

2024 Operations, Maintenance, and Monitoring Annual Report

South Park Landfill

Prepared for



**Seattle
Public
Utilities**

March 2025

ParametriX

In Association with



2024 Operations, Maintenance, and Monitoring Annual Report South Park Landfill

Prepared for

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March 2025 | 553-1550-067

Citation

Parametrix and HWA GeoSciences, Inc. 2025. 2024 Operations, Maintenance, and Monitoring Annual Report South Park Landfill. Prepared by HWA Geosciences in association with Parametrix, Seattle, Washington. March 2025.

Certification

The technical material and data contained in this document were prepared under the supervision and direction of the undersigned, whose seal, as a professional engineer licensed to practice as such, is affixed below.



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3/31/2025

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Acronyms and Abbreviations

CAP	Cleanup Action Plan
City	City of Seattle
COC	chemical of concern
CPOC	conditional point of compliance
CPSP	CenterPoint South Park LLC
County	King County
CUL	cleanup level
DCE	dichloroethene (<i>cis</i> -1,2-DCE is measured for the compliance monitoring)
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ft	feet
GPS	global positioning system
HHW	household hazardous waste
IA	Interim Action
IAWP	Interim Action Work Plan
KCPH	King County Public Health
KIP	Kenyon Industrial Park
LEL	lower explosive limit
LFG	landfill gas
LFGCCS	landfill gas collection and control system
µg/L	micrograms per liter
mg/L	milligrams per liter
MTCA	Model Toxics Control Act
NAVD 88	North American Vertical Datum of 1988
OMM	operations, maintenance, and monitoring
OMMP	Operations, Maintenance, and Monitoring Plan
ppmv	parts per million by volume
PLP	potential liable parties
PVC	polyvinyl chloride
redox	oxidation-reduction (potential)
RI/FS	Remedial Investigation/Feasibility Study
ROW	right-of-way
SMI	Strategic Materials, Inc.
SPPD	South Park Property Development, LLC
SPU	Seattle Public Utilities
SR	State Route
SRDS	South Recycling and Disposal Station
WAC	Washington Administrative Code

1. Introduction

The South Park Landfill is a former municipal solid waste landfill in the South Park neighborhood of Seattle, Washington, generally located at 8100 and 8200 2nd Avenue South, in Section 32 of Township 24 North, Range 4 East (Figure 1). Figure 2 shows the landfill, associated parcels, and surrounding areas. The Edge of Refuse refers to that portion of the landfill area where landfill operations historically occurred and where solid waste was placed as interpreted by Floyd|Snider in the Remedial Investigation/Feasibility Study (RI/FS) (Floyd|Snider et al 2021).

1.1 Regulatory Status

In 2009, Seattle Public Utilities (SPU) and South Park Property Development, LLC (SPPD) entered into Agreed Order No. 6706 with Washington State Department of Ecology (Ecology) to conduct a Remedial Investigation (RI)/Feasibility Study (FS) and to complete a preliminary draft Cleanup Action Plan (CAP) related to the historical landfill. The Settlement Area has been defined to consist of the two largest properties within the Edge of Refuse; South Recycling and Disposal Station (SRDS) owned by the City of Seattle (City)/SPU and CenterPoint South Park LLC (CPSP), formerly owned by the South Park Property Development, LLC (SPPD) which are the current primary potential liable parties (PLPs). The Settlement Area also includes certain adjacent City and Washington State rights-of-way (ROWs). The other properties within the Edge of Refuse are the Kenyon Industrial Park (KIP) and the 7901 2nd Avenue South properties, which are currently being negotiated to join the Agreed Order cleanup and protective measures for the landfill.

The Agreed Order was amended (first amendment) in 2013 to include an Interim Action (IA) to be conducted primarily on the portion of the Settlement Area property owned by SPPD (Farallon 2013) and was amended again in 2016 (second amendment) to include an IA to be conducted primarily on the SRDS property, owned by SPU.

In 2017, Ecology began negotiating a Consent Decree with the PLPs. The Consent Decree was finalized in March 2019. The Final CAP (Ecology 2018a) was included as an attachment to the Consent Decree. The selected cleanup action described in the CAP fulfills the requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington, administered by Ecology under the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC).

The CAP is currently in the process of being amended (draft Amended CAP; Ecology 2023) to address redevelopment plan modifications for the SRDS property and add additional PLPs. Until 2020, SPU planned to construct support facilities for the adjacent South Transfer Station (Figure 2) on the SRDS property in conjunction with implementation of the remedial action requirements. In 2020, SPU chose to reevaluate the best use of the SRDS property and decoupled the redevelopment elements from the remedial project. SPU will proceed with implementation of the required remedial action components defined in the CAP and will manage the SRDS property as a paved transfer station support facility with minor operational improvements for SPU activities.

The Agreed Order was amended again (third amendment) in August 2024 to include the modification of the South Transfer Station IA. The IAs included construction of a landfill cap, installing LFG and surface water control systems, establishing groundwater and landfill gas (LFG) monitoring, and implementing institutional controls.

This report presents the results of the 2024 operations, maintenance, and monitoring (OMM) that was conducted in accordance with the Final CAP for the Settlement Area (Ecology 2018a). The

required monitoring is described in the Post-Closure Operation, Maintenance, and Monitoring Plan (OMMP), presented as Appendix A of the CAP.

Coordination and preparation of this report are being performed for the Settlement Area under a 2019 Consent Decree with Ecology. Parametrix has been designated by the City and SPU, as the Site Coordinator to perform the long-term monitoring and reporting required under the CAP and the OMMP. Contact information for the responsible parties is presented in Table 1. Figures and tables are appended at the end of the report.

1.2 Background

The property encompassing the landfill was originally a private landfill from the 1930s to 1951, when the landfill was purchased by King County (County) for disposal of solid waste. The City purchased the SRDS property from the County in 1951 and continued solid waste operations. The SPPD property was leased for rubbish disposal from the County from 1958 through 1978 by the City. The SPPD property was purchased from the County in 2006.

The landfill received solid waste from the 1930s until 1966, when it was closed under the existing landfill closure laws at the time. During operation, much of the waste received at the landfill was burned on-site to reduce its volume (Floyd Snider 2021). The landfill is unlined primarily occurring over a local silt deposit with some of the waste buried below the water table. After closure, the City owned portion was redeveloped into the South Recycling and Disposal Station which operated from 1966 through 2013. The SPPD parcel was predominantly used as a storage yard until it was redeveloped into its current configuration starting in 2014. Additional details are provided in Section 1.3, below.

Investigations of groundwater, surface water, soil, and LFG began in the late 1980s. In February 2007, the landfill was added to Ecology's Hazardous Sites List (Facility Site Identification No. 2180) based on concerns related to groundwater contamination and the presence of potentially flammable or explosive LFG.

1.3 Settlement Area Properties and Remedy Components

The Settlement Area includes the SRDS and CPSP (formerly SPPD) properties and certain adjacent City and Washington State ROWs. The locations of the properties are shown on Figure 2. Brief descriptions of each property and the completed, or planned, remedy components are provided in the following sections.

1.3.1 South Recycling and Disposal Station Property

The SRDS property includes County tax parcel No. 7328400005, encompassing 10.55 acres. A portion of this property was purchased by SPU in 1951. Later in the 1950s, the City sold some portions of the property to private individuals. Between 1965 and 1967, the City reacquired those portions of the property sold in the 1950s. Two additional strips of land defined by County tax parcel No. 3224049110, 60 feet (ft) on the west of the SRDS property and 30 ft on the south, were incorporated into the property in 2003 by City Ordinance 121306. This additional land is in the process of being recorded by the County and brings the area to approximately 11 acres.

A transfer station for municipal solid waste and recyclable materials operated from 1966 to 2013 on the SRDS property. In Spring 2013, SPU opened a new solid waste transfer station (South Transfer Station) to the north, across South Kenyon Street, and the transfer station on the SRDS property became inactive, except for limited support activities. SPU operates a household hazardous waste

(HHW) collection site on the northernmost portion of the SRDS property near South Kenyon Street and 5th Avenue South.

The SRDS facility includes the main waste disposal building, a small maintenance facility, a scale house, two vehicle-fueling systems, and several additional small buildings used for offices and HHW collection. The offices and HHW collection are the only regularly occupied/active facilities. The majority of the facility is paved, except for some landscaped areas along the eastern edge of the property adjacent to 5th Avenue South, a landscaped strip along the south side of the property, a few landscape planter islands along the western side of the property, and other small areas in the interior of the property as shown in the aerial of Figure 2.

Under Amendment No. 2 of Agreed Order No. DE 6706, an IA was implemented for the SRDS property between 2015 and 2020, as detailed in an Interim Action Work Plan (IAWP) (Herrera 2021). The IA included monitoring during maintenance activities, evaluation of a groundwater seep, and a Supplemental Groundwater Investigation.

As required under the draft Amended CAP, SPU will demolish existing structures; abandon inactive utilities; install asphalt, concrete, or geomembrane landfill cap systems; install LFG and surface water controls; implement institutional controls; and perform compliance monitoring. The LFG collection system will include horizontal (trench) collectors, conveyance piping, and vents to address areas covered by cap materials.

1.3.2 CenterPoint South Park LLC Property

The CPSP (former SPPD) property is County tax parcel No. 3224049005 and includes 21.0 acres of land purchased from the County in 2006. The property was purchased by CPSP in 2022. The property was previously purchased by the County in 1957 and leased to SPU from 1958 to 1978 for municipal solid waste disposal. After disposal operations ended in 1966, additional unclassified fill was added, and the property was graded (but not paved) as part of landfill closure. The County later leased portions of the property to a variety of tenants from the mid-1980s through the late 1990s, primarily for truck and equipment storage. In 2008, the property was largely cleared of vegetation, and, in some areas, a layer of crushed concrete was added as ballast and the property was regraded.

In 2014 and 2015, the SPPD owner performed an IA for cleanup at the property in accordance with the 2013 Ecology-approved IAWP (Farallon 2013) under Amendment No. 1 of Agreed Order No. DE 6706. The IA was performed simultaneously with the redevelopment of the property. The property redevelopment included a modular building for employees and paved parking for employees and visitors. The IA work included regrading and capping the landfill surface, installing an engineered stormwater collection system, installing and operating an LFG control system, implementing institutional controls, and conducting monitoring.

1.4 Hydrogeologic Setting

South Park Landfill is located within the Lower Duwamish Valley, near the western valley wall, as shown in Figure 1. The landfill is at an elevation of approximately 15 to 30 ft above sea level. The southern portion (CPSP property) is generally at a higher elevation than the remainder of the landfill. The landfill has an overall shallow topographic gradient trending to the northeast towards the Duwamish Waterway. The Duwamish Waterway is approximately 1,700 to 2,000 ft northeast of the northeast landfill boundary.

The Duwamish Valley consists of a relatively thick sequence of historical channel, floodplain, and overbank alluvial deposits from the Duwamish River overlain by a relatively extensive layer of imported fill. The alluvial deposits range from 30 to 50 ft thick near the edge of the valley to more than 100 ft thick in the center of the valley (Hart Crowser 1998). Groundwater occurs throughout the alluvial deposits forming the Duwamish Valley Alluvial Aquifer. It is comprised of various zones of saturation and thickness occurring within the alluvial deposits. At the Settlement Area, there are three groundwater zones of interest; all are part of the upper portion of the Duwamish Valley Alluvial Aquifer system.

- The Perched Zone is a thin discontinuous layer of groundwater (mostly infiltrating rainwater) that exists above the Silt Overbank Deposit. In many places, the Perched Zone groundwater is in contact with solid waste and is conceptually equivalent to landfill leachate in those locations. The thickness of the Perched Zone may vary seasonally but is often only a few inches of water sitting on the hummocky surface of the Silt Overbank Deposit.
- The A-Zone of the Duwamish Valley Alluvial Aquifer is immediately beneath the Silt Overbank Deposit and is the critical zone where leachate (and perched water) can enter the groundwater system and move off-site. The A-Zone extends from the base of the Silt Overbank Deposit for approximately 15 to 20 ft (generally to -15 ft elevation North American Vertical Datum of 1988 [NAVD 88]).
- The B-Zone of the Duwamish Valley Alluvial Aquifer is the next deeper zone extending from approximately -15 ft elevation NAVD 88 to either the top of the estuarine/marine deposits or approximately -35 ft elevation NAVD 88, whichever is shallower.

The solid waste deposited in the landfill extends into the top of the A-Zone with the depth of waste extending down approximately to sea level (Floyd | Snider et al 2021). The lower portion of solid waste in the landfill is saturated (i.e., occurring below the local water table). Interpreted cross-sections of the landfill and surrounding area are included in Figures 5.2 to 5.7 in Floyd | Snider et al (2021).

1.5 Monitoring Program Overview

In accordance with the CAP, monitoring at the Settlement Area by the Site Coordinator consists of annual cap inspections, quarterly monitoring of LFG perimeter probes, and quarterly sampling and analysis of groundwater monitoring wells upgradient and downgradient of the Settlement Area. SPU assumed responsibility for the quarterly monitoring of LFG perimeter probes in the third quarter of 2022. Additional events may be triggered by LFG monitoring results at the perimeter probes or by unforeseen emergency or extreme weather conditions, as summarized in the following sections.

Monitoring performed by the Site Coordinator is in addition to the monitoring requirements of property owners in accordance with the CAP and OMMP. Monitoring by the property owners (SPU and CPSP) consists of continuous methane monitoring in on-site buildings as defined in the OMMP. The status of the 2024 monitoring is documented in the Annual Report Checklist presented in Appendix A.

1.5.1 Annual Monitoring

Cap inspections are conducted annually as described in Section 2 of this report. Maintenance forms are completed by the property owners to document repairs conducted and re-inspections are conducted by the Site Coordinator. The 2024 annual cap inspection results are presented in Appendix B.

1.5.2 Quarterly Monitoring

Quarterly monitoring at LFG perimeter probes and sampling and analysis of groundwater from monitoring wells was conducted as described in Sections 3 and 4, respectively, of this report. In addition to quarterly LFG monitoring, continuous methane detection systems with alarms are required to be operating in occupied buildings in the Settlement Area, and provisions are in place that would initiate methane monitoring in off-site buildings if triggered by LFG detections above regulatory limits in perimeter gas probes.

1.5.3 Unforeseen Emergency or Extreme Weather Events

An unforeseen emergency or extreme weather event, such as an earthquake, fire, flood, or other natural or man-made disaster, will trigger a requirement for an immediate Settlement Area-wide inspection. Such unforeseen events could cause sudden differential settlement of the landfill contents and/or cap that could affect the integrity of the landfill cap and infrastructure, including LFG control systems, monitoring probes, and monitoring wells, which could potentially result in exposure to methane gas or affect safe operation of the LFG control system. The following criteria for unforeseen events would trigger an immediate Settlement Area-wide inspection:

- An earthquake along the Seattle fault that registers 4.0 or greater on the Richter scale.
- An earthquake within 100 miles of Seattle that registers 5.0 or greater on the Richter scale.
- A major storm that produces greater than 3.0 inches of rainfall within a 24-hour period.
- Any fire that occurs on or below the cap.
- Any other damage in the Settlement Area observed by the property owners, facility workers, or the public, such as damage sustained by high winds, or facility or vehicular accident(s).

The monitoring program will document monitoring and inspection results, provide information on maintenance requirements, and document OMM activities performed during the previous year.

2. Landfill Cap System

The CAP requires inspection and maintenance of the landfill cap, including pavement, roadways, surficial stormwater features, and vegetated areas. The purpose of the inspection and maintenance is to confirm that the landfill cap remedy is performing as intended by the CAP in a manner that protects human health and the environment.

The cleanup action requires a landfill cap covering all areas at the Settlement Area that contain solid waste. The primary goal of the landfill cap is to block access or exposure to the solid waste and soil; secondary goals are to limit stormwater infiltration and to facilitate the performance of the LFG systems.

The landfill cap consists of pavement, buildings, and geomembrane/soil layers that must be maintained in such a manner to prevent contact with the solid waste/soil beneath the cap, prevent “short-circuiting” of the LFG controls, and prevent interference with the stormwater controls. The cap is not required to entirely block the infiltration of stormwater. Existing or planned stormwater controls are described for each property as follows:

SRDS Property. Stormwater management on the SRDS property is primarily pavement, catch basins, and conveyance pipes with collection into two systems. One system collects stormwater and liquids that may have come into contact with solid waste and directs them to the sanitary sewer. The other system collects stormwater from around the property and connects to the City’s storm drain system in 2nd Avenue South. This system ties into the storm drain system on State Route (SR) 509 that flows into the wetlands on the west side of SR 509. A series of roadside ditches and catch basins collect stormwater runoff from South Kenyon Street and 5th Avenue South. These stormwater systems also connect to the City’s storm drain system in 2nd Avenue South.

After redevelopment, in accordance with the draft Amended CAP, stormwater drainage will be collected across the SRDS property with flow and quality mitigation using an above-grade stormwater treatment system. The location, treatment media, sizing, and configuration of the stormwater treatment system are currently in the design process.

CPSP Property. Stormwater capture on the CPSP property is achieved with a system of paved surfaces and catch basins, and conveyance via overland flow on paved surfaces and piping to detention and treatment in one of two CPSP property bioswales. A small proportion of CPSP property stormwater runoff (e.g., from the access driveway off 5th Avenue South) is outside the capture area of the bioswales and flows to catch basins in ROWs.

2.1 Landfill Cap Inspection Methodology

Annual inspections consist of a visual survey of the accessible cap surface exterior to buildings, including drainage features and surface components of stormwater conveyance (i.e., catch basins, swales). The inspection documents signs of cap damage, failure, deterioration, or disturbance. Observations are noted on the field inspection forms and via sketches or global positioning system (GPS) [for location] and photographs.

The following types of observations are documented for specific areas of the landfill cap.

- Asphaltic Concrete (Location numbers AC-):
 - Cracking
 - Uneven settlement or potholes
 - Pooling or ponding
 - Separation of pavement from curbs, gutters, or catch basins
 - Sloughing or crumbling of edge materials
 - Erosion
 - Other signs of cap damage, failure or disturbance
- Low Permeability Geomembrane (Location numbers G-):
 - Erosion of cover soil
 - Exposed geotextile
 - Holes/signs of unauthorized digging
 - Exposed geomembrane
- Stormwater Management Facilities (Location numbers SW-):
 - Signs of water infiltration below structure
 - Erosion of soil
 - Holes/signs of unauthorized digging
 - Invasive/deep-rooted plants

If any of the above are identified during an inspection, the condition will be documented and a recommendation for repairs or monitoring will be included on the Cap Inspection Report. Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action and the Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Inspection Form B (a blank sample is located in Appendix B2-A), and the Site Coordinator will provide observations in Part 2 of the form after the verification inspection.

The basis of determining the timeline for repairs comes from the OMMP. The OMMP has the following guidance for the timeline of maintenance/repairs:

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days. These areas are of highest concern due to the potential compromise of the landfill cap and need to be further inspected, repaired, and restored in accordance with the approved 2013 IAWP of the Agreed Order.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

2.2 Landfill Cap Inspection and Maintenance Events

In accordance with the Cap Inspection Work Plan (Parametrix 2020), an annual inspection was conducted on March 5 and 15, 2024 and a mid-year landfill cap reinspection was conducted on October 4, 2024. Maintenance and repairs conducted by the property owners were documented and inspections were conducted by the Site Coordinator.

2.2.1 March 2024 Landfill Cap Inspection

The 2024 annual landfill cap inspection was conducted on March 5 and 15, 2024. Previously identified concerns that remained in the same general or worse condition were retained in the current list of concerns. The findings of the inspection are presented in the technical memorandum included as Appendix B1-A (Appendix B) and are summarized below.

2.2.1.1 SRDS Property

The general property conditions observed were good and all areas called out for repair in the October 2023 cap inspection (AC-13, AC-14, and AC-20) were repaired prior to this inspection. Pavement cracks, rutting, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time.

2.2.1.2 CPSP Property

The general property conditions observed were good and similar to previous inspections. The paved area was in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate asphaltic concrete cap damage. Vegetated slopes are uniform and generally in good condition with some erosion noted. The primary concerns were exposed geomembrane, invasive plant growth, and the growth of vegetation through asphalt, with several locations identified as needing repair (see Table 1 of the 2024 annual inspection report). Some of the invasive plants had been cut back prior to this inspection (AC-13, AC-21, G-4) but the asphalt was not sealed, and the damage caused by the roots had not been repaired. Regular maintenance is recommended. Although maintenance of geomembrane had been conducted at some locations (G-6, G-7, G-8, and G-12), geomembrane remained exposed. This inspection also found large metal stakes that penetrated the asphalt cap.

The two stormwater catch basins (SW-3 and SW-4) appeared to have been cleared since the October 2023 inspection but had since started accumulating debris. These are locations that will require continual maintenance.

2.2.1.3 Right-of-Way

Four areas in the ROW were identified as locations needing repair in the October 2023 cap inspection. ROW AC-1 and AC-2 represent a section of the road and not individual potholes and cracks due to the number of locations that need repair. Several of the holes in the AC-1 and AC-2 areas were patched but there are still locations which have increasingly deep and large potholes. AC-3 had not been repaired. At AC-4, the previous pothole had been patched; however, several asphalt cracks and ruts have worsened and are in need of repair.

2.2.2 October 2024 Mid-Year Landfill Cap Reinspection

A mid-year reinspection was conducted by the Site Coordinator on October 4, 2024. Locations identified in the March 2024 annual inspection were reinspected. The findings are presented in a technical memorandum included as Appendix B1-B (Appendix B) and are summarized below.

2.2.2.1 SRDS Property

The general property conditions observed were good and similar to previous inspections. Pavement cracks, rutting, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time except at locations SRDS AC-5 and SRDS AC-22.

2.2.2.2 CPSP Property

The general property conditions observed were good and similar to previous inspections. The paved area was in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate asphaltic concrete cap damage. Vegetated slopes were uniform and generally in good condition with some erosion. The primary concerns were exposed geomembrane, invasive plant growth, and growth of vegetation through asphalt. Some of the invasive plants were cut back and exposed geomembrane was present, but the asphalt was not sealed, and the damage caused by the roots had not been repaired. Upon further consideration the areas with metal stakes that were included in the annual inspection report were removed as an issue. If the stakes are removed, maintenance will be needed at that time to seal the areas the stakes were driven into.

The two stormwater catch basins (SW-3 and SW-4) appeared to have been cleared since the March inspection but continue to accumulate debris. These locations will require continual maintenance.

2.2.2.3 Right-of-Way

Four areas in the ROW were identified as locations needing repair in the March 2024 inspection. ROW AC-1 and AC-2 represent a section of the road and not individual potholes and cracks due to the number of locations that need repair. Several of the holes in the ROW AC-1, ROW AC-2, and ROW AC-4 areas were patched but there are still areas in those locations which have increasingly deep and large potholes. AC-3 has potholes along the street in the gravel.

2.2.3 Landfill Cap Maintenance Completed

Example forms to be used for documenting landfill cap maintenance are presented in Appendix B2-A of Appendix B. Cap maintenance completed during this reporting period is documented on Cap Maintenance Forms presented in Appendix B2-B, with Part 1 (Maintenance) completed by the property owner, and Part 2 (Observation/Review of Maintenance) completed by the Site Coordinator.

2.2.3.1 SRDS Property

In February 2024, cracks were repaired at locations SRDS AC-13, AC-14, and AC-20 with hot mix asphalt and sealant. The Site Coordinator observed the repairs and determined the repair activities were complete.

2.2.3.2 CPSP Property

On February 22 and 23, 2024, Veth's Landscaping, on behalf of CPSP completed cap maintenance at locations CPSP G-6, G-7, G-8, and G-12. Dead grass was removed, and new sod and re-seed was placed partially restoring areas of exposed geomembrane.

On May 13, 2024, Catchment Solutions, on behalf of CPSP removed blackberries and other invasive species overgrowth at locations CPSP AC-13, AC-21, and G-4 along fence lines.

On December 10, 2024, Catchment Solutions, on behalf of CPSP completed maintenance at location G-1, capping two open pipes in the landscaping slope. This repair will be inspected during the 2025 Annual Cap Inspection.

On January 29, 2025, Secoma Fence, on behalf of CPSP, installed gate posts for two 25-foot-wide barrier gates at each end of the private drive and repaired the asphalt surrounding the posts with cement. This repair will be inspected during the 2025 Annual Cap Inspection.

2.2.3.3 Rights-of-Way

On February 6, 2024, the Site Coordinator observed previously performed repairs on cracks and potholes at locations ROW AC-1 and AC-4. The repairs at AC-4 were considered complete and the repairs at AC-1 were considered partially complete, with a few large cracks remaining. However, at AC-4, several asphalt cracks and ruts have worsened and are still in need of repair.

2.2.4 Unforeseen Emergency or Extreme Weather Events

SPU provided a temporary sublease/permit of a small portion of the SRDS property to Strategic Materials, Inc. (SMI) for clean glass cullet storage. King County Public Health (KCPH) was notified of the proposed temporary change to operational usage.

SMI stacked ecology blocks to contain the glass cullet in two areas along the southern border of SRDS property. One of those areas had a failure with the stacked ecology blocks resulting in several blocks falling onto the cap and glass spilling into the swale. A vactor truck was used to remove the spilled glass. The glass and soil that were removed went through characterization and disposal.

SMI removed the glass from all stockpiles on SRDS property in January 2025. Inspections were conducted to verify that no damage was done to the cap. Cleanup of residual cullet, ecology block fragments, and glass labels is ongoing as of the date of this document.

No other unforeseen emergency or extreme weather events were identified at the Settlement Area during 2024 that triggered an inspection to the landfill cap.

2.3 Activities Planned for the Next One-Year Period

The Site Coordinator will conduct an annual cap inspection in the spring of 2025 which will include reinspection of previous areas of concern, reviewing maintenance conducted, and looking for any new areas of concern. The previously identified locations of concern will be evaluated during the 2025 inspections (See tables presented in Appendices B1-A and B1-B for further details). A mid-year reinspection will be conducted in the fall of 2025 to reinspect areas with minor cracks and ponding to observe if they have worsened exposing underlying materials and in need of repair.

2.3.1 SRDS Property

The 2024 Landfill Cap Inspection conducted in March 2024, and 2024 Mid-Year Landfill Cap Reinspection conducted in October 2024, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. Pavement restoration is needed at the areas of concern identified in the Mid-Year Landfill Cap Reinspection. Additional work may be required if new areas of concern are identified during the 2025 cap inspection.

2.3.2 CPSP Property

The 2024 Landfill Cap Inspection conducted in March 2024 and the 2024 Mid-Year Landfill Cap Reinspection conducted in October 2024, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. Several areas of concern identified during the cap inspections were repaired during this reporting period, but additional repairs are required. Additional work will be required in 2025 to complete and/or reinspect outstanding recommended repairs.

2.3.3 Rights-of-Way

The 2024 Landfill Cap Inspection conducted in March 2024, and 2024 Mid-Year Landfill Cap Reinspection conducted in October 2024, presented in Appendices B1-A and B1-B, identified areas of concern within the Settlement Area. Several areas of concern identified during the cap inspections were repaired during this reporting period, but additional repairs are required. Additional work will be required in 2025 to complete and/or reinspect outstanding recommended repairs.

3. Landfill Gas System

The LFG control system consists of property-specific solutions designed to operate separately but be compatible and synergistic in how they control LFG across the Settlement Area. Brief descriptions of the existing or planned LFG control systems for each property are provided below with the LFG monitoring discussed in the following sections.

- **SRDS Property.** The buildings that are currently on the property are either naturally ventilated or are elevated and skirted with porous siding; both are appropriate methods of LFG mitigation. As part of the draft Amended CAP, SPU will install an LFG control system at the SRDS property, intended to be operated passively, with an option to convert to active operation if necessary. The final design for the LFG system at the SRDS property will be described in an Engineering Design Report, which will be finalized by 2025 per the schedule outlined in the draft Amended CAP. This system will also influence the ROW associated with 5th Avenue South adjacent to this property.
- **CPSP Property.** An active LFG control system was installed at the CPSP property as part of the IA development in 2014 and 2015 (Farallon 2013). The LFG system was designed to protect buildings on the CPSP property and to control gas migration along the southern, western, and eastern perimeter of the Settlement Area. The system consists of a network of vertical gas collection wells and horizontal gas collection trenches. LFG is extracted under an applied vacuum and discharged out a vent stack in the surface component equipment enclosure, which is located on the northwest portion of the CPSP property. It is operated by the CPSP property owner in accordance with an Ecology-approved LFG Collection and Control System OMMP (Farallon 2016).

3.1 Landfill Gas Monitoring Methodology

The LFG monitoring includes quarterly monitoring of perimeter probes; continuous monitoring of on-site buildings using methane detectors and alarms conducted by individual property owners; and off-site building monitoring, if necessary (see conditions in Figure 4). The primary goal of perimeter probe monitoring is to evaluate potential lateral off-site LFG migration, and the primary goal of building monitoring is to protect human health.

The perimeter gas probe network for the Settlement Area includes 17 probes installed at the locations shown on Figure 3. The Site Coordinator conducted the perimeter gas probe monitoring through the second quarter of 2022 and SPU assumed responsibility for the monitoring in the third quarter of 2022. Procedures for perimeter gas probe monitoring are presented in the OMMP – Landfill Gas Monitoring and Contingency Plan.

3.1.1 Gas Probe Monitoring

A Landtec GEM 5000 is used to measure barometric pressure at the beginning and end of each monitoring event, as well as static pressure and LFG concentrations in each gas probe. The barometric pressure status (rising, falling, steady) is recorded.

At each probe, static pressure is measured prior to purging, and then one probe volume is purged prior to recording concentrations of methane, carbon dioxide, and oxygen. The purge time using the Landtec GEM is calculated for each probe based on its construction. The LFG meter is connected to LFG probes using Teflon tubing and a rubber stopper placed into probes without a valve. Teflon, silicone, and polyethylene tubing are utilized to connect to the LFG meter.

Several of the LFG probes exhibit water levels above their screens year-round, blocking landfill gas from entering the probes. If the probe is observed through field observations to be blocked by water during the purging process (e.g., high differential pressures, water entering Landtec GEM tubing), purging is discontinued, and the probe is noted to be blocked, and this information is entered directly into the Landtec GEM. All the data are downloaded from the Landtec GEM and submitted to the Site Coordinator.

3.1.2 Landfill Gas Triggers and Contingency Actions

The flow chart for the LFG triggers and contingency actions is presented in Figure 4, developed to clarify the flow chart presented in Figure A.2.6 of the OMMP (Parametrix 2021a). Methane concentrations in soil at the landfill boundary must not exceed 5 percent by volume, which is the lower explosive limit (LEL) for methane, or contingent actions are triggered as shown on Figure 4. The threshold criteria that would trigger additional off-site building monitoring is 1.25 percent by volume (25 percent of the LEL) for all probes other than GP-27 and GP-29. At probes GP-27 and GP-29, since methane concentrations of up to 5 percent by volume have been shown to be protective, the criterion for additional off-site building monitoring is 5 percent by volume.

3.2 Landfill Gas Monitoring Activities and Results

3.2.1 Perimeter Gas Probe Monitoring

Quarterly perimeter gas probe monitoring events were conducted in January, April, July, and October 2024. The results are summarized in Table 2 and included on the gas probe monitoring field forms presented in Appendix C1.

Four gas probes (GP-11, GP-13, GP-15, and GP-32) were observed to be blocked (screened zones completely saturated) during one or more sampling events and data measured from blocked probes during those events are not used.

None of the methane concentrations measured during quarterly monitoring events exceeded 5 percent by volume, which is the LEL for methane. Methane concentrations were less than the 1.25 percent by volume regulatory action limit.

3.2.2 Building Monitoring

Building monitoring is required for occupied on-site buildings unless the construction demonstrates effective LFG mitigation. Off-site building monitoring is required only if triggered by conditions in perimeter gas probes.

