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DURING CONSTRUCTION ANNUAL REPORT YEAR 3

DURHAM YORK ENERGY CENTRE - SURFACE WATER MONITORING PROGRAM

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REPORT

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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 3 Report is in general accordance with the Ontario Ministry of the Environment and Climate Change ("MOECC") Technical Guidance Document on Monitoring and Reporting for Waste Disposal Sites (2010). This Year 3 report highlights the continued Surface Water Monitoring Program - During Construction activities from April 2014 to January 2015.

The Year 1 Surface Water Monitoring Program - During Construction Report, dated April 30, 2013, was prepared by Golder Associates, reviewed by the MOECC, with acceptance confirmed during a conference call meeting with the Regional Municipalities of Durham and York on September 17, 2013. During this conference call discussion with the MOECC, a refinement for the Surface Water Monitoring Program in Year 2 focusing on monthly *in situ* turbidity measurements at the established surface water sampling stations, with optional additional Total Suspended solids sampling, was also discussed. These monthly surface water in situ measurements and periodic sampling efforts were implemented in Year 2, and along with continued weekly Environmental Monitor and Inspector ("EMI") E&SC Site inspections and spill records, response and reporting (where needed), continued for Year 3 and are all presented in this report.

The Year 2 Surface Water Monitoring Program - During Construction Report, dated April 29, 2014, was prepared by Golder Associates, reviewed by the MOECC, with acceptance confirmed by the Regional Municipalities of Durham and York in a letter stating the MOECC's satisfaction dated May 9, 2014 and received on May 13, 2014.

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 is provided in Appendix B.

Covanta is overseeing both the construction and operation phases of the Facility. Construction of the Facility is nearing completion and Functional Testing has been progressing through 2014. Facility start-up and testing on municipal solid waste commenced on February 13, 2015. 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 performing the various construction administration tasks for the Facility and the overall Site. CPP have also identified qualified staff to prepare the weekly 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, MOECC contact). Covanta assumed the role of EMI for the weekly E&SC Inspections in December 2014 and will continue this role through the completion of construction.

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 electricity, 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 (“MOECC”) (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 third year of during construction monitoring, since the program was initiated on May 28, 2012.

The Owners (“Regional Municipalities of Durham and York”) and Covanta have been meeting with the MOECC 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 relays these EMI reviews to the Owners and the MOECC

Spills Action Centre immediately, including a summary of any deficiencies and corrective measures, surface water sampling events, and/or any reportable spills on-Site.

Condition 20.7 of the EA Notice of Approval and Section 4.3 of the approved Groundwater and Surface Water Monitoring Plan requires the submission of a Surface Water Facility Initiation Report for the Facility. The first receipt of waste occurred on February 9, 2015 and the Facility Initiation Report was submitted by the Regional Municipalities of Durham and York to the MOECC on March 11, 2015 under separate cover.

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 Plain 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 and landscaping already complete (See Photographs 14 and 26 in Appendix C). Final outfall channel work was completed and tied into the new Region of Durham conveyance channel (receiving swale) constructed immediately south of the Site and north of the CNR in April 2014.

During most of the construction phase (up until April 2014), stormwater discharges from the SWM ponds were 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 uncontrolled from the ponds during the construction period.

For both the East and West SWM Pond, the controlled discharge was directed through temporary PVC piping until April 2014. During this period (up until connection was made to the new Region of Durham conveyance channel), both SWM Pond pipe outlets discharged to one outfall location immediately south of the West SWM Pond, beyond the property fence. Before connection to the new conveyance channel, if significant rainfall-runoff events (e.g., greater than 25 mm of total rainfall) resulted in the SWM pond water levels reaching the inlet (upstream end) of the PVC pipes, controlled discharge would gravity drain through the outlet pipes to the outfall location.

During the conveyance channel construction work, which commenced in September 2013, the ponds were pumped as needed to temporary conveyance swales downstream or around the conveyance channel construction activities. Actual discharge points and time frames were coordinated directly with the contractor executing the work to occur when turbidity levels in the ponds appeared to be low based on visual inspection, and to avoid any disruption to on-going work. The east and west SWM ponds discharged to a rip-rap splash pad located close to the southwest Site boundary. The outlet pad was located in a low-lying grassed area.

This Site outfall currently discharges directly to the newly constructed receiving swale (conveyance channel) south of the Site, and immediately north of the CNR. This conveyance channel directs surface water flow from east to west towards Tooley Creek. The upstream end of this channel within the study area conveys off Site runoff flow through two 600 mm diameter corrugated steel pipe ("CSP") culverts under Osborne Road.

From this culvert crossing, the conveyance channel continues west another 800 m to Courtice Road. Surface water flow is conveyed under Courtice Road via a 1250 mm diameter CSP. The conveyance channel discharges into Tooley Creek approximately 400 m downstream and west of the Courtice Road crossing.

Tooley Creek flows generally north to south and crosses the CNR immediately downstream of the confluence with the Site receiving swale (i.e., the newly constructed Region of Durham conveyance channel). 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. The program for Year 3 during construction is in general accordance with Sections 3.3 and 3.4 of the Plan (Stantec, 2011) and continues the program modifications and refinements from Year 1 and Year 2.

