JETT ENVIRONMENTAL CONSULTING

August 30, 2017

Ms. Charlene Fitch
Missouri Department of Natural Resources
Division of Environmental Quality
1730 East Elm Street
Jefferson City, Missouri 65101

**Re: 2017 Annual Assessment Monitoring Report**
**Bridgeton Landfill, LLC – Bridgeton Landfill**
**Missouri DNR Permit #MO – 118912**
**Bridgeton, Missouri**

Dear Ms. Fitch:

On behalf of the Bridgeton Landfill, LLC – Bridgeton Landfill, Jett Environmental Consulting is submitting the 2017 Annual Assessment Monitoring Report for the groundwater assessment monitoring program.

If you have any questions or comments, please contact me at steve.jett@jettenviro.com or 314-496-4654.

Sincerely,

Steve Jett, P.G.
Owner

*Attachment:* *Annual Assessment Monitoring Report (1 Hardcopy)*

*cc:* *Dana Sincox – Republic Services (1 Hardcopy & PDF via Email)*
*Mark Milward – Saint Louis County Department of Public Health (PDF via Email)*

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AUG 31 2017
SWMP

POSTED 8/31/17

*10 Quiet Brook Court*
*St. Charles, MO 63303*

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# 2017 Annual ASSESSMENT MONITORING REPORT

## Bridgeton Landfill, LLC
## Bridgeton Landfill
## Bridgeton, Missouri

## MO DNR PERMIT No. 118912

## August 2017

**Prepared by:**

JETT ENVIRONMENTAL CONSULTING

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## APPENDICES

# 1.0 INTRODUCTION

On behalf of the Bridgeton Landfill, LLC - Bridgeton Landfill, Jett Environmental Consulting has prepared this 2017 Annual Assessment Monitoring Report (AAMR) for the facility's groundwater assessment monitoring program. The AAMR has been prepared in accordance with the requirements of the December 17, 2013 Assessment Monitoring Plan (AMP) by Herst & Associates, Inc. and the August 18, 2014 response letter to the Missouri Department of Natural Resources (MDNR) Solid Waste Management Program's (SWMP's) July 30, 2014 comments on the AMP. The AMP was originally prepared in response to confirmed inorganic constituent statistical exceedances and confirmed organic constituent detections above the laboratory reporting limit (RL) that were observed at groundwater monitoring wells PZ-104-SS and PZ-104-SD in November 2012 and May 2013.

Per an October 14, 2016 MDNR letter, the site submitted an Updated AMP to MDNR on November 14, 2016. At the time of this submittal, MDNR comments have not been received regarding the Updated AMP.

# 2.0 ASSESSMENT WELLS AND CONSTITUENTS

The following nine groundwater monitoring wells constitute the facility's assessment wells and were sampled as a part of the assessment monitoring program within the past year:

| | | | |
|---|---|---|---|
| PZ-104-SS; | PZ-209-SS; | PZ-210-SS; | PZ-211-SS; |
| PZ-104-SD; | PZ-209-SD; | PZ-210-SD; | PZ-211-SD; and |
| PZ-104-KS. | | | |

In addition, the following two background groundwater monitoring wells were sampled in 2014 and 2015 to obtain data to be used in determining background concentrations for select constituents:

PZ-212-SS; and
PZ-212-SD.

**Appendix A** provides a map of the site layout, groundwater monitoring wells, and location of the nine assessment wells.

The facility's assessment monitoring constituent list includes 32 constituents. Fifteen of these constituents were specified in the AMP based on groundwater detection monitoring results at PZ-104-SS and PZ-104-SD initially identified in the AMP:

| | | |
|---|---|---|
| Arsenic, total; | Vanadium, total; | Ethylbenzene; |
| Barium, total; | 1,2-Dichloroethane; | Methyl Ethyl Ketone; |
| Chromium, total; | 4-Methyl-2-pentanone; | p-Dichlorobenzene (1,4-); |
| Cobalt, total; | Acetone; | Toluene; and |
| Nickel, total; | Benzene; | Xylenes, total. |

During the first assessment event in September 2014, the assessment wells were sampled for the constituents listed in Title 10 of the Missouri Code of State Regulation (CSR) 80-3 Appendix II. Six of the Appendix II list of assessment monitoring constituents that were detected in PZ-104-SS and/or PZ-104-SD in September 2014 had not previously been detected in May 2012, November 2012, and/or April 2013. These six constituents were thereafter added to the assessment constituent list:

| | | |
|---|---|---|
| Beryllium, total; | Copper, total; | Selenium, total; and |
| Cadmium, total; | Lead, total; | Zinc, total. |

Four of the Appendix II constituents that were detected in PZ-104-SS and/or PZ-104-SD in September 2014 had not previously been analyzed in wells PZ-104-SS or PZ-104-SD in May 2012,

November 2012, or April 2013. These four constituents were thereafter also added to the assessment constituent list:

Sulfide;
p-Cresol;
Phenol; and
Polychlorinated Biphenyl Aroclor 1221 (PCB-1221).

Seven additional constituents are not included in 10 CSR 80-3, but were specified by the SWMP in its July 30, 2014 letter to be included in the Bridgeton Landfill assessment monitoring program based on the results of SWMP split sampling of PZ-104-SD in November 2012:

1,2,4-Trimethylbenzene;
1,3,5-Trimethylbenzene;
1-Chlorobutane;
Isopropylbenzene;
Methyl-tert-butyl Ether;
p-Isopropyltoluene; and
Tetrahydrofuran.

## 3.0 ASSESSMENT MONITORING EVENTS

Groundwater assessment monitoring was initiated with the third quarter 2014 event. In accordance with the AMP, the assessment program currently entails semi-annual monitoring conducted in conjunction with the second and fourth quarter groundwater detection monitoring (DMP) events. Therefore, over the last year, assessment monitoring events were performed at the Bridgeton Landfill during fourth quarter 2016 and second quarter 2017. Routine DMP parameters were collected during the third quarter 2016 and first quarter 2017. Laboratory analytical testing was performed by Pace Analytical Services, LLC.

The semi-annual assessment events were performed in accordance with 10 CSR 80.3.010(11)(C)6.F.(II). The nine assessment monitoring wells were sampled for assessment constituents plus SWMP-specified non-10 CSR 80-3 constituents.

## 4.0 ASSESSMENT MONITORING RESULTS

The results of the assessment monitoring events performed from third quarter 2016 through second quarter 2017 are summarized on tables located in **Appendix B**. Constituent concentrations that exceeded groundwater protection standards (GWPSs) are indicated on the tables. GWPSs are from the December 17, 2013 AMP and 2015 AAMR Addendum, based on either maximum contaminant levels (MCLs) (National Primary Drinking Water Standard) or background concentrations (where available). Organic constituent GWPSs at assessment wells are assumed to be equal to the MCL (where established) or the RL if no MCL is established.

## 5.0 CURRENT GROUNDWATER CONDITIONS

In accordance with the AMP, this section presents an annual evaluation of current groundwater conditions, based on the past year of assessment monitoring results. This evaluation includes the concentrations, extents, and migration rates of the assessment constituents plus SWMP-specified non-10 CSR 80-3 constituents.

### 5.1 Concentrations of Assessment Constituents and SWMP-Specified Non-10 CSR 80-3 Constituents

In general, assessment constituent concentrations and SWMP-specified non-10 CSR 80-3 constituent concentrations have decreased or remained stable over the past year. The majority of constituents that were not detected in second quarter 2016 remain below RLs as of second quarter 2017.

The following assessment constituents that exhibited a GWPS exceedance in second quarter 2016 did not exhibit an exceedance as of second quarter 2017, indicating improvement with respect to these constituents over the past year:

- Sulfide at PZ-209-SD was detected at a concentration of 1.4 mg/L in second quarter 2016, but was below detection (<1.2 mg/L) in second quarter 2017.
- Benzene at PZ-104-KS was detected at a concentration of 5.8 ug/L in second quarter 2016, but was below the RL (5 ug/L) in second quarter 2017.
- p-Isopropyltoluene at PZ-104-KS was detected at a concentration of 5.7 ug/L in second quarter 2016, but was below the RL (5 ug/L) in second quarter 2017.

During second quarter 2017, there was no MCL-based GWPS exceedance for an inorganic constituent at the assessment wells:

During second quarter 2017, there were two background-based GWPS exceedance for an inorganic constituent at the assessment wells:

- Arsenic, total at PZ-104-SS was detected at a concentration of 16.2 ug/L, above the GWPS of 11 ug/L. Arsenic at PZ-104-SS is not typically detected above the RL. The next quarterly sampling event will be used as a confirmation event for this monitoring well/parameter.
- Nickel, total at PZ-104-SS was detected at a concentration of 48.5 ug/L, above the GWPS of 23 ug/L. Nickel at PZ-104-SS is not typically detected above the RL. The next quarterly sampling event will be used as a confirmation event for this monitoring well/parameter.

Review of the metals data for PZ-104-SS/PZ-104-SD indicates the samples or laboratory results may have been inadvertently switched. For example, the second quarter 2017 metals data for PZ-104-SS matches up with PZ-104-SD historical results, and the second quarter 2017 metals data for PZ-104-SD matches up with PZ-104-SS historical results. Review of the field sampling forms, chain of custody forms, and laboratory sample identification numbers did not indicate a switch in samples. The third quarter 2017 (August 2017) event will be utilized as a confirmation event for these results.

During second quarter 2017, there was one RL-based GWPS exceedances for an inorganic constituent at the assessment wells:

- Sulfide at PZ-209-SS was initially detected at a concentration of 2.2 mg/L in fourth quarter 2016 (RL = 2.0 mg/L) and was confirmed detected during second quarter 2017 at a concentration of 2.1 mg/L.

As of second quarter 2017, the GWPS exceedances for organic assessment constituents at the assessment wells are as follows:

- Benzene at PZ-104-SS (213 ug/L, MCL-based GWPS of 5 ug/L)
- Benzene at PZ-104-SD (400 ug/L, MCL-based GWPS of 5 ug/L);
- Methyl-tert-butyl ether at PZ-104-SS (7.9 ug/L, RL-based GWPS of 5 ug/L); and
- Tetrahydrofuran at PZ-104-SD (1,150 ug/L, RL-based GWPS of 100 ug/L).

Benzene concentrations at PZ-104-SS have increases from 44.1 ug/L to 213 ug/L in the past year, but continue to exhibit an overall downward trend since the peak concentration of 2,400 ug/L in April 2013. Benzene concentrations at PZ-104-SD have decreased 28% in the past year, from 554 ug/L in second quarter 2016 to 400 ug/L as of second quarter 2017, and continue to exhibit an overall downward trend since the peak concentration of 1,300 ug/L in May 2014.

Methyl-tert-butyl ether exhibited an initial detection at PZ-104-SS during the fourth quarter 2016 event (8.6 ug/L), which was confirmed during the second quarter 2017 event (7.9 ug/L).

