threshold carcinogen. He characterized this as a conservative value, noting that it was calculated by taking into consideration safety and uncertainty factors and by allocating exposure to food, air, soil and consumer products as well as drinking water.

[394] Dr. Forkert recommended a RUL of 1 µg/L for the site, having calculated a RUL of 0.75 µg/L based on a DWGV of 3 µg/L but noting that 1,4-dioxane was only detectable at 1 µg/L. Her opinion was largely grounded on the linear approach to cancer risk from 1,4-dioxane taken in the IRIS database as well as the limits, standards and guidelines for 1,4-dioxane in drinking water and groundwater that have been developed on the basis of the IRIS document. She noted the synergistic interaction of 1,4-dioxane with other toxic and carcinogenic chemicals in leachate.

[395] Based on his recent paper, which concluded that 1,4-dioxane is a carcinogen with a threshold MOA, Dr. Dourson recommended a MCLG for 1,4-dioxane in drinking water of 350 µg/L. On this basis, WMC proposed a compliance limit of 30 µg/L.

[396] The Tribunal does not find Dr. Dourson's recommendation to be of assistance. His opinion is based on a recent re-interpretation of a study, has received limited peer review and not yet received agency or public review. The Tribunal agrees with CCCTE's submissions that Dr. Dourson's MOA hypothesis is not conclusive but requires further study, confirmation by other independent scientific research and acceptance by other researchers and by regulators. The difficult debate concerning whether 1,4-dioxane acts as a carcinogen with linear or threshold MOA remains unresolved.

[397] In adjudicating this appeal, the Tribunal further finds that it is unnecessary for the Tribunal to resolve the scientific debate on whether 1,4-dioxane has a linear or threshold MOA as the matter, which the Tribunal is required to address, is to determine a site-specific RUL within the context of the Landfill Site.

[398] The Tribunal accepts that the 1,4-dioxane standards from several US states, cited by Dr. Forkert, are not necessarily directly comparable to a DWGV or a RUL. These state limits range from a 0.3 µg/L "regulatory limit" to a 34 µg/L "surface water guideline", and their significance is not clear from the evidence, although the Tribunal notes Dr. Deshpande's testimony that a groundwater limit would be akin to a RUL. The majority of these limits are in the 1 to 7 µg/L range and appear to be standards relating to drinking water or groundwater. Dr. Deshpande, who was the only witness qualified as an expert in drinking water standards, testified that there is little difference between a RUL of 7.5 µg/L and the range of 3 to 7 µg/L standards. The Tribunal observes that there is not a great difference between the standards in the 1 to 7 µg/L range and a RUL of 1 µg/L.



[399] The Tribunal received evidence concerning the uncertainty factors that had been applied by HC in determining the DWGV of 30 µg/L, which Dr. Deshpande characterized as conservative and precautionary. The Tribunal also heard evidence on lifetime cancer risk, including Dr. Deshpande's evidence that HC has defined the cancer risk range from 1 in 100,000 to 1 in 1,000,000 as essentially negligible. The Tribunal observes that Dr. Deshpande agreed in cross-examination that the lifetime cancer risk level of 1 in 1,000,000 should be used in a drinking water guideline where there is potential for multi-media exposure to a carcinogen from drinking water, food, soil, air or consumer products. The Tribunal further observes that Dr. Forkert, Dr. Dourson and Dr. Deshpande agreed on the potential exposure sources of water, air, soil, food and consumer products in respect of 1,4-dioxane.

[400] The Tribunal notes the Director's submissions that the precautionary approach is incorporated into the standard setting process and that this does not require an adoption of the strictest standard from another jurisdiction in Ontario. The Tribunal also notes WMC's submission that the application of the precautionary principle does not require absolute proof of harm or expert agreement on a safe standard. However, given the history and the current context of the Landfill Site, the Tribunal finds that the utmost precaution should be used in determining a site-specific RUL for 1,4-dioxane. As discussed in greater detail above in the Tribunal's findings on Issue 1, there continues to be uncertainty about the extent of contamination due to the hydrogeological complexity of the Site.

[401] The Tribunal notes its discussion of the precautionary principle above, under Issue 1, within the context of the continuing scientific uncertainty regarding the hydrogeological conditions at the Landfill, and particularly where and how far the contaminated groundwater will move. Given the adverse impacts that have been experienced by the residents living on Beechwood Road, until there is a full understanding of hydrogeology and extent of contamination in the area of the Site, it is prudent to apply the precautionary principle to ensure the protection of residents living further to the south of the Site and communities living downstream along Marysville

Creek. The most effective way to do so is to adopt a RUL that will produce the most protective approach that will address the Site-specific circumstances of this case. Based on the evidence adduced in this proceeding, a RUL of 1 µg/L for 1,4-dioxane will ensure that this goal will be achieved, as it will result in the establishment of the most protective CAZ.

[402] The Tribunal notes that the practical effect of applying this RUL may not be greatly different than the use of a RUL of 7.5 µg/L. WMC stated in submissions that even if a RUL of 1 µg/L is used, the proposed CAZ is likely sufficient if the results for 1,4-dioxane obtained from the open borehole are confirmed.

[403] The Tribunal further observes that, in the future, the MOECC may establish a different provincial RUL for 1,4-dioxane at such time as a permanent ODWQS is set. By that time, there may be greater certainty respecting the hydrogeological profile of the Site and the contaminant migration and attenuation, which may warrant an amendment to the RUL.

### Conclusion on Issue 2

[404] The Tribunal finds that a RUL for 1,4-dioxane of 1 µg/L should be used: to determine the boundaries of the CAZ: to expand the boundaries of the CAZ in the future, if needed; and as a trigger for further action to bring the Landfill into compliance with the applicable regulatory regime.

**Issue 3: Whether the common law public rights in the environment and the potential for public nuisance should be considered when making decision regarding the ECA and, if so, whether the precautionary principle requires the imposition of more stringent or protective conditions where there may be interference with any public rights in the environment**

*Submissions of NGL*

[405] NGL agrees with the facts as set out by CCCTE and the MBQ and also agrees with the legal position, recommendations and interim conditions advanced by CCCTE. In support of this position, NGL submits that the Tribunal must address the following questions: whether the Director, and by extension the Tribunal, has an obligation to consider the common law, including any common law public rights in the environment and the potential for public nuisance when making decisions regarding an ECA under the *EPA*; and, if so, where there is potential for or uncertainty about interference with public rights in the environment, does the precautionary principle require the Director and the Tribunal to impose more stringent or protective conditions.

[406] NGL argues that the tort of public nuisance involves the unreasonable interference with public rights, including public rights in the environment. NGL submits that the Director issued the ECA without adequately considering public rights to water resources and without imposing appropriately precautionary conditions despite significant uncertainties regarding the extent of contamination caused by the Landfill. NGL observes that the full extent of contamination caused by the Landfill remains uncertain and, in light of this uncertainty and the significance of the Landfill's known impacts, the establishment of protective, precautionary interim conditions are warranted to ensure the appropriate protection of public rights to water resources.

