Sterling Environmental Engineering, P.C.

ORANGE COUNTY LANDFILL
NYSDEC SITE NO. 336007
ROUTE 17M, GOSHEN, NEW YORK

2014 PERIODIC REVIEW REPORT

Prepared for:

Orange County Department of Public Works
Division of Environmental Facilities and Services
P.O Box 637
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December 8, 2014

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NYSDEC SITE NO. 336007
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2014 PERIODIC REVIEW REPORT

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1.0 EXECUTIVE SUMMARY

The 75-acre Orange County Landfill (the Landfill) is located on a 300-acre rural parcel approximately three (3) miles west of the Village of Goshen on the south side of Route 17M in the Town of Goshen, Orange County, New York. The Landfill was operated between 1974 and January 1992, and received approximately 7,000,000 cubic yards of predominately municipal waste. The Landfill was classified as a "Class 2" inactive hazardous waste disposal site by the New York State Department of Environmental Conservation (NYSDEC) in March 1992 (Site Number 336007). The nature and extent of contamination is hazardous waste reportedly disposed in the Landfill and elevated groundwater levels of certain dissolved metals and leachate indicator parameters. The impacts of hazardous waste constituents have been determined to not extend beyond the refuse mass.

The NYSDEC issued a Record of Decision (ROD) in January 1994 that required construction of a final cover over the Landfill waste mass, which was completed in 1995. A second ROD addressing the site as a whole, including any contamination that may have migrated from the waste mass, was issued in March 1998, and required additional activities including the continued operation and maintenance of the Landfill leachate collection system. The selected remedies for the Landfill include Institutional Control (IC) through a Declaration of Covenants and Restrictions that restricts disturbance of the Landfill cover and places restrictions on site uses, and Engineering Controls (EC) provided by the Landfill cover and leachate collection systems, air and water quality monitoring, regular inspections and maintenance activities. Post-closure water and air quality monitoring, leachate removal, inspections and maintenance at the Landfill have been provided by Orange County since 1996. A Site Management Plan (SMP) was approved by the NYSDEC on August 5, 2014, which incorporates the Institutional/Engineering Control (IC/EC) Plan, the Inspection and Monitoring Plan, and the Operation and Maintenance Plan to provide for the continual post-closure monitoring and maintenance of the Landfill.

Overall, the remedial program has been successful in meeting the remedial objectives set forth in the RODs in that leachate generation and contaminant migration through groundwater has been reduced, contaminated surface run-off and direct human/animal contact with waste is eliminated, and Landfill gas migration/buildup is prevented. Despite the overall success of the remedial program, discolored groundwater seeps exhibiting some leachate characteristics have been observed along the banks of the Cheechunk Canal, downgradient of the Landfill. As discussed in Section 4.2.2, the County submitted a Long Term Seep Evaluation Report and an Expedited Interim Remedial Measures (IRM) Work Plan to the NYSDEC addressing the seeps.

Based on the results of compliance activities performed in 2014, no changes to the approved SMP or required submittal date of the Periodic Review Report are recommended. The requirements for discontinuing site management have not been met. As such, continued compliance with the approved SMP, including additional required submittals and actions addressing the seeps, is recommended.

2.0 SITE OVERVIEW

The Landfill consists of a 75-acre waste mass on a 300-acre rural parcel approximately three (3) miles west of the Village of Goshen on the south side of Route 17M in the Town of Goshen, Orange County, New York (see Figure 1).

The Landfill property is bounded by the Cheechunk Canal to the southeast and by the Old Channel of the Wallkill River to the northwest and southwest. To the northwest of the Landfill, a proposed Landfill expansion of an additional 75-acres was intended. The project was never completed nor used for

landfilling. To the northeast edge of the Landfill lies a landfill-to-gas energy system facility. The New Hampton Transfer Station is located on the northeast border of the 300-acre parcel.

The Orange County Department of Public Works operated the Landfill between 1974 and January 1992. Approximately 7,000,000 cubic yards of predominately municipal waste was disposed, however waste oil, septic sludge, industrial waste and hazardous waste are documented to have also reportedly been disposed at the Landfill.

The Orange County Landfill (the Landfill) was classified as a "Class 2" inactive hazardous waste disposal site by the New York State Department of Environmental Conservation (NYSDEC) in March 1992, Site Number 336007. The NYSDEC issued two Records of Decisions (RODs), dated January 1994 and March 1998, respectively. The January 1994 ROD accelerated the capping of the Landfill and the March 1998 ROD addressed contamination which may have migrated from the waste mass.

The nature and extent of contamination are elevated levels of certain dissolved metals and leachate indicator parameters in downgradient groundwater. The impacts of hazardous waste constituents do not extend beyond the refuse mass.

The selected remedies for the Landfill include institutional and engineering controls. Institutional control (IC) is provided in the form of a Declaration of Covenants and Restrictions that restricts disturbance of the Landfill cover and places restrictions on site uses. Engineering controls (EC) are provided by the Landfill cover and leachate collection systems, annual air and water quality monitoring, regular inspections and maintenance activities.

The ongoing post-closure activities are outlined by the approved Site Management Plan (SMP) and are based on the requirements of the Technical Guidance for Site Investigation and Remediation (DER-10), Section 6.2. The June 6, 2014 SMP (approved by the NYSDEC on August 5, 2014) incorporates the Institutional/Engineering Control (IC/EC) Plan, the Inspection and Monitoring Plan, and the Operation and Maintenance Plan, which provide for the continual post-closure monitoring and maintenance of the Landfill.

Since January 1996, Orange County has submitted Post-Closure Monitoring and Maintenance reports to the NYSDEC documenting the Landfill inspection, environmental monitoring, and leachate management activities. On a moving forward basis, the NYSDEC requires annual documentation in the form of a Periodic Review Report (PRR).

In accordance with the approved SMP, an annual PRR, meeting the requirements of DER-10, Section 6.3, must be submitted to the NYSDEC within sixty (60) days of completion of the annual sampling event. The 2014 sampling event was completed on October 8, 2014. This PRR covers inspection, monitoring, operating and maintenance activities and compliance for the 2014 period.

3.0 PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

The Landfill has been subject to a Post-Closure Monitoring and Maintenance Program since January 1996, revised in January 1999 and June 2014, which includes regular site inspections, groundwater, surface water and leachate monitoring, leachate collection and management, mowing, and Landfill gas management. Monitoring locations are shown on Figure 2.

3.1 Groundwater Quality

Historical data obtained over nearly two decades monitoring indicates groundwater near the Landfill is characterized by concentrations of Total Dissolved Solids (TDS), iron, and manganese and occasional concentrations of ammonia, chloride, phenolics, arsenic, chromium, lead, magnesium, selenium, and sodium that exceed drinking water criteria. Data also indicate very little change in groundwater quality in recent years.

The 2014 monitoring data for site groundwater are presented in Tables 1 through 3. A groundwater contour map for the overburden hydrogeologic unit is provided as Figure 3. Recent (2014) downgradient groundwater results continue to demonstrate elevated concentrations of TDS, iron, and manganese with an occasional exceedance of ammonia (bedrock well MW-245D only), chloride (overburden well MW-220 only), arsenic (overburden wells MW-220, MW-245S, and MW-3B), magnesium (overburden wells MW-220 and PZ-4), and sodium (overburden wells MW-245S, MW-245D, and MW-3B). No phenolics or hexavalent chromium was detected in any of the downgradient groundwater samples while there were no reported exceedances for total chromium, lead, and selenium. In general, results show groundwater samples collected upgradient and downgradient of the Landfill waste mass indicate no significant differences in data trends where exceedances were observed.

A summary of current downgradient groundwater quality compared to recent results is presented below:

- MW-220 Exceedances for chloride, TDS, turbidity, arsenic, iron, and manganese were reported. Slight increases were evident for chloride and arsenic concentrations while still being well within the historical range for these analytes. Water quality parameters, such as TDS and turbidity, have lowered over the recent term due to improvements in low flow sampling methods. Iron and manganese results appear to be stable and within the published historical range.

- MW-245S Exceedances for TDS, turbidity, arsenic, iron, manganese, and sodium were reported. Water quality parameters, such as TDS and turbidity, were stable while arsenic, iron, manganese, and sodium results also appear to be stable and within the published historical range for each analyte. It should be noted that arsenic has exceeded the last eight (8) of nine (9) sampling events while sodium has exceeded the last six (6) sampling events.

- MW-245D Exceedances for ammonia, TDS, turbidity, iron, manganese, and sodium were reported. Water quality parameters, such as ammonia, TDS and turbidity consistently exceed their applicable standard although recent results are on the lower end of the historical range. For example, turbidity at MW-245S was 10 NTUs. Iron, manganese, and sodium results are stable and within the published historical range for each analyte.

- PZ-4 Exceedances for TDS, turbidity, iron, and magnesium were reported. Water quality parameters, such as TDS and turbidity, were stable and at the lower end of the published historical range while iron and magnesium were decreasing and at the lower end of the published historical range.

- MW-3B Exceedances for TDS, turbidity, arsenic, iron, manganese, and sodium were reported. Water quality parameters, such as TDS and turbidity, were stable while arsenic, iron, manganese, and sodium results also appear to be stable and within the published historical range for each analyte. It should be noted that arsenic has exceeded the last four (4) sampling events while sodium has exceeded the last five (5) sampling events.

3.2 Surface Water Quality

The 2014 analytical data for site surface water are presented in Table 4. The surface water samples collected from surface water monitoring locations SW-5, SW-8, and SW-13 exceeded the 0.1 mg/L Class C surface water standards for total aluminum (0.54 mg/L, 0.40 mg/L, and 0.47 mg/L, respectively). The surface water samples collected from surface water monitoring locations SW-5, SW-8, and SW-13 also exceeded the 0.3 mg/L Class C surface water standard for total iron (0.54 mg/L, 0.40 mg/L, and 0.46 mg/L, respectively). It should be noted that total recoverable iron was detected in the blank and in each sample.