The MOECC provided comments on the Year 1 during construction Groundwater and Surface Water Monitoring Program reports for the Site, in a response letter dated May 24, 2013 (Appendix A-2). A follow-up conference call was coordinated with the Regions, Covanta and Golder on September 17, 2013, to review the comments and discuss any modifications to the Surface Water program required. The Regions follow-up letter dated October 18, 2013 (Appendix A-3), summarized the key points discussed during this conference call. A few modifications to the Year 2 Surface Water Monitoring Program for the Site, summarized below, were accepted by the MOECC and Regions as per the correspondence.

- In Year 2, the Golder surface water field crew began taking in situ turbidity measurements using a turbidity meter at all stations for the monthly sampling efforts, with TSS sampling to be performed on an 'as needed basis', when there was any concern that *in situ* turbidity measurements were indicating TSS concentrations above 25 mg/L.
- Due to the Region trunk sewer construction activity start-up in September 2013, the SW1 and SW2 stations that were directly affected (within the zone of construction) were moved on September 30, 2013

The MOECC provided acceptance of the submission of the documents fulfilling Condition 20.8 in a letter dated October 31, 2013 (Appendix A-4).

The MOECC provided comments on the Year 2 during construction Groundwater and Surface Water Monitoring Program reports for the Site, in a response letter dated May 9, 2014 (Appendix A-5). A follow-up conference call was coordinated with the Regions, Covanta and Golder on June 5, 2014, to review the comments and discuss any modifications to the Surface Water program required.

More detail on the Surface Water Monitoring program and modifications is provided below.

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. Changes to locations SW1 and SW2 on/after September 30, 2013, due to construction are shown on Figure 2. Each station is described in more detail below, with photographs provided in Appendix C.

SW1

Sampling Location SW1 was established on June 5, 2013 within the CNR ditch ("receiving swale") on the north side of the CNR line immediately downstream of 100 Osborne Road driveway leading to the Courtice Water Pollution Control Plant ("WPCP") (Figure 1). This flat bottom ditch is approximately 1 m in width at this location. A pool that is slightly deeper than the downstream swale is located at the outlet of the 100 Osborne Road driveway culvert. Dense wetland grasses span the width of the channel.

SW1 was moved on September 30, 2013 approximately 15 m to the East; to the upstream inlet end of the culvert crossing 100 Osborne Rd driveway (Figure 2). The sampling location was moved because of Region of Durham sewer trunk construction on the outlet downstream side of the culvert. SW 1 remained at this location for the remainder of the construction phase Surface Water Monitoring program.

SW2

Sampling Location SW2 was originally established within the ditch on the north side of the CNR line approximately 50 m east of Courtice Road (Figure 1). 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.

SW2 was moved approximately 190 m to the west (Figure 2), at a suitable location west of the Courtice Road crossing and further downstream in the receiving swale before the Region trunk sewer construction started in September 2013. SW2 remained at this location for the remainder of the construction phase Surface Water Monitoring program.

SW3

Sampling Location SW3 is on Tooley Creek, approximately 50m north of the CNR crossing and upstream of the receiving swale confluence with Tooley Creek. 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 downstream of the receiving swale confluence with Tooley Creek. 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.

SWM Pond Outlets

Prior to the Region trunk sewer construction that started in October 2013, the east and west SWM ponds discharged to a rip-rap splash pad located close to the southwest Site boundary. The outlet pad was located in a low-lying grassed area.

At the time of construction of the Region trunk sewer, the E-SWMP and W-SWMP temporary outlets flowed onto to a rip-rap splash pad located in the large trunk sewer construction trench south of the new road entering the Covanta facility from the southwest.

Currently, both E-SWMP and W-SWMP permanent outfall pipes discharge directly to the new receiving swale south of the Site and north of the CNR, as shown on Figure 2. Both SWMP outfalls have been on-line (i.e., valves open) since late April, 2014, although the W-SWMP was also connected through the temporary line until it was removed in July 2014.

During the construction-stage, pond discharge was 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 has occurred on occasion (e.g., Year 1 - September 6, 2012 and November 1, 2012; Year 2 – June 25, 2013, October 7, 2013, December 20, 2013 and January 13, 2014; Year 3 – April 30, 2014). The SWM pond outlets are accessed by walking west along the southern perimeter fence from the 100 Osborne Road driveway. Pre October 2013, samples were taken at the combined W-SWMP and E-SWMP PVC pipes outfall location. Post October 2013 samples were taken at temporary re-located outlets during construction of the Region trunk sewer and samples were then taken at the permanent outfalls following completion of the new conveyance channel in April 2014.

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 contained in the Site photographic record established during the initiation of the program in late May/early June, 2012 (Appendix C), along with any notable additional photographs taken at the time of the specific inspection during the Year 3 monitoring period. Each EMI E&SC report is signed-off by the Golder CEP after confirmation is received that any outstanding deficiencies have been addressed.

