Surface Water Facility Initiation Report

Introduction:

The Durham York Energy Centre is an energy from waste facility located in the Municipality of Clarington, Ontario. The Durham York Energy Centre is located on approximately 12.1 hectares of rural land (Site). The Site is located on the west side of Osborne Road, southeast of the Courtice Road and Highway 401 interchange, and north of the Courtice Water Pollution Control Plant and the CN Railway.

The water monitoring programs for the Site were outlined in the Durham York Energy Centre Groundwater and Surface Water Monitoring Plan, prepared by Stantec Consulting Ltd, dated September 14, 2011, in accordance with Condition 20 of the Environmental Assessment (EA) for the Site.

Golder Associates Ltd. (Golder) was retained to monitor surface water during the construction phase. Construction phase surface water monitoring focused on erosion and sediment control (E&SC) measures.

Summary of Surface Water Monitoring Program

Baseline pre-construction monitoring for surface water in Tooley Creek occurred during the Environmental Assessment study process. The report findings can be accessed in *Baseline Concentrations, Appendix B (Jacques Whitford)* at http://www.durhamyorkwaste.ca/Archive/pdfs/study/amended-ea-study-docs/Amended-HHERA-Report/APPENDIX-B-Baseline-Chemical-Concentrations_Dec09.pdf.
The construction phase surface water E&SC monitoring commenced in May 2012 on a weekly basis and/or after surface water runoff events or spills. Surface water quality *in situ* measurements and sampling occurred at strategic locations upstream and downstream of the Stormwater Management Ponds (SWM) Ponds on-Site, the receiving swale, and Tooley Creek. Sampling efforts occurred during inter-events (dry periods), rainfall-runoff events, and controlled discharge events from the SWM ponds.

The Regions previously submitted Annual Groundwater and Surface Water Monitoring Reports covering monitoring activities in 2012 and 2013. The following list summarizes previous correspondence on the plan and reports with the Ministry of the Environment and Climate Change (MOECC):

Date	Submissions/Acknowledgments
September 15, 2011	Groundwater and Surface Water Plan
October 14, 2011	MOECC Approval of Plan
January 28, 2013	Well Development Letter and Report Submission Date
March 4, 2013	MOECC acknowledgement of Well development and Report Submission Date
April 30, 2013	1st Annual Groundwater and Surface Water Report Submission

May 24, 2013	MOECC Annual Report Comments
September 17, 2013	Teleconference/Meeting per. EA 20.3 (d) Re: 1st Annual Report/Plan
October 18, 2013	Responses to MOECC Report Comments
October 21, 2013	MOECC Approval of Report
April 30, 2014	2nd Annual Groundwater and Surface Water Report Submission
May 9, 2014	MOECC Approval of Report
June 5, 2014	Teleconference/Meeting per. EA 20.3 (d) Re: 2nd Annual Report/ Plan

The purpose of this Surface Water Facility Initiation Report is to summarize the results of all surface water monitoring activities that occurred prior to first receipt of waste in accordance with Condition 20.7 of the EA Notice of Approval. The 2014 Annual Monitoring report will be submitted under separate cover prior to April 30, 2015.

Summary of Surface Water Monitoring Program Results

The *in situ* surface water sampling measurements for pH demonstrated that the majority of pH levels in the receiving swale (CN Rail ditch) and Tooley Creek fell within the Provincial Water Quality Objectives (PWQO) and Canadian Water Quality Guidelines (CWQG) ranges. There was no evidence that the SWM Pond discharges had any adverse effects on pH levels in the receiving swale and Tooley Creek. The observed *in situ* temperature measurements during the monitoring periods were comparable within the receiving swale (CN Rail ditch) and Tooley Creek, and appeared to be unaffected by the SWM pond discharges for the *in situ* measurement events observed. Consequently, there have been no concerns that temperatures observed in the receiving stream and Tooley Creek would exceed the acceptable limits for PWQO or CWQG. The conductivity *in situ* measurements observed in the receiving swale (CN Rail ditch) and Tooley Creek indicated that any affects attributable to the SWM pond discharges do not present consistent trends or cause for concern. The total suspended solids (TSS) measurements were within acceptable limits and any higher TSS levels were likely the result of TSS build-up and wash-off conditions from off-Site sources.

