Fall 2019
Semi-Annual Water Quality Report
Gude Landfill
Montgomery County, Maryland

Prepared for

Department of Environmental Protection
Recycling and Resource Management Division
Montgomery County, Maryland 20850

Prepared by

EA Engineering, Science, and Technology, Inc., PBC
225 Schilling Circle, Suite 400
Hunt Valley, Maryland 21031
410-584-7000

December 2019
Version: DRAFT
EA Project No. 15564.04

This page intentionally left blank

CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

µg/L	Microgram(s) per liter
ACM	Assessment of Corrective Measures
CMA	Corrective Measure Alternative
COMAR	Code of Maryland Regulations
the County	Montgomery County
DEP	Department of Environmental Protection
EA	EA Engineering, Science, and Technology, Inc., PBC
EPA	U.S. Environmental Protection Agency
GW&SWMP	Groundwater and Surface Water Monitoring Plan
the Landfill	Gude Landfill
M-NCPPC	Maryland-National Capital Park and Planning Commission
MCL	Maximum contaminant level
MDE	Maryland Department of the Environment
mg/L	Milligram(s) per liter
PCE	Tetrachloroethene
RAO	Remedial action objectives
RPD	Relative percent difference
TCE	Trichloroethene
VC	Vinyl chloride
VOC	Volatile organic compound

This page intentionally left blank

1. INTRODUCTION

1.1 INTRODUCTION

The Montgomery County (the County) Department of Environmental Protection (DEP) completed the semi-annual groundwater and surface-water sampling for Gude Landfill (the Landfill) located in Rockville, Maryland, for the Fall 2019 sampling event. This report summarizes, interprets, and statistically analyzes the analytical results for the semi-annual sampling event performed in April 2019.

In accordance with the approved Groundwater and Surface Water Monitoring Plan (GW&SWMP) (Montgomery County DEP 2009), EA Engineering, Science, and Technology, Inc., PBC (EA) has prepared the semi-annual report on water quality at the Landfill. The analytical results, historical data tables, required statistical analysis, groundwater elevations, and groundwater contour map with the most recent topography of the site are included in the report. The County recently finalized and submitted an updated GW&SWMP that addresses the transition to low-flow sampling methods and other changes made to the program.

1.2 BACKGROUND

1.2.1 Site Description

The Landfill is located at 600 East Gude Drive, Rockville, Maryland 20850. The site has road access at two locations: East Gude Drive and Southlawn Lane. A site location map is provided as **Figure 1**.

The Landfill is currently owned and maintained by the County DEP Recycling and Resource Management Division (formerly Division of Solid Waste Services). The Landfill was used for the disposal of municipal solid waste and incinerator residues from 1964 to 1982. The Landfill property encompasses approximately 162 acres, of which approximately 140 acres was used for waste disposal. An additional 17 acres of waste disposal area was delineated in 2009 on Maryland-National Capital Park and Planning Commission (M-NCPPC) property, beyond the northeastern property boundary of the Landfill. A land exchange between the County and M-NCPPC on October 21, 2014, transferred ownership of this additional waste disposal area to the County in exchange for a similar area of land without waste, which was transferred to M-NCPPC.

1.2.2 Site History

The Landfill was initially permitted by the County in 1963. The Landfill was subsequently operated and closed under several facility names and refuse disposal permits from 1964 to 1982. The facility name of the Gude-Southlawn Landfill was modified by reference to the Gude Landfill. There is no current refuse disposal permit that is applicable to the Landfill.

The Landfill was constructed and operated prior to modern solid waste management disposal and facility design and closure standards that were implemented by the U.S. Environmental Protection

Agency (EPA) under the Resource Conservation and Recovery Act. Therefore, the Landfill was not originally constructed with a geosynthetic liner or compacted clay bottom liner, a leachate collection system, a landfill gas collection system, or a stormwater management system. Reportedly, soil was used as daily cover during waste filling, and a 2-foot (minimum) final layer of soil was reportedly placed over the waste mass during closure of the Landfill (in 1982) to support the vegetative cover.

Since 1982, the County has voluntarily, or through regulatory mandates, implemented and maintained best management practices for pre-regulatory era landfills to ensure compliance with Code of Maryland Regulations (COMAR) requirements. These best management practices include soil and vegetative cover system installation, cover system maintenance, water quality and landfill gas monitoring, and stormwater infrastructure improvements. The County currently maintains an active landfill gas collection system including flares, over 100 gas extraction wells, and horizontal gas conveyance piping. A network of onsite and offsite groundwater monitoring wells; a network of onsite landfill gas monitoring wells; environmental monitoring programs for groundwater, surface water, and landfill gas; and stormwater management infrastructure are also maintained at and for the Landfill site.

Since 1984, to monitor the quality of ground and surface water, Montgomery County DEP has been collecting groundwater samples at a total of 25 monitoring sites, which include 20 observation wells and 5 stream locations. Beginning in Fall 2010, as part of a Nature and Extent Study, 16 additional monitoring wells were installed at the site. The purpose of the Nature and Extent Study, directed by the Maryland Department of the Environment (MDE) and managed by the County, was to assess and investigate the nature and extent of environmental impacts near and potentially resulting from the Landfill.

The Gude Landfill Assessment of Corrective Measures (ACM), dated April 2016 (EA 2016), included a Work Plan for the Recommended Corrective Measure Alternative (CMA) – toupee capping and additional landfill gas collection. As part of the Work Plan, a total of 9 groundwater monitoring well shallow and deep pairs (18 total groundwater monitoring wells) was proposed. In 2017, 12 of these wells were installed (MW-16A/B, MW-19A/B, MW-21A/B, MW-22A/B, MW-23A/B, MW-24A/B), per the updated GW&SWMP. MW-17A/B and MW-18A/B (along the west/northwestern property boundary) are in an area that will be impacted by the capping project; therefore, the County plans to install these well pairs during construction of the cap. Monitoring well pair MW-20A/B will not be installed due to the site conditions as acknowledged by MDE in correspondence dated October 12, 2016 (Hynson 2016). Sampling and analysis are conducted semi-annually and include laboratory analysis for volatile organic compounds (VOCs), heavy metals, field parameters (temperature, pH, and conductivity), and other water quality parameters.

The ACM, approved July 8, 2016, included a Contingency Plan for the Recommended CMA, which provided a framework for the monitoring and evaluation of the selected CMA for the Landfill to document progress toward the attainment of established remedial action objectives (RAOs) for the site and dictate criteria or "triggers" for the implementation of contingency measures, in the event the recommended CMA fails to perform as anticipated. According to the ACM, a detailed evaluation of the groundwater monitoring data will be conducted every 10 years after implementation of the selected CMA to assess progress toward meeting RAOs. The focus of the evaluation will be an assessment of changes in the concentrations of the constituents of potential concern, particularly those reported at concentrations that exceed their respective maximum contaminant levels (MCLs). The identified changes (or stable concentrations) will be evaluated in the context of the physical characteristics of local groundwater transport (groundwater velocity and direction).

As presented in the ACM, it is estimated that the timeframe to meet the RAO for groundwater at the Landfill will be approximately 30 to 40 years following toupee capping, as the water infiltration will be decreased. Following capping and the resulting decrease in leachate production, it is estimated that VOCs, which are the most widespread constituents of potential concern at the Landfill, would be degraded in approximately 30 to 40 years. For the metals exceedances that are representative of groundwater quality and likely reflect Landfill-related impacts (e.g., cadmium in well OB11), elevated concentrations are localized in nature and only slightly exceed the MCL. Therefore, it is expected that these concentrations will fall consistently below MCLs following capping and decreased leachate production.

In July 2018, it was confirmed that the caps and lids for flush-mounted wells MW-23A and MW-23B were switched. It is our understanding that this has been the case since installation. EA field staff verified the issue and corrected the situation when onsite prior to the Fall 2018 sampling event. The wells are now correctly labeled, and all data have been updated to reflect the correct designation.

Starting with the Spring 2019 sampling event, the County has contracted EA to perform the semi-annual sampling and analysis. The County is currently in the process of preparing the design for the Recommended CMA – toupee capping and additional landfill gas collection.

1.2.3 Hydrogeologic Setting

The uplands section of the Piedmont is underlain by three principal types of bedrock aquifers: crystalline-rock and undifferentiated sedimentary-rock aquifers, aquifers in early Mesozoic basins, and carbonate-rock aquifers (Trapp and Horn 1997). The Landfill is underlain by the crystalline rock aquifer that extends over approximately 86 percent of the Piedmont Plateau Physiographic Province. At the Landfill, the crystalline rock that comprises the regional aquifer is overlain by unconsolidated material consisting of interbedded silts and clays and saprolite. Recorded logs from onsite and offsite borings for the groundwater monitoring wells correlated well with these general geological descriptions.

Based on information from site boring logs and well gauging, groundwater is present in the unconsolidated material, as well as the bedrock at the Landfill site. The groundwater table is typically present in the unconsolidated material along the perimeter of the Landfill and under the Derwood Station development, at depths ranging from approximately 3 to 60 feet below ground surface. Groundwater recharge at the Landfill is variable and is primarily determined by precipitation and runoff. Topographic relief, unconsolidated material, and surface recharge variations created by the Landfill may significantly affect the groundwater flow.

Groundwater flow is highly dependent on the composition and grain size of the sediments and, therefore, water likely moves more readily in the unconsolidated material than in the underlying bedrock. Groundwater in the bedrock (typically 20–60 feet below grade) is stored in, and moves through, fractures. No documentation of the degree of fracturing or orientation of bedrock fractures at the Landfill is available.

Based on site topography, some amount of surface water infiltration likely occurs through the natural cover system (grassy surface and soil layer) of the Landfill. Some of the infiltrating water likely moves vertically into the bedrock, while a portion also moves laterally along the boundary between the unconsolidated material and the surface of the bedrock and discharges to nearby streams and surface depressions.

2. SAMPLING PROCEDURES

On behalf of the County, EA performed the semi-annual groundwater and surface-water sampling for the Landfill. Upon arrival at each well, the condition of the well and surrounding area was noted. This process checks for evidence of tampering, evidence of physical damage, well integrity, evidence of breakage or heaving of the concrete pad (if present), and evidence of surface infiltration. After the physical inspection was completed, the static water levels were determined for all wells prior to initiation of any purging and sampling activities using an electronic water level indicator.

Prior to sample acquisition, wells were purged to ensure that the sample collection was as representative as possible of that in the aquifer. Low-flow purging and sampling methods (less than 0.5 liter per minute) were performed and achieved for the Fall 2019 sampling event at all monitoring well locations.

Temperature, pH, specific conductivity, dissolved oxygen, oxidation-reduction potential, and turbidity were measured in the field during groundwater purging, unless noted otherwise. These determinations were made using a YSI meter. All instrumentation was calibrated prior to transport to the field and recalibrated during the event daily.

During purging of the wells, water quality parameters as well as purge rate and depth to water were monitored and recorded every 5 minutes. Purging of the standing water was considered complete when three consecutive readings of the water quality indicator parameters agreed within approximately 10 percent. The water quality parameters of temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential reached stabilization prior to sampling. Due to the characteristics of some of the wells, stabilization and the turbidity goal of below 10 nephelometric turbidity units were not achieved prior to sampling.

After sampling parameters had stabilized to within 10 percent of each other, sample containers were filled by allowing the pump discharge to flow gently down the inside of the containers with as little agitation or aeration as possible. The first sample aliquot was used to fill the volatile organics parameter vials and was collected in a manner that minimized aeration and kept the glass containers free of bubbles and headspace. Containers that contained preservative were not filled to overflowing and were thoroughly mixed after filling by upending. Each pre-labeled container was placed in a cooler containing ice and a sample entry was made on the chain-of-custody form.

In addition, surface water samples were collected from five locations near the perimeter of the Landfill (ST015, ST065, ST70, ST80, and ST120). Surface water was collected using a clean, non-preservative bottle, which was rinsed several times with the surface water from the sampling location and then transferred into the proper sample container. Water quality parameters (temperature, pH, specific conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity) were measured in the field and recorded.

Information regarding low-flow well purging was recorded on field data sheets, which are presented in **Appendix A**. The chain-of-custody documents are provided in **Appendix B**.

Groundwater elevations are presented in **Table 1**. Results of field-measured parameters, along with laboratory results, are shown in **Table 2**.

3. SUMMARY OF GROUNDWATER AND SURFACE WATER RESULTS

During the Fall 2019 semi-annual sampling event (July 29 –August 9, 2019), EA sampled 51 groundwater monitoring wells and 5 surface water locations at the Landfill. This sampling event completes the second of two semi-annual monitoring events at the Landfill for the 2019 calendar year monitoring period in accordance with the revised GW&SWMP (December 2019).

