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NEW YORK STATE OF OPPORTUNITY. Department of Environmental Conservation

New York State Department of Environmental Conservation – Division of Environmental Remediation

PERIODIC REVIEW REPORT

Tioga Castings Site

Site Number 754012

June 2017

,

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TIOGA CASTINGS SITE PERIODIC REVIEW REPORT

Site Number 754012

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EXECUTIVE SUMMARY

The New York State Department of Environmental Conservation (NYSDEC) has issued a Work Assignment (WA) (# D007618-12) to Arcadis CE, Inc. (Arcadis) for Operation, Maintenance, and Monitoring at the Tioga Castings Site (NYSDEC site number 7-54-012) in New York State (the Site). This Periodic Review Report (PRR) documents the findings and observations associated with the monitoring program for the Site.

The Site was found to have been contaminated with cadmium, chromium, and lead during operations as a cupola-type foundry for the production of gray iron castings between 1945 and the late 1980s. During this time, operations included smelting of pig iron, scrap iron (including engine blocks), coke, limestone and the use of phenol-formaldehyde treated sand to cast the iron. The process produced wastes which included sand molds, bentonite, fly ash, cast iron grindings, and fine baghouse ash/cupola dust. These dusts were reportedly disposed at an off-site landfill until March 1979, at which time the facility operated an on-site landfill for their foundry wastes. In 1988, the facility closed and many casting materials were left on-site, including the materials left at the facility landfill, also on-site. In 1989, a fire inside the facility destroyed most of the foundry. Two Interim Remedial Measures (IRMs) were carried out to address potential physical/chemical hazards in 1989 and 1991.

A Record of Decision (ROD) was signed in 1995 for the Site (NYSDEC 1995). The selected remedy was developed to consolidate the waste materials still on-site, cover the on-site landfill, clean and fill an on-site septic tank, establish institutional controls to limit future use, and establish a groundwater monitoring program. Waste consolidation and landfill construction were completed in 1997.

Additional investigations were performed between 2008 and 2009 to support reclassification of the site from Class 2 to Class 4 on the NYSDEC Registry of Hazardous Waste Sites.

In August 2011, the boundaries of the site were reduced to only include the approximately one acre landfill.

A landfill liner and cap repair were performed in 2013 following flood damage that occurred during a 2011 tropical storm. The work was performed in accordance with a NYSDEC-approved Work Plan.

A Site Management Plan (SMP) was prepared in 2015. O&M and monitoring activities are currently conducted according to this SMP.

At this time, the remedial actions have performed as expected and while continued monitoring should be conducted, no significant changes to the current Site Management are recommended.

1 SITE OVERVIEW

1.1 Location and Features

The Tioga Castings site is located at Foundry Street, Owego, Tioga County, New York (Figure 2-1). The Site is approximately 1 acre in total and includes the on-site landfill area (Figure 2-2). The Site is currently zoned industrial and is listed as a Class 4 site on the NYSDEC Registry of Inactive Hazardous Waste Sites. Remedial activities have been completed for the former foundry facility area and the only remaining feature for monitoring is the landfill area.

1.2 Site History and Remediation

The Site was formerly owned by Tioga Castings between 1945 and 1988. The facility operated a cupola-type foundry for the production of gray iron castings. Operations at the facility included smelting of pig iron, scrap iron (including engine blocks), coke, limestone and the use of phenol-formaldehyde treated sand to cast the iron. The process produced solid wastes which included sand molds, bentonite, fly ash, cast iron grindings, and fine baghouse ash/cupola dust. These wastes were reportedly disposed of at an off-site landfill until March 1979. The facility then operated an on-site landfill for the disposal of its foundry wastes. The facility ceased operations in 1988 and left the waste materials in the landfill area as well as many types of foundry materials including:

- Sand casts
- Various drums
- Multiple one-ton plastic lined bags of cupola dust

In July 1989, the facility had a fire which destroyed most of the foundry structure and remaining structures were determined to be unsafe. Two IRMs were carried out to address potential physical/chemical hazards:

- In fall of 1989, a perimeter fence was erected to limit access to the property and drums that were left on-site were removed from the site and disposed of properly.
- A temporary cover was placed over the landfill in August 1991 in order to minimize the potential for erosion (wind, surface water) of the landfill materials.

A ROD was signed in 1995 for the Site (NYSDEC 1995). The selected remedy included the following items:

- Consolidation of on-site and off-site soil and waste piles that contained concentrations greater than the cleanup goals for the site in the on-site landfill
- Maintain deed restrictions to prevent Site development in areas of the site where contaminated material was present
- Placement of a low permeability cover over the on-site landfill
- Maintain a fence around the on-site landfill to limit site access

- Cleaning and filling an on-site septic tank
- Operations and maintenance of the remedy
- Groundwater monitoring
- Site-specific cleanup goals for cadmium, chromium, and lead were established (Table 2-1).

Table 2-1

Site-Specific Cleanup Goals

Analyte	Soil	Groundwater
Cadmium	10 ppm	10 ppb
Chromium	50 ppm	50 ppb
Lead	250 ppm (0 to 12 feet) 500 PPM (greater than 12 feet)	25 ppb

As part of the selected remedy, the landfill closure was completed in 1997. Asbestos-containing materials in piles of debris and in a building structure were identified at the Site and removed in 2001.

In June 2007, a NYSDEC-approved Work Plan, developed by Arcadis (formerly Malcolm Pirnie) was implemented with Site-specific operation and maintenance (O&M) and groundwater monitoring procedures.

At the request of NYSDEC, an investigation was conducted in 2008 to evaluate if subsurface soil contained concentrations of volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), or metals greater than the respective NYSDEC standards or the defined site-specific cleanup criteria. As part of the investigation, NYSDEC requested that three new groundwater monitoring wells be installed to provide additional information on groundwater quality. In addition, a soil vapor intrusion evaluation was performed to evaluate if vapor intrusion was an exposure pathway to VOCs in sub-surface soil or groundwater.

In April 2009, NYSDEC collected groundwater samples from the monitoring well network for analysis of VOCs, SVOCs, and metals to provide sufficient information on groundwater quality to support reclassification of the overall Site. In addition, in July 2009, NYSDEC collected surface soil samples to evaluate the potential for surface soil to be an exposure route to site-related contaminants.

Based on the results of the investigations, the site was reclassified from Class 2 to Class 4 on the NYSDEC Registry of Inactive Hazardous Waste Sites.

In August 2011, the boundaries of the site (originally encompassing approximately seven acres) were reduced by the NYSDEC to only include the approximately one acre landfill.

In September 2011, an inspection was performed to assess the site for any damage caused by Tropical Storm Lee. Based on the inspection, the north and south sides of the landfill perimeter slopes contained evidence of soil failure and minor slumping. A Work Plan was submitted by Arcadis to repair the landfill slopes and inspect the liner cover system. NYSDEC approved the plan and inspection and repair of the

landfill cap commenced in February 2013. During the inspection, portions of the high-density polyethylene (HDPE) liner were exposed to assess for damage. No liner perforations were observed, however, in areas where soil failure occurred, the liner was found to contain folds and wrinkles. These areas were repaired by cutting out the excess liner material and flatting folds. The liner was then repaired using an extrusion welder. The integrity of the repairs was then tested using a vacuum box. Liner repairs and cap restoration were completed in March 2013 (Arcadis, 2013).

In June 2012, the NYSDEC issued an Environmental Notice (EN) that restricts excavation or disturbance of the ECs; restricts interference or changes to ECs without prior written permission; limits property uses; and restricts groundwater usage.

Based on a review of historical groundwater data, six groundwater monitoring wells, generally located down-gradient of the landfill (Figure 2-2), were abandoned and replaced with one new down-gradient monitoring well between September and October of 2014.

A SMP was prepared and accepted by NYSDEC in 2015 (Arcadis, 2015a). Since then, O&M and monitoring activities have been conducted according to this SMP.

Routine O&M and groundwater monitoring are currently performed in accordance with the SMP.