The 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 Measurements and Sampling

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

Three inter-event ('dry-period'), surface water measurement and sampling efforts were performed during the Year 3 monitoring period. An inter-event occurs when there is no rainfall-runoff flow increase in the receiving swale and Tooley Creek. It should also be noted that some of these sampling efforts occurred when there were trace amounts of total daily rainfall observed at the nearby Courtice WPCP, approximately 5 km west of the Site. Depending on the water level conditions in the SWM ponds, on some occasions a controlled discharge may have occurred during these sampling efforts up until April 2014.

Rainfall-runoff events were observed during some monthly *in situ* measurement and sampling visits; during one gravity-fed SWMPs discharge scenario and during three scenarios where the SWMPs did not observe any discharge. However, there were no controlled discharge events observed during the Year 3 site visits.

Controlled discharges from the SWM Pond(s) were not observed or sampled during Year 3, even though every effort was made to be on-Site during the discharge periods. These discharge periods typically occurred shortly after larger rainfall events (i.e., for a rainfall-runoff event of approximately 5 mm or greater), 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) or current construction trench. Additional information on controlled discharges in Year 3 is provided in Section 5.1. Controlled discharges ceased after the tie-in of the permanent outfalls to the conveyance channel in April 2014.

During each sampling effort, comparative upstream and downstream viewpoints of both the receiving swale/conveyance channel 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 turbidity, pH, temperature, and conductivity were also taken by Golder staff at each surface water monitoring station, when conditions were suitable. The instrument used for these measurements was calibrated before each use, to ensure accurate results were obtained.

3.4 Certificate of Approval Requirements

Performing the E&SC and Surface Water Sampling program (as described in this report) 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 established consistent sampling locations that were considered representative of 'well-mixed' surface water conditions. Typically, these grabs were taken in the centre-line zone of the receiving swale or creek, and 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 due to the sampling procedure. 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 Environmental Safety 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

Records were maintained, including field notes, analytical results, measurements, and logs in electronic format and hardcopy. Golder developed both the EMI report template and the surface water sampling field form that was filled out for each monitoring station during the sampling visits (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) included commentary on the monthly *in situ* water quality measurements and the final EMI report(s) signed-off by the Golder Surface Water CEP, after confirmation was received that all notable deficiencies had been addressed.

A summary Site Photographic Record illustrating periodic observations from the E&SC monitoring and selected periodic *in situ* surface water measurements has been prepared (Appendix C).

3.8 Sampling Grabs and In Situ Measurements

A grab sample is defined as a sample collected during a very short time period at a single location. As mentioned above, Surface Water sampling occurred via a grab sample from established consistent sampling locations that are considered representative of 'well-mixed' surface water conditions at the sampling station and field personnel were required to obtain fall protection training for sampling at the SWM ponds.

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 were received and reviewed. If there was any question or concern regarding the initial laboratory results, the duplicate samples would then be submitted to the laboratory for additional analysis. The duplicate samples will be discarded at the end of every season once all reviews are complete.

In situ measurements for turbidity, 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 obtained (See Section 4.1).

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 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 Monitoring Program results for Year 3 construction are summarized in this section.

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, supported by phone and e-mail conversations between Covanta, CPP and Golder. In addition, the periodic unannounced visit to the Site by the Surface Water CEP or designate on August 8 and November 3, 2014 confirmed the accuracy of E&SC Site conditions presented in the weekly reports, and provided an opportunity to offer any additional recommendations, if needed.

The field and periodic laboratory data collected for seven (7) surface water measurements and periodic sampling events during Year 3 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. *In situ* water quality parameter measurements were also recorded using Hana probes and a Lamotte 2020we turbidity meter. Before field visits, the Hana probes were calibrated in the office using calibration buffer set solutions for pH and conductivity. The turbidity meter was calibrated using a series of polymeric based turbidity standard sample vials (in nephelometric turbidity units, ("NTUs")) that are factory tested and certified to provide a consistent level of transparency.

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 for the Year 3 monitoring period, 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). ■	■ 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.	■ Tie down improvements and repairs (e.g., patched tears) made to silt fencing, where needed. ■ Sediment build-up was periodically removed and re-distributed on-Site.
Controlled Discharge (up until April 2014)	■ 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

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

E&SC Measure	Deficiency Highlights	General Comments	Corrective Measures Implemented/Recommended
Vehicular Entrances to the Site	■ Mud mats clogging, general dirt build-up from construction transport activity on-Site.	■ Entrance mats appeared relatively clean during Surface Water CEP Site inspections.	■ Sweeping at the vehicle entrances via mechanical broom, as required per CPP general practice. ■ One truck wheel wash station 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., June 6, 2014, September 15, 2014).
Stock Piles (No.s 1,2 Working Construction Fill	■ N/A	■ N/A	■ N/A

Interceptor Swales (including Rock Check Dams)	■ Inlet swale to West SWM Pond retaining water in the spring and the east swale to East SWM Pond retaining water in the fall.	■ These drainage paths to the East and West Ponds did not experience excess sediment accumulation at upstream ends of rock check dams. ■ Sediment clean-out in the rock-check dam areas would be prescribed 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). ■ The swale to the East SWM Pond was intermittently holding water which typically occurred when water levels in the SWM Ponds were low.	■ N/A
Final Stage(s) of Construction: Site Vegetation and SWMP Cleanouts	■ NA	■ N/A	■ SWMPs cleanouts performed in August and September, 2013 ■ Silt fencing to be removed from areas on Site where construction is complete and plantings are established.