During the Fall 2019 sampling event, groundwater monitoring well samples were analyzed by Maryland Spectral Services Laboratory located in Baltimore, Maryland. The laboratory utilized the following methods for analyses:

- Inorganics (total metals) (EPA 3010A/6020A)
- Mercury (EPA 3010A/6020A)
- Ammonia (EPA 350.1)
- Chloride (EPA 300.0)
- Nitrate (EPA 300.0)
- VOCs (EPA 8260B)
- Chemical oxygen demand (EPA 410.4)
- Sulfate (EPA 300.0)
- Alkalinity (SM 2320B)
- Total hardness (SM 2340B/C)
- Total dissolved solids (SM 2540C)
- Total suspended solids (USGS I-3765-85).

The laboratory reports are provided in **Appendix C**.

The monitoring program is designed to evaluate how the Landfill is affecting the groundwater quality. This section discusses groundwater quality for VOCs, total metals, and physical and general parameters. The analytical methods and parameters utilized during this event are in compliance with 40 Code of Federal Regulations, Part 258, *Criteria for Municipal Solid Waste Landfills*, and the GW&SWMP. Samples are analyzed semi-annually. All analytical results below practical quantitation limits that were reported are identified with a “J” qualifier; non-detect analytical results are identified with a “U” qualifier.

3.1 GROUNDWATER FLOW

Based on the data collected from new and existing groundwater monitoring wells, the groundwater flow direction was inferred. The data indicated that groundwater flows in an easterly flow direction across the Landfill site, with minor northerly, northeasterly, and southeasterly flow components. Surface water elevations measured in 2011, as part of the Nature and Extent Study, from temporary stream gauges were consistent with groundwater table elevations from adjacent groundwater monitoring wells and locations, indicating a hydraulic connection between groundwater and surface water. In September 2015, temporary piezometers were installed through the waste mass, allowing for additional groundwater table elevation data to be collected. Groundwater elevation data collected were utilized to prepare a groundwater contour map for the Fall 2019 sampling event. The inferred groundwater flow contours have been overlain on the site topographic map and are presented on **Figure 2**. Groundwater elevations for Fall 2019 are presented in **Table 1**. It is important to note that the groundwater elevations for two wells, MW-2A and MW-2B have shown mounding since Spring 2019. Potential for surface infiltration or other potential factors which may have impacted the elevation data for these wells will be investigated during future sampling events.

3.2 ANALYTICAL RESULTS

3.2.1 Quality Control Samples

During the Fall 2019 sampling event, three field duplicate samples were collected at monitoring wells OB-01 (duplicate OB30), MW-24B (duplicate OB40), and OB11 (duplicate OB50) and analyzed for general water quality parameters, total metals, and VOCs.

The relative percent differences (RPDs) between sampling locations and corresponding duplicates were evaluated for the Fall 2019 sampling event to obtain an estimate of laboratory method precision. As shown in **Table 3**, only three VOCs were detected with RPDs greater than 20 percent between the duplicates and corresponding samples, which is indicated by the gray shading. As shown in **Table 4**, the RPD for some inorganic parameters was greater than 20 percent. The RPD exceedances with the laboratory are likely related to the sample aliquots for the inorganic parameters.

3.2.2 Volatile Organic Compounds

EA performed semi-annual sampling, which included groundwater and surface water. A complete summary of Fall 2019 analytical results is provided in **Table 2**.

Sixteen monitoring wells had MCL exceedances for one or more parameters. Historical MCL exceedance graphs and historical analytical data tables are presented in **Appendix D** and **Appendix E**, respectively. Monitoring wells MW-11B and MW-21A had first time MCL exceedances. MDE was notified of the first time MCL exceedances on October 10, 2019. This was the twentieth and fifth sampling events for these wells, respectively. Since these exceedances are likely representative of groundwater, the County chose not to perform verification re-sampling for these exceedances.

The MCL exceedances are summarized in **Table 5**. There were no VOC detections in the surface water monitoring locations (ST015, ST065, ST70, ST80, and ST120). The following is a summary of the MCL exceedances based on well locations:

- ***Northwest*****—**Groundwater along the Northwest portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-8, MW-11A, MW-11B, MW-12, MW-13A, MW-13B, MW-16A, MW-16B, OB03, OB03A, OB04, OB04A, and OB105) has historically been impacted by VOCs. During this sampling event, MW-11B, MW-13A, MW-13B, OB03, and OB03A had MCL exceedances. MW-11B had a first time MCL exceedance for tetrachloroethene (PCE). PCE was detected above the MCL (5 micrograms per liter [µg/L]) in MW-11B (6.6 µg/L), MW-13A (8.4 µg/L) and MW-13B (9.9 µg/L); trichloroethene (TCE) was detected above the MCL (5 µg/L) in MW-13A (14.1 µg/L) and MW-13B (11.0 µg/L); and vinyl chloride (VC) was detected above the MCL (2 µg/L) in five wells: MW-13A (3.9 µg/L), MW-13B (5.6 µg/L), OB03 (8.7 µg/L), OB03A (6.9 µg/L), and OB04A (2.1 µg/L). These exceedances are consistent with past events.

- ***West***—Groundwater along the West portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-6, MW-7, MW-9, MW-10, MW-14A, MW-14B, MW-15, MW-19A, MW-19B, OB01, OB02, and OB02A) has historically been impacted by VOCs at lower concentrations than the Northwest portion of the Landfill. During this sampling event, only MW-7 had an MCL exceedance for VC. VC was detected at a concentration of 2.4 µg/L, which is above the MCL of 2 µg/L. VC has been detected during recent sampling events just below the MCL.

- ***Southwest*—**Groundwater along the Southwest portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-21A, MW-21B, OB015, and OB12) has historically been impacted by VOCs at concentrations lower than the Northwest portion of the Landfill, but higher than in the West portion. During this sampling event, wells MW-21A, MW-21B, and OB12 had MCL exceedances in this area of the Landfill. MW-21A had first time MCL exceedances for PCE and VC. PCE was detected above the MCL (5 µg/L) in wells MW-21A (5.4 µg/L) and OB12 (16.2 µg/L); TCE was detected above the MCL (5 µg/L) in wells MW-21A (11.3 µg/L), MW-21B (6.4 µg/L), and OB12 (16.0 µg/L); VC was detected above the MCL (2 µg/L) in MW-21A (2.3 µg/L) and OB12 (6.2 µg/L); and 1,2-dicholoropropane was detected above the MCL (5 µg/L) only in OB12 (9.7 µg/L). These exceedances are consistent with past events.

- ***South*—**Groundwater along the South portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-22A, MW-22B, MW-23A, MW-23B, OB11, OB11A, and OB025) has historically been impacted by VOCs at concentrations of a magnitude similar to those reported in the Northwest portion of the Landfill. During this sampling event, only wells OB11, OB11A, and OB025 had MCL exceedances in this area of the Landfill. *Cis*-1,2-dichloroethene was detected above the MCL (70 µg/L) in OB11 (70.4 µg/L) and OB11A (97.3 µg/L); methylene chloride was detected above the MCL (5 µg/L) in OB11A (5.6 µg/L); PCE was detected above the MCL (5 µg/L) in OB11A (10.4 µg/L); TCE was detected above the MCL (5 µg/L) in OB11 (9.6 µg/L) and OB11A (12.1 µg/L); and VC was detected above the MCL (2 µg/L) in OB11 (17.5 µg/L), OB11A (15.0 µg/L), and OB025 (3.5 µg/L). These exceedances are consistent with past events.

- ***Southeast*—**Groundwater along the Southeast portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-3A, MW-3B, MW-4, MW-24A, MW-24B, OB08, OB08A, and OB10) has historically been impacted by VOCs at relatively low concentrations. During this sampling event, wells MW-24A, MW-24B, and OB10 had MCL exceedances in this area of the Landfill. Benzene was detected above the MCL

(5 µg/L) in MW-24B (5.3 µg/L); TCE was detected above the MCL (5 µg/L) in OB10 (6.0 µg/L); and VC was detected above the MCL (2 µg/L) in MW-24A (11.1 µg/L) and OB10 (28.1 µg/L). These exceedances are consistent with past events.

- ***Northeast*—**Groundwater along the Northeast portion of the Landfill boundary (in the vicinity of groundwater monitoring wells MW-1B, MW-2A, MW-2B, OB06, OB07, OB07A, and OB102) has historically had limited VOC detections. No MCL exceedances for VOCs were detected during this sampling event.

3.2.3 Inorganics

In Spring 2015, based on recommendations by MDE, the method of collecting samples changed from the three well volume purge method to the low-flow/low-stress method. The primary reason for this change in collection was to reduce the sample turbidity level, as turbidity could potentially interfere with the accuracy of metal analyses.

Two groundwater monitoring wells had MCL exceedances in the Southern (OB11) and Southeastern (MW-24B) portions of the Landfill. A summary of the metals MCL exceedances is shown in **Table 6**. Total cadmium was detected above the MCL (0.005 milligrams per liter [mg/L]) in OB11 (0.0118 mg/L). Total mercury was detected above the MCL (0.002 mg/L) in OB11 (0.00273 mg/L). Total arsenic was detected above the MCL (0.01 mg/L) in MW-24B (0.0309 mg/L). All the exceedances are consistent with historical data.

All five surface monitoring locations had detections for barium, calcium, iron, magnesium, manganese, nickel, potassium, and sodium, but had no MCL exceedances. Chromium and copper were detected below the MCL only in ST70; zinc was detected below the MCL in ST015 and ST70. All the detections are consistent with the historical data.

3.2.4 General Water Quality Parameters

None of the measured general water quality parameters had MCL exceedances. This is generally consistent with historical data. Nitrate is the only indicator parameter to have had past MCL exceedances, in MW-8. However, MW-8 has not had a nitrate MCL exceedance for the past nine sampling events.

The five surface water monitoring wells (ST015, ST065, ST70, ST80, and ST120) did not have any MCL exceedances for any of the general water quality parameters.

3.2.5 Methane

EA also measured the headspace within the groundwater monitoring well casings for methane. Historical methane concentrations recorded within the wells are presented in **Table 7**. Methane was not detected in any of the monitoring wells during this sampling event.

4. STATISTICAL ANALYSIS

EA performed statistical analysis for Gude Landfill groundwater monitoring data for the Fall 2019 sampling event. Statistical analysis was performed for wells within the Landfill groundwater monitoring network using data collected from 2001 through August 2019, when available.

Groundwater monitoring wells OB01, OB02, OB02A, OB03, OB03A, OB04, OB04A, OB06, OB07, OB07A, OB08, OB08A, OB10, OB11, OB11A, OB12, OB015, OB025, OB102, and OB105 were installed between 1984 and 1988. The statistical trend analysis for these wells used monitoring data since 2001. Groundwater monitoring wells MW-1B, MW-2A, MW-2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A, and MW-13B were installed in 2010 and first sampled in July 2010. Twelve additional groundwater monitoring wells (MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, MW-23B, MW-24A, and MW-24B) were installed in 2017. All available data were used in the statistical analysis for these wells.

Groundwater monitoring wells MW-14A, MW-14B, and MW-15 were installed in 2011 and only sampled three times, in September 2011, April 2019 and August 2019.

Low-flow groundwater sampling methods were employed beginning with the Spring 2015 event and will continue to be utilized by the County during future monitoring events. Previously, three volume well purge methods, which use higher flow rates, had been used. Higher flow rates can be associated with higher turbidity and can impact concentrations of constituents in groundwater samples. As a result, this change in methodologies may require further evaluation to exclude the historical data prior to employing the low-flow sampling method and potential modification of the statistical methods used as part of the semi-annual groundwater evaluation.

Because there is insufficient offsite/background well data to conduct interwell statistical comparisons, intrawell Mann-Kendall trend tests were performed consistent with the EPA Unified Guidance (EPA 2009). If interwell analysis is required in the future, additional background data will need to have been collected from an offsite/background well (i.e., MW-14A/B).

4.1 METHODOLOGY

Gude Landfill ceased accepting waste in 1982 and is, therefore, only governed by the State of Maryland under COMAR and as directed by MDE. Since 1982, the County has voluntarily, or through regulatory mandates, implemented and maintained best management practices for pre-regulatory era landfills to ensure compliance with COMAR requirements, including routine monitoring of groundwater and surface water. Part of routine water monitoring includes statistical analysis of groundwater data.