2 REMEDY PERFORMANCE, EFFECTIVENESS, AND PROTECTIVENESS

The remediation goals selected for this Site, according to the ROD (NYSDEC 1995) are as follows:

- Prevent direct contact exposure (dermal absorption, inhalation and incidental ingestion) with waste piles/soils that have concentrations above the clean-up goals.
- Prevent or reduce the transport of contamination off site via surface runoff from areas where the surface material is contaminated.
- Prevent or greatly reduce the transport of contamination off site via surface runoff from areas where surface material is contaminated.

The selected remedy for the Site was successfully incorporated following the guidance provided in each of the ROD documents (NYSDEC 1995).

The Tioga Casting Site landfill was constructed in 1997 in accordance with the ROD. The landfill was constructed by consolidating wastes and placing them in the existing on-site landfill. According the Tioga Castings Remediation Summary Report (NYSDEC, 1998), a “foundation layer” was placed over the consolidated landfill wastes. The remainder of the landfill cover system (from bottom to top) consists of a 60-mil HDPE liner, geo-composite drainage material, approximately two feet of compacted barrier protection soil, and six inches of topsoil. The landfill prevents direct contact exposure to remaining contamination at the site and reduces the potential for contamination to be transported off-site through runoff. In addition, the landfill has a perimeter fence with locking gate to limit access to the site and warning signs are present on the perimeter fence access gate indicating the area within the fence contains hazardous waste and that unauthorized entry is forbidden.

A SMP is in place and provides information regarding O&M and monitoring activities for the selected remedy. This includes an EN that restricts excavation or disturbance of the remedy. Therefore, only those who are actively performing work on the site, either in accordance the SMP or at the direction of the NYSDEC, would likely be exposed to site contaminants. In addition, groundwater use restrictions are in place to prevent use or ingestion of groundwater at the site.

Based on the current Site Management, including inspections, groundwater monitoring, and the EN that is in place for the Site, it appears that the Selected Remedies are performing as intended and are therefore effective and protective of human health and the environment.

3 OPERATION AND MAINTENACE

O&M activities were performed by Arcadis in accordance with the SMP on a semi-annual basis since the last (2014) PRR cycle. The O&M activities included inspection of the Engineering Controls that have been established at the Site including, the landfill cap and cover system (Figure 2-2), inspection of the landfill perimeter fencing, and landfill access gate and lock. Post-Closure O&M Checklists were used to document the findings from each inspection between 2014 and 2016. The inspection forms are provided in Appendix A. A summary of significant findings is provided below.

In addition to the inspection checklist, a photolog was kept during each visit. Photographs from the May 2016 inspection are included in Appendix B.

3.1 Landfill Cap

The landfill cap contains the former disposal area for the facility casting sands and other consolidated wastes from the site. The purpose of the cap was to prevent human and ecological exposure to contaminated materials and minimize surface water from entering the landfill area.

A visual inspection of the landfill cap was performed during each visit to the Site to assess the landfill for burrowing rodents, erosion, woody vegetation, and settlement. Woody vegetation encroaches the swales and landfill cap every year. Therefore, every spring since 2016, saplings and other shrubs are cut back to help reduce the potential for these plants to establish themselves on the landfill cap. In general, the condition of the landfill was found to be in acceptable condition with one exception. During the October 2014 inspection, it appeared that the machine used by NYSDEC Operations to mow the landfill cap made ruts in the northeast corner of the landfill cap, however, no visible damage to the liner was observed. The landfill cap was repaired by Arcadis on November 10, 2015 by restoring the perimeter rip-rap slope and placement of new topsoil to fill the ruts. Grass seed was spread in areas that received new topsoil (Arcadis 2015b).

3.2 Landfill Security

Security for the landfill consists of a perimeter fence with an entry gate and locks to limit access to the landfill and prevent tampering with the cap.

The landfill perimeter fence, entry gate, and locks were observed for proper operation and signs of deterioration. No issues were observed with the integrity of these components. In addition, the Foundry Street entry gate warning sign was in place and in acceptable condition.

4 GROUNDWATER MONITORING PROGRAM

Groundwater monitoring wells are sampled by Arcadis in accordance with the SMP on a five-quarter basis. The sampling is conducted to provide information on groundwater quality, monitor potential contaminant migration in the groundwater at the site, and assess hydrogeologic site conditions, including groundwater flow direction.

Based on the results of historic groundwater data, and at the direction of NYSDEC, six groundwater monitoring wells (MW-1R, MW-2, MW-3, MW-5, MW-7, and MW-8) generally located down-gradient of the landfill (Figure 2-2), were abandoned and replaced with one new down-gradient monitoring well (MW-9). The wells were abandoned between September 30 and October 1, 2016. Monitoring MW-9 was installed between September 29 and 30, 2016 to a total depth of 21 feet below ground surface. The location of the well was surveyed by Arcadis on November 10, 2014 (Arcadis, 2015b).

Since the last (2014) PRR cycle, groundwater sampling was performed on the following dates:

- February 5 and 6, 2015
- May 16, 2016

4.1 Groundwater Monitoring Well Inspection

During each sampling event, the integrity of each well is inspected and the results recorded on a groundwater monitoring well inspection form. Based on a review of the well inspection data since 2014, groundwater monitoring well MW-4 was observed to contain a damaged flush mount protective casing and concrete pad. The well was repaired by Parratt Wolf in September 2014. Since then, each monitoring well was reported to be in acceptable condition.

4.2 Water Level Survey

Prior to collecting groundwater samples, water levels are measured to the nearest hundredth of a foot.

Table 4-1 summarizes the groundwater elevations measured during each sampling event. A potentiometric surface map for the May 2016 event was created based on the groundwater elevations and is presented on Figure 4-1. As shown on Figure 4-1, the direction of groundwater flow near the landfill generally toward the southeast.

4.3 Groundwater Sampling

Groundwater samples are collected from four groundwater monitoring wells (MW-3D, MW-4, MW-6, and MW-9) using low-flow groundwater purging and sampling procedures.

Prior to collecting groundwater samples, pH, conductivity, turbidity, dissolved oxygen (DO), temperature, salinity, total dissolved solids (TDS), and oxidation-reduction potential (REDOX) are measured using a Horiba U-52 water quality meter and recorded on groundwater sampling purge logs.

Groundwater samples are sent to TestAmerica – Buffalo by chain -of-custody procedures and analysed for Target Analyte List (TAL) metals by USEPA method 6061B.

4.4 Groundwater Sampling Results

Groundwater sample results from the 2015 and 2016 site visits are summarized in Table 4-2 with available historical analytical results from monitoring wells that were abandoned in 2014.

Results from the 2015 monitoring event indicate that sodium was detected in the groundwater samples collected from and MW-6 (22,100 micrograms per liter (µg/l)) at concentrations greater than the NYSDEC Class GA Standard of 20,000 µg/L. In 2016, the sample from monitoring well MW-4 (25,700 µg/l) was the only sample to contain sodium at a concentration greater than the applicable NYSDEC Class GA Standard.

Table 4-2 shows that the iron concentrations in the 2015 samples from MW-6 (350 µg/L), and MW-9 (2500 µg/L) exceed the NYSDEC Class GA Standard of 300 µg/L. In 2016, iron was detected in the groundwater samples from MW-4 (380 µg/L) and MW-9 (1,100 µg/l) at concentrations greater that the corresponding NYSDEC Class GA Standard.

Table 4-2 shows that no other metals were detected at concentrations greater than the applicable NYSDEC Class GA Standards.

5 OVERALL PRR CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The landfill cap and the site security measures are currently in acceptable condition, and with continued maintenance, are operating as intended.

The groundwater samples collected from the groundwater monitoring wells did indicate sodium and iron are present at concentrations greater than the NYSDEC Class GA Standards. However, the site related contaminants of concern listed in Table 2-1 (cadmium, chromium, and lead) were not detected in any of the groundwater samples above the applicable NYSDEC Class GA Standards. Therefore, since the landfill contains consolidated wastes from the former foundry, continued monitoring is recommended to assess groundwater quality over time.

5.2 Recommendations

No changes to the SMP are recommended at this time. ICs/ECs are effective at preventing human contact with residual contamination. No changes to the PRR submittal frequency are recommended.