Tetrahydrofuran concentrations increased at PZ-104-SD from non-detect (<1,000 ug/L) during the second quarter 2016 event to 2,060 ug/L during the fourth quarter 2016 event, but decreased in concentration during the second quarter 2017 event (1,150 ug/L).

In the past year, the facility has implemented several measures to further enhance the removal of leachate and landfill gas from the waste mass.

- Expanded the landfill gas collection system, thereby enhancing the collection of gas and reducing intra-well pressure.
- Installed new electric pumps into lift stations and condensate traps to remove additional liquid.
- Added soils in areas of high differential settlement to enhance drainage, thereby preventing precipitation from percolating through the waste mass in the south quarry.
- Conducted a concentrated effort to dewater gas extraction wells in order to maximize the amount of gas extracted from each well by investigating new styles/manufacturers of high temperature pumps.

By removing leachate and gas that may be acting as a source of groundwater impacts in the vicinity of the assessment wells, the interim corrective measures are believed to be reducing constituent concentrations.

## 5.2 Extents of Assessment Constituents and SWMP-Specified Non-10 CSR 80-3 Constituents

PZ-104-SS and PZ-104-SD were the only wells with confirmed organic GWPS exceedances over the last year; therefore the extent of confirmed organic GWPS exceedances has not expanded outside of the PZ-104 well cluster. In general, the extents of the assessment and SWMP-specified non-10 CSR 80-3 constituent exceedances have decreased or stabilized over the past year. None of the assessment constituents exhibited an overall expansion of their exceeding area extents in the past year. **Appendix C** provides maps of the concentration extents for each of the assessment monitoring constituents detected during second quarter 2017.

Sulfide was the only inorganic constituent that exhibited a GWPS exceedance outside of the PZ-104 well cluster. However the fourth quarter 2016 and second quarter 2017 trace level sulfide detections at PZ-209-SS were only slightly above the laboratory RL and were the first sulfide detections at this well.

The vertical extent of the benzene exceedances has contracted in the past year to no longer encompass well PZ-104-KS, which is a deeper well within the same well cluster as PZ-104-SS and PZ-104-SD. Benzene concentrations have decreased significantly over time at PZ-104-SS and PZ-104-SD as noted in **Section 5.1**.

## 5.3 Migration Rates of Assessment Constituents and SWMP-Specified Non-10 CSR 80-3 Constituents

The majority of assessment constituents and SWMP-specified non-10 CSR 80-3 constituents either do not exhibit GWPS exceedances as of second quarter 2017, or the extent of the GWPS exceedances has remained stable. Accordingly, migration rates for these constituents cannot be evaluated at the present time.

P-isopropyltoluene no longer exceeds a GWPS at any well. In second quarter 2016, p-isopropyltoluene exceeded the GWPS at well PZ-104-KS, but concentrations for this well/parameter are now non-detect (<5 ug/L). In addition, benzene no longer exceeds its GWPS at PZ-104-KS (concentrations have decreased from 5.8 ug/L in second quarter 2016 to <5 ug/L in second quarter 2017).

Sulfide no longer exceeds its GWPS at PZ-209-SD and PZ-211-SD as of the second quarter 2017 event. However, sulfide now exceeds the GWPS at PZ-209-SS as of second quarter 2017 event. Well PZ-209-SS is a shallow well within the same well cluster as PZ-209-SD.

Only two constituents exhibited both an exceedance of a GWPS as of second quarter 2017 and an expansion of the extent of exceedances between second quarter 2016 and second quarter 2017: sulfide and tetrahydrofuran.

Migration rates are evaluated in the sub-sections below. In general, because the assessment well area has historically been regarded as hydrogeologically upgradient of the Bridgeton Landfill, migration of constituents via advective-dispersive transport away from the waste mass and towards the assessment monitoring wells is not believed to be likely.

Sulfide

The extent of sulfide GWPS exceedances changed in the past year such that it encompasses well PZ-209-SS, but no longer encompasses PZ-209-SD. Since sulfide is detected in shallow well PZ-209-SS instead of deep well PZ-209-SD, this is an indication of an upward vertical migration. The laboratory RL for sulfide has fluctuated over the last year (1, 1.2, 5, 10, and 20 mg/L) due to laboratory dilution factors. Therefore, since the second quarter 2017 sulfide detection at PZ-209-SS is below the laboratory reporting limit utilized during the second quarter 2016 event, a true estimate on the changes of sulfide over the last year is not possible. During the second quarter 2017 event, sulfide was reported as non-detect at each of the remaining assessment wells.

Tetrahydrofuran (SWMP-Specified Non-10 CSR 80-3 Constituent)

The extent of tetrahydrofuran GWPS exceedances changed in the past year such that it now encompasses PZ-104-SD. No well exceeded the tetrahydrofuran GWPS during the second quarter 2016 event, including PZ-104-SD. Accordingly, migration rates for this constituent cannot be evaluated at this time. Tetrahydrofuran concentrations at PZ-104-SD increased from non-detect (<1,000 ug/L) in third quarter 2016 to 2,060 ug/L during the fourth quarter 2016 event; however, tetrahydrofuran concentrations at PZ-104-SD decreased during the second quarter 2017 event to 1,150 ug/L. Tetrahydrofuran was detected above the RL at PZ-104-SD during the initial event in September 2014, but has only been sporadically detected above the RL since that time. Tetrahydrofuran has not migrated to any other assessment well.

## 5.4 Summary of Current Conditions

In general, the assessment monitoring results indicate that the confirmed groundwater impacts in the vicinity of the assessment wells have remained stable or improved in the past year. PZ-104-SS and PZ-104-SD are the only wells with confirmed organic GWPS exceedances; therefore the extent of confirmed organic GWPS exceedances has not expanded outside of PZ-104 well cluster. There were no confirmed constituents exceeding GWPSs that exhibited an overall expansion of their horizontal extents in the past year. Sulfide is the only inorganic constituent that exhibited a confirmed GWPS exceedance outside of the PZ-104 well cluster. However the trace level sulfide detections at PZ-209-SS are only slightly above the laboratory RL.

One assessment constituent that exceeded its GWPS in second quarter 2016 did not exceed its GWPS as of second quarter 2017: p-Isopropyltoluene at PZ-104-KS.

In general, the reductions in constituent concentrations observed in the past year at the assessment monitoring wells are believed to be attributable in part to the aggressive pursuit of interim corrective measures at the facility, as described in **Section 5.1** above.

# 6.0 RECOMMENDATIONS

In accordance with 10 CSR 80-3.010(11)(C)6.I(III), the facility will continue with semi-annual assessment monitoring as described in the AMP.

Potential remedial alternatives to address the groundwater quality issues at wells PZ-104-SS and PZ-104-SD were discussed and evaluated in a February 19, 2016 Assessment of Corrective Measures Report Addendum by Feezor Engineering, Inc.

# APPENDIX A


WELL PREFIX/SUFFIX EXPLANATION

| | |
|---|---|
| SS = ST. LOUIS UPPER SALEM UNIT | AS = SHALLOW ALLUVIUM |
| SD = DEEP SALEM UNIT | AI = INTERMEDIATE ALLUVIUM |
| KS = KEOKUK UNIT | AD = DEEP ALLUVIUM |
| LCS = LEACHATE COLLECTION SUMP | LR - LEACHATE RISER |

LEGEND

- LEACHATE COLLECTION SUMP
- GROUNDWATER MONITORING WELL
- ASSESSMENT MONITORING WELL

NORTH

0 100 200 400 800

Scale in Feet

Graphic Scale: 1 inch = 400 feet

Notes: Aerial topography provided Cooper Aerial Surveys Co. dated 12/12/16.

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# Figure 1
## Assessment Monitoring Wells Map
## Bridgeton Landfill, LLC - Bridgeton, Missouri

# APPENDIX B

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-104-SS 3Q16 | PZ-104-SS 4Q16 | PZ-104-SS 1Q17 | PZ-104-SS 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **11** | <5 | <5 | <5 | 16.2 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | 102 | 100 | 100 | 574 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **4** | <2 | <2 | <2 | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **5** | <0.2 | <0.2 | <0.2 | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | <5 | <5 | <5 | 9.5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | <5 | <5 | <5 | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | <5 | <5 | <5 | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **15** | <5 | <5 | <5 | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **23** | <10 | <10 | <10 | 48.5 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | <5 | <5 | <5 | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <20 | NR | <1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <10 | <10 | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **220** | <20 | <20 | <20 | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | <5 | <5 | <5 | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | 9 | 7.1 | 6.3 | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <10 | <10 | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <10 | <10 | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | 221 | 279 | 302 | 213 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | 7.8 | 5.9 | <5 | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <10 | <10 | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | 8.6 | NR | 7.9 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | 12.3 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | 17.1 | 21 | 31.7 | 25.4 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | 22.1 | 12.2 | 12.7 | 7.4 |

Notes:
RL: Laboratory Reporting Limit.
NR: Not required to be analyzed this event.
* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.
Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-104-SD 3Q16 | PZ-104-SD 4Q16 | PZ-104-SD 1Q17 | PZ-104-SD 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **10** | 17.9 | 20.2 | 16.3 | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | 628 | 647 | 609 | 105 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **27.5** | <2 | <2 | <2 | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **67.2** | <0.2 | <0.2 | <0.2 | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | 16.9 | 14.8 | 13.2 | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | <5 | <5 | <5 | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | 5.1 | <5 | <5 | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **250** | <5 | <5 | <5 | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | 70.1 | 67.9 | 62.7 | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | <5 | <5 | <5 | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <1 | NR | <10 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | 17.5 | 12.6 | 13.3 | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **2950** | <20 | <20 | <20 | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <25 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | <5 | <25 | <5 | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <25 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | 8.9 | <25 | 5.7 | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <25 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <50 | <10 | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | <10 | <50 | <10 | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | 451 | 592 | 433 | 400 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | 7.3 | <25 | <5 | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <25 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <50 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | <10 | <25 | <10 | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <25 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | 2060 | NR | 1150 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | 9.3 | <25 | 7.5 | 34.3 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | 33.7 | <25 | 24.6 | 20.4 |

Notes:
RL: Laboratory Reporting Limit.
NR: Not required to be analyzed this event.
* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.
Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-104-KS 3Q16 | PZ-104-KS 4Q16 | PZ-104-KS 1Q17 | PZ-104-KS 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **10** | NR | <5 | <5 | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 90 | 90 | 92.4 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **27.5** | NR | <2 | <2 | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **67.2** | NR | <0.2 | <0.2 | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | <5 | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <5 | <5 | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | <5 | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **250** | NR | <5 | <5 | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | <10 | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | <5 | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <1 | NR | <1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | <10 | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **2950** | NR | <20 | <20 | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | <5 | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | <5 | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | <5 | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | <10 | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | <10 | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | <5 | <5 | <5 | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | <5 | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | <10 | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | <5 | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | <1000 | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | <5 | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | <5 | <5 | <5 | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Second set of results for benzene, p-isopropyltoluene, and xylenes (total) represents verification sampling on 7/25/16.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-209-SS 3Q16 | PZ-209-SS 4Q16 | PZ-209-SS 1Q17 | PZ-209-SS 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **11** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 38 | NR | 84 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **4** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <5 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **15** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | 2.2 | NR | 2.1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **220** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-209-SD 3Q16 | PZ-209-SD 4Q16 | PZ-209-SD 1Q17 | PZ-209-SD 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **10** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 64.1 | NR | 49 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **27.5** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **67.2** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <5 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **250** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | 1.2 | NR | <1.2 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **2950** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-210-SS 3Q16 | PZ-210-SS 4Q16 | PZ-210-SS 1Q17 | PZ-210-SS 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **11** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 969 | NR | 83.3 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **4** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | 5.4 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **15** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | 10.4 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <1 | NR | <1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **220** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.22 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-210-SD 3Q16 | PZ-210-SD 4Q16 | PZ-210-SD 1Q17 | PZ-210-SD 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **10** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 475 | NR | 69.4 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **27.5** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **67.2** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | 30.1 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **250** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | 73.5 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <1 | NR | <1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **2950** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-211-SS 3Q16 | PZ-211-SS 4Q16 | PZ-211-SS 1Q17 | PZ-211-SS 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **11** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 81.4 | NR | 63.1 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **4** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <5 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **15** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | <1 | NR | <1 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **220** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

RL: Laboratory Reporting Limit.