3.2.2.1 On-Site

All occupied buildings on the Settlement Area (on-site buildings) are required to have continuous (i.e., operate 24 hours per day, 7 days per week) methane detectors with alarms, with the exception of the current SRDS buildings which are naturally ventilated or elevated. Methane concentrations inside buildings and structures within the landfill boundary must not exceed 1.25 percent by volume, or 25 percent of the LEL; meters in buildings should be set with a low alarm warning at 10 percent of the LEL and the high alarm at 25 percent of the LEL. Quarterly inspections of these alarms are required by individual property owners in accordance with the manufacturer's recommendations to ensure proper operation and protection of human health.

SRDS Property

Continuous monitoring is not required until the property is redeveloped and will include standard enclosed buildings and the installation of a new LFG system.

CPSP Property

The CPSP property owner did not report any incidences of methane detections inside on-site buildings or structures during 2024. The methane alarms were inspected in the first and second quarters of 2024. Quarterly inspection of the methane alarms in the on-site buildings was not conducted after the second quarter as the buildings are vacant.

Inspection checklists are included in Appendix C2.

3.2.2.2 Off-Site

Off-site building monitoring is required to be conducted by the CPSP and SRDS individual property owners when triggered by methane conditions measured in nearby perimeter probes, as indicated in Figure 4. Methane concentrations inside buildings and structures outside the landfill boundary must not exceed 100 parts per million by volume (ppmv), equivalent to 0.01 percent by volume or 0.2 percent of the LEL. These criteria are typically measured in the buildings/structures with either handheld or mounted equipment. Procedures for off-site building monitoring are detailed in the OMMP.

3.2.3 Operational Activities Completed

3.2.3.1 CPSP Property.

- Conducted quarterly operation and maintenance of the landfill gas collection and control system (LFGCCS).
- Conducted ongoing remote monitoring of the CPSP property LFGCCS blowers.
- Conducted quarterly maintenance of the methane alarms in the on-site buildings during the first and second quarters of 2024.

3.2.4 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2024 that triggered an inspection of the perimeter gas probes or the LFG system.

3.3 Activities Planned for the Next One-Year Period

3.3.1 Landfill Gas Monitoring

Quarterly perimeter probe monitoring by SPU personnel is planned during the last week of January (completed), April, July, and October.

Monitoring records for on-site buildings will be provided by property owners on the form presented in Appendix C2.

3.3.2 Gas Probe Maintenance

Some additional future maintenance may be necessary at the following locations:

- There is asphalt erosion near gas probe GP-31. The roadway margin near the probe appears to be actively eroding due to heavy truck traffic. The condition of the probe will continue to be monitored to determine when actions are necessary to restore the asphalt near the probe.
- Repair cracked concrete around the casing at GP-28.

3.3.3 Shallow Gas Probe Supplemental Network

Four of the compliance monitoring gas probes at South Park Landfill are consistently blocked with water (GP-11, GP-13, GP-15, and GP-32) so that the presence of LFG in the shallow subsurface cannot be monitored. The locations are on the west (GP-11 and GP-13) and south (GP-15 and GP32) side of the landfill. Since these probes are located in the vicinity of adjacent occupied buildings, these probes will be supplemented in 2025 with gas probes screened at shallower depths above the water table. A work plan (Parametrix 2023) was approved by Ecology in December 2023. The required permits were secured from the City in early 2025, and the work is scheduled to take place in the spring of 2025.

4. Groundwater Monitoring System

Long-term groundwater monitoring is being conducted to evaluate the effectiveness of cleanup actions at the Settlement Area on groundwater quality. The CAP requires long-term groundwater monitoring to continue until groundwater chemicals of concern (COCs) are in compliance at the conditional point of compliance (CPOC), which has been established at, or near, the downgradient Edge of Refuse. The monitoring program includes assessing current groundwater concentrations and monitoring trends to confirm that vinyl chloride, *cis*-1,2-dichloroethene (DCE), benzene, arsenic, iron, and manganese concentrations continue to decrease over time and in a reasonable restoration timeframe.

In accordance with the CAP, analysis for dissolved arsenic in CPOC wells (MW-08, MW-10, MW-12, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32 and MW-33) was discontinued beginning in the second quarter of 2023 because concentrations remained in compliance with the CUL for 2 years. Additionally, analysis for benzene at well MW-25 was discontinued beginning in the third quarter of 2023 because concentrations remained in compliance for 2 years.

There are 14 groundwater monitoring wells included in the long-term groundwater monitoring program for the Settlement Area at the locations shown on Figure 5. In addition to the CPOC wells, the monitoring well network also includes wells used to monitor upgradient groundwater conditions (MW-12, MW-14, and MW-29) and wells used to monitor downgradient groundwater conditions adjacent to the former Glitsa American, Inc. property (MW-30 and MW-31). All wells are completed in native material except MW-18, which is completed in refuse, and MW-32 and MW-33, which are completed beneath refuse at the edge of waste. Table 3 provides a summary of the well depths, screen intervals, type of pump, top of casing, and well completion elevations.

The monitoring wells are completed primarily in one of three groundwater zones (Perched Zone, A-Zone, or B-Zone), all of which are part of the Duwamish Valley Alluvial Aquifer. There are four well pairs downgradient of the landfill that are screened in two different zones: Perched Zone/A-Zone (MW30/MW-31) and A- and B-Zones (MW-27/MW-8, MW-25/MW-10, and MW-26/MW-24).

4.1 Groundwater Monitoring Methodology

Groundwater monitoring includes measuring groundwater levels and sampling groundwater at the 14 monitoring wells and analyzing the samples for Site-specific COCs.

4.1.1 Water Level Measurement

During each quarterly monitoring event, approximately time synchronous groundwater levels are measured with a precision of 0.01 foot using an electric water level indicator. Groundwater level measurements are made relative to the surveyed top of the polyvinyl chloride (PVC) well casing or other defined measuring point at the wellhead, typically the northern-most portion of the PVC casing stick-up.

4.1.2 Sampling and Analysis

Groundwater samples are collected according to procedures outlined in the OMMP, using either a dedicated bladder pump and Teflon tubing or a peristaltic pump with disposable low-density polyethylene and silicon tubing. Details on which type of pump is used at each well are included in Table 3. The monitoring wells are purged using low-flow sampling procedures while field parameters

(temperature, pH, specific conductivity, dissolved oxygen, and oxidation-reduction potential [redox]) are measured to determine stabilization using a calibrated multiparameter probe with a flow-through cell. Turbidity is also measured in the field using a separate turbidity meter outside of the flow through cell.

Long-term groundwater monitoring includes analyzing samples for vinyl chloride, iron, and manganese (groundwater COCs that have exceeded cleanup levels (CULs) at the CPOC); and cis-1,2-DCE, the precursor for vinyl chloride. Benzene was previously analyzed in samples from well MW-25 to track a localized plume that appears to originate upgradient of the Settlement Area; and arsenic was previously analyzed in samples from wells MW-08, MW-10, MW-12, MW-18, MW-24, MW-25, MW-26, MW-27, MW-32, and MW-33. Analysis of benzene and dissolved arsenic was discontinued prior to the third and second quarters of 2023, respectively.

Groundwater samples are analyzed using the following methods:

- cis-1,2-DCE: U.S. Environmental Protection Agency (EPA) Method 8260D
- Vinyl chloride: EPA Method 8260D-SIM
- Iron and manganese: EPA Method 6020A

4.1.3 Groundwater Contingency Triggers and Actions

The Site-specific CULs for groundwater at the Settlement Area as stated in the CAP, which are based on the protection of groundwater as a potential drinking water source, are as follows:

- Vinyl chloride 0.29 micrograms per liter ($\mu\text{g}/\text{L}$)
- Iron (Total) 27 milligrams per liter (mg/L) (A-Zone); 31 mg/L (B-Zone)
- Manganese (Total) 2.2 mg/L
- cis-1,2-DCE 16 $\mu\text{g}/\text{L}$
- Benzene 5.0 $\mu\text{g}/\text{L}$
- Arsenic (Dissolved) 5.0 $\mu\text{g}/\text{L}$ (background; note that MW-27 is not a CPOC well for arsenic).

Trigger conditions and contingency actions for vinyl chloride are described in Section 4.1.3.1. Required actions for iron and manganese and arsenic are described in Sections 4.1.3.2 and 4.1.3.3.

4.1.3.1 Vinyl Chloride

In accordance with the CAP, either or both of the following two conditions will potentially trigger contingent actions based on monitoring in the existing compliance monitoring well network:

- **Condition 1.** Condition 1 (the concentration trigger) is based on groundwater concentrations. If concentrations in any downgradient well exceed 1.45 $\mu\text{g}/\text{L}$ (five times the CUL) for two consecutive sampling events, a contingent response is triggered. This trigger is not applied to MW-30 and MW-31, whose concentrations are affected by a non-landfill source in addition to the landfill.
- **Condition 2.** Condition 2 (the trend trigger) is based on a statistically significant increase in groundwater concentrations over time in the monitoring wells. The trend identification uses the nonparametric Mann-Kendall method and will be applied to downgradient wells where the concentration of vinyl chloride is greater than the CUL. The trend analysis will include MW-31

(which is screened in the alluvial aquifer) but not MW-30 (which is screened in the Silt Overbank Deposit).

4.1.3.2 Iron and Manganese

In accordance with the CAP, as long as the concentrations are stable or decreasing, no further action is required beyond monitoring. Once a dataset of eight quarterly events has been collected during long-term monitoring, Ecology may approve a decreased frequency of monitoring for iron and manganese. If the concentrations are increasing, the Subject PLPs will meet with Ecology to discuss next actions. Ecology will determine if further active remediation is needed and if this will require reopening the consent decree due to remedy failure.

4.2 Groundwater Monitoring Activities and Results

4.2.1 Long-Term Groundwater Monitoring

Quarterly long-term monitoring events were conducted in February, May, August, and November 2024. The measured groundwater levels, calculated gradients, interpreted flow directions, and groundwater quality results are presented in this section of the report.

4.2.1.1 Gradients and Flow Direction

Groundwater elevations calculated based on depth to groundwater measured in each well and the surveyed casing elevations are summarized in Table 4.

Horizontal Gradients

Groundwater gradient maps were prepared using data from all the A-Zone wells plus MW-18, as the A- and B-Zones are not separate aquifers or even hydraulically separated by any low permeability layers. Figures 6, 7, 8 and 9 show the interpreted gradients. The groundwater flow direction is generally to the east and northeast, toward the Lower Duwamish Waterway, with gradients ranging from 0.0075 to 0.0095 ft/ft in the northern region (calculated between MW-12 and MW-32) and 0.0083 to 0.0095 ft/ft in the southern region (calculated between MW-14 and MW-18). This is consistent with historical observations.

Vertical Gradients

Vertical groundwater gradients were calculated based on water level measurements collected in downgradient pairs completed in the Perched Zone/A-Zone of the Duwamish Valley Alluvial Aquifer (MW-30/MW-31) and the A- and B-Zones of the Duwamish Valley Alluvial Aquifer (MW-27/MW-8, MW-25/MW-10, and MW-26/MW-24). These data are presented in Table 5.

Boring logs show that the wells are mostly completed in the same alluvial aquifer, with some in the upper portions (A-Zone) and some in the lower (B-Zone), and no significant aquitards or low permeability layers in between the two zones. Vertical gradients measured in most of the well pairs during most of the sampling events were essentially neutral or within measurement error. Downward gradients were observed in well pair MW-30/MW-31 and are consistent with data presented in the RI indicating that the Silt Overbank Deposit is likely acting as a low permeability aquitard in this area.

Flow Velocity

Based on estimates of horizontal hydraulic conductivity and porosity determined in the RI/FS (Floyd | Snider et al. 2021) and the gradients measured in 2024, estimated horizontal groundwater flow velocities in the Duwamish Valley Alluvial Aquifer in the northern and southern regions of the Settlement Area are summarized in Table 6.

The two regions were identified in the RI/FS as having differing groundwater flow directions, soil types, and hydraulic conductivity estimates. The northern region of the Settlement Area (SRDS property) is in the vicinity of MW-10/MW-25, with a northeasterly groundwater flow direction and slightly higher hydraulic conductivities. The southern region of the Settlement Area (CPSP property) is in the vicinity of MW-8/MW-27, with an easterly groundwater flow direction and slightly lower hydraulic conductivities due to siltier soils. These values are similar or higher than measured/estimated values during the RI/FS, due to steeper measured and interpreted gradients.

The following formula was used to calculate groundwater flow velocities:

$V = Ki/ne$, where:

V = groundwater velocity (ft/day)

K = hydraulic conductivity (ft/day)

i = hydraulic gradient (ft/ft)

ne = effective porosity (dimensionless)

Based on the observed gradients of 0.0075 to 0.0095 ft/ft in the northern region of the Settlement Area and 0.0083 to 0.0095 ft/ft in the southern region, the calculated flow velocity ranged from 4.20 to 7.59 ft/day in the northern region and 1.27 to 3.21 ft/day in the southern region of the Settlement Area.

4.2.1.2 Groundwater Quality Results

Groundwater samples were analyzed by Analytical Resources, Inc. in Tukwila, Washington. The quarterly groundwater quality data are summarized in Table 7. Field data sheets for each quarterly event are presented in Appendix D3. Laboratory reports and data validation memoranda are presented in Appendix D4 and D5, respectively.

The following is a summary of CUL exceedances in CPOC wells during 2024 monitoring events:

- Vinyl chloride concentrations exceeded the CUL of 0.29 µg/L in A-Zone wells MW-25 (Q1, Q2, and Q4), and MW-32 (Q2, Q3 and Q4).
- Total iron concentrations exceeded the CUL of 27 mg/L in A-Zone wells MW-25 (Q1, Q2, Q3 and Q4) and MW-29 (Q4); and the CUL of 31 mg/L in B-Zone well MW-10 (Q1, Q2, Q3, and Q4).
- Total manganese concentrations exceeded the CUL of 2.2 mg/L in A-Zone well MW-25 (Q1, Q2, Q3, and Q4) and B-Zone well MW-10 (Q4).
- There were no concentrations of cis-1,2-DCE exceeding the CUL of 16 µg/L.

Time-series plots for all COCs, showing data for all historical events and post-Consent Decree sampling events organized separately for the A-/Perched Zone and the B-Zone, are presented in Appendix D1.

Time-series plots show CULs for all COCs and the concentration trigger value for vinyl chloride (1.45 µg/L).

Vinyl Chloride Trigger Evaluation and Trend Analyses

In 2024, vinyl chloride concentrations exceeded the CUL in CPOC downgradient A-Zone wells MW-25 and MW-32 during at least two quarters, but none of the concentrations exceeded the concentration trigger value.

Time-series plots of all historical data presented in Appendix D1 show apparent overall stable or decreasing trends for vinyl chloride over the history of monitoring. Historic data coverage prior to 2020 for each well is summarized below.

- 1999-2014: MW-8, MW-10, MW-12, MW-14, MW-18, MW-24
- 2006-2014: MW-25, MW-26, MW-27
- 2013-2014: MW-29
- 2011-2014: MW-30, MW-31, MW-32, MW-33

Mann-Kendall trend analyses for the vinyl chloride post-Consent Decree data (second quarter 2020 through fourth quarter 2024) were conducted using the Excel-based program ProUCL (EPA 2015). The Mann-Kendall trend plots, calculations, and a summary of the approach used is provided in Appendix D2, and the results are summarized in Table 8. Note that trends are required to include MW-31 but not MW-30, even though these wells are not CPOC wells.

There were no statistically significant trends in the post-Consent Decree data for vinyl chloride in the two downgradient CPOC wells that had 2024 vinyl chloride concentrations above the CUL (MW-25 and MW-32). Statistically significant increasing trends of vinyl chloride were observed in CPOC well MW-33 (A Zone) at concentrations below the CUL, and non-CPOC well MW-31 (A-Zone) at concentrations above the CUL (Table 8).

Since there were no wells that exceeded either of the contingency trigger conditions for vinyl chloride in 2024 (concentrations above the concentration trigger criteria for two consecutive sampling events and an increasing trend in a well where the concentration of vinyl chloride is greater than the CUL), no additional actions were required.

Iron and Manganese Trend Analysis

In 2024, iron and manganese concentrations exceeded the CUL during all four quarters in downgradient well MW-25 (A-Zone). Manganese concentrations exceeded the CUL during all four quarters in downgradient well MW-10 (B-Zone). In addition, the iron concentration exceeded the CUL during one quarter in downgradient well MW-29 (A-Zone) and the manganese concentration exceeded the CUL during one quarter in downgradient well MW-10 (B-Zone). Time-series plots for iron and manganese are presented in Appendix D1. Historic data coverage prior to 2020 for each well is summarized below.

- 1999-2003; 2011-2014: MW-08, MW-10, MW-12, MW-14, MW-18, MW-24
- 2006; 2011-2014: MW-25, MW-26, MW-27
- 2013-2014: MW-29, MW-30, MW-31, MW-32, MW-33

The time-series plots show generally stable or decreasing trends over the history of monitoring since 1999. One exception was the apparent increase in iron in well MW-25. Apparent decreases included

iron in upgradient well MW-12 (A-Zone) and downgradient wells MW-32 (A-Zone) and MW-08 and MW-18 (B-Zone); and manganese in upgradient well MW-12 (A-Zone), and downgradient wells MW-26, MW-29, and MW-32 (A-Zone) and MW-08 (B-Zone).

Mann-Kendall trend analyses for the iron and manganese post-Consent Decree data (second quarter 2020 through fourth quarter 2024) were conducted using the Excel-based program ProUCL (EPA 2015). The Mann-Kendall trend plots, calculations, and a summary of the approach used is provided in Appendix D2, and the results are summarized in Tables 9 and 10.

The trend analyses indicated statistically significant increasing trends in the post-Consent Decree data for iron in downgradient wells MW-25, MW-31, and MW-32 (A-Zone) and MW-24 (B-Zone); and for manganese in upgradient well MW-14 (A-Zone) and downgradient wells MW-25 and MW-31 (A-Zone), and MW-24 (B-Zone). Therefore, in accordance with the CAP, it is recommended that analyses for iron and manganese be continued during 2025. This recommendation will be discussed with Ecology.

4.2.2 Monitoring Well Maintenance Completed

No maintenance was completed or required in 2024.

4.2.3 Unforeseen Emergency or Extreme Weather Events

No unforeseen emergency or extreme weather events were identified at the Settlement Area during 2024 that triggered an inspection to the groundwater monitoring wells.

4.3 Activities Planned for the Next One-Year Period

4.3.1 Groundwater Monitoring

During the next 1-year period, quarterly groundwater monitoring is planned during the months of February, April, August, and November. SPU is assuming responsibility for the quarterly groundwater monitoring in the second quarter of 2025.

4.3.2 Monitoring Well Maintenance

- The bladder pump from MW-10 will be repaired or replaced to facilitate future groundwater monitoring. The well is currently sampled with a peristaltic pump.
- The locking lid for MW-27 will be repaired/rewelded to ensure well security.
- The old partially buried purge water drums that the County installed will be removed.
- Additional discharge and air lines may be replaced with Teflon lined and polyethylene tubing depending upon field observations.

5. Conclusions and Recommendations

The 2024 activities at the landfill were completed in accordance with the CAP. No unforeseen emergency or extreme weather events occurred during 2024 at the Settlement Area that triggered additional monitoring requirements.

5.1 Landfill Cap

The 2024 Annual Landfill Cap Inspection was conducted on March 5 and 15, 2024, and identified some areas requiring additional monitoring, maintenance, and repairs. A Mid-Year Landfill Cap Reinspection was conducted on October 4, 2024. SRDS and CPSP conducted some of the recommended repairs during 2024, and these repairs were observed by the Site Coordinator. Additional work is required based on the findings of the inspections. The Site Coordinator will conduct an annual inspection in the Spring of 2025.

5.2 Landfill Gas

LFG monitoring throughout 2024 indicated that LFG remains present at the Settlement Area and that the LFG is being effectively controlled without offsite migration above regulatory thresholds.

Supplemental shallow gas probe installation is scheduled for the Spring of 2025 for probes with screened intervals that are typically blocked by groundwater (GP-11, GP-13, GP-15, and GP-32) since these probes are located in the vicinity of adjacent occupied buildings. A work plan to install the supplemental gas probes (Parametrix 2023) has been approved by Ecology.

5.3 Groundwater

The groundwater flow direction observed in 2024 groundwater monitoring was toward the northeast and generally consistent with historical measurements. Based on the measured gradients, the calculated flow velocity ranged from 4.20 to 7.59 ft/day in the northern region and 1.27 to 3.21 ft/day in the southern region of the Settlement Area.

Comparison of water levels in the shallow and deep wells show slightly downward vertical gradients (water levels are higher in the shallower wells) most predominant in the MW-30/MW-31 well pair off the Settlement Area to the northeast.

The following CPOC wells had at least one COC concentration that exceeded the CUL during 2024:

- Vinyl chloride: downgradient wells MW-25 and MW-32 (A-Zone)
- Iron: downgradient wells MW-25 and MW-29 (A-Zone) and MW-10 (B-Zone)
- Manganese: downgradient wells MW-25 (A-Zone) and MW-10 (B-Zone)

The 2024 vinyl chloride data were evaluated and there were no conditions that triggered contingent actions. None of the vinyl chloride groundwater monitoring results exceeded the concentration trigger (concentration greater than 1.45 µg/L for two consecutive sampling events), and there were no statistically significant increasing trends in the post-Consent Decree data in the two downgradient wells that had vinyl chloride concentrations above the CUL (MW-25 and MW-32). Statistically significant increases were observed in CPOC well MW-33 at concentrations below the CUL and in non-CPOC well MW-31 at concentrations above the CUL. There were no CPOC wells that exceeded either of the contingency trigger conditions for vinyl chloride in 2024 and no additional actions were required. Trends

in vinyl chloride will be updated quarterly during 2025 in wells where measured concentrations exceed the CUL.

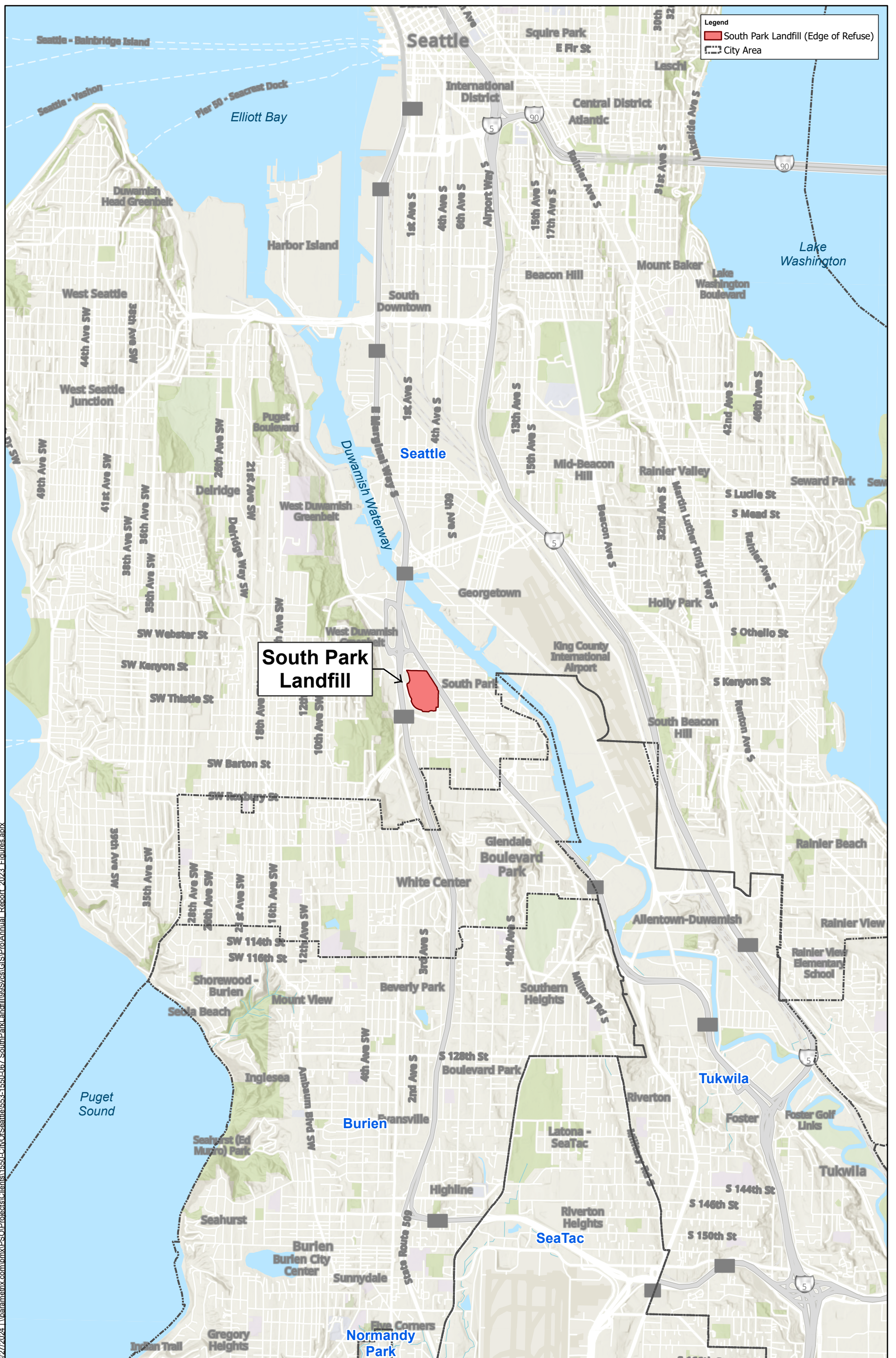
Since statistically significant upward trends during the post-Consent Decree period were observed for iron and manganese in some wells (iron in wells MW-24, MW-25, MW-31, and MW-32, and manganese in wells MW-14, MW-24, MW-25, and MW-31), monitoring for iron and manganese will continue in 2025 in accordance with the CAP. Trends in iron and manganese will be reevaluated after the fourth quarter 2025 event to assess whether potential future reductions in monitoring frequency can be recommended.

6. References

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Figures





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Source: ESRI, Mapbox, OpenStreetMap

Figure 1
Vicinity Map
South Park Landfill

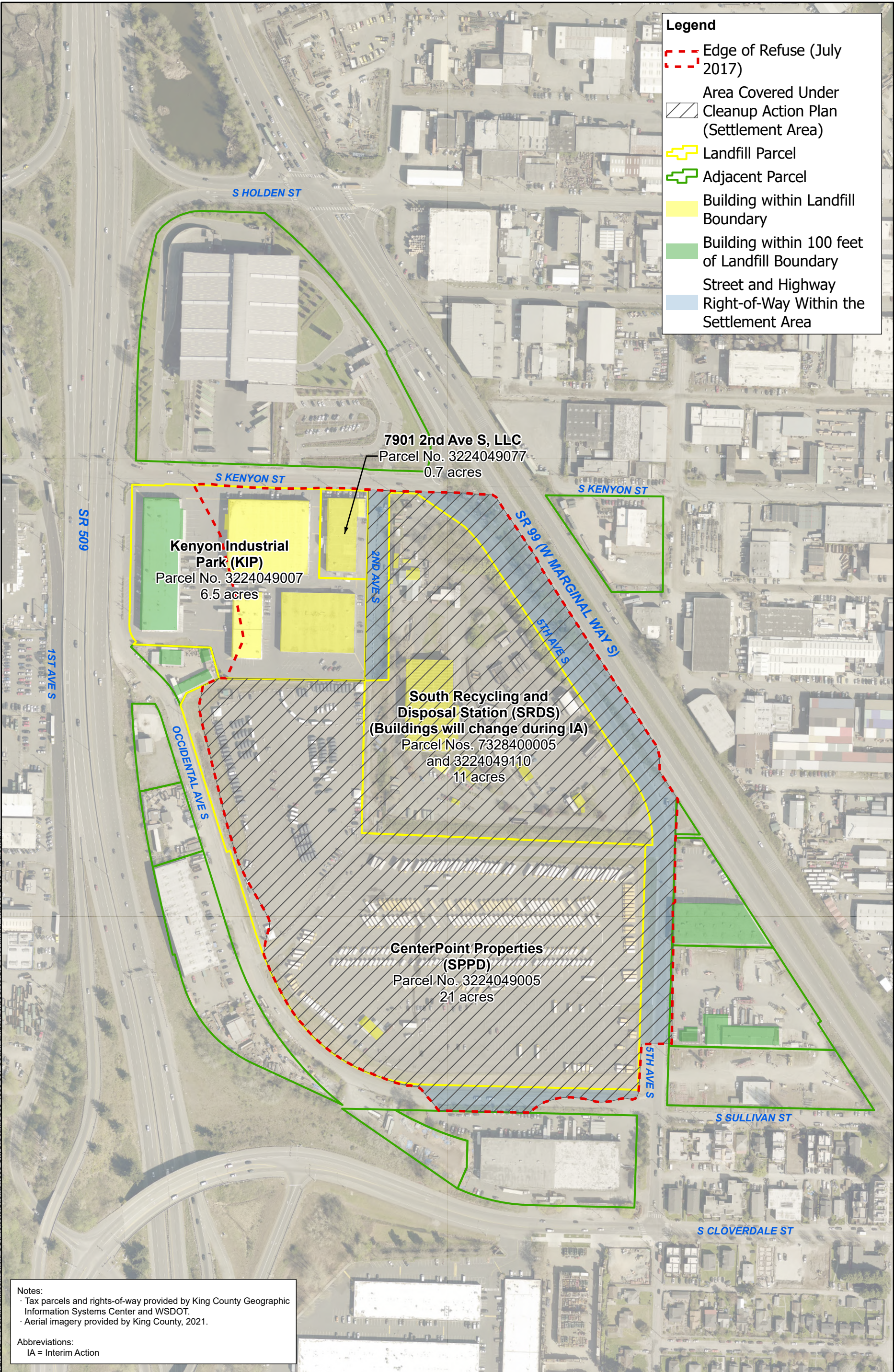
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0 0.5 1 2 Miles

Legend

- - - Edge of Refuse (July 2017)
- Area Covered Under Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- Building within Landfill Boundary
- Building within 100 feet of Landfill Boundary
- Street and Highway Right-of-Way Within the Settlement Area



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


Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

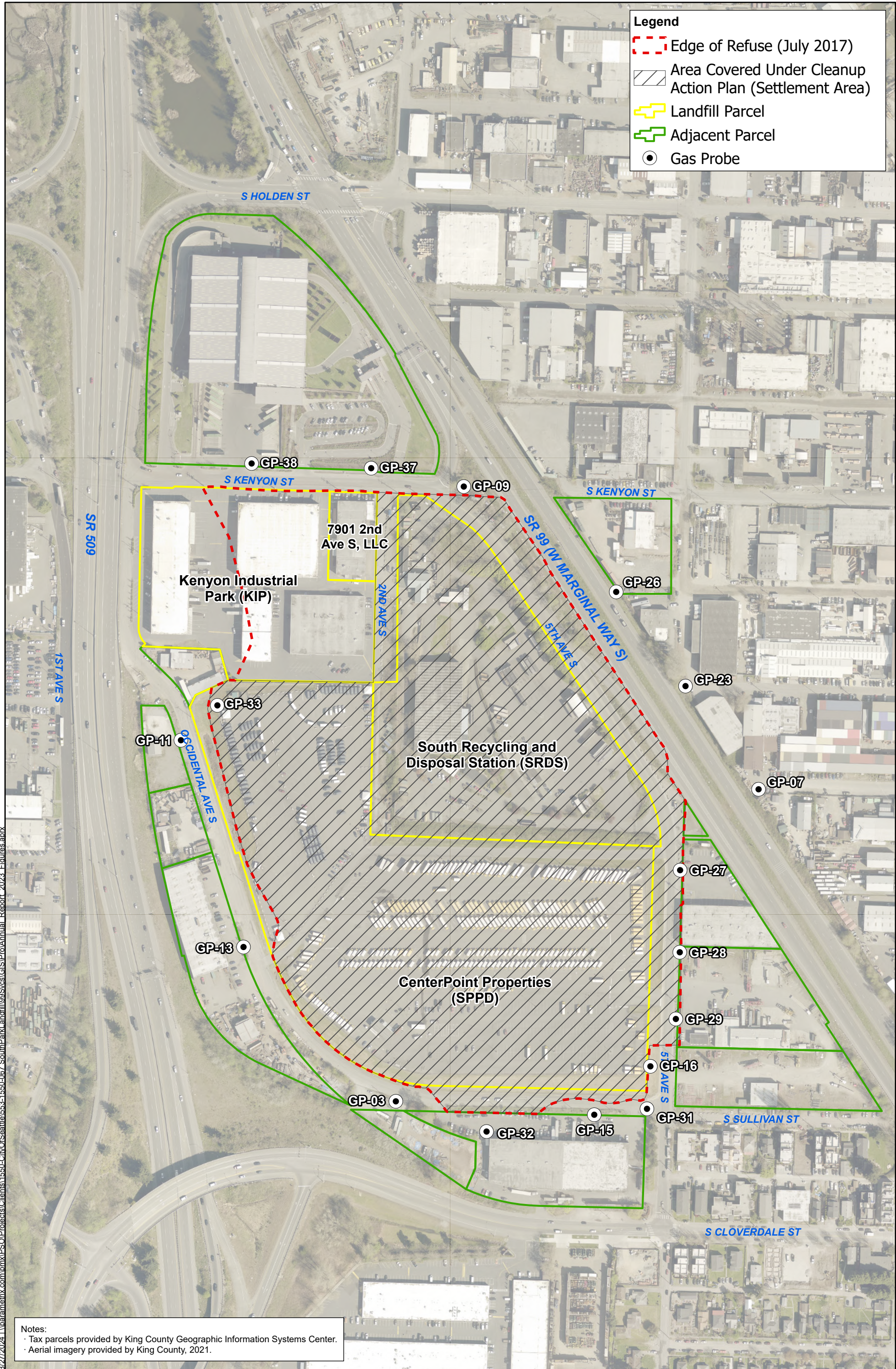
Parametrix



Figure 2
Parcel Map with Rights-of-Way
South Park Landfill

Legend

-  Edge of Refuse (July 2017)
-  Area Covered Under Cleanup Action Plan (Settlement Area)
-  Landfill Parcel
-  Adjacent Parcel
-  Gas Probe



Notes:
 • Tax parcels provided by King County Geographic Information Systems Center.
 • Aerial imagery provided by King County, 2021.