The Mann-Kendall test for monotonic trend (Gilbert 1987) was used to identify constituents with concentrations that display an increasing or decreasing trend over time. The basic principle of the Mann-Kendall test is to examine the sign of pairwise differences of observed values. The test does not have distributional assumptions (i.e., it does not require the data to be normally distributed or follow any other distribution) and the test also can handle non-detects and irregular sampling intervals. The data are ordered by sampling date for each well/parameter pair, and each concentration is compared to previous/historical concentrations. The test statistics are calculated based on the number of increases and decreases from one sampling event to another. The significance probability of an increasing or decreasing trend is then calculated from the test statistic and the number of sampling events for each well/parameter pair. Reported concentrations less than the laboratory detection limit were treated as 0. Exact two-sided probabilities for the null distribution of the Mann-Kendall test were obtained from Hollander and Wolfe (1973). The null hypothesis of no trend was evaluated against the two-sided alternative hypothesis. Rejection of the null hypothesis at the 95 percent significance level (i.e., two-sided $p < 0.05$) led to the conclusion that the monitoring data contain a statistically significant trend. Statistically significant trends were characterized as increasing ($S > 0$) or decreasing ($S < 0$).

The statistical test does not evaluate the magnitude of the increase or decrease associated with the results of the analysis.

A trend analysis was performed for each chemical constituent at every monitoring well if:

1. The monitoring well had been sampled on at least four independent time periods
2. At least 4 sample results for a constituent exceeded the analytical laboratory detection limit.

4.2 GROUNDWATER TREND RESULTS

Trend analysis results for VOCs, metals, and general indicator parameters in groundwater are discussed in this section. **Table 8** identifies parameters with statistically increasing trends and **Table 9** identifies parameters with statistically decreasing trends.

4.2.1 Volatile Organic Compounds

Thirteen VOCs were identified as having increasing statistical trends, and 17 of the groundwater monitoring wells had one or more VOCs with increasing statistical trends (**Table 8**). Fifteen VOCs were identified as having decreasing trends, and 18 of the groundwater monitoring wells had one or more VOCs with decreasing statistical trends (**Table 9**).

Twelve VOCs (1,1-dichloroethane, 1,2-dichloroethane, 1,1-dichloropropane, 1,4-dichloro-benzene, benzene, chlorobenzene, *cis*-1,2-dichhloroethene, methylene chloride, PCE, *trans*-1,2-dichloroethene, TCE, and VC) had both decreasing and increasing trends. One VOC had only increasing trends: 1,2-dichlorobenzene (OB03, OB11, and OB11A). Three VOCs had only decreasing trends: chloroethane (OB03 and OB03A), dichlorodifluoromethane (MW-13A, MW-13B, OB03, OB03A, OB04A, OB10, OB11, and OB11A), and trichlorofluoromethane (OB11A).

The following is a summary of the trends based on well locations.

Northwest**—**This area represents groundwater along the Northwest portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB03, OB03A, OB04, OB04A, OB105, MW-8, MW-11A, MW-11B, MW-12, MW-13A, MW-13B, MW-16A, and MW-16B.

- MW-8, MW-11A, MW-12, MW-16A, and MW-16B had no statistically significant increasing or decreasing VOC trends this event.

- MW-13A and MW-13B had no statistically significant increasing VOC trends this event.

- OB04, OB105, and MW-11B had no statistically significant decreasing VOC trends this event.

- Statistically significant increasing VOC trends were observed for OB03 (2 parameters), OB03A (1 parameter), OB04 (4 parameters), OB04A (5 parameters), OB105 (2 parameters), and MW-11B (3 parameters).

- Statistically significant decreasing VOC trends were observed for OB03 (9 parameters), OB03A (7 parameters), OB04A (2 parameters), MW-13A (9 parameters), and MW-13B (12 parameters).

West**—**This area represents groundwater along the West portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB01, OB02, OB02A, MW-6, MW-7, MW-9, MW-10, MW-14A, MW-14B, MW-15, MW-19A, and MW-19B.

- MW-9, MW-10, MW-19A, and MW-19B had no statistically significant increasing or decreasing VOC trends this event.

- OB01, OB02, OB02A, and MW-6 had no statistically significant increasing VOC trends this event.

- MW-7 had no statistically significant decreasing VOC trends this event.

- Statistically significant increasing VOC trends were observed only for MW-7 (3 parameters).

- Statistically significant decreasing VOC trends were observed for OB01 (4 parameters), OB02 (1 parameter), OB02A (2 parameters), and MW-6 (2 parameters).

- MW-14A, MW-14B, and MW-15 were installed in 2017 and this is the third sampling event; therefore, there was not sufficient data for statistical trend analysis.

Southwest**—**This area represents groundwater along the Southwest portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB015, OB12, MW-21A, and MW-21B.

- MW-21A and MW-21B had no statistically significant increasing or decreasing VOC trends this event.
- OB015 had no statistically significant increasing VOC trends this event.
- OB12 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB12 (8 parameters).
- Statistically significant decreasing VOC trends were observed for OB015 (1 parameter).

South**—**This area represents groundwater along the South portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB11, OB11A, OB025, MW-22A, MW-22B, MW-23A, and MW-23B.

- MW-22A, MW-22B, MW-23A and MW-23B had no statistically significant increasing or decreasing VOC trends this event.
- OB025 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB11 (2 parameters), OB11A (3 parameters), and OB025 (1 parameter).
- Statistically significant decreasing VOC trends were observed for OB011 (3 parameters) and OB11A (8 parameters).

Southeast**—**This area represents groundwater along the Southeast portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB08, OB08A, OB10, MW-3A, MW-3B, MW-4, MW-24A, and MW-24B.

- MW-3A, MW-3B, MW-4, MW-24A, and MW-24B had no statistically significant increasing or decreasing VOC trends this event.
- OB08 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB08 (4 parameters), OB08A (2 parameters), and OB10 (5 parameters).
- Statistically significant decreasing VOC trends were observed for OB08A (1 parameter) and OB10 (2 parameters).

Northeast**—**This area represents groundwater along the Northeast portion of the Landfill boundary in the vicinity of groundwater monitoring wells OB06, OB07, OB07A, OB102, MW-1B, MW-2A, and MW-2B.

- MW-1B had no statistically significant increasing or decreasing VOC trends this event.
- OB07A, MW-2A, and MW-2B had no statistically significant increasing VOC trends this event.
- OB07 and OB102 had no statistically significant decreasing VOC trends this event.
- Statistically significant increasing VOC trends were observed for OB06 (1 parameter), OB07 (1 parameter), and OB102 (1 parameter).
- Statistically significant decreasing VOC trends were observed for OB06 (1 parameter) and OB07A (1 parameter), MW-2A (1 parameter) and MW-2B (1 parameter).

4.2.2 Metals

Fourteen metals (total) were identified as having increasing statistical trends, and 25 of the groundwater monitoring wells had one or more metals with increasing statistical trends (**Table 8**). Sixteen metals (total) were identified as having decreasing statistical trends, and 32 of the groundwater monitoring wells had one or more metals with decreasing statistical trends (**Table 9**). The trend analysis does not indicate an overall trend of improvement or degradation in the groundwater quality with respect to metals concentrations. Beginning with the Spring 2015 sampling event, low-flow groundwater sampling methods were employed due to issues with high metal concentrations potentially related to high turbidity. Future data will be assessed to determine whether the reported concentrations of metals in samples collected using low-flow sampling methods, once the low-flow method is performed accurately at all well locations, are consistently lower than the concentrations reported using the old methodology. If such a difference is observed, the changed sampling methodology could result in artificial decreasing trends in total metals, which do not reflect changes in groundwater chemistry. If needed, the statistical methods used as part of the semi-annual groundwater evaluation could be modified to address such artificial trends. In order to conduct meaningful comparisons, it is recommended that a minimum of 4 years of low-flow sampling (eight events) be collected before conducting hypothesis testing to compare the low-flow methodology to those obtained using three well volume purge methods. Since there was some variability in the low-flow methodology prior to 2019, this assessment will be performed in 2023.

4.2.3 General Indicator Parameters

Thirty-one groundwater monitoring well locations were determined to have statistically increasing trends for one or more general indicator parameters (**Table 8**), and 34 groundwater monitoring well locations were determined to have statistically decreasing trends for general indicator parameters (**Table 9**).

This page intentionally left blank

5. CONCLUSIONS

This report summarizes the groundwater data obtained from the Fall 2019 semi-annual sampling event and historical data dating back to 2001. All historical data have been evaluated and statistical testing and analysis were performed as described in Section 4. The groundwater and surface water results are consistent with historical data and trends.

Semi-annual monitoring will continue with the Spring 2020 event in accordance with the updated GW&SWMP.

This page intentionally left blank

6. REFERENCES

EA Engineering, Science, and Technology, Inc., PBC (EA). 2016. *Gude Landfill Assessment of Corrective Measures Montgomery County, Maryland*. April.

Gilbert, R.O. 1987. *Statistical Methods for Environmental Pollution Monitoring*. Van Nostrand Reinhold, New York.

Hollander, M. and D.A. Wolfe. 1973. *Nonparametric Statistical Methods*. Wiley, New York.

Hynson, M. 2016. Maryland Department of the Environment. Letter from Martha Hynson, Chief, Solid Waste Operations Division, to Rao Malladi, Department of Environmental Protection. October 12.

Montgomery County Department of Environmental Protection (DEP). 2009. *Groundwater and Surface Water Monitoring Plan.* March.

Trapp, H., Jr. and M.A. Horn. 1997. *Hydrologic Atlas 730-L.* U.S. Geological Survey.

U.S. Environmental Protection Agency (USEPA). 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance*. EPA 530/R-09-007. Office of Resource Conservation and Recovery, Washington D.C. March.

This page intentionally left blank

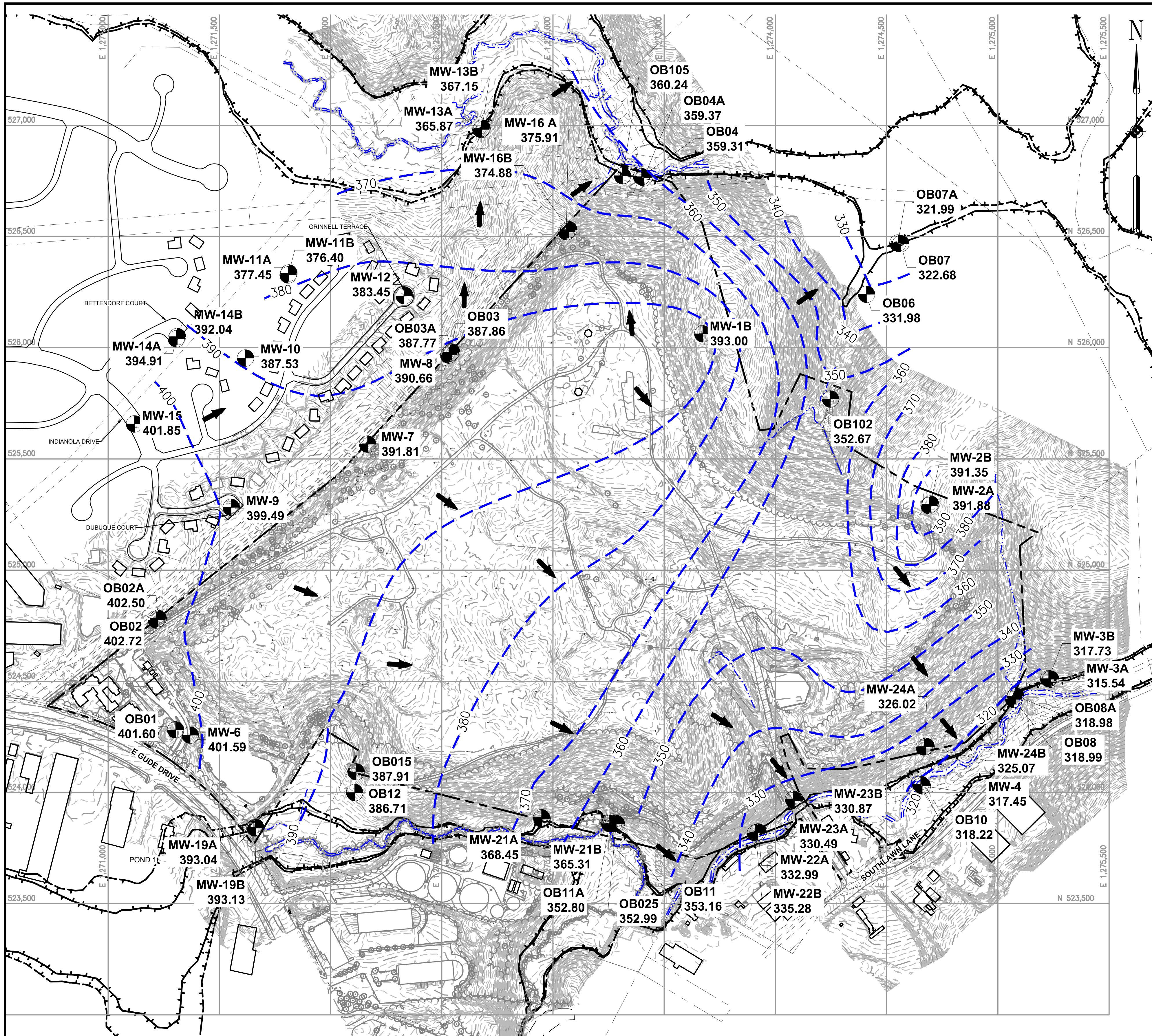
Figures

This page intentionally left blank

Gude Landfill
Montgomery County, Maryland

Figure 1.
Groundwater and Surface Water Monitoring Locations
May 2017

This page intentionally left blank



FILE PATH: Q:\PROJECTS\1564601 - GUDE LF DESIGN\CAD\PRODUCTION\FIGURES\GROUNDWATER CONTOUR MAPS\FALL 2019\FIG 2 - AUGUST 2019.DWG [4-1 (11X17)] 12/20/16