NR: Not required to be analyzed this event.

* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

## Groundwater Monitoring Results for Assessment Constituents
## Bridgeton Landfill, LLC
## Bridgeton Landfill

| Constituent | Units | Constituent Type | GWPS | PZ-211-SD 3Q16 | PZ-211-SD 4Q16 | PZ-211-SD 1Q17 | PZ-211-SD 2Q17 |
|---|---|---|---|---|---|---|---|
| ***Inorganic Constituents*** | | | | | | | |
| Arsenic, Total | ug/L | 10 CSR 80-3 App I+II | **10** | NR | <5 | NR | <5 |
| Barium, Total | ug/L | 10 CSR 80-3 App I+II | **2,000** | NR | 70.4 | NR | 39.7 |
| Beryllium, Total | ug/L | 10 CSR 80-3 App I+II | **27.5** | NR | <2 | NR | <2 |
| Cadmium, Total | ug/L | 10 CSR 80-3 App I+II | **67.2** | NR | <0.2 | NR | <0.2 |
| Chromium, Total | ug/L | 10 CSR 80-3 App I+II | **100** | NR | <5 | NR | <5 |
| Cobalt, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <5 | NR | <5 |
| Copper, Total | ug/L | 10 CSR 80-3 App I+II | **1,300** | NR | <5 | NR | <5 |
| Lead, Total | ug/L | 10 CSR 80-3 App I+II | **250** | NR | <5 | NR | <5 |
| Nickel, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Selenium, Total | ug/L | 10 CSR 80-3 App I+II | **50** | NR | <5 | NR | <5 |
| Sulfide | mg/L | 10 CSR 80-3 App II | **RL** | NR | 2.7 | NR | <5 |
| Vanadium, Total | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Zinc, Total | ug/L | 10 CSR 80-3 App I+II | **2950** | NR | <20 | NR | <20 |
| ***Organic Constituents*** | | | | | | | |
| 1,2,4-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,2-Dichloroethane | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| 1,3,5-Trimethylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 1,4-Dichlorobenzene | ug/L | 10 CSR 80-3 App I+II | **75** | NR | <5 | NR | <5 |
| 1-Chlorobutane | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| 4-Methyl-2-pentanone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Acetone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Benzene | ug/L | 10 CSR 80-3 App I+II | **5** | NR | <5 | NR | <5 |
| Ethylbenzene | ug/L | 10 CSR 80-3 App I+II | **700** | NR | <5 | NR | <5 |
| Isopropylbenzene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Methyl Ethyl Ketone | ug/L | 10 CSR 80-3 App I+II | **RL** | NR | <10 | NR | <10 |
| Methyl-tert-butyl Ether | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| PCB Aroclor 1221 | ug/L | 10 CSR 80-3 App II | **0.5** | NR | <0.2 | NR | <0.2 |
| p-Cresol* | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| Phenol | ug/L | 10 CSR 80-3 App II | **RL** | NR | <10 | NR | <10 |
| p-Isopropyltoluene | ug/L | MDNR-Specified | **RL** | NR | <5 | NR | <5 |
| Tetrahydrofuran | ug/L | MDNR-Specified | **RL** | NR | <100 | NR | <100 |
| Toluene | ug/L | 10 CSR 80-3 App I+II | **1,000** | NR | <5 | NR | <5 |
| Xylenes, Total | ug/L | 10 CSR 80-3 App I+II | **10,000** | NR | <5 | NR | <5 |

Notes:

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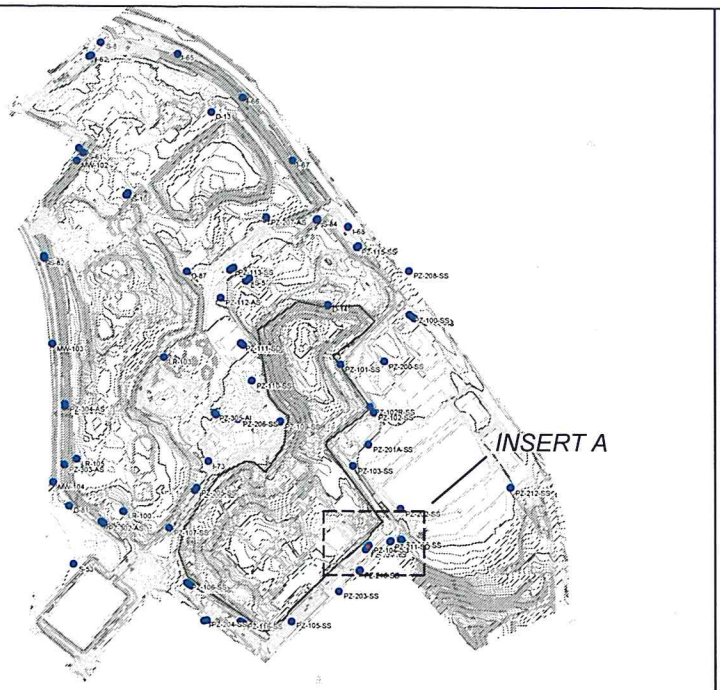
* Samples not analyzed for p-cresol individually. Reported result is for m+p-cresols.

Constituent concentration exceeds GWPS (where established) or MCL.

# APPENDIX C

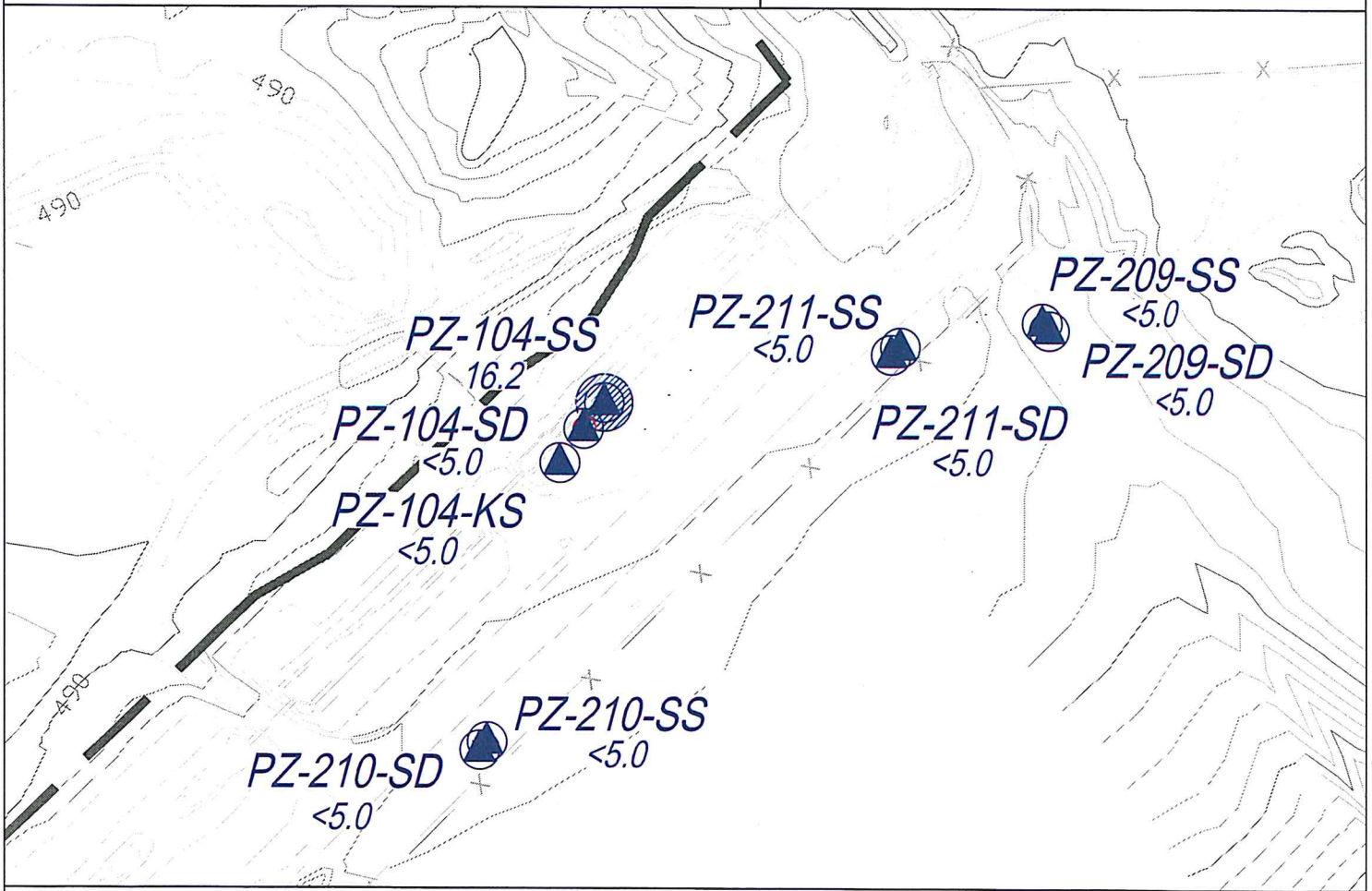



0 100 200 Feet

SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (11 ug/L)
- 16.2 TOTAL ARESENIC CONCENTRATION (ug/L)

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NOTES:

- BASE TOPOGRAPHY IS BASED ON AERIAL SURVEY DATA PROVIDED BY COOPER AERIAL SURVEYS CO. DATED DECEMBER 2, 2016.

| | |
|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 TOTAL ARSENIC CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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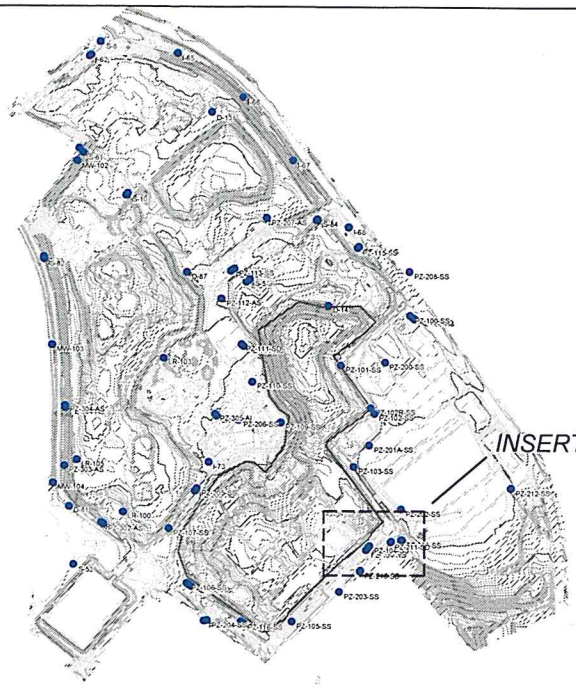
FEEZOR ENGINEERING, INC.