[407] NGL makes its submissions on the basis of the evidence provided by the other parties, noting in particular that: the Director issued the ECA knowing that it was based, in part, on an application supported by deficient documents; the MOECC has been aware that the Landfill is causing contamination of off-site public groundwater resources since at least 2010; WMC has proposed a CAZ to resolve the Landfill's ongoing non-compliance with regulatory requirements; the Landfill has significantly impacted public water resources; and the full extent of impacts to those resources remains unknown. NGL asserts that throughout the years that the Landfill was operated pursuant to MOECC approvals, the common law (including the doctrine of public nuisance and

common law public rights) continued to apply to the Landfill as a parallel system of protection in addition to the regulatory system created by the *EPA*.

[408] NGL submits that Guideline B-7 and Procedure B-7-1 charge the MOECC with public interest obligations, noting that a primary objective of Guideline B-7 is to ensure the conservation of Ontario's groundwater resources and the control of the use of these resources in an effective manner for the public good. NGL says that the conservation of Ontario's groundwater resources is a public interest obligation imposed on the MOECC as part of its mandate to ensure the overall wise management of water resources. NGL asserts that another objective of Guideline B-7 is to ensure that the impact of a disposal facility on the Reasonable Use of neighbouring properties is limited to an amount that would not justify an award for damages at civil law. NGL submits that, where contamination levels do not exceed relevant RULs, the MOECC presumes that impacts from the contamination are insufficient to justify an award of civil damages.

[409] NGL submits that the Director has an obligation to consider common law public rights to the environment when making decisions that potentially affect public resources, including discretionary decisions to issue ECAs and that the Director must consider the potential for public nuisance to interfere with such rights as a result of his decision. NGL asserts that the Tribunal also has a duty to consider potential public nuisance impacts on public rights in the environment on an appeal under s. 139 and s. 145.2 of the *EPA* because the Tribunal is stepping into the shoes of the Director.

[410] Citing *British Columbia v. Canadian Forest Products Limited*, [2004] 2 SCR 74 ("*Canfor*") at para. 74 to 76, NGL submits that the Supreme Court of Canada has: acknowledged that the notion that there are public rights in the environment that reside in the Crown has deep roots in the common law; held that public rights are common law rights shared by all citizens that include rights to access and use certain public resources, such as surface waters; and stated that, by legal convention, ownership of these public rights vests in the Crown. NGL further cites *Canada v. The Sun Diamond*, [1983] FCJ No. 83 (QL) (TD) ("*Sun Diamond*") as authority for the proposition that the

pollution of public surface waters constitutes a public nuisance that interferes with the public's right to use those resources.

[411] NGL asserts that the Tribunal recognized that Ontario's groundwater is a public resource to which there may be a public right of access in *Nestlé Canada Inc. v. Ontario (Ministry of the Environment)* (2013), 76 CELR (3d) 331 (Ont. Env. Rev. Trib.) (*Nestlé*), at para. 49. NGL submits that, at common law, groundwater is a public resource that no one owns, everyone has a right to access, and no one may contaminate. Therefore, NGL characterizes the common law public right to access groundwater as a public right to access uncontaminated groundwater. NGL also cites the decision in *Jackson et al. v. Drury Construction Co. Ltd.* (1974), 4 OR (2d) 735 (CA) ("*Jackson*") as authority for the proposition that everyone has a right of access to groundwater.

[412] NGL submits that common law public rights to water resources are not extinguished by statute. NGL states that, at common law, the right to access and withdraw groundwater is unlimited and citizens may withdraw as much groundwater as they please, even to the detriment of a neighbour. NGL says that while the *Ontario Water Resources Act* ("*OWRA*") imposes a statutory permitting scheme for large water takings, that restriction does not nullify the public right of access with respect to smaller takings or takings for certain domestic purposes, nor does it oust public rights to public resources. Citing *Ryan v. Victoria (City)*, [1999] 1 SCR 201 ("*Ryan*"), at para. 29, NGL asserts that the common law regime of public rights and public nuisance continues to exist parallel to the *EPA* and *OWRA* regulatory regimes. NGL states that nothing in those statutes excludes the continued application of the common law, and that nothing in the *EPA* purports to extinguish common law public rights to water resources.

[413] NGL further submits that Guideline B-7, which applies to decisions about the Reasonable Use of groundwater resources near sources of contamination, explicitly contemplates the continued importance of common law rights under the *EPA* regulatory system, in its statement at p. 92 that "[t]he impact a disposal facility may have on the

reasonable use of neighbouring properties shall be limited to an amount that would not justify an award for damages in a civil law suit.”

[414] NGL asserts that the law of public nuisance protects public rights to water resources against pollution, stating that the Supreme Court of Canada in *Ryan*, at para. 52, defined a public nuisance to include any activity that unreasonably interferes with the public’s interest in questions of health, safety, morality, comfort or convenience, and required that the conduct complained of amount to “an attack upon the rights of the public generally to live their lives unaffected by inconvenience, discomfort or other forms of interference.” NGL says the whether or not a particular activity constitutes a public nuisance is a question of fact, and factors to be considered (set out at para. 53 of *Ryan*) include the inconvenience caused by the activity, the difficulty involved in lessening or avoiding the risk, the utility of the activity, the general practice of others, and the character of the neighbourhood.

[415] NGL submits that the Director has a duty to consider public rights to the environment when making decisions that may potentially affect public resources. In support, NGL cites *Lafarge Canada Inc. v. Ontario (Environmental Review Tribunal)* (2008), 241 OAC 156, at para. 63 to 65 (“*Lafarge*”), at para. 63, in which the Divisional Court upheld the Tribunal’s decision in *Dawber v. Ontario (Ministry of the Environment)* (2007), 28 CELR (3d) 281 (“*Dawber*”) that the common law is “relevant law” as defined in the leave to appeal test in s. 41(a) of the *EBR* and also confirmed that the Director has an obligation to consider the impact of a decision on common law rights where such rights are potentially affected by the decision and could be negated or diminished by a regulatory approval, as set out in *Dawber* at para. 73 to 74.

[416] NGL states that the Tribunal in *Dawber*, at para. 74, held that a reasonable decision would consider the rights that are being diminished to assess whether the detrimental effect on those rights is appropriate and necessary, and in the interests of environmental protection. NGL further notes that the Divisional Court in *Lafarge*, at para. 65, found that where the Director is considering the approval of activity that might

give rise to a nuisance or other tort, “it may be necessary to require more protective and stringent conditions, given the potential for migration of substances off-site.”

