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DURING CONSTRUCTION ANNUAL REPORT YEAR 1

DURHAM-YORK ENERGY CENTRE - SURFACE WATER MONITORING PROGRAM

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1.0 INTRODUCTION

Golder Associates Ltd. ("Golder Associates") has been retained by Covanta Durham York Renewable Energy Limited Partnership ("Covanta") to oversee the Surface Water Monitoring Program for the Durham York Energy Centre (the "Facility") during construction. This Surface Water Monitoring Program involves erosion and sediment control ("E&SC") monitoring, along with a surface water quality sampling program, and spill response support as needed.

This Surface Water Monitoring Program - During Construction Year 1 Report is in general accordance with the Ontario Ministry of the Environment ("MOE") Technical Guidance Document on Monitoring and Reporting for Waste Disposal Sites (2010).

1.1 Location

The Facility is located at 72 Osborne Road in Clarington, Ontario (the Waste Disposal Site "WDS" or "Site"), is approximately 12 ha and is currently under construction. The Site is bounded by the Canadian National Railway ("CNR") line to the south, industrial development to the north, agricultural land to the west (owned by the Regional Municipality of Durham), and Osborne Road to the east (Figure 1).

1.2 Ownership and Key Personnel

The Facility and Site is owned by the Regional Municipalities of Durham and York, and is operated by Covanta. The key contact information for the Site owner(s), the Site operator and the Competent Environmental Practitioner ("CEP") for both groundwater and surface water overseeing the environmental monitoring programs during construction are provided in Appendix B.

Covanta is overseeing both the construction and operation phases of the Facility. Functional testing (i.e., when waste is first delivered) is scheduled to be begin by approximately March, 2014. Courtice Power Partnership ("CPP") is the general contractor comprised of a joint venture between Kenaidan Contracting Ltd. and Barton Malow Canada Inc., hired by Covanta. CPP are delivering the various construction administration efforts for the Facility and the overall Site. CPP have also identified qualified staff to prepare the weekly Environmental Monitor and Inspector ("EMI") E&SC Site inspections, to be presented to the Golder Surface Water CEP for review and follow-up as required (e.g., confirmation that any identified E&SC deficiencies have been addressed, Site visit, prescription of mitigation measures, MOE contact).

1.3 Description and Development of the WDS

Durham and York Regions partnered in 2005 to undertake an environmental study to investigate alternative methods to manage their future residential waste. The goal of the study was to seek local solutions to responsibly manage residual municipal solid waste not captured by the Regions recycling and diversion programs.

Extensive public consultation was undertaken throughout the process to reach the preferred alternative of the mass burn incinerator at the Site, selected as the most environmentally sustainable disposal option for residual municipal solid waste in the Regions.

The Facility will be capable of processing 140,000 tonnes per year of post-diversion residual waste, while recovering metals and energy from waste ("EFW"). The waste arriving at the Facility will have minimal recyclables content, due to the various province-leading curbside and waste management facility diversion programs offered by the Regions; in addition, any residual metals will be removed from the ash for recycling.

The EFW process also includes production of high-pressure steam, which is fed through a turbine generator that produces electricity. The EFW Facility is projected to produce up to 15 MW of renewable energy, enough to power approximately 10,000 homes (Stantec, 2009).

1.4 Monitoring and Reporting Program Objectives and Requirements

This Surface Water Monitoring Program is in Accordance with Condition 20 of the Site's Environmental Assessment ("EA") Notice of Approval issued by the Ontario Ministry of the Environment ("MOE") (Appendix A). Specifically, Condition 20.1 required the preparation of the Durham-York Energy Centre Groundwater and Surface Water Monitoring Plan for the Regional Municipalities of Durham and York ("the Plan") (Stantec, 2011).

This report provides a summary of the surface water monitoring program activities, including the EMI weekly E&SC inspection efforts, periodic surface water quality sampling performed by Golder, along with any reportable spill incidents and associated responses for the first year of during construction monitoring, since the program was initiated on May 28, 2012.

The Owners ("Regional Municipalities of Durham and York") and Covanta has been meeting with the MOE approximately every two months on-Site to review the status of construction and perform a Site walk.

Covanta, the CPP EMI and the Golder Surface Water CEP circulate weekly EMI reports highlighting E&SC inspections, as well as summaries of the periodic surface water quality sampling observations, in accordance with the Surface Water Monitoring Plan. Covanta then relays these EMI reviews to the Owners, including a summary of any deficiencies and corrective measures, surface water sampling events, and/or any reportable spills on-Site.

1.5 Assumptions and Limitations

The following assumptions and limitations for the Surface Water Monitoring Program are outlined below:

- The EMI provides complete and accurate weekly E&SC Site observations, deficiency reporting, and follow-up as documented via electronic information exchanges and phone conversations.
- There are many factors that can affect the results produced by an *in-situ* surface water monitoring program. The monitoring equipment used along with the monitoring design set-up, the sampling procedures and Site specific environmental factors may all play a role in affecting observed results. Golder staff followed the sampling methods and laboratory chain-of-custody protocol procedures prescribed in Section 3.0.
- Spill reporting has been provided for all notable incidents on Site and clean-up measures for any reportable spills have been implemented in a timely manner and as outlined in follow-up incident reports provided to the Surface Water CEP.

2.0 PHYSICAL SETTING

2.1 Geology and Hydrogeology

The Site and surrounding study area is situated within the Iroquois Plan Region, generally underlain by a dense Newmarket Till with low permeability and limited infiltration potential. The Newmarket Till layer is estimated to be between 25 to 30 m in depth ((Genivar and Jacques Whitford, 2007); (CLOCA, 2008); (DFO, et al., 2000)). A thin layer of intertill sediments of approximately 5 m (including both Thorncliffe and Scarborough formations) lies beneath the Newmarket Till layer (DFO, et al., 2000). Below the overburden layers described above lies the Whitby shale bedrock (DFO, 2005).

The groundwater flow through the Site generally follows the surrounding Site topography, from the northeast to the southwest towards Lake Ontario (Jacques Whitford Ltd., 2009). This groundwater baseflow pattern travels laterally and discharges to local surface water features (e.g., receiving swale, Tooley Creek and ultimately Lake Ontario). A substantial Region of recharge and discharge is known within the Iroquois Beach/Shoreline Area (DFO, et al., 2000).

2.2 Surface Water Features

Before construction, the general northeast to southwest slope of the Site was approximately 1.9 %, based on a detailed Site topographic survey in 2005 (The Regional Municipality of Durham, 2005). The overall, post development slope of the Site will be approximately the same (1.9%). The Site re-grading efforts are now directing Site runoff towards two Stormwater Management ("SWM") Ponds (East and West), located at the southeastern and southwestern quadrants of the Site (Figure 1). During construction, Site runoff is still generally conveyed from northeast to southwest, via overland flow or through two constructed swales that direct runoff towards the two SWM Ponds along the southern perimeter.

These SWM ponds are currently operational for construction, with final grading already complete, but final outfall, channel and landscaping work still required. The completion of the SWM Pond construction will occur once the Region of Durham trunk sewer construction scheduled for 2013, immediately south of the Site, north of the CNR line and receiving swale is completed.

The stormwater discharges from these SWM ponds are controlled by float-pumps in the aft bay of both ponds, to keep water levels at approximately 1 m below the invert of the temporary polyvinyl chloride ("PVC") pipe outlets. This practice minimizes the potential for major storm events to discharge from the ponds, uncontrolled during the construction period.

For both the East and West SWM Pond, the controlled discharge is directed through a 300 mm diameter, PVC pipe. Both SWM Pond pipe outlets direct discharge to one outfall location immediately south of the West SWM Pond, beyond the property fence. During this construction phase, if significant rainfall-runoff events (e.g., greater than 25 mm of total rainfall) result in the SWM ponds reaching the inlet (upstream end) of the PVC pipes, controlled discharge will gravity drain through the outlet pipes to the outfall location.