6 SUMMARY AND CERTIFICATION

O&M activities were conducted in accordance with the SMP between 2014 and 2016, with groundwater monitoring samples collected during the February 5, 2015 and May 16, 2016 visits. Repairs to the landfill liner and cap were performed following Tropical Storm Lee in 2014. A minor cap repair was also performed in 2015 to repair damage caused by mowing. The landfill cap is functioning as designed and the overall landfill condition, including the perimeter fencing, is acceptable.

Sodium and iron are the only metals detected in groundwater at concentrations greater than the applicable NYSDEC Class GA Standards.

Based on the remediation objectives specified in the ROD, the landfill is performing as intended and minimizing the potential for off-site migration of, and exposure to, the remaining contamination in the landfill.

The completed NYSDEC IC/EC certification is provided as Appendix C.

7 REFERENCES

NYSDEC 1995. Record of Decision, Tioga Castings Site, Oswego, Tioga County. Site Number 7-54-012. March 1995.

NYSDEC 1998, Remediation Summary Report, Tioga Castings Site, Village of Owego, Tioga County, New York, Site No. 7-54-012, New York State Department of Environmental Conservation.

Arcadis 2013. Tioga Castings Site Quarterly Report, Second Quarter 2013, NYSDEC Site Number 7-54-012, July 2013.

Arcadis 2015a. Site Management Plan, Tioga Castings Site, Oswego, Tioga County, NY. Site Number 7-54-012. January 2015.

Arcadis 2015b. Tioga Castings Site Quarterly Report, First Quarter 2015, NYSDEC Site Number 7-54-012, March 2015.

TABLES

Table 4-1
Summary of Groundwater Elevations
Tioga Casting
Owego, New York
NYSDEC Site No. 7-54-012

Well	Measuring Point Elevation (feet)		11/24/2008		5/18/2010		10/28/2010		2/28/2011		7/19/2012		10/14/2013		2/5/2015		5/16/2016	
			DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)	DTW (feet)	Elevation (feet)
MW-3D	812.42	(2)	17.52		14.17		16.58	795.84	16.47	795.95	18.56	793.86	17.69	794.73	18.36	794.06	17.18	795.24
MW-4	806.33	(1)	10.87	795.46	7.81	798.52	10.04	796.29	9.91	796.42	11.71	794.62	11.11	795.22	11.70	794.63	10.86	795.47
MW-6	815.53	(3)	10.74		7.60		10.72		19.67	795.86	21.63	793.90	20.60	794.93	21.51	794.02	20.03	795.50
MW-9	809.97	(4)													16.37	793.60	15.17	794.80

(1) - Source: Monitoring Plan: Tioga Casting (NYSDEC, April 25, 2005)
(2) - From Malcolm Pirnie, Inc. level survey performed 10/28/2010
(3) - From Malcolm Pirnie, Inc. level survey performed 2/28/2011
(4) - From Malcolm Pirnie, Inc. level survey performed 11/10/2014

Table 4-2
Summary of Groundwater Sample Results - Metals
Tioga Castings Site
Owego, New York
NYSDEC Site Number 7-54-012

Well Date Units	NYSDEC Class GA Standards	MW-1R 4/13/2009 ug/L	MW-1R 3/18/2010 ug/L	MW-1R 10/28/2010 ug/L	MW-1R 2/28/2011 ug/L	MW-1R 7/19/2012 ug/L	MW-1R 10/14/2013 ug/L	MW-2 8/2/2007 ug/L	MW-2 7/17/2008 ug/L	MW-2 4/13/2009 ug/L	MW-2 3/19/2010 ug/L	MW-2 10/28/2010 ug/L	MW-2 2/28/2011 ug/L	MW-2 7/19/2012 ug/L	MW-2 10/14/2013 ug/L
Aluminum		1050	41.0 BE	20.8 J	37.7 J	200 U	930	60.2 B	23.6 U	632	57.8 BE	9.2 J	250.0 U	200.0 U	2500
Antimony	3	6.7 U	6.8 U	8.0 U	15.0 U	20.0 U	20.0 U	5.6 U	5.5 U	6.7 U	6.8 U	8.0 U	15.0 U	200.0 U	20.0 U
Arsenic	25	3.0 U	5.6 U	4.2 U	15.0 U	10.0 U	10.0 U	4.2 U	3.7 U	3.0 U	5.6 U	4.2 U	15.0 U	10.0 U	10.0 U
Barium	1000	59.8 B	51.9 BE	50.7	48.7	57.0	58.0	61.6 B	54.3 B	102	48.8 BE	78.9	45.5	78.0	210
Beryllium	3*	0.5 U	0.2 BE	0.7 U	5.0 U	2.0 U	2.0 U	0.40 B	0.3 U	0.5 U	0.2 U	0.7 U	5.0 U	2.0 U	2.0 U
Cadmium	5 [10]	0.3 U	0.6 BE	0.5 U	5.0 U	1.0 U	1.0 U	0.36 U	0.3 U	0.3 U	0.3 BE	0.5 U	5.0 U	1.0 U	1.3
Calcium		61200	63700	58900	58700	67500	58700	54500 E	48800	50900	51400	62900	42400	58700	81800
Chromium	50 [50]	10.4 B	0.9 U	1.1 U	5.0 U	2.1 J B	1.9 J	0.84 U	0.9 U	5.8 B	0.9 U	1.1 U	5.0 U	1.7 J B	6.5
Cobalt		3.8 U	0.6 U	5.8 U	5.0 U	4.0 U	4.0 U	1.1 B	1.1 U	3.8 U	0.6 U	5.8 U	5.0 U	4.0 U	1.5 J
Copper	200	181	1.3 U	2.3 J	10.0 U	10.0 U	10.0 U	1.3 U	1.3 U	105	1.3 U	2.0 U	10.0 U	10.0 U	7.3 J
Iron	300	**1410**	48.9 BE	43.7 J	86.4 J	50.0 U	**1000**	19.3 U	19 U	**532**	28.6 BE	29.4 J	125.0 U	19.0 J	**3900**
Lead	25 [25]	1.4 U	3.0 U	4.4 J	15.0 U	5.0 U	5.0 U	2.9 U	2.9 U	1.4 U	3.0 U	3.3 J	15.0 U	5.0 U	5.0 U
Magnesium		11500	12100	10900	11500	12700	11900	8650 E	7670	8320	8290	10100	6960	9500	14200
Manganese	300	106	16.5	3.9 J	11.3	0.73 J B	61.0	2.8 B	8.2 B	211	54.2	5.0 J	3.9 J	8.2 B	**2800**
Mercury	0.7	NA	0.1 U	0.1 U	0.2 U	0.20 U	0.2 U	0.12 U	0.1 U	NA	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U
Nickel	100	6.9 B	1.4 BE	4.2 U	5.0 U	10.0 U	10 U	1.2 U	1.0 U	7.3 B	1.3 U	4.2 U	5.0 U	10.0 U	8.0 J
Potassium		2070 B	1640 BE	1640	1570	1900	2000	4710 BE	3900 B	4550	4550 BE	5830	4450	5700	7400
Selenium	10	11.4 U	8.7 U	4.8 U	38.0 U	15.0 U	15.0 U	6.1 U	6.1 U	11.4 U	8.7 U	4.8 U	38.0 U	15.0 U	15.0 U
Silver	50	2.2 U	1.2 U	1.5 U	5.0 U	2.20 J	3.0 U	1.7 B	1.3 U	2.2 U	1.2 U	1.5 U	5.0 U	3.0 U	3.0 U
Sodium	20000	**25600**	**25100**	**23300**	**23300**	**32100**	**28300**	**36100 E**	18700	**25200**	**24000**	**35000**	**22000**	**46500**	**74200**
Thallium	0.5*	3.0 U	10.2 U	2.4 U	15.0 U	20.0 U	20.0 U	7.0 U	5.9 U	3.0 U	10.2 U	2.4 U	15.0 U	20.0 U	20.0 U
Vanadium		4.7 U	1.1 U	6.1 U	5.0 U	5.0 U	1.5 J	0.80 B	1.0 U	4.7 U	1.1 U	6.1 U	5.0 U	5.0 U	3.9 J
Zinc	2000*	13.5 U	4.1 BE	21.1	25.0 U	2.0 J	5.2 J	3.6 U	3.6 U	13.5 U	2.3 BE	12.9 J	25.0 U	1.5 J	19.0

* - NYSDEC Guidance Value.
1- Duplicate sample from MW-4
NA - Not analyzed.
U - Analyte not detected.
J- Greater than the MDL but below the CRDL
B - Greater than MDL but less than RL.
MDL - Method detection limit.
RL - Reporting limit.
E - Estimated value.
[25] - Site-specific cleanup goal.