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

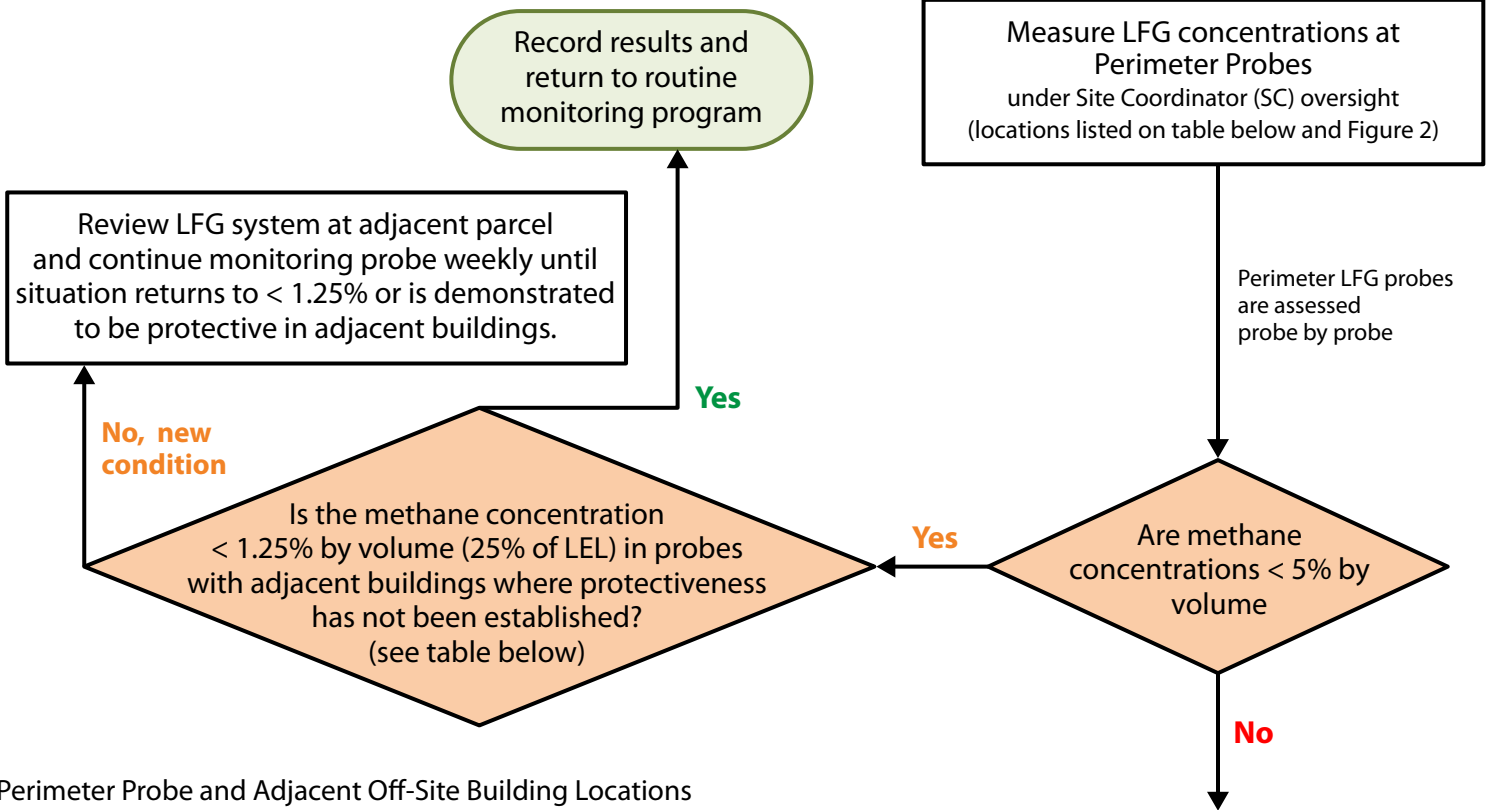
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Figure 3
Perimeter Gas Probe Network
 South Park Landfill



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for Perimeter Probe Monitoring



Perimeter Probe and Adjacent Off-Site Building Locations

Gas Probe	Adjacent LFG System	Adjacent Off-site Buildings within 100 ft ¹	Protectiveness Established*?
GP-03	SPPD	None	NA
GP-07	SRDS/SPPD	Eagle Eye Enterprises, LLC	No
GP-09	SRDS	None	NA
GP-11	SPPD	International Construction Equipment, Inc.	No
GP-13	SPPD	NorthStar Ice Equipment	No
GP-15	SPPD	Lenci/Emerson	No
GP-16	SPPD	None	NA
GP-23	SRDS	Bank of America (2 buildings)	No
GP-26	SRDS	Rick Larson Enterprises, Inc.	No
GP-27	SPPD	5th Avenue South	Yes
GP-28	SPPD	5th Avenue South	No
GP-29	SPPD	5th Avenue South	Yes
GP-31	SRDS	Emerson Power Products	No
GP-32	SRDS	Emerson Power Products	No
GP-33	SPPD	W.G. Clark Construction Co	No
GP-37	SRDS	None	NA
GP-38	None	None	NA

Notes:
 1 Adjacent off-site buildings within 100 ft are shown on Figure 3.
 * Protectiveness established at methane concentrations up to 5 percent in adjacent probes.
 Due to shallow groundwater, some probes are only measured when the water table is low enough for the probes to function.
 NA - Not applicable.

Abbreviations: Ecology = Washington State Department of Ecology; LEL = Lower Explosive Limit; LFG = Landfill gas; OMMP = Operations, Maintenance, and Monitoring Plan; PLP = Potentially liable person; PM = Project manager; SPPD = South Park Property Development, LLC; SRDS = South Recycling and Disposal Station

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure OMMP.

Contingent Action Triggered by Exceedance

1. SC notifies the Ecology PM, Public Health - Seattle & King County, and the rest of the PLP Group.
2. Parcel staff adjust adjacent LFG system to increase control on LFG, and continue DAILY monitoring at probe until control is established (using criteria above) then weekly for 4 weeks.
3. SC arranges monitoring of indoor air for LFG in any off-site buildings within 100 feet of the Landfill boundary (Figure 3). Refer to OMMP Figure A.2.6 for triggers and actions based on indoor measurements.
4. SC notifies Ecology PM and Public Health - Seattle & King County of the actions taken and their effectiveness. If the adjustments to the adjacent gas system are not effective, then a plan must be prepared and submitted for approval.
5. SC reports exceedances and actions in Annual Report to Ecology.

Legend

- - - Edge of Refuse (July 2017)
- Area Covered Under Cleanup Action Plan (Settlement Area)
- Landfill Parcel
- Adjacent Parcel
- + Groundwater Monitoring Well Network
- Discharge Point



Notes:
 • Tax parcels provided by King County Geographic Information Systems Center.
 • Aerial imagery provided by King County, 2021.

Source: Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

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


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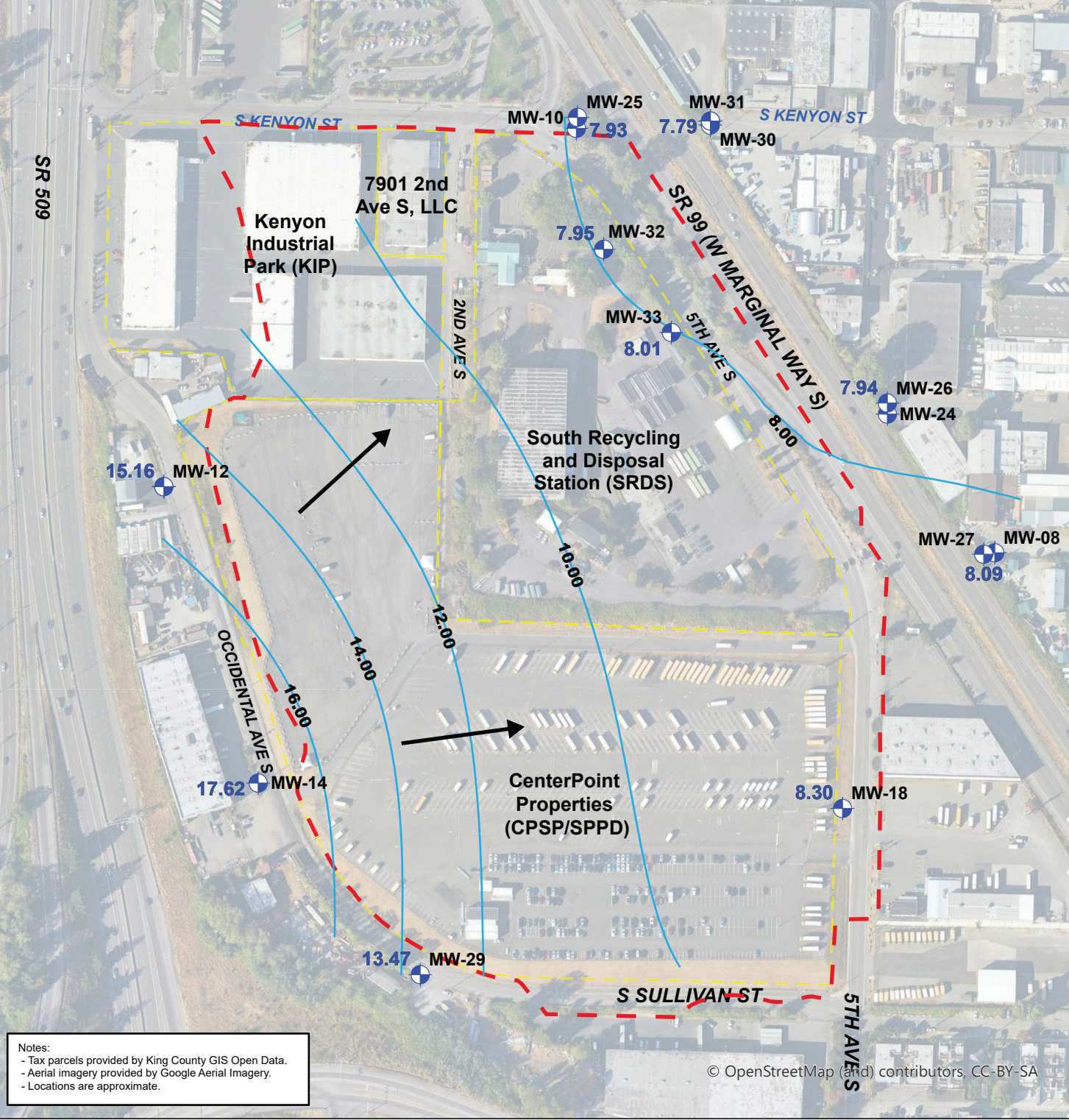
Figure 5
Groundwater Monitoring Well Network
 South Park Landfill

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Legend

 Edge of Refuse (July 2017)	 Perimeter Groundwater Monitoring Well
 Landfill Parcel	17.62 Groundwater Elevation
10.00 Groundwater Elevation Contour	(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)
 Groundwater Flow Direction	

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Notes:
 - Tax parcels provided by King County GIS Open Data.
 - Aerial imagery provided by Google Aerial Imagery.
 - Locations are approximate.

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Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

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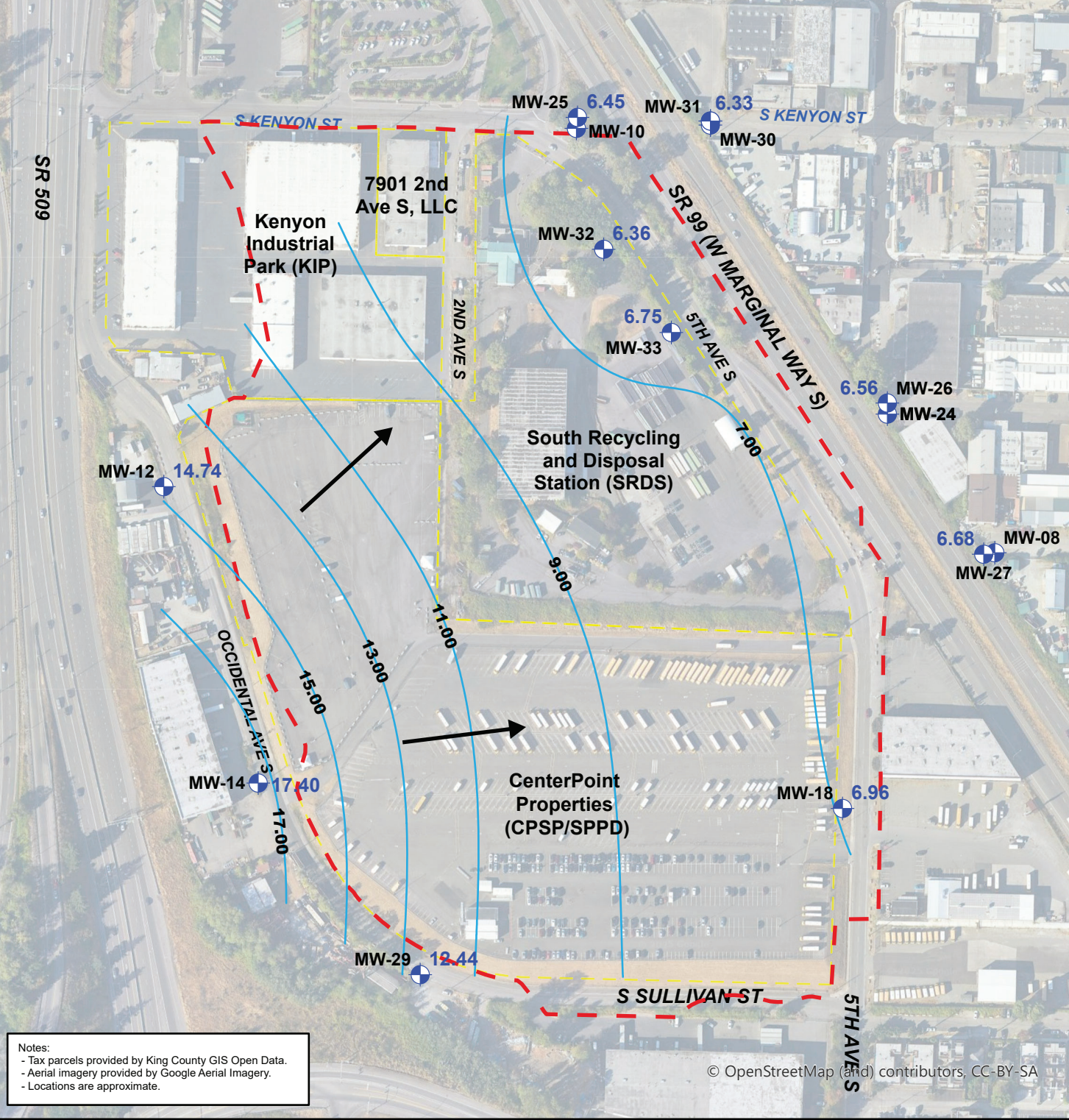
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Figure 6
Potentiometric Surface Map
February 5, 2024
South Park Landfill

Legend

- Edge of Refuse (July 2017)
- Landfill Parcel
- 10.00 Groundwater Elevation Contour
- Groundwater Flow Direction
- Perimeter Groundwater Monitoring Well
- 17.62** Groundwater Elevation
(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)

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 - Locations are approximate.

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Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

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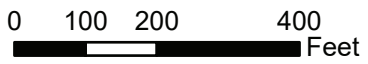


Figure 7
Potentiometric Surface Map
 May 1, 2024
 South Park Landfill

Legend

- Edge of Refuse (July 2017)
- Landfill Parcel
- 10.00 Groundwater Elevation Contour
- Groundwater Flow Direction
- Perimeter Groundwater Monitoring Well
- 17.62** Groundwater Elevation
(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)

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 - Locations are approximate.

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Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

Parametrix

Figure 8
Potentiometric Surface Map
August 6, 2024
South Park Landfill



Legend

 Edge of Refuse (July 2017)	 Perimeter Groundwater Monitoring Well
 Landfill Parcel	17.62 Groundwater Elevation
 10.00 Groundwater Elevation Contour	(Data from wells MW-08, MW-10, MW-24, and MW-30 not shown or used in contouring)
 Groundwater Flow Direction	

2/5/2025 \\parametrix.com\pmx\PSOI\Projects\Clients\1550-CityOfSeattle\553-1550-067 SouthParkLandfill\99Svc\GIS\Pro\SouthPark Working_MH.aprx



Notes:
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 - Aerial imagery provided by Google Aerial Imagery.
 - Locations are approximate.

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Source: City of Seattle, King County, Floyd|Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.

Parametrix



0 100 200 400
 Feet

Figure 9
Potentiometric Surface Map
 November 4, 2024
 South Park Landfill
 Seattle, WA

Tables

Table 1. Project Contact Information, South Park Landfill

Contact	Title	Affiliation	Phone Number (s)	Mailing Address	Email Address
Ryan K. Gardiner	Ecology Site Manager	Ecology	425.681.5543 (C)	Northwest Region Toxics Cleanup Program Washington State Dept. of Ecology 15700 Dayton Ave. N., Shoreline WA 98133	RYGA461@ECY.WA.GOV
Mark Jusayan	CIP and Landfill Closure Program Manager	SPU	206.684.4174	Seattle Public Utilities P.O. Box 34018 Seattle, WA 98124-5177	Mark.Jusayan@seattle.gov
Min Soon Yim	Utility Manager	SPU	206.233.2629	Seattle Public Utilities Solid Waste Line of Business - Landfill Closure Division 23076 Military Road So. Kent, WA 98032	Min-Soon.Yim@seattle.gov
Shannon Straws	Sr. Environmental Analyst	SPU	206.233.2629 (W) 206.348.7604 (C)	Seattle Public Utilities Solid Waste Line of Business - Landfill Closure Division 23076 Military Road So. Kent, WA 98032	Shannon.Straws@seattle.gov
Ashley Piatek	Environmental Director	CenterPoint	630.586.8023 (W) 312.505.5001 (C)	CenterPoint Properties 1808 Swift Drive Oak Brook, IL 60523	apiatek@centerpoint.com
Andrea Hacker	Local Property Manager	CenterPoint	206.798.5342 (C)	CenterPoint Properties 111 Broadway, Suite 2130 Oakland, CA 94607	ahacker@centerpoint.com
John Houlihan	Legal Counsel	CenterPoint	206.547.5052 (W) 206.714.0296 (C)	Houlihan Law 100 N 35 th Street, Seattle, WA 98103	john@houlihan-law.com
Laura Lee	Site Coordinator	Parametrix	425.941.9409 (C) 206.394.3665 (W)	Parametrix 719 2nd Avenue, Suite 200 Seattle, WA 98104	Lblee@parametrix.com

Primary contacts in **bold**

Table 2. Methane in Perimeter Gas Probes, 2024, South Park Landfill

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc) ¹	Purge Duration (min)		Date Monitored	Time of Measurement	Pressure (in W.C.)	CH ₄ (% Volume)	CO ₂ (% Volume)	O ₂ (% Volume)
				Purge rate =	550 ml/min						
GP-03	0.063	6.73 to 8.63	725	1.32	2/1/2024	10:48	-0.01	0.0	1.7	17.3	
					4/30/2024	10:21	-0.01	0.0	4.1	13.5	
					7/30/2024	10:23	0.07	0.0	6.3	13.4	
					10/29/2024	10:45	0.08	0.0	7.0	12.4	
GP-07	0.063	5.75 to 6.25	519	0.94	2/1/2024	9:09	0.01	0.0	1.2	18.4	
					4/30/2024	9:05	0.01	0.0	1.9	19.4	
					7/30/2024	8:58	0.05	0.0	3.0	18.1	
					10/29/2024	10:56	0.01	0.0	2.6	18.5	
GP-09	0.063	6.62 to 10.62	899	1.63	2/1/2024	10:02	0.01	0.0	8.7	10.0	
					4/30/2024	8:29	0.03	0.0	6.6	14.7	
					7/30/2024	10:02	0.01	0.0	4.7	17.3	
					10/29/2024	10:26	0.04	0.0	4.2	17.7	
GP-11	0.167	6.23 to 6.73	4,632	8.42	2024/02/01	10:37	--	--	--	--	
					4/30/2024	9:44	0.03	0.0	0.7	21.1	
					7/30/2024	10:17	-0.06	0.0	0.4	21.1	
					10/29/2024	10:38	--	--	--	--	
GP-13	0.167	4.91 to 5.41	4,014	7.29	2/1/2024	10:43	1.11	0.0	0.9	19.9	
					4/30/2024	9:52	--	--	--	--	
					7/30/2024	11:52	--	--	--	--	
					10/29/2024	11:36	--	--	--	--	
GP-15	0.167	6.62 to 8.62	5,558	10.11	2/1/2024	11:10	2.04	0.0	1.2	19.3	
					4/30/2024	10:32	--	--	--	--	
					7/30/2024	11:35	--	--	--	--	
					10/29/2024	11:56	-30.51	0.0	1.0	20.6	
GP-16	0.167	6.60 to 9	5,867	10.67	2/1/2024	9:30	0.02	0.0	8.3	10.3	
					4/30/2024	10:54	0.07	0.0	7.5	11.1	
					7/30/2024	10:45	-0.06	0.0	12.6	6.0	
					10/29/2024	12:18	0.01	0.0	11.7	6.8	
GP-23	0.167	6.05 to 7.05	4,940	8.98	2/1/2024	9:02	0.00	0.0	0.2	21.4	
					4/30/2024	9:19	0.02	0.0	7.0	14.0	
					7/30/2024	9:15	0.02	0.0	8.3	13.1	
					10/29/2024	11:14	0.01	0.0	7.2	14.8	
GP-26	0.063	4.62 to 9.62	868	1.57	2/1/2024	8:48	-0.03	0.0	2.2	16.5	
					4/30/2024	8:40	0.03	0.0	1.8	19.7	
					7/30/2024	8:39	0.05	0.0	2.1	19.1	
					10/29/2024	11:23	0.05	0.0	2.1	19.3	
GP-27	0.063	8.57 to 13.57	1,216	2.21	2/1/2024	9:47	0.02	0.1	9.2	0.0	
					4/30/2024	11:12	0.02	0.0	8.1	0.3	
					7/30/2024	11:16	0.05	0.0	11.0	0.6	
					10/29/2024	12:38	0.02	0.0	12.4	0.7	
GP-28	0.063	6.59 to 11.59	1,042	1.89	2/1/2024	9:41	0.01	0.0	0.1	21.0	
					4/30/2024	11:07	0.07	0.0	0.2	20.9	
					7/30/2024	11:05	-0.01	0.0	0.0	21.1	
					10/29/2024	12:32	-0.01	0.0	0.2	21.3	
GP-29	0.063	4.62 to 9.62	868	1.57	2/1/2024	9:35	-0.05	0.0	12.3	0.1	
					4/30/2024	10:59	0.09	0.0	13.9	0.0	
					7/30/2024	10:54	-0.02	0.0	16.8	0.0	
					10/29/2024	12:23	0.11	0.0	15.8	0.0	
GP-31	0.063	4.64 to 9.64	868	1.57	2/1/2024	11:17	0.07	0.0	1.7	16.3	
					4/30/2024	10:38	-0.03	0.0	5.8	11.7	
					7/30/2024	10:29	0.04	0.0	11.0	7.7	
					10/29/2024	12:03	0.05	0.0	9.4	7.1	
GP-32	0.063	4.72 to 9.72	868	1.57	2/1/2024	11:38	--	--	--	--	
					4/30/2024	10:28	--	--	--	--	
					7/30/2024	11:42	-0.55	0.0	1.5	18.1	
					10/29/2024	11:45	--	--	--	--	
GP-33	0.063	8.2 to 13.2	1,165	2.12	2/1/2024	9:55	-0.02	0.0	0.9	19.6	
					4/30/2024	10:05	-0.04	0.0	0.9	20.3	
					7/30/2024	9:29	0.02	0.0	1.9	18.4	
					10/29/2024	9:56	-0.01	0.0	2.3	18.1	
GP-37	0.063	2.8 to 7.8	868	1.57	2/1/2024	10:13	0.06	0.0	8.3	4.0	
					4/30/2024	8:14	-0.01	0.0	8.6	6.7	
					7/30/2024	9:46	0.07	0.0	10.6	10.5	
					10/29/2024	10:12	0.04	0.0	9.4	10.7	

Table 2. Methane in Perimeter Gas Probes, 2024, South Park Landfill

Gas Probe	Probe Diameter (ft)	Screened Interval (ft btoc)	Purge Volume (cc) ¹	Purge Duration	Date Monitored	Time of Measurement	Pressure (in W.C.)	CH ₄ (% Volume)	CO ₂ (% Volume)	O ₂ (% Volume)
				(min) Purge rate = 550 ml/min						
GP-38	0.063	3.8 to 8.8	882	1.6	2/1/2024	10:21	-0.01	0.0	12.7	2.9
					4/30/2024	8:22	0.00	0.0	13.1	4.4
					7/30/2024	9:54	0.06	0.0	18.7	2.2
					10/29/2024	10:19	0.02	0.0	16.0	3.1

Notes:

- ¹ Purge volume assumes no water present within the probe screen
- No measurement, screen blocked by water

Abbreviations:

- ft feet
- cc cubic centimeter
- W.C. Water Column
- CH₄ Methane
- CO₂ Carbon Dioxide
- O₂ Oxygen

Table 3. Groundwater Monitoring Well Information, South Park Landfill

Well ID	Latitude (NAD 83) ¹	Longitude (NAD 83) ¹	Well Information from RI ²										Pump Information		
			WASPN North (ft NAD 83)	WASPN East (ft NAD 83)	Ground Elevation (ft NAVD 88)	Casing Elevation (ft NAVD 88)	Stickup (ft)	Total Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)	Screen Top Elevation (ft NAVD 88)	Screen Bottom Elevation (ft NAVD 88)	Aquifer	Pump Type	Target Intake or Top of Pump ³ (ft bgs)
MW-08	47.529801	-122.3273	196834.57	1271362.27	12.88	14.76	1.88	45.6	35.6	45.6	-22.72	-32.72	B-Zone	Bladder	40
MW-10	47.531977	-122.3306	197659.19	1270559.83	17.7	19.35	1.65	45	35	45	-17.3	-27.3	B-Zone	Peristaltic	40
MW-12	47.530062	-122.3337	196964.43	1269792.64	19.11	20.63	1.52	15.3	10	15	9.11	4.11	A-Zone	Bladder	12.5
MW-14	47.528523	-122.3329	196399.9	1269963.70	19.05	19.85	0.8	21.8	11.5	21.5	7.55	-2.45	A-Zone	Bladder	16.5
MW-18	47.528449	-122.3284	196350.26	1271077.67	20.78	22.03	1.25	40.4	30	40	-9.22	-19.22	B-Zone	Bladder	35
MW-24	47.530515	-122.3281	197110.02	1271165.6	13.57	15.13	1.56	45.3	35	45	-21.43	-31.43	B-Zone	Bladder	40
MW-25	47.532033	-122.3305	197657.49	1270566.75	17.3	20.09	2.79	27	22	27	-4.7	-9.7	A-Zone	Bladder	24.5
MW-26	47.53057	-122.3281	197121.60	1271164.4	13.55	15.94	2.39	25	15	25	-1.45	-11.45	A-Zone	Bladder	20
MW-27	47.529792	-122.3273	196835.06	1271357.64	12.72	14.76	2.04	20	10	20	2.72	-7.28	A-Zone	Bladder	15
MW-29	47.527537	-122.3316	196034.29	1270270.91	19.45	19.16	-0.29	30	20	30	-0.55	-10.55	A-Zone	Peristaltic	25
MW-30	47.532014	-122.3295	197655.77	1270826.64	17.6	17.07	-0.53	13	8	13	9.6	4.6	Perched	Peristaltic	10.5
MW-31	47.532027	-122.3295	197660.37	1270825.71	17.58	17.12	-0.46	23	18	23	-0.42	-5.42	A-Zone	Bladder	20.5
MW-32	47.531347	-122.3303	197416.52	1270622.16	17.51	17.07	-0.44	24	19	24	-1.49	-6.49	A-Zone	Peristaltic	21.5
MW-33	47.53092	-122.3298	197257.91	1270751.02	17.81	17.34	-0.47	25	20	25	-2.19	-7.19	A-Zone	Peristaltic	22.5

Notes:

- ¹ Converted from Washington State plane data.
- ² Well information sourced from the RI Table 5.4 (Floyd Snider, 2017).
- ³ Pump intake placed at the midpoint of the screen interval.