This Site outfall disperses flow through a grassy, overland flow route leading to the receiving swale south of the Site, and immediately north of the CNR (i.e., the CNR ditch). This swale directs surface water flow from east to west towards Tooley Creek. The upstream end of this swale within the study area conveys flow through a 600 mm diameter corrugated steel pipe ("CSP") culvert under Osborne Road. From this culvert crossing, the swale continues east another 600 m to Courtice Road. Surface water flow from this swale is conveyed under

Courtice Road via a 1250 mm diameter CSP, and discharges into Tooley Creek approximately 400 m downstream and west of the Courtice Road crossing. The swale within the Study Area has a varying bank full width between 1 to 2 m (Jacques Whitford Ltd., 2009).

It is also important to note that as part of a Regional Municipality of Durham trunk servicing construction scheduled for the area in 2013, modifications will be made to this receiving swale.

Downstream from the CNR crossing, Tooley Creek meanders for approximately 1 km before discharging into Lake Ontario at the Tooley Creek Coastal Marsh. In this reach, the average channel width is approximately 5 m with steep well-incised banks and minimal riparian buffer lands. There are no road crossings of the creek south of the CNR.

The Tooley Creek Watershed is fully contained within the Municipality of Clarington and has an area of 1040 ha. The headwaters originate in the Maple Grove Wetland Complex north of Highway 2. The definable stream length of this creek is 26 km (AECOM Canada Ltd., 2009).

3.0 DESCRIPTION OF MONITORING PROGRAM

The following Section outlines the Surface Water Monitoring program for the Site and greater study area as outlined in Figure 1 in more detail. This program for Year 1 during construction is in general accordance with Sections 3.3 and 3.4 of the Plan (Stantec, 2011).

3.1 Surface Water Monitoring Locations

The on and off-Site surface water sampling stations (SW1 to SW4, E-SWMP-IN, E-SWMP-OUT, W-SWMP-IN, and W-SWMP-OUT) are shown on Figure 1. Each station is described in more detail below, will conditions during sampling events shown in Appendix C.

SW1

Sampling Location SW1 is within the CNR ditch (“receiving swale”) on the north side of the CNR line immediately downstream of Osborne Road. This flat bottom ditch is approximately 1 m in width at this location. Dense wetland grasses span the width of the channel. A pool that is slightly deeper than the downstream swale is located at the outlet of the Osborne Road culvert. During runoff events, samples were taken approximately 10 m downstream of the culvert. During periods of minimal runoff such as inter-event sampling Site visits, the deeper pool area was the only feasible sampling location.

SW2

Sampling Location SW2 is within the ditch on the north side of the CNR line approximately 50 m east of Courtice Road. This location is accessed via agricultural land to the north. At this location the ditch is approximately 2 m in width with well treed banks providing good shade across the channel. The channel bed contains much less vegetation than at SW1, but exhibits minor channel obstructions from woodland debris.

SW3

Sampling Location SW3 is on Tooley Creek, approximately 50m north of the CNR crossing and therefore upstream of the rail ditch input. The sampling location is surrounded by grassland. The channel bed consists of exposed loamy soil with grasses along the banks. The banks are steeper than 2:1 and are prone to erosion, particularly along the outside bends of channel meanders. The bankfull depth at this location is approximately 1.5 m.

SW4

Sampling Location SW4 is on Tooley Creek, approximately 50 m south of the CNR crossing and therefore downstream of the rail ditch input. The sampling location is surrounded by grassland. The channel bed consists of exposed loamy soil with some cobbles. Immediately downstream of the sampling location, a meander in the creek has resulted in significant erosion on the western bank. There is minimal vegetation within the channel. The bankfull depth at this location is approximately 1.5 m.

SWM Pond Inlets

Sampling locations E-SWMP-IN and W SWMP-IN are in close proximity to the eastern and western SWM pond inlet headwalls, respectively. Samples are taken from the centre-line of the inflow path at both stations. During the construction-phase of Site development, the ponds were excavated into on-Site fill material. The ponds remain unlined with exposed soil along the perimeter side slopes. The interim ponds consist of a single-bay.

SWM Pond Outlets

The east and west SWM ponds discharge to a rip-rap splash pad located close to the southwest Site boundary. The outlet pad is located in a low-lying grassed area. During the construction-stage, pond discharge is primarily a result of controlled pumping after a runoff event. However, during significant rainfall-runoff events to date, gravity discharge from the outlet of the western and eastern SWM ponds have occurred on occasion (e.g., September 6, 2012 and November 1, 2012). The SWM pond outlets are accessed by walking west along the southern perimeter fence from Osborne Road. Samples were taken at the PVC pipes outfall location (Photographs 6, 17, 29, 44, and 58, Appendix C).

3.2 Monitoring Frequency

Erosion and Sediment Control Monitoring Inspections

The weekly E&SC monitoring inspections performed by the qualified CPP EMI designated for the Site, are presented in a report template designed by Golder (Appendix D). These EMI reports outline key observations and notable deficiencies to address. Observations made during surface water sampling efforts by Golder are also included on Page 2 of these reports, when appropriate.

After the CPP EMI completes the form, it is then reviewed and signed-off by the Covanta Site construction manager or designate. It is then e-mailed to the Golder Surface Water CEP, along with Site photographs taken during the inspection for the final review. The Site photographs are of key on and off-Site vantage points outlined in the Site photographic record established during the initiation of the program in late May/early June, 2012 (Appendix B), along with any notable, additional photographs taken during the specific inspection. Each EMI E&SC report is signed-off by the Golder CEP after confirmation is received that any outstanding deficiencies have been addressed.

This photographic record also provides comparative upstream and downstream viewpoints of both the receiving swale (CNR ditch) and Tooley Creek, taken during the surface water quality sampling efforts performed by Golder.

Surface Water Quality Sampling

Surface water quality sampling efforts have occurred at strategic locations upstream and downstream of the SWM Ponds on Site, the receiving swale, and Tooley Creek (Figure 1).

One inter-event ('dry-period'), surface water sampling effort was performed per season (i.e., spring, summer, fall and winter). This sampling effort occurs when there is no rainfall-runoff flow increase in the receiving swale and Tooley Creek. Depending on the water level conditions in the SWM ponds, on some occasions a controlled discharge may still have occurred during these sampling efforts.

At least one rainfall-runoff event was also sampled per season, targeting controlled discharges from the SWM Pond for a rainfall-runoff event of approximately 5 mm or greater. It should be noted that some of these sampling efforts occurred when there were trace amounts of total daily rainfall observed at the nearby Oshawa Water Pollution Control Plant ("WPCP"), approximately 5 km west of the Site.

Considering the variability of rainfall events, every effort was made to be on-Site during the discharge periods. These discharge periods typically occurred shortly after larger rainfall events, controlled via float pumps located in the aft bays of the SWM Ponds. These discharges were controlled to minimize any turbidity and/or Total Suspended Solids ("TSS") discharge to the receiving swale, while at the same time maintaining a lower water level in the ponds. The controlled discharges were timed to provide sufficient storage in both ponds, and after settling had occurred, to minimize any uncontrolled discharges with higher TSS loadings to the receiving swale (CNR ditch).

During these sampling efforts, comparative upstream and downstream viewpoints of both the receiving swale and Tooley Creek were also taken for inclusion in the Site photographic record.

3.3 Field and Laboratory Parameters and Analysis

Four (4), 500 mL sampling bottles were filled at each location with surface water grabs. Two (2) of the sampling bottles from each location were submitted to the laboratory for TSS and Turbidity analyses. The bottles submitted were labeled with the appropriate analysis identified, the date and time of sampling, sampling grab location and Golder project number. The additional two (2) bottles from each sampling location were kept as duplicates and were stored off-Site at the local Golder-Whitby office in coolers on ice (see Section 3.8).