[417] While NGL recognizes that these statements were made in the context of s. 41 of the *EBR*, it submits that they nevertheless apply to this appeal for two reasons. First, NGL submits that the leave to appeal test in s. 41 of the *EBR* does not impose any new obligation to consider relevant law and policies when making decisions as the Director and the Tribunal are obliged to do so as a result of general principles of administrative law. Second, NGL submits that if common law rights are “relevant law” for the purposes of assessing the apparent reasonableness of a Director’s decision, they must also be “relevant law” when the Director makes the original decision and when the Tribunal steps into the Director’s shoes to make a decision on an appeal. NGL asserts that, otherwise, the apparent reasonableness of the Director’s decision would be measured against factors that did not need to inform the decision. NGL further asserts, therefore, that common law rights are relevant law that the Director must have regard to when making statutory decisions that are prescribed under the *EBR*.

[418] NGL further submits that, based on the Crown’s *parens patriae* role as guardian of public rights, the Director must have regard to public nuisance, and common law public rights in particular, when making decisions that could affect such rights. NGL cites *Canfor*, at para. 74 to 76, in which the Supreme Court of Canada held: that the Crown, as holder of inalienable public rights, is responsible for their protection under its jurisdiction as *parens patriae*; and that this is an “important jurisdiction that should not be attenuated by a narrow judicial construction.” NGL says that, traditionally, the Crown has discharged its *parens patriae* responsibility to protect public rights through actions for public nuisance and asserts that this responsibility imposes a moral, if not legal, obligation to ensure that public nuisances are remedied as rapidly as possible. NGL argues that the Crown’s *parens patriae* jurisdiction is broad enough to require that the Director, as agent of the Crown, not authorize a public nuisance without due consideration of the common law public rights that may be impacted.

[419] Therefore, NGL asserts that the Crown's role as *parens patriae* required the Director to turn his mind to the potential public nuisance impacts on public rights to water resources before issuing the ECA, and that the Tribunal cannot step into the Director's shoes and substitute its opinion in a way that fails to accord with this *parens patriae* duty. As a result, NGL submits that the Tribunal must consider the potential public nuisance impacts on public rights to water resources when making its decision on this appeal.

[420] In response to the Director's submissions, NGL asserts that the authority to exercise a *parens patriae* role is not limited to the Attorney General, noting that in *Sun Diamond* at p. 21, the clean-up of an oil spill, constituting a public nuisance, by a crown corporation was cited as an example of *parens patriae*. Regarding the question of whether the authority can only be asserted in a superior court of inherent jurisdiction, NGL notes that, in *Sun Diamond*, the Crown asserted its *parens patriae* jurisdiction in the Federal Court, which is not a superior court of inherent jurisdiction, and, at p. 26, the Court cited *parens patriae* as one ground upon which it relied in finding the defendant liable in public nuisance. NGL argues that there is a common law basis for a public right to groundwater and surface water above and beyond those associated with a private landowner, citing *Sun Diamond* at p. 12 and 23, regarding public nuisance in relation to water in areas used by the public for recreation such as swimming, sailing and scuba diving. With respect to the Director's assertion that Ontario has not vested ownership of water, as many other provinces have, NGL notes that in *Sun Diamond*, at p. 25, the defendant was found to be liable even where the affected areas were partly in waters that were not vested in the Federal Crown.

[421] NGL indicates that it is not asserting that the Crown has a duty to sue for compensation in this matter, but says that the *parens patriae* duty is sufficiently broad that the Director must consider the potential common law right to sue when he is making decisions that might affect those rights.



[422] NGL puts forward the definition of the precautionary principle adopted by the Supreme Court of Canada in *Spraytech* at para. 31, that where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. NGL argues that the Director issued the ECA knowing that: the monitoring plans it approved were deficient; public nuisance impacts were likely; further work needed to be done to determine the extent of the impacts; and the plans he accepted on an interim basis were insufficient to address either of those issues.

[423] NGL submits that there is evidence that leachate from the Landfill has interfered with the public right to access and use uncontaminated groundwater, but notes that there is an incomplete evidentiary record so that the full extent of the groundwater contamination, and thus the extent of the interference with this public right, remains uncertain. NGL notes that there is evidence suggesting that surface water resources in the vicinity of the Landfill, which also give rise to public rights, remain at risk of contamination. NGL characterizes the proposed CAZ as a way of permitting what the government deems to be acceptable harm to a public resource.

[424] Acknowledging that the risk of surface water contamination is uncertain, NGL states that the potential impacts to public rights are serious and submits that, where an incomplete evidentiary record leads to uncertainty about whether public rights may be seriously or irreversibly interfered with, the Director ought to take a precautionary approach and either not approve the ECA or impose such conditions as are necessary to protect these rights and minimize the potential for public nuisance impacts. NGL clarifies that is not asking the Tribunal to make any determination with respect to public nuisance. NGL argues that the Tribunal should adopt the more stringent and protective conditions proposed by the CCCTE, based on the evidence of ongoing interference with the public right to groundwater, potential interference with the public right to surface water, and continuing uncertainty with respect to the extent of both.

*Submissions of the Director*

[425] Regarding NGL's argument that the Director and, therefore, the Tribunal must consider the common law and the precautionary principle in making its decision in this appeal, the Director observes that it has already been established that the common law and a precautionary approach are relevant factors in making decisions under the *EPA* and it is therefore unnecessary for the Tribunal to consider the detailed reasoning set out by NGL to reach a conclusion on this point.

[426] As set out above, the Director notes that the precautionary approach is included in the MOECC's SEV and past Tribunal decisions have considered it to be applicable policy that must be considered. He acknowledges that the Divisional Court in *Lafarge* confirmed that common law rights are relevant law to be considered.

[427] However, the Director says that NGL appears to be asking the Tribunal to decide that there are additional legal grounds justifying why common law rights and the precautionary principle are factors that must be taken into account. He submits that, based on the facts in this case, there is no reason for the Tribunal to decide these issues. Furthermore, the Director disagrees with many of NGL's legal arguments and interpretations, and states that the Tribunal need not consider whether there are further legal grounds justifying consideration of the common law in this case given that Guideline B-7 and Procedure B-7-1 explicitly recognize common law rights as a basis for the guideline.

[428] The Director goes on to address NGL's suggestion that a number of specific legal principles also apply, as well as its assertions that the Director is carrying out public interest obligations and that the Crown is charged with the supervision of public rights to water. He states that the Director issues the ECA under the *EPA*, including s. 20.3, 20.6 and 20.7, which allow for the imposition of terms and conditions and for the exercise of his authority in accordance with the purpose of the *EPA* to provide for the protection and conservation of the natural environment. The Director submits that

because Guideline B-7 is issued under the authority of the *OWRA*, the Director's duties must be read in conjunction and a consistent manner with that Act, the purpose of which is "to provide for the conservation, protection and management of Ontario's waters and for their efficient and sustainable use, in order to promote Ontario's long-term environmental, social and economic well-being." The Director adds that, under s. 29 of the *OWRA*, the Minister is granted "supervision of all surface waters and ground waters in Ontario".