Abbreviations:

- NAD 83 = North American Datum of 1983
- NAVD 88 = North American Vertical Datum of 1988
- ft = feet
- bgs = below ground surface
- btoc = below top of casing
- WASPN = Washington State Plane North - 4601

Table 4. Groundwater Elevation Summary, 2024, South Park Landfill

Well ID	TOC (ft NAVD 88)	Depth to Water (ft)				Groundwater Elevation (ft NAVD 88)			
		2/5/24	5/1/24	8/6/24	11/4/24	2/5/24	5/1/24	8/6/24	11/4/24
Perched Zone									
MW-30	17.07	8.48	9.90	10.79	10.81	8.59	7.17	6.28	6.26
Shallow / A-Zone wells									
MW-12	20.63	5.47	5.89	6.64	5.59	15.16	14.74	13.99	15.04
MW-14	19.85	2.23	2.45	3.42	2.81	17.62	17.40	16.43	17.04
MW-25	20.09	12.16	13.64	14.40	14.19	7.93	6.45	5.69	5.90
MW-26	15.94	8.00	9.38	10.25	10.03	7.94	6.56	5.69	5.91
MW-27	14.76	6.67	8.08	8.99	8.81	8.09	6.68	5.77	5.95
MW-29	19.16	5.69	6.72	8.91	8.34	13.47	12.44	10.25	10.82
MW-31	17.12	9.33	10.79	11.54	11.39	7.79	6.33	5.58	5.73
MW-32	17.07	9.12	10.71	11.41	11.17	7.95	6.36	5.66	5.90
MW-33	17.34	9.33	10.59	11.58	11.29	8.01	6.75	5.76	6.05
Deep / B-Zone wells									
MW-08	14.76	6.70	8.15	9.04	8.84	8.06	6.61	5.72	5.92
MW-10	19.35	11.41	12.91	13.66	13.45	7.94	6.44	5.69	5.90
MW-18	22.03	13.73	15.07	15.98	15.72	8.30	6.96	6.05	6.31
MW-24 ¹	15.13	7.21	8.62	9.50	9.43	7.92	6.51	5.63	5.70

Notes:

¹ MW-24 depth to water measurement was collected approximately 6.5 hours after first depth to water measurement during the third quarter monitoring event

Abbreviations:

TOC = Top of casing

ft = feet

NAVD 88 = North American Vertical Datum of 1988

Table 5. Groundwater Vertical Gradients, 2024, South Park Landfill

Well Pairs	Zone	Groundwater Elevation (ft NAVD 88)				Mid-screen Elevation (ft NAVD 88)	Mid-screen Elevation Difference (ft)	Vertical gradient (ft/ft)			
		2/5/24	5/1/24	8/6/24	11/4/24			2/5/24	5/1/24	8/6/24	11/4/24
MW-26	Shallow	7.94	6.56	5.69	5.91	-6.45	19.98	0.0010	0.0025	0.0030	0.0105
MW-24	Deep	7.92	6.51	5.63	5.70	-26.43					
MW-27	Shallow	8.09	6.68	5.77	5.95	-2.28	25.44	0.0012	0.0028	0.0020	0.0012
MW-08	Deep	8.06	6.61	5.72	5.92	-27.72					
MW-25	Shallow	7.93	6.45	5.69	5.90	-7.2	15.1	-0.0007	0.0007	0.0000	0.0000
MW-10	Deep	7.94	6.44	5.69	5.90	-22.3					
MW-30	Perched	8.59	7.17	6.28	6.26	7.1	10.02	0.0798	0.0838	0.0699	0.0529
MW-31	Shallow	7.79	6.33	5.58	5.73	-2.92					

Notes: Positive vertical gradient represents downward hydraulic flow
 Negative vertical gradient represents upward hydraulic flow

Abbreviations:

ft = feet

NAVD 88 = North American Vertical Datum of 1988

Table 6. Groundwater Flow Velocity, South Park Landfill

Region	Horizontal Hydraulic Conductivity ¹ (ft/day)	2024 Horizontal Hydraulic Gradient (ft/ft)	Effective Porosity ¹	Horizontal Groundwater Velocity (ft/day)
Northern Region ²	145 to 167	0.0075 to 0.0095	0.21 to 0.26	4.20 to 7.59
Southern Region ³	40 to 71	0.0083 to 0.0095	0.21 to 0.26	1.27 to 3.21

Notes:

¹ Hydraulic Conductivity and Effective Porosity as determined from the RI-FS (Floyd Snider, 2017).

² Horizontal gradients for the northern region are calculated between A-Zone wells MW-12 and MW-32.

³ Horizontal gradients for the southern region are calculated between A-Zone well MW-14 and B-Zone well MW-18.

Table 7. Groundwater Quality Data Summary, 2024, South Park Landfill

Parameter	Units	Cleanup Level	Upgradient Wells													Downgradient Wells									
			A-Zone													Perched Zone									
			MW-12 2/7/24	MW-60 (MW-12 Dup) 2/7/24	MW-12 5/1/24	MW-12 8/7/24	MW-12 11/5/24	MW-14 2/7/24	MW-14 5/1/24	MW-60 (MW-14 Dup) 5/1/24	MW-14 8/7/24	MW-14 11/5/24	MW-29 2/6/24	MW-29 5/1/24	MW-29 8/7/24	MW-60 (MW-29 Dup) 8/7/24	MW-29 11/5/24	MW-30 ¹ 2/7/24	MW-30 ¹ 5/2/24	MW-61 (MW-30 Dup) 5/2/24	MW-30 ¹ 8/6/24	MW-30 ¹ 11/5/24			
Field Parameters			Temperature	C		10.4	--	12.1	14.8	14.8	13.5	13.5	--	15.8	15.6	12.1	12.1	12.8	--	12.4	11.6	12.0	--	15.3	15.3
			Dissolved Oxygen	mg/L		1.10	--	0.25	0.36	0.36	0.20	0.01	--	0.24	0.15	0.23	0.84	0.30	--	0.09	0.79	0.13	--	0.27	0.17
			Specific Conductivity	µS/cm		365.2	--	445.8	520	534.2	465.1	454.7	--	593	555.4	765	906	835	--	619.7	395.4	615.6	--	616	588.3
			pH	units		6.65	--	6.42	6.13	6.06	6.96	6.72	--	6.72	6.77	6.91	6.75	6.80	--	6.82	6.73	6.40	--	6.29	6.38
			Redox	mv		71.0	--	35.1	133.5	186.5	-38.7	-28.3	--	-39.0	-46.4	-95.8	-98.1	-87.5	--	-109.8	41.5	66.5	--	0.9	-23.2
			Turbidity	NTU		4.11	--	1.13	0.68	4.15	6.69	6.75	--	1.13	3.02	14.9	1.21	1.24	--	12.2	2.86	2.00	--	1.27	1.32
Metals			Iron, Total	mg/L	27 A-Zone 31 B-Zone	1.14	1.28	2.07	0.228	0.360 U	3.26	3.49	3.55	5.05	3.02	21.7	26.4	21.4	21.8	45.7	2.47	0.539	0.563	3.65	4.67
			Manganese, Total	mg/L	2.2	0.130	0.150	0.150	0.0290	0.0168	0.778	0.791	0.814	0.929	0.735	0.587	0.666	0.636	0.593	0.712	0.0490	0.0566	0.0557	0.155	0.178
Volatile Organic Compounds			Vinyl Chloride	µg/L	0.29	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0496	0.0909	0.0200 UJ	0.126	0.0442	0.0422	0.0827	0.0849	0.232	0.259
			Cis-1,2-Dichloroethene	µg/L	16	0.20 UJ	0.20 U	0.20	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 UJ	0.20 U	0.20 U	0.26	0.25	0.32	0.74	0.41

Table 7. Groundwater Quality Data Summary, 2024, South Park Landfill

			Downgradient Wells (cont.)																				
			A-Zone																				
Parameter	Units	Cleanup Level	MW-25	MW-61	MW-25	MW-25	MW-25	MW-26	MW-26	MW-26	MW-26	MW-27	MW-27	MW-27	MW-27	MW-31 ¹	MW-31 ¹	MW-31 ¹	MW-31 ¹	MW-32 ²	MW-32 ²	MW-32 ²	MW-32 ²
			2/5/24	(MW-25 Dup) 2/5/24	5/1/24	8/7/24	11/4/24	2/6/24	5/2/24	8/6/24	11/6/24	2/6/24	5/3/24	8/6/24	11/6/24	2/7/24	5/2/24	8/6/24	11/5/24	2/5/24	5/1/24	8/7/24	11/4/24
Field Parameters																							
Temperature	C		13.3	--	14.0	14.7	14.0	12.1	12.3	12.3	12.1	11.1	12.1	13.6	13.2	13.8	13.8	14.2	14.5	13.5	14.5	14.9	14.2
Dissolved Oxygen	mg/L		0.17	--	0.41	0.32	0.14	0.26	0.35	0.28	0.18	1.76	0.00	0.29	0.19	0.23	0.02	0.32	0.10	0.28	0.02	0.36	0.08
Specific Conductivity	µS/cm		1213	--	1168	1182	1147	243.5	292.7	315.8	330.9	450.5	305.0	513	582.2	594.6	485.0	524	517.5	868	801	831	824
pH	units		6.56	--	6.61	6.64	6.66	6.29	6.17	6.04	6.05	6.67	6.54	6.57	6.45	6.76	6.47	5.33	6.42	6.82	6.87	6.86	6.80
Redox	mv		-99.1	--	-77.9	-74.5	-114.1	9.5	26.7	39.9	32.0	-50.4	25.8	-73.6	-62.5	-58.4	-54.4	-77.1	-57.4	-114.2	-113.0	-93.7	-116.6
Turbidity	NTU		3.55	--	1.46	0.87	3.60	3.62	4.08	1.71	4.29	13.5	7.65	7.47	5.07	10.9	4.74	3.99	3.07	1.18	2.98	0.67	2.25
Metals																							
Iron, Total	mg/L	27 A-Zone 31 B-Zone	35.6	33.6	34.9	35.4	28.1	5.42	7.82	9.10	6.94	12.7	2.74	20.8	21.3	20.7	18.7	22.2	18.8	15.5	12.8	16.1	14.4
Manganese, Total	mg/L	2.2	2.73	2.69	2.85	2.87	2.59	0.0688	0.100	0.109	0.0945	0.385	0.146	0.537	0.530	0.858	0.775	0.945	0.864	1.40	1.25	1.33	1.16
Volatile Organic Compounds																							
Vinyl Chloride	µg/L	0.29	0.417	0.411	0.386	0.249	0.441	0.0420	0.0200 U	0.0200 U	0.0264	0.0569	0.0728	0.0581	0.0452	0.402 ¹	0.690 ¹	0.741	0.776	0.195	0.307	0.306	0.357
Cis-1,2-Dichloroethene	µg/L	16	0.20 UJ	0.20 U	0.21	0.20 U	0.22	0.42	0.33	0.22	0.20 U	0.20 U	0.21	0.20 U	0.20 U	0.20 U	0.32	0.33	0.36	0.44	0.57	0.36	0.47

Table 7. Groundwater Quality Data Summary, 2024, South Park Landfill

			Downgradient Wells (cont.)																				
			A-Zone (cont.)				B-Zone																
			MW-33 ²	MW-33 ²	MW-33 ²	MW-33 ²	MW-08	MW-08	MW-08	MW-08	MW-10	MW-10	MW-10	MW-10	MW-18 ²	MW-18 ²	MW-18 ²	MW-18 ²	MW-24	MW-24	MW-24	MW-24	MW-61 (MW-24 Dup)
2/5/24	5/1/24	8/6/24	11/4/24	2/6/24	5/3/24	8/6/24	11/6/24	2/5/24	5/1/24	8/7/24	11/4/24	2/7/24	5/2/24	8/7/24	11/4/24	2/6/24	5/2/24	8/6/24	11/6/24	11/6/24			
Parameter	Units	Cleanup Level																					
Field Parameters																							
Temperature	C		14.9	15.5	16.9	15.4	10.9	11.8	13.6	12.6	13.4	14.0	14.6	13.9	13.3	14.5	14.8	14.5	11.9	12.3	12.9	12.3	--
Dissolved Oxygen	mg/L		0.39	0.16	0.23	0.10	0.27	0.22	0.22	0.10	0.22	0.25	0.05	0.18	0.25	0.00	0.37	0.25	0.12	0.00	0.49	0.09	--
Specific Conductivity	µS/cm		1354	1312	1299	1247	1551	1145	1097	990	1499	1426	1449	1450	589.3	564.9	589	565.3	1067	1089	1152	1052	--
pH	units		6.79	6.80	6.80	6.78	6.92	6.79	6.77	6.73	6.82	6.81	7.03	6.76	6.96	6.78	6.75	6.77	6.78	6.69	6.72	6.60	--
Redox	mv		-127.9	-113.1	-100.3	-124.7	-95.5	-80.8	-101.2	-97.6	-131.4	-118.5	-128.0	-144.8	-79.0	-75.2	-71.3	-81.3	-95.6	-81.9	-75.1	-72.6	--
Turbidity	NTU		0.66	1.05	0.50	8.89	1.15	2.77	1.54	4.44	3.65	0.39	0.82	2.81	7.21	1.73	0.75	0.14	9.01	2.38	4.44	4.17	--
Metals																							
Iron, Total	mg/L	27 A-Zone 31 B-Zone	16.3	16.4	18.7	14.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Manganese, Total	mg/L	2.2	1.62	1.76	1.97	1.77	1.09	0.763	0.916	0.714	2.05	2.01	2.15	2.25	0.866	0.683	0.820	0.727 J-	1.73	1.49	1.92	1.51 J+	1.59
Volatile Organic Compounds																							
Vinyl Chloride	µg/L	0.29	0.125	0.130	0.192	0.190	0.0660	0.0594	0.0613	0.0545	0.109	0.0966	0.0802	0.125	0.0200 U	0.0200 U	0.0205	0.0200 U	0.0325	0.0272	0.0501	0.0524	0.0544
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.74	0.85	0.53	0.76	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

Table 7. Groundwater Quality Data Summary, 2024, South Park Landfill

Parameter	Units	Cleanup Level	Trip Blanks							
			MW-80 2/6/24	MW-81 2/7/24	MW-80 5/1/24	MW-81 5/3/24	MW-80 8/6/24	MW-81 8/7/24	MW-80 11/4/24	MW-81 11/6/24
Field Parameters										
Temperature	C		--	--	--	--	--	--	--	--
Dissolved Oxygen	mg/L		--	--	--	--	--	--	--	--
Specific Conductivity	µS/cm		--	--	--	--	--	--	--	--
pH	units		--	--	--	--	--	--	--	--
Redox	mv		--	--	--	--	--	--	--	--
Turbidity	NTU		--	--	--	--	--	--	--	--
Metals										
Iron, Total	mg/L	27 A-Zone	--	--	--	--	--	--	--	--
		31 B-Zone	--	--	--	--	--	--	--	--
Manganese, Total	mg/L	2.2	--	--	--	--	--	--	--	--
Volatile Organic Compounds										
Vinyl Chloride	µg/L	0.29	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U	0.0200 U
Cis-1,2-Dichloroethene	µg/L	16	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U

Notes:

- ¹ MW 30 and MW-31 monitor the former Glitsa property and are not CPOC wells.
- ² MW 18 is completed in refuse along the downgradient edge of the Landfill; MW 32 and MW 33 are completed beneath refuse along the downgradient edge.
- █ = Exceeds cleanup level for CPOC wells
- = Not analyzed
- U = The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ = The analyte was not detected above a detection limit that may be inaccurate or imprecise.
- J+ = The result is an estimated quantity, but the result may be biased high.
- J- = The result is an estimated quantity, but the result may be biased low.

Abbreviations:

- µg/L Micrograms per liter
- mg/L Milligrams per liter
- µS/cm Microsiemens per centimeter
- NTU Nephelometric Turbidity unit
- CPOC Conditional point of compliance

Table 8. Summary of Vinyl Chloride Trend Analyses, South Park Landfill

Well ID	# Samples	# ND's	% ND's	MK S Value ¹	Significance Level ²	Trend ²
Upgradient Wells						
A-Zone						
MW-12	19	19	100	NA	NA	NA
MW-14	19	19	100	NA	NA	NA
MW-29	19	12	63.16	61	0.0170	increasing*
Downgradient Wells						
A-Zone						
MW-25	17	0	0	-24	0.1740	no trend
MW-26	19	6	31.58	-7	0.4180	no trend
MW-27	19	3	15.79	11	0.3650	no trend
MW-31	19	0	0	75	0.0040	increasing
MW-32	19	0	0	-21	0.2450	no trend
MW-33	19	0	0	76	0.0030	increasing
B-Zone						
MW-08	19	2	10.53	-35	0.1190	no trend
MW-10	17	0	0	18	0.2450	no trend
MW-18	19	4	21.05	-56	0.0250	decreasing
MW-24	19	1	5.26	35	0.1190	no trend

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2024)

ND = Non-detected value

All ND's were replaced with estimated values using the ROS (Regression on Order Statistics) method.

NA = Not applicable

* Because of limited data, more than 50% ND's, the trend may not be meaningful.

Bold = Downgradient well where the vinyl chloride concentration is greater than the CUL

¹ The Mann-Kendall test statistic, S, is based on pair-wise differences between each concentration and all earlier concentrations. A positive S value indicates an increasing trend, a zero value indicates no trend, and a negative value indicates a decreasing trend. The null hypothesis for this test is no trend. For a positive S value, the alternative hypothesis is an increasing trend. For a negative S value, the alternative hypothesis is a decreasing trend.

² Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Table 9. Summary of Total Iron Trend Analyses, South Park Landfill

Well ID	# Samples	# ND's	% ND's	MK S Value ¹	Significance Level ²	Trend ²
Upgradient Wells						
A-Zone						
MW-12	19	3	15.79	14	0.3140	no trend
MW-14	19	0	0	-29	0.1660	no trend
MW-29	19	0	0	10	0.3650	no trend
Downgradient Wells						
Perched Zone						
MW-30	19	0	0	17	0.2900	no trend
A-Zone						
MW-25	17	0	0	47	0.0320	increasing
MW-26	19	0	0	27	0.1840	no trend
MW-27	19	0	0	31	0.1490	no trend
MW-31	19	0	0	117	0.0000	increasing
MW-32	19	0	0	70	0.0060	increasing
MW-33	19	0	0	46	0.0540	no trend
B-Zone						
MW-08	19	0	0	-29	0.1660	no trend
MW-10	17	0	0	18	0.2450	no trend
MW-18	19	0	0	-83	0.0020	decreasing
MW-24	19	0	0	64	0.0120	increasing

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2024)

ND = Non-detected value

All ND's were replaced with estimated values using the ROS (Regression on Order Statistics) method

¹ The Mann-Kendall test statistic, S, is based on pair-wise differences between each concentration and all earlier concentrations. A positive S value indicates an increasing trend, a zero value indicates no trend, and a negative value indicates a decreasing trend. The null hypothesis for this test is no trend. For a positive S value, the alternative hypothesis is an increasing trend. For a negative S value, the alternative hypothesis is a decreasing trend.

² Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Table 10. Summary of Total Manganese Trend Analyses, South Park Landfill

Well ID	# Samples	# ND's	% ND's	MK S Value ¹	Significance Level ²	Trend ²
Upgradient Wells						
A-Zone						
MW-12	19	0	0	-1	0.5000	no trend
MW-14	19	0	0	102	0.0000	increasing
MW-29	19	0	0	-17	0.2900	no trend
Downgradient Wells						
Perched Zone						
MW-30	19	0	0	11	0.3650	no trend
A-Zone						
MW-25	17	0	0	46	0.0320	increasing
MW-26	19	0	0	-8	0.3910	no trend
MW-27	19	0	0	-7	0.4180	no trend
MW-31	19	0	0	133	0.0000	increasing
MW-32	19	0	0	-75	0.0040	decreasing
MW-33	19	0	0	32	0.1330	no trend
B-Zone						
MW-08	19	0	0	-86	0.0010	decreasing
MW-10	17	0	0	-49	0.0230	decreasing
MW-18	19	0	0	-107	0.0000	decreasing
MW-24	19	0	0	53	0.0340	increasing

Notes:

Trend analyses include all post-Consent Decree data (Second Quarter 2020 through Fourth Quarter 2024)

ND = Non-detected value

¹ The Mann-Kendall test statistic, S, is based on pair-wise differences between each concentration and all earlier concentrations. A positive S value indicates an increasing trend, a zero value indicates no trend, and a negative value indicates a decreasing trend. The null hypothesis for this test is no trend. For a positive S value, the alternative hypothesis is an increasing trend. For a negative S value, the alternative hypothesis is a decreasing trend.

² Significance of the Mann-Kendall test statistic, S, is a function of the magnitude of S and the number of concentrations, with a larger positive or negative value of S and a greater number of concentrations leading to a higher statistical significance. An increasing or decreasing trend is considered statistically significant if the significance level is less than 0.05 (the confidence level is greater than 0.95); otherwise, no trend is indicated. Value provided is the tabulated p-value reported by ProUCL.

Appendix A

Annual Report Checklist

SOUTH PARK LANDFILL ANNUAL REPORT CHECKLIST

DUE TO ECOLOGY March 31 of each calendar year (includes January 1 through December 31 of the previous year)

1. Landfill Cap Inspections and Maintenance

	Type of Activity	Date Completed	Form Completed	Comments
<input checked="" type="checkbox"/>	Annual	March 5 and 15, 2024	<input checked="" type="checkbox"/>	Annual inspection
<input checked="" type="checkbox"/>	Maintenance	February 22, 2024	<input checked="" type="checkbox"/>	SRDS. Repairs to asphalt at locations SRDS AC-13, 14, and 20.
		February 28, 2024	<input checked="" type="checkbox"/>	CenterPoint. Repairs to geomembrane at locations CPSP G-6, 7, 8, and 12.
		May 13, 2024	<input checked="" type="checkbox"/>	CenterPoint. Removal of invasive plants CPSP AC-13, 21, and G-4.
		December 10, 2024	<input type="checkbox"/>	CenterPoint. Capped open pipes at location G-1. The form will be completed after Coordinator inspects repair.
		January 29, 2025	<input type="checkbox"/>	CenterPoint. Installed gate posts for barrier gates at each end of the private drive and repaired the asphalt surrounding the posts with cement. The form will be completed after Coordinator inspects repair.
		Date unknown	<input checked="" type="checkbox"/>	SDOT repaired cracks and potholes at locations ROW AC-1 and AC-4.
<input checked="" type="checkbox"/>	Reinspection	October 4, 2024	<input checked="" type="checkbox"/>	Mid-year reinspection

2. Quarterly LFG Perimeter Probe Monitoring

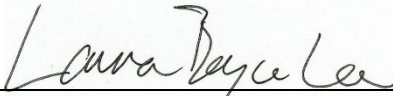
		Date Completed	Field Forms	Comments
<input checked="" type="checkbox"/>	Q1	February 1, 2024	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q2	April 30, 2024	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q3	July 30, 2024	<input checked="" type="checkbox"/>	
<input checked="" type="checkbox"/>	Q4	October 29, 2024	<input checked="" type="checkbox"/>	

3. Owner-reported Quarterly Inspection of On-site Building Methane Detectors and Alarms

		Date Completed	
		SPPD	SRDS
<input checked="" type="checkbox"/>	Q1	March 5, 2024	Not required until redevelopment
<input checked="" type="checkbox"/>	Q2	June 6, 2024	
<input type="checkbox"/>	Q3	Not performed, building are unoccupied	
<input type="checkbox"/>	Q4	Not performed, building are unoccupied	
Off-site building monitoring conducted? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

4. Quarterly Groundwater Monitoring

		Date Completed	Field Forms	Uploaded into EIM
<input checked="" type="checkbox"/>	Q1	February 5 through 7, 2024	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q2	May 1 through 3, 2024	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q3	August 6 through 7, 2024	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/>	Q4	November 4 through 6, 2024	<input checked="" type="checkbox"/>	<input type="checkbox"/>



 Site Coordinator Signature

March 31, 2025

 Date

Source: South Park Landfill Final Cleanup Action Plan.
 Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan.
 Prepared by Washington State Department of Ecology 2018.

Appendix B

Landfill Cap Inspection and Maintenance

Appendix B1

Cap Inspections

Appendix B1-A

March 2024 Annual Inspection

DATE: September 25, 2024
TO: Mark Jusayan, Seattle Public Utilities
Ashley Piatek, CenterPoint Properties
FROM: Laura Lee, Amber Bailey, and Tiffany Neier, PE
SUBJECT: South Park Landfill 2024 Annual Landfill Cap Inspection
CC: Ryan Gardiner, Washington State Department of Ecology
PROJECT NUMBER: 553-1550-067
PROJECT NAME: South Park Landfill Site Coordinator

Introduction

The purpose of this Technical Memorandum is to summarize the findings of the March 2024 annual landfill cap inspection at the South Park Landfill.

The inspection satisfies the requirements of the Cleanup Action Plan which fulfills a requirement of the Consent Decree that was signed on March 26, 2019. The primary objective of this inspection was to reinspect issues identified during the October 2023 mid-year inspection, document current status, and complete another inspection of the landfill cap to identify any additional areas needing repair and document recommended maintenance or repairs.

The majority of the 2024 annual inspection was performed on March 5, 2024, by Parametrix staff members from approximately 7:30 a.m. to 12 p.m. PST. The weather was partly cloudy, and the high temperature was around 46° F. The March 5, 2024 inspection was not able to be completed due to site conditions. A follow up inspection was performed by HWA staff on March 15, 2024 for seven locations of concern that were not observed during the March 5 inspection. The weather was sunny, and the high temperature was around 60° F for that inspection.

Figure 1 shows the approximate bounds of the landfill cap for the two Consent Decree Settlement Area properties and the right-of-way (ROW) as defined in the Cleanup Action Plan. Figure 1 also shows the approximate landfill refuse extent which goes below two additional properties that are not currently included in the Settlement Area. Cap Inspection Form A, provided in Appendix A, was completed for the South Recycling and Disposal Station (SRDS) property, the CenterPoint South Park LLC (CPSP) property, and the ROW. Photographs were taken using a Trimble DA2 GNSS Receiver which used GPS to tag the photographs. The photographs are included in Tables 1 and 2 with numbered locations mapped on Figure 1.

The basis of determining the timeline for repairs shown in the tables in this report comes from the Cleanup Action Plan Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, which has the following guidance for the timeline of maintenance/repairs:

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days.



2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.
3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action. The Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Maintenance Form B and the Site Coordinator will provide observations in Part 2 of the form.

The next cap inspection shall occur in the third quarter of 2024.

SRDS Parcel

The general property conditions observed on the SRDS parcel were good and Seattle Public Utilities had performed significant maintenance since the previous inspection. Locations on the SRDS property that were identified to be repaired or re-inspected in the October 2023 cap inspection were reinspected during this site visit. All areas called out for repair in the October 2023 cap inspection were repaired prior to this inspection. Areas where maintenance was performed were inspected and documented in a Cap Maintenance form (Attachment B-1). Due to the planned redevelopment of the property, additional temporary pavement restoration is not recommended based on conditions at this time.

The Cap Inspection Checklist Form A was completed for the SRDS property and is included in Attachment A-1.

CPSP Parcel

The general property conditions observed on the CPSP parcel were good and similar to previous inspections. Locations on the CPSP property that were identified in the October 2023 cap inspection were reinspected during this site visit. The paved area is in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate settlement or asphaltic concrete cap damage. The cap is also being watched for locations with plant growth in the asphalt cracks. The roots of the plants can cause minor cracks to expand as seen in AC-23. The asphalt needs to be sealed once the vegetation has been removed both to repair the cap and to prevent the plant from growing back. This inspection also found large metal stakes that penetrated the asphalt cap and were not sealed.

Areas where maintenance was performed were inspected and documented in a Cap Maintenance form (Attachment B-2). Vegetated slopes are uniform and generally in good condition with some erosion noted in Table 1. The primary concerns are exposed geomembrane, invasive plant growth, and the growth of vegetation through asphalt. Some of the invasive plants were cut back but the asphalt was not sealed, and the damage caused by the roots had not been repaired, as shown in Table 1.

The two stormwater catch basins (SW-3 and SW-4) appeared to have been cleared since the October inspection but had since started accumulating debris. These are locations that will require continual maintenance.

Table 1 describes the issue or concern at each location on the CPSP property, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Previous concerns identified primarily remain in the same general condition with improvements at several locations. Each location of concern is identified by number in Figure 1 and corresponding photographs are included in Table 1.

Figure 1 shows the CPSP Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Checklist Form A was completed for the CPSP property and is included in Attachment A-2.

Right-of-Way

The ROW was inspected on two different dates: March 5, 2024, with a follow up visit on March 15 as explained above. There are four areas in the ROW that were identified as locations needing repair in the October 2023 cap inspection. ROW AC-1 and AC-2 represent a section of the road and not individual potholes and cracks due to the number locations that need repair. Several of the holes in the AC-1 and AC-2 areas were patched but there are still locations which have increasingly deep and large potholes. AC-4 was repaired but AC-3 was not. Table 2 describes the issue or concern at each location in the ROW, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Each location of concern is identified by number in Figure 1 with corresponding photographs included in Table 2.

Figure 1 shows the ROW Cleanup Action Plan boundary and the locations of concern. The Cap Inspection Checklist Form A was completed for the ROW and is included in Attachment A-3.

Under the Cleanup Action Plan, routine street maintenance does not require Ecology notification or maintenance reports.

Figures

Figure 1. Landfill Cap Inspection Site Plan with Points of Concern

Tables

Table 1. Status of Identified Locations of Concern on the South Park Landfill CPSP Property, March 2024 Inspection

Table 2. Status of Identified Locations of Concern in the South Park Landfill Right-of-Way, March 2024 Inspection

Attachments

- A March 2024 Cap Inspection Checklists
 - A-1 SRDS Cap Inspection Checklist
 - A-2 CPSP Cap Inspection Checklist
 - A-3 ROW Cap Inspection Checklist

- B Maintenance Forms
 - B-1 SRDS Maintenance Form
 - B-2 CPSP Maintenance Form
 - B-3 ROW Maintenance Form

Figures



9/26/2024 1:14:50 PM C:\PSO\Projects\Clients\1550-CityOfSeattle\1550-067-SouthParkLandfill\98\SusGIS\Pro\Annual_Report_2024_CAP_Inspection.aprx

Legend

- - - Edge of Refuse (July 2017)
- SRDS CAP
- CPSP CAP
- ROW CAP
- Gas Probe
- Inspection Location**
- CPSP
- ROW

Source: City of Seattle, King County, Google Maps, Floyd | Snider, Aspect, Herrera. 2018. South Park Landfill, Landfill Post-Closure Operations, Maintenance, and Monitoring Plan. All locations shown are approximate.