The E&SC deficiencies noted throughout the Year 3 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 In Situ Measurement Results

Surface water *in situ* measurements (for turbidity, pH, temperature and conductivity), with consideration for TSS and Turbidity sampling if conditions warranted further assessment, was conducted on nine (9) occasions during the period from April 2014 to January 2015. These sampling events consisted of five (5) inter-events, one (1) rainfall-runoff gravity-fed discharge, and (3) rainfall-runoff with no discharge sets. During the monthly visits, the field staff would determine whether or not additional sampling beyond the *in situ* measurements were warranted based on visual measurements and turbidity meter results. A summary of the sampling events is provided in Table 2 below.

Table 2: Surface Water Sampling Event Summary - Year 3 Construction

Date (Type of event) [1.]	Season	Total Rainfall [2.]	Site Conditions and Observations
April 30, 2014 (Rainfall-runoff, gravity fed discharge)	Spring	No data available	▪ Antecedent rainfall: April 29/14(30.1 mm) ▪ Gravity fed discharge from West SWM Pond.
May 30, 2014 (Inter-event)	Spring	0 mm	▪ Antecedent rainfall: May 27/14 (0.3 mm) ▪ No SWM Pond discharge.
June 3, 2014 (Rainfall runoff, no discharge)	Summer	19.6 mm	▪ No Antecedent rainfall. ▪ No SWM Pond discharge.
July 28, 2014 (Rainfall runoff, no discharge)	Summer	13.0 mm	▪ Antecedent rainfall: July 27/14 (24.1 mm) ▪ No SWM Pond discharge.
August 29, 2014 (Inter-event)	Summer	0 mm	▪ No antecedent rainfall. ▪ No SWM Pond discharge.
September 11, 2014 (Rainfall-runoff, no discharge)	Fall	5.8 mm	▪ Antecedent rainfall: September 10/14 (14.6 mm); October 6/14 (4.5mm); September 5/14 (20.3 mm); ▪ No SWM Pond discharge.
October 24, 2014 (Inter-event)	Fall	0 mm	▪ Antecedent rainfall: October 20/14 (14.1 mm); October 21/14 (1.3 mm). ▪ No SWM Pond discharge.
December 22, 2014 (Inter-event)	Fall	0 mm	▪ Antecedent rainfall: December 17/14 (1.9 mm); December 16/14 (5.9 mm). ▪ No SWM Pond discharge.
January 15, 2015 (Inter-event)	Fall	0 mm	▪ Antecedent rainfall: January 12/15 (0.6 mm); January 6/15 (0.3 mm); January 4/15 (8.1 mm). ▪ No SWM Pond discharge.

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 Plant ("WPCP"), Environment Canada Climate ID No. 6155878.

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 shown on Figures 1 and 2. During rainfall-runoff-gravity discharge sampling events, samples were also taken from the East and West SWM Pond stations. However, samples were not submitted to Maxxam Analytics for TSS and turbidity analyses as visual and/or *in situ* turbidity measurements did not identify any potential issues. The *in situ* measurements for turbidity, temperature, pH, conductivity, and qualitative observations recorded during sampling are provided in Appendix E-3. Sampling results are summarized in Tables 3 to 8 below, and compared to the Provincial Water Quality Objectives ("PWQOs") (MOE, 1994) and Canadian Water Quality Guidelines ("CWQGs") (CCME, 2013).

Table 3: *In Situ* Turbidity Measurements

Date [1.] (Type of event)	PWQO (NTU)	CWQG (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)
April 30, 2014 (Rainfall-runoff, gravity-fed discharge)	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [2.] for CWQG narrative for Turbidity.	160.0	376.0	90.2	114.0	188.0	888.0 [5.]	NA	816.0 [5.]
May 30, 2014 (Inter-event)			925.0 [5.]	8.9	4.1	2.9	27.6	10.0	8.3	ND
June 3, 2014 (Rainfall runoff, no discharge)			24.7	120.0	33.0	48.7	427.0	51.4	21.9	539.0 [5.]
July 28, 2014 (Rainfall runoff, no discharge)			11.0	55.4	21.9	48.1	233.0	157.0	5.8	208.0
August 29, 2014 (Inter-event)			ND	ND	8.8	11.5	11.1	12.2	29.4	ND
September 11, 2014 (Rainfall-runoff, no discharge)			BD [7.]	BD [7.]	12.0	21.0	BD [7.]	BD [7.]	BD [7.]	BD [7.]
October 24, 2014 (Inter-event)			16.2	ND	8.3	11.7	36.4	44.9	5.4	ND
December 22, 2014 (Inter-event)			12.2	65.0	6.5	4.7	5.8	ND	40.8	22.0
January 15, 2015 (Inter-event)			ND	ND	ND	ND	ND	ND	ND	ND

Notes:

1. Inter-event (dry) or rainfall-runoff sampling event indication is provided below the date.
2. The CWQGs 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).
3. Where 'NA' is indicated, sample was not measured to do Health &Safety / access issues during construction.
4. Where 'ND' is indicated, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort or location was dry.
5. Turbidity meter instrument measurement likely out of range.
6. Where 'BD' is indicated, measurement was below detection limit of the instrument used.
7. Instrument used was a Hach Model DR850 s/n 31509 Meter.