Table 4-2
Summary of Groundwater Sample Results - Metals
Tioga Castings Site
Owego, New York
NYSDEC Site Number 7-54-012

Well Date Units	NYSDEC Class GA Standards	MW-3 4/13/2009 ug/L	MW-3 3/19/2010 ug/L	MW-3 10/28/2010 ug/L	MW-3 2/28/2011 ug/L	MW-3D 4/13/2009 ug/L	MW-3D 3/18/2010 ug/L	MW-3D 10/28/2010 ug/L	MW-3D 2/28/2011 ug/L	MW-3D 7/19/2012 ug/L	MW-3D 10/14/2013 ug/L	MW-3D 2/5/2015 ug/L	MW-3D 5/16/2016 ug/L	MW-4 8/2/2007 ug/L	MW-4 7/17/2008 ug/L
Aluminum		195.0	39.8 U	17.7 J	250.0 U	668	39.8 U	11.7 J	250.0 U	200.0 U	310	200 U	200 U	40.0 U	32.6 B
Antimony	3	6.7 U	6.8 U	8.0 U	15.0 U	6.7 U	6.8 U	8.0 U	15.0 U	20.0 U	20.0 U	20 U	20 U	5.6 U	5.5 U
Arsenic	25	3.0 U	5.6 U	4.2 U	15.0 U	3.0 U	5.6 U	4.2 U	15.0 U	10.0 U	10.0 U	15 U	15 U	4.2 U	3.7 U
Barium	1000	38.3 B	46.5 BE	57.1	44.6	39.2 B	45.3 BE	56.7	43.6	51.0	46.0	39	40	40.0 B	38.3 B
Beryllium	3*	0.5 U	0.2 U	0.7 U	5.0 U	0.5 U	0.2 U	0.7 U	5.0 U	2.0 U	2.0 U	2 U	2 U	0.27 U	0.3 U
Cadmium	5 [10]	0.3 U	0.3 U	0.5 U	5.0 U	0.3 U	0.3 U	0.5 U	5.0 U	1.0 U	1.0 U	2 U	2 U	0.36 U	0.7 B
Calcium		42900	51300	54400	49800	42300	50000	54000	48600	55200	45800	44400	43400 B	42700 E	42400
Chromium	50 [50]	3.5 B	0.9 U	1.1 U	5.0 U	3.8 B	0.9 U	1.1 U	5.0 U	1.6 J B	4.0 U	4 U	4 U	0.84 U	0.9 U
Cobalt		3.8 U	0.6 U	5.8 U	5.0 U	3.8 U	0.6 U	5.8 U	5.0 U	4.0 U	4.0 U	4 U	4 U	0.89 U	1.1 U
Copper	200	71.3	1.3 U	2.0 U	10.0 U	56.6	1.3 U	2.3 J	10.0 U	10.0 U	10.0 U	10 U	10 U	1.4 B	1.3 U
Iron	300	144 B	19.3 U	55.6	125.0 U	**558**	19.3 U	52.9	24.4 J	26.0 J	**390**	50 U	46 BJ	47.6 B	34 B
Lead	25 [25]	1.5 B	3.0 U	5.1 J	15.0 U	1.4 U	3.0 U	4.6 J	15.0 U	5.0 U	5.0 U	10 U	10 U	2.9 U	2.9 U
Magnesium		7450	9270	9550	9300	7490	9120	9680	9120	10000	8800	8800	8700	8190 E	7830
Manganese	300	14.0 B	0.3 BE	3.0 J	8.0 U	40.3 B	0.9 BE	2.2 J	1.2 J	2.4 J B	21.0	0.8 J	1.8 J	0.79 B	1.2 B
Mercury	0.7	NA	0.1 U	0.1 U	0.2 U	NA	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.12 U	0.1 U
Nickel	100	4.2 B	1.3 U	4.2 U	5.0 U	3.9 B	1.3 U	4.2 U	5.0 U	10.0 U	10.0 U	10 U	10 U	1.2 U	1.0 U
Potassium		1430 B	1890 BE	1480	1230	1550 B	1610 BE	1490	1260	1500	1400	1200	1300	1020 BE	1860 B
Selenium	10	11.4 U	8.7 U	4.8 U	38.0 U	11.4 U	8.7 U	4.8 U	38.0 U	15.0 U	15.0 U	25 U	25 U	6.1 U	6.1 U
Silver	50	2.2 U	1.2 U	1.5 U	5.0 U	2.2 U	1.2 U	1.5 U	5.0 U	3.0 U	3.0 U	6 U	6 U	1.0 U	1.3 U
Sodium	20000	17000	16900	17000	15200	17300	16900	17400	15600	18400	15700	15400	15200	12000 E	12800
Thallium	0.5*	3.0 U	10.2 U	2.4 U	15.0 U	3.0 U	10.2 U	2.4 U	15.0 U	20.0 U	20.0 U	20 U	20 U	7.0 U	5.9 U
Vanadium		4.7 U	1.1 U	6.1 U	5.0 U	4.7 U	1.1 U	6.1 U	5.0 U	5.0 U	5.0 U	5 U	5 U	0.78 U	1.0 U
Zinc	2000*	13.5 U	1.5 U	44.3	25.0 U	13.5 U	1.5 U	14.5 J	25.0 U	1.9 J	3.6 J	1.9 J	10 U	3.6 U	3.6 U

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E - Estimated value.
[25] - Site-specific cleanup goal.

Table 4-2
Summary of Groundwater Sample Results - Metals
Tioga Castings Site
Owego, New York
NYSDEC Site Number 7-54-012