Parametrix



Figure 1
 Landfill Cap Inspection- March 2024
 Site Plan With Locations for Repair
 South Park Landfill
 Seattle, WA

Tables

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Asphalt Concrete								
AC-3	Uncapped pipe	Uncapped pipe protruding from the asphalt needs to be capped or filled and sealed..	Pipe is still not capped.	No significant changes observed	Pipe has not been capped. Previous recommended actions remain.	60 days	CenterPoint	
AC-6	Gaps and holes in electric fence post holes	Seal the remaining gaps in the interface between the posts of the new electric fence and the asphalt There are still some electric fence posts that have not been completely sealed, especially around the back of the pipe where it would be hard to reach. There are also some holes that were drilled next to the installed post. All posts and holes need to have complete seals.	Action Not Yet Completed	No visible improvement	Evidence of continued ponding. Unclear if changes were made.	No later than end of calendar year	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection


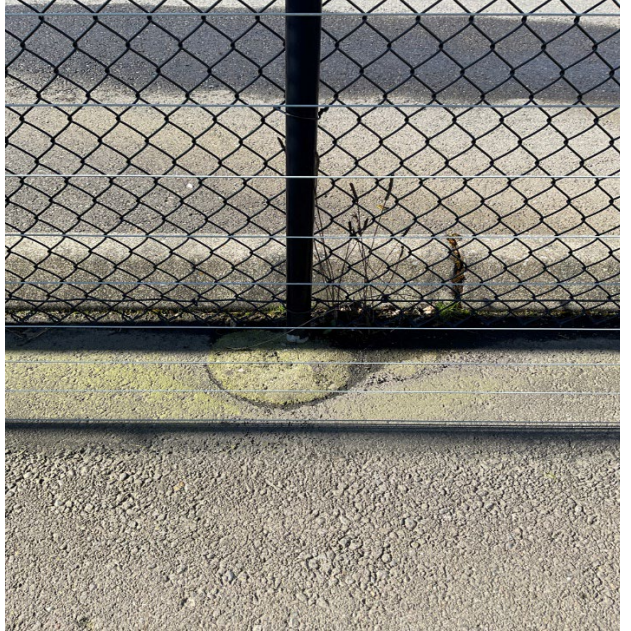
CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-13	Blackberry shrubs growth and stagnated water behind the concrete blocks	Blackberries continue to grow. Sediment blocking flow from the swale causing up to 4" of ponding water. Remove blackberry shrubs and clear pathways to allow proper water flow into the storm drains.	Plants were cut back. No maintenance form was submitted.	Improved	There is still some sediment buildup. This is an area that will likely need continuous maintenance. Most of the blackberries were removed but there are still some small plants that will likely grow. Additional sediment removal needed.	No later than end of calendar year	CenterPoint	
AC-19	Pavement cracks near to fences	Remove plants and seal cap penetrations.	No actions taken	No significant changes observed	Plants are still there, and the crack is not sealed. Previous recommended repairs remain.	No later than end of calendar year	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-21	Holes near fence allowing growth of invasive plants & ponding presence	Invasive plants continue to grow in hole near fence with ponding Previous recommendations remain	Plant was cut back. No maintenance form was submitted.	Improved	Plant has been mostly removed. Seal pavement where the plant was growing.	60 days	CenterPoint	
AC-22	Unsealed pavement after plant removal	Part of the plant has been removed but the pavement has not been sealed	No actions taken	Worse	Plant has regrown. Remove plant and seal pavement.	60 days	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection


CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection		Photographs	
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection		Recommended Action Assignment
AC-23	Invasive plant growth	6ft tall plant next to the storm drain. Remove the plants and seal the cap penetration.	Plant was cut back	Improvement	Most of the plant has been removed but the roots are still there, and the cap penetration was not sealed. Plant roots had pushed up the pavement. Repair and seal pavement.	60 days	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-29	Metal stakes penetrating the cap			New Point	Four (4) Metal stakes penetrating the cap. Cap needs to either be sealed around the stakes or the stakes removed and the pavement repaired.	60 days	CenterPoint	 

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	Conditions Observed and Recommended Action	March 2024 Inspection		Photographs
		Conditions Observed and Recommended Action	Action Taken			Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-31	Metal stakes penetrating the cap			New Point	Six (6) metal stakes penetrating the cap. Cap needs to either be sealed around the stakes or the stakes removed and the pavement repaired.	60 days	CenterPoint	 

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-32	Metal stake penetrating the cap			New Point	Four (4) metal stakes penetrating the cap. Cap needs to either be sealed around the stakes or the stakes removed and the pavement repaired.	60 days	CenterPoint	 

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection


CPSP Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Low-Permeability Geomembrane								
G-1	An open pipe present	Need investigation of this open pipe and action should be taken to cap it, if it does not have any purpose.	Action Not Yet Completed	No significant changes observed	Previous recommendations remain	60 days	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
G-4	Blackberry shrubs growth in the area and poor vegetation.	Improved growth of grass and growth of blackberry shrubs around the region. Remove the blackberry shrubs before the roots spread and re-seed the grass.	Blackberries removed and evidence of seeding. No maintenance form was submitted for this point.	Improved	Blackberries have mostly been removed, no new grass is growing, but there is evidence of an attempt to reseed (small holes in the ground). Re-establish appropriate vegetation. Submit maintenance form.	No later than end of calendar year	CenterPoint	 

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
G-6	Geomembrane exposed in this area	<p>Geomembrane still exposed.</p> <p>Locations with exposed geomembrane are of the highest concern due to the potential compromise of the landfill cap. The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP). The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Along with Site Coordinator, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs are made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration.</p>	Action Not Yet Completed	No significant changes observed	Geomembrane still exposed. Previous recommendations remain.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	
G-7	Exposed and damaged geomembrane at the parking area interface	<p>Geomembrane still exposed.</p> <p>See G-6 for recommended action.</p>	Action Not Yet Completed	No significant changes observed.	Maintenance forms were received, however geomembrane still exposed. Previous recommendations remain.	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
G-8	Exposed geomembrane around utility access hole	Work with Site Coordinator to prepare a plan to re-establish cover over the geomembrane. The geomembrane should be carefully exposed so as to not damage the geomembrane and inspected to determine if it is excess material or part of the cover. Make repairs as necessary and install adequate cover soil in accordance with the IAWP.	No documentation of actions taken	Site not observed during inspection.	Previous recommendations remain	60 days	CenterPoint will work in coordination with Site Coordinator to establish a solution	Location was not observed during inspection
G-12	Poor vegetative cover	Dirt appears to be tilled and the area may have been seeded. No maintenance report received. Submit maintenance report if the tilling was intentional otherwise repair vegetation.	No documentation of actions taken.	Worse	No vegetation established.	No later than end of calendar year	CenterPoint	
G-14	Invasive Plants	Invasive large plant growth. Remove the large plant due to risk of roots compromising the cover system.	Plants removed. No maintenance form was submitted for this point.	Improved	Large plants were removed. Stump was not found to determine if the roots had damaged the cap. Recommend inspecting the cap to determine if it was damaged. Submit maintenance form.	No later than end of calendar year	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection


CPSP Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Stormwater Management Facilities								
SW-1	Standing water	<p>Improved plant growth but there are still patches of bare soil. Water presence in the swale due to improper sloping.</p> <p>The swale does not meet City of Seattle Stormwater Manual requirement for a biofiltration swale to have a minimum slope of 1.5%. Bottom channel should be regraded to the intended 1.5% slope. Along with Site Coordinator, prepare a plan to address this situation.</p>	Action Not Yet Completed.	Improved	<p>Improved plant growth but there are still patches of bare soil. Water presence in the swale due to improper sloping.</p> <p>Previous recommended actions from 2023 remain.</p>	No later than end of calendar year	CenterPoint will work in coordination with Site Coordinator to establish a solution	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection



CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
SW-2	Invasive/Deep Rooted Plants – Appear to be off of the liner. No longer a concern.	Trees have grown larger. Remove the tree coordinating with CenterPoint Previous recommendations from 2023 remain		Remove	Decided that these plants will likely not harm the geomembrane			
SW-3	Catch basin clogged	Catch basin inlet obstructed. Remove the obstruction.	Some debris were removed. No maintenance form was submitted.	Improved	Catch basin inlet partially obstructed. Remove the obstruction. This will likely be an area of continuous maintenance.	No later than end of calendar year	CenterPoint	

Table 1. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, March 5, 2024, Inspection


CPSP Location	Description	October 2023 Inspection		Condition Status	March 2024 Inspection			Photographs
		Conditions Observed and Recommended Action	Action Taken		Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
SW-4	Catch basin clogged	Catch basin inlet obstructed with sediment buildup and plant growth. Remove the obstruction and vegetation.		No significant changes observed	Catch basin inlet obstructed with sediment buildup and plant growth. Remove the obstruction and vegetation.	No later than end of calendar year	CenterPoint	

Table 2. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, March 5, 2024, Inspection


ROW Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Asphalt Concrete								
AC-1	Cracks and pavement repair	Cracks got worse with ponding. Repair/repatching should be coordinated with SDOT	Asphalt Patching	Improved. Maintenance form not received.	Part of the pothole was repaired but there is still a significant size hole in the asphalt and cracking.	No later than end of calendar year	SPU to coordinate with SDOT	

Table 2. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, March 5, 2024, Inspection




ROW Location	Description	October 2023 Inspection		March 2024 Inspection			Photographs	
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection		Recommended Action Assignment
AC-2	Asphalt open cracking	Cracks got extended. Repatching should be coordinated with SDOT	No action taken	Worse	Cracks got extended and holes are deeper. Some of the holes are close to penetrating the cap. Previous recommendation remains	No later than end of calendar year	SPU to coordinate with SDOT	

Table 2. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, March 5, 2024, Inspection

ROW Location	Description	October 2023 Inspection		March 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-3	Potholes alongside of street in the gravel	Pothole appears to be getting worse and should be patched to prevent further erosion.	No action taken	Worse	Previous recommendations remain.	60 days	SPU to coordinate with SDOT	
AC-4	Potholes in the middle of roadway	The pothole got bigger and ponding inside. Repatching should be done coordinating with SDOT	Repaired	Resolved	Previous pothole had been patched	Resolved	SPU to coordinate with SDOT	

Notes: Locations with recommended repairs or action items are in **BOLD** text.

Attachment A

Cap Inspection Checklists

- A-1 SRDS Cap Inspection Checklist
- A-2 CenterPoint Cap Inspection Checklist
- A-3 ROW Cap Inspection Checklist

SOUTH PARK LANDFILL CAP INSPECTION FORM A

Date: March 5, 2024 Inspector(s): Tiffany Neier, Amber Bailey	Parcel Owner: <input checked="" type="checkbox"/> SRDS <input type="checkbox"/> CPSP <input type="checkbox"/> Right-of-Way																
Type of Inspection: <input checked="" type="checkbox"/> Annual <input type="checkbox"/> Reinspection <input type="checkbox"/> Non-Routine Reason:																	
Last Rain Event before Inspection: Daily precipitation observations from King County Hamm Creek Rain Station (HAU2). Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation																	
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th></th> <th>02/28/24</th> <th>02/29/24</th> <th>03/01/24</th> <th>03/02/24</th> <th>03/03/24</th> <th>03/04/24</th> <th>03/05/24</th> </tr> </thead> <tbody> <tr> <td>Precipitation (in)</td> <td style="text-align: center;">1.1</td> <td style="text-align: center;">0.74</td> <td style="text-align: center;">0.3</td> <td style="text-align: center;">0.11</td> <td style="text-align: center;">0.09</td> <td style="text-align: center;">0.29</td> <td style="text-align: center;">0.11</td> </tr> </tbody> </table>			02/28/24	02/29/24	03/01/24	03/02/24	03/03/24	03/04/24	03/05/24	Precipitation (in)	1.1	0.74	0.3	0.11	0.09	0.29	0.11
	02/28/24	02/29/24	03/01/24	03/02/24	03/03/24	03/04/24	03/05/24										
Precipitation (in)	1.1	0.74	0.3	0.11	0.09	0.29	0.11										

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor cracks observed that do not currently need repair.
Open cracks/ruts	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor ponding observed that do not currently need repair.
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location: There are no recommended repairs required at the time of this inspection.				

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geomembrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location:				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Incorrect drainage path or not draining	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor drainage issues observed that do not currently need repair.
Recommended Maintenance or Repair Type/Location:				

Attach necessary documentation such as photographs, sketches, and additional notes.

SOUTH PARK LANDFILL CAP INSPECTION FORM A

Date: March 5, 2024 Inspector(s): Tiffany Neier, Amber Bailey	Parcel Owner: <input type="checkbox"/> SRDS <input checked="" type="checkbox"/> CPSP <input type="checkbox"/> Right-of-Way																
Type of Inspection: <input checked="" type="checkbox"/> Annual <input type="checkbox"/> Reinspection <input type="checkbox"/> Non-Routine Reason:																	
Last Rain Event before Inspection: Daily precipitation observations from King County Hamm Creek Rain Station (HAU2). Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation																	
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	02/28/24	02/29/24	03/01/24	03/02/24	03/03/24	03/04/24	03/05/24										
Precipitation (in)	1.1	0.74	0.3	0.11	0.09	0.29	0.11										

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor cracks observed that do not currently need repair.
Open cracks/ruts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP AC-6, AC-19, AC-21, AC-22, AC-23 need repair
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP AC-6, AC-13, AC-21 need repair
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There was one area with minor erosion observed that does not currently need repair.
Invasive plant growth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP AC-13, AC-19, AC-21, and AC-23 need repair
Other signs of cap damage, failure, or disturbance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP AC-3, AC-29, AC-31, and AC-32 need repair
Recommended Maintenance or Repair Type/Location: See Table 2 for details and recommended actions.				

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location CPSP G-1 needs repair
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location CPSP G-12 needs repair
Exposed geomembrane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP G-6, G-7, G-8 need repair
Soil Sloughing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive plant growth	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP G-4, G-14 need repair
Recommended Maintenance or Repair Type/Location: See Table 2 for details and recommended actions.				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Incorrect drainage path or not draining	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP SW-1, SW-3, SW-4 need repair
Recommended Maintenance or Repair Type/Location: See Table 2 for details and recommended actions.				

Attach necessary documentation such as photographs, sketches, and additional notes.

See Figure 1 and Table 2

SOUTH PARK LANDFILL CAP INSPECTION FORM A

Date: March 15, 2024 Inspector(s): Chris Bourgeois	Parcel Owner: <input type="checkbox"/> SRDS <input type="checkbox"/> CPSP <input checked="" type="checkbox"/> Right-of-Way																
Type of Inspection: <input checked="" type="checkbox"/> Annual <input type="checkbox"/> Reinspection <input type="checkbox"/> Non-Routine Reason:																	
Last Rain Event before Inspection: Daily precipitation observations from King County Hamm Creek Rain Station (HAU2). Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation																	
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	3/9/24	3/10/24	3/11/24	3/12/24	3/13/24	3/14/24	3/15/24										
Precipitation (in)	0.4	0.38	0.22	0.22	0	0	0										

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations ROW AC-1 See Table 3 for details
Open cracks/ruts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations ROW AC-1, AC-2, AC-3 See Table 3 for details
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations ROW AC-1, and AC-2 See Table 3 for details
Pooling or ponding	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location: See Table 3 for recommended actions.				

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Erosion of soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geotextile membrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Invasive/deep-rooted plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Incorrect drainage path or not draining	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

Attach necessary documentation such as photographs, sketches, and additional notes.

See Figure 1 and Table 3

Attachment B

Maintenance Forms

Appendix B2-B.1

SRDS

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS
 CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 2/22/2024

Repaired by: Hot Mix

Reason for Maintenance:

Crack Open

Describe Maintenance Location (attach sketch and photos):

AC-13

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gim

2/22/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS
 CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance
(Completed by Property Owner)

Date of Repair/ Maintenance:	Repaired by: Hot Mix
-------------------------------------	-----------------------------

Reason for Maintenance:
Crack open

Describe Maintenance Location (attach sketch and photos):
AC-14

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gim

2/22/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance (Completed by Site Coordinator)	
Date of Observation/Review:	Inspector(s):
Observation Notes (attach photos):	
_____	_____
Site Coordinator/Inspector Signature	Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS
 CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: <u>2/22/2024</u>	Repaired by: <u>Hot Mix</u>
---	-----------------------------

Reason for Maintenance:
Crack open

Describe Maintenance Location (attach sketch and photos):
AC-20

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gim

2/23/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Site Coordinator/Inspector Signature

Date

Appendix B2-B.2

CenterPoint (former SPPD)

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 11/9

Repaired by: Catchment Solutions

Reason for Maintenance:

Storm drain inspections and cleaning

Describe Maintenance Location (attach sketch and photos):

SW-3 & SW-4; AC-23

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Drains inspected and cleared, sediment removed from around drain. Butterfly bush removed from AC-23

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 1/10/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 2/22 & 2/23

Repaired by: Veths Landscaping

Reason for Maintenance:

Restoration of exposed geomembrane areas

Describe Maintenance Location (attach sketch and photos):

G-6, G-7, G-8, G-12

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Hand removal of dead grass, install new sod and re-seed

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 2/28/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Site Coordinator/Inspector Signature

Date

Appendix B2-B.3

ROW

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: 3/5/24

Inspector(s): Tiffany Neier, Amber Bailey

Observation Notes (attach photos):

Road patches

ROW AC-1. Partially complete. A large portion of this area of concern was patched; several of the potholes were filled, but there is an area that still needs repair.



Tij Neier

3/12/24

Site Coordinator/Inspector Signature

Date

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: 3/15/24

Inspector(s): Chris Bourgeois

Observation Notes (attach photos):

Road patches

ROW AC-4. Complete. Large and smaller potholes patched with asphalt.





Chris B

Site Coordinator/Inspector Signature

3/28/24

Date

Appendix B1-B

October 2024 Mid-Year
Inspection

DATE: December 31, 2024
TO: Mark Jusayan, Seattle Public Utilities
Ashley Piatek, CenterPoint Properties
FROM: Laura Lee and Amber Bailey
SUBJECT: South Park Landfill 2024 Mid-Year Landfill Cap Inspection
CC: Ryan Gardiner, Washington State Department of Ecology
PROJECT NUMBER: 553-1550-067
PROJECT NAME: South Park Landfill Site Coordinator

Introduction

The purpose of this Technical Memorandum is to summarize the findings of the October 2024 mid-year landfill cap inspection at the South Park Landfill.

The inspection satisfies the requirements of the Cleanup Action Plan which fulfills a requirement of the Consent Decree that was signed on March 26, 2019. The primary objective of this inspection was to reinspect issues identified during the March 2024 annual inspection and document recommended maintenance or repairs.

The 2024 mid-year inspection was performed on October 4, 2024, by Parametrix staff members from approximately 7:30 a.m. to 2 p.m. PST. The weather was rainy, and the high temperature was around 51°F with a rainfall accumulation of approximately 0.47 inches of rain recorded at the King County Hamm Creek Rain Station (HAU2).

Figure 1 shows the approximate bounds of the landfill cap for the two Consent Decree Settlement Area properties and the right-of-way (ROW) as defined in the Cleanup Action Plan. Figure 1 also shows the approximate landfill refuse extent which goes below two additional properties that are not currently included in the Settlement Area. Cap Inspection Form A, provided in Appendix A, was completed for the South Recycling and Disposal Station (SRDS) property, the CenterPoint South Park LLC (CPSP) property, and the ROW. Photographs were taken using a Trimble DA2 GNSS Receiver which used GPS to tag the photographs. The photographs are included in Tables 1, 2 and 3 with numbered locations mapped on Figure 1.

The basis of determining the timeline for repairs shown in the tables in this report comes from the Cleanup Action Plan Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, which has the following guidance for the timeline of maintenance/repairs:

1. If underlying material (such as geomembrane) is exposed, corrective action shall occur within 60 days.
2. If minor cracks or ponding do not expose underlying materials and the problem does not appear to be getting worse the issue shall be reinspected in 6 months.



3. If underlying material is not exposed but is worsening or the issue needs to be elevated to a repair before it worsens, the corrective action shall occur within the calendar year.

Corrective actions proposed by the property owners should be coordinated with the Site Coordinator prior to taking action. The Site Coordinator should perform verification inspections during and/or after corrective actions are complete to determine if the maintenance and repairs are consistent with the intent of the regulatory requirements. The property owner should document any repairs or maintenance in Part 1 of the Cap Maintenance Form B and the Site Coordinator will provide observations in Part 2 of the form.

The next cap inspection shall occur in the first quarter of 2025.

SRDS Parcel

The general property conditions observed were good and similar to previous inspections. Locations on the SRDS property that were identified to be repaired or re-inspected in the March 2024 cap inspection were reinspected during this site visit. Pavement cracks, rutting, and ponding areas remain the primary concerns; however, with the planned redevelopment of the property, temporary pavement restoration is not recommended based on conditions at this time, except at locations SRDS AC-5 and SRDS AC-22 as shown in Table 1.

Figure 1 shows the SRDS Cleanup Action Plan boundary and the locations of concern needing repair. The Cap Inspection Checklist Form A was completed for the SRDS property and is included in Attachment A-1.

CPSP Parcel

The general property conditions observed on the CPSP parcel were good and similar to previous inspections. Locations on the CPSP property that were identified in the March 2024 cap inspection were reinspected during this site visit. The paved area is in good condition, though ponding will continue to be monitored to ensure the depressions do not get deeper, which could indicate settlement or asphaltic concrete cap damage. The cap is also being watched for locations with plant growth in the asphalt cracks which could indicate cracks in asphalt that may need to be sealed. The roots of the plants can cause minor cracks to expand as seen in several locations shown in Table 2. The asphalt needs to be sealed once the vegetation has been removed both to repair the cap and to prevent the plant from growing back.

Areas where maintenance was performed were inspected and documented in a Cap Maintenance form (Attachment B-2). Vegetated slopes are uniform and generally in good condition with some erosion and poor vegetative cover as noted in Table 2. The primary concerns are exposed geomembrane, invasive plant growth, and cracks in the asphalt. Some of the invasive plants were cut back and exposed geomembrane was present, but the asphalt was not sealed, and the damage caused by the roots had not been repaired, as shown in Table 2.

The two stormwater catch basins (SW-3 and SW-4) appeared to have been cleared since the March inspection but had since started accumulating debris. These are locations that will require continual maintenance.

Table 2 describes the issue or concern at each location needing repair on the CPSP property, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Previous concerns identified primarily remain in the same general condition with improvements at several locations. Each location of concern needing repair is identified by number in Figure 1 and corresponding photographs are included in Table 2.

Figure 1 shows the CPSP Cleanup Action Plan boundary and the locations of concern needing repair. The Cap Inspection Checklist Form A was completed for the CPSP property and is included in Attachment A-2.

Right-of-Way

There are four areas in the ROW that were identified as locations needing repair in the March 2024 cap inspection. ROW AC-1 and AC-2 represent a section of the road and not individual potholes and cracks due to the number locations that need repair. Several of the holes in the ROW AC-1, ROW AC-2, and ROW AC-4 areas were patched but there are still areas in those locations which have increasingly deep and large potholes. AC-3 has potholes along the street in the gravel. Table 3 describes the issue or concern at each location needing repair in the ROW, status of previous repairs or change of condition if applicable, proposes a recommended action, and indicates a timeline for repairs or maintenance. Each location of concern needing repair is identified by number in Figure 1 with corresponding photographs included in Table 3.

Figure 1 shows the ROW Cleanup Action Plan boundaries and the locations of concern needing repair. The Cap Inspection Checklist Form A was completed for the ROW and is included in Attachment A-3.

Under the Cleanup Action Plan, routine street maintenance does not require Ecology notification or maintenance reports.

Figures

Figure 1. Landfill Cap Inspection October 2024 Site Plan with Locations for Repair, South Park Landfill

Tables

Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, October 2024 Inspection

Table 2. Status of Identified Locations of Concern on the South Park Landfill CPSP Property, October 2024 Inspection

Table 3. Status of Identified Locations of Concern in the South Park Landfill Right-of-Way, October 2024 Inspection

Attachments

- A October 2024 Cap Inspection Checklists
 - A-1 SRDS Cap Inspection Checklist
 - A-2 CPSP Cap Inspection Checklist
 - A-3 ROW Cap Inspection Checklist

- B Maintenance Forms
 - B-1 CPSP Maintenance Form

Figures



1/2/2025 11:15:00 AM C:\Users\jg1550\OneDrive\Documents\11550_CityOfSeattle\11550_067_SouthParkLandfill\995\995_Visual\Annual_Report_2024_CAP_Inspection.mxd

Figure 1
 Landfill Cap Inspection- October 2024
 Site Plan With Locations for Repair
 South Park Landfill
 Seattle, WA

Tables

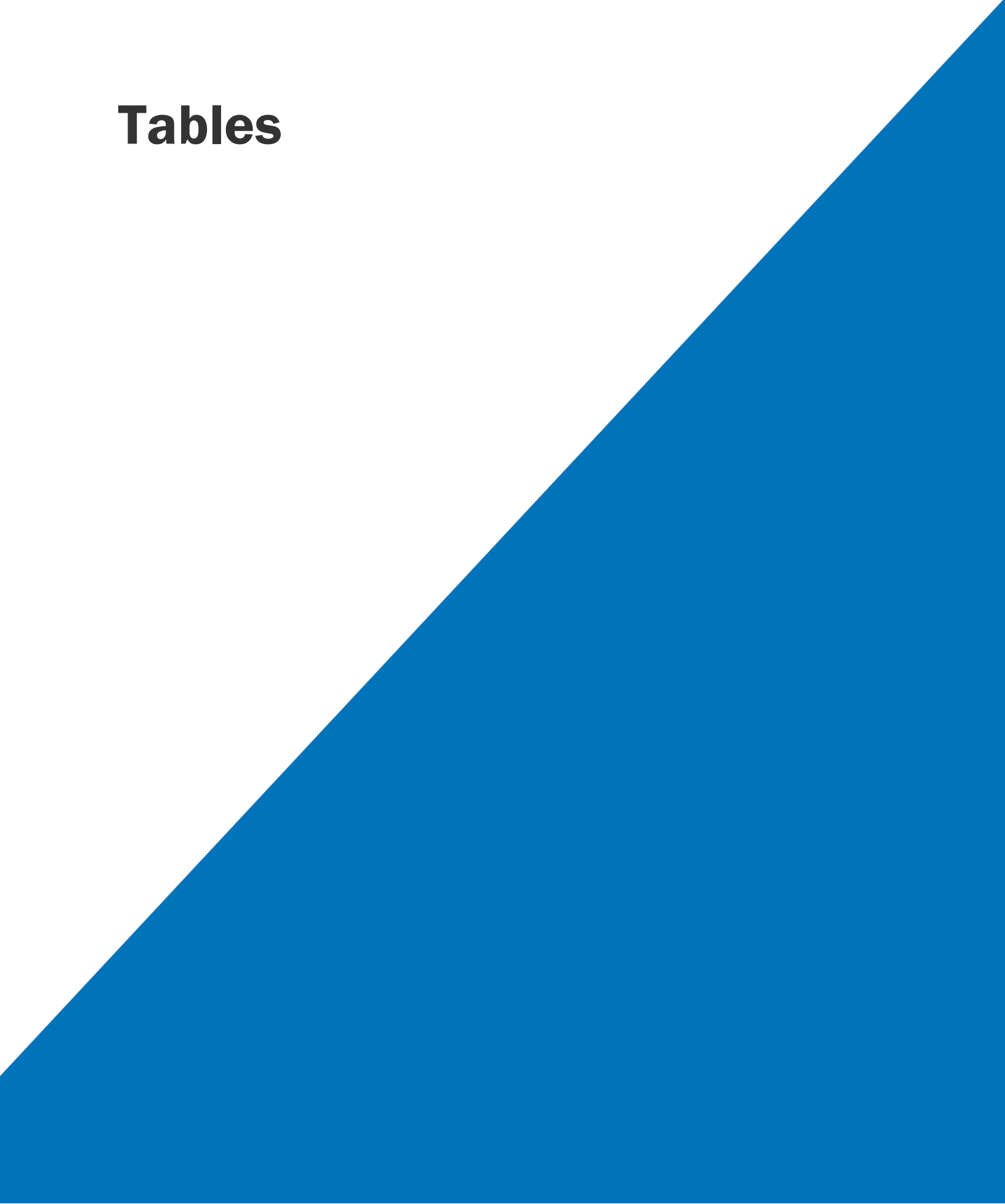


Table 1. Status of Identified Locations of Concern on the South Park Landfill SRDS Property, October 4, 2024, Inspection



SRDS	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Asphalt Concrete								
AC-5	Cracking, divots and ponding	New location	No actions taken or required	New condition at this location	Area has potholes and divots with ponding.	December 2025	Site Coordinator	
AC-22	Cracking and rut in asphalt	NA	NA	New location	Cracks and ruts in pavement. Patch rut in asphalt and seal to prevent further degradation.	December 2025	SRDS	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection



CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Asphalt Concrete								
AC-3	Uncapped pipe	Uncapped pipe protruding from the asphalt needs to be capped or filled and sealed.	Action Not Yet Completed	No significant changes observed	The pipe has not been capped. Previous recommended actions remain.	Past Due	CenterPoint	
AC-6	Gaps and holes in electric fence post holes	Evidence of continued ponding. Unclear if changes were made.	Action Not Yet Completed	Resolved	Water was flowing during inspection, ponding issue resolved.	NA	NA	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection




CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-13	Blackberry shrubs growth and stagnated water behind the concrete blocks	Blackberries continue to grow. Sediment blocking flow from the swale causing up to 4" of ponding water. Remove blackberry shrubs and clear pathways to allow proper water flow into the storm drains.	Plants were cut back. Maintenance form was submitted.	Worse	Sediment buildup with oil sheen was observed. Blackberries have grown back. Regular maintenance is recommended.	Ongoing	CenterPoint	 
AC-20	Minor cracks	Plant growth in crack Follow-up reinspection	No actions taken or required	Worse	Increased plant growth indicates the cracks have worsened and the asphalt needs to be sealed.	December 2025	CenterPoint	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection



CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-21	Holes near fence allowing growth of plants & ponding presence	Plant has been mostly removed. Seal pavement where the plant was growing.	Plant was cut back. Maintenance form was submitted.	No significant changes observed	Previous recommendations remain.	Past Due	CenterPoint	
AC-22	Unsealed pavement after plant removal	Part of the plant was removed but has since regrown. Remove the plant and seal the pavement.	No actions taken or maintenance forms received	No significant changes observed	Post is not sealed, as indicated by plant growth. Remove plant and seal pavement.	Past Due	CenterPoint	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection



CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-23	Separation of pavement from storm drain	Most of the plant next to the storm drain has been removed but the roots are still there, and the cap penetration was not sealed. Plant roots had pushed up the pavement. Repair and seal pavement.	No actions taken	No significant changes observed	Previous recommendations remain.	Past Due	CenterPoint	 

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection



CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
Low-Permeability Geomembrane								
G-1	An open pipe present	Need investigation of this open pipe and action should be taken to cap it, if it does not have any purpose.	Action Not Yet Completed	No significant changes observed	Previous recommendations remain.	Past due	CenterPoint	
G-4	Blackberry shrubs growth in the area and poor vegetation	Blackberries have mostly been removed, no new grass is growing, but there is evidence of an attempt to reseed (small holes in the ground). Re-establish appropriate vegetation. Submit maintenance form.	Blackberries removed and evidence of seeding.	Improved	Maintenance forms received for clearing blackberries, however blackberries have grown back. Regular maintenance is recommended.	Ongoing	CenterPoint	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection



CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
G-6	Geomembrane exposed in this area	<p>Geomembrane still exposed.</p> <p>Locations with exposed geomembrane are of the highest concern due to the potential compromise of the landfill cap. The configuration of the geomembrane and cover at the interface of the parking area does not appear to be in accordance with Figure 5 of the Interim Action Work Plan (IAWP). The geomembrane appears to be directly below the asphalt with no drainage layer or surfacing layer in between. Along with Site Coordinator, prepare a plan to reestablish cover over the geomembrane. Most likely, the area should be exposed, and the geomembrane tested for damage before repairs are made. The crest of slope should then be provided cover to the maximum extent possible considering the existing asphalt and curb configuration.</p> <p>Geomembrane still exposed. Previous recommendations remain.</p>	Action Not Yet Completed	No significant changes observed	Geomembrane still exposed. Previous recommendations remain.	Past Due	CenterPoint	
G-7	Exposed and damaged geomembrane at the parking area interface	<p>Maintenance forms were received, however geomembrane still exposed. See G-6 for recommended action.</p>	Action Not Yet Completed	No significant changes observed	Geomembrane still exposed. Previous recommendations remain.	Past Due	CenterPoint	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection




CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
G-8	Exposed geomembrane around utility access hole	Work with Site Coordinator to prepare a plan to re-establish cover over the geomembrane. The geomembrane should be carefully exposed so as to not damage the geomembrane and inspected to determine if it is excess material or part of the cover. Make repairs as necessary and install adequate cover soil in accordance with the IAWP.	No documentation of actions taken	No significant changes observed	Geomembrane still exposed. Previous recommendations remain.	Past Due	CenterPoint	
Stormwater Management Facilities								
SW-3	Catch basin clogged	Catch basin inlet partially obstructed. Remove the obstruction.	Some debris was removed. No maintenance form was submitted.	No significant changes observed	Previous recommendations remain. This will likely be an area of continuous maintenance.	Ongoing	CenterPoint	

Table 2. Status of Identified Locations of Concern on the CenterPoint South Park LLC (CPSP) Property, October 4, 2024, Inspection

CPSP Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
SW-4	Catch basin clogged	Catch basin inlet obstructed with sediment buildup and plant growth. Remove the obstruction and vegetation.	Action Not Yet Completed	No significant changes observed	Previous recommendations remain.	Ongoing	CenterPoint	

Notes: NA = Not applicable

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, October 4, 2024, Inspection


ROW Location	Description	March 2024 Inspection		October 2024 Inspection			Photographs	
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection		Recommended Action Assignment
Asphalt Concrete								
AC-1	Asphalt cracks and ruts	Part of the pothole was repaired but there is still a significant size hole in the asphalt and cracking.	Partial Asphalt Patching.	Improvement	Partial asphalt patching was observed. Repair/repatching should be coordinated with SDOT. Report on the SDOT Find It, Fix It app.	December 2025	SDOT	

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, October 4, 2024, Inspection




ROW Location	Description	March 2024 Inspection		October 2024 Inspection			Photographs	
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection		Recommended Action Assignment
AC-2	Asphalt open cracking	Cracks got extended and holes are deeper. Some of the holes are close to penetrating the cap. Repatching should be coordinated with SDOT	No action taken	Improved	Previous pothole and some deep cracks were patched; however, several cracks are deeper and need repair. Repair/repatching should be coordinated with SDOT. Report on the SDOT Find It, Fix It app.	December 2025	SDOT	

Table 3. Status of Identified Locations of Concern on the South Park Landfill Right-of-Way Property, October 4, 2024, Inspection

ROW Location	Description	March 2024 Inspection		October 2024 Inspection				Photographs
		Conditions Observed and Recommended Action	Action Taken	Condition Status	Conditions Observed and Recommended Action	Timeline for Repair and/or Reinspection	Recommended Action Assignment	
AC-3	Potholes alongside of street in the gravel	Pothole appears to be getting worse and should be patched to prevent further erosion.	Site Coordinator reported on SDOT Find It, Fix It; repairs were not made	Worse	Previous conditions remain. Repair should be coordinated with SDOT. Report on the SDOT Find It, Fix It app.	December 2025	SDOT	
AC-4	Asphalt cracks and ruts in the middle of roadway	Previous pothole had been patched	Repaired	Worse	Previous pothole was repaired; however, several asphalt cracks and ruts have worsened and are in need of repair. Repair/repatching should be coordinated with SDOT. Report on the SDOT Find It, Fix It app.	December 2025	SDOT	

Attachment A

Cap Inspection Checklists

- A-1 SRDS Cap Inspection Checklist
- A-2 CenterPoint Cap Inspection Checklist
- A-3 ROW Cap Inspection Checklist

SOUTH PARK LANDFILL CAP INSPECTION FORM A

Date: October 4, 2024 Inspector(s): Amber Bailey, Bruno Antoine	Parcel Owner: <input checked="" type="checkbox"/> SRDS <input type="checkbox"/> CPSP <input type="checkbox"/> Right-of-Way																
Type of Inspection: <input type="checkbox"/> Annual <input checked="" type="checkbox"/> Reinspection <input type="checkbox"/> Non-Routine Reason:																	
Last Rain Event before Inspection: Daily precipitation observations from King County Hamm Creek Rain Station (HAU2). Source: https://green2.kingcounty.gov/hydrology/DataDownload.aspx?G_ID=1517&Parameter=Precipitation																	
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;"></td> <td style="width: 10%; text-align: center;">9/28/24</td> <td style="width: 10%; text-align: center;">9/29/24</td> <td style="width: 10%; text-align: center;">9/30/24</td> <td style="width: 10%; text-align: center;">10/01/24</td> <td style="width: 10%; text-align: center;">10/02/24</td> <td style="width: 10%; text-align: center;">10/03/24</td> <td style="width: 10%; text-align: center;">10/04/24</td> </tr> <tr> <td style="text-align: left;">Precipitation (in)</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0</td> <td style="text-align: center;">0.47</td> </tr> </table>			9/28/24	9/29/24	9/30/24	10/01/24	10/02/24	10/03/24	10/04/24	Precipitation (in)	0	0	0	0	0	0	0.47
	9/28/24	9/29/24	9/30/24	10/01/24	10/02/24	10/03/24	10/04/24										
Precipitation (in)	0	0	0	0	0	0	0.47										

VISUAL INSPECTION CHECKLIST

Asphalt Concrete				
	Yes	No	Needs Repair	If yes, describe:
Minor cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor cracks observed that do not currently need repair.
Open cracks/ruts	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AC-22 needs repair
Differential settlement	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Potholes	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	AC-5 needs repair
Pooling or ponding	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	There were multiple locations with minor ponding observed that do not currently need repair.
Separation of pavement from curbs, gutters, or catch basins	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Sloughing or crumbling of edge materials	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Other signs of cap damage, failure, or disturbance	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location: See Table 1 for details and recommended actions.				