There was no indication that the East and West SWM Pond discharges resulted in adverse effects on turbidity levels in the receiving swale and further downstream in Tooley Creek. Any increased turbidity loadings observed at downstream stations in the receiving swale and Tooley Creek likely resulted from upstream influences typically associated with off-Site activities. These activities included construction activities observed upstream of the Site, including 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 run-off loading. These potential upstream influences were not specifically identified or characterized by this monitoring program. Surface Water Monitoring results for years 2012, 2013 and 2014 are included as Appendix A of this report.

Summary of Spills

The Surface Water Monitoring program required that spills be properly contained, cleaned-up and monitored thereafter. The on-Site civil contractor, Courtice Power Partnership (CPP) and Covanta Durham York Renewable Energy Limited Partnership (Covanta) handled the immediate response to any spills on-Site, while reporting these events to the Golder Surface Water Competent Environmental Practitioner (CEP), for follow up monitoring, 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. Two significant spills which required follow-up responses from the Golder surface water team have been summarized below:

On November 11, 2014, 380 litres (100 gallons) of Boil Out water was spilled during the transfer of 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. 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. The spill was reported to the MOECC Spill Action Centre on November 11, 2014.

On June 28 2013, four litres (1.5 gallons) of mineral oil was spilled during the delivery and unloading of a new transformer in the loading/unloading area. Absorbent pads and socks were used in the spill area approximately 25 m east of the main DYEC building, to contain the spill on the asphalt surface. Since this spill occurred during a rainfall-runoff period, some of this synthetic oil drained into the stormwater sewer, conveying it to the East Stormwater Management Pond (E-SWMP). Here it was contained within an upstream portion of the E-SWMP inlet using containment booms spanning beyond the entire inlet opening. The E-SWMP was not discharging during the initial incident, nor did it following the incident and before the follow-up clean-out and sampling efforts were completed. The spill response was appropriately communicated to and deemed satisfactory by the MOECC Spill Response Centre.

Other spills included 100L of hydraulic oil from a crane to the ground, and 18 L of hydraulic oil from an excavator to the ground. These spills were immediately contained and cleaned up and monitored appropriately and were reported to the MOECC Spills Action Response Centre. The potentially contaminated soil from the 100L hydraulic oil spill was removed (excavated) and transported off off-Site and appropriate sampling and monitoring follow-up was carried out showing no notable concerns on-Site, in the receiving swale or further downstream in Tooley Creek. The 18 L hydraulic 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.

Summary of Weekly Environmental Monitor Inspector (EMI) Reports

The weekly E&SC monitoring inspections performed by the qualified CPP EMI designated for the Site, were presented in a report template form designed by Golder. The weekly report outlined key observations and noted deficiencies to be addressed. Observations made during surface water sampling efforts by Golder were also included in these reports, when appropriate.

After the CPP EMI completed the report form, it would then be reviewed and signed-off by the Covanta Site construction manager or designate and then e-mailed to the Golder Surface Water CEP for the final review, along with Site photographs taken during the inspection. The Site photographs were taken from key on and off-Site vantage points consistent with the Site photographic record established during the initiation of the program in late May/early June, 2012, along with any notable additional photographs taken at the time of the specific inspection during the monitoring period. Some deficiencies and observations encountered on the weekly E&SC reports included tears in silt fencing, minor build-ups of silt in roadways and culverts and sediment build-ups in rock check dams. Deficiencies were addressed and/or repaired in a timely manner and noted in the subsequent weekly EMI E&SC report.

Conclusions of the Construction Phase Surface Water Monitoring

The construction phase surface water E&SC measures and *in situ* water quality sampling undertaken throughout the construction monitoring phase indicate that there were no significant concerns with respect to facility construction on surface water conditions in the receiving swale (CN Rail ditch) and further downstream in Tooley Creek. All spills as a result of construction activity were recorded and dealt with appropriately as prescribed by the Ontario Environmental Act and Ontario Regulation 675/98 Classification and Exemption of Spills and Reporting of Discharges.