The downstream surface water samples collected from SW-5 (0.54 mg/L) and SW-8 (0.40 mg/L) were slightly lower than the historic statistical average for iron (1 mg/L) at that location.

A comparison of upstream to downstream water quality indicates that the Landfill is not impacting surface water quality. In fact, downstream water quality appears to be slightly better than upstream sample results.

3.3 Leachate Quality

The 2014 analytical data for site surface water are presented in Table 5. Leachate samples were collected from manholes MH-5, MH-7 and MH-15, and analyzed for 6 NYCRR Part 360 Baseline Parameters. Leachate water quality is generally characterized by detectable to elevated concentrations of leachate indicator and inorganic parameters alkalinity, ammonia, BOD, COD, chloride, cyanide, hardness, nitrate, phenolics, sulfate, TDS, TKN, TOC, aluminum, arsenic, barium, boron, calcium, chromium, iron, magnesium, manganese, nickel, potassium, sodium, and zinc. Inorganic parameters that were either not detected or detected at trace levels include: antimony, beryllium, cadmium, chromium, hexavalent, copper, lead, mercury, selenium, silver and thallium. One (1) Volatile Organic Compound (VOC), chloroethane, was detected in the sample from MH-5 at (J-qualified) concentration of 20 ug/L. Three (3) VOCs, benzene, chlorobenzene and ethylbenzene, were detected at (J-qualified) concentrations of 17 ug/L, 27 ug/L and 25 ug/L, respectively. No VOCs were detected in the sample from MH-15.

Leachate sample results for 2014 are generally consistent with previous results.

3.4 Air Quality

In accordance with the SMP, Landfill gas monitoring consists of measuring explosive gas (Lower Explosive Limit, or LEL) and VOCs of the headspace of monitoring well/piezometers MW-3B, MW-220, MW-230S, MW-230D, MW-245S, MW-245D and PZ-4, and leachate manholes MH-5, MH-7 and MH-15. VOCs are also analyzed in post-closure water samples.

As described in Section 4.2.3 below, during the 2014 sampling event MW-231D was sampled instead of MW-230D and MW-234S was not sampled. None of the air monitoring locations measured indicated the presence of VOCs. All air monitoring locations measured 0% LEL, with the exception of MH-7, which was 8% LEL. The 2014 air quality monitoring results are consistent with past results.

4.0 INSTITUTIONAL/ENGINEERING CONTROL PLAN COMPLIANCE

The multiple institutional and engineering controls for the Landfill implemented by way of the RODs and documented in the SMP continue to be in place and performing as designed. These controls were reviewed and evaluated through this PRR.

4.1 Institutional Controls

Institutional Controls (IC) include non-physical means of enforcing a restriction on the use of real property that limits human and environmental exposure, restricts the use of groundwater, provides notice to the potential owners, operators, or members of the public, or prevents actions that would interfere with the effectiveness of the remedial program or with the effectiveness and/or integrity of operation, maintenance or monitoring activities at or pertaining to the Landfill property.

4.1.1 Deed Restrictions

The IC for the Landfill is in the form of a Declaration of Covenants and Restrictions filed with the deed for the Landfill property. The Declaration of Covenants and Restrictions was executed on June 13, 2014, and continues to protect both human health and the integrity of the Landfill. No uses, disturbances or interferences have been allowed by Orange County. Any future use to the Landfill footprint must be approved by Orange County and NYSDEC. The underlying groundwater is not a source of drinking water for nearby residents.

4.2 Engineering Controls

Engineering Controls (EC) include physical barriers or methods employed to actively or passively contain, stabilize, or monitor contamination, restrict the movement of contamination to ensure the long-term effectiveness of the remedial program, or eliminate potential exposure pathways to contamination. The following sections describe the ECs and their goals as part of the remedy for the Landfill from the ROD dated March 1998.

4.2.1 Part 360 Landfill Cover System

Installation of the standard Part 360 Landfill cover system (completed in November 1995) minimizes infiltration of precipitation to wastes and the resultant generation of leachate, and prevents the release of previously disposed wastes. The cover system is regularly inspected by Orange County to evaluate its performance. During the regular post-closure field inspections conducted throughout 2014, no damage to the Landfill cover system was observed. A CD containing completed inspection reports are included in Appendix A. Beyond the regular on-going post-closure care, no actions or special maintenance is required for the Part 360 Landfill cover system at this time.

4.2.2 Leachate Collection System

The leachate collection system is located along the perimeter of the waste mass. Leachate from the waste mass is collected by underground pipes which flow by gravity to sumps. From these sumps, leachate is pumped into aboveground storage tanks (ASTs) where it is regularly removed for offsite treatment. Modifications to the collection system were introduced with the March 1998 ROD where approximately 950 feet of additional leachate collection piping was installed to contain leachate outbreaks encountered during excavation of a new drainage ditch along the southeastern perimeter road.

In 2012, NYSDEC received citizen complaints that seeps were observed immediately downstream of the Landfill. It should be noted that the Cheechunk Canal is reportedly owned by New York State. Due to the Canal's proximity to the Landfill, the NYSDEC notified Orange County that the seeps may indicate the Landfill perimeter leachate collection system is not functioning properly. The County immediately responded, and has continued to respond, as follows:

- July 16, 2012 - NYSDEC notifies County to prepare a work plan for the sampling, analysis, and assessment of the seeps.
- August 16, 2012 - Orange County met with the NYSDEC at the Landfill to inspect the seeps and select sampling locations.
- August 22, 2012 - Orange County met with the NYSDEC at the Landfill to inspect the seeps. The inspection included canoeing the stretch of the Canal along the entire length of the Canal adjacent to the Landfill. Samples of seeps were collected for laboratory analysis. Notes, photographs, and data generated by this inspection were submitted to the NYSDEC on September 20, 2012. A Solid Waste Management Facility Site Visit Report, dated August 24, 2012 was provided by the NYSDEC.
- October 19, 2012 - Orange County provides a Work Plan for investigation of the perimeter leachate collection system.
- April 11, 2013 and August 19, 2013 - Orange County proceeded with investigation of the leachate collection system including cleaning and internal video inspection by Closed Circuit Television (CCTV). Mr. Carl Hoffman of the NYSDEC observed the field investigation on April 11, 2013.
- August 21, 2013 - Samples of seeps were collected for laboratory analysis.
- December 18, 2013 - Orange County provides a Work Plan to install piezometers between the Landfill and Canal to understand the subsurface conditions and piezometry immediately upgradient of the seeps exhibiting elevated ammonia. The Work Plan was approved by the NYSDEC on December 31, 2013.
- February 19 and 20, 2014 - Six (6) overburden piezometers were installed. A comprehensive letter report summarizing the findings of the piezometer installations was provided to the NYSDEC on April 4, 2014.
- June 12, 2014 - Orange County collected samples of the seeps and surface water for laboratory analysis.
- October 6 and 8, 2014 - Orange County conducted sampling of the overburden groundwater, seeps in accordance with the approved Work Plan. The purpose of monitoring was to understand seasonal fluctuations in groundwater elevation and water quality as the foundation to developing a seep mitigation plan.
- October 20, 2014 - Based upon agreements reached at the September 22, 2014 meeting with NYSDEC, Orange County proceeded with steps to immediately address the seeps and a Pre-Construction Notification was submitted to the USACOE. The notification was rescinded per request by the NYSDEC.
- October 31, 2014 - Orange County submitted a Seep Mitigation Plan and Engineering Report.
- November 18, 2014 - Orange County met with NYSDEC to enter into an Order on Consent to mitigate the seeps.
- December 3, 2014 – Orange County submitted a Long Term Seep Evaluation Report and Expedited IRM Work Plan to the NYSDEC and NYSDOH.

The perimeter leachate collection system was determined to be functioning as the installed leachate collection pipe is surrounded by permeable stone. Accordingly, leachate and groundwater is collected and conveyed through the system to the leachate manhole even if the perforated pipe were damaged or blocked. As a result, further efforts to conduct internal video inspection were suspended. In addition, the

leachate collection system is installed in the overburden silt/clay geologic strata, well above the elevation of the seeps and hydrostatic piezeometric surface of the confined aquifer contributing to the seeps. Accordingly, the County does not intend to pursue remedial action of deepening the leachate collection system.

As of the date of this PRR, Orange County is proceeding with development of remedial plans to address the seeps, including preparation of:

- Long Term Seep Evaluation Report;
- Expedited IRM Work Plan;
- Long Term Seep Elimination Feasibility Study; and
- Supplemental Sediment Investigation Work Plan.

4.2.3 Groundwater Monitoring Wells

Existing groundwater monitoring wells are located along the perimeter of the Landfill waste mass upgradient, cross-gradient, and downgradient. The wells are used to monitor groundwater quality around the Landfill property. Monitoring wells are routinely checked for sediment buildup in the well using depth to bottom measurements and the integrity of the outer casing, lid and lock. These monitoring wells are sampled every fifth quarter for 6 NYCRR Part 360 Baseline Parameters for indication of contamination by the Landfill waste mass.

Monitoring wells MW-230D and MW-234S are damaged and Orange County is making arrangements for repair. Accordingly, MW-231D was sampled instead of MW-230D during the 2014 sampling event. Wells MW-235S and MW-235D could not be located in the field, and concentrated efforts will be made in Spring 2015 to locate the wells. Appendix B provides information on monitoring wells where corrective actions are needed.

Overall, the monitoring well network is functioning as designed, and Orange County will continue the approved annual monitoring program.