In situ measurements for pH, temperature and conductivity were also taken by Golder staff at each surface water monitoring station. The instrument used for these measurements was calibrated before each use, to ensure accurate results were provided.

3.4 Certificate of Approval Requirements

Performing the E&SC and Surface Water Sampling program laid out here-in is what is required for the Site, as stipulated by both Condition 20 of the EA Approval and Section 7, Part 14 (a) to (c) of the Multi-Media Certificate of Approval ('C of A') No. 7306-8FDKNX, dated June 28, 2011.

3.5 Monitoring Procedures and Methods

Surface Water sampling occurred via grab samples from identified, consistent sampling locations that were considered representative of 'well-mixed' surface water conditions at the sampling station. Typically, these grabs were taken in the centre-line zone of the receiving swale or creek, or the centre of the inlet or outlet location for the SWM Ponds. Whenever possible these samples were grabbed from depths slightly below the surface of the water (Burton and Pitt, 2002).

When collecting samples, care was taken not to disturb the substrate at the sampling station in order to avoid any increase in TSS or Turbidity measurements while sampling efforts occur. When depths were too shallow, every effort was taken for a 'well-mixed' sample, while avoiding any disturbance (e.g., shallow sampling scoops using control bottle).

3.6 Standard Operating Procedures

A standard surface water sampling protocol was developed for Golder field staff (Appendix E-1). The standard operating procedure for the E&SC monitoring was communicated to Covanta and CPP via the EMI template.

A Health and Safety Environmental Plan ("HaESP") was developed by Golder, respecting on-Site arrival and departure reporting to both the CPP Health and Safety Officer and the Covanta Site Construction Manager or designate.

Field personnel were required to obtain fall protection training for sampling at the SWM ponds to ensure appropriate health and safety procedures were followed on-Site when sampling these areas.

3.7 Record Keeping and Field Notes

Golder maintained records, including field notes, analytical results, measurements, and logs in electronic format and hardcopy. Golder developed both the EMI report and surface water sampling field form that was filled out for each monitoring station during the sampling effort (Appendix D and Appendix E-3, respectively).

An e-mail circulation to the project construction group involved with the Surface Water Monitoring Program (Covanta, CPP, and Golder) was also provided with the final EMI report signed-off by the Golder Surface Water CEP, after confirmation was received that all notable deficiencies had been addressed.

A Site Photographic Record illustrating weekly observations from the E&SC monitoring and periodic surface water sampling efforts is also summarized with selected events (Appendix C).

3.8 Sampling Methods

Surface Water sampling occurred via a grab sample from identified, consistent sampling locations that are considered representative of 'well-mixed' surface water conditions at the sampling station. A grab sample is defined as a sample collected during a very short time period at a single location. Typically, these grabs were taken in the centre-line zone of the receiving swale or creek, or the centre of the inlet or outlet location for the SWM Ponds. These samples were grabbed from depths slightly below the surface of the water, if the water depths at the time of sampling were accommodating (Burton and Pitt, 2002).

Care was taken to not to disturb the substrate at the sampling station, to avoid any increase in TSS or Turbidity measurements while sampling efforts occurred. If depths were too shallow, every effort was taken for a 'well-mixed' sample, while avoiding any disturbance (e.g., shallow sampling scoops using control bottle).

Sampling Grabs and In Situ Measurements

Field personnel were required to obtain fall protection training for sampling at the SWM ponds to ensure appropriate health and safety procedures were followed on-Site when sampling these areas.

Sampling grabs were made either by direct sampling or by sampling pole using latex gloves and standard sampling procedures. Direct sampling grabs were carried out at sampling stations where there was slow flowing water with a very narrow stream where the centre of the stream could be accessed safely by arm extension from the stream bank without disturbing the sediment. The sampling pole was used to access the SWM ponds and all other monitoring stations.

When taking direct sampling grabs, the sample bottle was held near its base and plunged below the surface, ensuring that sediment was not disturbed. The sample bottle was filled to the top and the lid was then placed securely on the bottle. When using the sampling pole, the sample container was securely attached to the holder with clamps. The container lid was removed and the sampling pole was extended slowly to the sampling point. The same procedure used for the direct sampling grab was then used. Care was used to avoid any debris floating in the stream entering the sample bottles.

Four (4), 500 mL sampling bottles were filled at each location with surface water grabs. Two (2) of the sampling bottles from each location were submitted to the laboratory (Maxxam Analytics) for TSS and Turbidity analyses. The bottles submitted were labeled with the appropriate analysis identified, the date and time of sampling, sampling grab location and Golder project number. An additional two (2) bottles acted as duplicates and were stored off-Site at the local Golder-Whitby office until lab results are received and reviewed. The duplicate samples will be discarded every season once this review is complete. If there is any question or concern regarding the initial laboratory results, the duplicate samples would then be submitted to the laboratory for additional analysis.

In situ measurements for pH, temperature and conductivity were also taken by Golder staff when on-Site. The instrument used for these measurements was calibrated before each use, to ensure accurate results are provided.

3.9 Quality Assurance and Sampling Analysis

Grab samples were packaged in ice and sent to the laboratory for analysis immediately after the sampling event. Approximately two (2) to three (3) bags of ice were required to fill the cooler box provided with the bottles. Ice bags entirely surrounded the sample bottles by being placed on the bottom of the cooler below the sample bottles, as well as between, on all sides and above the sample bottles. If the temperature of the bottles is above 10 ˚C when it is received at the laboratory, the analysis results are less reliable and this will be noted in the laboratory results.

Golder followed the chain-of-custody protocol from the laboratory, and provided a copy of the grab sample set exchange with the laboratory to Covanta for their records.

When analytical results were completed, they were forwarded via e-mail to the Golder Surface Water CEP.

An additional two (2) bottles, acting as duplicates, were stored off-Site at the local Golder-Whitby office until lab results are received and reviewed.

4.0 MONITORING RESULTS

The Surface Water Program monitoring results for Year 1 during construction are summarized in this section. Since this is the first year of monitoring for the Site, there is no historic data for the stations and parameter monitoring for this Site.

4.1 Data Quality Evaluation

The EMI E&SC weekly monitoring reports were validated through photographs sent during the review and sign-off of each report, phone and e-mail conversations between Covanta, CPP and Golder, along with the initial and periodic unannounced visits to the Site by the Surface Water CEP on May 29, 2012, September 5, 2012, and January 23, 2013 to confirm accuracy of recent E&SC Site conditions presented, and provide any additional recommendations, if needed.

The field and laboratory data collected for eight (8) surface sampling events during Year 1 construction monitoring have followed the Surface Water Monitoring Program protocols outlined in Section 3.0. The standard operating procedures for sampling at the Site and greater study area (Appendix E-1) were followed and laboratory results verified through certificates of analyses (Appendix E-2) provided by the laboratory (Maxxam Analytics). Maxxam Analytics are accredited by the Standards Council of Canada and the Canadian Association for Laboratory Accreditation, and is recognized as a certified laboratory by the MOE.

In situ water quality parameter measurements were also recorded using Hana probes. Before field visits, the Hana probes were calibrated in the office using calibration buffer set solutions for pH and conductivity.

4.2 E&SC Monitoring Results

A summary of notable deficiencies, general comments and corrective measures taken on-Site by the EMI CPP and Covanta, with input where needed from the Golder Surface Water CEP, is provided in Table 1 below. Selected photographs from the weekly E&SC inspections are also provided in Appendix C.