Upon the first receipt of waste, surface water monitoring moves from the construction phase to the operations phase. The Operations Phase Surface Water Monitoring includes in-stream monitoring for electrical conductivity, pH, temperature, and turbidity at upstream and downstream locations within Tooley Creek. Results will be compared to relevant Provincial Water Quality Objectives (MOECC 1994) and Canadian Water Quality Guidelines (CCME 2011). Additionally, surface water monitoring may be conducted on Site within the stormwater management ponds in the event of a spill.

Table 1: Total Suspended Solids Sampling Laboratory 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)
Year 1										
June 5, 2012 (Inter-event)		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)	25	10	14	14	<10	<10	<10	13	<10	<10
April 8, 2013 (Controlled discharge)		10	<10	<10	<10	<10	12	<10	13	19
Year 2										
May 31, 2013 (Controlled Discharge)		10	<10	10	<10	<10	<10	17	NA	**92**
June 25, 2013 (Rainfall-runoff, Controlled discharge)		10	**81**	10	**28**	**44**	<10	12	<10	**87**
July 22, 2013 (Controlled discharge)		10	8	5	3	2	18	**49**	**240**	**130**

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)
August 28, 2013 (Inter-event)		10	NA	NA	NA	NA	NA	NA	NA	NA
September 30, 2013 (Inter-event)			NA	NA	NA	NA	ND	ND	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)		10	**40**	**49**	**31**	22	**31**	**81**	**69**	**150**
November 22, 2013 (Controlled discharge)	10 25		**28**	**28**	7	18	**430**	**45**	**300**	**30**
December 20, 2013 (Inter-event)	10		ND	ND	ND	ND	ND	ND	ND	ND
January 13, 2014 (Rainfall-runoff, no discharge)		10	NA	**26**	NA	NA	ND	ND	ND	ND
February 28, 2014 (Inter-event)	10		NA	NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)			10	**330**	**540**	**590**	NA	NA	NA	**36**

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 of the relevant year's During Construction Annual Report, where applicable.

Table 2: Turbidity Sampling Laboratory Results

Date (Type of event) [1.]	**PWQO** (NTU)	**CWQG** (NTU)	**RD** [3.] (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)
Year 1											
June 5, 2012 (Inter-event)	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [2.] for CWQG narrative for Turbidity.	0.2	31.0	5.2	3.5	2.9	NA	NA	NA	NA
June 27, 2012 (Inter-event)			0.2	70.0	1.7	3.4	3.2	NA	NA	NA	6.1
September 6, 2012 (Rainfall-runoff, Controlled discharge)			0.2	120.0	27.0	3.2	16.0	6.9	11.0	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	37.0	28.0	10.0	9.7	910.0	270.0	ND	55.0
March 12, 2013 (Freshet Conditions)			0.2	25.0	14.0	32.0	27.0	41.0	86.0	ND	ND
March 19, 2013 (Controlled discharge)			0.2	22.0	14.0	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	12.0	15.0	23.0	30.0

Date (Type of event) [1.]	PWQO (NTU)	CWQG (NTU)	RD [3.] (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)
Year 2	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [2.] for CWQG narrative for Turbidity.									
May 31, 2013 (Controlled Discharge)			0.2	10.0	9.0	2.5	2.9	20.0	130.0	NA	460.0
June 25, 2013 (Rainfall-runoff, Controlled Discharge)			0.2	28.0	7.7	17.0	20.0	8.2	19.0	9.3	52.0
July 22, 2013 (Controlled discharge)			0.2	9.0	16.0	5.4	5.2	33.0	450.0	280.0	390.0
August 28, 2013 (Inter-event)			0.2	NA	NA	NA	NA	NA	NA	NA	NA
September 30, 2013 (Inter-event)			0.2	NA	NA	NA	NA	NA	NA	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)			0.2	24.0	24.0	25.0	29.0	28.0	130.0	32.0	47.0
November 22, 2013 (Controlled discharge)			0.2	29.0	18.0	5.1	16.0	89.0	36.0	110.0	35.0
December 20, 2013 (Inter-event)			0.2	ND	ND	ND	ND	ND	ND	ND	ND

Date (Type of event) [1.]	PWQO (NTU)	CWQG (NTU)	RD [3.] (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)
January 13, 2014 (Rainfall-runoff, no discharge)			0.2	NA	10.0	NA	NA	ND	ND	ND	ND
February 28, 2014 (Inter-event)			NA	NA	NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)			0.2	9.8	220.0	87.0	100.0	NA	NA	NA	66

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. 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).
3. RDL - Reported Detection Limit.
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 of the relevant year's During Construction Annual Report, where applicable.