4.2.4 Surface Water Runoff Features

Surface water runoff features are located on and around the Landfill property. Terraces and riprap downchutes on the Landfill waste mass direct stormwater runoff to the Landfill perimeter drainage ditches successfully preventing the occurrence of standing water on the Landfill. The surface water runoff is directed into perimeter drainage ditches into drainage basins to reduce particulates and sediment before it ultimately enters into the Cheechunk Canal. These surface water runoff features are checked monthly for sediment buildups, overgrowth of vegetation, overflow of drainage ditches or basins, improper drainage of terraces and downchutes, and sloughing of the Landfill cover. Appendix A contains documentation of regular inspections of the surface water runoff features in 2014.

Based on the observed conditions, no corrective measures are needed for the surface water management features. Orange County will continue to perform regular inspections.

4.3 IC/EC Certification

As required by DER-10, Section 6.3(a), the completed and signed NYSDEC IE/EC Certification Form is provided as Appendix C.

5.0 MONITORING PLAN COMPLIANCE

The Landfill was granted a post-closure monitoring variance by the NYSDEC in December 2002 reducing the monitoring of the Landfill from quarterly monitoring to every fifth quarter. The NYSDEC approved further modifications to the monitoring plan on August 5, 2014. Monitoring includes collection of groundwater, surface water, and leachate samples for analysis of 6 NYCRR Part 360 Baseline parameters, as well as water level measurements from select monitoring wells, and air quality monitoring. Monitoring wells and sample locations are shown on Figure 2. The following sections describe the monitoring requirements for groundwater, surface water, leachate, and air quality.

5.1 Groundwater Monitoring

The recently updated groundwater monitoring program provides for annual collection of static water level measurements and water quality samples from one piezometer location (PZ-04) and six (6) monitoring wells spread out around the Landfill property. In addition, static water level measurements are to be taken from twenty-one (21) additional monitoring wells and piezometers.

In the 2014 sampling event, samples were obtained from three (3) piezometer locations (PZ-04, PZ-14-3, and PZ-14-5) and eight (8) monitoring well locations using low flow methodology and analyzed for 6 NYCRR Part 360 Baseline parameters. Upgradient bedrock well MW-230D could not be sampled due to damage to the well casing. A sample was collected instead from MW-231D, located approximately 700 feet southeast from MW-230D. The two additional overburden piezometers (PZ-14-3 and PZ-14-5) were sampled in support of the ongoing seep evaluation. Water level measurements were collected at thirty-three (33) locations, while two (2) monitoring wells (MW-235S and MW-235D) were unable to be located. Water levels were also measured in the six (6) newly installed piezometers PZ-14-1 through PZ-14-6 in support of the ongoing seep evaluation.

As described in Section 3.1, results generally show groundwater samples collected upgradient and downgradient of the Landfill waste mass indicate no significant differences in data trends where exceedances were observed.

Overall, the groundwater monitoring program meets the remedial objectives for the site in that it provides suitable means to determine the effectiveness of the selected remedy. Orange County will repair the damaged wells and locate the missing wells, and continue groundwater monitoring according to the approved SMP. Additional groundwater monitoring will be conducted in support of the ongoing seep evaluation.

5.2 Surface Water Monitoring

The approved surface water monitoring program consists of annual sampling of three (3) locations (SW-5, SW-8, and SW-13) along the Cheechunk Canal adjacent to the Landfill footprint. These locations are located upgradient, cross-gradient and downgradient of the Landfill (see Figure 2).

Surface water sampling for the 2014 event included sampling of the three (3) surface water monitoring locations in the Cheechunk Canal. These surface water samples were analyzed for 6 NYCRR Part 360 Baseline parameters.

The surface water monitoring program meets the remedial objectives for the site in that it provides direct means to determine the effectiveness of the selected remedy. Orange County will continue surface water monitoring according to the approved SMP.

5.3 Leachate Monitoring

Leachate monitoring consists of annual sampling of three (3) manhole locations, labeled MH-5, MH-7 and MH-15, located on the eastern edge of the Landfill footprint. During the 2014 monitoring event, leachate samples were collected from MH-5, MH-7 and MH-15, which were analyzed for 6 NYCRR Part 360 Baseline parameters.

Section 4.2.1.1 of the approved SMP requires that if conditions indicative of leachate outbreaks such as wet spots, dead vegetation, surface sloughing or discoloration are observed near the Landfill, further investigation is warranted to evaluate the condition and determine the appropriate corrective action.

Due to the development of seeps southeast of the Landfill on the banks of the Cheechunk Canal, additional seep and surface water sampling was performed on June 12, 2014 and October 6 - 8, 2014. The June 12, 2014 sampling event consisted of the collection of five (5) seep samples. The October 6-8, 2014 sampling event consisted of the collection of two overburden groundwater samples from piezometers PZ-14-3 and PZ-14-5, one seep sample (Seep Monitoring Point) in the vicinity of the most persistent seep, and three (3) surface water samples (Upstream: SW-5; slightly downstream of the seep area (SW-Seep-DS; and Downstream: (SW-8)). The sample locations are shown on Figure 2. All samples were analyzed for 6 NYCRR Part 360 Baseline parameters and results are provided in Tables 3 and 4.

The leachate monitoring program meets the remedial objectives for the site. Orange County will continue leachate monitoring according to the approved SMP, and will continue implementation of a remedial plan for the seeps.

5.4 Air Quality Monitoring

Air quality monitoring includes field measurements of explosive gas and VOCs levels in the headspaces of the manholes, piezometers, and monitoring wells sampled during each monitoring event. VOC analyses are also performed on collected groundwater, surface water and leachate samples.

The air quality monitoring program meets the remedial objectives to evaluate the effectiveness of the selected remedy in that it provides a direct means to determine if Landfill gases are prevented from migration and buildup. Orange County will continue air quality monitoring according to the approved SMP.

6.0 OPERATION AND MAINTENANCE PLAN COMPLIANCE

The Operation and Maintenance (O&M) Plan for the Landfill, outlined in the approved SMP, consists of the following components:

- Repair, if necessary, of the Landfill cover system in accordance with approved specification materials and methods;
- Annual mowing of the vegetated cover system;
- Annual or more frequent mowing of grass-lined ditches;
- Addition, if necessary, of soil amendments (fertilizer, lime) to the cover system;
- Annual or more frequent clearing of drainage swales, ditches and downchutes;
- Investigation of stressed vegetation and gas odors;
- Vector control;

- Snow plowing and upkeep of the perimeter access road;
- Collection, removal and disposal of leachate;
- Preventative maintenance of leachate pumps; and
- Repair or replacement, if necessary, of monitoring wells and piezometers.

During 2014, the following O&M activities were performed:

- Regular inspections of the Landfill cap and cover materials, surface water drainage features, monitoring wells, leachate collection system and the Landfill property;
- Mowing of the Landfill cover system from June 2 through September 23, 2014;
- Regular leachate removal from aboveground storage tanks for treatment at permitted facilities;
- Supplemental investigations related to the seeps along the Cheechunk Canal; and
- Annual groundwater, surface water, leachate and air quality monitoring performed on June, 12, 2014 and October 6 through 8, 2014.

Operational issues were addressed by Landfill staff, including:

- Repair to leachate tank L-2 on December 11, 2013;
- Repair to leachate tank L-2 piping on January 25, 2014 to prevent freezing of the line;
- A hole was noted in leachate tank L-5 on January 7, 2014, necessitating that the tank be pumped out and the associated leachate pump being shut off until it was repaired on April 12, 2014;
- Repair of leachate tank L-5 pump float switch on April 28, 2014;
- Repair of discharge pipe and pump float switch for leachate tank L-3 on May 19, 2014;
- Electrical repairs due to lightning strike on June 14, 2014, necessitating that leachate tanks L-3, L-4 and L-5 be taken out of service until repaired on August 11, 2014; and
- Electrical repairs to leachate tank L-3 pump on September 3, 2014 due to problems causing the circuit breaker to activate.

The components of the remedy subject to O&M requirements (Landfill cover, gas venting and leachate collection systems, surface water runoff features, and the monitoring well/piezometer network) are performing as designed, with the exception of the damaged and missing wells. Regular inspections performed by Orange County personnel continue to show compliance with the March 1998 remedy determined for the Landfill, with the exception of the seeps. Operation and maintenance of the property continues to protect human health and the overall integrity of the Landfill.

There were no deficiencies in complying with the O&M Plan during the 2014 reporting period. As discussed above, the leachate collection system is installed too high to intercept groundwater causing the seeps. Mitigation of the seeps will be the subject of the ongoing evaluation.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The Landfill continues to comply with the required activities set forth in the SMP for the 2014 reporting year. All ICs and ECs have been successfully implemented. The monitoring plan for the Landfill is on-going in accordance with the approved variance granted by the NYSDEC in August 2014. The County will continue to monitor the waste mass and surrounding property visually and analytically, and perform monthly inspections for the integrity of the Landfill and the protection of human health.

As described above, the County will arrange for repair of the damaged wells and locate the missing wells. In support of the ongoing seep evaluation, the County has submitted a Long Term Seep Evaluation Report and Expedited IRM Work Plan, and is preparing the following submittals for the NYSDEC:

- Supplemental Sediment Investigation Work Plan (due by December 18, 2014); and
- Long Term Seep Elimination Feasibility Study (due January 30, 2015).