Well Date Units	NYSDEC Class GA Standards	MW-4 4/13/2009 ug/L	MW-4 3/18/2010 ug/L	MW-4 10/28/2010 ug/L	MW-4 2/28/2011 ug/L	MW-4 7/19/2012 ug/L	MW-4 10/14/2013 ug/L	MW-4 2/5/2015 ug/L	MW-4 5/16/2016 ug/L	MW-5 8/2/2007 ug/L	MW-5 7/17/2008 ug/L	MW-5 4/13/2009 ug/L	MW-5 3/18/2010 ug/L	MW-5 10/28/2010 ug/L	MW-5 2/28/2011 ug/L
Aluminum		754	39.8 U	10.6 J	26.6 J	200.0 U	200.0 U	200 U	150 J	79.0 B	28.9 B	102 B	39.8 U	22.4 J	250.0 U
Antimony	3	6.7 U	6.8 U	8.0 U	15.0 U	20.0 U	20.0 U	20 U	20 U	5.6 U	5.5 U	6.7 U	6.8 U	8.0 U	15.0 U
Arsenic	25	3.0 U	5.6 U	4.2 U	15.0 U	10.0 U	10.0 U	15 U	15 U	4.2 U	3.7 U	3.0 U	5.6 U	4.2 U	15.0 U
Barium	1000	60.9 B	42.6 BE	50.3	40.8	48.0	43.0	40	60	56.4 B	55.7 B	47.1 B	47.4 BE	67.3	52.0
Beryllium	3*	0.5 U	0.2 U	0.7 U	5.0 U	2.0 U	2.0 U	2.0 U	2 U	0.51 B	0.3 U	0.5 U	0.2 U	0.7 U	5.0 U
Cadmium	5 [10]	0.3 U	0.5 BE	0.5 U	1.7 J	1.0 U	1.0 U	2.0 U	1 J	0.36 U	0.3 U	0.3 U	0.3 U	0.5 U	5.0 U
Calcium		40500	48000	47900	43100	50900	46000	42300	42000 B	44400 E	45200	44000	45100	49500	43900
Chromium	50 [50]	3.4 B	0.9 U	1.1 U	5.0 U	1.6 J B	4.0 U	1.1 JB	4 U	0.84 U	0.9 U	3.9 B	0.9 U	1.1 U	5.0 U
Cobalt		3.8 U	0.6 U	5.8 U	5.0 U	4.0 U	4.0 U	4.0 U	4 U	0.89 U	1.1 U	3.8 U	0.6 U	5.8 U	5.0 U
Copper	200	49.7	1.3 U	2.0 U	10.0 U	10.0 U	10.0 U	10 U	3.9 J	1.3 U	1.3 U	89.3	1.3 U	2.0 U	10.0 U
Iron	300	**667**	22.2 BE	33.4 J	57.3 J	50.0 U	34.0 J	70	**380 B**	19.3 U	19 U	246	19.3 U	94.1	52.9 J
Lead	25 [25]	1.4 U	3.0 U	2.6 U	15.0 U	5.0 U	5.0 U	10 U	10 U	2.9 U	2.9 U	6.0 B	3.0 U	7.2	15.0 U
Magnesium		7080	8820	8390	8140	9400	8800	8700	8500	7600 E	7570	7440	7330	7980	7500
Manganese	300	79.4	1.5 BE	2.0 J	2.2 J	0.7 J B	1.6 J	2.3 J	7.4	0.90 B	0.7 B	10.1 B	0.8 BE	5.6 J	1.8 J
Mercury	0.7	NA	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.12 U	0.1 U	NA	0.1 U	0.1 U	0.2 U
Nickel	100	4.5 B	1.3 U	4.2 U	1.5 J	10.0 U	10.0 U	10 U	1.9 J	1.2 U	1.4 B	5.0 B	1.3 U	4.2 U	5.0 U
Potassium		1190 B	1130 BE	1230	1330	1300	1100	1100	23300	3330 BE	3340 B	2880 B	3530 BE	3620	3210
Selenium	10	11.4 U	8.7 U	4.8 U	38.0 U	15.0 U	15.0 U	25 U	25 U	6.1 U	6.1 U	11.4 U	8.7 U	4.8 U	38.0 U
Silver	50	2.2 U	1.2 U	1.5 U	5.0 U	2.7 J	3.0 U	6.0 U	6 U	1.6 B	1.3 U	2.2 U	1.2 U	1.5 U	5.0 U
Sodium	20000	15200	16100	15000	13900	17400	15700	14600	**25700**	14200 E	15400	13300	8320	13600	9080
Thallium	0.5*	3.0 U	10.2 U	2.4 U	15.0 U	20.0 U	20.0 U	20 U	20 U	7.0 U	5.9 U	3.0 U	10.2 U	2.4 U	15.0 U
Vanadium		4.7 U	1.1 U	6.1 U	5.0 U	5.0 U	5.0 U	5.0 U	5 U	0.80 B	1.0 U	4.7 U	1.1 U	6.1 U	5.0 U
Zinc	2000*	13.5 U	1.5 U	6.5 U	25.0 U	1.5 J	10.0 U	2.3 J	3 J	3.6 U	3.6 U	13.5 U	3.6 BE	15.3 J	25.0 U

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1- Duplicate sample from MW-4
NA - Not analyzed.
U - Analyte not detected.
J- Greater than the MDL but below the CRDL
B - Greater than MDL but less than RL.
MDL - Method detection limit.
RL - Reporting limit.
E - Estimated value.
[25] - Site-specific cleanup goal.

Table 4-2
Summary of Groundwater Sample Results - Metals
Tioga Castings Site
Owego, New York
NYSDEC Site Number 7-54-012

Well Date Units	NYSDEC Class GA Standards	MW-5 7/19/2012 ug/L	MW-5 10/14/2013 ug/L	MW-6 2/28/2011 ug/L	MW-6 7/24/2012 ug/L	MW-6 10/14/2013 ug/L	MW-6 2/6/2015 ug/L	MW-6 5/16/2016 ug/L	MW-7 4/13/2009 ug/L	MW-7 3/18/2010 ug/L	MW-7 10/28/2010 ug/L	MW-7 2/28/2011 ug/L	MW-7 7/19/2012 ug/L	MW-7 10/14/2013 ug/L
Aluminum		85.0 J	120.0 J	49.5 J	520.0	310.0	360	200 U	1810	140 BE	28.2 J	162.0 J	200.0 U	100.0 J
Antimony	3	20.0 U	20.0 U	15.0 U	20.0 U	20.0 U	20 U	20 U	6.7 U	6.8 U	8.0 U	15.0 U	20.0 U	20.0 U
Arsenic	25	10.0 U	10.0 U	15.0 U	10.0 U	10.0 U	15 U	15 U	3.0 U	5.6 U	4.2 U	15.0 U	10.0 U	10.0 U
Barium	1000	63.0	72.0	53.1	61.0	62.0	70	54	165	133 BE	96.0	66.8	92.0	100.0
Beryllium	3*	2.0 U	2.0 U	5.0 U	2.0 U	2.0 U	2.0 U	2 U	0.5 U	0.2 U	0.7 U	5.0 U	2.0 U	2.0 U
Cadmium	5 [10]	1.0 U	1.0 U	5.0 U	1.0 U	1.0 U	2.0 U	2 U	0.3 U	0.4 BE	0.5 U	5.0 U	1.0 U	1.0 U
Calcium		50600	55100	54200	73500	54200	78700	48600 B	64300	85600	60300	45200	61200	64000
Chromium	50 [50]	1.6 J B	4.0 U	5.0 U	2.7 J B	4.0 U	4.0 U	4 U	10.4 B	0.9 U	1.1 U	0.8 J	1.5 J B	4.0 U
Cobalt		4.0 U	4.0 U	5.0 U	4.0 U	4.0 U	4.0 U	4 U	5.8 B	0.6 U	5.8 U	5.0 U	4.0 U	4.0 U
Copper	200	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10 U	10 U	178	3.1 BE	3.6 J	4.5 J	1.7 J	5.1 J
Iron	300	150.0	40.0 J	98.8 J	**670.0**	**330.0**	**350**	120 B	**2880**	192	297.0	**457.0**	170.0	**660**
Lead	25 [25]	5.0 U	5.0 U	15.0 U	5.0 U	5.0 U	10 U	10 U	**30.2 B**	3.0 U	3.1 J	2.9 J	5.0 U	5.0 U
Magnesium		8500	9600	9280	11300	10100	13200	9500	10000	13600	9230	7030	9300	10300
Manganese	300	5.8 B	3.6	7.5 J	36.0 B	15.0	20	2.8 J	**989**	115	**474.0**	130.0	210.0 B	**340.0**
Mercury	0.7	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	NA	0.1 U	0.1 U	0.2 U	0.2 U	0.2 U
Nickel	100	10.0 U	10.0 U	5.0 U	10.0 U	10.0 U	10 U	10.0 U	10.6 B	2.8 BE	4.2 U	1.1 J	10.0 U	2.1 J
Potassium		3700	3900	2090.0	2300	2000	2400	2000	4510	5190	4170	3270	4200	4400
Selenium	10	15.0 U	15.0 U	38.0 U	15.0 U	15.0 U	25 U	25 U	11.4 U	8.7 U	4.8 U	38.0 U	15.0 U	15.0 U
Silver	50	3.0 U	3.0 U	5 U	3.0 U	3.0 U	6.0 U	6 U	2.2 U	1.2 U	1.5 U	5.0 U	3.0 U	3.0 U
Sodium	20000	**21400**	**20500**	**21900**	**26900**	**22400**	**22100**	19900	**57500**	**58900**	**20700**	**32700**	**27600**	**22100**
Thallium	0.5*	20.0 U	20.0 U	15.0 U	20.0 U	20.0 U	20 U	20 U	3.0 U	10.2 U	2.4 U	15.0 U	20.0 U	20.0 U
Vanadium		5.0 U	5.0 U	5 U	5.0 U	5.0 U	5.0 U	5 U	7.2 B	1.1 U	6.1 U	5.0 U	5.0 U	5.0 U
Zinc	2000*	4.7 J	3.6 J	25.0 U	4.6 J	2.8 J	3.2 J	10 U	40.4 B	10.4 BE	18.0 J	18.3 J	4.8 J	7.3 J

* - NYSDEC Guidance Value.
1- Duplicate sample from MW-4
NA - Not analyzed.
U - Analyte not detected.
J- Greater than the MDL but below the CRDL
B - Greater than MDL but less than RL.
MDL - Method detection limit.
RL - Reporting limit.
E - Estimated value.
[25] - Site-specific cleanup goal.