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)
Year 2	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [2.] for CWQG narrative for Turbidity.								
May 31, 2013 (Controlled Discharge)			22.5	15.8	4.67	5.15	36.5	40.0	NA	1000 [5.]
June 25, 2013 (Rainfall-runoff, Controlled Discharge)			101.0	13.9	66.1	**84.8**	21.9	41.3	20.9	186.0
July 22, 2013 (Controlled discharge)			9.1	15.4	5.9	4.7	26.6	310.0	180.0	52.4
August 28, 2013 (Inter-event)			NA	NA	NA	NA	NA	235	NA	NA
September 30, 2013 (Inter-event)			24.6	NA	12.9	9.2	ND	ND	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)			23.0	43.5	27.0	25.4	39.6	86.7	40.0	55.4
November 22, 2013 (Controlled discharge)			51.1	23.0	5.5	14.4	196.0	25.3	80.0	25.6
December 20, 2013 (Inter-event)			76.7	NA	13.6	12.2	ND	ND	2.9	NA
January 13, 2014 (Rainfall-runoff, no discharge)			7.6	27.8	4.8	4.5	ND	ND	NA	NA

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)
February 28, 2014 (Inter-event)	Surface water concentrations will change the natural Secchi disk reading by more than 10% [2.]	See Note [2.] for CWQG narrative for Turbidity.	10.0	NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)			15.9	555.0	374.0	335.0	NA	NA	NA	110.0
Year 3										
April 30, 2014 (Rainfall-runoff, gravity-fed discharge)			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

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)
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 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).
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.
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
Year 1	**6.5 to 8.5**	**6.5 to 9.0**								
June 5, 2012 (Inter-event)			7.2	7.4	7.6	7.7	NA	NA	NA	NA
June 27, 2012 (Inter-event)			**5.8**	**6.3**	7.2	6.6	NA	NA	NA	7.5
September 6, 2012 (Rainfall-runoff, Controlled discharge)			7.7	7.7	7.9	7.8	8.3	8.2	8.3	8.1
September 28, 2012 (Inter-event)			7.4	7.4	7.7	7.4	8.2	ND	**8.9**	ND
November 1, 2012 (Rainfall-runoff-discharge)			8.3	8.1	8.4	8.3	**9.8**	**8.8**	ND	**8.6**
March 12, 2013 (Freshet Conditions)			**6.3**	8.0	7.7	7.8	**5.8**	**5.9**	ND	ND
March 19, 2013 (Controlled discharge)			7.1	7.4	7.6	7.6	6.9	7.4	7.7	8.2
April 8, 2013 (Controlled discharge)			7.2	7.3	7.5	7.8	**5.6**	**6.3**	7.1	7.0
Year 2										
May 31, 2013 (Controlled Discharge)			8.1	8.1	8.3	8.2	8.1	**8.6**	NA	8.6

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 25, 2013 (Rainfall-runoff Controlled Discharge)			7.0	7.0	7.5	7.3	6.5	6.6	7.1	7.2
July 22, 2013 (Controlled discharge)			7.3	7.8	7.4	7.6	**8.6**	8.0	7.5	7.6
August 28, 2013 (Inter-event)			NA	NA	NA	NA	NA	**8.8**	NA	NA
September 30, 2013 (Inter-event)			**6.4**	NA	6.6	6.7	ND	ND	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)	**6.5 to 8.5**	**6.5 to 9.0**	7.8	7.9	7.9	7.8	8.1	8.4	8.3	8.3
November 22, 2013 (Controlled discharge)				8.3	8.4	8.3	**8.6**	**9.4**	**9.3**	**9.4**
December 20, 2013 (Inter-event)				NA	8.1	8.0	ND	ND	8.3	NA
January 13, 2014 (Rainfall-runoff, no discharge)		8.5	8.1	8.0	8.2	8.3	ND	ND	NA	NA
February 28, 2014 (Inter-event)		8.0		NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)			**8.8**	8.2	8.2	8.3	NA	NA	NA	**8.9**