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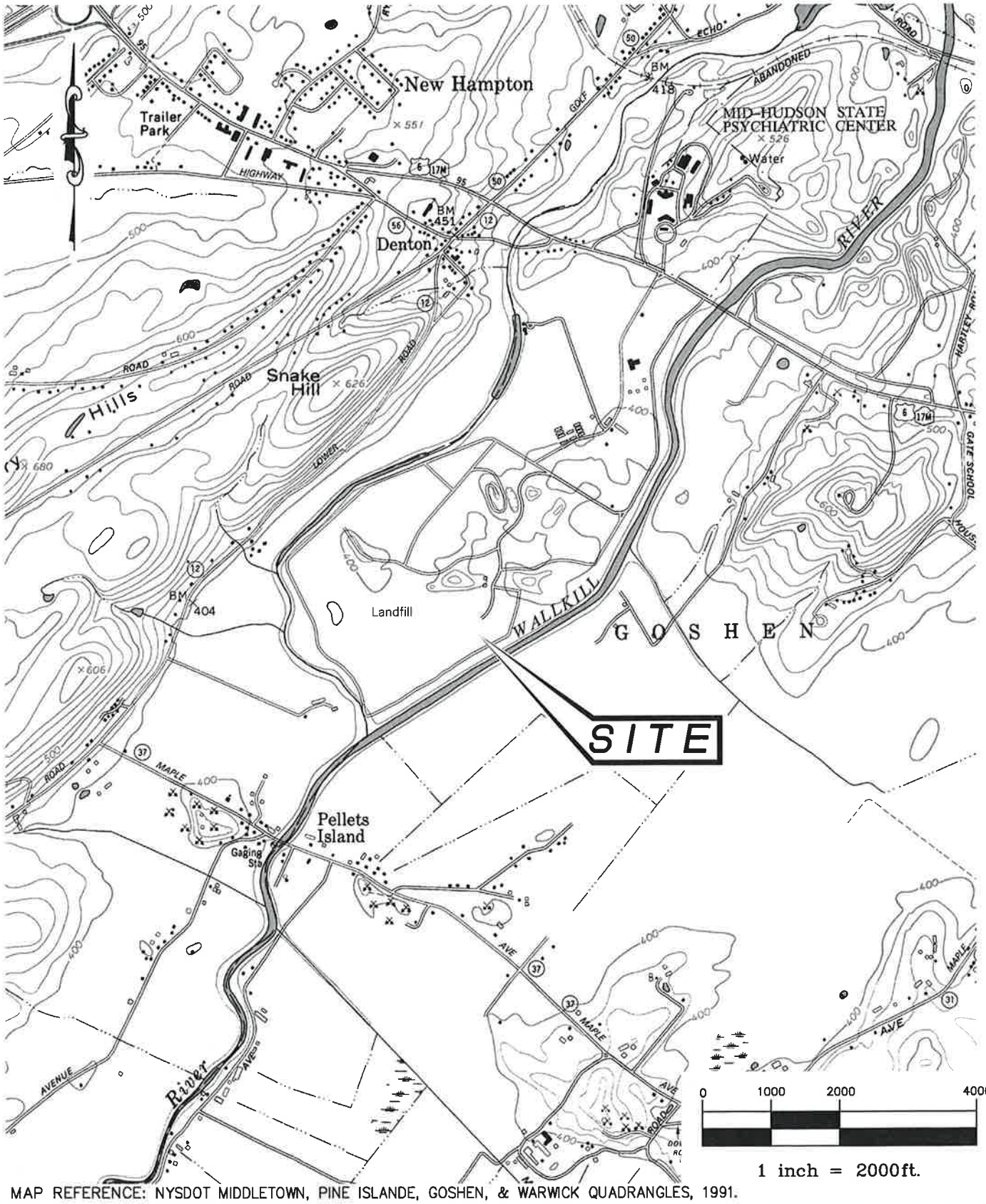
FIGURES



MAP REFERENCE: NYSDOT MIDDLETOWN, PINE ISLANDE, GOSHEN, & WARWICK QUADRANGLES, 1991.

STERLING

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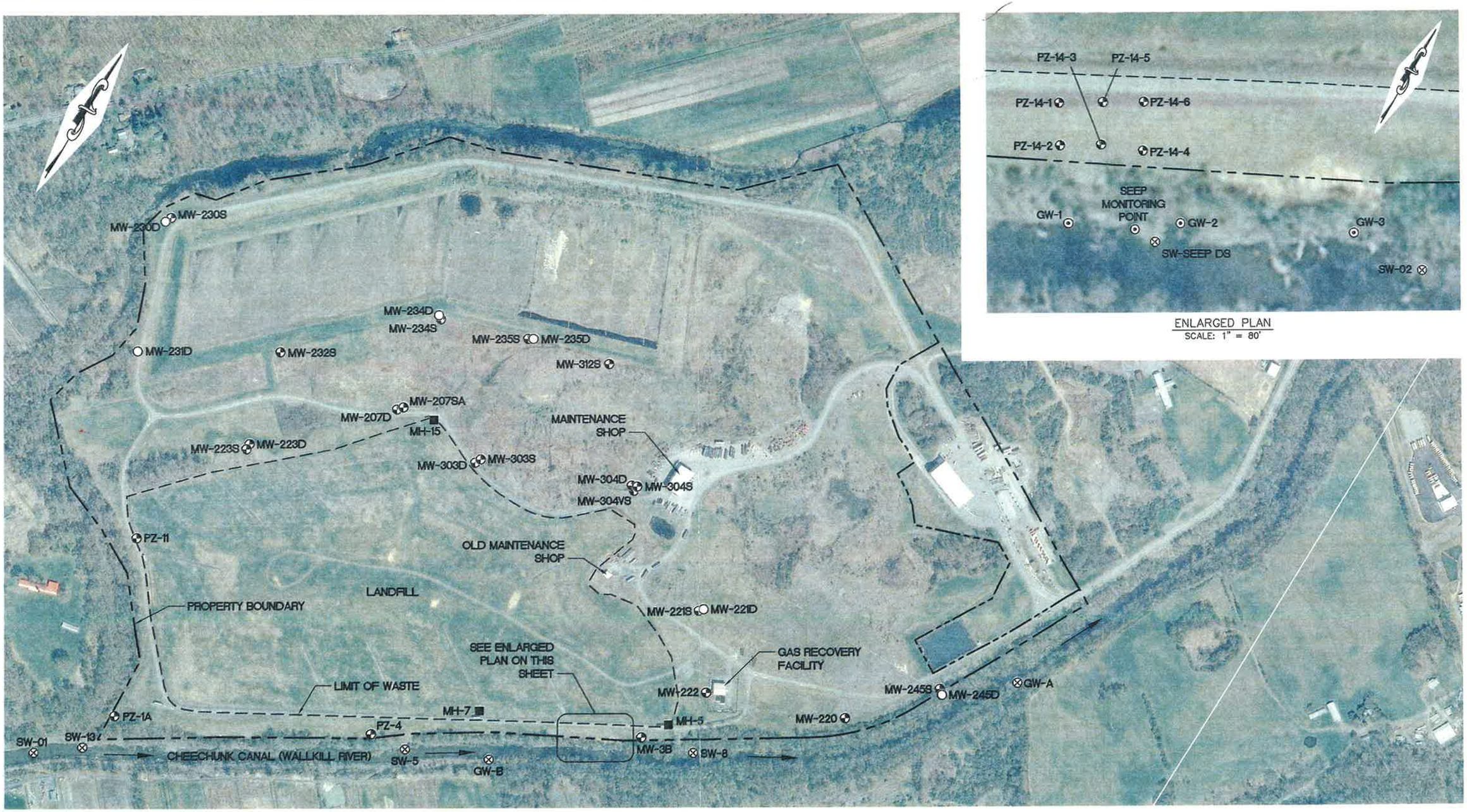
SITE LOCATION MAP

ORANGE CO. DEPT. OF PUBLIC WORKS

ORANGE COUNTY LANDFILL

TOWN OF GOSHEN — ORANGE CO., N.Y.

PROJ. No.: 2013–29	DATE: 12/3/14	SCALE: 1" = 2000'	DWG. NO. 2010–15038	FIGURE 1



ENLARGED PLAN
SCALE: 1" = 80'

LEGEND:

MW-230S	OVERBURDEN MONITORING WELL AND PIEZOMETER LOCATIONS
MW-230D	BEDROCK MONITORING WELL LOCATIONS
MH-5	LEACHATE SAMPLING LOCATIONS
GW-1	SEEP MONITORING LOCATIONS
SW-5	SURFACE WATER SAMPLE LOCATIONS
– – – – –	LIMIT OF WASTE
—— – – ——	PROPERTY BOUNDARY