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geomembrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location:				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Incorrect drainage path or not draining	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	The catch basin at SW-5 had minor ponding but does not currently need repair.
Recommended Maintenance or Repair Type/Location:				

Attach necessary documentation such as photographs, sketches, and additional notes.

See Figure 1 and Table 1

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP G-6, G-7, G-8 need repair
Holes/signs of unauthorized digging	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Location CPSP G-1 needs repair
Poor vegetative cover	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP G-4 needs repair
Exposed geomembrane	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP G-6, G-7, G-8 need repair
Soil Sloughing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Recommended Maintenance or Repair Type/Location: See Table 2 for details and recommended actions.				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Erosion of soil	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Exposed geotextile membrane	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Invasive/deep-rooted plants	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Poor vegetative cover	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Incorrect drainage path or not draining	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Locations CPSP SW-3 and SW-4 need repair
Recommended Maintenance or Repair Type/Location: See Table 2 for details and recommended actions.				

Attach necessary documentation such as photographs, sketches, and additional notes.

See Figure 1 and Table 2

VISUAL INSPECTION CHECKLIST (continued)

Low-Permeability Geomembrane				
	Yes	No	Needs Repair	If yes, describe:
Erosion of cover soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geotextile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geomembrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

Stormwater Management Facilities				
	Yes	No	Needs Repair	If yes, describe:
Signs of water infiltration below structures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Erosion of soil	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Exposed geotextile membrane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Holes/signs of unauthorized digging	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Invasive/deep-rooted plants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Poor vegetative cover	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Incorrect drainage path or not draining	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Not applicable to ROW
Recommended Maintenance or Repair Type/Location:				

Attach necessary documentation such as photographs, sketches, and additional notes.

See Figure 1 and Table 3

Attachment B

Maintenance Forms

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 5/13/2024

Repaired by: Catchment Solutions

Reason for Maintenance:

Remove blackberry and other invasive species overgrowth

Describe Maintenance Location (attach sketch and photos):

AC-13, AC-21, G-4

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Remove blackberry bushes and other invasive species throughout the site and along fence lines.

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 5/13/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: October 4, 2024

Inspector(s): Amber Bailey

Observation Notes (attach photos):

AC-13: Sediment buildup with oil sheen was observed. Blackberries have grown back. Regular maintenance is recommended.



AC-21: Seal pavement where the plants have grown back.



G-4: Blackberries have grown back. Regular maintenance is recommended.





Amber Bailey

1/2/2025

Site Coordinator/Inspector Signature

Date

Appendix B2

Cap Maintenance Documentation

Appendix B2-A

Example Form

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Site Coordinator/Inspector Signature

Date

Appendix B2-B

Completed Forms

Appendix B2-B.1

SRDS

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Min-Soon Yim

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 2/22/2024

Repaired by: Hot Mix

Reason for Maintenance:

Crack Open

Describe Maintenance Location (attach sketch and photos):

AC-13

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gim

2/22/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: 3/05/2024

Inspector(s): Tiffany Neier, Amber Bailey

Observation Notes (attach photos):

Hole is patched with asphalt and sealant

Tij Neier

3/07/2024

Site Coordinator/Inspector Signature

Date



SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS
 CenterPoint (former SPPD)

Owner Contact: Min-Soon Yim

**Part 1: Maintenance
(Completed by Property Owner)**

Date of Repair/ Maintenance:	Repaired by: Hot Mix
-------------------------------------	-----------------------------

Reason for Maintenance:
Crack open

Describe Maintenance Location (attach sketch and photos):
AC-14

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gjin

2/22/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: **3/05/2024**

Inspector(s): **Tiffany Neier, Amber Bailey**

Observation Notes (attach photos):

Hole is patched with asphalt and sealant

Tij Neier

3/07/2024

Site Coordinator/Inspector Signature

Date



SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Min-Soon Yim

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 2/22/2024

Repaired by: Hot Mix

Reason for Maintenance:

Crack open

Describe Maintenance Location (attach sketch and photos):

AC-20

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):



Before



After

Is the maintenance activity complete?

Yes

No

If no, explain:

Minsoon Gim

2/23/2024

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: **3/05/2024**

Inspector(s): **Tiffany Neier, Amber Bailey**

Observation Notes (attach photos):

Hole is patched with asphalt and sealant



3/07/2024

Site Coordinator/Inspector Signature

Date



Appendix B2-B.2

CenterPoint

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 2/22 & 2/23

Repaired by: Veths Landscaping

Reason for Maintenance:

Restoration of exposed geomembrane areas

Describe Maintenance Location (attach sketch and photos):

G-6, G-7, G-8, G-12

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Hand removal of dead grass, install new sod and re-seed

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 2/28/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

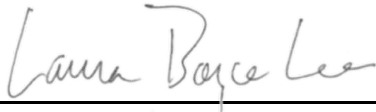
Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: March 15, 2024

Inspector(s): Chris Bourgeois, Parametrix

Observation Notes (attach photos):

Maintenence has been conducted; however geomembrane remains exposed.



Site Coordinator/Inspector Signature

September 25, 2024

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 5/13/2024

Repaired by: Catchment Solutions

Reason for Maintenance:

Remove blackberry and other invasive species overgrowth

Describe Maintenance Location (attach sketch and photos):

AC-13, AC-21, G-4

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Remove blackberry bushes and other invasive species throughout the site and along fence lines.

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 5/13/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: October 4, 2024

Inspector(s): Amber Bailey

Observation Notes (attach photos):

AC-13: Sediment buildup with oil sheen was observed. Blackberries have grown back. Regular maintenance is recommended.



AC-21: Seal pavement where the plants have grown back.



G-4: Blackberries have grown back. Regular maintenance is recommended.





Amber Bailey

1/2/2025

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)	
Date of Repair/ Maintenance: 12/10/2024	Repaired by: Catchment Solutions
Reason for Maintenance: Open pipe in landscaping	
Describe Maintenance Location (attach sketch and photos): G-1	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary): Capped two open pipes in landscaping slope	
Is the maintenance activity complete? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, explain:	
Property Owner Signature	Date
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Maintenance will be observed during the 2025 annual cap inspection.

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 1/29/2025

Repaired by: Secoma Fence

Reason for Maintenance:

Installation of two 25' wide barrier gates at each end of private driveway

Describe Maintenance Location (attach sketch and photos):

Located on the east and west ends of the private drive

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Dig up to 4' in asphalt to install gate posts, repairs around posts filled with cement

Is the maintenance activity complete? Yes No

If no, explain:



03/06/2025

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Maintenance will be observed during the 2025 annual cap inspection.

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 5/13/2024

Repaired by: Catchment Solutions

Reason for Maintenance:

Remove blackberry and other invasive species overgrowth

Describe Maintenance Location (attach sketch and photos):

AC-13, AC-21, G-4

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Remove blackberry bushes and other invasive species throughout the site and along fence lines.

Is the maintenance activity complete? Yes No

If no, explain:



Property Owner Signature

Date 5/13/2024

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review: October 4, 2024

Inspector(s): Amber Bailey

Observation Notes (attach photos):

AC-13: Sediment buildup with oil sheen was observed. Blackberries have grown back. Regular maintenance is recommended.



AC-21: Seal pavement where the plants have grown back.



G-4: Blackberries have grown back. Regular maintenance is recommended.





Amber Bailey

1/2/2025

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)	
Date of Repair/ Maintenance: 12/10/2024	Repaired by: Catchment Solutions
Reason for Maintenance: Open pipe in landscaping	
Describe Maintenance Location (attach sketch and photos): G-1	
Describe Maintenance or Repair Performed (attach photos and documentation as necessary): Capped two open pipes in landscaping slope	
Is the maintenance activity complete? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If no, explain:	
Property Owner Signature	Date
All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.	

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Maintenance will be observed during the 2025 annual cap inspection.

Site Coordinator/Inspector Signature

Date

SOUTH PARK LANDFILL CAP MAINTENANCE FORM B

Parcel Owner: SRDS

Owner Contact: Andrea Hacker

CenterPoint (former SPPD)

Part 1: Maintenance (Completed by Property Owner)

Date of Repair/ Maintenance: 1/29/2025

Repaired by: Secoma Fence

Reason for Maintenance:

Installation of two 25' wide barrier gates at each end of private driveway

Describe Maintenance Location (attach sketch and photos):

Located on the east and west ends of the private drive

Describe Maintenance or Repair Performed (attach photos and documentation as necessary):

Dig up to 4' in asphalt to install gate posts, repairs around posts filled with cement

Is the maintenance activity complete? Yes No

If no, explain:



03/06/2025

Property Owner Signature

Date

All maintenance and repair documentation must be provided to the Site Coordinator within 60 days of the completion of the maintenance/repair OR by March 1 if the activity is completed within 60 days prior to March 1.

Part 2: Observation/Review of Maintenance
(Completed by Site Coordinator)

Date of Observation/Review:

Inspector(s):

Observation Notes (attach photos):

Maintenance will be observed during the 2025 annual cap inspection.

Site Coordinator/Inspector Signature

Date

Appendix B2-B.3

ROW



Chris B

Site Coordinator/Inspector Signature

3/28/24

Date

Appendix C

Landfill Gas Monitoring

Appendix C1

Perimeter Probe Monitoring Field Forms

South Park Landfill
First Quarter 2024 Gas Probe Monitoring Data

Gas Probe	Date	Time	Rel. Press. inches H2O	CH4 %	CO2 %	O2 %	Balance %	Blocked (Y/N)	Baro. Press. inches Hg
SP00GP26	2/1/2024	8:48	-0.03	0.0	2.2	16.5	81.3	N	29.45
SP00GP23	2/1/2024	9:02	0.00	0.0	0.2	21.4	78.4	N	29.46
SP00GP07	2/1/2024	9:09	0.01	0.0	1.2	18.4	80.4	N	29.48
SP00GP16	2/1/2024	9:30	0.02	0.0	8.3	10.3	81.4	N	29.47
SP00GP29	2/1/2024	9:35	-0.05	0.0	12.3	0.1	87.6	N	29.46
SP00GP28	2/1/2024	9:41	0.01	0.0	0.1	21.0	78.9	N	29.46
SP00GP27	2/1/2024	9:47	0.02	0.1	9.2	0.0	90.7	N	29.46
SP00GP33	2/1/2024	9:55	-0.02	0.0	0.9	19.6	79.5	N	29.47
SP00GP09	2/1/2024	10:02	0.01	0.0	8.7	10.0	81.3	N	29.47
SP00GP37	2/1/2024	10:13	0.06	0.0	8.3	4.0	87.7	N	29.47
SP00GP38	2/1/2024	10:21	-0.01	0.0	12.7	2.9	84.4	N	29.47
SP00GP11	2/1/2024	10:37	-0.03	0.0	1.1	20.0	78.9	Y	29.48
SP00GP13	2/1/2024	10:43	1.11	0.0	0.9	19.9	79.2	N	29.47
SP00GP03	2/1/2024	10:48	-0.01	0.0	1.7	17.3	81.0	N	29.47
SP00GP15	2/1/2024	11:10	2.04	0.0	1.2	19.3	79.5	N	29.49
SP00GP31	2/1/2024	11:17	0.07	0.0	1.7	16.3	82.0	N	29.48
SP00GP32	2/1/2024	11:38	-2.08	0.0	0.1	16.5	83.4	Y	29.48

Device ID GEM™5000; G5 V1_15_12; LSGAM:6_0_20160627; {5306575199}

South Park Landfill
Second Quarter 2024 Gas Probe Monitoring Data

Gas Probe	Date	Time	Rel. Press. inches H2O	CH4 %	CO2 %	O2 %	Balance %	Blocked (Y/N)	Baro. Press. inches Hg
SP00GP37	4/30/2024	8:14	-0.01	0.0	8.6	6.7	84.7	N	30.03
SP00GP38	4/30/2024	8:22	0.00	0.0	13.1	4.4	82.5	N	30.05
SP00GP09	4/30/2024	8:29	0.03	0.0	6.6	14.7	78.7	N	30.04
SP00GP26	4/30/2024	8:40	0.03	0.0	1.8	19.7	78.5	N	30.05
SP00GP07	4/30/2024	9:05	0.01	0.0	1.9	19.4	78.7	N	30.06
SP00GP23	4/30/2024	9:19	0.02	0.0	7.0	14.0	79.0	N	30.06
SP00GP11	4/30/2024	9:44	0.03	0.0	0.7	21.1	78.2	N	30.06
SP00GP13	4/30/2024	9:52	-0.36	0.0	2.1	19.3	78.6	Y	30.06
SP00GP33	4/30/2024	10:05	-0.04	0.0	0.9	20.3	78.8	N	30.07
SP00GP03	4/30/2024	10:21	-0.01	0.0	4.1	13.5	82.4	N	30.08
SP00GP32	4/30/2024	10:28	-2.82	0.0	0.4	17.2	82.4	Y	30.08
SP00GP15	4/30/2024	10:32	-24.05	0.0	6.4	5.8	87.8	Y	30.08
SP00GP31	4/30/2024	10:38	-0.03	0.0	5.8	11.7	82.5	N	30.08
SP00GP16	4/30/2024	10:54	0.07	0.0	7.5	11.1	81.4	N	30.08
SP00GP29	4/30/2024	10:59	0.09	0.0	13.9	0.0	86.1	N	30.08
SP00GP28	4/30/2024	11:07	0.07	0.0	0.2	20.9	78.9	N	30.07
SP00GP27	4/30/2024	11:12	0.02	0.0	8.1	0.3	91.6	N	30.08

Device ID GEM™5000; G5 V1_15_12; LSGAM:6_0_20160627; {43838984636}

South Park Landfill
Third Quarter 2024 Gas Probe Monitoring Data

Gas Probe	Date	Time	Rel. Press. inches H2O	CH4 %	CO2 %	O2 %	Balance %	Blocked (Y/N)	Baro. Press. inches Hg
SP00GP26	7/30/2024	8:39	0.05	0.0	2.1	19.1	78.8	N	29.98
SP00GP07	7/30/2024	8:58	0.05	0.0	3.0	18.1	78.9	N	29.98
SP00GP23	7/30/2024	9:15	0.02	0.0	8.3	13.1	78.6	N	29.98
SP00GP33	7/30/2024	9:29	0.02	0.0	1.9	18.4	79.7	N	29.98
SP00GP37	7/30/2024	9:46	0.07	0.0	10.6	10.5	78.9	N	29.97
SP00GP38	7/30/2024	9:54	0.06	0.0	18.7	2.2	79.1	N	29.99
SP00GP09	7/30/2024	10:02	0.01	0.0	4.7	17.3	78.0	N	30.00
SP00GP11	7/30/2024	10:17	-0.06	0.0	0.4	21.1	78.5	N	29.98
SP00GP03	7/30/2024	10:23	0.07	0.0	6.3	13.4	80.3	N	29.98
SP00GP31	7/30/2024	10:29	0.04	0.0	11.0	7.7	81.3	N	29.98
SP00GP16	7/30/2024	10:45	-0.06	0.0	12.6	6.0	81.4	N	29.99
SP00GP29	7/30/2024	10:54	-0.02	0.0	16.8	0.0	83.2	N	29.99
SP00GP28	7/30/2024	11:05	-0.01	0.0	0.0	21.1	78.9	N	29.99
SP00GP27	7/30/2024	11:16	0.05	0.0	11.0	0.6	88.4	N	29.99
SP00GP15	7/30/2024	11:35	-18.93	0.0	4.7	15.2	80.1	Y	30.00
SP00GP32	7/30/2024	11:42	-0.55	0.0	1.5	18.1	80.4	N	30.00
SP00GP13	7/30/2024	11:52	-2.55	0.0	3.4	17.9	78.7	Y	30.00

GEM™5000; G5 V1_15_12; LSGAM:6_0_20160627; {10895351023}

**South Park Landfill
Fourth Quarter 2024 Gas Probe Monitoring Data**

Gas Probe	Date	Time	Rel. Press. inches H2O	CH4 %	CO2 %	O2 %	Balance %	Blocked (Y/N)	Baro. Press. inches Hg
SP00GP33	10/29/2024	9:56	-0.01	0.0	2.3	18.1	79.6	N	30.07
SP00GP37	10/29/2024	10:12	0.04	0.0	9.4	10.7	79.9	N	30.07
SP00GP38	10/29/2024	10:19	0.02	0.0	16.0	3.1	80.9	N	30.08
SP00GP09	10/29/2024	10:26	0.04	0.0	4.2	17.7	78.1	N	30.08
SP00GP11	10/29/2024	10:38	-0.05	0.0	0.7	20.9	78.4	Y	30.07
SP00GP03	10/29/2024	10:45	0.08	0.0	7.0	12.4	80.6	N	30.07
SP00GP07	10/29/2024	10:56	0.01	0.0	2.6	18.5	78.9	N	30.07
SP00GP23	10/29/2024	11:14	0.01	0.0	7.2	14.8	78.0	N	30.09
SP00GP26	10/29/2024	11:23	0.05	0.0	2.1	19.3	78.6	N	30.08
SP00GP13	10/29/2024	11:36	-2.75	0.0	4.3	16.1	79.6	Y	30.09
SP00GP32	10/29/2024	11:45	1.59	0.0	1.0	18.6	80.4	Y	30.08
SP00GP15	10/29/2024	11:56	-30.51	0.0	1.0	20.6	78.4	N	30.08
SP00GP31	10/29/2024	12:03	0.05	0.0	9.4	7.1	83.5	N	30.09
SP00GP16	10/29/2024	12:18	0.01	0.0	11.7	6.8	81.5	N	30.09
SP00GP29	10/29/2024	12:23	0.11	0.0	15.8	0.0	84.2	N	30.08
SP00GP28	10/29/2024	12:32	-0.01	0.0	0.2	21.3	78.5	N	30.08
SP00GP27	10/29/2024	12:38	0.02	0.0	12.4	0.7	86.9	N	30.07

GEM™5000; G5 V1_15_12; LSGAM:6_0_20160627; {20672848369}

Appendix C2

On-Site Building Monitoring Forms

Code
2125

SOUTH PARK LANDFILL
SPPD ON-SITE BUILDING
METHANE ALARM INSPECTION CHECKLIST

Building Location: MENS Restroom
Make and Model of Detector: Techemor

Monthly Check		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	3/5/24	ML
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Quarterly Test		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	3/5/24	ML
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

SOUTH PARK LANDFILL
SPPD ON-SITE BUILDING
METHANE ALARM INSPECTION CHECKLIST

Building Location: Training office
Make and Model of Detector: Techamon

Monthly Check		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	3/5/24	lm
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Quarterly Test		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	3/5/24	lm
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

SOUTH PARK LANDFILL
SPPD ON-SITE BUILDING
METHANE ALARM INSPECTION CHECKLIST

Building Location: Mens Restroom

Make and Model of Detector: Technamor

Monthly Check		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	6/6/24	uu
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Quarterly Test		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	6/6/24	uu
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

SOUTH PARK LANDFILL
SPPD ON-SITE BUILDING
METHANE ALARM INSPECTION CHECKLIST

Building Location: Training office

Make and Model of Detector: Techmar

Monthly Check		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	6/6/24	uu
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Quarterly Test		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input checked="" type="checkbox"/>	6/6/24	uu
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

SOUTH PARK LANDFILL
SPPD ON-SITE BUILDING
METHANE ALARM INSPECTION CHECKLIST

Building Location: _____

Make and Model of Detector: _____

Monthly Check		
Press test button and confirm indicator light is illuminated.		
Pass	Date	Initials
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

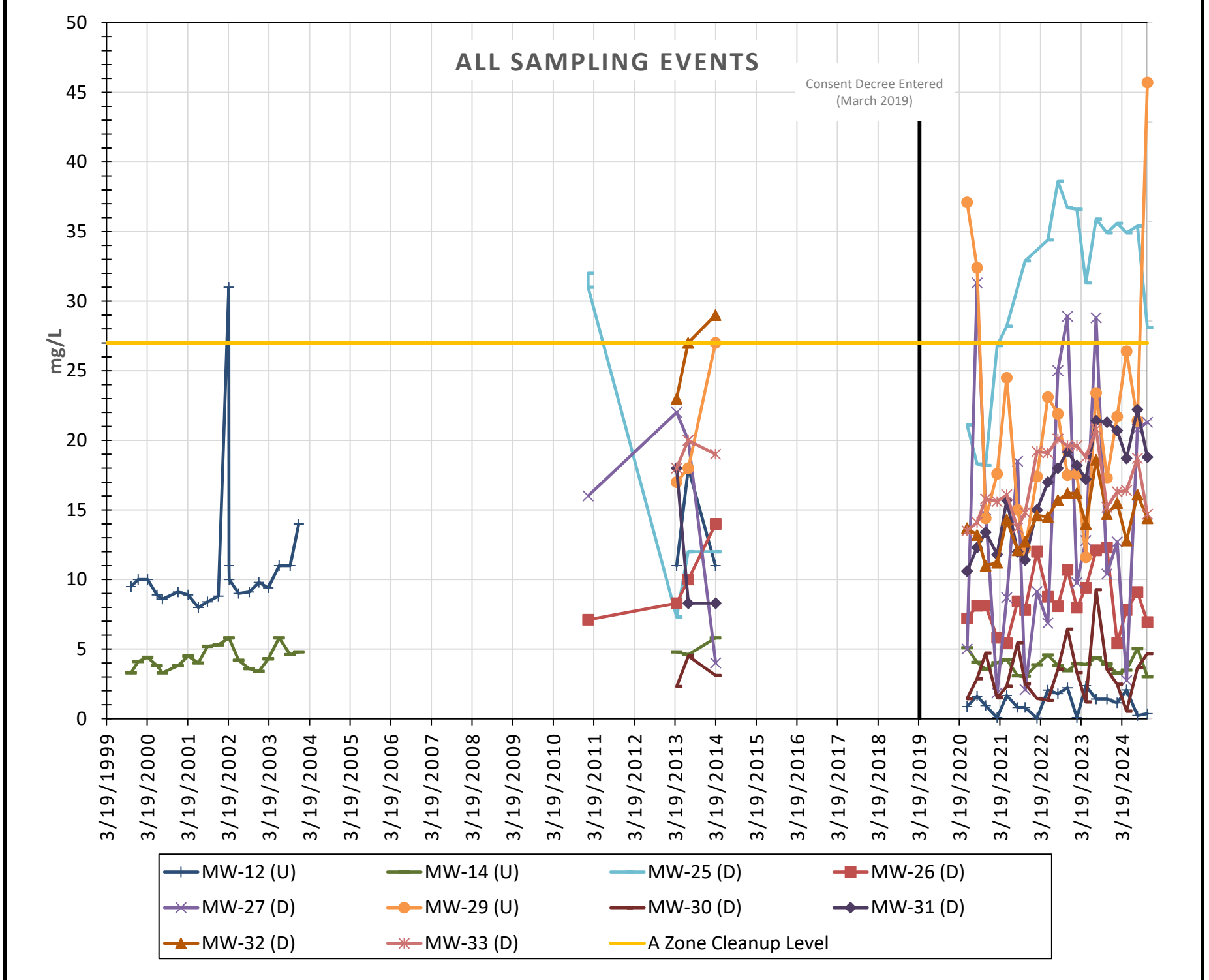
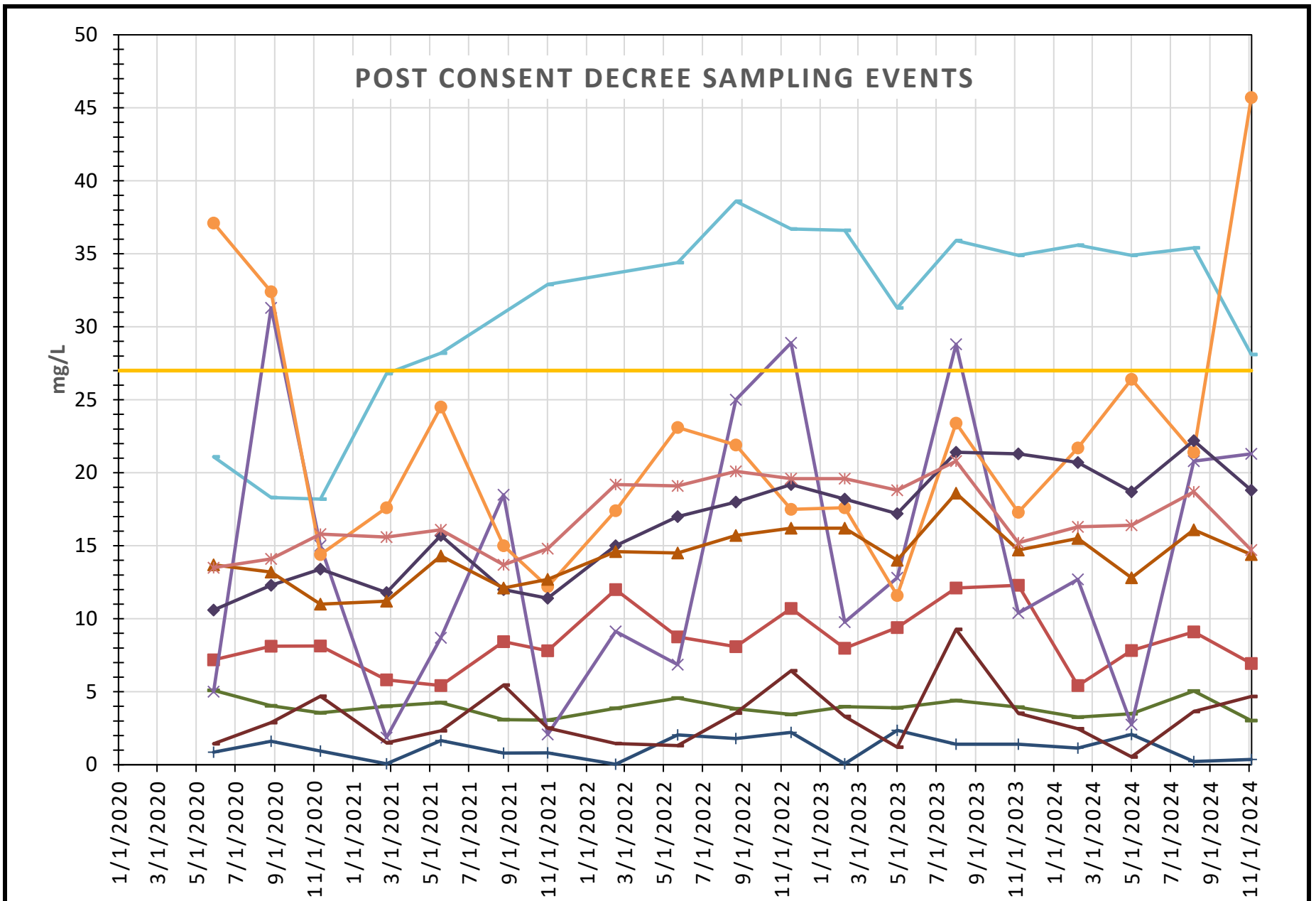
Quarterly Test		
Direct gas from unlighted butane lighter into the detector through one of the vent holes and hold for several seconds. Confirm that red light and alarm activated.		
Pass	Date	Initials
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