NA

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**
Year 3										
April 30, 2014 (Rainfall-runoff, gravity-fed Discharge)			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	8.42
July 28, 2014 (Rainfall runoff, no discharge)	**6.5 to 8.5**	**6.5 to 9.0**	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

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 of the relevant year’s During Construction Annual Report, 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)
Year 1	Note[2.]	Note[3.]								
June 5, 2012 (Inter-event)			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	5.0
April 8, 2013 (Controlled discharge)			6.7	6.7	7.7	7.6	7.6	7.7	7.7	7.8
Year 2										
May 31, 2013 (Controlled Discharge)			20.1	17.4	18.9	17.7	22.7	22.3	NA	14.9
June 25, 2013 (Rainfall-runoff, Controlled Discharge)			21.0	18.6	19.1	19.0	23.4	23.8	23.3	21.6
July 22, 2013 (Controlled discharge)			23.5	21.4	22.3	21.6	25.2	24.4	24.9	24.9

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)
August 28, 2013 (Inter-event)	Note[2.]	Note[3.]	NA	NA	NA	NA	NA	24.3	NA	NA
September 30, 2013 (Inter-event)			22.4	NA	20.5	26.5	ND	ND	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)			15.2	14.1	14.2	14.8	16.3	15.5	16.0	15.9
November 22, 2013 (Controlled discharge)			5.9	5.8	5.6	5.6	7.8	3.5	4.4	3.8
December 20, 2013 (Inter-event)			0.0	NA	0.0	0.9	ND	ND	3.9	NA
January 13, 2014 (Rainfall-runoff, no discharge)			1.4	0.3	0.5	0.3	ND	ND	NA	NA
February 28, 2014 (Inter-event)			NA	NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)			6.7	2.3	2.1	1.7	NA	NA	NA	2.2
Year 3										
April 30, 2014 (Rainfall-runoff, gravity-fed Discharge)			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

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)
August 29, 2014 (Inter-event)	Note[2.]	Note[3.]	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 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.

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 [4.] (µS/cm)	W-SWMP-OUT [4.] (µS/cm)
Year 1	N/A								
June 5, 2012 (Inter-event)		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
Year 2									
May 31, 2013 (Controlled Discharge)		610	700	920	860	1080	320	NA	280
June 25, 2013 (Rainfall-runoff, Controlled Discharge)		630	740	860	820	940	410	840	400
July 22, 2013 (Controlled discharge)		670	590	1270	1080	750	280	420	290

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)
August 28, 2013 (Inter-event)	N/A	NA	NA	NA	NA	NA	318	NA	NA
September 30, 2013 (Inter-event)		>20	NA	>20	>20	ND	ND	ND	ND
October 7, 2013 (Rainfall-runoff, no discharge)		520	860	960	850	2150	1140	1080	1020
November 22, 2013 (Controlled discharge)		449	577	930	834	943	551	598	548
December 20, 2013 (Inter-event)		3999 [5.]	NA	3999 [5.]	3999 [5.]	ND	ND	2756	NA
January 13, 2014 (Rainfall-runoff, no discharge)		3999 [5.]	3160	1116	1440	ND	ND	NA	NA
February 28, 2014 (Inter-event)		NA	NA	NA	NA	NA	NA	NA	NA
March 31, 2014 (Controlled Discharge)		1635	1065	505	552	NA	NA	NA	615
Year 3									
April 30, 2014 (Rainfall-runoff, Gravity-fed Discharge)		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

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)
July 28, 2014 (Rainfall runoff, no discharge)	N/A	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 of the relevant year's During Construction Annual Report, where applicable.
3. Where 'NA' is provided, 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. Exceeding range of Hana probe, most likely due to freezing conditions / stagnant water.