[429] The Director says that if the reference to the Director carrying out "public interest obligations" refers to these statutory authorities and duties, it takes no issue with this characterization. However, if NGL is suggesting that the Director is required by common law to exercise a further public interest obligation to protect "public water rights" based on the *parens patriae* principle, he submits that there is no basis in law for this assertion. Citing an article entitled "Ground Water at Common Law" by Alan D. Reid, in *Water law in Canada: The Atlantic Provinces* by G.V. La Forest, the Director submits that there is no independent public right to access and use groundwater at common law, and that the right to access and use both groundwater and surface water is a property right. He contends that these rights, known as the right to percolating water and riparian rights, are exercised by a landowner, not by everyone.

[430] Regarding NGL's submission that groundwater is a public resource that no one owns but everyone has a right to access, the Director asserts that the *Canfor* decision did not decide this matter but instead, after reviewing general principles, indicated that it was possible for the Attorney General of a province to sue for compensation on the basis of public rights. The Director submits that it is not appropriate for the Tribunal to consider these issues in the case at hand, because NGL did not lead specific evidence, in addition to the evidence adduced by CCCTE and MBQ, related to several factors that should be considered in respect of its legal argument, including: whether the authority to exercise a *parens patriae* role is limited to the Attorney General; whether the authority can only be asserted in a Superior court of inherent jurisdiction; whether there is a common law basis for a public right to groundwater and surface water above and

beyond those associated with a private landowner; and whether it is important that Ontario has not vested ownership of water.

[431] The Director disagrees with NGL's assertion that the Tribunal in *Nestlé* recognized that Ontario's groundwater is a public resource to which there may be a public right of access. He argues that in *Nestlé*, the Tribunal clearly indicated that the issue was moot and need not be resolved on the motion that was the subject of the decision. The Director says it appears that NGL is relying upon a brief observation by the Tribunal that groundwater is transient and runs and pools underneath the surface, belonging to no one until captured, and in this sense groundwater is a public resource. He notes that the Tribunal in *Nestlé* stated that "if" groundwater is subject to a public trust, then the common law public right is a right to access it. However, the Director asserts that the Tribunal made no finding in *Nestlé* that groundwater is subject to a public trust, and submits that a more exhaustive and detailed analysis of the history and evolution of the common law as it applies to groundwater would be required to make such a finding. Furthermore, he states that the *Jackson* case, which NGL cites to support the proposition that everyone has a right of access to groundwater, indicates that the right is limited to every landowner and not the public at large.

[432] The Director further argues that it is inaccurate for NGL to assert that the CAZ is a way of permitting what the government deems to be acceptable harm to a public resource. He says that in approving a CAZ, the Director is not giving a pre-approval authorizing WMC to contaminate the local groundwater aquifer beyond RULs, but rather is taking a responsive action to address a historic situation that cannot be easily reversed. The Director submits that the purpose of the CAZ is to ensure that harm caused by the unreasonable off-site impacts is minimized by preventing the contaminated water from being used while it naturally attenuates.

[433] The Director states that the use of a CAZ, as set out in Guideline B-7, is a policy decision within the MOECC's authority and discretion, and in issuing Guideline B-7, the MOECC has balanced the costs and benefits of addressing legacy landfill sites in a

manner that serves the best interests of the people of Ontario, consistent with the purposes of the *OWRA*. The Director notes that he has proposed that WMC be required to establish a CAZ, which entails acquiring the property rights, presumably at fair market value, thus compensating neighbouring property owners for their losses. The Director further notes that WMC must also carry out extensive monitoring to ensure that groundwater users are protected until they will be able to use the groundwater again.

[434] The Director submits that NGL's arguments are not supported in law, and need not and should not be decided in this case given that it has already been determined that the common law is relevant law to be considered and Guideline B-7 specifically addresses the common law. The Director adds that, because NGL's arguments were not put forward by CCCTE, little or no evidence was tendered to address this difficult and complex area of law.

#### *Submissions of WMC*

[435] WMC submits that NGL has fundamentally misconstrued the law of public nuisance and its application to the facts before the Tribunal. WMC says that the evidence shows the presence of leachate impacted groundwater beneath the proposed CAZ, which consists of privately owned or controlled lands. WMC asserts that, if there is a cause of action in nuisance, it is a private nuisance and the landowner or occupant of those lands would be the person with that cause of action.

[436] WMC further submits that there is no "public ownership" of the groundwater beneath the proposed CAZ and that the only "right" in respect of such groundwater is where a person appropriates a right of use to such groundwater. WMC says there is no use being made of the groundwater beneath the proposed CAZ, and the only person who may appropriate that use is the landowner or occupant of those lands. WMC contends that because the "public" has not appropriated the right of use of groundwater beneath the proposed CAZ, there can be no public nuisance.

[437] WMC asserts that there is no cause of action in nuisance arising merely by the risk of harm. WMC further maintains that, to the extent that there is a risk of harm arising from a “public” right of use to the groundwater migrating from beneath the proposed CAZ, the Director considers such risk when exercising his or her discretion in accordance with Guideline B-7. With respect to the exercise of the precautionary principle, WMC says that its actions for the purposes of bringing the Landfill into compliance with Guideline B-7, are entirely consistent with the application of the precautionary principle.

### *Findings on Issue 3*

[438] NGL asks the Tribunal to consider: whether it has an obligation to consider the common law, including the tort of public nuisance and common law public rights in the environment, in making decisions regarding an ECA under the *EPA*; and if so whether the precautionary principle requires it to impose more stringent or protective conditions where there is potential for interference with public rights in the environment.

[439] There is no doubt that the precautionary principle is part of the Tribunal’s consideration. It has been considered and applied in past Tribunal decisions, such as *McIntosh*, and it has been applied in the Tribunal’s analysis above. The Tribunal also accepts that common law rights are relevant law to be considered, as confirmed by the Divisional Court in *Lafarge*. This holds true under the *EPA* as well as the *EBR*, which was at issue in *Lafarge*. As the Director points out, Guideline B-7 refers explicitly requires consideration of the common law in providing, at s. 2.0, that the impact a disposal facility may have on the reasonable use of neighbouring properties shall be limited to an amount that would not justify an award for damages in a civil lawsuit.

[440] NGL appears to be requesting that the Tribunal recognize a common law public right to access uncontaminated groundwater and surface water, as well as whether the Director is required by common law to exercise a public interest obligation, beyond his

statutory duties, to protect public water rights based on the *parens patriae* principle. The Tribunal finds, however, that the law is not settled on these questions and, furthermore, that it is not necessary for the Tribunal to make a determination on these questions in deciding this matter.