Table 4-2
Summary of Groundwater Sample Results - Metals
Tioga Castings Site
Owego, New York
NYSDEC Site Number 7-54-012

Well Date Units	NYSDEC Class GA Standards	MW-8 4/13/2009 ug/L		MW-8 3/18/2010 ug/L		MW-8 10/28/2010 ug/L		MW-8 2/28/2011 ug/L		MW-8 7/19/2012 ug/L		MW-8 10/14/2013 ug/L		MW-9 2/5/2015 ug/L		MW-9 5/16/2016 ug/L	
Aluminum		6190		39.8	U	45.5	J	324.0		230.0		130.0	J	3000		810	
Antimony	3	6.7	U	6.8	U	8.0	U	15.0	U	20.0	U	20.0	U	20	U	20	U
Arsenic	25	3.0	U	5.6	U	4.2	U	15.0	U	10.0	U	10.0	U	15	U	15	U
Barium	1000	219		64.6	BE	71.6		67.0		66.0		67.0		110		86	
Beryllium	3*	0.5	U	0.2	U	0.7	U	5.0	U	2.0	U	2.0	U	2.0	U	2.0	U
Cadmium	5 [10]	0.3	U	0.3	BE	0.5	U	5.0	U	1.0	U	1.0	U	2.0	U	2.0	U
Calcium		52400		52600		52800		50300		50000		49200		70600		74800	B
Chromium	50 [50]	8.9	B	0.9	U	1.9	J	5.0	U	1.9	J B	4.0	U	3.8	JB	1.6	J
Cobalt		3.8	U	0.6	U	5.8	U	5.0	U	4.0	U	4.0	U	4.0	U	4.0	U
Copper	200	66.3		1.3	U	2.3	J	1.6	J	10.0	U	10.0	U	5.1	J	2.2	J
Iron	300	**4530**		40.2	BE	104.0		**560.0**		140.0		190.0		**2500**		**1100**	**B**
Lead	25 [25]	17.3	B	3.0	U	2.6	U	15.0	U	5.0	U	5.0	U	10	J	3	J
Magnesium		8740		8870		8300		8430		8000		8300		12100		11500	
Manganese	300	**524**		2.7	BE	5.0	J	28.9		4.0	B	8.5		140		55	
Mercury	0.7	NA		0.1	U	0.1	U	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel	100	9.5	B	1.3	U	4.2	U	5.0	U	10.0	U	10.0	U	2.5	J	1.9	J
Potassium		3770		2440	BE	2630		2630		2900		2600		4800		5700	
Selenium	10	11.4	U	8.7	U	4.8	U	38.0	U	15.0	U	15.0	U	25	U	25	U
Silver	50	2.2	U	1.2	U	1.5	U	5.0	U	3.0	U	3.0	U	6.0	U	6.0	U
Sodium	20000	**26700**		**23300**		**21300**		**21900**		**28500**		18600		8000		7100	
Thallium	0.5*	3.0	U	10.2	U	2.4	U	15.0	U	20.0	U	20.0	U	20.0	U	20.0	U
Vanadium		9.8	B	1.1	U	6.1	U	5.0	U	5.0	U	5.0	U	4.5	J	1.9	J
Zinc	2000*	40.2	B	3.0	BE	23.8		25.0	U	4.1	J	3.3	J	13		4	J

* - NYSDEC Guidance Value.
1- Duplicate sample from MW-4
NA - Not analyzed.
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B - Greater than MDL but less than RL.
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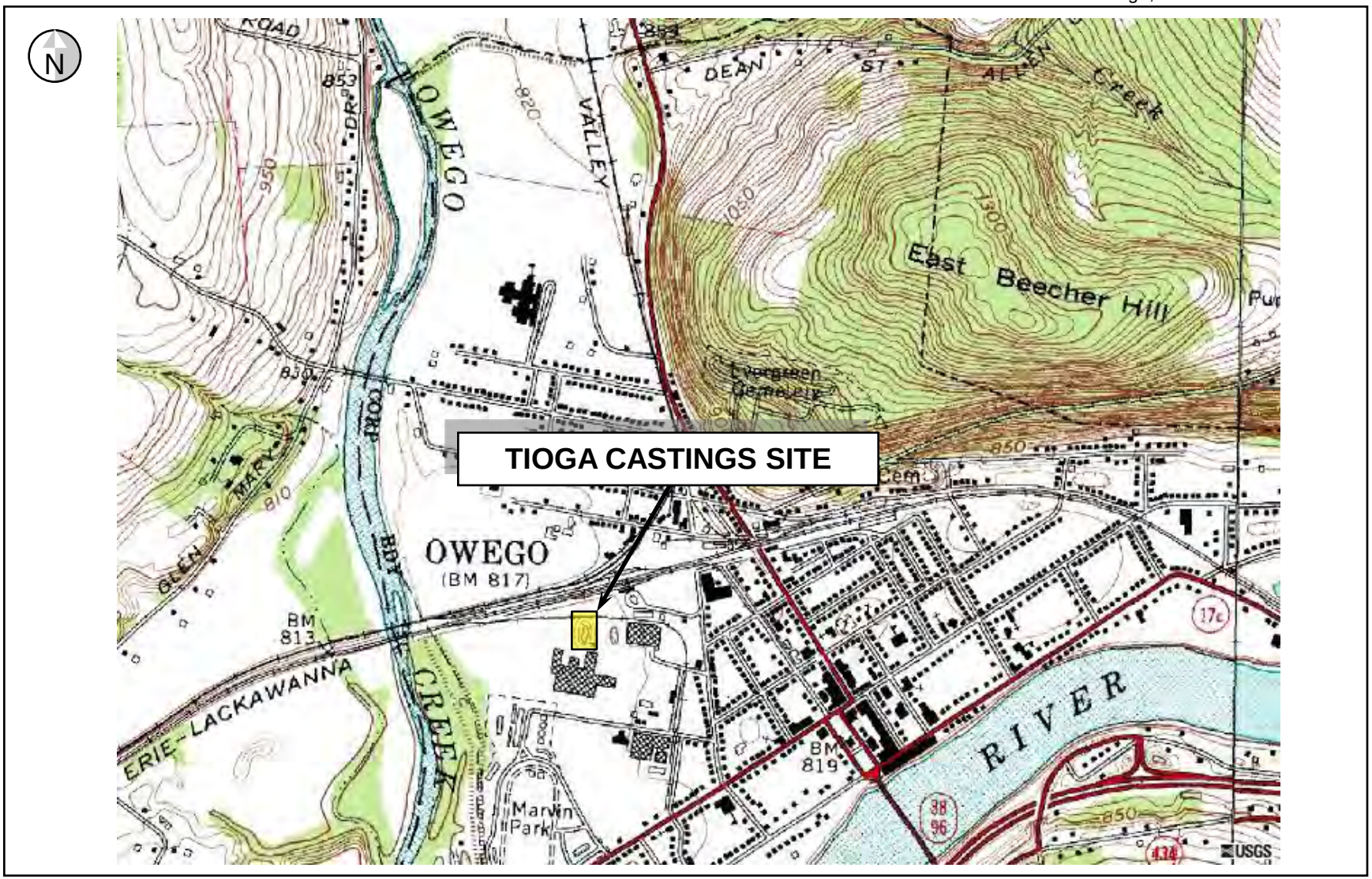
RL - Reporting limit.
E - Estimated value.
[25] - Site-specific cleanup goal.

FIGURES

ARCADIS Design & Consultancy for natural and built assets

Figure 2-1
Site Location
Tioga Castings Site
NYSDEC Site Number 7-54-012
Owego, New York

0 2,000 ft



Source: USGS 7.5-minute Series Topographic Quadrangle, OWEGO (1990).