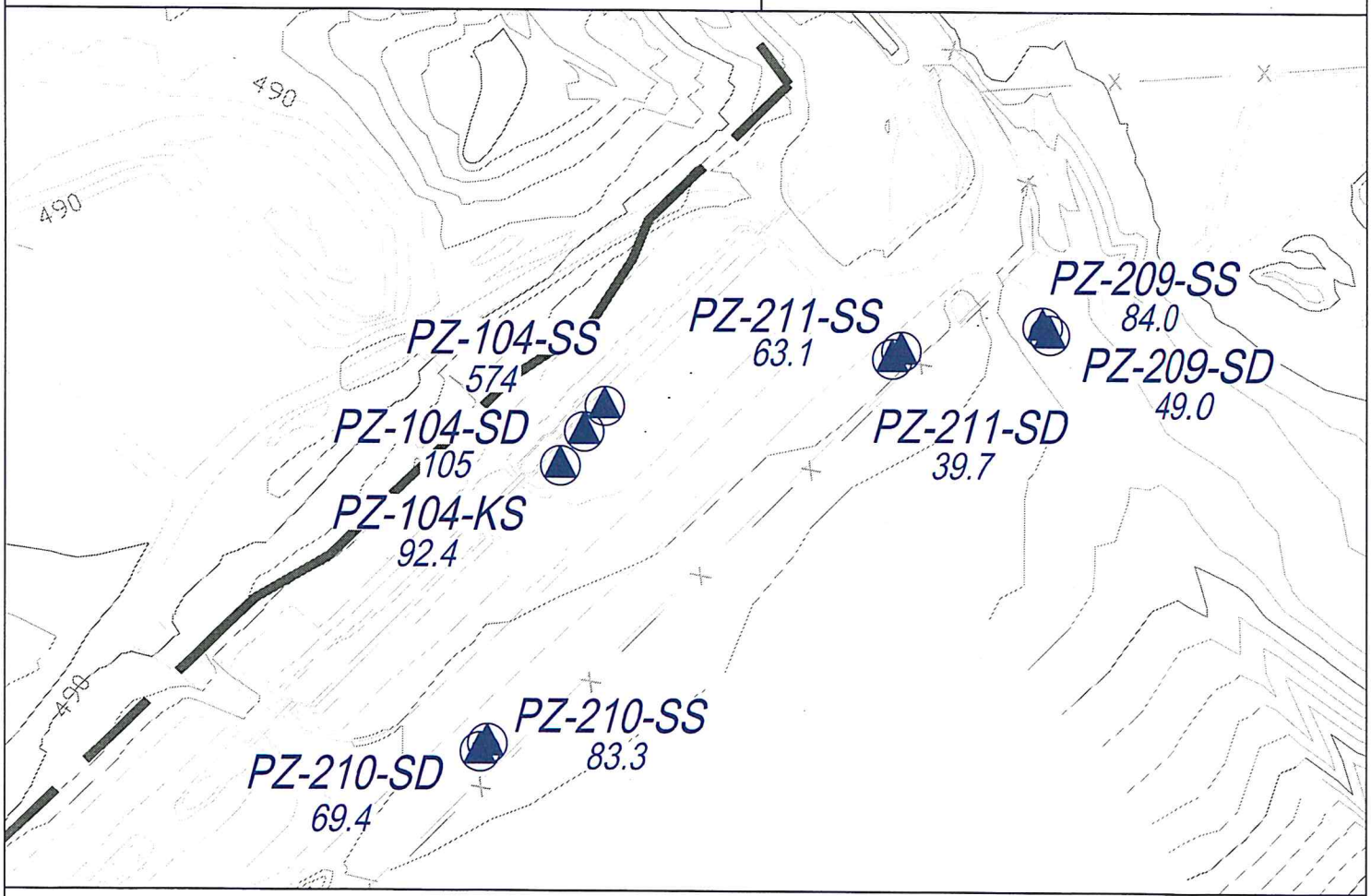



0 100 200 Feet

SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (2,000 ug/L)
- 574 TOTAL BARIUM CONCENTRATION (ug/L)

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| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| 2017 Q2 TOTAL BARIUM CONCENTRATIONS | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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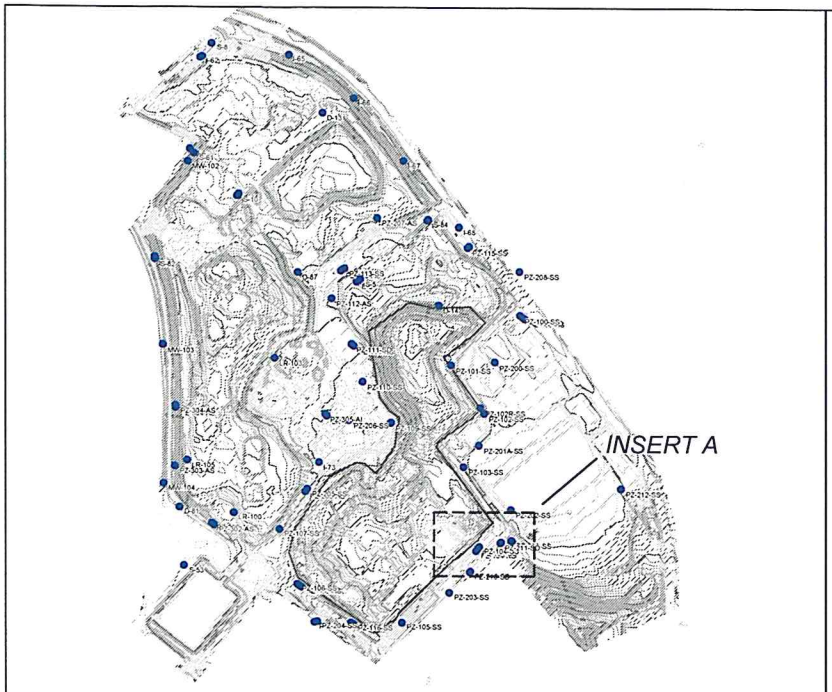
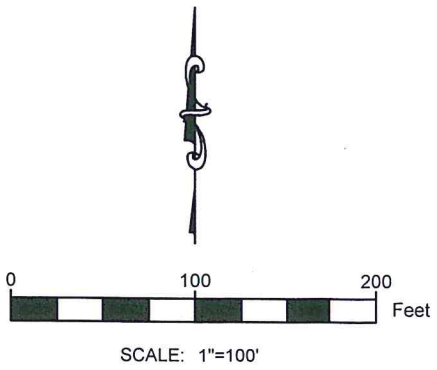
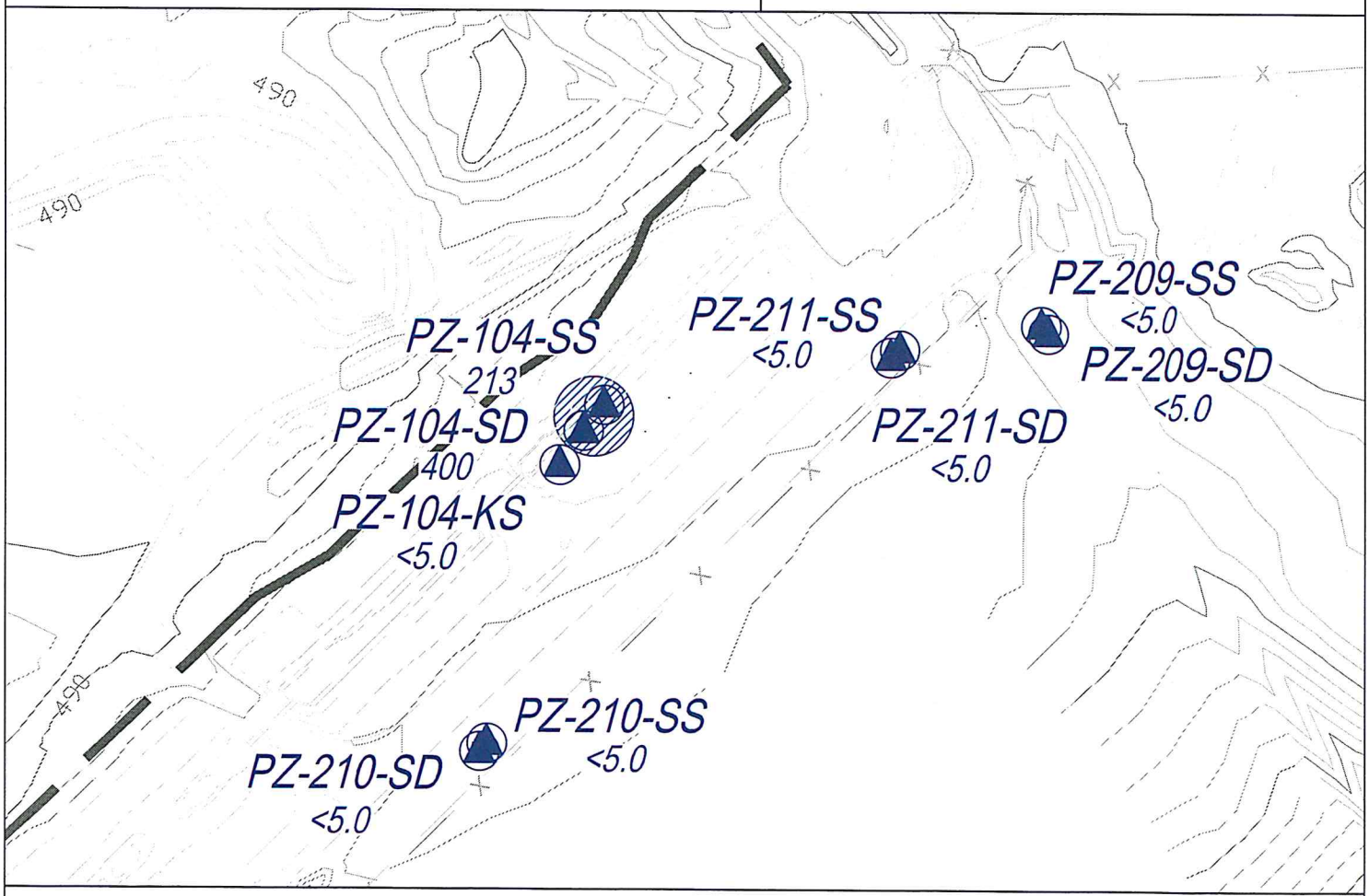



LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (5 ug/L)
- 400 TOTAL BENZENE CONCENTRATION (ug/L)

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| | |
|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 BENZENE CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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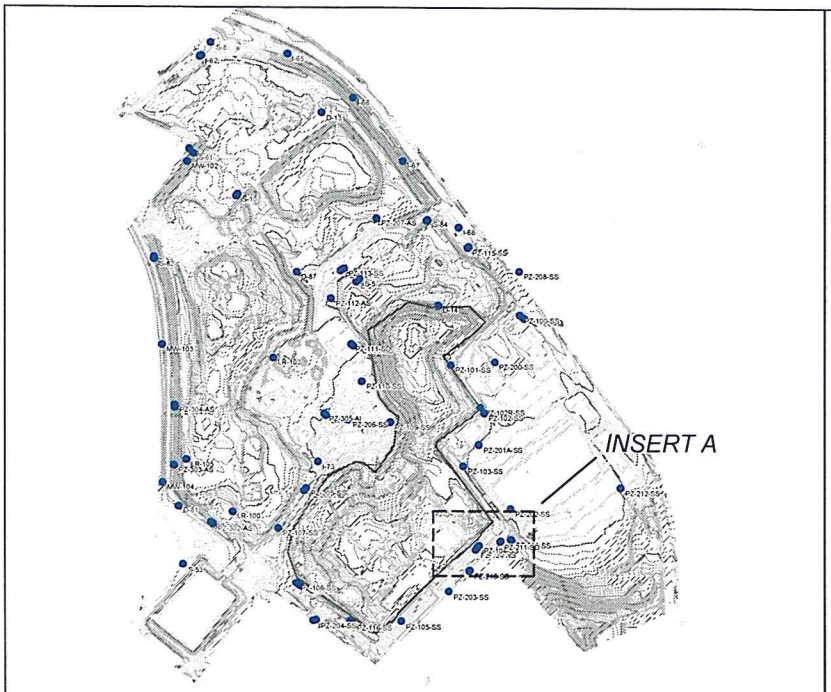
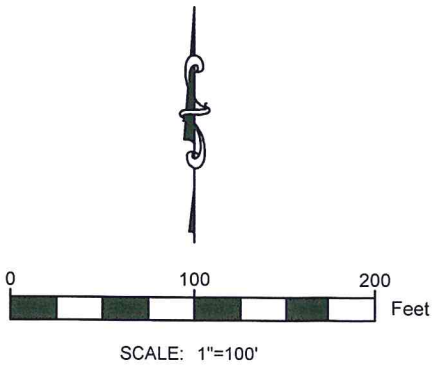
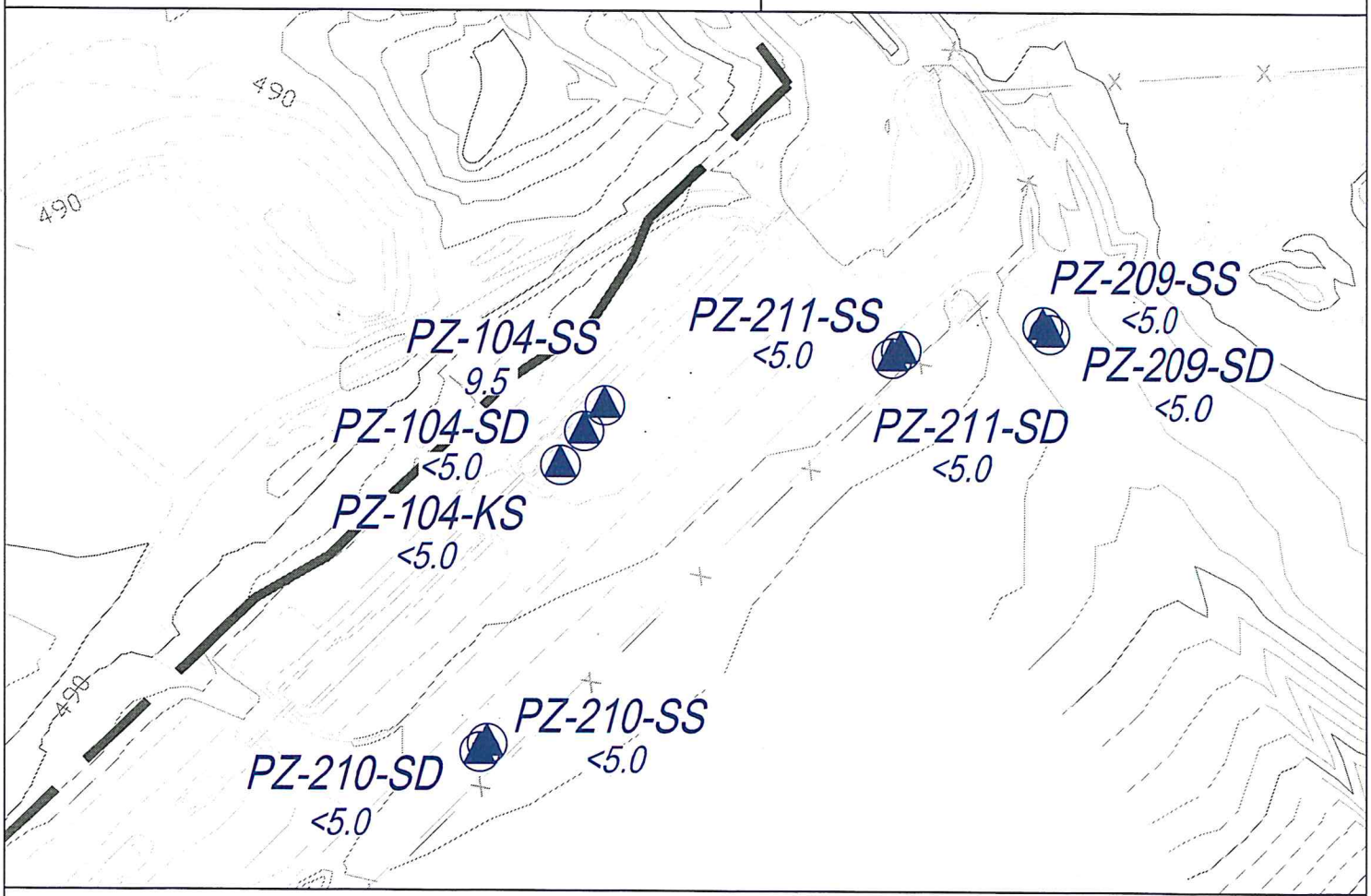



SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (100 ug/L)
- 9.5 TOTAL CHROMIUM CONCENTRATION (ug/L)

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| | |
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| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 TOTAL CHROMIUM CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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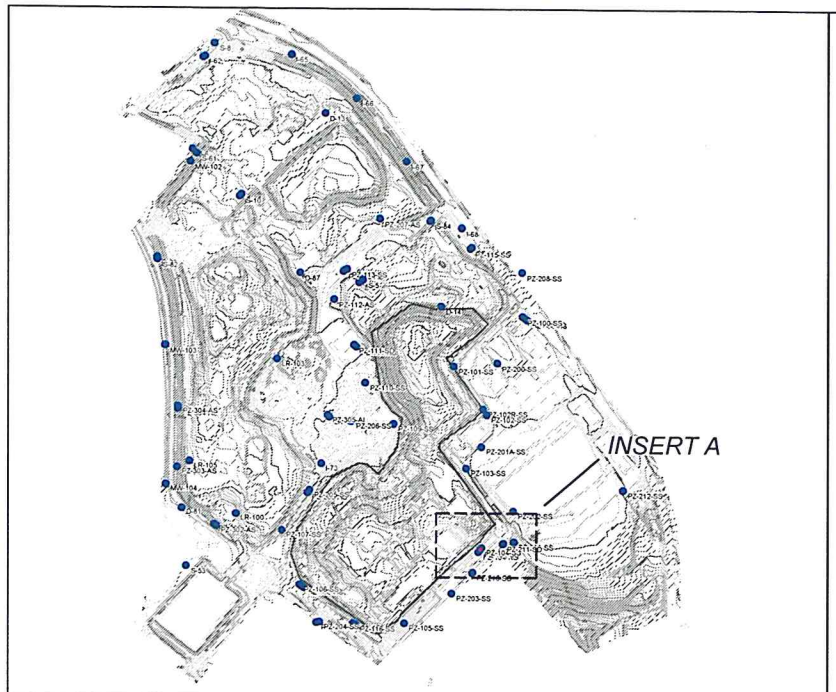
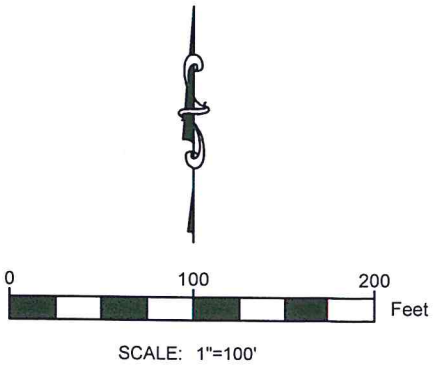
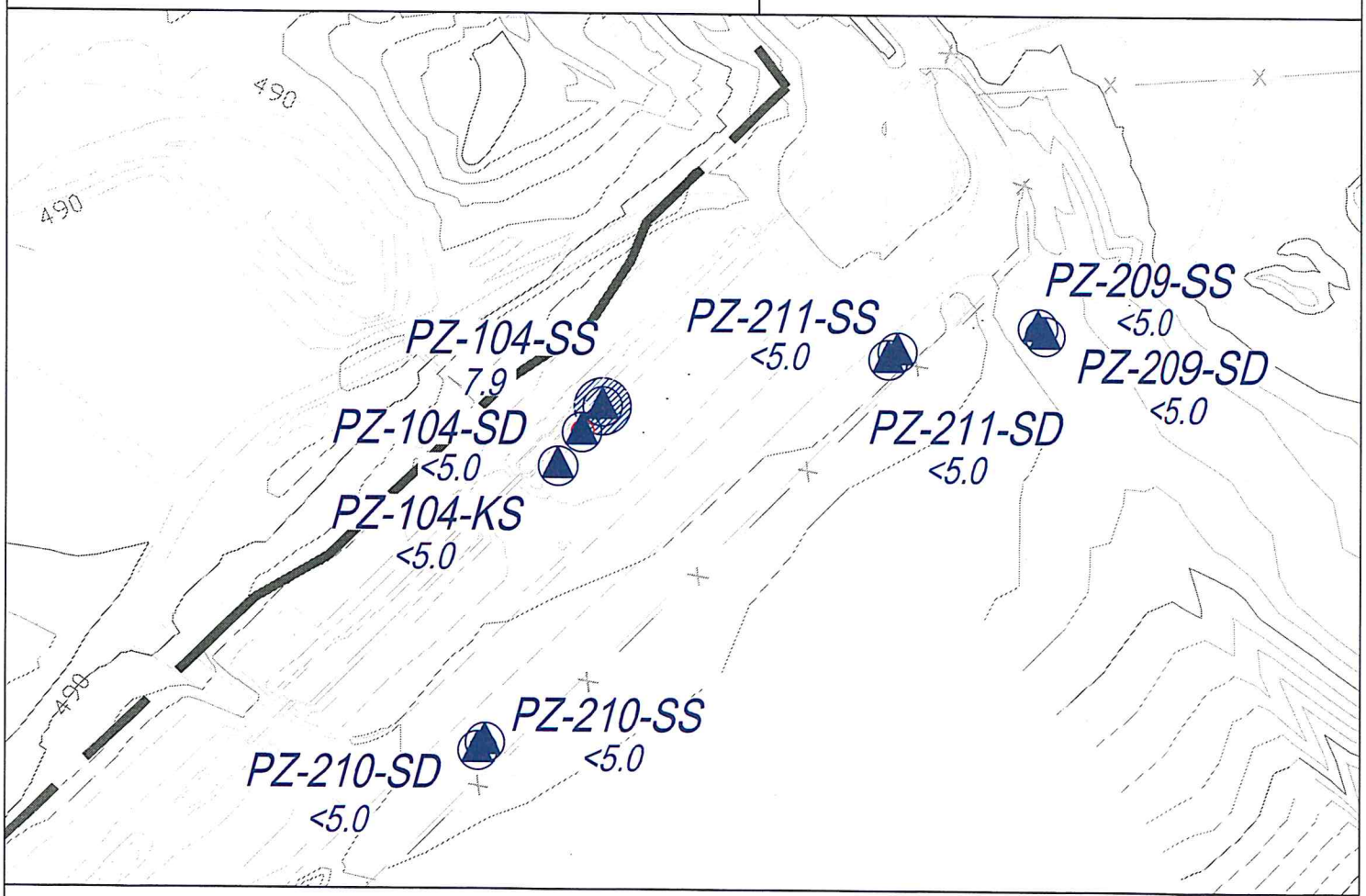



SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD WHICH IS EQUAL TO THE LABORATORY REPORTING LIMIT (ug/L)
- 7.9 TOTAL METHYL-t-BUTYL ETHER CONCENTRATION (ug/L)

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| | |
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| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 METHYL-t-BUTYL ETHER CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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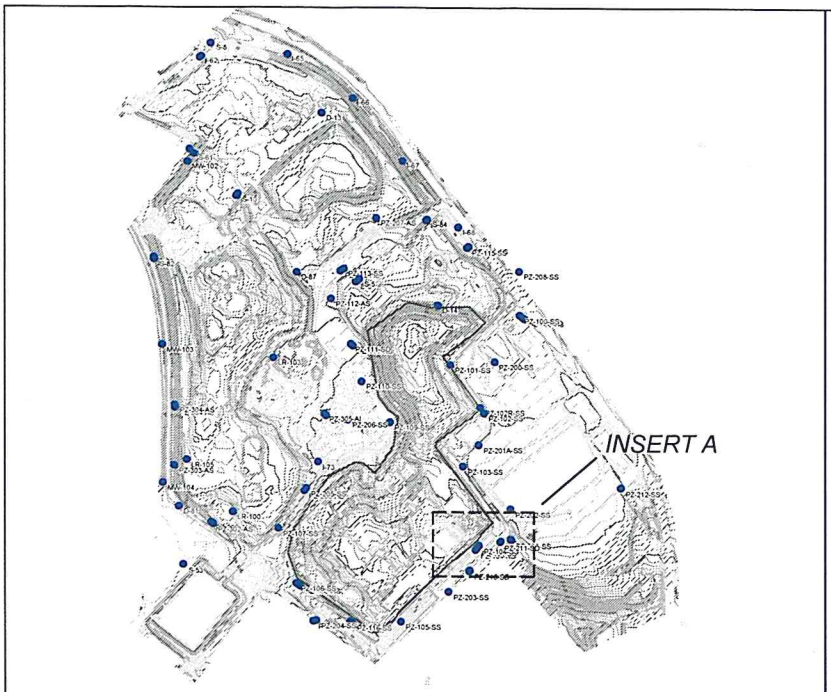
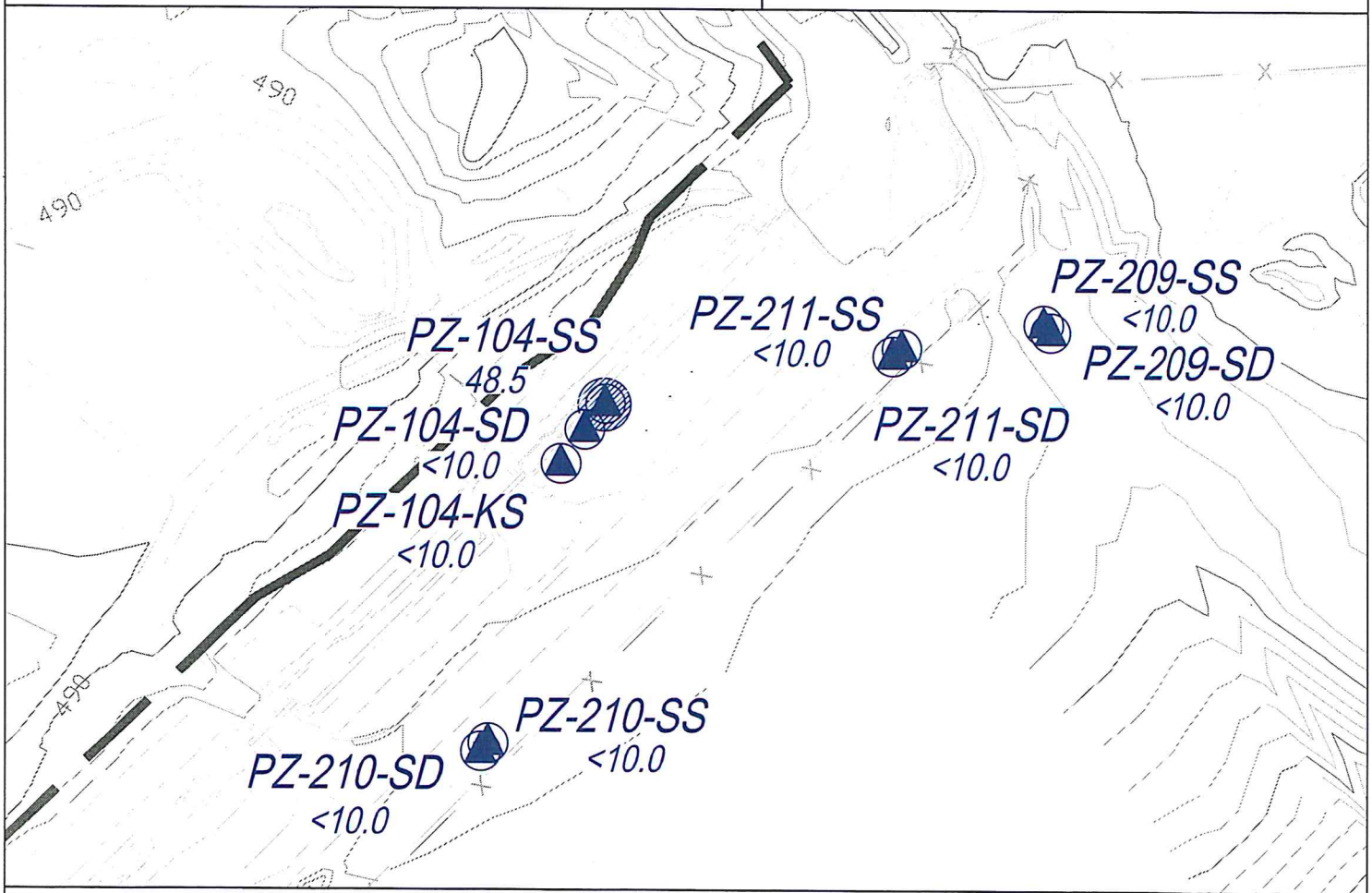



0 100 200 Feet

SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (23 ug/L)
- 48.5 TOTAL NICKEL CONCENTRATION (ug/L)