[441] It should be noted that the Tribunal decision in *Nestlé*, in considering the public trust doctrine, did not make a specific determination that Ontario's groundwater is a public resource to which there may be a public right of access. Instead, the Tribunal stated as follows at para. 49 and 52:

Groundwater is transient. It runs and pools underneath the surface, belonging to no one until captured. In this sense groundwater is a public resource. If it is subject to a public trust, then the common law public right is a right to access groundwater similar to the public right to fish and to navigate navigable waters....

Since the Tribunal has found on other grounds that the proposed settlement and withdrawal are not consistent with the purpose and provisions of the OWRA or in the public interest, the question of the nature and breadth of the public trust doctrine need not be resolved in the context of this motion.

[442] Similarly, in *Canfor*, when addressing the *parens patriae* issue in the context of whether the Crown could sue for compensation as well as injunctive relief, the Supreme Court of Canada, discussed the notion that there are public rights in the environment that reside in the Crown (para. 74) and observed that

this notion of the Crown as the holder of inalienable "public rights" in the environment and certain common resources was accompanied by the procedural right of the Attorney General to sue for their protection representing the Crown as *parens patriae* (para 76).

[443] However, the Court in *Canfor* further stated at para. 81 that, while there seemed to be no legal barrier to the Crown suing, in a proper case, for compensation on account of public nuisance or negligence causing environmental damage to public lands, there were clearly important and novel policy questions raised by such actions. The Court determined, at para. 82 and 83, that *Canfor* was not a proper appeal for the Court to embark on a consideration of "these difficult issues" and proceeded on the basis that

the Crown was entitled in that case to sue as the landowner of the tract of forest at issue.

[444] The Tribunal observes that the precautionary principle, as well as common law rights in the context of Guideline B-7, have been considered in the Tribunal's analysis above. The Tribunal finds that NGL has not provided any persuasive submission that the Tribunal's disposition in this proceeding would be different if the additional legal principles proposed by NGL were accepted and applied by the Tribunal. Again, the Tribunal notes that a common law public right to access uncontaminated groundwater and surface water, and a common law *parens patriae* principle requiring the Director to exercise a public interest obligation to protect public water rights, as put forward by NGL, are not clearly settled at law. The Tribunal finds that NGL has not adequately explained how, in the circumstances of this case, these additional principles would have resulted in different conclusions by the Tribunal given the precautionary measures being ordered by the Tribunal according to the Tribunal's analysis and findings on the voluminous expert evidence adduced in this proceeding.

### Conclusion on Issue 3

[445] The Tribunal finds that, in deciding this matter, it is unnecessary to address and make findings respecting whether there is a common law public right to access uncontaminated groundwater and surface water or a common law requirement that the Director consider the public interest in protecting public water rights, based on the *parens patriae* principle.

**Issue 4: Whether the Tribunal should maintain a further supervisory role in this matter after the wording of the ECA conditions and EMP provisions is finalized**



*Submissions of CCCTE*

[446] CCCTE observes that s. 145.2 of the *EPA* gives the Tribunal the authority to “confirm, alter or revoke the action of the Director that is the subject-matter of the hearing” and to issue orders directing “the Director to take such action as the Tribunal considers the Director should take in accordance with this Act and the regulations, and, for such purposes, the Tribunal may substitute its opinion for that of the Director.”

[447] CCCTE submits that s. 16.1 of the *Statutory Powers Procedure Act* (“*SPPA*”) empowers the Tribunal to make interim decisions or orders and to impose conditions in relation to interim decisions or orders. CCCTE cites the recent decision of the Tribunal in *Gaffney v. Ontario (Director, Ministry of the Environment and Climate Change)*, 2015 CarswellOnt 4704 (“*Gaffney*”), at para. 8-10, in which the Tribunal held that it has jurisdiction under s. 16.1 of the *SPPA* to issue an interim order in the exercise of its broad authority under s. 145.2 of the *EPA*.

[448] CCCTE further submits that the Tribunal should exercise its authority under the *SPPA* and the *EPA* to make a conditional interim decision in this case, rather than a final disposition of all matters under appeal. CCCTE says this would enable the Tribunal to remain seized of the matters under appeal, particularly given the consensus among the parties that additional post-hearing field work, studies, and investigations must be carried out by WMC.

[449] CCCTE cites the decision of the former Environmental Assessment Board (“EAB”) in *Cobourg (Town), Re*, 1989 CarswellOnt 3625 (“*Cobourg*”) at para. 15, 142-144 as authority for its contention that the Tribunal may consider or use phased approaches in lengthy or complex proceedings where it becomes necessary for proponents to obtain further data, information or analysis and periodically report back to the Tribunal. CCCTE states that, in the evolving circumstances of this case, a phased approach is both reasonable and necessary to protect the environment and the public interest, safeguard local residents and communities, and ensure meaningful public

participation and accountability. CCCTE is not aware of any examples of such a phased hearing but notes that this case is unusual in having so many unresolved issues. CCCTE further notes that, while the Director opposes the issuance of an interim decision, he presents no authorities as to why interim relief should be refused.

[450] CCCTE submits that it is not seeking an adjournment but a continuation of the hearing in 2016, if necessary, and is not asking the Tribunal to enforce the ECA or regulate the Landfill in perpetuity. CCCTE asserts that not all evidence has been obtained or presented yet, noting that the Director concedes that more fieldwork and analysis is needed. Therefore, CCCTE submits that a two phase hearing is necessary to ensure that issues at the Landfill are dealt with in a timely manner, claiming that the MOECC has been ineffective in addressing problems at the Landfill. CCCTE maintains that the contamination issues have begun to be addressed because of the ongoing involvement of CCCTE and the MBQ.

[451] In summary, it is CCCTE's position that the proposed EMP and contingency plans should only be amended and approved by the Tribunal on an interim basis. CCCTE submits that WMC should complete and report on further investigative work and identify any additional changes needed to finalize the EMP and contingency plans. If the parties are unable to agree on the finalized content of the EMP and contingency planning requirements, CCCTE submits that the parties should return to this Tribunal panel in 2016 for a focused hearing and decision.

#### *Submissions of the MBQ*

[452] The MBQ support CCCTE's submission that the Tribunal should take a phased approach in its decision, noting that this has already occurred in this matter due to the settlement of certain issues and the Tribunal's April 26, 2013 interim decision ordering the Director to amend the ECA. The MBQ cite the recent Ontario Court of Appeal decision in *Prince Edward County Field Naturalists v. Ostrander Point GP Inc.*, 2015 ONCA 269 (CanLII), which discussed the Tribunal's approach to the remedy in that

instance, and states that the Tribunal must ensure that a fair process is crafted in a complex hearing in which not all information is known and new evidence may be admitted. The MBQ urge the Tribunal to take such an approach in this case.