0 250 500 1000

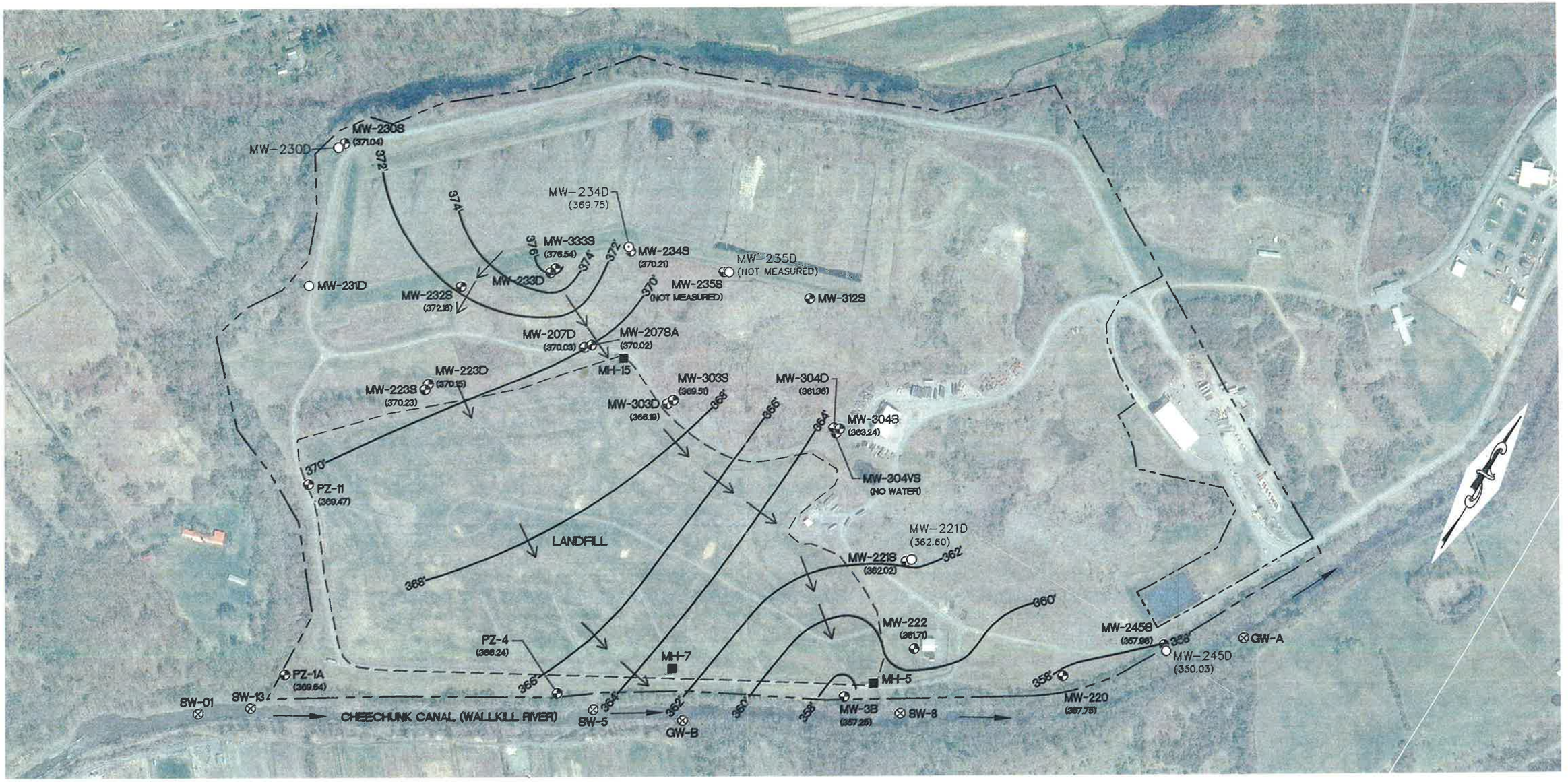
(IN FEET)
1 inch = 500 ft.

MAP REFERENCES:
1. PROPERTY BOUNDARY AND LIMIT OF WASTE FROM DRAWINGS ENTITLED "OVERALL PLAN AND RESTRICTED PARCEL," BY THOMAS J. BARRY, DATED FEBRUARY 14, 2013.
2. AERIAL PHOTOGRAPHY FROM NEW YORK STATWIDE DIGITAL ORTHOIMAGERY PROGRAM, PHOTOGRAPHY CIRCA 2013.

STERLING
Sterling Environmental Engineering, P.C.
24 Wade Road • Latham, New York 12110

SAMPLE LOCATION MAP
ORANGE CO. DEPT. OF PUBLIC WORKS
ORANGE COUNTY LANDFILL
TOWN OF GOSHEN ORANGE CO., N.Y.

PROJ. No.:	DATE:	SCALE:	DWG. NO.	FIGURE
2010-15	12/3/14	1"=500'	2010-15039	2



LEGEND:

358'	GROUNDWATER ELEVATION CONTOURS
→	INFERRED GROUNDWATER FLOW DIRECCTION
MW-230S	OVERBURDEN MONITORING WELL AND PIEZOMETER LOCATIONS
MW-230D	BEDROCK MONITORING WELL LOCATIONS
MH-5	LEACHATE SAMPLING LOCATIONS
GW-1	SEEP MONITORING LOCATIONS
SW-5	SURFACE WATER SAMPLE LOCATIONS
— — — —	LIMIT OF WASTE
— — — —	PROPERTY BOUNDARY

0 250 500 1000

(IN FEET)

1 inch = 500 ft.

MAP REFERENCES:
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GROUNDWATER CONTOUR MAP – OVERBURDEN HYDROGEOLOGIC UNIT
ORANGE CO. DEPT. OF PUBLIC WORKS
ORANGE COUNTY LANDFILL
TOWN OF GOSHEN ORANGE CO., N.Y.

PROJ. No.:	DATE:	SCALE:	DWG. NO.	FIGURE
2010-15	12/3/14	1"=500'	2010-15040	3

TABLES

TABLE 1

Summary of Field Parameter Measurements (October 6-8, 2014)
Orange County Lanfill, Goshen, New York

Parameter	Title 6 Part 703.3 Standards	Units	Groundwater Sample Locations							Surface Water Locations			Manhole Leachate		
			MW-230S	MW-231D	MW-220	MW-245D	MW-3B	MW-245S	PZ-4	SW-13	SW-5	SW-8	MH-5	MH-7	MH-15
Static Water Level [1]	---	feet	14.56	20.65	21.19	41.05	29.18	33.15	16.10	---	---	---	---	---	---
Specific Conductivity	---	mS/cm[c]	0.650	1.503	0.872	1.048	0.853	0.873	0.890	0.790	0.800	0.788	1.775	2.893	1.418
Temperature	---	degrees C	13.67	13.17	16.01	12.62	17.41	14.77	14.23	15.79	16.00	15.47	17.11	15.74	17.58
pH	6.5<pH< 8.5	pH Units	7.95	7.54	7.17	7.35	7.59	---	7.38	7.46	7.36	7.16	7.50	7.36	5.76
ORP	--	mV	-125.5	-83.8	-1.7	6.1	-61.6	227.5	62.4	516.9	-138.6	495.8	204.4	-81.9	28.16
Dissolved Oxygen [2]	> 6.0	mg/L	---	---	---	---	---	---	---	**5.71**	**4.51**	**4.83**	0.79	2.59	1.38

NOTES :

Values in **BOLD** indicate an exceedance of applicable water quality standard.

[1] Measured from the top of the PVC well to water surface.

[2] Dissolved Oxygen Standard applies to surface water samples only.

--- No standard or not measured.

Table 2

Summary of Static Water Level Readings and Groundwater Elevations (October 6-8, 2014)
Orange County Landfill, Goshen, New York

Well I.D.	Measuring Point Elevation (ft)	Static Water Level (ft)	Groundwater Elevation (ft)
MW-207D	390.02	20.89	369.13
MW-207SA	389.74	19.72	370.02
MW-220	378.94	21.19	357.75
MW-221S	381.44	19.42	362.02
MW-221D	381.21	18.69	362.52
MW-222	382.49	20.78	361.71
MW-223S	389.25	19.02	370.23
MW-223D	389.36	19.21	370.15
MW-230S	385.6	14.56	371.04
MW-230D	385.35	Well Damaged	
MW-231D	387.67*	20.65	367.02
MW-232S	388.64	16.46	372.18
MW-233S	389.29	12.75	376.54
MW233D	---	19.82	---
MW-234S	390.63	20.42	370.21
MW-234D	390.1	20.35	369.75
MW-235S	388.04	---	---
MW-235D	393.74	---	---
MW-245S	391.13	33.15	357.98
MW-245D	391.08	41.05	350.03
MW-303S	389.85	20.34	369.51
MW-303D	389.83	23.64	366.19
MW-304VS	390.72	NE	---
MW-304S	390.92	27.68	363.24
MW-304D	390.08	28.72	361.36
MW-312S	387.87*	19.34	368.53
MW-3B	386.43	29.18	357.25
PZ-11	390.41	20.94	369.47
PZ-14-1[†]	390.27	29.06	361.21
PZ-14-2[†]	381.94	21.53	360.41
PZ-14-3[†]	381.83	21.39	360.44
PZ-14-4[†]	381.77	21.23	360.54
PZ-14-5[†]	392.22	31.93	360.29
PZ-14-6[†]	391.11	29.74	361.37
PZ-1A	385.28	15.64	369.64
PZ-4	382.34	16.10	366.24

Notes:
NE = Not encountered
--- = Not measured or no available data
[†] = Measuring point elevation surveyed by Sterling Environmental Engineering, P.C. on September 6, 2014.
* = Measuring point elevation obtained from Table 3-2 of the Remedial Investigation Report for the Orange County Landfill - DRAFT, prepared by Stearns & Wheler, dated March 1995.
All other Measuring Point Elevations were obtain from Table 1 of the 2013 Monitoring Event for the Orange County Landfill, prepared by Cornerstone Environmental Group, LLC., dated September 2013.