NOTES:

1. TOPOGRAPHY COMPILED BY WALLACE MONTGOMERY. USING PHOTOGRAMMETRIC METHODS WITH PHOTOGRAPHY DATED MAY 2018 AND SUPPLEMENTED WITH FIELD SURVEY PERFORMED BY WALLACE MONTGOMERY.
2. SURVEY OF STREAMS TAKEN FROM MAY 2018 PHOTOGRAMMETRY BY WALLACE MONTGOMERY.
3. HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983/91 (NAD-83/91). COORDINATE SYSTEM IS MARYLAND STATE PLANE, U.S. SURVEY FEET. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD-88) WITH ELEVATIONS SHOWN IN FEET.
4. FIELD SURVEY OF MW-14A, MW-14B, & MW-15, TEMPORARY GROUNDWATER MONITORING LOCATIONS, AND STREAM GAUGE LOCATIONS PERFORMED BY C.C. JOHNSON & MALHOTRA, P.C., AUGUST 2011.
5. THE PROPERTY BOUNDARY SHOWN REFLECTS A LAND EXCHANGE BETWEEN MONTGOMERY COUNTY AND M-NCPPC WHICH OCCURRED ON 21 OCTOBER 2014.

LEGEND

- 10-FT ELEVATION CONTOUR
- 2-FT ELEVATION CONTOUR
- PROPERTY BOUNDARY
- STREAM
- 320 — GROUNDWATER CONTOUR INTERVAL (10 FEET)
- MW-1B 393.00 — EXISTING GROUNDWATER MONITORING WELL GROUNDWATER ELEVATION (FT. MSL)
- INFERRED GROUNDWATER FLOW

0 250 500 1000

GRAPHIC SCALE IN FEET

EA Engineering, Science, and Technology, Inc., PBC Hunt Valley Center 225 Schilling Circle, Suite 400 Hunt Valley, Maryland 21031 (410) 584-7000	PROJECT NUMBER: 15646.01	DESIGNED BY: PL/LJO	DRAWN BY: CAG	FIGURE: 2	GUDE LANDFILL SEMI-ANNUAL REPORT GROUNDWATER AND SURFACE WATER MONTGOMERY COUNTY, MARYLAND	FIGURE 2 GROUNDWATER CONTOUR MAP AUGUST 2019
	DATE: DECEMBER 2019	CHECKED BY: PL/LJO	PROJECT MGR.: LJO	SHEET NUMBER: -		

This page intentionally left blank

Tables

This page intentionally left blank

Table 1
Groundwater Elevation Data (feet above mean sea level)

Monitoring Well	Well Top of Casing Elevation	Water Elevation											Fall 2019 Depth to Water
		F2014	S2015	F2015	S2016	F2016	S2017	F2017	S2018	F2018	S2019	F2019	
OB01	415.90	400.82	402.59	399.40	401.84	399.96	399.10	399.95	400.66	402.00	402.99	401.60	14.30
OB02	418.72	401.91	404.14	400.31	403.28	400.73	399.79	400.42	401.67	404.27	405.72	402.72	16.00
OB02A	418.70	401.95	404.52	400.22	403.45	400.65	399.76	400.32	401.51	404.29	405.70	402.50	16.20
OB03	409.86	386.24	389.42	384.25	386.18	383.14	380.56	379.99	381.86	388.65	392.61	387.86	22.00
OB03A	410.07	386.23	388.46	384.24	386.17	383.08	380.61	380.06	381.94	388.81	392.82	387.77	22.30
OB04	364.21	359.37	359.95	358.57	359.42	358.41	358.65	358.27	358.71	358.83	361.01	359.31	4.90
OB04A	365.37	359.94	360.63	359.19	360.06	359.06	359.21	358.73	359.19	359.46	361.35	359.37	6.00
OB06	339.78	330.94	332.99	328.63	330.59	328.40	328.81	324.06	329.21	329.60	334.58	331.98	7.80
OB07	329.38	322.70	324.22	319.60	322.50	319.66	320.50	318.44	320.97	321.23	325.88	322.68	6.70
OB07A	328.44	321.97	323.50	319.00	321.96	319.20	320.18	318.19	320.67	320.73	325.03	321.99	6.45
OB08	324.99	319.06	319.23	318.00	318.40	317.51	317.23	316.69	316.88	316.79	320.24	318.99	6.00
OB08A	325.28	318.73	318.91	317.65	318.04	317.19	316.89	316.46	316.65	316.55	319.88	318.98	6.30
OB10	325.77	318.68	319.18	318.27	318.85	318.29	318.50	318.38	318.45	319.06	319.28	318.22	7.55
OB11	362.56	352.51	352.86	350.96	351.45	353.29	352.34	352.11	352.74	352.89	354.15	353.16	9.40
OB11A	361.90	360.32	361.13	359.66	360.39	354.02	352.40	352.18	352.82	352.77	353.55	352.80	9.10
OB12	405.01	353.58	354.71	352.79	353.91	343.36	386.78	385.77	387.47	387.80	389.81	386.71	18.30
OB015	410.01	352.99	353.91	352.44	353.42	338.52	387.55	386.20	388.64	388.86	392.36	387.91	22.10
OB025	361.89	386.75	389.49	385.26	388.54	395.39	352.21	351.87	352.96	352.71	354.34	352.99	8.90
OB102	363.17	387.69	391.47	386.07	390.45	397.19	349.71	348.57	349.17	350.29	353.86	352.67	10.50
OB105	363.24	352.94	354.67	352.10	354.17	357.97	359.64	359.07	359.69	360.70	361.26	360.24	3.00
MW1B	434.00	391.76	387.14	387.58	383.79	383.44	381.07	378.78	376.73	380.47	397.70	393.00	41.00
MW2A	445.53	388.79	378.42	381.99	374.97	375.27	371.55	368.49	367.57	367.64	399.63	391.88	53.65
MW2B	444.45	388.74	378.42	382.01	374.59	375.40	371.18	367.40	364.37	365.32	399.65	391.35	53.10
MW3A	324.54	317.61	316.13	314.89	315.45	314.59	314.69	314.13	314.43	314.22	315.54	315.54	9.00
MW3B	324.73	316.15	318.24	315.28	317.07	316.30	315.56	314.33	315.11	314.95	319.71	317.73	7.00
MW04	324.75	318.17	318.59	317.93	318.35	317.77	318.00	317.93	317.98	318.52	318.35	317.45	7.30
MW06	417.29	401.58	403.40	400.31	402.76	400.77	399.84	400.67	401.42	402.73	403.49	401.59	15.70
MW07	433.81	389.88	391.09	387.91	388.37	386.13	383.42	382.90	383.93	388.15	394.91	391.81	42.00
MW08	412.66	389.40	394.17	387.40	389.92	386.31	383.59	382.99	385.29	394.40	396.16	390.66	22.00
MW09	417.69	399.12	400.95	397.09	400.05	397.19	396.30	395.78	397.55	399.28	403.44	399.49	18.20
MW10	394.03	379.96	390.48	383.56	387.30	383.45	383.15	380.53	384.52	387.34	391.43	387.53	6.50
MW11A	393.45	376.37	381.79	374.79	379.66	374.86	375.22	374.24	377.27	378.29	379.18	377.45	16.00
MW11B	393.40	376.06	378.93	374.22	377.68	374.43	375.26	374.20	376.03	377.44	382.10	376.40	17.00
MW12	397.55	390.12	384.58	380.85	383.77	380.33	379.40	378.51	380.79	384.05	389.34	383.45	14.10
MW13A	373.37	364.93	368.00	365.60	367.52	366.02	366.72	366.15	367.04	367.31	366.37	365.87	7.50
MW13B	373.35	367.77	368.72	366.49	368.24	366.87	367.41	366.85	367.66	368.11	368.53	367.15	6.20
MW-14A*	412.31	--	--	--	--	--	--	--	--	--	398.91	394.91	17.40
MW-14B*	412.34	--	--	--	--	--	--	--	--	--	397.24	392.04	20.30
MW-15*	414.45	--	--	--	--	--	--	--	--	--	405.25	401.85	12.60
MW-16A	420.11	--	--	--	--	--	--	371.14	370.79	373.44	378.55	375.91	44.20
MW-16B	418.68	--	--	--	--	--	--	370.54	370.29	372.79	376.88	374.88	43.80
MW-19A	397.54	--	--	--	--	--	--	392.50	393.33	394.22	393.29	393.04	4.50
MW-19B	397.33	--	--	--	--	--	--	392.51	393.32	394.25	393.71	393.13	4.20
MW-21A	372.45	--	--	--	--	--	--	362.89	364.67	365.61	367.10	368.45	4.00
MW-21B	371.61	--	--	--	--	--	--	363.24	364.73	365.57	367.01	365.31	6.30
MW-22A	338.79	--	--	--	--	--	--	332.91	332.61	332.84	333.58	332.99	5.80
MW-22B	339.58	--	--	--	--	--	--	334.38	334.75	335.16	334.54	335.28	4.30
MW-23A	354.89	--	--	--	--	--	--	329.35	329.68	329.81	331.27	330.49	24.40
MW-23B	354.47	--	--	--	--	--	--	330.66	328.73	329.61	331.22	330.87	23.60
MW-24A	355.02	--	--	--	--	--	--	323.78	323.67	323.99	328.02	326.02	29.00
MW-24B	354.17	--	--	--	--	--	--	323.41	323.18	323.54	326.17	325.07	29.10

* Monitoring wells MW-14A, MW-14B, and MW-15 were gauged during Spring 2019 event for the first time since installation in 2011.