*Submissions of the Director*

[453] The Director strongly objects to the CCCTE's proposal that the Tribunal make a conditional interim decision in this matter rather than a final disposition of the matters under appeal. He characterizes this request as asking the Tribunal to unilaterally implement a staged or bifurcated hearing, with the Tribunal remaining seized of the matter despite having already held a hearing on the merits of the matters under appeal. The Director asserts that, if the Tribunal were to do this, it would supplant the statutory authority of the Director and the MOECC to exercise their decision-making powers and carry out their enforcement functions.

[454] The Director says that the scope of this appeal is to determine the appropriate monitoring conditions for the Landfill at this point in time, and argues that there is no legal authority for the Tribunal to retain continuing regulatory oversight over the Landfill. He asserts that doing so would be beyond the scope of the CCCTE's appeal, and would oust the MOECC's jurisdiction. The Director submits that, in *Cobourg*, the EAB did not make a conditional interim decision, as the CCCTE is requesting in this case, but appears to have granted an adjournment for four months on consent (para. 15 and 83). He says that, having proceeded with a hearing on the merits in this matter, CCCTE is now seeking an adjournment of the hearing after the fact.

[455] The Director notes that in *Cobourg* at para. 142-144, the EAB refers to a "staged approval", submitting that a staged approval is a final decision that only permits certain activities to occur once certain conditions are met, and that it is not necessary to return to the adjudicative body to ascertain whether the conditions are met because that decision would be made by the Director. He argues that a staged approval is not

equivalent to a staged hearing as proposed by CCCTE and that the EAB rejected even a staged approval in *Cobourg*.

[456] While the Director agrees that the Tribunal has the authority to make interim orders, it is not aware of any decision where the Tribunal has, without the prior consent of the parties, made an interim order requiring the parties to attend a second phase of a hearing after hearing all the evidence on the merits at a contested hearing. He asserts that the subject matter of this hearing is the appropriate monitoring conditions that should be imposed at this time. The Director states that WMC will need to monitor the Landfill for a significant period into the future and MOECC staff will have an ongoing role of evaluating that data and recommending the actions, under an adaptive management framework. He notes that there will continue to be ongoing issues of data interpretation that could result in further disputes arising.

[457] The Director submits that it is uncertain when the extent of the groundwater impacts will be completely delineated by the timeframes suggested by CCCTE and notes that further issues may arise during this time to delay the delineation process, resulting in the Tribunal being seized of this matter for an unspecified and extended period of time. He asserts that a time limit must be imposed on the scope of any hearing or the dispute may continue indefinitely, and submits that once the evidence has been heard on its merits, the Tribunal should move towards rendering a decision to end its adjudicative function. The Director states that to do otherwise would result in endless litigation, place a significant strain on the resources of the parties and the Tribunal, and effectively require the Tribunal to play a regulatory oversight role as opposed to an adjudicative role. He submits that the Tribunal is legally required to render a decision based on the evidence that was presented at the hearing in this matter, and further submits that there is no authority to unilaterally extend a hearing into the future to address future disputes that may arise based on new evidence.

### *Submissions of WMC*

[458] WMC adopts the submissions of the Director on this issue, noting that the Director has the statutory authority granted under the *EPA* to amend or approve the ECA and to require a regulated party to take certain actions in respect of the ECA. WMC submits that CCCTE's request for a staged hearing would replace the Director and effectively put the Tribunal "in the shoes of" the Director for the foreseeable future. WMC says that the role of the Tribunal is to render a decision and not to act as the regulator dealing with ongoing issues regarding the ECA.

[459] WMC agrees with the Director's submission that CCCTE's request for a staged Hearing will only cause the dispute to last indefinitely, maintaining that this would be to nobody's benefit.

### *Findings on Issue 4*

[460] CCCTE is asking the Tribunal to make a conditional interim decision in this case, instead of finally disposing of the appeal, as would be the normal course, so that this Tribunal panel remains seized for a potential second phase of this hearing. There does not appear to be a precedent at the Tribunal for such a phased hearing process.

[461] In advocating for a second phase in this hearing, CCCTE cites the *Cobourg* decision, which dealt with the proposed expansion of a landfill site. In *Cobourg*, as set out at para. 15 and 83, it became clear to the EAB after hearing the evidence of the Town of Cobourg and the Ministry of the Environment that there were serious concerns about possible groundwater and surface water contamination as well as concerns regarding the quality of the Town's technical evidence. As a result, the EAB agreed to an adjournment of four months while the Town conducted further hydrogeological investigations to address these concerns, after which the hearing was reconvened. At the conclusion of the hearing, the EAB considered issuing a staged approval but concluded that it could not do so due to the challenge of developing benchmarks for

extending or revoking the approval, and instead denied the application to expand the landfill (para. 142-144).

[462] In *Cobourg*, the EAB adjourned the hearing prior to its conclusion and later reconvened it. The EAB considered the possibility of a issuing a staged approval but it did not conduct a staged hearing, nor did it even consider doing so. It issued its decision after the conclusion of the hearing, and that decision was final.

[463] In this proceeding, CCCTE is seeking an interim decision and a potential second stage of this hearing, which is quite different from the situation in *Cobourg*.

[464] Without deciding whether or not the Tribunal has the authority to impose a phased hearing process, the Tribunal determines that it is not appropriate to do so in this case. The Tribunal is an adjudicative body and is not in a position to play an ongoing, regulatory role with respect to the Landfill. That is the role of the Director and MOECC staff. As noted by the Director in his submissions, the Landfill will continue to need to be monitored for an extended period of time and the Tribunal is not equipped to oversee WMC's monitoring program into the future.

#### Conclusion on Issue 4

[465] The Tribunal determines that it is unnecessary to impose a phased hearing process in this proceeding. Once the wording of the ECA conditions and EMP provisions is finalized, the Tribunal will not maintain a further supervisory role in this matter.

[466] The Tribunal has heard the evidence and submissions that the parties chose to adduce in this proceeding, and has now issued its reasons on all of the main issues in the appeal. As noted above, one further step needs to be undertaken to revise ECA and EMP wording consistent with these reasons. Once the Tribunal receives either agreed-upon final wording from the parties or submissions from the parties on the final

wording of the ECA conditions and EMP provisions, the Tribunal will make its determination of the final wording of the ECA conditions and EMP provisions and issue its final decision in this matter. It will not maintain a further supervisory role after that final step is completed.