Table 1: Summary of Site E&SC Deficiency List, General Comments and Corrective Measures

E&SC Measure	Deficiency Highlights	General Comments	Corrective Measures Implemented / Recommended
Perimeter Silt Fencing	■ Silt fencing experienced several minor tears on all sides, and additional tie downs/reinstatements (typically after high winds) were also needed (mostly, along western perimeter). ■ Silt fencing temporarily removed in southeast corner around East SWM Pond area before new fencing installation occurs. ■ Observed fence breaches.	■ Weekly EMI inspections along with Daily perimeter Site walks ensured silt fence deficiencies were addressed quickly. ■ Some visible sediment transport build-up along southern silt fence.	■ Increase height to meet required, minimum height of 0.6 m, as per Ontario Provincial Standard Drawing (OPSD) No. 219.130. ■ Tie down improvements and repairs (e.g., patched tears) made to silt fencing, where needed. ■ Provided temporary sediment control fencing at down grade off-Site area before landscaping and new fencing installation occurs. ■ Sediment build-up was periodically removed and re-distributed on-Site.
Vehicular Entrances to the Site	■ Mud mats clogging, general dirt build-up from construction transport activity on-Site.	■ Entrances mats appeared relatively clean during Surface Water CEP Site inspections.	■ Sweeping at the vehicle entrances via mechanical broom, as required per CPP general practice. ■ Two truck wheel wash stations on-Site near southern Site entrance (Gate 2). ■ Harder access road surfaces installed in Year 1 of construction to reduce potential of sediment transport from trucking activities. ■ Periodic sweeping of Osbourne Road also occurred (e.g., November 15, 2012).

Table 1: Summary of Site E&SC Deficiency List and Corrective Measures

E&SC Measure	Deficiency Highlights	General Comments	Corrective Measures Implemented/Recommended
Interceptor Swales (including Rock Check Dams)	■ Sediment buildup in the rock-check dam areas of the interceptor swales. Rock check dam damage after larger storm event/wash-out occurred.	■ Sediment clean-out in the rock-check dam areas periodically along western and eastern swales directing runoff towards the SWM Ponds. Clean-out occurred based on visual and *in situ* measurements (if the depth of sediment is greater than ½ the height of the control from the toe to the spillway in any of these features).	■ Rock check Dam repairs occurred on June 26, 2012, August 13, 2012, September 6, 2012, September 26, 2012, and November 21, 2012. ■ Rock check dam cleanouts occurred on June 12, 2012, June 21, 2012, August 7, 2012, November 21, 2012, and March 25, 2013.
Controlled Discharge	■ NA	■ Provided effective sediment control via pumping to discharge cleaner surface water from SWM Ponds periodically during construction, while maintaining storage capacity to minimize the frequency of gravity drain discharges to the receiving swale. ■ See Section 4.3 and 5.2 for more details on the effectiveness of this Sediment Control measure for the Site during construction.	■ NA

The E&SC deficiencies noted throughout the Year 1 monitoring period were addressed by the CPP EMI, Covanta and the Golder Surface Water CEP on an as needed basis. For more details on all of the EMI reports and deficiency and corrective measures, see Appendix D.

4.3 Surface Water Sampling Results

Surface water sampling was conducted on eight (8) occasions during the period from May 28, 2012 to April 8, 2013. These sampling events consisted of four (4) inter-event sets of samples and (4) rainfall-runoff-gravity discharge and/or controlled discharge sets.

A summary of the sampling events is provided in Table 2 below.

Table 2: Surface Water Sampling Event Summary - Year 1 Construction

Date (Type of event) [1.]	Season	Total Rainfall [2.]	Site Conditions and Observations
June 5, 2012 (Inter-event)	Spring	Trace amount (0.4 mm)	▪ Antecedent rainfall: June 1/12 (26.1 mm);June 2/12 (2.1mm); June 3/12 (1.8 mm) and June 4/12 (trace amounts, 0.2 mm). ▪ No SWM Pond discharge.
June 27, 2012 (Inter-event)	Summer	0 mm	▪ Antecedent rainfall: June 21/12 (20mm); June 24/12 (7mm). ▪ West SWM Pond controlled discharge occurred in the afternoon (to lower high water level in pond from rainfall earlier in the week) after receiving swale sampling was completed. Sample was also taken at outlet location in afternoon, for comparative purposes only.
September 6, 2012 (Rainfall-runoff, Controlled discharge)	Summer	0 mm	▪ Antecedent rainfall: Sept 3 and 4/12 (24.4 and 43.6mm). ▪ West SWM Pond gravity discharge on Sept 5/12, controlled discharge on Sept 6/12. ▪ East SWM Pond gravity discharge on Sept 5/12 & Sept 6/12.
September 28, 2012 (Inter-event)	Fall	0 mm	▪ Antecedent conditions: 5 days of dry conditions (Sept 23 to 27/12) leading up to sampling effort. ▪ No SWM Pond discharge.
November 1, 2012 (Rainfall-runoff-discharge)	Fall	3.3 mm	▪ Antecedent rainfall: Oct 27 to 31/12 (18.5, 8.6, 9.6, 6.6, and 7.3 mm). ▪ West SWM Pond gravity discharge only. ▪ East SWM Pond was not discharging/still had sufficient storage capacity, since water levels were reduced from periodic controlled discharges prior to visit.
March 12, 2013 (Freshet Conditions, Inter-event)	Winter	0 mm	▪ Antecedent rainfall: March 11/12 (4.9mm). ▪ No SWM Pond discharge.
March 19, 2013 (Controlled discharge)	Winter	Trace amount (0.5 mm)	▪ Antecedent rainfall: March 18/12 (5.0mm). ▪ Controlled discharges from both SWM Ponds.
April 8, 2013 (Controlled discharge)	Spring	13.3 mm [3.]	▪ Antecedent conditions: Approximately one week of dry conditions (April 1 to 7/12). ▪ East SWM Pond controlled discharge only.

Notes:
1. Inter-event (dry), controlled discharge (due to recent rainfall-runoff), rainfall-runoff-discharge (gravity drain), or freshet ('spring melt') sampling event conditions.
2. Rainfall totals observed at the Oshawa, Water Pollution Control Plan ("WPCP"), Environment Canada Climate ID No. 6155878.
3. Rainfall total observed at the Oshawa Environment Canada Climate ID No. 6155875.

The surface water sampling efforts for all events involved *in situ* measurements and grab samples taken at Stations SW-1, SW-2, SW-3 and SW-4 stations shown on Figure 1. During controlled discharge and/or rainfall-runoff-gravity discharge sampling events, samples were also taken from the East and West SWM Pond stations, where appropriate. The sample grabs from each location were submitted to Maxxam Analytics for TSS and Turbidity analyses. Results from these laboratory analyses are provided in Appendix E-2, the *in situ* measurements for temperature, pH, conductivity, and qualitative observations recorded during sampling are provided in Appendix E-3. Sampling results are summarized in Tables 3 to 7 below, and compared to the Provincial Water Quality Objectives ("PWQOs") (MOE, 1994) and Canadian Water Quality Guidelines ("CWQGs") (CCME, 2013).