Table 4: *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
April 30, 2014 (Rainfall-runoff, gravity-fed Discharge)	**6.5 to 8.5**	**6.5 to 9**	8.2	8.2	8.2	8.3	6.7	8.2	NA	8.0
May 30, 2014 (Inter-event)			7.3	8.2	8.5	8.2	**9.2**	**9.3**	7.7	ND
June 3, 2014 (Rainfall runoff no discharge)			7.9	8.0	8.1	8.5	7.4	7.8	7.8	8.4
July 28, 2014 (Rainfall runoff, no discharge			8.1	8.1	8.1	8.0	7.5	7.6	7.1	8.1
August 29, 2014 (Inter-event)			ND	ND	6.8	6.6	6.7	6.8	7.8	ND
September 11, 2014 (Rainfall-runoff, no discharge			8.0	8.3	8.2	8.2	7.9	8.1	8.1	8.3
October 24, 2014 (Inter-event)			7.8	ND	8.3	8.2	7.2	7.3	8.5	ND
December 22, 2014 (Inter-event)			7.2	8.0	7.8	7.8	6.6	ND	7.4	7.4
January 15, 2015 (Inter-event)			ND	ND	ND	ND	ND	ND	ND	ND

Notes:

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

Table 5: *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)
April 30, 2014 (Rainfall-runoff, gravity-fed Discharge)	Note[2.]	Note[3.]	5.6	5.7	5.6	5.9	5.6	5.6	NA	5.7
May 30, 2014 (Inter-event)			19.4	19.0	16.6	16.8	22.6	21.6	18.3	ND
June 3, 2014 (Rainfall runoff, no discharge)			17.4	18.4	16.9	17.0	18.3	20.2	18.7	19.2
July 28, 2014 (Rainfall runoff, no discharge)			19.6	21.1	18.1	19.4	21.4	22.9	22.0	19.6
August 29, 2014 (Inter-event)			ND	ND	15.7	15.3	22.2	21.7	20.9	ND
September 11, 2014 (Rainfall-runoff, no discharge)			17.8	17.5	17.7	17.7	20.3	20.1	18.8	18.4
October 24, 2014 (Inter-event)			11.3	ND	9.5	9.2	10.7	10.3	11.5	ND
December 22, 2014 (Inter-event)			3.9	3.0	2.5	2.6	2.4	ND	3.8	4.1
January 15, 2015 (Inter-event)			ND	ND	ND	ND	ND	ND	ND	ND

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 indicated, sample was not measured to do Health &Safety / access issues during construction.
5. Where 'ND' is indicated, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort or location was dry.
6. Exceedances of limits are in bold, with further discussion in Section 5.2, where applicable.

Table 6: *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 [3.] (µS/cm)	W-SWMP-OUT [4.] (µS/cm)
April 30, 2014 (Rainfall-runoff, Gravity-fed Discharge)	N/A	3150	1927	722	978	1476	563	NA	578
May 30, 2014 (Inter-event)		409	1099	828	864	1004	457	1135	ND
June 3, 2014 (Controlled discharge)		971	859	866	815	958	543	1125	520
July 28, 2014 (Rainfall runoff, no discharge)		244	349	805	668	534	505	2599	444
August 29, 2014 (Inter-event)		NA	NA	1346	1126	755	497	777	ND
September 11, 2014 (Rainfall-runoff, no discharge)		569	489	1177	1112	707	615	605	670
October 24, 2014 (Inter-event)		781	NA	847	807	362	377	625	ND
December 22, 2014 (Inter-event)		1670	1060	1041	1037	1709	ND	2168	ND
January 15, 2015 (Inter-event)		ND	ND	ND	ND	ND	ND	ND	ND

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 indicated, sample was not measured to do Health &Safety / access issues during construction.
4. Where 'ND' is indicated, SWM Pond station was not sampled or provided in this table, since there was no discharge from the SWM feature during the sampling effort or location was dry.

Exceeding range of Hana probe, most likely due to freezing conditions / stagnant water.

4.4 Spill Response

The CPP EMI and Covanta handled any 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 MOECC occurred. The Owners were also notified of the incidents that warranted a call to the MOECC Spills Action Centre, and the follow-up response activities.

Table 7 below summarizes the spills and follow-ups with the MOECC Spills Action Centre. Appropriate Site actions were taken to contain and remove the spill from the Site and/or within the building envelope.