Appendix D

Groundwater Monitoring

Appendix D1

Time-Series Plots

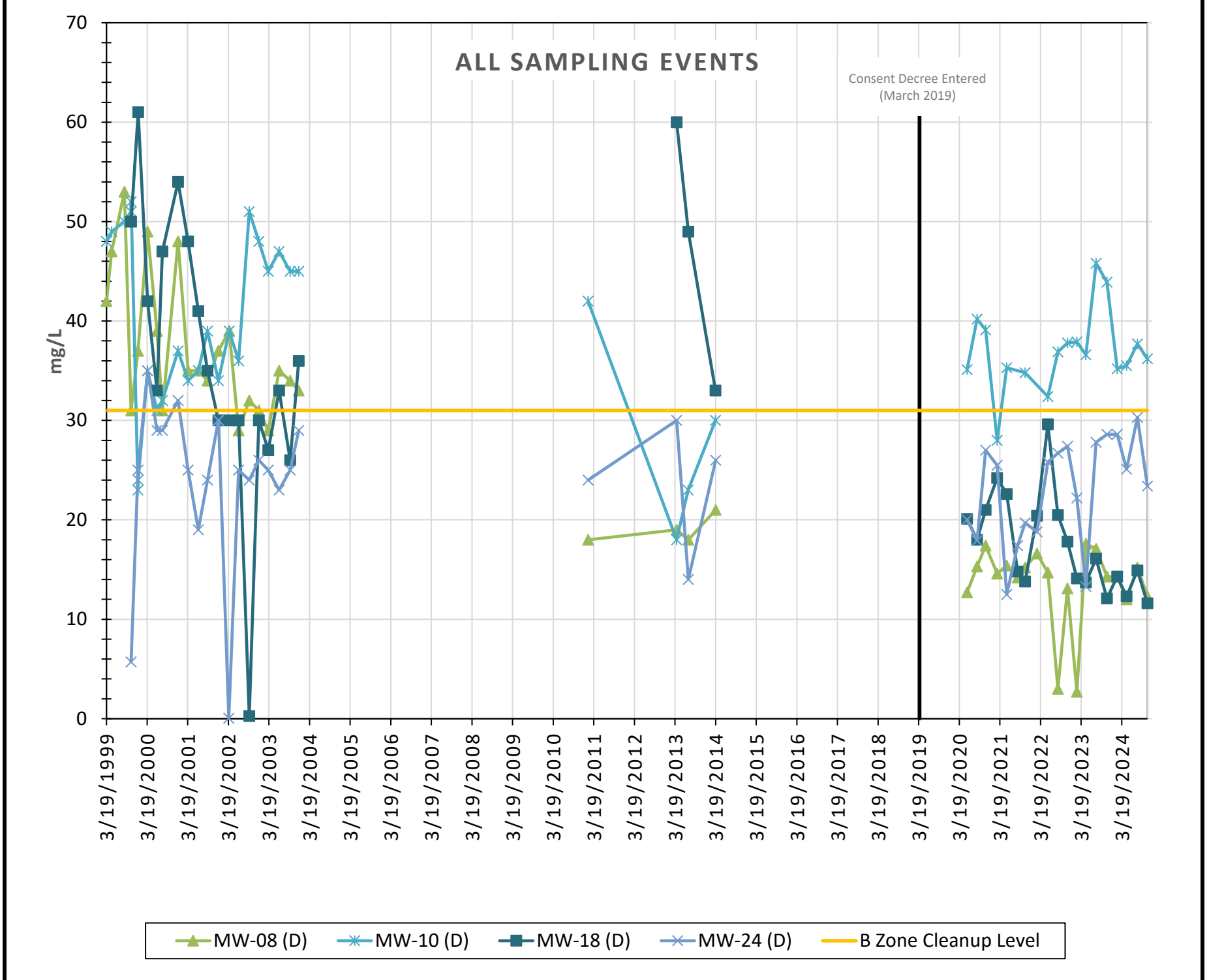
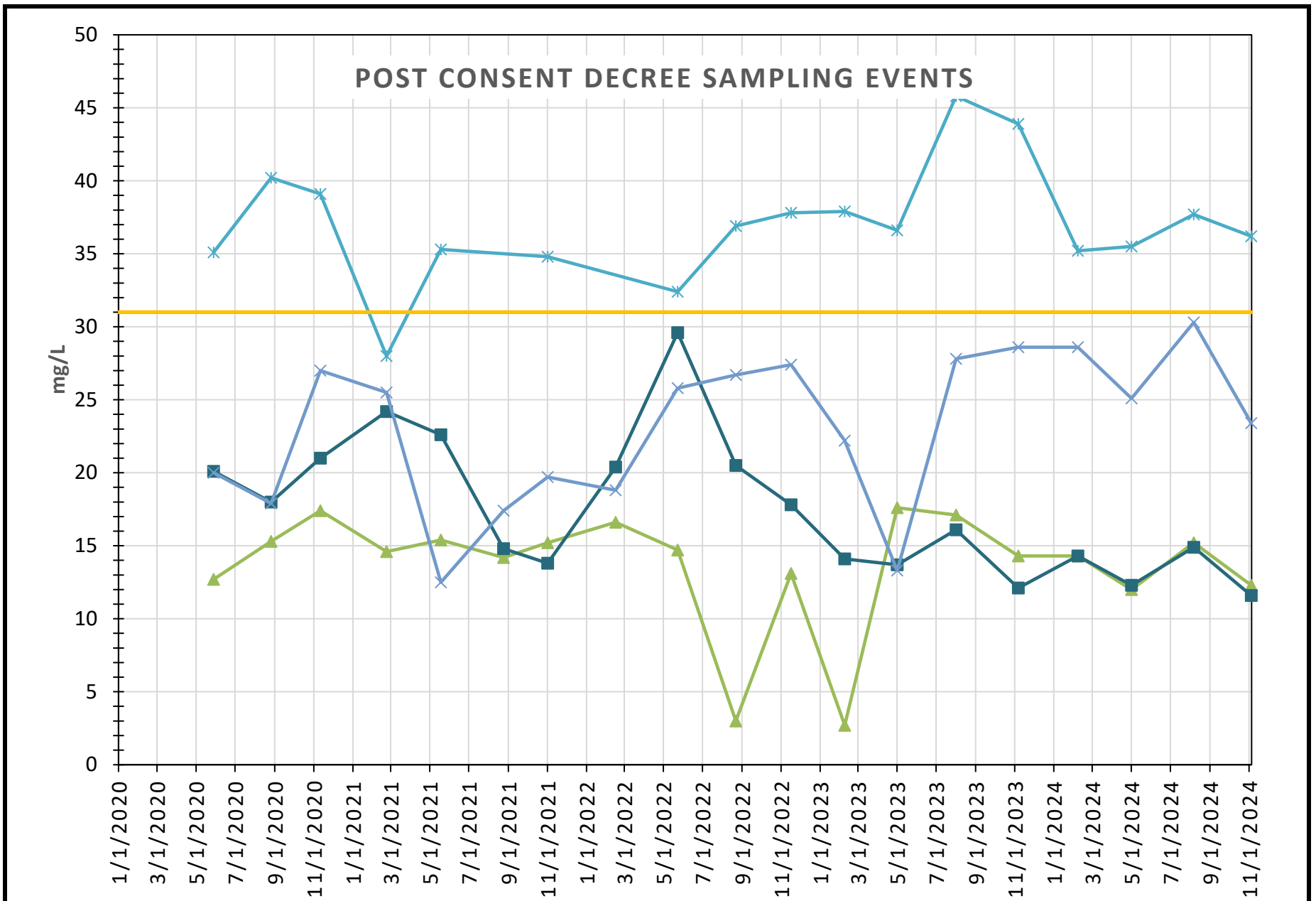


- MW-12 (U)
- MW-14 (U)
- MW-25 (D)
- MW-26 (D)
- MW-27 (D)
- MW-29 (U)
- MW-30 (D)
- MW-31 (D)
- MW-32 (D)
- MW-33 (D)
- A Zone Cleanup Level



**Total Iron Concentrations
A-Zone CPOC Wells
South Park Landfill**

D = Downgradient
U = Upgradient

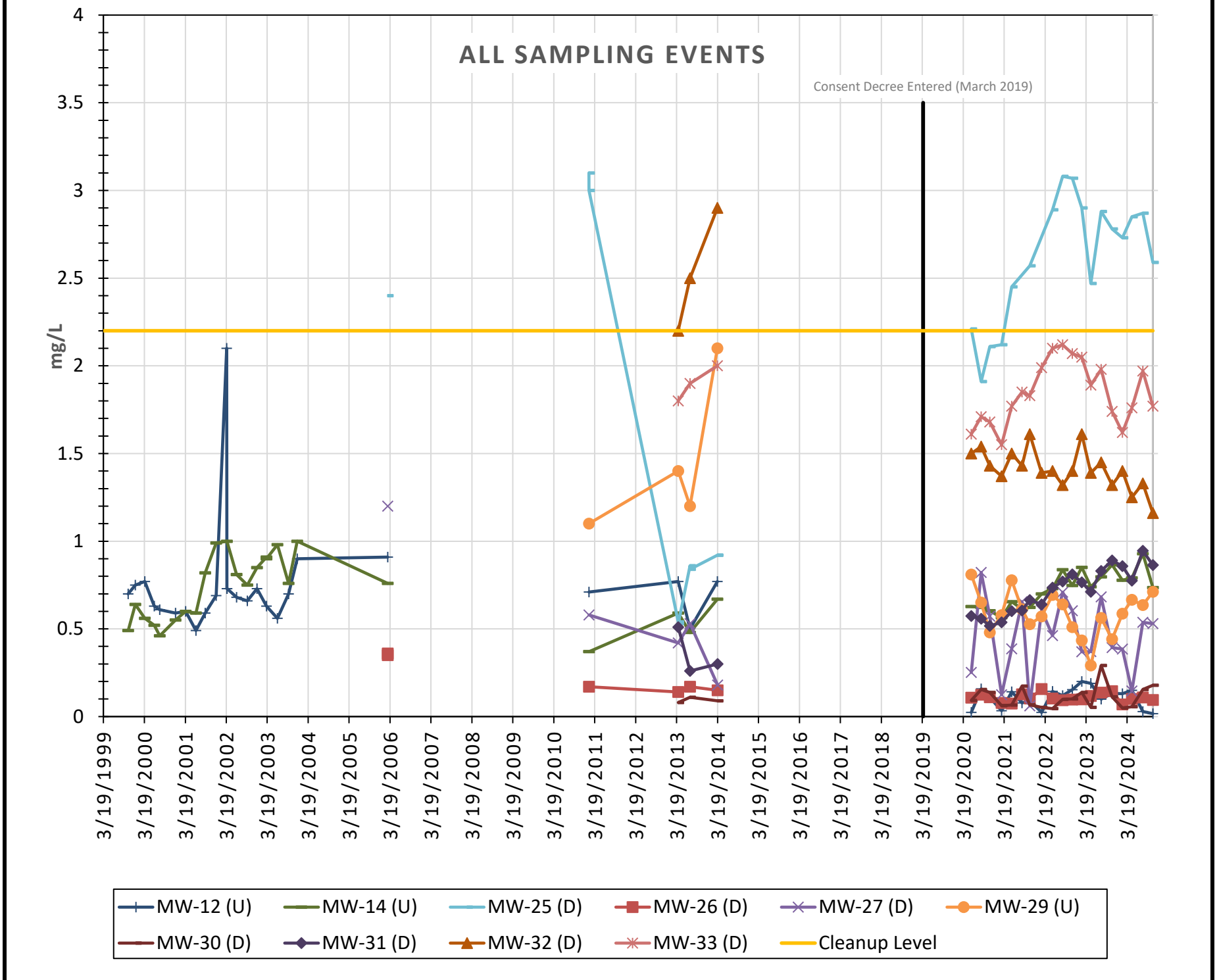
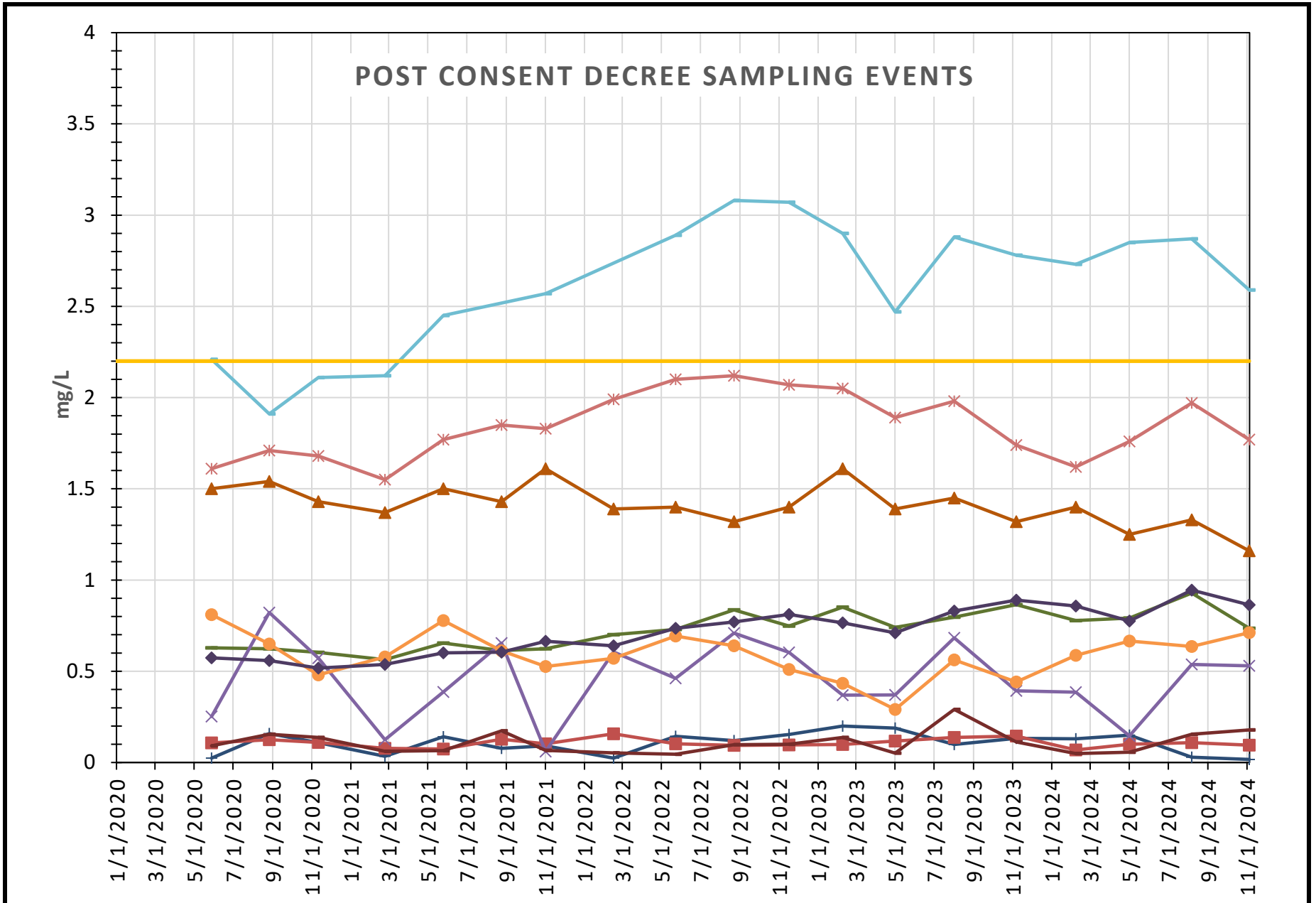


▲ MW-08 (D)
 ✱ MW-10 (D)
 ■ MW-18 (D)
 ✱ MW-24 (D)
 — B Zone Cleanup Level



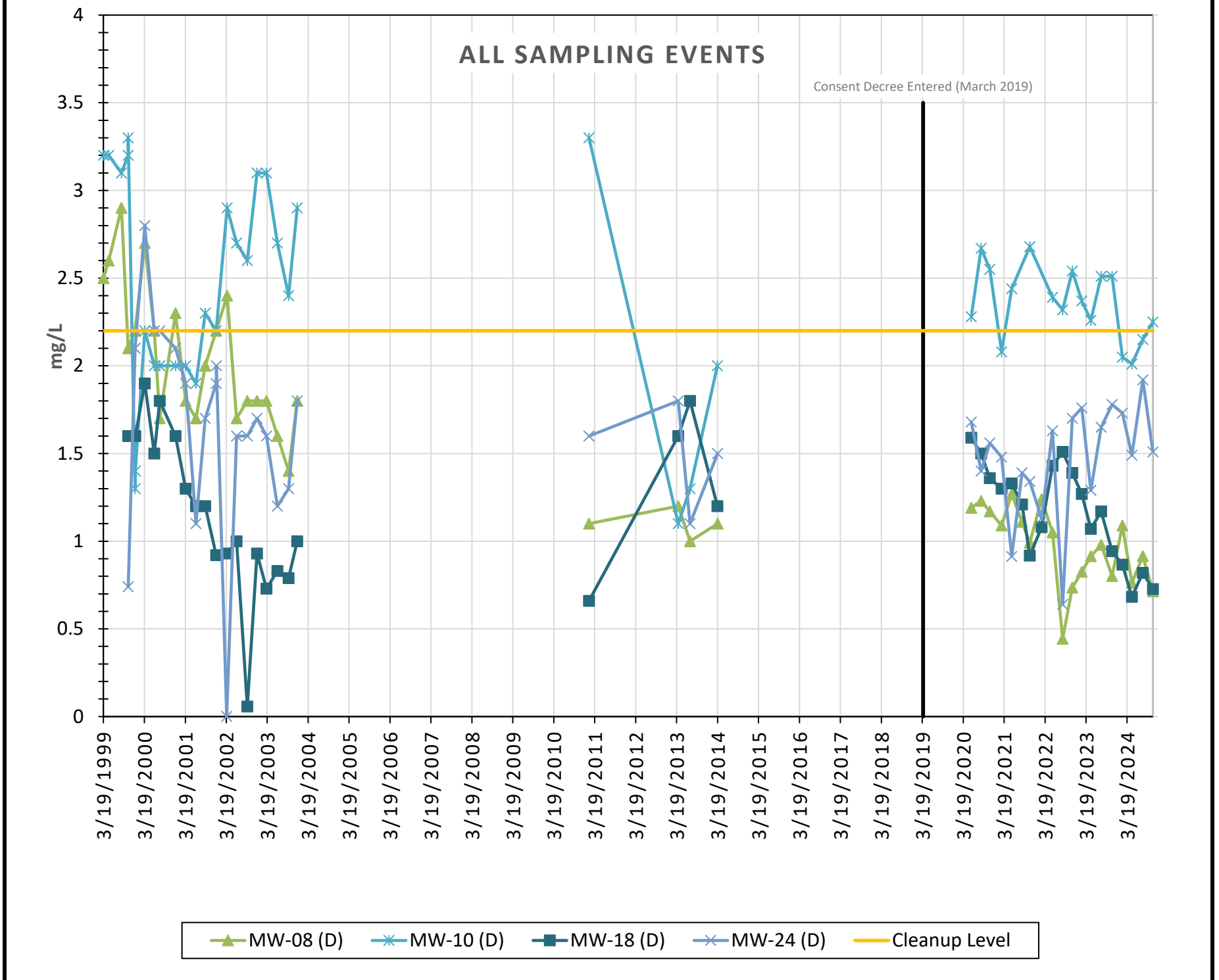
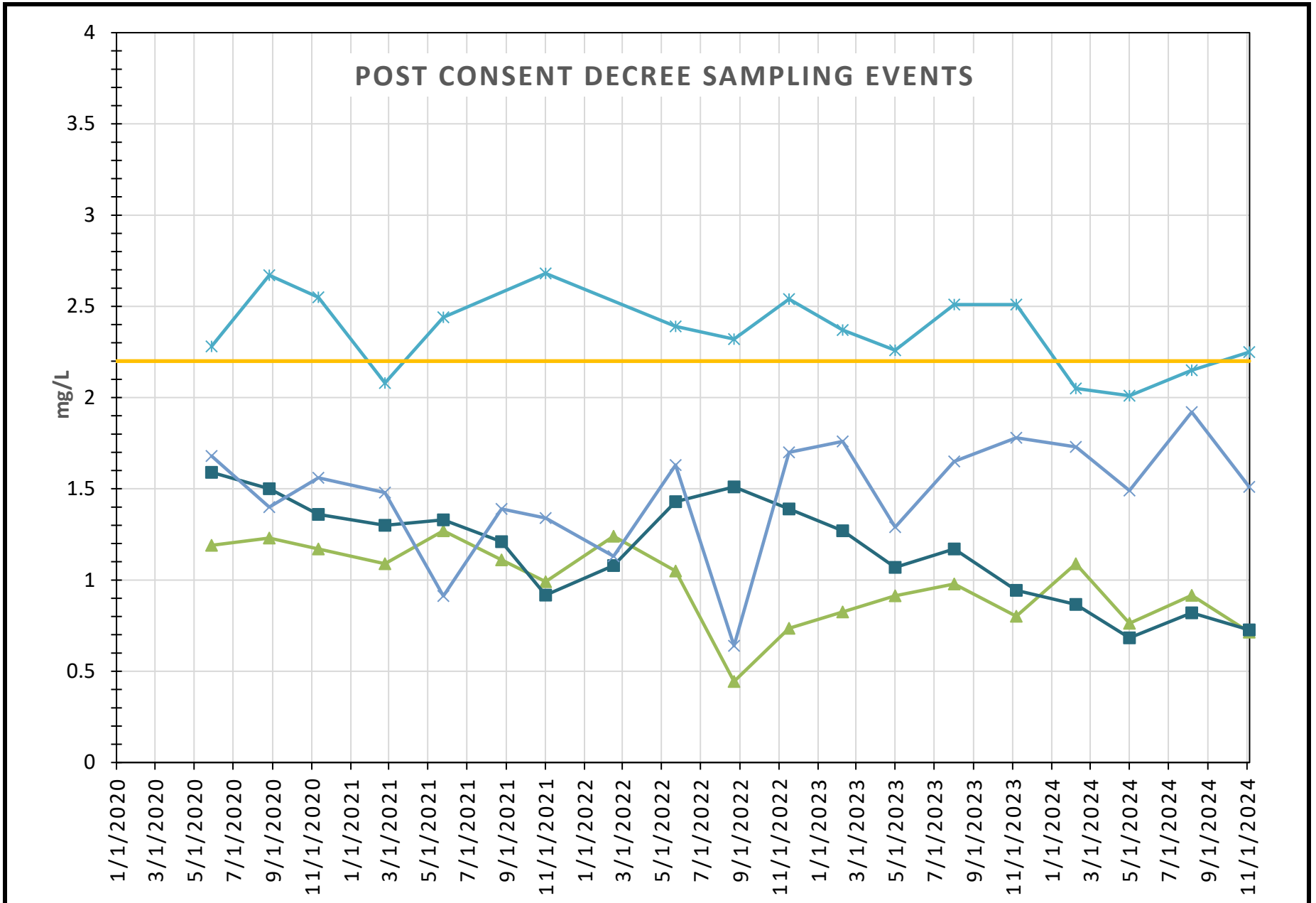
**Total Iron Concentrations
B-Zone CPOC Wells
South Park Landfill**