Table 3: Total Suspended Solids Sampling Results

Date (Type of event)[1.]	TSS Limit[2], CWQG[3] (mg/L)	RDL[3] (mg/L)	Stations							
			SW-1 (mg/L)	SW-2 (mg/L)	SW-3 (mg/L)	SW-4 (mg/L)	E-SWMP-IN (mg/L)	W-SWMP-IN (mg/L)	E-SWMP-OUT (mg/L)	W-SWMP-OUT (mg/L)
June 5, 2012 (Inter-event)	25	10	**54**	10	<10	<10	NA	NA	NA	NA
June 27, 2012 (Inter-event)		10	**230**	<10	<10	<10	NA	NA	NA	<10
September 6, 2012 (Rainfall-runoff, Controlled discharge)		10	**68**	24	<10	15	15	17	<10	19
September 28, 2012 (Inter-event)		10	**35**	15	<10	<10	<10	ND	<10	ND
November 1, 2012 (Rainfall-runoff-discharge)		10	20	17	<10	10	**1400**	**120**	ND	31
March 12, 2013 (Freshet Conditions)		10	20	<10	**64**	**53**	19	**29**	ND	ND
March 19, 2013 (Controlled discharge)		10	14	14	<10	<10	<10	13	<10	<10
April 8, 2013 (Controlled discharge)		10	<10	<10	<10	<10	12	<10	13	19

Notes:

1. Inter-event (dry), controlled discharge (due to recent rainfall-runoff), rainfall-runoff-discharge (gravity drain), or freshet ('spring melt') sampling event conditions.
2. There is no PWQO and {Interim PWQO} for TSS. A suitable TSS limit for various sewage (including SWM) discharges, and receiving water is accepted to be 25 mg/L (MOE, 1994b).
3. The CWQQs for TSS are the following:
   i. clear flow
   Maximum increase of 25 mg/L from background levels for any short-term exposure (e.g., 24-h period). Maximum average increase of 5 mg/L from background levels for longer term exposures (e.g., inputs lasting between 24 h and 30 d).
   ii. high flow
   Maximum increase of 25 mg/L from background levels at any time when background levels are between 25 and 250 mg/L. Should not increase more than 10% of background levels when background is ≥ 250 mg/L (CCME, 2013).
4. RDL - Reported Detection Limit.
5. Where 'NA' is entered, sample was not measured to do Health &Safety / access issues during construction.
6. Where 'ND' is entered, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort.
7. Exceedances of limits are in bold, with further discussion in Section 5.2, where applicable.

Table 4: Turbidity Sampling Results

Date (Type of event) [1.]	PWQO (NTU)	CWQG (NTU)	RDL [4.] (NTU)	Stations: SW-1 (NTU)	SW-2 (NTU)	SW-3 (NTU)	SW-4 (NTU)	E-SWMP-IN (NTU)	W-SWMP-IN (NTU)	E-SWMP-OUT (NTU)	W-SWMP-OUT (NTU)
June 5, 2012 (Inter-event)	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [3.] for CWQG narrative for Turbidity.	0.2	31	5.2	3.5	2.9	NA	NA	NA	NA
June 27, 2012 (Inter-event)			0.2	70	1.7	3.4	3.2	NA	NA	NA	6.1
September 6, 2012 (Rainfall-runoff, Controlled discharge)			0.2	120	27	3.2	**16**	6.9	11	6.0	9.6
September 28, 2012 (Inter-event)			0.2	5.2	5.9	4.6	4.9	1.4	ND	3.3	ND
November 1, 2012 (Rainfall-runoff-discharge)			0.2	37	28	10	9.7	910	270	ND	55
March 12, 2013 (Freshet Conditions)			0.2	25	14	32	27	41	86	ND	ND
March 19, 2013 (Controlled discharge)			0.2	22	14	9.2	6.3	2.0	21	4.5	5.6
April 8, 2013 (Controlled discharge)			0.2	5.2	4.4	1.5	1.8	12	15	23	30

Notes:

1. Inter-event (dry), controlled discharge (due to recent rainfall-runoff), rainfall-runoff-discharge (gravity drain), or freshet (‘spring melt’) sampling event conditions.
2. Lab results for Turbidity analyzed only, due to challenges with accurate and consistent *in situ* Secchi disk measurements for turbidity.
3. The CWQQs for TSS are the following:
   i. clear flow
   Maximum increase of 8 NTUs from background levels for a short-term exposure (e.g., 24-h period). Maximum average increase of 2 NTUs from background levels for a longer term exposure (e.g., 30-d period).
   ii. high flow or turbid waters
   Maximum increase of 8 NTUs from background levels at any one time when background levels are between 8 and 80 NTUs. Should not increase more than 10% of background levels when background is > 80 NTUs (CCME, 2013).
4. RDL - Reported Detection Limit.
5. Where ‘NA’ is provided, sample was not measured to do Health &Safety / access issues during construction.
6. Where ‘ND’ is provided, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort.
7. Exceedances of limits are in bold, with further discussion in Section 5.2, where applicable.

Table 5: *In Situ* pH Measurements

Date (Type of event) [1.]	PWQO	CWQG	Stations							
			SW-1	**SW-2**	**SW-3**	**SW-4**	**E-SWMP-IN**	**W-SWMP-IN**	**E-SWMP-OUT**	**W-SWMP-OUT**
June 5, 2012 (Inter-event)	**6.5 to 8.5**	**6.5 to 9**	7.15	7.38	7.60	7.70	NA	NA	NA	NA
June 27, 2012 (Inter-event)			**5.78**	**6.25**	7.15	6.64	NA	NA	NA	7.47
September 6, 2012 (Rainfall-runoff, Controlled discharge)			7.73	7.74	7.94	7.79	8.33	8.20	8.33	8.14
September 28, 2012 (Inter-event)			7.40	7.41	7.70	7.38	8.16	ND	**8.86**	ND
November 1, 2012 (Rainfall-runoff-discharge)			8.25	8.06	8.35	8.31	**9.80**	**8.80**	ND	**8.62**
March 12, 2013 (Freshet Conditions)			**6.28**	8.00	7.70	7.76	**5.83**	**5.94**	ND	ND
March 19, 2013 (Controlled discharge)			7.12	7.43	7.64	7.62	6.85	7.35	7.74	8.16
April 8, 2013 (Controlled discharge)			7.16	7.30	7.54	7.79	**5.59**	**6.27**	7.08	6.98

Notes:

1. Inter-event (dry) or rainfall-runoff sampling event indication is provided below the date.
2. Where ‘NA’ is provided, sample was not measured to do Health &Safety / access issues during construction.
3. Where ‘ND’ is provided, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort.
4. Sampling results out of the PWQO and CWQG acceptable limits are in bold, with further discussion in Section 5.2, where applicable.

Table 6: *In Situ* Temperature Measurements

Date (Type of event) [1.]	PWQO	CWQG	Stations							
			SW-1 (°C)	SW-2 (°C)	SW-3 (°C)	SW-4 (°C)	E-SWMP-IN (°C)	W-SWMP-IN (°C)	E-SWMP-OUT (°C)	W-SWMP-OUT (°C)
June 5, 2012 (Inter-event)	Note[2.]	Note[3.]	16.1	15.4	16.8	17.1	NA	NA	NA	NA
June 27, 2012 (Inter-event)			18.0	17.8	17.0	15.9	NA	NA	NA	20.8
September 6, 2012 (Rainfall-runoff, Controlled discharge)			23.1	22.3	20.1	21.2	26.8	24.0	24.4	25.4
September 28, 2012 (Inter-event)			14.7	13.8	12.6	13.2	15.7	ND	15.8	ND
November 1, 2012 (Rainfall-runoff-discharge)			7.9	8.3	8.6	8.5	8.4	8.0	ND	8.2
March 12, 2013 (Freshet Conditions)			2.8	2.7	1.4	1.4	2.4	1.6	ND	ND
March 19, 2013 (Controlled discharge)			1.5	0.2	0.5	1.2	4.4	0.8	5.2	5
April 8, 2013 (Controlled discharge)			6.7	6.7	7.7	7.6	7.6	7.7	7.7	7.8

Notes:

1. Inter-event (dry) or rainfall-runoff sampling event indication is provided below the date.
2. PWQO for Temperature (generally) states: The natural thermal regime of any body of water shall not be altered so as to impair the quality of the natural environment. In particular, the diversity, distribution and abundance of plant and animal life shall not be significantly changed (MOE, 1994).
3. CWQG for Temperature:
   i.Thermal Stratification: Thermal additions to receiving waters should be such that thermal stratification and subsequent turnover dates are not altered from those existing prior to the addition of heat from artificial origins
   ii. Maximum Weekly Average Temperature: Thermal additions to receiving waters should be such that the maximum weekly average temperature is not exceeded
   iii. Short-term Exposure to Extreme Temperature: Thermal additions to receiving waters should be such that the short-term exposures to maximum temperatures are not exceeded. Exposures should not be so lengthy or frequent as to adversely affect the important species (CCME, 2013).
4. Where 'NA' is provided, sample was not measured to do Health &Safety / access issues during construction.
5. Where 'ND' is provided, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort.
6. Exceedances of limits are in bold, with further discussion in Section 5.2, where applicable.