## ORDER

[467] The Tribunal directs the Director to amend the ECA as follows, subject to the receipt of submissions from the parties regarding the final language of the ECA conditions and EMP provisions consistent with this Decision:

1. Retain the interim amendments replacing Condition 8.5 with new provisions and added Conditions 8.7 and 8.8, as set out in the Tribunal's Order dated July 21, 2015, as amended on October 29, 2015, set out in Appendix A, attached to this Order.
2. Add the following additional provisions to Condition 8.5:

### 8.5(a)

iv. Setting a Reasonable Use Limit (RUL) for 1,4-dioxane at 1 µg/l. Should Ontario amend O. Reg. 169/03 to set an Ontario Drinking Water Quality Standard for 1,4-dioxane, the RUL shall be re-calculated in accordance with procedure document B-7-1.

### 8.5(c)

v. Submit a report to all the parties and the District Manager, either an independent report on in conjunction with the semi-annual report required by condition 14.1 of this approval, by April 15, 2016 detailing the work carried out and results of all testing obtained further to items

8.5(c) i. to iii. [set out below in Appendix A, which sets out the revised interim order conditions], detailing any additional relevant additional work carried during this time period, and providing an assessment with necessary supporting rationale as to whether the off-site leachate impacted groundwater has been delineated in accordance with the following criteria:

The extent of leachate impacted groundwater shall be delineated if it is demonstrated that water within a sufficient number of monitoring wells at the outer extent of the impacted area that are hydraulically connected to the defined leachate impacted groundwater does not exceed any reasonable use limits (RUL) as defined in Guideline B-7 and its corresponding procedure, B-7-1 or any RUL set out in this approval.

8.5(d) The following process shall be followed with respect to the report submitted under 8.5(c) v.:

- i. CCCTE, the MBQ and NGL shall have until June 1, 2016 to provide written comments on the report to the Owner and the District Manager and specifically whether delineation has been completed in accordance with the criteria.
- ii. After receiving the written comments from CCCTE, the MBQ and NGL, the District Manager will convene a meeting among all the parties to obtain further input and attempt to reach a consensus on whether delineation has been completed.
- iii. By no later than July 31, 2016, the District Manager shall issue a written notice to the Owner and copying the parties indicating



whether delineation has been completed in accordance with the criteria.

- iv. If it has been determined that delineation has not been completed, the Owner shall submit another proposal for additional groundwater investigations that shall be considered in accordance with steps i. through iii. with timelines modified by the District Manager accordingly.
- v. The procedures or deadlines set out in steps i. through iv. can be altered with the consent of all the parties.

8.5(e) The Owner shall conduct a comprehensive investigation of the hydrogeological implications and potential impacts of an existing pipeline which runs across the northern part of the neighbouring properties to the south of the site and submit a report outlining the findings in conjunction with the report required by April 15, 2016 under item 8.5(c)iv.

8.5(f) Within 90 days of the District Manager providing written notice to the Owner that delineation has been completed, the Owner shall submit to the Director, Environmental Approvals Branch, Ministry of the Environment and Climate Change an application for approval to amend the ECA to address any non-compliance with condition 8.6 and guideline B-7, including if warranted an application to incorporate a contaminant attenuation zone into the approval, and including a proposed updated EMP. The application to amend the ECA shall be treated as a standard application and be posted on the EBR Registry for public comment. The application shall outline the options that were considered for bringing the Site into compliance with Guideline B-7 and the rationale for the preferred option, and include all necessary supporting documentation.

3. The following new conditions shall be added to the ECA:

8.6.1. For the purposes of condition 8.6, a reasonable use limit of 1 µg/l shall be used for the parameter 1,4-dioxane unless an Ontario Drinking Water Quality Standard is established in O. Reg. 169/03.

8.6.2. Notwithstanding condition 8.6, if a contaminant attenuation zone (CAZ) is established, the site shall be operated in such a way to ensure compliance with MOE's Guideline B-7 Reasonable Use Concept at monitoring points along the boundary of the CAZ where it replaces the property line.

8.9 Unless otherwise agreed in writing to by the residents of the residences listed below and unless the residence is vacant and likely to remain vacant, the Owner shall provide whole house replacement water supplies for the residences located at 1264, 1252, 1250, 1206, 1181, and 1144 Beechwood Road.

4. Condition 9.1 of the ECA shall be deleted and replaced with the following:

9.1 (a) The Owner shall initiate the contingency plans outlined in section 7.4 of the EMP referenced in condition 8.5(b), or as replaced with an updated version, when any of the identified trigger mechanisms occur.

9.1 (b) Notwithstanding Condition 9.1(a), the Owner shall not use a fracture trench as a Leachate Collection System contingency measure.

5. The interim EMP shall be further modified to implement continuous conductivity monitoring on Marysville Creek for one year, with continuous conductivity loggers placed at: an appropriate location on the Creek, far enough upstream of Deseronto Road to ensure no interference from road

- salt; and a second location upstream of the Landfill to detect background influences.
6. The interim EMP shall be further modified to state that the need for additional nested wells in the area of Marysville Creek and the Landfill shall be assessed should 1,4-dioxane or another listed parameter be detected.
  7. The interim EMP shall be further modified to require that the domestic and agricultural wells at properties located south of Highway 401 on County Road 1 West and Belleville Road, at the addresses noted at the hearing, should be tested for 1,4-dioxane every two years for at least the next six years, or until the extent of the leachate contaminated groundwater is delineated if that takes longer than six years, and then every five years once the delineation is complete.
  8. The interim EMP shall be further modified to require that confirmation re-sampling (Step 2 under the groundwater evaluation methods and trigger mechanisms set out at 7.1 of the proposed revised EMP) is to occur at the same time as a water quality conformance assessment (Step 1).

[468] The Tribunal orders that, if the parties are unable to negotiate an agreement concerning the final wording of the ECA conditions and EMP provisions, the parties are to file any submissions regarding the final wording of those conditions and provisions by January 31, 2016.

*Appeal Allowed in Part  
Director Ordered to Amend Environmental Compliance Approval*

*“Maureen Carter-Whitney”*

MAUREEN CARTER-WHITNEY  
MEMBER

Appendix A – Revised Interim Order Conditions

Appendix B – Amendments to Table 2 to Interim Environmental Monitoring Plan

If there is an attachment referred to in this document,  
please visit [www.elto.gov.on.ca](http://www.elto.gov.on.ca) to view the attachment in PDF format.