NOTES: F=Fall; S= Spring

This page intentionally left blank

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-1B 8/9/2019 Sampling Results	MW-2A 8/5/2019 Sampling Results	MW-2B 8/5/2019 Sampling Results	MW-3A 7/31/2019 Sampling Results	MW-3B 7/31/2019 Sampling Results	MW-4 7/30/2019 Sampling Results	MW-6 8/1/2019 Sampling Results	MW-7 8/5/2019 Sampling Results	MW-8 8/2/2019 Sampling Results	MW-9 8/8/2019 Sampling Results	MW-10 8/9/2019 Sampling Results	MW-11A 8/8/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	43.4	19	17.4	36	42.2	43.8	241	344	612	18.6	31.7	22.6
Ammonia Nitrogen	mg/L	--	0.1 U	0.37	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	1.24	1.05	0.12	0.1 U	0.1 U
Chemical Oxygen Demand	mg/L	--	3 U	3 U	3 U	9.7	11.5	11.5	3 U	51.9	18.9	4.2	7	10.2
Chloride	mg/L	--	2.5	2.5	4	3	3.6	157	564	188	126	44.1	2.2	23.9
Dissolved Oxygen, Field	mg/L	--	8.52	7.62	8.69	8.87	6.46	0.5	0.19	0.09	0.11	6.07	1.31	6.86
Hardness	mg/L	--	28.1	16.9	13.6	18.1	28.5	174 B	470	400	596	77.1	20.4	42
Nitrate	mg/L	10	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.7	1.7	0.2 U	0.2 U	1.7	0.2 U	5.1
ORP, Field	mV	--	198.6	284.5	243.2	202.6	106.2	199.9	61.1	-35.5	28.5	268.7	207	239.3
pH, Field	SU	--	5.79	4.28	5.04	5.4	6.43	5.77	5.62	5.7	6.45	4.76	5.64	5.23
pH, Lab	SU	--	6.3	5.49	5.5	6.31	2.14	5.93	6.12	6.14	6.96	5.48	6.11	5.84
Specific Conductivity, Field	µS/cm	--	0.089	0.047	0.05	37.8	86	529	2.073	1.199	1.435	0.18	0.081	0.13
Specific Conductivity, Lab	µS/cm	--	88.6	47.5	48.5	76.9	91.4	597	2110	1210	1470	199	79.8	135
Sulfate, total	mg/L	--	1 U	1 U	1 U	1.1	2.9	5.9	41.1	34.1	64.4	1 U	5.2	2.4
Temperature, field	°C	--	16.9	16.5	16.2	14.8	20	15.8	19.2	17.7	14.7	18.9	17	17
Total Dissolved Solids	mg/L	--	69	45	40	61	73	475	1440	800	868	136	70	111
Total Suspended Solids	mg/L	--	5.8	109	4.7	20.2	9.2	25.1	28.1	6.2	2.3 J	26.2	31.7	14
Turbidity, Lab	NTU	--	1.25	104	1.69	14	9.26	11.9	4.77	10.1	2.63	159	14.1	24.9
Turbidity, Field	NTU	--	0.7	115.8	0.05	9.8	16.5	8.0	1.72	0.1	0.0	126	8.66	32
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.0013	0.001 U	0.00149	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Barium, total	mg/L	2	0.001 U	0.0326	0.00781	0.0152	0.0117	0.0357	0.382	0.146	0.146	0.114	0.021	0.0364
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	5	2.25	2.42	3.11	7.87	32 B	75.6	73.6	99.6	10.1	4.36	9.06
Chromium, total	mg/L	0.1	0.00512	0.014	0.00692	0.0533	0.0185	0.00357	0.00658	0.00123	0.001 U	0.036	0.0021	0.00537
Cobalt, total	mg/L	--	0.001 U	0.00285	0.001 U	0.00442	0.00124	0.001 U	0.707	0.0764	0.0204	0.00762	0.001 U	0.001 U
Copper, total	mg/L	--	0.001 U	0.00743 B	0.001 U	0.0139	0.0221	0.0114	0.00287	0.0264	0.00338	0.00775 B	0.00758	0.00207 B
Iron, total	mg/L	--	0.128	4.61	0.1 U	7.47	0.584	1.48	3.63	4.31	0.444	11.3	0.549	1.75
Lead, total	mg/L	0.015	0.001 U	0.00406	0.001 U	0.00166	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00786	0.001 U	0.0011
Magnesium, total	mg/L	--	3.8	2.74	1.84	2.51	2.16	23	68.4	52.4	84.2	12.6	2.31	4.7
Manganese, total	mg/L	--	0.00313	0.143	0.0359	0.281	0.0216	0.0579	64.8	19.6	1.27	0.357	0.0328	0.0271
Mercury, total	mg/L	0.002	0.0001 U	0.000117	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000179	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.00357 B	0.00932	0.005	0.0351	0.0114	0.00219	0.0811	0.0111	0.00599	0.0275	0.00359 B	0.00406
Potassium, total	mg/L	--	0.945	2.22	1.15	1.67	1.19	2.85	4.35	4.33	12.5	4.2	1.33	0.789
Selenium, total	mg/L	0.05	0.001 U	0.00132	0.001 U	0.001 U	0.001 U	0.001 U	0.00969	0.001 U	0.001 U	0.00224	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	7.44	3.5	3.41	3.47	6.37	29.7 B	171	67	90.5	7.61	5.14	4.66
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.00422	0.001 U	0.00618	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.014	0.0037	0.00388
Zinc, total	mg/L	--	0.004 U	0.0199 B	0.0063 B	0.0173 B	0.0154 B	0.00609	0.0381 B	0.00793 B	0.004 U	0.0842	0.0456	0.0105 B
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-1B 8/9/2019 Sampling Results	MW-2A 8/5/2019 Sampling Results	MW-2B 8/5/2019 Sampling Results	MW-3A 7/31/2019 Sampling Results	MW-3B 7/31/2019 Sampling Results	MW-4 7/30/2019 Sampling Results	MW-6 8/1/2019 Sampling Results	MW-7 8/5/2019 Sampling Results	MW-8 8/2/2019 Sampling Results	MW-9 8/8/2019 Sampling Results	MW-10 8/9/2019 Sampling Results	MW-11A 8/8/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1 U	1 U	1 U	1 U	1 U	4.8	12.3	1.6	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	12.7	5 U	5 U	5 U	5 U
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.2	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	8.4	4.2	5.5	1 U	1 U	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	2	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	1 U	1 U	1 U	1 U	1 U	1.1	5.5	6	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.9	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1 U	1 U	1 U	1 U	1 U	1 U	1.3	2.4	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-11B 8/8/2019 Sampling Results	MW-12 8/8/2019 Sampling Results	MW-13A 8/6/2019 Sampling Results	MW-13B 8/6/2019 Sampling Results	MW-14A 8/5/2019 Sampling Results	MW-14B 8/6/2019 Sampling Results	MW-15 8/7/2019 Sampling Results	MW-16A 8/5/2019 Sampling Results	MW-16B 8/5/2019 Sampling Results	MW-19A 8/7/2019 Sampling Results	MW-19B 8/7/2019 Sampling Results	MW-21A 7/29/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	68.1	30.5	32.1	207	7.5	35.6	1 U	217	151	61.4	105	262
Ammonia Nitrogen	mg/L	--	0.1 U	0.1 U	0.1 J	0.12	0.1 U	0.1 U	0.15	0.13	0.1 U	0.1 U	0.1 U	7.05
Chemical Oxygen Demand	mg/L	--	3 U	15.1	5	4.3	16.6	6.5	6.5	32.8	27.4	3 U	4.2	26.3
Chloride	mg/L	--	17.3	111	76.8	116	354	23.6	28.1	59.4	257	290	172	147
Dissolved Oxygen, Field	mg/L	--	3.75	4.56	0.14	0.16	7.21	5.24	4.53	0.25	0.25	0.17	0.2	0.15
Hardness	mg/L	--	78	79.2	102	319	323	65.4 B	81.5 B	153	368	268 B	282 B	303 B
Nitrate	mg/L	10	3.6	2.9	1.4	5.6	5.4	5.2	5.3	8.4	2.3	2.3	1.9	0.9
ORP, Field	mV	--	184.1	227.5	249.2	201.6	231.5	134.9	237.3	-0.3	105.8	190.5	167.8	200
pH, Field	SU	--	5.97	5.03	4.65	5.72	4.91	5.48	5.17	6.02	5.66	5.42	5.66	6.05
pH, Lab	SU	--	6.56	5.6	5.48	6.33	5.45	5.87	5.61	6.4	6.09	5.95	6.1	5.91
Specific Conductivity, Field	µS/cm	--	0.21	0.437	0.294	0.777	1.14	0.185	0.195	0.675	1.069	1.01	0.745	1025
Specific Conductivity, Lab	µS/cm	--	212	451	322	790	1160	187	522	659	1050	1040	766	1100
Sulfate, total	mg/L	--	3.4	14.6	2.1	15.8	24.4	2.1	80.6	20	7.8	13.5	9.3	66.1
Temperature, field	°C	--	14.9	20.2	15.9	13.9	17.1	16.2	17	22.4	19.4	15.2	15.2	17.7
Total Dissolved Solids	mg/L	--	156	298	231	504	1020	164	162	408	719	797	614	633
Total Suspended Solids	mg/L	--	3.7	14.4	13.9	2.3 U	64	67.5	144	29.3	2.3 U	17	18	8.8
Turbidity, Lab	NTU	--	1.54	9.62	9.16	0.5 U	11.2	4.38	58.2	37.1	3.29	34.3	10	20
Turbidity, Field	NTU	--	0.0	9.97	0.0	0.0	8.92	4.26	54.0	6.59	9.8	8.25	9.9	3.1
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00221	0.00112	0.001 U	0.001 U	0.001 U
Barium, total	mg/L	2	0.0185	0.15	0.136	0.0723	0.419	0.0176	0.0905	0.234	0.0279	0.11	0.0336	0.31
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	15.4	16.7	16.6	74.4	55.8	13 B	11.5 B	17.6	54.8	44 B	61.5 B	53.6 B
Chromium, total	mg/L	0.1	0.00307	0.00369	0.0012	0.00115	0.00766	0.00406	0.018	0.0161	0.00172	0.00261	0.00469	0.00121
Cobalt, total	mg/L	--	0.001 U	0.001 U	0.0188	0.001 U	0.00399	0.001 U	0.00553	0.00545	0.00777	0.00687	0.001 U	0.0832
Copper, total	mg/L	--	0.001 U	0.00292 B	0.00273 B	0.001 U	0.00858 B	0.00142	0.0453	0.008 B	0.001 U	0.00659	0.00202	0.00542
Iron, total	mg/L	--	0.1 U	0.449	0.54	0.1 U	2.18	0.591	13.1	7.64	0.975	0.922	0.516	8.08
Lead, total	mg/L	0.015	0.001 U	0.00136	0.00113	0.001 U	0.001 U	0.001 U	0.00275	0.00178	0.001 U	0.00105	0.001 U	0.001 U
Magnesium, total	mg/L	--	9.6	9.07	14.8	32.2	44.7	7.98	12.8	26.6	56.1	38.4	31.1	41.1
Manganese, total	mg/L	--	0.00369	0.0359	0.801	0.0396	0.046	0.021	0.194	9.06	10	1.53 J	0.0311	13.8
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.0001 U	0.000299	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.000411	0.000276	0.0001 U
Nickel, total	mg/L	--	0.001 U	0.00281	0.00744	0.00141	0.0343	0.00367	0.0199	0.014	0.0134	0.00841	0.00447	0.0185
Potassium, total	mg/L	--	0.823	1.76	2.67	3.47	3.71	1.53	1.89	3.39	3.63	3.74	2.32	17.8
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00231	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	10.4	51.3	12	20.3	69.8	8.51 B	8.21 B	70	39.9	85.1 B	22.5 B	80.5 B
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.00311	0.001 U	0.001 U	0.001 U	0.00548	0.001 U	0.00919	0.0012	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.00444 B	0.0182 B	0.0193 B	0.00495 B	0.0683	0.00711 B	0.055 B	0.0183 B	0.00795 B	0.0313 B	0.00698 B	0.0185
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	8.9	9.1	1 U	1 U	1 U	1 U	1 U	2.4	4.6	6.1

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-11B 8/8/2019 Sampling Results	MW-12 8/8/2019 Sampling Results	MW-13A 8/6/2019 Sampling Results	MW-13B 8/6/2019 Sampling Results	MW-14A 8/5/2019 Sampling Results	MW-14B 8/6/2019 Sampling Results	MW-15 8/7/2019 Sampling Results	MW-16A 8/5/2019 Sampling Results	MW-16B 8/5/2019 Sampling Results	MW-19A 8/7/2019 Sampling Results	MW-19B 8/7/2019 Sampling Results	MW-21A 7/29/2019 Sampling Results
1,1-Dichloroethene	μg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	μg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	μg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	μg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	μg/L	5	1 U	1 U	1.5	1.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	μg/L	5	1 U	1 U	4.3	4.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.7
1,3-Dichloropropane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	μg/L	75	1 U	1 U	3.2	6.4	1 U	1 U	1 U	1.5	5.3	1 U	1.1	1.5
2,2-Dichloropropane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acrylonitrile	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	μg/L	5	1 U	1 U	1 U	1.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	μg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	μg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	μg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	μg/L	100	1 U	1 U	1 U	1.4	1 U	1 U	1 U	4.1	11.8	1 U	1 J	1 U
Chloroethane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	μg/L	80	1.1	2.3	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	μg/L	70	3.8	1 U	59.5	56.7	1 U	1 U	1 U	1 U	1 U	5.9	14.4	20.5
cis-1,3-Dichloropropene	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	μg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	μg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	μg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	μg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	μg/L	5	1 U	1 U	1.7 J	3 J	1 U	1 U	1 U	1 U	1 U	1 U	1.1	1 U
o-Xylene	μg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	μg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	μg/L	5	6.6	1 U	8.4	9.9	1 U	1 U	1 U	1 U	1 U	1.4	2.2	5.4
Toluene	μg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	μg/L	--	1 U	1 U	1.8	2.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	μg/L	5	2.9	1 U	14.1	11	1 U	1 U	1 U	1 U	1 U	2	4.3	11.3
Trichlorofluoromethane	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	μg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	μg/L	2	1 U	1 U	3.9	5.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.3