Table 3

Summary of Groundwater Analytical Results (October 7 and 8, 2014)
Orange County Landfill, Goshen, New York

Analyte	Units	Groundwater Standard[A]	MW-230S 10/7/2014	MW-231D 10/8/2014	MW-220 10/8/2014	MW-245S 10/7/2014	MW-245D 10/8/2014	PZ-4 10/7/2014	MW-3B 10/7/2014	PZ-14-3 10/6/2014	PZ-14-5 10/6/2014
Water Quality Parameters											
Alkalinity, Total	mg/L	---	130 B	140	320	280	210	370	540	570 B	600 B
Ammonia	mg/L	2.0	0.28	**3.9 B**	0.0090 U	0.10	**5.2**	0.0090 U	0.50	**5.3**	9.1 B
Biochemical Oxygen Demand	mg/L	---	2.2	2.9	2.0 U	2.0 U	6.4	2.0 U	2.0 U	2.0 U	7.1 b
Chemical Oxygen Demand	mg/L	---	5.0 U	16	8.0 J	6.7 J	9.6 J	8.0 J	13	23 B	32 B
Chloride	mg/L	250	41	**630**	23	77	40	30	70	61	79
Color	Color Units	15[B]	5.0 U	15	**40**	5.0 U	10	5.0 U	5.0 U	5.0 U	5.0 U
Cyanide, Total	mg/L	0.2	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U ^	0.0050 U	0.0050 U	**0.23**
Hardness	mg/L	---	180	440	570	420	360	580	530	610	580
Nitrate as N	mg/L	10	0.020 U	0.080	0.051	0.032 J	0.73	0.34	0.020 U	0.69	0.09
Phenolics, Total Recoverable	mg/L	0.001[C]	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.026
Sulfate	mg/L	250	33	120	150	100	160	140	37	34	30
Total Dissolved Solids	mg/L	500	320	**1500**	**680**	**600**	**620**	**710**	**700**	**680**	**780**
Total Kjeldahl Nitrogen	mg/L	---	0.35	4.2	0.16 J	2.2	5.3	0.57	1.2 B	5.9	9.2
Total Organic Carbon	mg/L	---	1.5	1.5	2.9	2.2	1.8	0.80 J	3.5	3.2	8.9
Turbidity	NTU	5.0[B]	**82**	**26**	**30**	**120**	**10**	**35**	**11**	**450**	**240**
Volatile Organic Compounds											
1,1,1-Trichloroethane	µg/L	5.0	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
1,1,2,2-Tetrachloroethane	µg/L	5.0	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,1,2-Trichloroethane	µg/L	1.0	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
1,1-Dichloroethane	µg/L	5.0	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
1,1-Dichloroethene	µg/L	5.0	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U	0.85 U
1,2-Dichlorobenzene	µg/L	3.0	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
1,2-Dichloroethane	µg/L	0.6	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
1,2-Dichloropropane	µg/L	5.0	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
1,3-Dichlorobenzene	µg/L	3.0	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
1,4-Dichlorobenzene	µg/L	3.0	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U
2-Chloroethyl vinyl ether	µg/L	---	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
Benzene	µg/L	1.0	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Bromodichloromethane	µg/L	50	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
Bromoform	µg/L	50	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Bromomethane	µg/L	5.0	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U
Carbon tetrachloride	µg/L	5.0	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U	0.51 U
Chlorobenzene	µg/L	5.0	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U
Chloroethane	µg/L	5.0	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U
Chloroform	µg/L	7.0	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U
Chloromethane	µg/L	5.0	0.64 U	0.64 U	0.64 U	0.64 U	0.64 U	0.64 U	0.64 U	0.64 U	0.64 U
cis-1,2-Dichloroethene	µg/L	5.0	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
cis-1,3-Dichloropropene	µg/L	---	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U
Dibromochloromethane	µg/L	50	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
Dichlorodifluoromethane	µg/L	5.0	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Ethylbenzene	µg/L	5.0	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
Methylene Chloride	µg/L	5.0	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U	0.81 U
m-Xylene & p-Xylene	µg/L	5.0	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
o-Xylene	µg/L	5.0	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U
Tetrachloroethene	µg/L	5.0	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Toluene	µg/L	5.0	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
trans-1,2-Dichloroethene	µg/L	5.0	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U
trans-1,3-Dichloropropene	µg/L	---	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Trichloroethene	µg/L	5.0	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U	0.60 U
Trichlorofluoromethane	µg/L	5.0	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Vinyl chloride	µg/L	2.0	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U
Xylenes, Total	µg/L	---	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Total Recoverable Metals											
Aluminum	mg/L	---	1.1	0.24	0.16 J	3.8	0.060 U	0.65	0.060 U	6.3	0.73
Antimony	mg/L	0.003[C]	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U	0.0068 U
Arsenic	mg/L	0.025	0.0063 J	0.0056 U	**0.030**	**0.15**	0.0082 J	0.010 J	**0.047**	**0.094**	**0.057**
Barium	mg/L	1.0	0.094	0.036	0.072	0.098	0.10	0.034	0.17	0.63	0.51
Beryllium	mg/L	0.003	0.00030 U	0.00030 U	0.00030 U	0.00037 J	0.00030 U	0.00030 U	0.00030 U	0.00047 J	0.00047 J
Boron	mg/L	1.0	0.013 J	0.074	0.034	0.026	0.050	0.091	0.21	0.18	0.21
Cadmium	mg/L	0.005	0.00050 U	0.0023	0.00050 U	0.00050 U	0.00054 J	0.00050 U	0.00050 U	0.00050 U	0.00050 U
Calcium	mg/L	---	63	110	160	120	91	160	150	180	140
Chromium	mg/L	0.05	0.0018 J	0.0031 J	0.0045	0.0091	0.0036 J	0.0018 J	0.0010 U	0.028	0.0076
Chromium, hexavalent	mg/L	0.05	0.0050 U	0.0050 U	0.0050 U	0.0050 U	0.0050 U H	0.0050 U	0.0050 U	0.0050 U	0.0050 U
Copper	mg/L	2.0	0.0042 J B	0.0025 J	0.0016 U	0.0075 J B	0.0016 U	0.0036 J B	0.0019 J	0.091	0.0072 J
Iron	mg/L	0.3	**1.7 B**	**1.0**	**6.1**	**8.0 B**	**0.66**	**1.2 B**	**1.3 B**	**18 B**	**4.8 B**
Lead	mg/L	0.025	0.0037 J	0.0047 J	0.0030 J	0.013	0.0064 J	0.0046 J	0.0036 J	0.017	0.003 U
Magnesium	mg/L	35	11	**42**	**43**	27	31	**39**	33	**56**	**54**
Manganese	mg/L	0.3	**0.58**	0.11[1] B	**1.3 B**	**1.5**	**0.34 B**	0.11[1]	**0.88**	**2.0**	**1.0**
Mercury	mg/L	0.0007	0.00012 U	0.00012 U	0.00012 U	0.00012 U	0.00012 U	0.00012 U	0.00012 U	0.00012 U	0.00012 U
Nickel	mg/L	0.1	0.0018 J	0.0024 J	0.0030 J	0.0067 J	0.0053 J	0.0022 J	0.0085 J	0.025	0.028
Potassium	mg/L	---	1.9	4.1	2.4	3.1	4.3	2.7	2.6	9.3	9.8
Selenium	mg/L	0.01	0.0087 U	0.010 J	0.0087 U	0.0087 U	0.0092 J	0.0087 U	0.0087 U	0.0087 U	0.0087 U
Silver	mg/L	0.05	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U	0.0017 U
Sodium	mg/L	20	9.8	**270**	13	**46**	**59**	15	**63**	**60**	**87**
Thallium	mg/L	0.0005[C]	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U	0.010 U
Zinc	mg/L	2.0	0.010 B	0.028 B	0.0077 J B	0.021 B	0.046 B	0.011 B	0.0074 J B	0.087 B	0.026 B

Notes:

Values in **BOLD** indicate an exceedance of applicable water quality standard.
U = Sample concentration was not detected at or above the reporting limit.
B = Compound was found in the blank and the sample.
b = Result detected in the Unseeded Control Blank (USB).
J = Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
H = Sample was prepared or analyzed beyond the specified holding time.
^ = Instrument related QC exceeds the control limits.
[A] = NY TOGs 1.1.1: Water Quality Stds & Guidance Values: GA Water Class for Standard and Guidance Values; Eff. June 1998
[B] = Standards based on EPA Part 5, Subpart 5-1 Public Water Systems - Tables 1 and 5.
[C] = The sample specific reporting limit does not support the applicable groundwater standard.
[1] = The sum of iron and manganese concentrations must not excede 0.5 mg/L.

Table 4

Summary of Surface Water Analytical Results (October 6, 2014)
Orange County Landfill, Goshen, New York