G:Project/0266362/File/Reports/1st Qtr 2012/Figure 2-1.ppt

Legend

- Monitoring Well
- Abandoned Well
- Former Casting Facility
- On-Site Landfill/Site Boundary
- Approximate Parcel Boundary

0 60 120 240 360 480 Feet

N

Note: Site feature boundaries are approximate.

NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
SITE NUMBER 754012

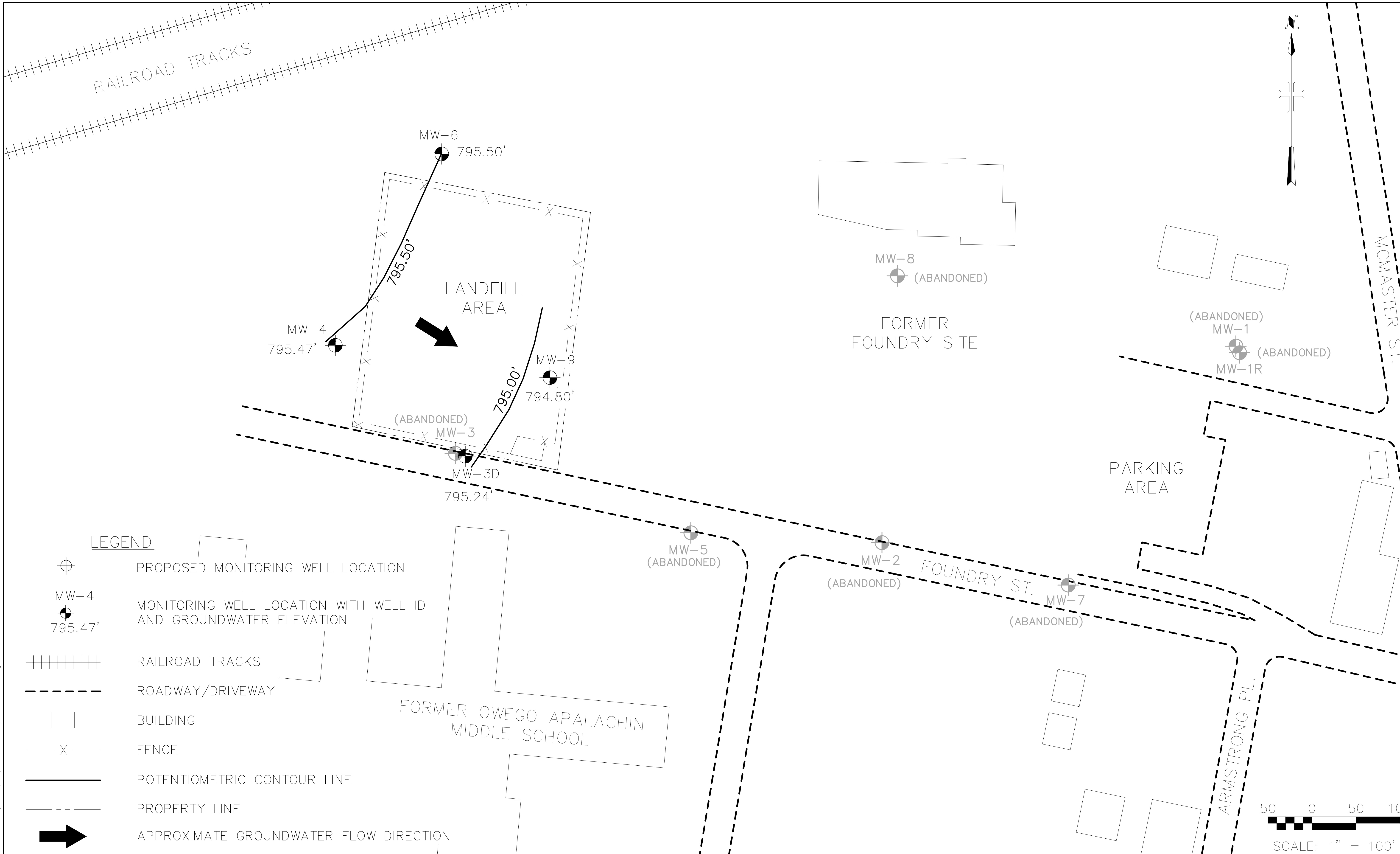
Tioga Casting Facility, Owego, New York

SITE FEATURES

ARCADIS Design & Consultancy for natural and built assets

FIGURE **2-2**

G:\GIS\MXD\00266403.0000\Site Map.mxd
G:\PROJECT\00266403.0000\Reports\4th Qtr 2014-drilling\Figure 2-2.pdf



ARCADIS Design & Consultancy for natural and built assets

NYSDEC STANDBY CONTRACT NO D007618-12
NYSDEC SITE NO. 7-54-012
TIOGA CASTING FACILITY
OWEGO, NEW YORK

POTENTIOMETRIC SURFACE (5/6/2016)

SCALE: AS SHOWN

MARCH 2017

FIGURE 4-1

APPENDIX A

O&M Checklists

TIOGA CASTINGS SITE LANDFILL

Post-Closure Operation and Maintenance Checklist

Inspected by: Jeremy Wyckoff

Date: 4/23/2014 Time: 11:45

Weather Conditions: Cloudy ~45°F

LANDFILL COVER SYSTEM

Erosion		YES	X	NO
Holes or Cracks in Cover		YES	X	NO
Cap Settlement		YES	X	NO
Ponded Water or Wet Areas		YES	X	NO
Burrowing Rodents		YES	X	NO
Sparse Vegetation/Bare Soil		YES	X	NO
Brush or Other Woody Vegetation,		YES	X	NO
Excessive Weeds in Grass		YES	X	NO
Grass Mowed	X	YES		NO

DRAINAGE DITCHES

Erosion		YES	X	NO
Obstructions		YES	X	NO
Sediment Accumulation		YES	X	NO
Evidence of Surcharging		YES	X	NO
Presence of Brush	X	YES		NO

Comments: Brush growing in perimeter swales - None on landfill cap.

Trimmed brush from perimeter of landfill cap.

Continued

FENCING

Warning Signs	X	OK		OTHER
Gates and Locks	X	OK		OTHER
Posts	X	OK		OTHER
Top Tension Wire	X	OK		OTHER
Barbed Wire	X	OK		OTHER

Comments:

MONITORING WELLS

Capped and Locked		YES	X	NO
Casing Damage		YES	X	NO

Comments: MW-6 lock will not lock and needs replacement.

All other locks are corrodid and should be replaced.

Concrete collar for MW-4 flushmount is deteriorated - flushmount should be replaced

INSPECTOR'S SIGNATURE JRW DATE 4/23/2014

TIOGA CASTINGS SITE LANDFILL

Post-Closure Operation and Maintenance Checklist

Inspected by: Jeremy Wyckoff

Date: 10/1/2014 Time: 11:00

Weather Conditions: Cloudy ~65°F

LANDFILL COVER SYSTEM

Erosion		YES	X	NO
Holes or Cracks in Cover		YES	X	NO
Cap Settlement		YES	X	NO
Ponded Water or Wet Areas		YES	X	NO
Burrowing Rodents		YES	X	NO
Sparse Vegetation/Bare Soil		YES	X	NO
Brush or Other Woody Vegetation,		YES	X	NO
Excessive Weeds in Grass		YES	X	NO
Grass Mowed	X	YES		NO

DRAINAGE DITCHES

Erosion		YES	X	NO
Obstructions		YES	X	NO
Sediment Accumulation		YES	X	NO
Evidence of Surcharging		YES	X	NO
Presence of Brush	X	YES		NO

Comments: Brush growing in swales. Tractor used to mow made ruts on northeast corner of the landfill.

Took pictures of the damage, no liner visible is the ruts.

Continued

FENCING

Warning Signs	X	OK		OTHER
Gates and Locks	X	OK		OTHER
Posts	X	OK		OTHER
Top Tension Wire	X	OK		OTHER
Barbed Wire	X	OK		OTHER

Comments:

MONITORING WELLS

Capped and Locked	X	YES		NO
Casing Damage		YES	X	NO

Comments: Abandoned MW-1R, MW-2, MW-3, MW-5, MW-7 and MW-8. Drilled and installed MW-9 along the East side of the landfill. Work performed 9/29/14-10/1/14. Generated three drums of IDW.