Table 7: *In Situ* Conductivity Measurements

Date [1.] (Type of event)	PWQO, CWQG[2]	Stations							
		SW-1 (µS/cm)	SW-2 (µS/cm)	SW-3 (µS/cm)	SW-4 (µS/cm)	E-SWMP-IN (µS/cm)	W-SWMP-IN (µS/cm)	E-SWMP-OUT [4.] (µS/cm)	W-SWMP-OUT [4.] (µS/cm)
June 5, 2012 (Inter-event)	N/A	629	602	1174	1041	NA	NA	NA	NA
June 27, 2012 (Inter-event)		551	641	1130	998	NA	NA	NA	640
September 6, 2012 (Rainfall-runoff, Controlled discharge)		270	480	1030	640	460	700	450	650
September 28, 2012 (Inter-event)		615	678	1185	1052	515	ND	500	ND
November 1, 2012 (Rainfall-runoff-discharge)		408	440	771	747	494	415	ND	457
March 12, 2013 (Freshet Conditions)		980	1000	390	400	1280	370	ND	ND
March 19, 2013 (Controlled discharge)		5330	3460	1420	1340	1970	360	2010	1940
April 8, 2013 (Controlled discharge)		1960	1730	860	820	2160	650	2140	2150

Notes:
1. Inter-event (dry) or rainfall-runoff sampling event indication is provided below the date.
2. There are no PWQO and CWQG limits for conductivity. However, higher values are often related to higher concentrations of finer suspended metals in surface water. More discussion provided in Section 5.2.
3. Where 'NA' is provided, sample was not measured to do Health &Safety / access issues during construction.
4. Where 'ND' is provided, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort.

4.4 Spill Response

The CPP EMI and Covanta handled any of the spills on-Site, while reporting these issues to the Golder Surface Water CEP after they were contained, cleaned up, and any appropriate communication to the MOE occurred. The Owners were also notified of the incidents that warranted a call to the MOE Spill Action Centre, and the follow-up response activities.

Table 8 below summarizes the spills and follow-ups with the MOE Spill Response Action Centre. Appropriate Site actions were taken to contain and remove the spill from the Site and/or within the building envelope.

Table 8: Site Spills – Year 1 Construction

Date (Type of event)	Description	Amount	Call-in to MOE Spill Response Action Centre
June 5, 2012 (Inter-event)	Man lift Refuse Pit	1L	No
September 19, 2012	Man lift Refuse Pit	< 1L	No
September 25, 2012 [1.]	Crane - Site	100 L	Yes
January 2, 2013	Excavator – Site	2 L	No
March 12, 2013	Crane – Site	2 L	No
March 18, 2013	Equipment – Site	18 L	Yes

Notes:

1. Surface water sampling and Site follow-up inspection performed on September 28, 2012.

More details on the September 25, 2012 and March 18, 2013 spills, containment and removal are discussed in Section 5.3. All of the Spill investigation forms and details are provided in Appendix F.

5.0 ASSESSMENT, INTERPRETATION AND DISCUSSION

5.1 E&SC Measures, Deficiencies and Contingency Measures

The following summarizes the E&SC measures, deficiencies and contingency measures that were implemented, based on the weekly CPP EMI findings, Surface Water CEP review and any follow-up efforts required (Appendix D).

Perimeter Silt Fencing

Throughout the monitoring period, tears and wind damage to the perimeter silt fencing throughout the Site were identified, reinstated and promptly repaired, as needed.

The daily Site walks performed by both Covanta and CPP adequately supports catching these deficiencies quickly, in concert with the weekly (at minimum) CPP EMI reporting efforts.

Preservation of Natural Vegetation

There were no concerns noted with the preservation of natural vegetation on-Site during the course of the Year 1 monitoring period (e.g., mature pine tree near Stock Pile and Gate 2 Entrance).

Vehicular Entrances to the Site

The sweeping of Gates 1 and 2 has been typically practiced by CPP as needed, as part of their standard Site maintenance practices. A wheel washing station at the Gate 2 Entrance, along with the hard access road surfaces established on Site minimize any potential for sediment transport off-Site.

Stock Piles

The on-Site stockpiles that were no longer active have been stabilized with vegetation. No concerns with sediment transport from these piles, along with the active piles on-Site were observed during the Year 1 construction monitoring efforts.

Interceptor Swale Rock Check Dam Repairs and Clean-outs

Several interceptor swale rock check dams were repaired throughout the Year 1 monitoring period. Clean-outs of the western and eastern interceptor swales also occurred periodically, on an as needed basis (as summarized in Table 1, Section 4.2). For more details on the locations of the rock check dam clean-out locations, see the EMI reports in Appendix D.

The CPP EMI, along with the Golder Surface Water CEP, prescribed repairs and clean-outs, based on visual inspections. Clean-outs are prescribed when the sediment accumulation is greater than one-half of the height, from the pool invert to spillway crest of the rock check dams.

Controlled Discharges from SWM Ponds

The controlled discharges were performed to maintain storage capacity in both SWM Ponds during the construction period. During Year 1 of construction, CPP has timed these discharges to ensure settling had occurred in the SWM Ponds, to minimize any TSS loading discharges to the outfall channel. CPP has used a benchmark of approximately 1 m below invert of the PCV outlet pipe in each Pond to determine when pumping should occur. Prior to pumping, SWM pond surface water conditions are also confirmed via visual inspection to be at low turbidity levels (i.e., confirm settling has occurred).

5.2 Surface Water Sampling Results

5.2.1 Total Suspended Solids

The TSS sampling results summarized in Table 3, Section 4.3 are discussed in more detail in this section.

A TSS concentration of 25 mg/L or lower for any discharge or background surface water concentration from most municipal or private sewage works applications, along with receiving water concentrations, is typically considered an acceptable limit for fish habitat (MOE, 1994b). The CWQG for TSS considers an increase of 25 mg/L in low or higher flow receiving water conditions as the acceptable limit.

Observed TSS sampling results were below 25 mg/L for all of the in-stream stations (SW1, SW2, SW3 and SW4) for most sampling scenarios, with the exception of SW-1, which was typically above this level during sampling events in 2012. The (SW3) upstream and (SW4) downstream Tooley Creek stations observed higher TSS values (64 mg/L and 53 mg/L, respectively) during the March 12, 2013 sampling efforts during this pre-Spring freshet period.

Sediment loading issues from rural agricultural lands and other local developments upstream of SW1 may be contributing factors to these higher TSS concentrations. The higher TSS values observed in Tooley Creek on

March 12, 2013 are more likely related to TSS build-up and wash-off conditions resulting in higher receiving stream loadings observed during these melt conditions.

TSS results at downstream Stations SW-2 (Railway ditch/receiving Swale) and SW-4 (Tooley Creek) are not surprisingly higher for sampling events conducted during a rainfall-runoff response, than during inter-event periods. The September 6, 2012, November 1, 2012 and March 12, 2013 rainfall-runoff and spring freshet sampling results showed the gravity drain discharges from the Site have negligible impact on these downstream loadings in the receiving swale and further downstream in Tooley Creek. There is an apparent anomaly observed on September 6, 2012 where TSS levels at the Tooley Creek upstream SW-3 station were below the detection limit of 10 mg/L, whereas the downstream SW4 station TSS level was 15 mg/L. These upstream and downstream sampling results are less than 25 mg/L and there is no evidence suggesting the increase in TSS from SW-3 to SW-4 was a direct result of the discharge from the Site alone. Rather, the higher TSS level at SW-4 is most likely a result of the loading contribution from upstream of SW-1 which at 68mg/L was significantly higher than the TSS concentrations at the SWM Pond outlets E-SWMP-OUT (< 10 mg/L) and W-SWMP-OUT (19 mg/L).