Table 7: Site Spills – Year 3 Construction

Date (Type of event)	Description	Amount	Call-in to MOECC Spill Response Action Centre
July 17, 2014 [1.]	Hydraulic Oil	8 L	No
November 11, 2014 [2.]	Boiler Treatment Chemical	380 L	Yes

Notes:
1. Onto concrete floor below.
2. Surface water sampling and Site follow-up inspections performed on November 11 and 17, 2014, measuring pH at the E-SWMP-IN station.

More details on the July 17, 2014 and November 11, 2014 spills, containment, clean-up, removal, continued monitoring and assessment are discussed in Section 5.4. All of the Spill investigation forms and details are provided in Appendix F. A minor mineral oil spill occurred on June 16, 2014 when construction equipment hit a bushing on the air-cooled condenser Auxiliary Transformer. The mineral oil was entirely contained with no release to the environment. The material was cleaned up and no spill report was prepared.

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.

Preservation of Natural Vegetation

There were no concerns noted with the preservation of natural vegetation on-Site during the course of the Year 3 monitoring period (e.g., mature pine tree near Stock Pile and Gate 2 Entrance).

Vehicular Entrances to the Site

As part of their standard Site maintenance practices, CPP swept the area around Gates 1 and 2 as needed. 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. The majority of the active stockpiles were also used on-Site for final grading or removed from Site. One stockpile remains for use near the secondary entrance road. The excess topsoil stockpiles will be removed from the Site, once the Half Load Restrictions are lifted in spring 2015. There were no concerns with sediment transport from these piles, nor were any issues with the active piles on-Site observed during the Year 3 construction monitoring.

Interceptor Swale Rock Check Dam Repairs, Clean-outs, Stabilized and Vegetated

The interceptor swale rock check dams were reported to be in good condition during the Year 3 monitoring period. Clean-outs of the western and eastern interceptor swales 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 until connection to the completed Region trunk sewer conveyance channel in April 2014 to maintain storage capacity in both SWM Ponds during the primary construction period. During Year 3 of construction, CPP timed these discharges to ensure settling had occurred in the SWM Ponds to minimize any TSS loading discharges to the outfall channel. CPP used a benchmark of approximately 1 m below invert of the PVC outlet pipe in each Pond to determine when pumping should begin. 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).

Final Stages of Construction

For the final stages of Site construction, the landscaping plantings serve to provide the final cover for stabilization, thus providing the ultimate E&SC measure for the Site.

The south side of the Site was seeded on October 21, 2013 and the west side of the Site on November 4, 2013. The north and east areas were seeded in the fall of 2014. Sod, seedlings and plantings were placed along the north, west and south areas of the Site. General Site observations during the surprise seasonal visits on August 8 and November 3, 2014, confirmed the plantings on-Site were well established, resulting in progressive stabilization for the Site cover. The monitoring of the plantings by Covanta will continue into the operational phase of the project, with any deficiencies addressed on an as needed basis. Final landscaping will be completed during the spring of 2015.

SWMP cleanouts are also an important periodic E&SC measure, and required during the final stage of construction to ensure quantity control capacity and functionality (e.g., TSS removal efficiency) is maintained before SWMP certification. No clean outs were reported in the EMI reports during Year 3.

5.2 Surface Water In Situ Measurement Results

The *in situ* measurements of turbidity, pH, temperature and conductivity are summarized in Tables 3, 4, 5 and 6, respectively (Section 4.3). The *in situ* measurements field forms are provided in Appendix E-3.

5.2.1 Turbidity

The *in situ* turbidity measurement results summarized in Table 3, Section 4.3 are discussed in more detail in this section.

Similar to Year 2 results, 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. Although the June 3, 2014 and July 28, 2014 *in situ* measurements indicate a significant increase in turbidity from SW1 to SW2, with measurements of 24 NTU to 120 NTU and 11 NTU to approximately 55 NTU respectively, the SWMPs were not discharging during these measurement periods. Further downstream on Tooley Creek, increases in turbidity were observed from approximately 33 NTU at SW3 to 49 NTU at SW4 and from 22 NTU at SW3 to 48 NTU at SW4, on June 3 and July 28, 2014, respectively.

On April 30, 2014, the *in situ* turbidity results indicate a significant increase in turbidity from SW1 to SW2 with measurements of 160 NTU to 376 NTU. A gravity-fed discharge was observed during this period and is the apparent cause of the turbidity increase between SW1 and SW2. Elevated turbidity results of 90 NTU and 114 NTU were also observed at the Tooley Creek locations of SW3 and SW4 respectively. However, since turbidity readings at both of the upstream of Site locations (SW1 and SW3) were somewhat elevated during this period, other off-site factors appear to have been contributing to the elevated turbidity levels seen at the downstream stations (SW2 and SW4). As with the Year 1 and 2 results, these observed increases in turbidity between the upstream and downstream stations on Tooley Creek are most likely associated with a variety of background influences unrelated to controlled discharge during rainfall-runoff periods (e.g., stream bank erosion and deposition, re-suspension of sediment in Tooley Creek and/or receiving swale).