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-21B 7/29/2019 Sampling Results	MW-22A 7/29/2019 Sampling Results	MW-22B 7/29/2019 Sampling Results	MW-23A 8/7/2019 Sampling Results	MW-23B 8/7/2019 Sampling Results	MW-24A 7/31/2019 Sampling Results	MW-24B 7/31/2019 Sampling Results	OB01 8/8/2019 Sampling Results	OB02 8/2/2019 Sampling Results	OB02A 8/2/2019 Sampling Results	OB03 8/2/2019 Sampling Results	OB03A 8/2/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	207	373	289	25.6	63	151	295	91.9	59.6	44.3	238	307
Ammonia Nitrogen	mg/L	--	0.29	0.1 U	0.1 U	0.16	0.1 U	0.46	0.1 U	0.1 U	0.1 U	0.1 U	2.62	3.75
Chemical Oxygen Demand	mg/L	--	16.5	12.3	18.6	3 U	11.5	36	45.1	3 U	6.3	8.9	15.1	14.9
Chloride	mg/L	--	128	141	127	97.6	65.8	321	300	667	209	322	218	195
Dissolved Oxygen, Field	mg/L	--	0.3	0.21	0.43	1.56	3.08	0.25	0.21	0.3	0.29	0.13	0.15	0.09
Hardness	mg/L	--	254 B	372 B	320 B	106 B	117 B	445	545	112	287	380	332	387
Nitrate	mg/L	10	1.5	0.2 U	0.4	4	0.2 U	0.2 U	0.2 U	2.6	0.2 U	1.2	0.2 U	0.2 U
ORP, Field	mV	--	200	199.9	200	321.6	133.1	200	200	203	176.1	187.5	37.5	-27.8
pH, Field	SU	--	6.55	6.42	6.87	4.92	6.61	5.85	6.43	5.34	5.63	5.3	5.57	5.8
pH, Lab	SU	--	6.35	6.21	6.11	5.42	6.89	2.67	6.61	5.78	6.18	5.88	6.23	6.38
Specific Conductivity, Field	µS/cm	--	8.54	1018	918	0.365	0.342	1246	1374	2.196	0.814	1.138	1.11	1.225
Specific Conductivity, Lab	µS/cm	--	842	1120	954	411	347	1270	1400	2250	826	1160	1120	1220
Sulfate, total	mg/L	--	40.2	37.5	37.2	4.2	8.6	10.3	1 U	38.1	20	24.1	32.2	67
Temperature, field	°C	--	20.9	16.2	19	11.3	17.4	19.4	17.3	18.1	16.1	16.6	16.4	17.6
Total Dissolved Solids	mg/L	--	507	681	585	304	205	1010	981	1920	616	975	636	698
Total Suspended Solids	mg/L	--	22.6	36.7	8.6	122	69.8	8.9	59.4	7.6	4.2	2.3 U	3.4	5.7
Turbidity, Lab	NTU	--	102	24.1	15.3	43.6	9.56	0.5 U	245	0.5 U	3.91	0.5 U	7.38	20.6
Turbidity, Field	NTU	--	30.3	5.4	9.4	31.62	0.7	0.0	5.7	0.0	0.44	0.0	0.0	71.13
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.00156	0.00463	0.001 U	0.001 U	0.00525	0.0309	0.001 U	0.001 U	0.001 U	0.00216	0.00336
Barium, total	mg/L	2	0.075	0.0238	0.0335	0.137	0.0109	0.288	0.174	0.342	0.333	0.341	0.403	0.274
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	64.7 B	91 B	85 B	13.2 B	16.1 B	65.7	89.1	17.7	55.1	69	61.4	70.4
Chromium, total	mg/L	0.1	0.0163	0.00202	0.00379	0.0102	0.00578	0.00458	0.00437	0.00275	0.00307	0.001 U	0.00191	0.00127
Cobalt, total	mg/L	--	0.031	0.00142	0.001 U	0.00433	0.0012	0.0637	0.0479	0.00793	0.00595	0.001 U	0.0406	0.0392
Copper, total	mg/L	--	0.00242	0.00209	0.00151	0.00123	0.00452	0.0101	0.00315	0.00548 B	0.00184	0.001 U	0.001 U	0.001 U
Iron, total	mg/L	--	19	8.68	1.5	3.15	0.469	23.3	44.7	0.1 U	0.498	0.1 U	18	22.1
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.00225	0.00107	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	22.6	35.3	26.1	17.7	18.5	68.2	78.4	16.5	36.3	50.3	43.3	51.2
Manganese, total	mg/L	--	4.72	1.93	0.522	0.0891	0.0561	9.22	3.99	0.861	1.48	0.0347	19.8	14.1
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.0001 U	0.000549	0.0001 U	0.0001 U	0.0001 U	0.000138	0.0001 U	0.000117	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0265	0.00581	0.00485	0.00781	0.00458	0.036	0.0167	0.029	0.0153	0.00903	0.0133	0.0118
Potassium, total	mg/L	--	16.9	5.1	6.93	3.55	4.35	4.95	3.7	4.78	6.89	4.55	6.82	10.3
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.00105	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	45.2 B	85.2 B	51.4 B	27.8 B	16.2 B	49.5	32.1	12.5	27.6	41.1	57.3	73.3
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.00307	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.00959	0.004 U	0.00552	0.0204 B	0.0378 B	0.004 U	0.0116 B	0.0175 B	0.004 U	0.004 U	0.00792 B	0.005 B
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	4.8	1 U	1 U	1 U	1 U	1.6	4	1 U	1 U	1 U	15.5	12

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	MW-21B 7/29/2019 Sampling Results	MW-22A 7/29/2019 Sampling Results	MW-22B 7/29/2019 Sampling Results	MW-23A 8/7/2019 Sampling Results	MW-23B 8/7/2019 Sampling Results	MW-24A 7/31/2019 Sampling Results	MW-24B 7/31/2019 Sampling Results	OB01 8/8/2019 Sampling Results	OB02 8/2/2019 Sampling Results	OB02A 8/2/2019 Sampling Results	OB03 8/2/2019 Sampling Results	OB03A 8/2/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2	1.8
1,2-Dichloropropane	µg/L	5	1.3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	4.1	3.2
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	1 U	1 U	1 U	1 U	1 U	12.4	12.5	1 U	1 U	1 U	9.4	8.2
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	8.2	5 U	5 U	5 U	5 U	5 U
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	4.5	5.3	1 U	1 U	1 U	1.9	1.7
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1 U	1 J	1 U	1 U	1 U	8.6	3.4	1.5	1 U	1 U	1.8	2.2
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	10.7	7.3	3.8	4.8	1 U	7.2	2.7	1.5	1 U	1 U	47.5	36.2
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1.3	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1.4	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1.9	1.4	1 U	2.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	2.1	28.5	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	2.3	3.2	1 U	1 U	1 U	3.5	2.9
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	6.4	3.8	1.8	1.6	1 U	1.3	1 U	1 U	1 U	1 U	4	2.6
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1 U	1 U	1 U	1 U	1 U	11.1	2	1 U	1 U	1 U	8.7	6.9

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	OB04 8/1/2019 Sampling Results	OB04A 8/1/2019 Sampling Results	OB06 7/30/2019 Sampling Results	OB07 7/30/2019 Sampling Results	OB07A 7/30/2019 Sampling Results	OB08 7/31/2019 Sampling Results	OB08A 7/31/2019 Sampling Results	OB10 7/30/2019 Sampling Results	OB11 7/29/2019 Sampling Results	OB11A 7/29/2019 Sampling Results	OB12 8/6/2019 Sampling Results	OB015 8/6/2019 Sampling Results
General Parameters														
Alkalinity	mg/L	--	286	210	213	214	110	223	218	167	252	356	153	82.7
Ammonia Nitrogen	mg/L	--	0.83	0.99	0.1 U	0.1 U	0.1 U	0.1 U	0.34	0.1 U	0.1 U	0.46	0.1 U	0.1 U
Chemical Oxygen Demand	mg/L	--	35.3	52.2	55	31.8	20.6	7.6	11.8	24.7	38.4	27.8	6.3	3 U
Chloride	mg/L	--	514	593	344	229	210	44.3	50.8	244	453	426	97.8	10.3
Dissolved Oxygen, Field	mg/L	--	0.11	0.13	0.73	0.25	1.33	0.35	0.25	0.23	0.22	0.23	0.1	1.42
Hardness	mg/L	--	931	896	586 B	525 B	318 B	203	183	377 B	615 B	603 B	202	91.7
Nitrate	mg/L	10	1.5	1.6	0.2 U	1.4	1.5	0.2 U	0.4	0.2 U	0.7	0.7	1.2	0.6
ORP, Field	mV	--	93	178.8	199.9	199.9	199.9	199.9	199.9	199.9	200	200	3.7	137.9
pH, Field	SU	--	5.73	5.41	5.91	6.44	5.71	6.33	6.18	5.89	5.61	5.81	5.36	5.56
pH, Lab	SU	--	6.19	6.01	6.14	6.59	5.99	6.57	6.4	2.88	5.14	5.26	6.05	6.45
Specific Conductivity, Field	µS/cm	--	2.04	1.775	1479	1009	526	487.7	490.5	941	1680	1750	0.896	0.325
Specific Conductivity, Lab	µS/cm	--	2080	2090	1720	1200	938	544	548	1090	1820	1870	606	325
Sulfate, total	mg/L	--	21.9	15.5	124	47	31.5	5.8	2.4	2.6	22.2	10.7	16.7	74.4
Temperature, field	°C	--	16.8	17.2	14.6	13.6	13.5	15.8	15.5	14.7	17.4	17.4	16.4	20.5
Total Dissolved Solids	mg/L	--	1670	1790	1150	1020	775	326	343	952	1390	1150	370	197
Total Suspended Solids	mg/L	--	6 U	2.3 J	16.3	5.7	2.3 U	2.3 U	13.5	2.3 U	4 U	7.3	2.4 U	23.4
Turbidity, Lab	NTU	--	0.5 U	0.5 U	8.59	1.14	0.645	0.5 U	10.7	0.5 U	0.5 U	2.34	0.5 U	28.8
Turbidity, Field	NTU	--	1.6	2.3	9.7	0.0	0.0	0.0	1.8	0.0	0.0	0.0	0.0	281.12
Inorganics														
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00269	0.001 U	0.001 U	0.00119	0.001 U	0.001 U
Barium, total	mg/L	2	0.272	0.0687	0.172	0.0472	0.041	0.152	0.0717	0.135	0.0281	0.191	0.0155	0.0591
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.0118	0.00117	0.001 U	0.001 U
Calcium, total	mg/L	--	179	149	132 B	133 B	63.7 B	55.3	42.1	69.8 B	120 B	103 B	35.6	9.21
Chromium, total	mg/L	0.1	0.0044	0.00278	0.00431	0.00195	0.00152	0.00269	0.00205	0.00114	0.00195	0.00129	0.001 U	0.00976
Cobalt, total	mg/L	--	0.001 U	0.00104	0.00467	0.001 U	0.00111	0.00572	0.0136	0.0266	0.002	0.0356	0.001 U	0.001 U
Copper, total	mg/L	--	0.0391	0.033	0.0147	0.00659	0.00367	0.00237	0.00211	0.00155	0.0097	0.00798	0.001 U	0.00392 B
Iron, total	mg/L	--	0.1 U	0.1 U	0.741	0.1 U	0.1 U	0.139	3.79	2.8	0.112	1.96	0.1 U	2.98
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.00186	0.001 U	0.001 U
Magnesium, total	mg/L	--	118	127	62.4	47	38.7	15.7	18.9	49.2	76.6	83.9	27.6	16.7
Manganese, total	mg/L	--	4.14	3.2	0.626	0.135	0.128	6.68	8.85	14.9	1.35	13.5	0.154	0.0664
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.000148	0.000111	0.000413	0.0001 U	0.0001 U	0.0001 U	0.00273	0.000963	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0164	0.026	0.0112	0.00168	0.00421	0.00755	0.00656	0.026	0.0337	0.0325	0.00681	0.00872
Potassium, total	mg/L	--	6.59	6.66	4.2	4.62	2.46	2.62	2.52	3.78	5.39	5.7	2.69	1.77
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	76.2	124	139 B	25.7 B	22.2 B	24.1	28.3	26.9 B	90.4 B	118 B	28.8	32.7
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.00755 B	0.0263 B	0.0156	0.00437	0.00788	0.004 U	0.00507 B	0.0073	0.0415	0.0204	0.00584 B	0.0296 B
VOCs														
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.5	13.5	13.7	15.2	1 U

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	OB04 8/1/2019 Sampling Results	OB04A 8/1/2019 Sampling Results	OB06 7/30/2019 Sampling Results	OB07 7/30/2019 Sampling Results	OB07A 7/30/2019 Sampling Results	OB08 7/31/2019 Sampling Results	OB08A 7/31/2019 Sampling Results	OB10 7/30/2019 Sampling Results	OB11 7/29/2019 Sampling Results	OB11A 7/29/2019 Sampling Results	OB12 8/6/2019 Sampling Results	OB015 8/6/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.7	2.8	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.4	2.6	1.4	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1.2	1.1	3.4	4.6	4.8	9.7	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	6.1	8.1	1 U	1 U	1 U	2.9	3.9	11.1	19.4	18.2	11.3	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5.2	5 U	5 U
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1.6	1.7	1 U	1 U	1 U	1 U	1 U	2.8	2	2.8	3.3	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	1.9	1.7	1.2	1 U	1 U	5.5	10.3	5.9	22.7	23.6	3.9	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	13.5	18.3	1.3	2.3	1.9	13.4	7	42.2	70.4	97.3	44.6	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.1	2.1	1.1	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	2	3.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	5.6	3.2 J	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1.3	1.4	1 U	1.1	1.4	1 U	1 U	1 U	3.6	10.4	16.2	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	2.9	3.4	3.3	2.6	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1.3	1.3	1 U	1 U	1 U	1 U	1 U	6	9.6	12.1	16	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 J	1.5	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	1.4	2.1	1 U	1 U	1 U	1.2	1 U	28.1	17.5	15	6.2	1 U