Analyte	Units	Surface Water Standard[A]	SW-13	SW-5	SW-8
Water Quality Parameters					
Alkalinity, Total	mg/L	---	210 B	230	220 B
Ammonia	mg/L	[1]	0.0090 U	0.0090 U	0.014 J B
Biochemical Oxygen Demand	mg/L	---	2.0 U H	2.0 U	2.0 U
Chemical Oxygen Demand	mg/L	---	6.4 J B ^	21 B	21 B
Chloride	mg/L	---	100	100	100
Color	Color Units	---	25	25	25
Cyanide, Total	mg/L	0.0052	0.0050 U ^	0.0050 U ^	0.0050 U ^
Hardness as calcium carbonate	mg/L	---	240	230	240
Nitrate as N	mg/L	---	2.1	2.1	2.1
Phenolics, Total Recoverable	mg/L	0.001[2]	0.0050 U	0.0050 U	0.0050 U
Sulfate	mg/L	---	33	33	34
Total Dissolved Solids	mg/L	---	390	430 H	400
Total Kjeldahl Nitrogen	mg/L	---	0.94	0.75	0.41
Total Organic Carbon	mg/L	---	4.1	4.1	4.1
Turbidity	NTU	---	28	29	22
Volatile Organic Compounds					
1,1,1-Trichloroethane	µg/L	---	0.39 U	0.39 U	0.39 U
1,1,2,2-Tetrachloroethane	µg/L	---	0.26 U	0.26 U	0.26 U
1,1,2-Trichloroethane	µg/L	---	0.48 U	0.48 U	0.48 U
1,1-Dichloroethane	µg/L	---	0.59 U	0.59 U	0.59 U
1,1-Dichloroethene	µg/L	---	0.85 U	0.85 U	0.85 U
1,2-Dichlorobenzene	µg/L	5 [3]	0.44 U	0.44 U	0.44 U
1,2-Dichloroethane	µg/L	---	0.60 U	0.60 U	0.60 U
1,2-Dichloropropane	µg/L	---	0.61 U	0.61 U	0.61 U
1,3-Dichlorobenzene	µg/L	5 [3]	0.54 U	0.54 U	0.54 U
1,4-Dichlorobenzene	µg/L	5 [3]	0.51 U	0.51 U	0.51 U
2-Chloroethyl vinyl ether	µg/L	---	1.9 U	1.9 U	1.9 U
Benzene	µg/L	10	0.60 U	0.60 U	0.60 U
Bromodichloromethane	µg/L	---	0.54 U	0.54 U	0.54 U
Bromoform	µg/L	---	0.47 U	0.47 U	0.47 U
Bromomethane	µg/L	---	1.2 U	1.2 U	1.2 U
Carbon tetrachloride	µg/L	---	0.51 U	0.51 U	0.51 U
Chlorobenzene	µg/L	5	0.48 U	0.48 U	0.48 U
Chloroethane	µg/L	---	0.87 U	0.87 U	0.87 U
Chloroform	µg/L	---	0.54 U	0.54 U	0.54 U
Chloromethane	µg/L	---	0.64 U	0.64 U	0.64 U
cis-1,2-Dichloroethene	µg/L	---	0.57 U	0.57 U	0.57 U
cis-1,3-Dichloropropene	µg/L	---	0.33 U	0.33 U	0.33 U
Dibromochloromethane	µg/L	---	0.41 U	0.41 U	0.41 U
Dichlorodifluoromethane	µg/L	---	0.28 U	0.28 U	0.28 U
Ethylbenzene	µg/L	17	0.46 U	0.46 U	0.46 U
Methylene Chloride	µg/L	200	0.81 U	0.81 U	0.81 U
m-Xylene & p-Xylene	µg/L	65 [3]	1.1 U	1.1 U	1.1 U
o-Xylene	µg/L	65 [3]	0.43 U	0.43 U	0.43 U
Tetrachloroethene	µg/L	1.0	0.34 U	0.34 U	0.34 U
Toluene	µg/L	6,000	0.45 U	0.45 U	0.45 U
trans-1,2-Dichloroethene	µg/L	---	0.59 U	0.59 U	0.59 U
trans-1,3-Dichloropropene	µg/L	---	0.44 U	0.44 U	0.44 U
Trichloroethene	µg/L	40	0.60 U	0.60 U	0.60 U
Trichlorofluoromethane	µg/L	---	0.45 U	0.45 U	0.45 U
Vinyl chloride	µg/L	---	0.75 U	0.75 U	0.75 U
Xylenes, Total	µg/L	65	1.1 U	1.1 U	1.1 U
Metals, Total Recoverable					
Aluminum	mg/L	0.1	**0.54**	**0.40**	**0.47**
Antimony	mg/L	---	0.0068 U	0.0068 U	0.0068 U
Arsenic	mg/L	0.15[4]	0.0056 U	0.0056 U	0.0098 J
Barium	mg/L	---	0.041	0.040	0.041
Beryllium	mg/L	[5]	0.00030 U	0.00030 U	0.00030 U
Boron	mg/L	10	0.046	0.045	0.045
Cadmium	mg/L	[5]	0.00050 U	0.00050 U	0.00050 U
Calcium	mg/L	---	59	58	61
Chromium	mg/L	[5]	0.0015 J	0.0010 U	0.0010 J
Chromium, hexavalent	mg/L	0.011[4]	0.0050 U	0.0050 U	0.0050 U
Copper	mg/L	[5]	0.0054 J	0.0051 J	0.0050 J
Iron	mg/L	0.3	**0.54 B**	**0.40 B**	**0.46 B**
Lead	mg/L	[5]	0.0030 U	0.0030 U	0.0031 J
Magnesium	mg/L	---	23	23	23
Manganese	mg/L	---	0.13	0.13	0.12
Mercury	mg/L	0.7	0.00012 U	0.00012 U	0.00012 U
Nickel	mg/L	[5]	0.0016 J	0.0018 J	0.0020 J
Potassium	mg/L	---	3.8	3.7	3.8
Selenium	mg/L	---	0.0087 U	0.0087 U	0.0087 U
Silver	mg/L	---	0.0017 U	0.0017 U	0.0017 U
Sodium	mg/L	---	52	52	52
Thallium	mg/L	0.008[2]	0.010 U	0.010 U	0.010 U
Zinc	mg/L	[5]	0.0071 J B	0.023 B	0.012 B

Notes:

Values in **BOLD** indicate an exceedance of applicable water quality standard.

U = Compound is not detected at or above laboratory method detection limit.

J = Result is less than the laboratory reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.

B = Compound was found in the blank and the sample.

H = Sample was prepared or analyzed beyond specified holding time.

^ = Instrument related QC exceeds the control limits.

[A] = T.O.G.S. 1.1.1 Ambient Water Quality Standards for Class C Surface Water

[1] = Surface water standard for ammonia (mg/L) is interpolated using the temperatures and pH of the individual samples. SW-13 = 2.18; SW-5 = 2.19; and SW-8 = 2.10

[2] = Laboratory Method Detection Limit is greater than or equal to the applicable water quality standard.

[3] = Applies to the sum of 1,2-1,3-1,4-Dichlorobenzene, or Applies to each individual isomer, or applies to the sum of m-, o-, and p-xylenes, or applies to the sum of cis-trans 1,3-Dichloropropene.

[4] = Standard applies to the dissolved form, not total recoverable.

[5] = Surface Water Standard for Berylium, Cadmium, Chromium, Copper, Lead, Nickel, and Zinc are based on the individual sample's hardness.

Berylium (mg/L): SW-13 = 1.1; SW-5 = 1.1; and SW-8 = 1.1

Cadmium (mg/L): SW-13 = 0.01; SW-5 = 0.01; and SW-8 = 0.01

Chromium: (mg/L): SW-13 = 1.17; SW-5 = 1.13; and SW-8 = 1.7

Copper (mg/L): SW-13 = 0.03; SW-5 = 0.03; and SW-8 = 0.03

Lead (mg/L): SW-13 = 0.25; SW-5 = 0.24; and SW-8 = 0.25

Nickel (mg/L): SW-13 = 0.98; SW-5 = 0.95; and SW-8 = 0.98

Zinc (mg/L): SW-13 = 0.25; SW-5 = 0.24; and SW-8 = 0.25

Table 5

Summary of Leachate Analytical Results (October 6 and 7, 2014)
Orange County Landfill, Goshen, New York

Analyte	Units	MH-5 10/6/2014	MH-7 10/7/2014	MH-15 10/7/2014
Water Quality Parameters				
Alkalinity, Total	mg/L	1300 B	3600 B	660
Ammonia	mg/L	130 B	180	31 B
Biochemical Oxygen Demand	mg/L	16 b	35	15
Chemical Oxygen Demand	mg/L	250 B	650	130
Chloride	mg/L	520	1600	150
Color	Color Units	40	200	50
Cyanide, Total	mg/L	0.0083 J	0.0065 J	0.018
Hardness as calcium carbonate	mg/L	760	720	800
Nitrate as N	mg/L	0.24	0.030 J	0.020 U
Phenolics, Total Recoverable	mg/L	0.0075 J	0.016	0.0050 U
Sulfate	mg/L	4.6	67	8.1
Total Dissolved Solids	mg/L	1000	4000 H	1100
Total Kjeldahl Nitrogen	mg/L	140	560	33
Total Organic Carbon	mg/L	57	180	33
Turbidity	NTU	440	180	87
Volatile Organic Compounds				
1,1,1-Trichloroethane	µg/L	3.9 U	7.7 U	3.9 U
1,1,2,2-Tetrachloroethane	µg/L	2.6 U	5.2 U	2.6 U
1,1,2-Trichloroethane	µg/L	4.8 U	9.6 U	4.8 U
1,1-Dichloroethane	µg/L	5.9 U	12 U	5.9 U
1,1-Dichloroethene	µg/L	8.5 U	17 U	8.5 U
1,2-Dichlorobenzene	µg/L	4.4 U	8.9 U	4.4 U
1,2-Dichloroethane	µg/L	6.0 U	12 U	6.0 U
1,2-Dichloropropane	µg/L	6.1 U	12 U	6.1 U
1,3-Dichlorobenzene	µg/L	5.4 U	11 U	5.4 U
1,4-Dichlorobenzene	µg/L	5.1 U	10 U	5.1 U
2-Chloroethyl vinyl ether	µg/L	19 U	37 U	19 U
Benzene	µg/L	6.0 U	17 J	6.0 U
Bromodichloromethane	µg/L	5.4 U	11 U	5.4 U
Bromoform	µg/L	4.7 U	9.4 U	4.7 U
Bromomethane	µg/L	12 U	24 U	12 U
Carbon tetrachloride	µg/L	5.1 U	10 U	5.1 U
Chlorobenzene	µg/L	4.8 U	27 J	4.8 U
Chloroethane	µg/L	20 J	17 U	8.7 U
Chloroform	µg/L	5.4 U	11 U	5.4 U
Chloromethane	µg/L	6.4 U	13 U	6.4 U
cis-1,2-Dichloroethene	µg/L	5.7 U	11 U	5.7 U
cis-1,3-Dichloropropene	µg/L	3.3 U	6.6 U	3.3 U
Dibromochloromethane	µg/L	4.1 U	8.3 U	4.1 U
Dichlorodifluoromethane	µg/L	2.8 U	5.5 U	2.8 U
Ethylbenzene	µg/L	4.6 U	25 J	4.6 U
Methylene Chloride	µg/L	8.1 U	16 U	8.1 U
m-Xylene & p-Xylene	µg/L	11 U	22 U	11 U
o-Xylene	µg/L	4.3 U	8.6 U	4.3 U
Tetrachloroethene	µg/L	3.4 U	6.8 U	3.4 U
Toluene	µg/L	4.5 U	9.1 U	4.5 U
trans-1,2-Dichloroethene	µg/L	5.9 U	12 U	5.9 U
trans-1,3-Dichloropropene	µg/L	4.4 U	8.8 U	4.4 U
Trichloroethene	µg/L	6.0 U	12 U	6.0 U
Trichlorofluoromethane	µg/L	4.5 U	9.0 U	4.5 U
Vinyl chloride	µg/L	7.5 U	15 U	7.5 U
Xylenes, Total	µg/L	11 U	22 U	11 U
Metals, Total Recoverable				
Aluminum	mg/L	0.16 J	0.44	0.060 U
Antimony	mg/L	0.0068 U	0.0068 U	0.0068 U
Arsenic	mg/L	0.031	0.023	0.0094 J
Barium	mg/L	1.9	0.16	0.14
Beryllium	mg/L	0.00030 U	0.00030 U	0.00030 U
Boron	mg/L	1.0	3.0	0.47
Cadmium	mg/L	0.00050 U	0.00050 U	0.00050 U
Calcium	mg/L	180	150	160
Chromium	mg/L	0.0054	0.012	0.0023 J
Chromium, hexavalent	mg/L	0.0050 U	0.0091 J	0.0050 U
Copper	mg/L	0.0038 J	0.0052 J	0.0020 J
Iron	mg/L	47 B	13 B	15 B
Lead	mg/L	0.0030 U	0.0064 J	0.0030 U
Magnesium	mg/L	53	84	43
Manganese	mg/L	2.2	0.52	1.9
Mercury	mg/L	0.00012 U	0.00012 U	0.00012 U
Nickel	mg/L	0.028	0.089	0.017
Potassium	mg/L	67	200	39
Selenium	mg/L	0.0087 U	0.0087 U	0.0087 U
Silver	mg/L	0.0017 U	0.0017 U	0.0017 U
Sodium	mg/L	370	830	140
Thallium	mg/L	0.010 U	0.010 U	0.010 U
Zinc	mg/L	0.014 B	0.013 B	0.010 B