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| | |
|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 TOTAL NICKEL CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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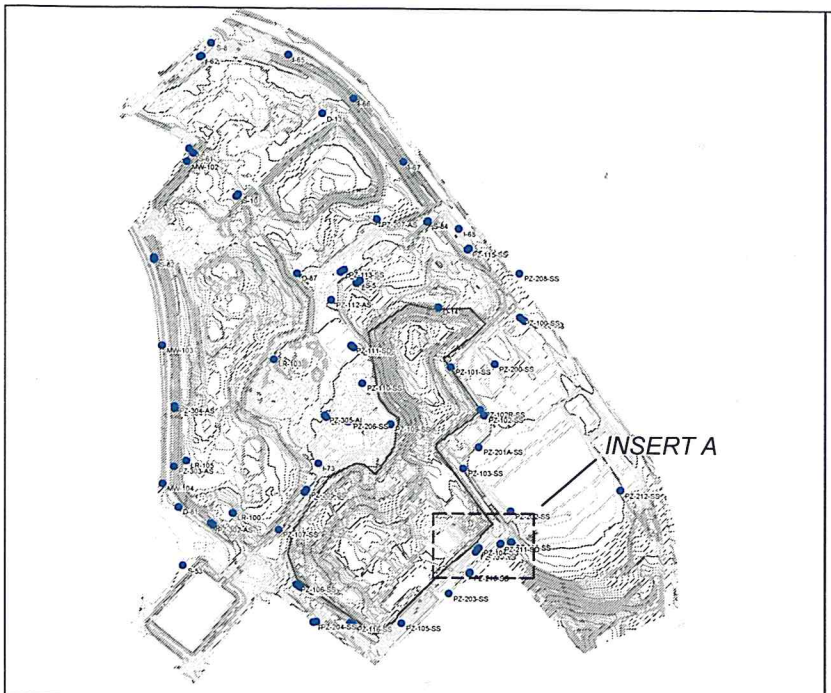
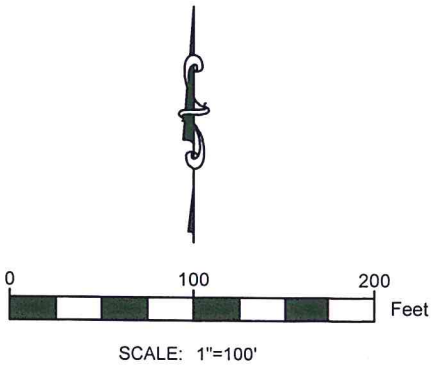
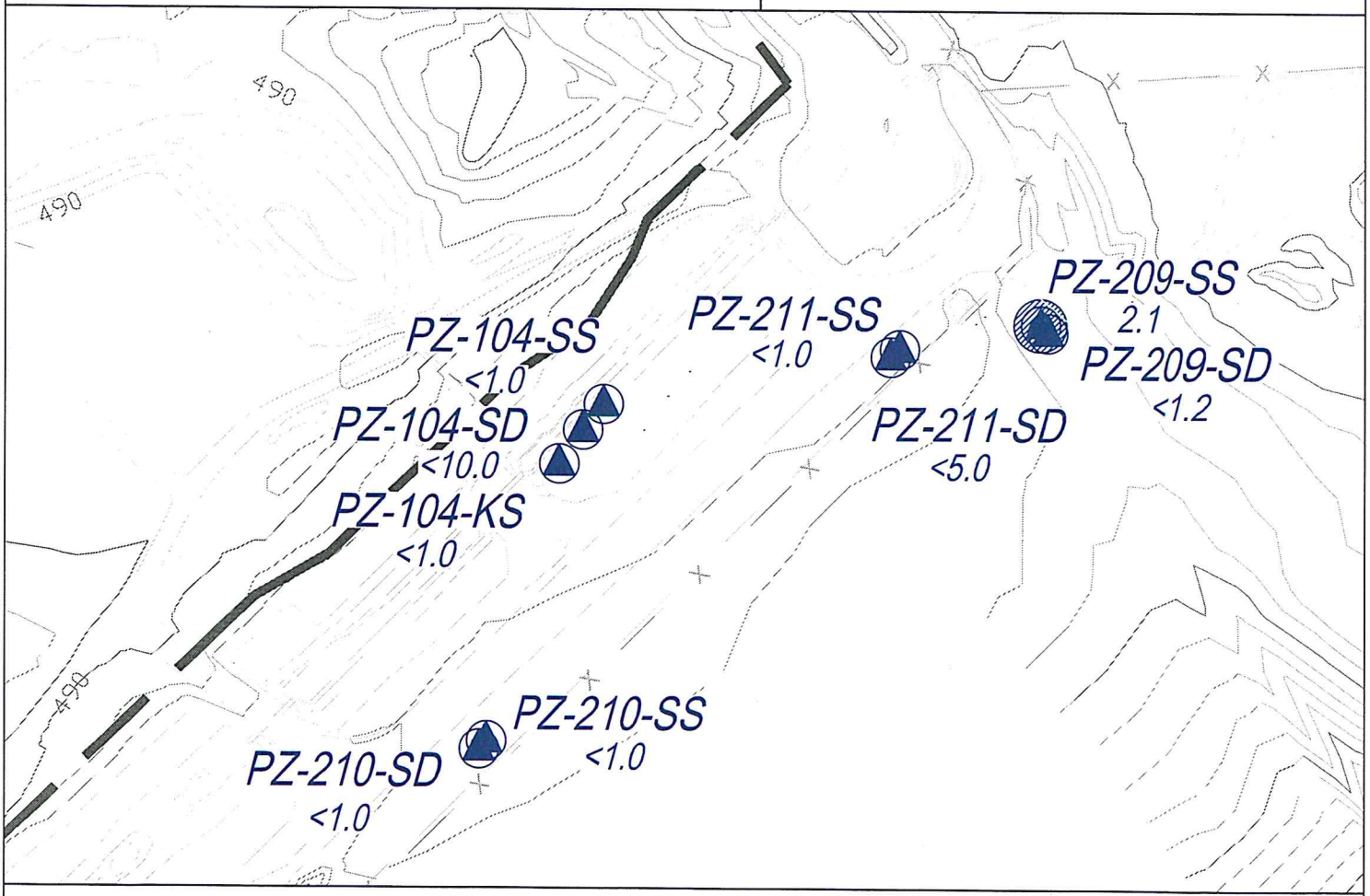



SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD WHICH IS EQUAL TO THE LABORATORY REPORTING LIMIT (mg/L)
- 2.1 SULFIDE CONCENTRATION (mg/L)

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| | |
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| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| 2017 Q2 SULFIDE CONCENTRATIONS | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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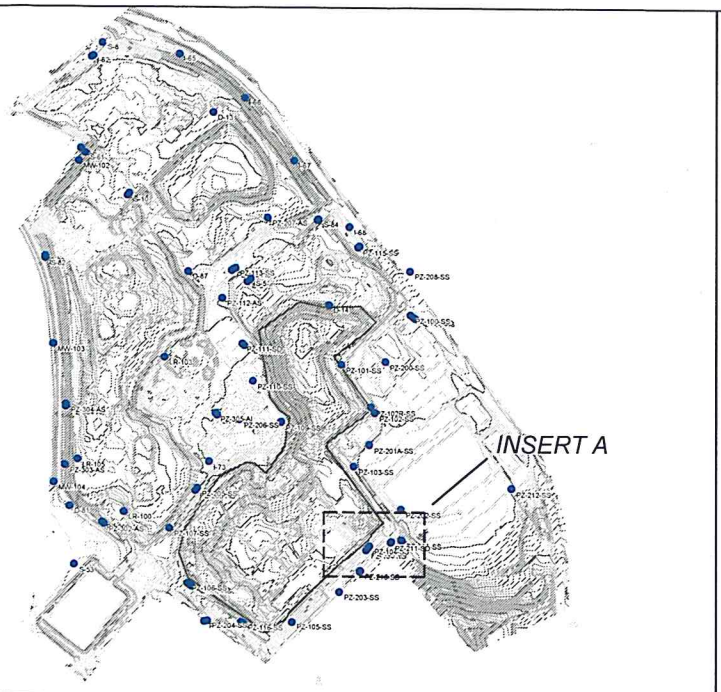
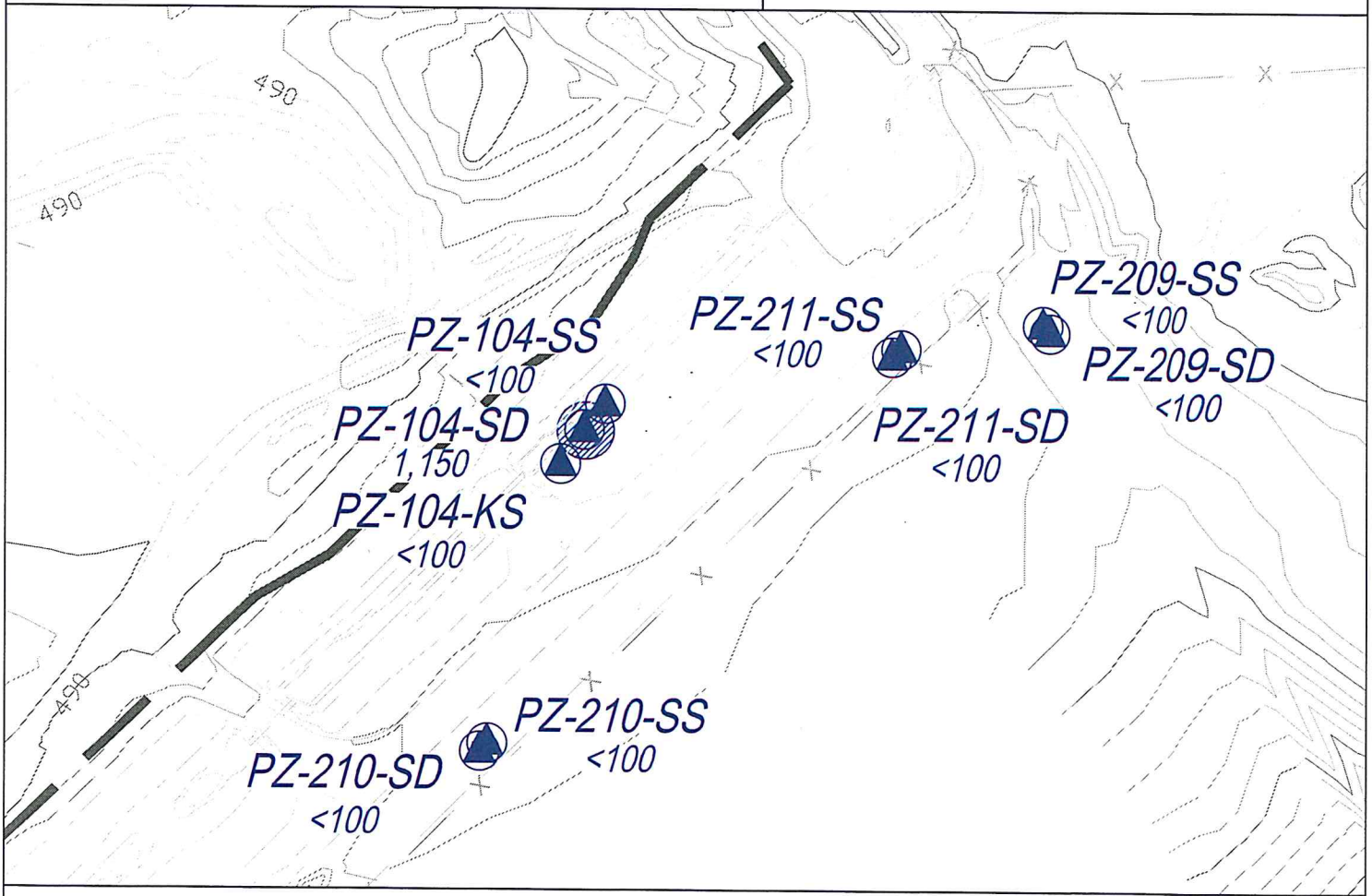



0 100 200 Feet

SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD WHICH IS EQUAL TO THE LABORATORY REPORTING LIMIT (ug/L)
- 1,150 TOTAL TETRAHYDROFURAN CONCENTRATION (ug/L)