5.2.2 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. A pH level of 8.5 was measured at SW-4 on June 3, 2014, as shown in Table 4 . There were two pH levels outside of the acceptable PWQO and CWQG ranges measured in the East and West SWM Ponds inlets. These were slightly basic pH levels measured at the inlet sampling locations, (e.g., 9.16 and 9.3 at E-SWMP-IN and W-SWMP-IN, respectively, on May 30, 2014. However, there is no evidence the SWM Pond discharges have any adverse effects on pH levels in the receiving swale and Tooley Creek.

5.2.3 Temperature

The observed *in situ* temperature measurements during the Year 3 monitoring period were very comparable within the receiving swale (CN Rail ditch) and Tooley Creek, and appear to be unaffected by the SWM pond discharges for all of the *in situ* measurement events observed. Consequently, there have been no concerns that temperatures observed in the receiving stream and Tooley Creek would exceed any of the acceptable limits for PWQO or CWQG as described in Table 5.

5.2.4 Conductivity

The conductivity *in situ* measurements observed in the receiving swale (CN Rail ditch) and Tooley Creek during Year 3 of this Surface Water Program generally showed fairly comparable results (with some notable exceptions described below) at their respective upstream and downstream sampling locations suggesting that any affect attributable to the SWM pond discharges was relatively small (as shown in Table 6).

The greatest differential increase in conductivity in Tooley Creek observed during the Year 3 monitoring was on April 30, 2014 when the SW3 (upstream) and SW4 (downstream) stations measured conductivity of 722 µS/cm and 978 µS/cm, respectively, compared to 3150 µS/cm measured in the receiving swale at SW1 and 1927 µS/cm at SW2. On May 30, 2014 there was a small increase in conductivity measured at Tooley Creek stations SW3 and SW4 (828 µS/cm and 864 µS/cm, respectively), whereas 409 µS/cm was measured in the receiving Swale at SW1 and 1099 µS/cm at SW2. There are no PWQO or CWQG limits for conductivity. 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 3 do not present any consistent trends or any cause for concerns at this time. However, any consistent observed increases during future sampling will continue to be monitored, with consideration for additional E&SC measures at the Site outfall, if deemed appropriate.

5.3 Water Discharge Assessments

5.3.1 Potable Water Discharge Assessment

On June 16, 2014, an unintended potable water release from a heat exchanger flushing process on-Site was reported to Golder. On June 17, 2014 Golder visited the Site to assess the situation and collect surface water samples. It was reported by Covanta during the site visit that potable water was discharged from heat exchanger piping near the upgradient limit of the east swale. Upon inspection by Golder field staff, slight iron staining was observed at the point of discharge. However no evidence of iron staining was noted in the east swale. Surface water samples were collected at the E-SWMP forebay (IN) and pond outlet (OUT), along with the W-SWMP (OUT) location. The E-SWMP water level was reported to be lower than average and the pond was not discharging. The W-SWMP was observed to be at capacity, with a gravity-fed discharge observed during the site visit. Results from the sampling are summarized in Table 8 below, with the laboratory analysis report provided in Appendix E-2.

Table 8: Potable Water Assessment – Iron Sampling Results

Analysis Parameter	PWQO (µg/L)	E-SWMP (OUTLET) (µg/L)	W-SWMP (INLET) (µg/L)	E-SWMP (INLET) (µg/L)	RDL
Total Iron (Fe)	300	280	420	490	100

Notes:
1. Sampling occurred on June 14, 2014;
2. RDL – Reported Detection Limit.

Both of the SWMP inlet samples were over the PWQO for Iron of 300 µg/L, with results at 420 µg/L at the W-SWMP (INLET) and 490 µg/L at the E-SWMP (INLET). However, the only discharge occurring during the site visit at the E-SWMP (OUT) station observed an iron concentration of 280 µg/L, below the PWQO of 300 µg/L.

5.3.2 Rinse Water Discharge Assessment

On June 18 2014, Covanta reported to Golder that cleaning solution was being applied to the front entrance brick wall for masonry cleaning purposes. The following summarizes CPP's efforts in carrying out this task.

The wall was soaked with water via a pressure washer. After the wall was soaked, the mixed cleaning chemical (7 parts water and 3 parts masonry cleaner) was applied to the wall with a brush. The 7/3 mixture was allowed to soak in for a few minutes before it was rinsed off with water from the pressure washer

After discussions between Golder and Covanta regarding this cleaning activity, and the need for appropriate responses (if any) in relation to the Surface Water Monitoring Program, the following assessment summary and recommendations were provided:

Provided the cleaning product or the rinse water is not discharged directly into a surface water body or a catch basin, discharge to the ground is unlikely to result in an environmental impact to human or ecological receptors, with the exception that the discharge could damage vegetation that may be present at the immediate point of contact. As a precautionary measure, it may be advisable to carefully soak the ground immediately at the base of the brickwork prior to use and to further dilute the cleaning product after it is discharged (rinsed). The active ingredient in the cleaner is hydrochloric acid and the acidic condition formed will be quickly neutralized in the ground by carbonate minerals naturally present in soil and will result in no lasting change in soil or groundwater quality.