Notes:

U = Sample concentration was not detected at or above the reporting limit.
B = Compound was found in the blank and the sample.
b = Compound was found in the unseeded control blank.
J = Result is less than the reporting limit but greater than or equal to the method detection limit and the concentration is an approximate value.
H = Sample was prepared or analyzed beyond the specified holding time.

APPENDIX A

ORANGE COUNTY LANDFILL POST-CLOSURE FIELD INSPECTION DOCUMENTS

(PROVIDED ON CD)

APPENDIX B

MONITORING WELL CORRECTIVE ACTIONS LETTER DATED OCTOBER 14, 2014

STERLING
Sterling Environmental Engineering, P.C.

October 14, 2014

Mr. Peter S. Hammond
Orange County Department of Public Works
Division of Environmental Facilities and Services
P.O Box 637
2455-2459 Route 17M
Goshen, New York 10924

Subject: Annual Post-Closure Monitoring Event – Monitoring Well Repairs
Orange County Landfill
STERLING File #2010-15

Dear Mr. Hammond,

Two (2) damaged wells were observed by Sterling Environmental Engineering, P.C. (STERLING) at the Orange County Landfill during the Annual Post-Closure Monitoring (PCM) event conducted October 6 through 8, 2014. Damage to monitoring wells MW-230D (upgradient) and MW-234S were identified. The outer protective casing for each well may have been damaged by mowing equipment. Both wells were previously documented (STERLING, 2012 and Cornerstone, 2013). MW-230D, installed on August 30, 1989, is a 139.5 foot deep upgradient bedrock well and is a preferred sampling location. Well MW-234S, installed on August 29, 1989, is a 41.8 foot deep well screening the sand/gravel hydrogeologic unit. MW-234S is desirable as a location for monitoring water levels. MW-230D appeared to be missing the uppermost section of the two (2) inch inside diameter (I.D.) Schedule 40 PVC riser and an obstruction at four (4) to five (5) feet below top of protective casing prevents further evaluation of well integrity with devices such as a water level meter, weighted tape or bailer. Damage observed at MW-234S included a missing well cap and bent protective steel casing that initially prevented removal of the bailer from inside the well. Due to this obstruction, it is very difficult to lower a water level meter into the overburden monitoring well to collect depth to water/total depth data.

The integrity of each monitoring well will need to be assessed by sounding the well with a probe and a bailer to ensure each well is useable and enable collection of representative data.

The following repair work is recommended to allow well access for gauging, groundwater sampling, and/or to protect from vandalism.

MW-230D

Recommended Repair:

- Excavate around outer steel protective casing to identify undamaged area(s).
- Cut or remove outer steel casing with close attention to not damage the inner PVC riser (monitoring well).

- Once the two (2) inch I.D. Schedule 40 PVC casing has been determined to be useable, secure an appropriately sized Fernco flexible coupling over the lower end of the Schedule 40 PVC riser to a height of 2.5 feet above grade.
- The top of the outer protective casing should extend approximately 0.3 foot above the top of measuring point (top of 2 inch I.D. PVC riser).
- Establish new concrete apron, if required.
- A new lockable aluminum well cap must be seated on top of the outer protective casing and secured with a hex key.
- The inner and outer portion of the well cap should be labeled with a permanent marker.

A certified driller is recommended to perform this task to preserve the integrity of the monitoring well.

MW-234S

Recommended Repair:

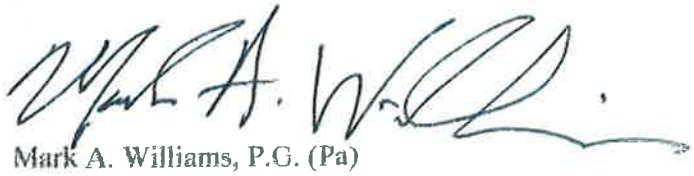
It is recommended to bend the protective steel casing back into an upright position with a heavy wrench or pry-bar without compromising the Schedule 40 PVC riser. If required, a new concrete apron may need to be established. A new lockable aluminum well cap must be seated on top of the outer protective casing and secured with a hex key and the inner and outer portion of the well cap should be labeled with a permanent marker. Upon completion of these repairs, STERLING recommends securing suitable markers such as bike flags to each monitoring well to make the wells visible to mowing crews.

STERLING understands the County's Department of Public Works may undertake the repairs. As an alternative, STERLING can obtain a quotation from a certified well driller to conduct the subject well repairs. STERLING is prepared to coordinate the aforementioned well repairs immediately upon authorization and prepare a summary report to document that the repairs have been completed.

Please contact me should you have any questions or comments.

Very truly yours,

STERLING ENVIRONMENTAL ENGINEERING, P.C.



Mark A. Williams, P.G. (Pa)
Associate Geologist
mark.williams@sterlingenvironmental.com

MAW/bc
Email/First Class Mail

S:\Sterling\Projects\2010 Projects\Orange County - 2010-15\Correspondence\Well Repairs_Cost_Ltr.doc

APPENDIX C

NYSDEC INSTITUTIONAL AND ENGINEERING CONTROLS CERTIFICATION FORM

Enclosure 2
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 336007

Site Name Orange County Landfill

Site Address: ROUTE 17M Zip Code: 10924
City/Town: Goshen
County: Orange
Site Acreage: 75.0

Reporting Period: November 1, 2011 to October 30, 2012

	YES	NO
1. Is the information above correct?	☒	☐
If NO, include handwritten above or on a separate sheet.		
2. Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment during this Reporting Period?	☐	☒
3. Has there been any change of use at the site during this Reporting Period (see 6NYCRR 375-1.11(d))?	☐	☒
4. Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property during this Reporting Period?	☐	☒
If you answered YES to questions 2 thru 4, include documentation or evidence that documentation has been previously submitted with this certification form.		
5. Is the site currently undergoing development?	☐	☒

Box 2

	YES	NO
6. Is the current site use consistent with the use(s) listed below? Closed Landfill	☒	☐
7. Are all ICs/ECs in place and functioning as designed?	☐	☒

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues. *

Signature of Owner, Remedial Party or Designated Representative

12/8/14
Date

* As described in section 4.2.2 of the Periodic Review Report, seeps have been investigated through work plans approved by and submitted to NYSDEC pursuant to the draft Order on Consent.

SITE NO. 336007 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
16-1-1.1	O. C. Dept. Envrion. Facilities Services	Monitoring Plan O&M Plan

Box 4

Description of Engineering Controls

Parcel	Engineering Control
16-1-1.1	Cover System Leachate Collection

Engineering Control Details for Site No. 336007

Parcel: 16-1-1.1

This is a municipal landfill that has been capped under Title 3, with leachate collection and gas collection. Periodic groundwater monitoring and inspections and reporting in accordance with the 1997 OM &M plan (and updates thereto) are required.

Box 5

Periodic Review Report (PRR) Certification Statements

1. I certify by checking "YES" below that:

   a) the Periodic Review report and all attachments were prepared under the direction of, and reviewed by, the party making the certification;

   b) to the best of my knowledge and belief, the work and conclusions described in this certification are in accordance with the requirements of the site remedial program, and generally accepted engineering practices; and the information presented is accurate and compete.

YES	NO
☐	☐

2. If this site has an IC/EC Plan (or equivalent as required in the Decision Document), for each Institutional or Engineering control listed in Boxes 3 and/or 4, I certify by checking "YES" below that all of the following statements are true:

   (a) the Institutional Control and/or Engineering Control(s) employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

   (b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

   (c) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control;

   (d) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

   (e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

YES	NO
☐	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and DO NOT COMPLETE THE REST OF THIS FORM. Otherwise continue.

A Corrective Measures Work Plan must be submitted along with this form to address these issues.

_____ _____

Signature of Owner, Remedial Party or Designated Representative Date

IC CERTIFICATIONS
SITE NO. 336007

Box 6

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 1,2, and 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as _____(Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner, Remedial Party, or Designated Representative Rendering Certification Date

IC/EC CERTIFICATIONS

Box 7

Professional Engineer Signature

I certify that all information in Boxes 4 and 5 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I _____ at _____,
print name print business address

am certifying as a Professional Engineer for the _____
(Owner or Remedial Party)

_____	_____	_____
Signature of Professional Engineer, for the Owner or Remedial Party, Rendering Certification	Stamp (Required for PE)	Date