Shaded concentrations represent MCL exceedances

Table 2
Fall 2019 Results

Parameters	Units	MCL	OB025 7/29/2019 Sampling Results	OB102 8/5/2019 Sampling Results	OB105 8/1/2019 Sampling Results	ST015 8/1/2019 Sampling Results	ST065 7/30/2019 Sampling Results	ST70 7/30/2019 Sampling Results	ST80 7/30/2019 Sampling Results	ST120 8/1/2019 Sampling Results
General Parameters										
Alkalinity	mg/L	--	330	1050	675	74.5	78.5	112	123	69.5
Ammonia Nitrogen	mg/L	--	1.96	18	6.34	0.1 U	0.1 U	0.11	0.1 U	0.18
Chemical Oxygen Demand	mg/L	--	22.2	149	77.2	3 U	21.5	10.7	15.9	16.7
Chloride	mg/L	--	170	472	317	108	98.1	138	140	116
Dissolved Oxygen, Field	mg/L	--	0.23	0.15	0.05	7.96	8.05	7.7	8.03	8.06
Hardness	mg/L	--	354 B	550	846	160	142 B	212 B	210 B	153
Nitrate	mg/L	10	1.9	1.1	1	1.7	1.6	1.5	1.8	1.6
ORP, Field	mV	--	200	61.2	-11.9	110.8	200	200	200	107
pH, Field	SU	--	5.99	6.38	6.05	8.36	7.76	6.92	7.76	7.12
pH, Lab	SU	--	5.32	6.68	6.53	7.41	7.66	7.57	7.96	7.06
Specific Conductivity, Field	µS/cm	--	1143	3.129	2.42	0.532	529	737	751	5.26
Specific Conductivity, Lab	µS/cm	--	1180	3160	2420	523	505	725	735	521
Sulfate, total	mg/L	--	45.2	99.4	267	18.5	12.5	30.6	21.9	12.8
Temperature, field	°C	--	19.5	16.5	16.6	24.2	22.9	22.1	22.2	21.7
Total Dissolved Solids	mg/L	--	732	1960	1630	338	321	463	465	336
Total Suspended Solids	mg/L	--	6.3	42.8	163	2.5 U	2.5 U	3.1	2.4 U	2.5 U
Turbidity, Lab	NTU	--	1.5	5.15	113	1.21	0.76	4.58	0.816	1.78
Turbidity, Field	NTU	--	0.0	0.4	79.0	0.0	0.0	0.0	0.0	4.6
Inorganics										
Antimony, total	mg/L	0.006	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Arsenic, total	mg/L	0.01	0.001 U	0.001 U	0.00309	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Barium, total	mg/L	2	0.1	0.304	0.134	0.0717	0.0426	0.0837	0.0694	0.0523
Beryllium, total	mg/L	0.004	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Cadmium, total	mg/L	0.005	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Calcium, total	mg/L	--	57.6 B	80.5	139	33.1	27.2 B	49.9 B	47.7 B	29.2
Chromium, total	mg/L	0.1	0.00234	0.00236	0.00959	0.001 U	0.001 U	0.00444	0.001 U	0.001 U
Cobalt, total	mg/L	--	0.03	0.061	0.0126	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Copper, total	mg/L	--	0.0336	0.0213	0.0141	0.001 U	0.001 U	0.0015	0.001 U	0.001 U
Iron, total	mg/L	--	0.323	0.297	14.4	0.165	0.122	0.241	0.107	0.378
Lead, total	mg/L	0.015	0.001 U	0.001 U	0.00339	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Magnesium, total	mg/L	--	51.1	84.7	121	18.8	17.9	21.2	22.1	19.5
Manganese, total	mg/L	--	22.6	14.4	5.52	0.112	0.0177	0.147	0.0424	0.132
Mercury, total	mg/L	0.002	0.0001 U	0.0001 U	0.000315	0.0001 U	0.0001 U	0.0001 U	0.0001 U	0.0001 U
Nickel, total	mg/L	--	0.0181	0.0767	0.0381	0.00428	0.00268	0.00429	0.00235	0.00395
Potassium, total	mg/L	--	13.5	47.9	15.8	2.17	3.41	8.2	6.98	2.91
Selenium, total	mg/L	0.05	0.001 U	0.001 U	0.00138	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Silver, total	mg/L	--	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Sodium, total	mg/L	--	73.7 B	525	194	32.8	32.1 B	49.2 B	48.7 B	34.4
Thallium, total	mg/L	0.002	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Vanadium, total	mg/L	--	0.001 U	0.001 U	0.0115	0.001 U	0.001 U	0.001 U	0.001 U	0.001 U
Zinc, total	mg/L	--	0.0114	0.0104 B	0.0878 B	0.00441 B	0.004 U	0.0119	0.004 U	0.004 U
VOCs										
1,1,1,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,1-Trichloroethane	µg/L	200	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2,2-Tetrachloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	µg/L	--	1 J	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Table 2
Fall 2019 Results

Parameters	Units	MCL	OB025 7/29/2019 Sampling Results	OB102 8/5/2019 Sampling Results	OB105 8/1/2019 Sampling Results	ST015 8/1/2019 Sampling Results	ST065 7/30/2019 Sampling Results	ST70 7/30/2019 Sampling Results	ST80 7/30/2019 Sampling Results	ST120 8/1/2019 Sampling Results
1,1-Dichloroethene	µg/L	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,3-Trichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-chloropropane	µg/L	0.2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	µg/L	0.05	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	µg/L	600	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	µg/L	75	3.1	1.4	3.7	1 U	1 U	1 U	1 U	1 U
2,2-Dichloropropane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	µg/L	--	5.8	5 U	6.9	5 U	5 U	5 U	5 U	5 U
Acrylonitrile	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Allyl Chloride	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Benzene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromochloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	µg/L	100	2.7	2.3	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroprene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	µg/L	70	7.5	1 U	7.6	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	µg/L	80	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	µg/L	700	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m&p-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Iodide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl Methacrylate	µg/L	--	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Methyl Tertiary Butyl Ether	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Bromide	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene	µg/L	10000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	µg/L	100	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	µg/L	1000	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,3-Dichloropropene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,4-Dichloro-2-butene	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	µg/L	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Acetate	µg/L	--	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	µg/L	2	3.5	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Shaded concentrations represent MCL exceedances

Table 3
Relative Percent Difference for Volatile Organic Compounds - Duplicate Analysis

Parameter	OB30[1]	OB-01	RPD	OB40[1]	MW-24B	RPD	OB50[1]	OB11	RPD
Acetone	5 U	5 U	NA	9.7	8.2	16.8%	5 U	5 U	NA
Benzene	1 U	1 U	NA	5.3	5.3	0.0%	2.6	2.0	26.1%
Chlorobenzene	1.4	1.5	6.9%	3.2	3.4	6.1%	23.0	22.7	1.3%
1,2-Dichlorobenzene	1 U	1 U	NA	1 U	1 U	NA	2.8	2.7	3.6%
1,4-Dichlorobenzene	1 U	1 U	NA	13.1	12.5	4.7%	18.1	19.4	6.9%
1,1-Dichloroethane	1 U	1 U	NA	4.4	4.0	9.5%	13.3	13.5	1.5%
1,2-Dichloroethane	1 U	1 U	NA	1 U	1 U	NA	2.7	2.4	11.8%
cis-1,2-Dichloroethene	1.3	1.5	14.3%	2.3	2.7	16.0%	95.5	70.4	30.3%
trans-1,2-Dichloroethene	1 U	1 U	NA	3.1	3.2	3.2%	3.0	3.4	12.5%
1,2-Dichloropropane	1 U	1 U	NA	1 U	1 U	NA	5.0	4.6	8.3%
Methyl tert-butyl ether (MTBE)	1 U	1 U	NA	1 U	1 U	NA	2.2	2.1	4.7%
o-Xylene	1 U	1 U	NA	1.2	1.4	15.4%	1 U	1 U	NA
Tetrachloroethene	1 U	1 U	NA	1 U	1 U	NA	10.2	3.6	95.7%
Toluene	1 U	1 U	NA	27.7	28.5	2.8%	1 U	1 U	NA
Trichloroethene	1 U	1 U	NA	1 U	1 U	NA	10.9	9.6	12.7%
Vinyl chloride	1 U	1 U	NA	2.0	2.0	0.0%	14.4	17.5	19.4%

(1) Duplicate sample

(2) RPDs>20% are shaded

This page intentionally left blank

Table 4
Relative Percent Difference for Inorganics and General Water Quality Parameters - Duplicate Analysis

Parameter	OB30[1]	OB-01	RPD	OB40[1]	MW-24B	RPD	OB50[1]	OB11	RPD
Alkalinity	89.7	91.9	2.4%	292.0	295.0	1.0%	223.0	252.0	12.2%
Arsenic, total	ND	ND	NA	0.0343	0.0309	10.4%	ND	ND	NA
Barium, total	0.335	0.342	2.1%	0.190	0.174	8.8%	0.0272	0.0281	3.3%
Cadmium, total	ND	ND	NA	ND	ND	NA	0.0124	0.0118	5.0%
Calcium, total	8.89	17.70	66.3%	95.50	89.10	6.9%	128	120	6.5%
Chemical Oxygen Demand	16.3	ND	NA	40.8	45.1	10.0%	33.4	38.4	13.9%
Chloride	702	667	5.1%	309	300	3.0%	452	453	0.2%
Chromium, total	0.00278	0.00275	1.1%	0.00440	0.00437	0.7%	0.0015	0.0020	26.7%
Cobalt, total	0.00800	0.00793	0.9%	0.0513	0.0479	6.9%	0.0019	0.0020	4.6%
Conductivity	2240	2250	0.4%	1420	1400	1.4%	1840	1820	1.1%
Copper, total	0.00534	0.00548 B	NA	0.00300	0.00315	4.9%	0.00784	0.00970	21.2%
Iron, total	ND	ND	NA	44.7	44.7	0.0%	ND	112.0	NA
Magnesium, total	17.0	16.5	3.0%	84.2	78.4	7.1%	82.7	76.6	7.7%
Manganese, total	0.064	0.861	172.5%	4.46	3.99	11.1%	1.460	1.350	7.8%
Mercury, total	0.000149	0.000138	7.7%	ND	ND	NA	0.0027	0.0027	0.7%
Nickel, total	0.0288	0.0290	0.7%	0.0177	0.0167	5.8%	0.0351	0.0337	4.1%
Nitrate	2.7	2.6	3.8%	0.6	ND	NA	0.7	0.7	0.0%
Potassium, total	4.70	4.78	1.7%	4.1	3.7	9.0%	5.2	5.4	4.6%
Sodium, total	31.9	12.5	87.4%	34.2	32.1	6.3%	94.5	90.4	4.4%
Sulfate	36.0	38.1	5.7%	30.0	ND	NA	48.0	22.2	73.5%
Total Dissolved Solids	1880	1920	2.1%	993	981	1.2%	1530	1390	9.6%
Total Suspended Solids	ND	7.6	NA	45.7	59.4	26.1%	ND	ND	NA
Total Hardness	92.2	112.0	19.4%	585.0	545.0	7.1%	661.0	615.0	7.2%
Zinc, total	0.0153	0.0175 B	NA	0.0138	0.0116 B	NA	0.0436	0.0415	4.9%