# INSERT A

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| **2017 Q2 TETRAHYDROFURAN CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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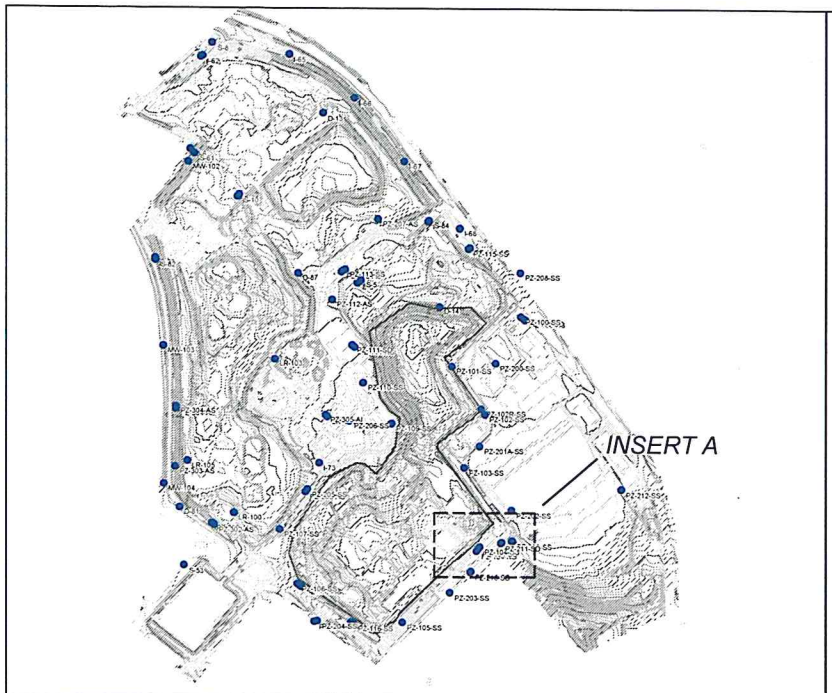
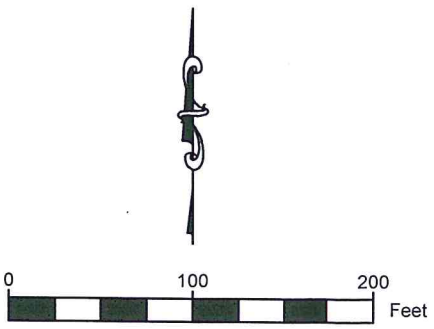
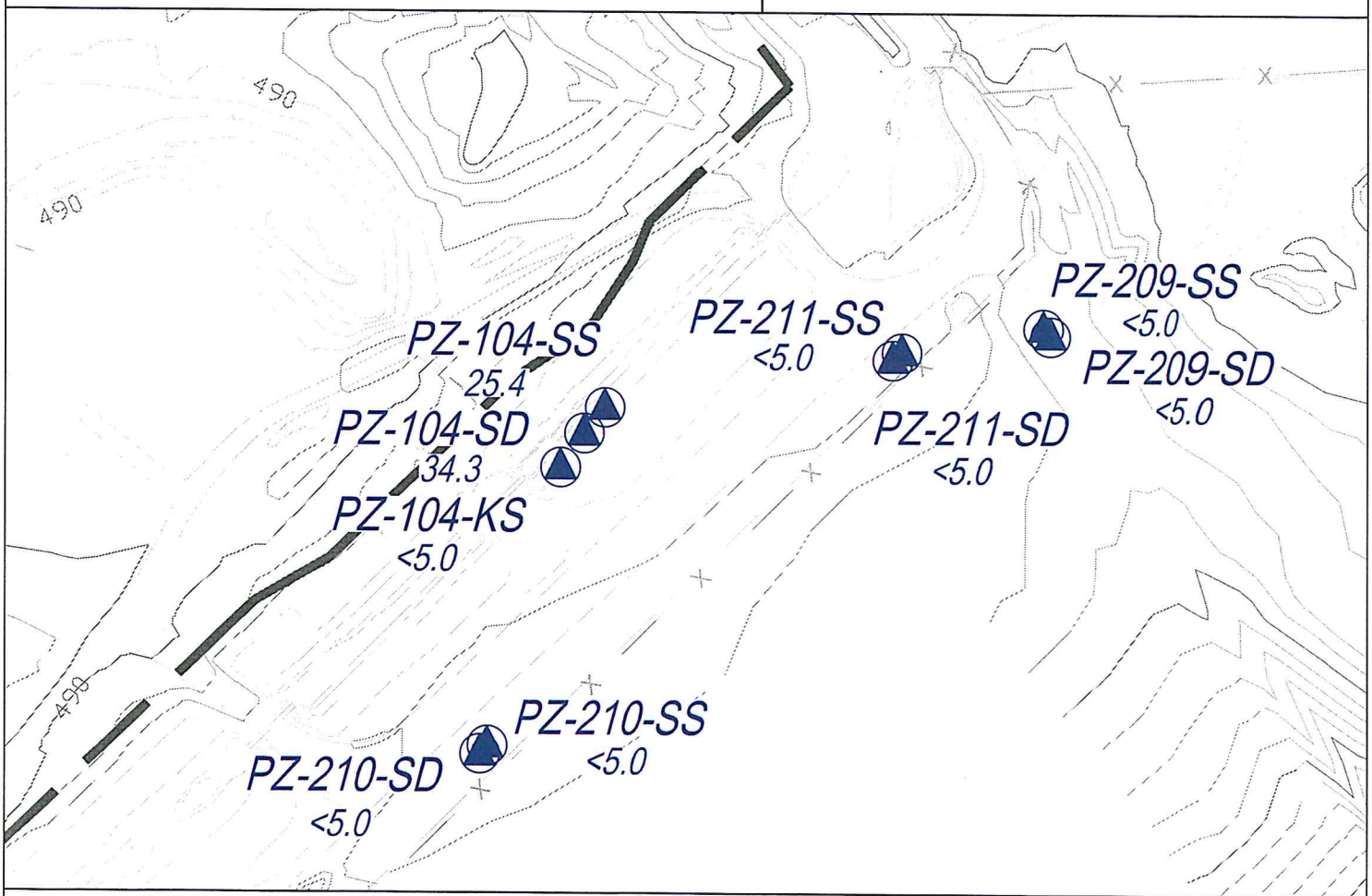



SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (1,000 ug/L)
- 34.3 TOTAL TOULENE CONCENTRATION (ug/L)




# INSERT A

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| | |
|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 TOULENE CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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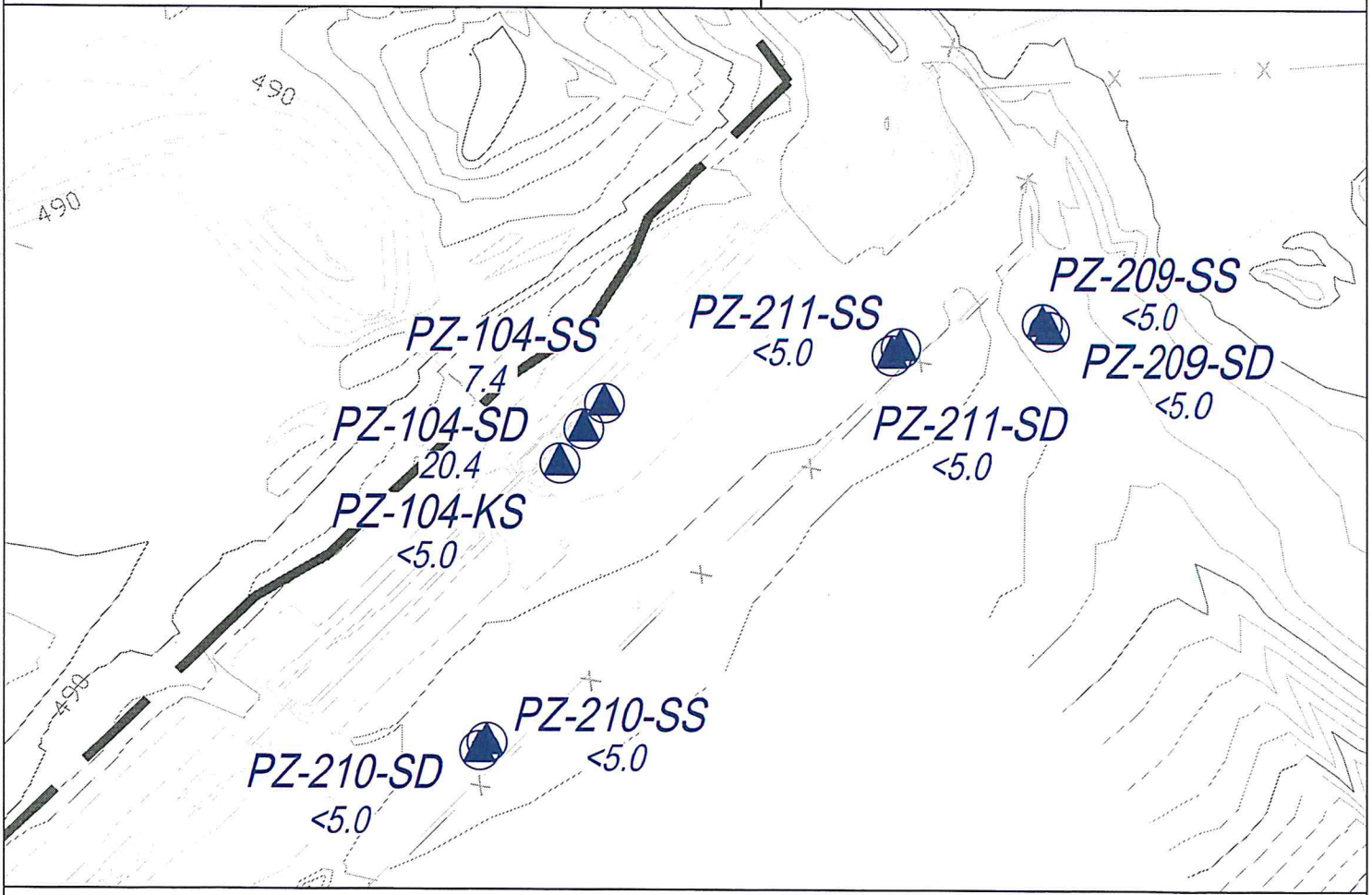
FEEZOR ENGINEERING, INC.


0 100 200 Feet

SCALE: 1"=100'

LEGEND

- SOLID WASTE BOUNDARY
- x PERIMETER FENCE
- GROUNDWATER DETECTION WELL (SAMPLED AND SPLIT WITH MDNR)
- EXCEEDS GROUNDWATER PROTECTION STANDARD (10,000 ug/L)
- 7.4 TOTAL XYLENES CONCENTRATION (ug/L)

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| | |
|---|---|
| BRIDGETON LANDFILL, LLC<br>13570 ST. CHARLES ROCK ROAD<br>BRIDGETON, MISSOURI 63044 | BRIDGETON LANDFILL<br>ANNUAL ASSESSMENT<br>REPORT |
| **2017 Q2 TOTAL XYLENES CONCENTRATIONS** | |
| PROJECT NUMBER: BT-144 \| AUGUST 2017 \| DESIGNED BY: AMR \| APPROVED BY: AW | |

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