Inter-event sampling efforts on June 5 and 27, 2012 and September 28, 2012, all demonstrated TSS sampling results in the downstream receiving swale (SW-2) and Tooley Creek, SW-3 and SW-4 stations were far below TSS concentrations of 25 mg/L, and often below the detection limit of 10 mg/L. The low TSS levels are typically representative of flow conditions during inter-event periods, with negligible point or non-point source loading affects. On November 1, 2013, the higher TSS of 31 mg/L loading discharge observed at the West SWM Pond discharge outfall, but did not appear to have any noticeable affects on the receiving swale TSS concentrations at SW-1 and SW-2 of 20 mg/L and 17 mg/L, respectively. Note that in the absence of discharge measurements, which are necessary to carry out a mass balance, it is not possible to quantify the actual contribution of the SWM Pond to the TSS concentration measured at the downstream station SW-2.

Controlled SWM Pond discharge events, observed more recently during sampling events on March 19 and April 8, 2013, resulted in outlet TSS concentrations which were well below the 25mg/L level (below detection limits of 10 mg/L on March 19) level and appeared not to affect TSS levels in the receiving swale (measured at SW-2) which were below detection limits on April 8 and were, in fact, higher (at 14 mg/L) than the SWM outlet concentrations on March 19. These results demonstrate the effectiveness of lowering SWM Pond levels through periodic discharges of surface water in the SWM Ponds after initial settling has occurred.

5.2.2 Turbidity

The Turbidity sampling results summarized in Table 4, Section 4.3 are discussed in more detail in this section.

Turbidity concentration results generally follow the same trend as outlined for TSS above (See Tables 3 and 4). Similar to TSS, there is no indication that the East and West SWM Pond discharges are having any adverse effects on turbidity levels in the receiving swale and further downstream in Tooley Creek. For example, the higher turbidity discharge levels observed on November 1, 2012 of 55 NTU from the W-SWMP-OUT did not have any notable adverse effects in the receiving swale, with corresponding turbidity concentrations of 37 NTU and 28 NTU at Stations SW1 (upstream of the SWM pond outlets) and SW2 (downstream), respectively. Similarly, the April 8, 2013 controlled discharge turbidity levels from both the E-SWMP-OUT and W-SWMP-OUT stations of 23 NTU and 30 NTU were also observed. However, at the upstream and downstream receiving swale stations SW-1 and SW-2, turbidity levels of 5.2 NTU and 4.4 NTU show no indications of effects from these controlled discharges.

Tooley Creek turbidity results for all sampling events (except for September 6, 2012) are typically comparable and appear to be unaffected by the SWM Pond discharges. The (SW3) upstream and (SW4) downstream observed an increase in Turbidity values, from 3.2 NTU to 16 NTU mg/L during the September 6, 2012 sampling efforts during the rainfall-runoff, controlled discharge sampling indicate the CWQG limit (i.e., an increase greater than 8 NTU during high flow/turbid waters - see Table 4, Note 3) was exceeded. However, a significant increase in turbidity when comparing upstream and downs downstream Tooley Creek stations (SW3 and SW4) has not been observed since this September 6, 2012 result.

This observed increase and could be related to a variety of background factors unrelated to the controlled discharge during this rainfall-runoff period (e.g., bank erosion and deposition, re-suspension of sediment in Tooley Creek and/or receiving swale).

5.2.3 *In Situ* Measurements

The *in situ* measurements of pH, temperature and conductivity are summarized in Tables 5, 6 and 7, respectively (Section 4.3). The *in situ* measurements field forms are provided in Appendix E-3.

5.2.3.1 pH

The *in situ* surface water sampling measurements for pH demonstrate the receiving swale (CN Rail ditch) and Tooley Creek pH levels fall within the PWQO and CWQG ranges from 6.5 to 8.5 and 6.5 to 9, respectively, with the exception of pH levels of 5.78 and 6.25 at SW-1 and SW-2 on June 27 2012 and 6.28 measured at Station SW-1 on March 12, 2013 during the spring freshet conditions. There are also some pH levels out of the acceptable PWQO and CWQG ranges measured in the East and West SWM Ponds inlets and outlets periodically. The SWM Ponds outfall locations have had some slightly more basic pH levels out of the PWQO range, (e.g., 8.86 on September 28, 2012; and 8.62 on November 1, 2012). However, there is no evidence the SWM Pond discharges have any adverse affects on pH levels in the receiving swale and Tooley Creek.

5.2.3.2 Temperature

The spring freshet conditions on March 12, 2013, observed *in situ* temperature measurements with the largest variance in temperature. The East and West SWM Pond outfall measurements on that day were 5.2 °C and 5.0 °C, respectively, whereas the receiving swale upstream and downstream (SW-1 and SW-2) stations recorded temperatures of 1.5°C and 0.2 °C, respectively. Further downstream in Tooley Creek, temperature measurements of 0.5 °C and 1.2 °C were taken at SW-3 and SW-4 (upstream and downstream) Stations.

Temperature measurements in the receiving swale and Tooley Creek show very comparable levels at all stations and appear to have been unaffected by the SWM pond discharges for all of the sampling events observed during Year 1 of this program. Therefore, there have been no concerns with any increases in temperature observed in the receiving stream and Tooley Creek that would exceed any of the narratives for PWQO or CWQG narratives outlined in Table 6.

5.2.3.3 Conductivity

The conductivity *in situ* measurements observed in the receiving swale (CN Rail ditch) and Tooley Creek during Year 1 of this Surface Water Program typically showed very comparable results at their respective upstream and downstream sampling locations suggesting that any affect attributable to the SWM pond discharges was small. The notable exception is the September 6, 2012 sampling event where SW-1 and SW-2 measurements nearly doubled going from 270 µS/cm (upstream) to 480 µS/cm (downstream) in the receiving swale, while in Tooley Creek levels dropped by nearly half going from 1030 µS/cm at SW-3 (upstream) to 640 µS/cm at SW-4 (downstream). At the same time measurements taken at the SWM pond east and west outlets were 450 and 650 µS/cm, respectively. This would indicate that the SWM pond discharges likely contributed to the increase in the conductivity levels in the receiving swale between SW-1 and SW2, while at the same time was a factor in decreasing the conductivity levels in Tooley Creek at the downstream location. As mentioned above, without discharge measurements, which are necessary to carry out a mass balance, it is not possible to quantify the actual contribution of the SWM Pond to the conductivity levels measured at the downstream stations.

There are no PWQO or CWQG limits for conductivity. However, any significant increases are often considered indicators for groundwater influence and/or increases in finer suspended metal loadings in receiving water. The conductivity measurements observed in Year 1 do not present any cause for major concerns at this time. However, continued observed increases during any sampling conditions will continue to be monitored, with consideration for additional E&SC measures at the Site outfall, if deemed appropriate.

5.3 Spill Response

On September 25, 2012, a hydraulic oil spill occurred from a failed hydraulic hose on a 150 ton crawler crane. This spill resulted in approximately 100 L of hydraulic oil hitting the ground. The material was immediately contained, via dry absorbent and pig blankets. The following day on September 26 the crane was repaired by All Crane Canada and was moved away from the spill area, and all of the potentially contaminated soil (approximately 0.5 metric tons of material) was removed (excavated) by Miller Waste and transported off off-Site to Pebblestone Multi-Services Inc. (now owned by The Miller Group - Miller Waste Systems) at 2000 Wentworth Street in Whitby, Ontario.

Covanta notified the Golder Surface Water CEP of the September 25, 2012 spill within 24 hours after the event, spill containment and initiation of clean-up. Covanta informed the Surface Water CEP of the call to the MOE Spill Response Action Centre, and that appropriate containment measures were in place, along with arrangements for transportation of the contaminated soil off-Site was underway.