5.4 Spill Response

Hydraulic Oil on July 17, 2014

On July 17, 2014, approximately 8 litres (2.11 gallons) of hydraulic oil spilled in the Boiler Building when fluid leaked out of a loose hose fitting during commissioning of the Unit 2 Stoker Feed Table. The spill was contained inside the building and there was no risk reported by Covanta of surface water or ground water contamination. The fluid was cleaned up with dry absorbent material but inadvertently mixed with water from the Feed Chute

Water Jacket. The oil/water mixture was collected in a plastic garbage drum and disposed of by Detox Environmental. This spill was not reported to the MOECC because there was no discharge to the environment.

Boiler Treatment Chemical on November 11, 2014

On November 11 2014, approximately 380 litres (100 gallons) of Boiler Boil Out water spilled during transfer of the Boil Out water from the Unit 2 Boiler to the Frac Tank located under the Air Cooled Condenser. The Boil Out Water contained low concentrations of ChemTreat cleaning agents BL1283 and CT23, with pH ranges from 12 to 14. Visual inspections revealed the spill to be contained within the gravel pad and sump area under and immediately adjacent to the Frac Tank, and not in close proximity to any catch basins (See Photographs 29, 30, and 33 in Appendix C). There was no evidence the Boiler Boil Out water drained across the access road as verified during the spill response follow-up site visit performed by Golder on November 12, 2014 (Photographs 29-34 Appendix C).

The spill was reported to the MOECC Spill Action Centre on November 11, 2014, and the MOECC Reference Number is included in the spill report (Appendix F).

The following recommendations were implemented/ acted upon by CPP and the Site Environmental Monitoring Team, directed by Covanta in accordance with both Covanta's initial response efforts and Golder's recommendations.

- The E-SWMP Inlet was tested for pH on several occasions via *in situ* measurements performed by the Covanta operations crew, from the day the spill took place on November 11, continuing for the remainder of the week until November 14. Considering the location of the boil out water spill (east side of Facility), it was determined that if there was any chance for drainage of the spill towards the SWMPs, the E-SWMP would be the receiver. The pH values at the E-SWMP-IN sampling location ranged from 8.46 on Wednesday November 12, 2014 to 8.25 on Monday November 17, 2014.
- When sampling or performing any follow-up testing or mitigation in the area of the frac tank and/or the E-SWMP-IN sampling location, wear protective googles with side-shield or full-face shield. Ensure an emergency eyewash kit is readily available. Wear butyl rubber or neoprene gloves. If necessary, prevent skin exposure with protective clothing (Tyvek). Avoid breathing vapours or mist, ventilate if necessary. Respiratory protection is only required if cleanup generates a water mist.
- Due to the Frac Tank remaining filled with water, any remedial efforts cannot be completed until the tank is removed. Once the Frac Tank has been moved, it is recommended that the area in and around the tank be flushed with water thoroughly, to dilute and promote further infiltration of any residual ChemTreat from the Boil Out water that is still at the surface.

5.5 Adequacy of the Monitoring Program

The Surface Water Monitoring Program for the Year 3 construction period for the Site is considered to be adequate and in general accordance with the Plan.

5.6 Assessment of the Need for Implementation of Contingency Measures

Based on the Year 3 Surface Water Monitoring Program results, there is no need for the implementation of any further contingency measures at this time. Upon the first receipt of waste in early 2015, the construction phase of the Durham York Energy Centre (DYEC) Surface Water Monitoring Program will be complete, and the operational phase Surface Water Monitoring Program will commence.

6.0 CONCLUSIONS

The E&SC deficiencies noted throughout the Year 3 monitoring period were appropriately addressed by 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 *in situ* measurements and sampling results taken throughout the Year 3 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 Operation Phase, currently scheduled to start after the construction phase is complete in early 2015.

Considering there were continued construction activities observed upstream of the Site, together with the Region sanitary trunk sewer construction along the northern side of the CNR immediately south and west of the Site, as well as rural agricultural influence on runoff loading, the higher turbidity loadings observed at downstream stations in the receiving swale and Tooley Creek on April 30, 2014, and/or slight turbidity increases at the downstream Tooley Creek station typically observed throughout the Year 3 period are most likely associated with these off Site, upstream influences. These potential influences were not specifically identified or characterized by this monitoring program.

7.0 RECOMMENDATIONS

It is recommended for the start of the Operation Phase that the sampling program for the Years 1 to 3 Operations Phase surface water monitoring requirements are reviewed with the MOECC promptly after submission of this Year 3 report. As per the Plan requirements for the operations phase, the Surface Water Monitoring Program should be reviewed and revised based on the findings of the pre and during construction monitoring.

It is also recommended that the Owners, Covanta, and the Operations Phase Surface Water and Groundwater CEPs continue appropriate, responsive communication. This practice will ensure that appropriate mitigation measures and/or spill response occurs, including both surface water and groundwater sampling, when warranted. This continued coordination effort will also allow the MOECC to provide their input upfront on the level of spill response and/or mitigation required, based on each particular incident, noting that minor equipment failure spills are often observed during the initial operational phase of the project.

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
MOECC	Ontario Ministry of the Environment and Climate Change
MW	Mega Watts
NTU	Nephelometric Turbidity Units
OPSD	Ontario Provincial Standard Drawing
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