(1) Duplicate sample

(2) RPDs>20% are shaded

This page intentionally left blank

Table 5
MCL Exceedances - Volatile Organic Compounds

Monitoring Well	Parameter	Units	MCL	Result
Northwest				
MW-11B	Tetrachloroethene	µg/L	5	6.6
MW-13A	Tetrachloroethene	µg/L	5	8.4
	Trichloroethene	µg/L	5	14.1
	Vinyl Chloride	µg/L	2	3.9
MW-13B	Tetrachloroethene	µg/L	5	9.9
	Trichloroethene	µg/L	5	11.0
	Vinyl Chloride	µg/L	2	5.6
OB03	Vinyl Chloride	µg/L	2	8.7
OB03A	Vinyl Chloride	µg/L	2	6.9
OB04A	Vinyl Chloride	µg/L	2	2.1
West				
MW-7	Vinyl Chloride	µg/L	2	2.4
Southwest				
MW-21A	Tetrachloroethene	µg/L	5	5.4
	Trichloroethene	µg/L	5	11.3
	Vinyl Chloride	µg/L	2	2.3
MW-21B	Trichloroethene	µg/L	5	6.4
OB12	1,2-Dichloropropane	µg/L	5	9.7
	Tetrachloroethene	µg/L	5	16.2
	Trichloroethene	µg/L	5	16.0
	Vinyl Chloride	µg/L	2	6.2
South				
OB11	cis-1,2-Dichloroethene	µg/L	70	70.4
	Trichloroethene	µg/L	5	9.6
	Vinyl Chloride	µg/L	2	17.5
OB11A	cis-1,2-Dichloroethene	µg/L	70	97.3
	Methylene Chloride	µg/L	5	5.6
	Tetrachloroethene	µg/L	5	10.4
	Trichloroethene	µg/L	5	12.1
	Vinyl Chloride	µg/L	2	15.0
OB025	Vinyl Chloride	µg/L	2	3.5
Southeast				
MW-24A	Vinyl Chloride	µg/L	2	11.1
MW-24B	Benzene	µg/L	5	5.3
OB10	Trichloroethene	µg/L	5	6.0
	Vinyl Chloride	µg/L	2	28.1

This page intentionally left blank

Table 6
MCL Exceedances - Inorganics

Monitoring Well	Parameter	Units	MCL	Result
South				
OB11	Cadmium, total	mg/L	0.005	0.0118
	Mercury, total	mg/L	0.002	0.00273
Southeast				
MW-24B	Arsenic, total	mg/L	0.01	0.0309

This page intentionally left blank

Table 7

Historical Methane Concentrations (% by volume)

Well	9/20/2005	4/4/2006	9/26/2006	4/17/2007	10/2/2007	3/27/2008	9/23/2008	3/5/2009	9/21/2009	3/24/2010	9/14/2010	4/19/2011	9/6/2011	3/7/2012	9/10/2012	3/18/2013	9/11/2013	3/6/2014	9/2/2014	3/19/2015	8/31/2015
OB01	0.0	16.8	0.0	0.0	0.0	0.0	*	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	1.9	1.3	3.7
OB02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB02A	2.9	0.0	4.5	24.2	0.0	0.0	1.6	1.3	2.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB03A	48.3	47.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB04A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
OB0105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
OB08A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.0	0.0	0.0
OB0102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB07A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB011	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.0	0.0
OB011A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.2	0.0	0.0	0.0
OB025	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0
OB015	0.0	0.0	0.0	0.0	6.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0
OB012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-1B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.0	0.0	0.0
MW-2A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-2B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-3A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
MW-3B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.0
MW-04	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0
MW-06	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-07	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-08	--	--	--	--	--	--	--	--	--	--	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-09	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0
MW-10	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-11A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.0
MW-11B	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0
MW-12	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0
MW-13A	--	--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0
MW-13B	--	--	--	--	--	--	--	--	--	--	--	--	--	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0
MW-14A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-14B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-15	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-16A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-16B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-19A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-19B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-21A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-21B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-22A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-22B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-23A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-23B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-24A	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
MW-24B	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

* Unable to sample - well within construction site

Table 7
Historical Methane Concentrations (% by volume)

Well	3/18/2016	9/2/2016	3/6/2017	9/19/2017	4/5/2018	9/7/2018	4/8/2019	7/29/2019
OB01	7.2	2.7	0.2	8.1	9.3	20.2	0.0	0.0
OB02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB02A	0.0	0.0	0.0	0.0	0.0	1.4	0.0	0.0
OB03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB03A	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
OB04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB04A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB0105	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB08	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB08A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB0102	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB07	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
OB07A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB011	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
OB011A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB025	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OB10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-1B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-2A	0.0	0.0	0.0	0.0	0.0	0.1	13.3	0.0
MW-2B	0.0	0.0	0.0	0.0	0.0	0.1	1.6	0.0
MW-3A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-3B	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0
MW-04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-06	0.1	0.1	6.0	0.0	0.0	0.0	0.0	0.0
MW-07	0.0	0.0	0.0	0.0	0.0	57.8	0.02	0.0
MW-08	0.0	0.0	0.0	0.0	0.0	6.8	0.0	0.0
MW-09	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-10	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-11A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-11B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-12	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-13A	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-13B	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MW-13B	--	--	--	--	--	--	0.0	0.0
MW-13B	--	--	--	--	--	--	0.0	0.0
MW-13B	--	--	--	--	--	--	0.0	0.0
MW-16A	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-16B	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-19A	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-19B	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-21A	--	--	--	0.7	0.0	0.0	0.0	0.0
MW-21B	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-22A	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-22B	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-23A	--	--	--	0.0	0.0	0.0	0.0	0.0
MW-23B	--	--	--	0.1	0.1	0.0	0.0	0.0
MW-24A	--	--	--	13.5	2.3	0.0	0.0	0.0
MW-24B	--	--	--	2.9	0.0	0.0	0.0	0.0

* Unable to sample - well within construction site

Table 8
Gude Landfill Groundwater Monitoring Data
Chemical Constituents with Statistically Significant Increasing Trends
(2001 through August 2019)

	GROUNDWATER MONITORING WELL LOCATIONS																																
	Northwest									West					Southwest	South						Southeast						Northeast					
Parameter	OB03	OB03A	OB04	OB04A	OB105	MW-11A	MW-11B	MW-13B	MW-16A	OB01	OB02A	MW-6	MW-7	MW-9	OB12	OB11	OB11A	OB025	MW-22A	MW-23A	MW-23B	OB08	OB08A	OB10	MW-4	MW-24A	MW-24B	OB06	OB07	OB07A	OB102	MW-2A	MW-2B
1,1-Dichloroethane															X																		
1,2-Dichloroethane															X																		
1,2-Dichloropropane															X							X		X									
1,2-Dichlorobenzene	X															X	X																
1,4-Dichlorobenzene	X	X	X	X	X								X		X	X	X					X	X	X									
Benzene			X	X											X																		
Chlorobenzene			X	X									X		X							X	X	X				X			X		
cis-1,2-Dichloroethene					X		X						X		X			X				X		X					X				
Methylene Chloride			X	X																													
Tetrachloroethene							X																										
trans-1,2-Dichloroethene															X																		
Trichloroethene							X																										
Vinyl Chloride				X													X							X									
Barium, total			X	X	X					X	X		X									X		X							X		
Cadmium, total																X																	
Calcium, total		X	X	X						X		X	X				X							X					X				
Chromium, total																					X												
Cobalt, total										X		X	X									X	X	X		X							
Copper, total			X	X																													
Iron, total													X																				
Magnesium, total	X	X	X	X			X			X		X	X		X	X	X			X				X					X				
Manganese, total			X	X	X					X	X	X	X			X	X	X					X	X		X		X	X				
Mercury, total																X																	
Nickel, total			X	X	X					X	X	X				X			X					X		X					X		
Potassium, total										X											X			X							X		
Selenium, total			X	X												X	X												X	X			
Sodium, total										X	X	X	X			X	X		X					X				X					
Alkalinity				X	X								X		X	X	X		X									X	X				
Ammonia Nitrogen					X								X										X								X		
Chemical Oxygen Demand			X	X									X															X	X				
Chloride	X		X	X		X	X	X		X	X	X	X	X	X	X	X	X		X		X		X	X		X	X	X	X			X
Dissolved Oxygen, Field														X																		X	X
Hardness			X	X			X	X		X	X				X	X								X					X			X	
Nitrate							X	X		X	X														X								
Nitrate+Nitrite							X	X		X	X														X								
Phosphate																							X						X	X			
Specific Conductivity, Field				X						X		X				X	X	X						X				X					
Sulfate, total								X	X				X		X	X						X			X			X	X				
Total Dissolved Solids												X																					
Turbidity		X																					X										

Notes:
1. Monitoring wells OB02, OB015, MW-1B, MW-3A, MW-3B, MW-10, MW-12, MW-13A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, and MW-22B had no parameters with increasing trends.
2. Existing monitoring wells MW-1B, MW-2A, MW- 2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A and MW-13B were first sampled in 2010.
3. MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, MW-23B, MW-24A and MW-24B were first sampled in Fall 2017.
4. MW-14A, MW-14B, and MW-15 were sampled during April 2019 event for the second time and therefore do not have sufficient data for statistical analysis.

This page intentionally left blank

Table 9
Gude Landfill Groundwater Monitoring Data
Chemical Constituents with Statistically Significant Decreasing Trends
(2001 through August 2019)

GROUNDWATER MONITORING WELL LOCATIONS																																							
	Northwest													West							Southwest		South				Southeast						Northeast						
Parameter	OB03	OB03A	OB04	OB04A	OB105	MW-8	MW-11A	MW-11B	MW-12	MW-13A	MW-13B	MW-16A	MW-16B	OB01	OB02	OB02A	MW-6	MW-7	MW-9	MW-10	OB015	OB12	OB11	OB11A	OB025	MW-22B	OB08	OB08A	OB10	MW-3A	MW-3B	MW-4	OB06	OB07	OB07A	OB102	MW-1B	MW-2A	MW-2B
1,1-Dichloroethane	X	X								X	X			X			X							X															
1,2-Dichloroethane											X																												
1,2-Dichloropropane	X	X									X																												
1,4-Dichlorobenzene											X																												
Benzene	X	X								X	X													X															
Chlorobenzene	X	X																						X															
Chloroethane	X	X																																					
cis-1,2-Dichloroethene										X	X			X	X	X	X																X						
Dichlorodifluoromethane	X	X		X						X	X												X	X					X										
Methylene Chloride										X	X													X															
Tetrachloroethene	X									X	X												X	X											X			X	X
trans-1,2-Dichloroethene										X	X																												
Trichloroethene	X	X		X						X	X			X		X							X	X				X	X										
Trichlorofluoromethane																								X															
Vinyl Chloride	X									X	X			X							X																		
Barium, total	X	X					X		X	X										X	X	X				X				X	X	X					X		
Cadmium, total																								X															
Calcium, total					X		X		X										X	X										X	X					X			
Chromium, total							X																							X									
Cobalt, total	X	X					X						X								X									X	X					X			
Copper, total	X	X				X	X		X	X				X	X	X	X			X	X	X	X	X			X	X	X	X	X				X		X		
Iron, total	X	X			X		X		X	X										X	X				X		X			X		X			X	X	X		
Lead, total							X										X				X									X	X								
Magnesium, total							X		X	X										X										X	X					X			
Manganese, total							X		X										X	X	X					X				X		X					X		
Nickel, total		X							X												X											X							
Potassium, total	X						X		X												X			X		X	X			X	X	X	X				X		
Selenium, total																	X																						
Sodium, total						X				X										X							X			X	X					X		X	X
Vanadium, total							X			X										X										X	X								
Zinc, total	X	X					X										X					X		X	X					X	X	X	X			X	X		
Alkalinity							X			X	X			X					X	X							X	X			X	X							
Ammonia Nitrogen	X	X																						X															
Chemical Oxygen Demand																																				X			
Chloride						X			X											X																			
Dissolved Oxygen, Field																									X						X								
Hardness					X				X																			X								X			
Nitrate						X				X								X				X											X						
Nitrate+Nitrite										X								X				X											X						
Nitrite																																	X						
ORP, Field	X	X	X		X	X	X	X	X	X	X			X				X	X	X	X	X	X	X	X			X		X	X			X		X	X		X
pH, Field			X					X		X	X	X													X				X		X	X							
Specific Conductivity, Field																				X																			
Sulfate, total					X																			X							X								
Total Dissolved Solids									X	X										X	X										X				X	X			
Turbidity																					X								X										
Turbidity, Field					X		X			X					X		X		X	X					X							X				X			

Notes:
1. Monitoring well MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-23A, MW-23B, MW-24A, and MW24B had no parameters with decreasing trends.
2. Existing monitoring wells MW-1B, MW-2A, MW- 2B, MW-3A, MW-3B, MW-4, MW-6, MW-7, MW-8, MW-9, MW-10, MW-11A, MW-11B, MW-12, MW-13A and MW-13B were first sampled in 2010.
3. MW-16A, MW-16B, MW-19A, MW-19B, MW-21A, MW-21B, MW-22A, MW-22B, MW-23A, MW-23B, MW-24A and MW-24B were first sampled in Fall 2017.
4. MW-14A, MW-14B, and MW-15 were sampled during April 2019 event for the second time and therefore do not have sufficient data for statistical analysis.

This page intentionally left blank

Appendix A

Field Forms

This page intentionally left blank

Appendix B

Chain-of-Custody Documents

This page intentionally left blank

Appendix C

Laboratory Reports

This page intentionally left blank

Appendix D

Maximum Contaminant Level Exceedance Graphs

This page intentionally left blank

Appendix E

Historical Data Tables