**Environmental Review Tribunal**

A constituent tribunal of Environment and Land Tribunals Ontario

Website: [www.elto.gov.on.ca](http://www.elto.gov.on.ca) Telephone: 416-212-6349 Toll Free: 1-866-448-2248

**Appendix A****Revised Interim Order Conditions**

1. Condition 8.5 of the ECA shall be deleted and replaced with the following:

8.5(a) The Owner shall submit to the District Manager by no later than August 31, 2015, with copies to the parties, a revised interim Environmental Monitoring Plan (“EMP”) to be implemented on an interim basis pending the final decision of the Tribunal with respect to the appeal of the ECA. The interim EMP shall implement all of the provisions of the Environmental Monitoring Plan Revision No. 03, prepared by WESA, dated March 30, 2015, subject to the following modifications ordered by the Tribunal:

- i. Replacing Table 2 on page 11 of Environmental Monitoring Plan Revision No. 03 with the table attached to this order as Appendix B, which sets out revised monitoring frequencies and the addition of two monitoring wells.
- ii. Adding a requirement that any new monitoring wells will be tested at least four times within the first year, on a quarterly basis, after being established, instead of the frequency set out in Environmental Monitoring Plan Revision No. 03.
- iii. Adding one surface water monitoring event to section 4 of the EMP to occur at one point in time during the summer months after a rainfall of more than 25 millimetres.

8.5(b) The Owner shall carry out monitoring in accordance with the interim EMP submitted by August 31, 2015 as of September 1, 2015 on a going forward basis until such time as further amendments to the ECA and EMP are directed by the Tribunal.

8.5(c) The Owner shall:

- i. Submit a proposal to the District Manager and the parties by August 14, 2015 to replace monitoring well M178 and then replace and test the well in accordance with directions issued by the District Manager after considering input from the parties.
  - ii. Submit a proposal to the District Manager and the parties by August 14, 2015 to install two or three new monitoring wells to the east of the southern part of the eastern landfill boundary and then, subject to acquiring the legal right to do so, install the wells in accordance with directions issued by the District Manager after considering input from the parties.
  - iii. Complete all further work and testing required for monitoring wells M187 to M191 by December 1, 2015.
  - iv. Test monitoring well M82-2 at least two more times over and above the twice yearly sampling required by table 2 of the EMP prior to December 31, 2015.
2. The following new conditions shall be added:

8.7 Any off site exceedances of parameters for groundwater, surface water, or odour shall be reported to the District Manager within 48 hours of determination of the exceedance. In addition, a statement detailing which results are out of compliance with the Ministry's guidelines and objectives shall be provided at the same time as the results.

8.8 Any monitoring result that detects 1,4-dioxane at or above the detection limit of 1 µg/l at any groundwater well or domestic well at which 1,4-dioxane has not been detected in the past or at any surface water monitoring location shall be reported to the District Manager within 48 hours of determination of the exceedance.

Appendix B

Amendments to Table 2 to Interim Environmental Monitoring Plan

C:\2505-00-00 Environmental Monitoring Plan WM Richmond Landfill March 2015

Pathway Definition & Location	Rationale for Location	Selected Monitors	Parameter List	Frequency of Sampling
<b>Shallow Groundwater Flow Zone</b>				
Background Locations	Background groundwater quality	M58-4, M64-4, M70-3, M96, M99-2	Groundwater Inorganic & General VOCs 1,4 dioxane	Once each year, in Spring
Low Head Regions	Zones of low hydraulic head down gradient from the landfill footprint within the shallow groundwater flow path on WM property	M54-4, M65-2, M67-2, M80-2, M85, M86, M87-2, CW97-5	Groundwater Inorganic & General VOCs 1,4 dioxane, alkalinity	Twice each year, in Spring and Fall <del>each year, in Spring</del>
Areas between Low Head Regions and Landfill Footprint	Areas down gradient and slag gradient from the landfill footprint	M53-4, M81, M101, M103, M104, M114-2	Groundwater Inorganic & General VOCs 1,4 dioxane	Twice each year, in Spring and Fall <del>each year, in Spring</del>
<b>Intermediate Bedrock Groundwater Flow Zone</b>				
Background Locations (see Note 1)	Background groundwater quality	M56-4, M58-3, M59-2, M59-4, M91-1, M95-1	Groundwater Inorganic & General VOCs 1,4 dioxane	Once each year, in Spring
Low Head Regions: north of the Landfill	Zones of low hydraulic head down gradient from the landfill footprint within the intermediate bedrock groundwater flow path on WM property	M82-1, M82-2	Groundwater Inorganic & General VOCs 1,4 dioxane, alkalinity	Twice each year, in Spring and Fall <del>each year, in Spring</del>
Low Head Regions: south of the Landfill	Zones of low hydraulic head down gradient from the landfill footprint within the intermediate bedrock groundwater flow path on WM property (including the proposed CAZ)	M80-1, M106, M177, M178, M185-1, M185-2, M186, M187, M188, M190	Groundwater Inorganic & General VOCs 1,4 dioxane, alkalinity	Twice each year, in Spring and Fall <del>each year, in Spring</del>
Areas between Low Head Regions and Landfill Footprints: north and west of the Landfill	Areas down gradient from the landfill footprint	M5-3, M63, M75, CW1, CW4	Groundwater Inorganic & General VOCs 1,4 dioxane	Twice each year, in Spring and Fall <del>each year, in Spring</del>
Areas between Low Head Regions and Landfill Footprints: south of the Landfill	Areas down gradient from the landfill footprint	M72, M74	Groundwater Inorganic & General VOCs 1,4 dioxane	Twice each year, in Spring and Fall <del>each year, in Spring</del>
		M52-2, M64-2, M108, M129-1, M163, M170, <del>M101</del>	Groundwater Inorganic & General VOCs 1,4 dioxane	Twice each year, in Spring and Fall <del>each year, in Spring</del>
		M92, M93, M114-1, M121, M123, M167, M171, M174-1, M174-2, M174-3 <del>Loc</del>	Groundwater Inorganic & General VOCs 1,4 dioxane	Twice each year, in Spring and Fall <del>each year, in Spring</del>
		<del>reclamation wells</del>		
<b>Off-site Domestic Water Supply Wells</b>				
Off-site Domestic Wells	Drilled wells that are used for potable water supplies south of Highway 401, along County Road 1 West east of Deseronto Road, and on Belleville Road west of Deseronto Road.	1441 County Road 1 West 1483 County Road 1 West 1494 County Road 1 West (UNKN) 1499 County Road 1 West (UNKN) 1556 County Road 1 West (UNKN) 1561 County Road 1 West (UNKN) 1614 County Road 1 West (UNKN) 1654 County Road 1 West 1680 County Road 1 West 1695 County Road 1 West 1866 County Road 1 West 614 and 690 Belleville Road (UNKN) (UNKN; see Note 2)	1,4 dioxane	Once every <del>two</del> <u>two</u> years, starting in 2015 in Spring

**Notes:**  
 1. Background locations west of the landfill also provide monitoring locations down gradient of the landfill along the western boundary of the property.  
 2. The final list of domestic well locations will depend on confirmation of which addresses have drilled wells (7 locations are unknown well construction; denoted UNKN). A residential survey will be completed prior to implementing the EMP in order to determine which of these locations will be sampled. Only those residences with drilled bedrock wells that supply water for domestic use will be sampled; residences that use shallow dug wells or cisterns for water supplies are not included in the program.