INSPECTOR'S SIGNATURE JRW DATE 10/1/2014

TIOGA CASTINGS SITE LANDFILL

Post-Closure Operation and Maintenance Checklist

Inspected by: B. Quaglieri

Date: 3/24/15 Time: 1025

Weather Conditions: 20°F, Partly Cloudy

LANDFILL COVER SYSTEM

Erosion	___	YES	X	NO
Holes or Cracks in Cover	___	YES	X	NO
Cap Settlement	___	YES	X	NO
Ponded Water or Wet Areas	___	YES	X	NO
Burrowing Rodents	___	YES	X	NO
Sparse Vegetation/Bare Soil	___	YES	X	NO
Brush or Other Woody Vegetation,	___	YES	X	NO
Excessive Weeds in Grass	___	YES	X	NO
Grass Mowed	___	YES	X	NO

DRAINAGE DITCHES

Erosion	___	YES	X	NO
Obstructions	___	YES	X	NO
Sediment Accumulation	___	YES	X	NO
Evidence of Surcharging	___	YES	X	NO
Presence of Brush	___	YES	X	NO

Comments: Vegetation is dormant.

Continued

FENCING

Gates and Locks	X	OK	____	OTHER
Posts	X	OK	____	OTHER
Top Tension Wire	X	OK	____	OTHER
Barbed Wire	X	OK	____	OTHER

Comments: _____

_____

MONITORING WELLS

Capped and Locked	X	YES	____	NO
Casing Damage	____	YES	X	NO

Comments: Replaced locks @ MW-3D, MW-6, and MW-9

INSPECTOR'S SIGNATURE _____ DATE 3/24/15

TIOGA CASTINGS SITE LANDFILL

Post-Closure Operation and Maintenance Checklist

Inspected by: Jeremy Wyckoff and Lance Whalen

Date: 9/24/2015 Time: 10:30

Weather Conditions: Clear ~55° F

LANDFILL COVER SYSTEM

Erosion		YES	X	NO
Holes or Cracks in Cover		YES	X	NO
Cap Settlement		YES	X	NO
Ponded Water or Wet Areas		YES	X	NO
Burrowing Rodents		YES	X	NO
Sparse Vegetation/Bare Soil		YES	X	NO
Brush or Other Woody Vegetation,		YES	X	NO
Excessive Weeds in Grass		YES	X	NO
Grass Mowed	X	YES		NO

DRAINAGE DITCHES

Erosion		YES	X	NO
Obstructions		YES	X	NO
Sediment Accumulation		YES	X	NO
Evidence of Surcharging		YES	X	NO
Presence of Brush	X	YES		NO

Comments: Brush growing in swales.

Continued

FENCING

Warning Signs	X	OK		OTHER
Gates and Locks	X	OK		OTHER
Posts	X	OK		OTHER
Top Tension Wire	X	OK		OTHER
Barbed Wire	X	OK		OTHER

Comments:

MONITORING WELLS

Capped and Locked	X	YES		NO
Casing Damage		YES	X	NO

Comments:

INSPECTOR'S SIGNATURE JRW DATE 9/24/2015

TIOGA CASTINGS SITE LANDFILL

Post-Closure Operation and Maintenance Checklist

Inspected by: B. Quaglieri

Date: 5/16/16 Time: 0935

Weather Conditions: 43°F, Sunny

LANDFILL COVER SYSTEM

Erosion	___	YES	X	NO
Holes or Cracks in Cover	___	YES	X	NO
Cap Settlement	___	YES	X	NO
Ponded Water or Wet Areas	___	YES	X	NO
Burrowing Rodents	___	YES	X	NO
Sparse Vegetation/Bare Soil	___	YES	X	NO
Brush or Other Woody Vegetation,	___	YES	X	NO
Excessive Weeds in Grass	___	YES	X	NO
Grass Mowed	___	YES	X	NO

DRAINAGE DITCHES

Erosion	___	YES	X	NO
Obstructions	___	YES	X	NO
Sediment Accumulation	___	YES	X	NO
Evidence of Surcharging	___	YES	X	NO
Presence of Brush	X	YES	___	NO

Comments: _____

Continued

FENCING

Warning Signs	X	OK	____	OTHER
Gates and Locks	X	OK	____	OTHER
Posts	X	OK	____	OTHER
Top Tension Wire	X	OK	____	OTHER
Barbed Wire	X	OK	____	OTHER

Comments: _____

_____

MONITORING WELLS

Capped and Locked	X	YES	____	NO
Casing Damage	____	YES	X	NO

Comments: _____

_____

_____

INSPECTOR'S SIGNATURE _____ DATE 5/16/16

APPENDIX B

Site Photograph Log

ARCADIS

Appendix B
Photograph Log

Tioga Castings Site
NYSDEC Site #7-54-012
Owego, New York

Southeast corner of landfill – facing west (05/16/16)

Southeast corner of landfill – facing north (05/16/16)

Northeast corner of landfill – facing west (05/16/16)

Northeast corner of landfill – facing south (05/16/16)

Northwest corner of landfill – facing south (05/16/16)

Northwest corner of landfill – facing east (05/16/16)

Southwest corner of landfill – facing east (05/16/16)

Southwest corner of landfill – facing north (05/16/16)

Center of landfill – facing southwest corner (05/16/16)

Center of landfill – facing southeast corner (05/16/16)

Center of landfill – facing northeast corner (05/16/16)

Center of landfill – facing northwest corner (05/16/16)

Landfill access gate (05/16/16)

APPENDIX C

IC/EC Certification Form

Enclosure 1
Engineering Controls - Standby Consultant/Contractor Certification Form

Site Details **Box 1**

Site No. 754012

Site Name Tioga Casting Facilities

Site Address: Foundry Street Zip Code: 13827
City/Town: Owego
County: Tioga
Site Acreage: 1.0

Reporting Period: December 30, 2013 to December 30, 2016

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

Box 2

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

IF THE ANSWER TO EITHER QUESTION 6 OR 7 IS NO, sign and date below and contact the DEC PM regarding the development of a Corrective Measures Work Plan to address these issues.

Signature of Standby Consultant/Contractor Date

SITE NO. 754012 **Box 3**

Description of Institutional Controls

Parcel	Owner	Institutional Control
128.07-2-7	John Sweet III	Ground Water Use Restriction Soil Management Plan Landuse Restriction O&M Plan IC/EC Plan Monitoring Plan Site Management Plan

Institutional Controls include: An Environmental Notice which includes restrictions on land use and groundwater use, and compliance with a site management plan that details the 0peration, maintenance, monitoring and reporting that is required at the site.

Box 4

Description of Engineering Controls

Parcel	Engineering Control
128.07-2-7	Cover System Fencing/Access Control

As per the Record of Decision,signed March 20, 1995, the remedy required consolidation of contaminated soils into a landfill at the western edge of the property. The landfill was properly closed and capped with a synthetic liner. Then the landfill was encompassed with a perimeter fence.

Engineering Controls include: Perimeter fence, cap, monitoring well network.

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, including data and material prepared by previous contractors for the current certifying period, if any;

   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
X	☐

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) nothing has occurred that would constitute a failure to comply with the Site Management Plan, or equivalent if no Site Management Plan exists.

YES	NO
X	☐

IF THE ANSWER TO QUESTION 2 IS NO, sign and date below and contact the DEC PM regarding the development of a Corrective Measures Work Plan to address these issues.

Signature of Standby Consultant/Contractor

Date

Box 6

IC/EC CERTIFICATIONS

Professional Engineer Signature

I certify that all information in Boxes 2 through 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, DANIEL J LOEWENSTEIN at ARCADIS
print name

855 ROUTE 146

CLIFTON PARK, NY 12065
(print business address)

am certifying as a Professional Engineer.

Signature of Professional Engineer

STATE OF NEW YORK
DANIEL JOHN LOEWENSTEIN
LICENSED PROFESSIONAL ENGINEER
066594
Stamp
(Required for PE)

6/9/17
Date

Arcadis CE, Inc.

855 Route 146

Suite 210

Clifton Park, New York 12065

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