A Site visit to inspect the location of the spill and any potential impact on the receiving stream off-Site was conducted on Friday September 28, 2012. Antecedent weather during this period observed five (5) days of dry (inter events) conditions from September 23 to 27, 2012, along with continued dry conditions on September 28, 2012 during the Golder follow-up inspection and surface water sampling in the receiving swale and Tooley Creek. During the Site visit, there were no notable concerns on-Site, in the receiving swale or further downstream in Tooley Creek, as was anticipated considering the prolonged dry conditions and therefore no additional hydrocarbon analyses for the surface water sample submissions were performed.

On March 18, 2013, another hydraulic fluid spill of approximately 18 L from an excavator occurred east of the administration building currently under construction. Covanta and the CPP EMI reported that the spill was immediately contained and at no time was the hydraulic oil or any other effects of the spill a concern to nearby waterways or estuaries. The equipment was isolated, the spill immediately cleaned-up and the contaminated soil hauled to Coco Paving Maplegrove Yard at 3075 Maple Grove Rd, Bowmanville, ON for remediation. CPP reported this spill to the MOE Spill Action Centre. The MOE responded to this reported incident by confirming that a spill less than 25 L was not a reportable event unless the spill affected nearby waterways.

A Spill Response Plan as part of the conditions for the EA, will be prepared for the Operational Phase of the Facility and will incorporate any learning and corrective measures learned from the During Construction monitoring period.

5.4 Adequacy of the Monitoring Program

The Surface Water Monitoring Program for the Year 1, During Construction period for the Site is considered to be adequate and in general accordance with the Plan.

5.5 Assessment of the Need for Implementation of Contingency Measures

Based on the Year 1 Surface Water Monitoring Program results, there is no need for the implementation of any further contingency measures at this time.

For Year 2, as a proactive contingency, the Golder Surface Water CEP will also be informed within 24 hours of reportable spills (i.e., after the MOE Spill Action Centre is notified as is appropriate). This follow-up will ensure Covanta, the CPP EMI, along with the Golder Surface Water CEP and the Genivar Groundwater CEP have discussed (with input from the MOE Spill Action Centre) whether a Site visit and additional surface water and/or groundwater sampling efforts are needed.

6.0 CONCLUSIONS

The E&SC deficiencies noted throughout the monitoring period were appropriately addressed by the Covanta and the CPP EMI. Covanta, the CPP EMI, and the Golder Surface Water CEP carried out the weekly inspections, review and sign-off, to ensure deficiencies were promptly addressed.

Surface water quality sampling results taken throughout the monitoring program indicate that there are no significant concerns with any Site influence on surface water conditions in the receiving swale (CN Rail ditch) and further downstream in Tooley Creek. These monitoring results are also providing baseline surface water quality data for comparative purposes, as the Surface Water Monitoring Program continues into the Year 2, during construction period, and for the Operation Phase scheduled to start in March, 2014.

Considering there were additional construction activities observed upstream of the Site, along with rural agricultural influence on runoff loading, the higher TSS, turbidity and conductivity loadings observed at downstream stations in the receiving swale and Tooley Creek on September 6, 2012 are most likely associated with these off Site, upstream influences not specifically identified or characterized by this monitoring program.

7.0 RECOMMENDATIONS

It is recommended that the E&SC Inspections and the Surface Water Sampling program continue until construction activities throughout the Site are complete. These continued efforts should include the weekly EMI report circulation, review and sign-off by Covanta, the CPP EMI and the Golder Surface Water CEP once all deficiencies are confirmed to be appropriately addressed.

Surface water quality sampling results will be collected as per the program outlined in Section 3.0, and will be promptly analyzed by the Golder Surface Water CEP. Any potential issues or concerns rising from these results and relating to Site discharges should be immediately brought to the attention of Covanta and the CPP EMI and promptly addressed with appropriate mitigation measures.

Since the Regional Municipality of Durham trunk servicing construction is scheduled for the area in 2013, it is also recommended that Covanta, the CPP EMI and Golder Surface Water CEP continue to monitor any impacts or modifications made to this receiving swale, and make any appropriate modifications to the Surface Water Monitoring stations or sampling frequencies to support this study.

It is also recommended that the Owners, Covanta, the CPP EMI, along with the Golder Surface Water CEP and the Genivar Groundwater CEP all discuss any spill incident via conference call within 24 hours after such incident. This conference call will follow the first call to the MOE Spill Action Centre as appropriate. This practice will ensure that an appropriate spill response occurs, including both surface water and groundwater sampling, when appropriate. This coordination effort will also allow the MOE to provide their input upfront on the level of spill response required, based on each particular incident, noting that minor equipment failure spills are often observed during a major construction project. These continued spill response efforts and any valuable lessons learned will be incorporated into the Spill Response Plan, as part of the conditions for the EA approval, will be prepared for the Operational Phase of the Facility schedule to start in March, 2014.

Report Signature Page

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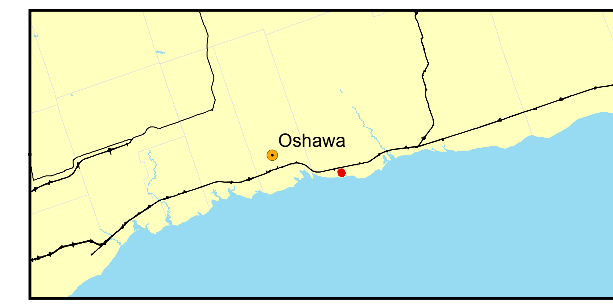
9.0 GLOSSARY OF TERMS AND ABBREVIATIONS

CEP	Competent Environmental Practitioner
CNR	Canadian National Railway
CofA	Certificate of Approval
CPP	Courtice Power Partners
CSP	corrugated steel pipe
CWQG	Canadian Water Quality Guideline
DFO	Department of Fisheries and Oceans
DYEC	Durham York Energy Centre
EA	Environmental Assessment
ECA	Environmental Compliance Approval
EFW	Energy from Waste
E&SC	erosion and sediment control
EMI	Environmental Monitor and Inspector
HaESP	Health and Safety Environmental Plan
mg/L	Milligrams per litre
MNR	Ontario Ministry of Natural Resources
MOE	Ontario Ministry of the Environment
MW	Mega Watts
OPSD	Ontario Provincial Standard Drawing
NTU	Nephelometric Turbidity Units
PVC	polyvinyl chloride
PWQO	Provincial Water Quality Objective
RDL	Reported Detection Limit
SW	Surface Water
SWM	Stormwater management
TSS	Total Suspended Solids
µS/cm	Micro Siemens per centimetre
WDS	Waste Disposal Site
WPCP	Water Pollution Control Plant

FIGURES

LEGEND

- Surface Water Sampling Locations
- Major Contour (25 m)
- Minor Contour (5 m)
- Expressway
- Highway
- Major Road
- Local Road
- Railway
- Swale
- Interceptor Swale
- Utility Line
- Watercourse
- Waterbody
- Catchment Divide
- Approximate Site Boundary



REFERENCE

Base Data - MNR NRVIS, obtained 2004, CANMAP v2006.4
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Projection: Transverse Mercator Datum: NAD 83 Coordinate System: UTM Zone 17N

200 100 0 200 400
SCALE 1:9,000 METERS

PROJECT
DURHAM-YORK ENERGY CENTRE
SURFACE WATER AND EROSION AND SEDIMENT CONTROL MONITORING

TITLE
SURFACE WATER SAMPLING LOCATIONS

Golder Associates
Mississauga, Ontario

PROJECT NO. 12-1151-0155 (4000)			SCALE AS SHOWN	REV. 0.0
DESIGN	PRM	25 Aug. 2010	FIGURE: 1	
GIS	PRM	25 Apr. 2013		
CHECK	JSA	25 Apr. 2013		
REVIEW	TW	25 Apr. 2013		

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