D = Downgradient
U = Upgradient



D = Downgradient
U = Upgradient

**Total Manganese Concentrations
A-Zone CPOC Wells
South Park Landfill**

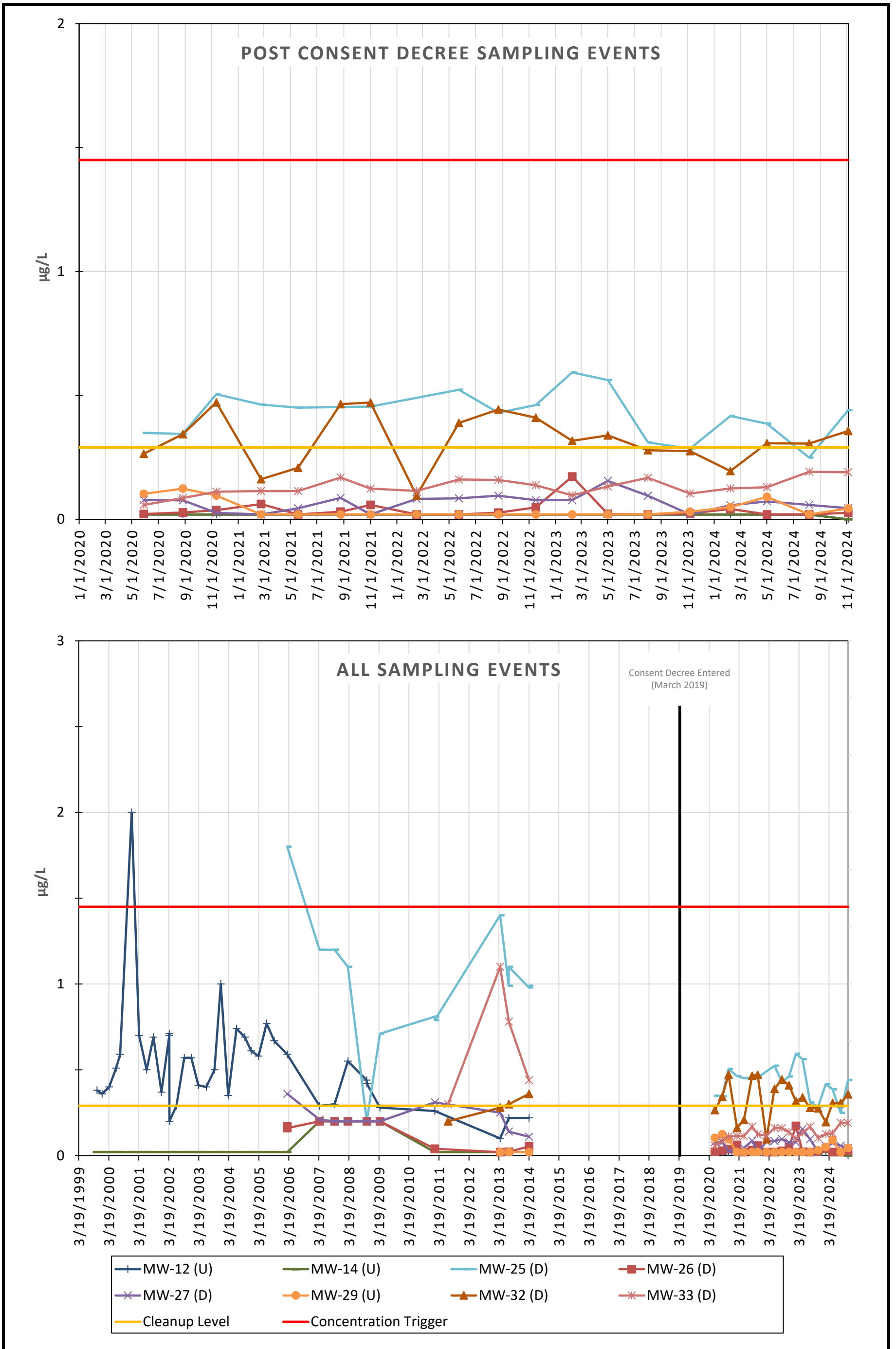


▲ MW-08 (D)
 ✱ MW-10 (D)
 ■ MW-18 (D)
 ✱ MW-24 (D)
 — Cleanup Level



**Total Manganese Concentrations
B-Zone CPOC Wells
South Park Landfill**

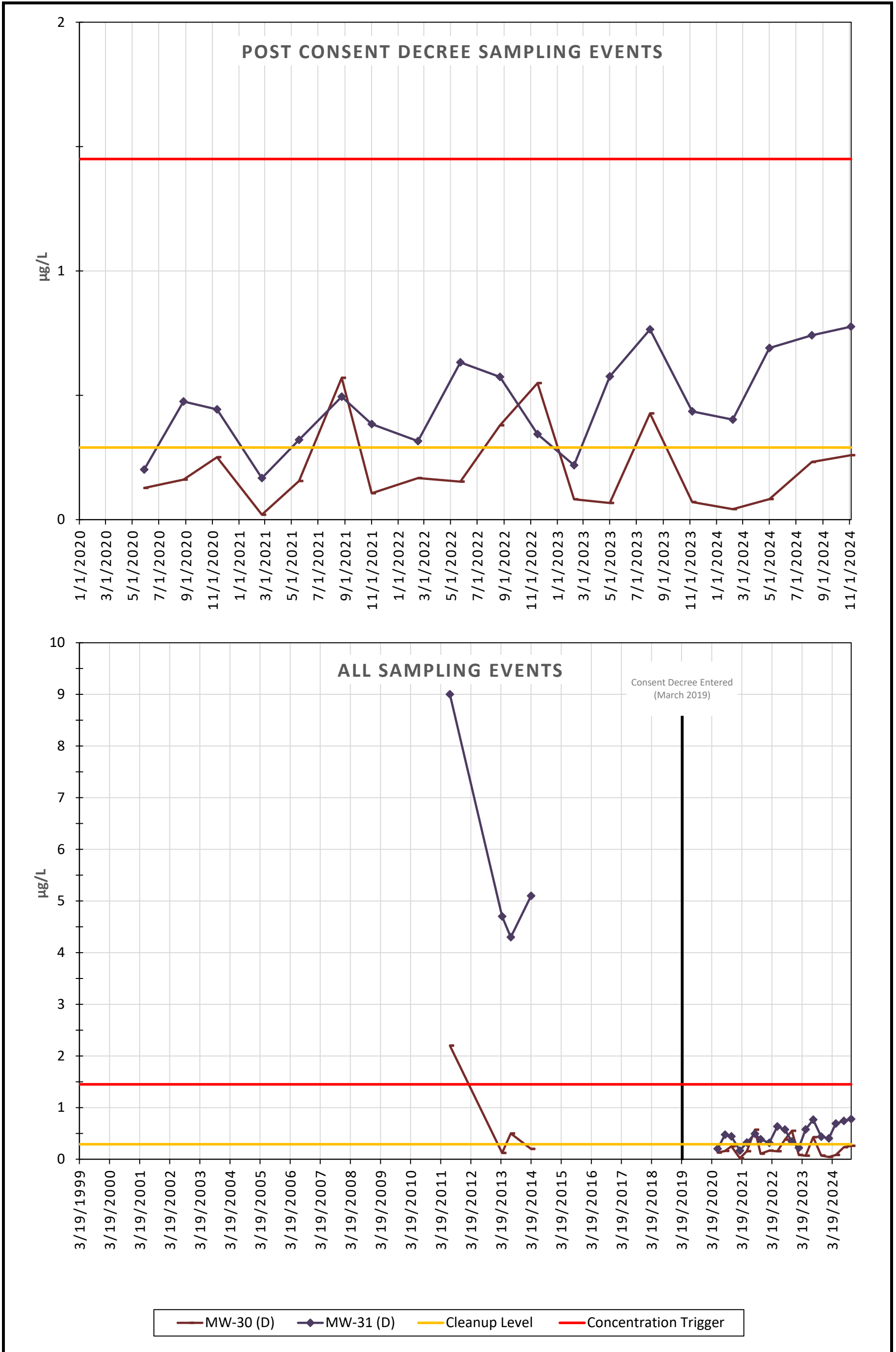
D = Downgradient
U = Upgradient

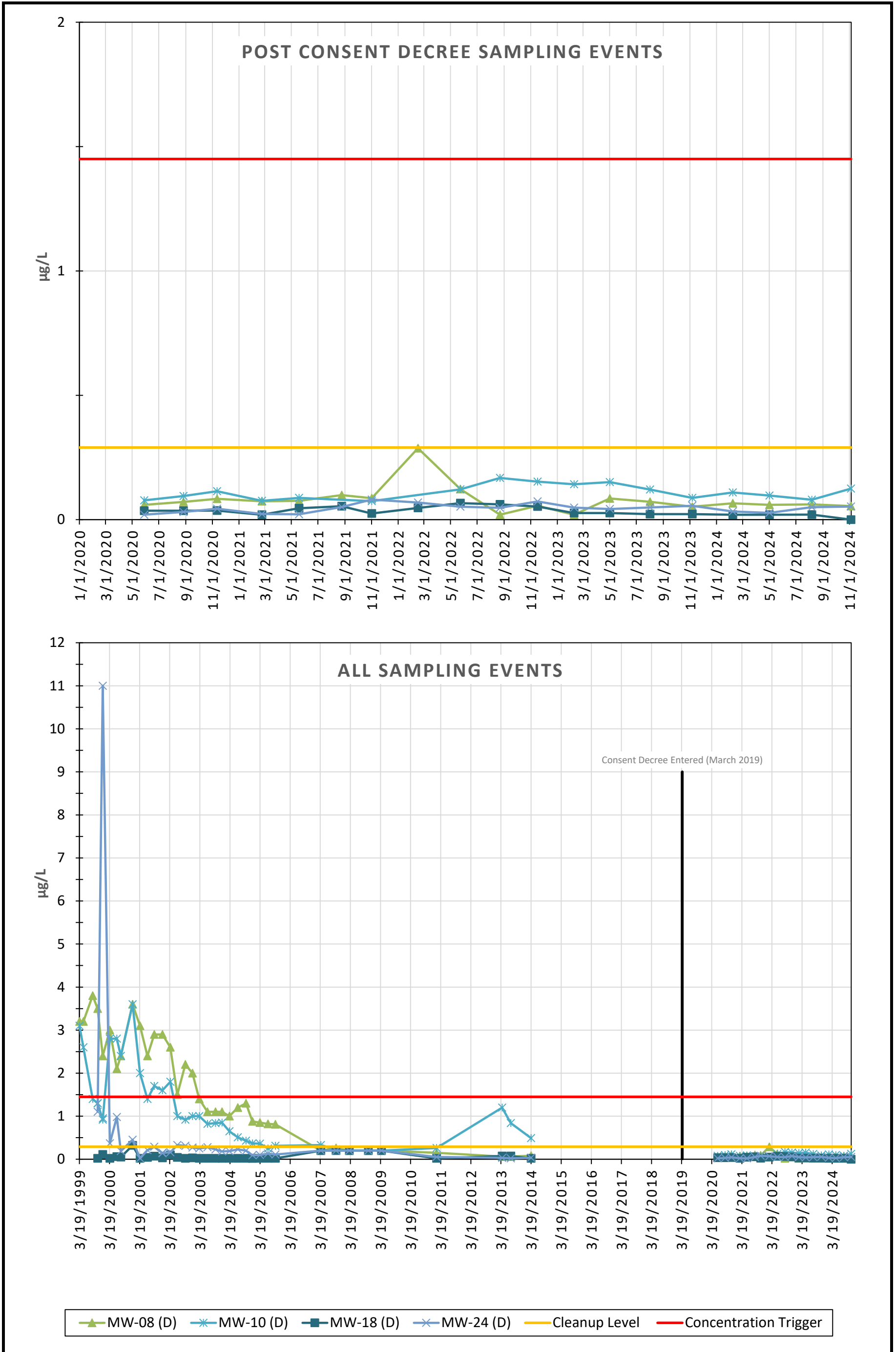


Parametrix

**Vinyl Chloride Concentrations
A-Zone CPOC Wells
South Park Landfill**

D = Downgradient
U = Upgradient

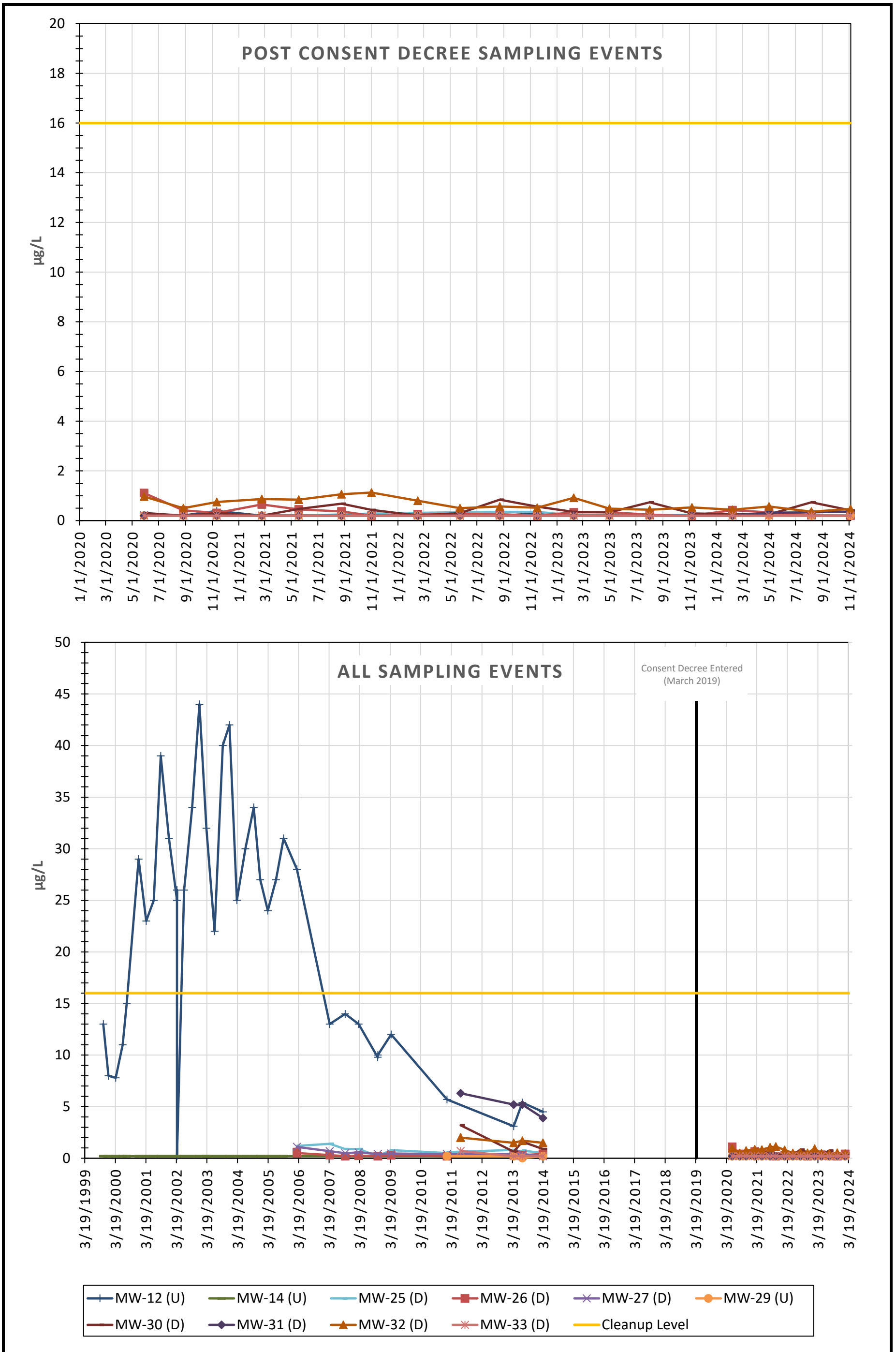




Parametrix

**Vinyl Chloride Concentrations
B-Zone CPOC Wells
South Park Landfill**

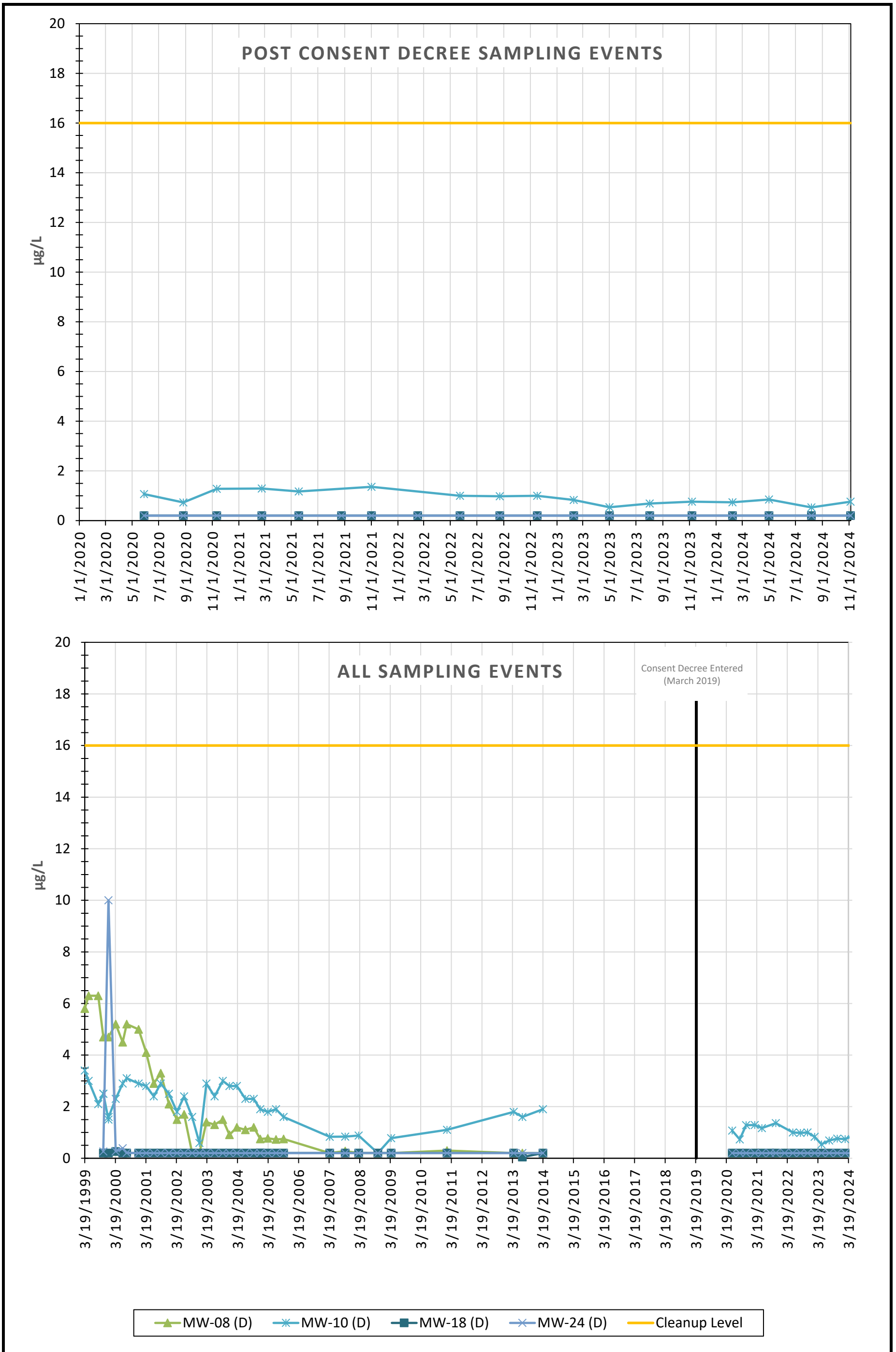
D = Downgradient
U = Upgradient



Parametrix

**Cis-1,2-Dichloroethene Concentrations
A-Zone CPOC Wells
South Park Landfill**

D = Downgradient
U = Upgradient



Appendix D2

Trend Analyses

APPENDIX D2

Trend Analyses

Per the CAP, the Mann-Kendall test was used to statistically evaluate groundwater quality trends for vinyl chloride ($\mu\text{g/L}$), total iron (mg/L), and total manganese (mg/L) using monitoring data collected in 2020 through 2024. The Mann-Kendall test is a nonparametric trend evaluation procedure that can be used when there are missing values or when the data do not conform to any particular distribution. The Mann-Kendall test only uses directional differences (positive, zero, negative) of the data rather than the measured values. In statistical terms, the Mann-Kendall test is a nonparametric test for zero slope of the linear regression of time-ordered data versus time (Gilbert 1987). For the Mann-Kendall test, the null hypothesis (H_0) is no trend (i.e., the observations are randomly ordered in time), which is tested against the alternative hypothesis (H_A) of an increasing or decreasing monotonic trend.

An assumption underlying the Mann-Kendall test is that the time-ordered data are monotonic (Salmi et al. 2002); that is, the successive values in the data set consistently increase or decrease, but not necessarily in a linear manner, and they display no seasonal or other cycle. If the data are not monotonic, then the statistical power of the Mann-Kendall trend test is reduced. One example of non-monotonic data is precipitation, which can vary seasonally as well as by larger time intervals (e.g., years or decades). Statistical power is the strength of a test to identify an actual release of contaminated groundwater or difference from a compliance standard (EPA 2009). In the case of the Mann-Kendall test, statistical power is the strength to correctly identify an increasing or decreasing trend in a set of time-ordered data.

The Mann-Kendall test computes an S statistic based on pair-wise differences between each time-ordered value and all earlier values. A positive S value indicates an increasing trend, zero indicates no trend, and a negative value indicates a decreasing trend. The magnitude of S does not indicate the slope of the trend; instead, large positive values of S indicate that measurements taken later in time tend to be larger than those taken earlier. Similarly, large negative values of S indicate that measurements taken later in time tend to be smaller than those taken earlier (Gilbert 1987).

Significance of the Mann-Kendall test S statistic is a function of the magnitude of S and the number of measurements, with a larger positive or negative value of S and a greater number of measurements leading to a higher statistical significance (Gilbert 1987).

To evaluate trends in the monitoring data using the Mann-Kendall test, the EPA (2022) program ProUCL (version 5.2.0) was used. Per the CAP and Washington Department of Ecology guidance (Ecology 2005), groundwater monitoring data were evaluated at a 95 percent confidence level (5 percent significance level). That is, a trend was considered statistically significant if the confidence level was greater than 95 percent (the significance level was less than 5 percent).

Table 1 lists the percent non-detects by chemical for each of the 14 wells evaluated. For data sets with non-detect, or “censored”, results, per the *Ecology Guidance for Monitoring at Landfills and Other Facilities* (Ecology 2018), the censored data were handled as follows:

- ProUCL guidance (EPA 2022) states that the substitution of half detection limits for censored values is not recommended, as the bias cannot be quantified with certainty. Because the Mann-Kendall test is a nonparametric test, it was not necessary to substitute censored values with half detection limits for wells with fewer than 15 percent non-detects. The Mann-

Kendall test only uses directional differences (positive, zero, negative), which are not affected by use of detection limits or half detection limits for censored values.

- For all wells, censored values were replaced with estimated values using the ROS method prior to statistical analysis. The ROS method fits a regression line to the uncensored data, then assigns values from that line below the detection limit to estimate concentrations for the censored observations. The uncensored values are then combined with the estimated censored values for further statistical analysis.
- Wells with more than 50 percent but less than 90 percent non-detects for a specific chemical were analyzed using the Mann-Kendall test; however, the results should be interpreted with caution, as significance of the analysis may be diminished due the large number of censored data. Statistical evaluations are typically not performed on data sets with more than 50 percent non-detects because meaningful trends are difficult to determine due to the large number of censored values.

For wells with more than 90 percent non-detects (indicating only one or no detected values), Mann-Kendall tests were not run (see Table 1). No vinyl chloride, total iron, or total manganese values from any wells were detected at an order of magnitude higher than all other results (see time-series plot in Appendix D1) or means (per Ecology 2018), so no statistical outliers were suggested in the data.

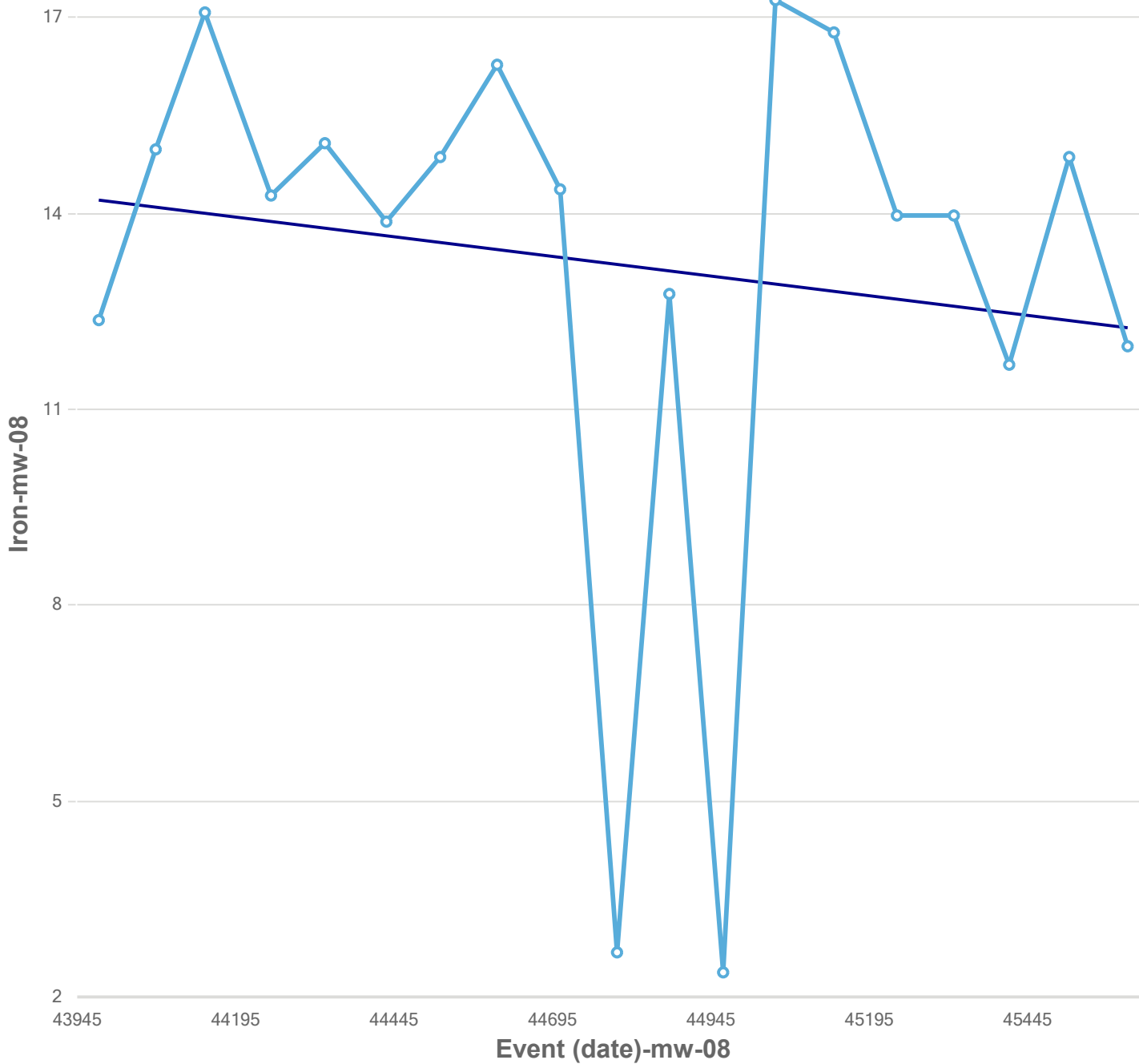
REFERENCES

- Ecology (Washington State Department of Ecology). 2005. Implementation Guidance for the Ground Water Quality Standards. Washington State Department of Ecology Publication #96-02. Olympia, WA.
- Ecology. (Washington State Department of Ecology). 2018. Guidance for Monitoring at Landfills and Other Facilities Regulated Under Chapters 173-304, 173-306, 173-350, and 173-351 WAC, Revised December 2018. Washington State Department of Ecology Publication no. 12-07-072.
- EPA (U.S. Environmental Protection Agency). 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance. EPA 530/R-09-007. March 2009. U.S. Environmental Protection Agency Office of Resource and Recovery. Washington, D.C.
- EPA (U.S. Environmental Protection Agency). 2022. ProUCL Version 5.2.0 Technical Guide: Statistical Software for Environmental Applications for Data Sets with and without Nondetect Observations. April 2022. Prepared by Neptune and Company, Inc., Lakewood, CO. Prepared for U.S. Environmental Protection Agency Office of Research and Development. Washington, D.C.
- Gilbert, R.O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley & Sons, Inc. New York, NY. 320 pages.

Table 1. Summary of Data Sets Used for Trend Tests

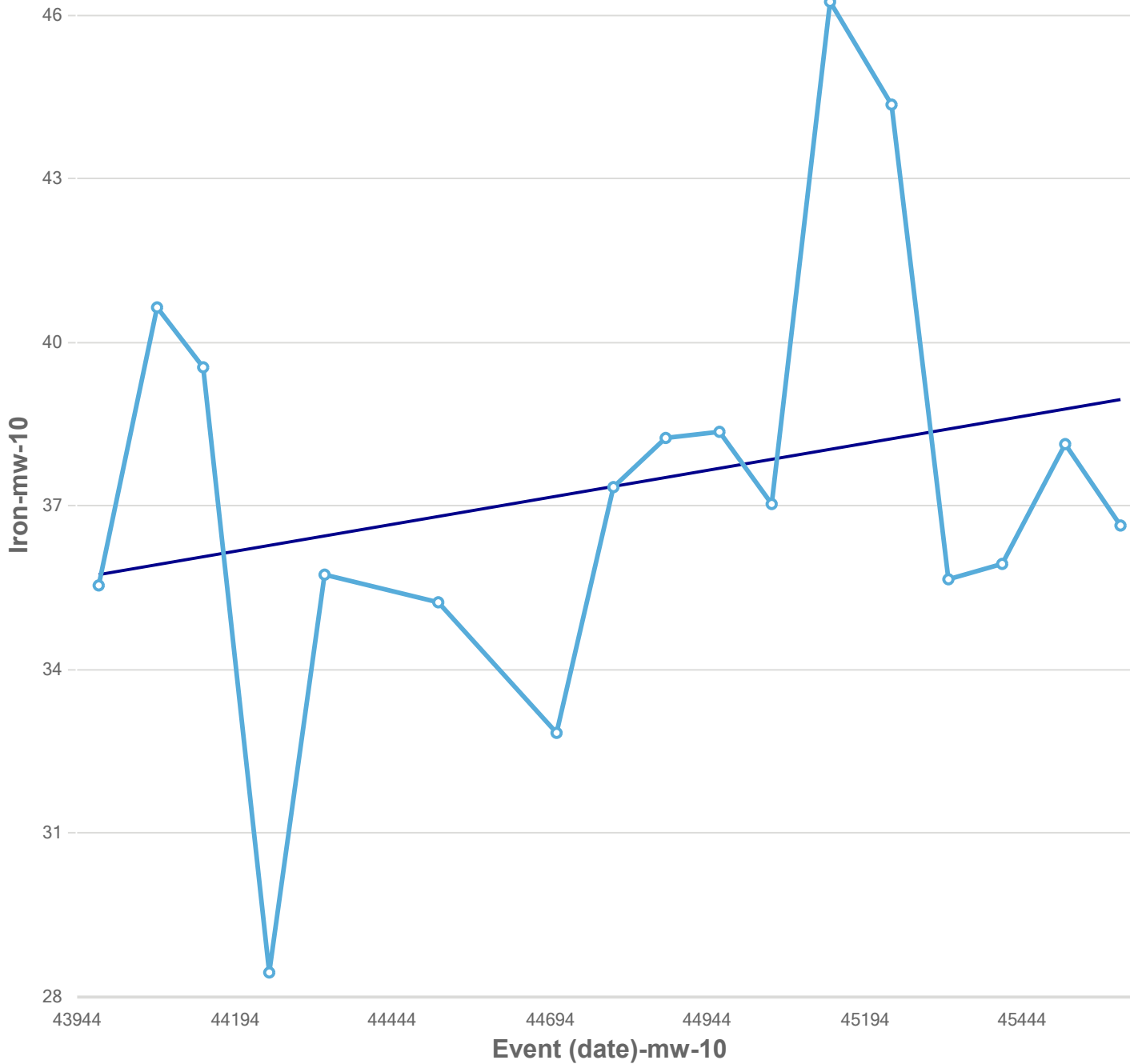
Well	Vinyl Chloride				Total Iron				Total Manganese			
	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects	Sample Size	Number of Detects	Number of Non-detects	Percent of Non-detects
MW-08	19	17	2	10.53	19	19	0	0	19	19	0	0
MW-10	17	17	0	0	17	17	0	0	17	17	0	0
MW-12	19	0	19	100	19	16	3	15.79	19	19	0	0
MW-14	19	0	19	100	19	19	0	0	19	19	0	0
MW-18	19	15	4	21.05	19	19	0	0	19	19	0	0
MW-24	19	18	1	5.26	19	19	0	0	19	19	0	0
MW-25	17	17	0	0	17	17	0	0	17	17	0	0
MW-26	19	13	6	31.58	19	19	0	0	19	19	0	0
MW-27	19	16	3	15.79	19	19	0	0	19	19	0	0
MW-29	19	7	12	63.16	19	19	0	0	19	19	0	0
MW-30	19	18	1	5.26	19	19	0	0	19	19	0	0
MW-31	19	19	0	0	19	19	0	0	19	19	0	0
MW-32	19	19	0	0	19	19	0	0	19	19	0	0
MW-33	19	19	0	0	19	19	0	0	19	19	0	0

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5482
Standardized Value of S	-0.9808
M-K Test Value (S)	-29
Tabulated p-value	0.1660
Approximate p-value	0.1633
OLS Regression Line (Blue)	
OLS Regression Slope	-0.0012
OLS Regression Intercept	67.5570
Insufficient statistical evidence of a significant trend at the specified level of significance.	

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

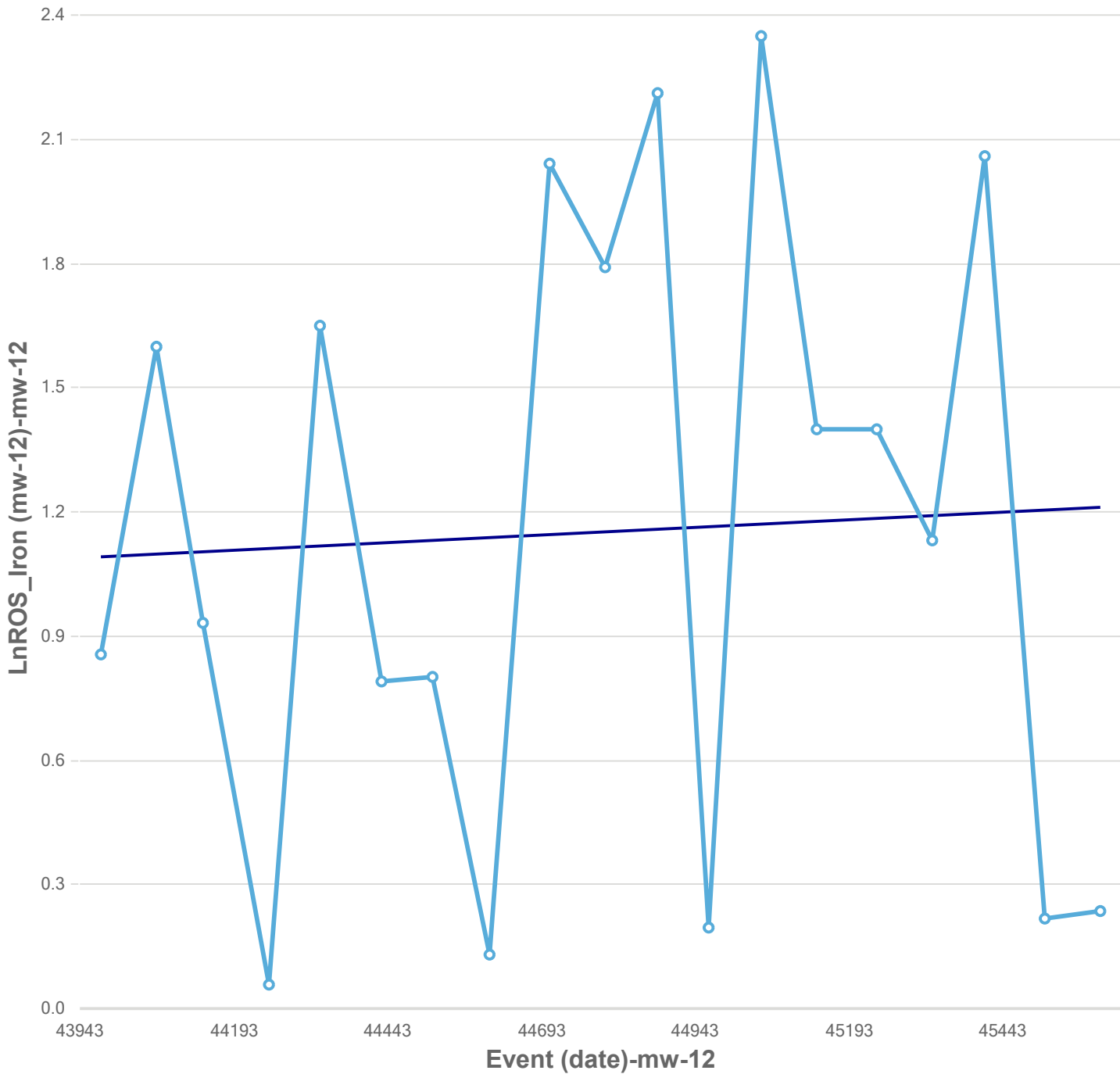
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2762
Standardized Value of S	0.7003
M-K Test Value (S)	18
Tabulated p-value	0.2450
Approximate p-value	0.2419

OLS Regression Line (Blue)

OLS Regression Slope	0.0020
OLS Regression Intercept	-51.5267

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

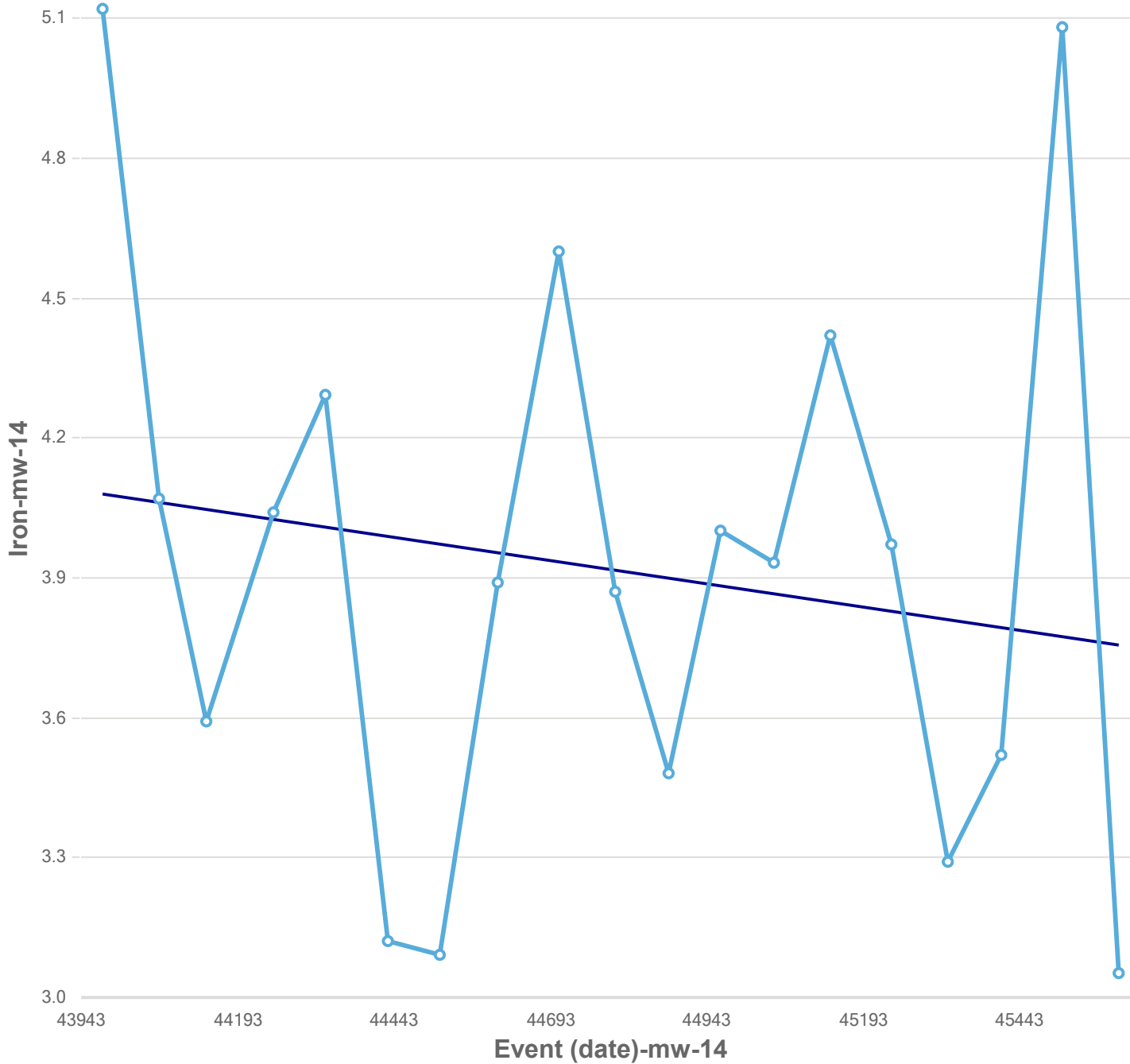
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	0.4551
M-K Test Value (S)	14
Tabulated p-value	0.3140
Approximate p-value	0.3245

OLS Regression Line (Blue)

OLS Regression Slope	0.0001
OLS Regression Intercept	-2.1341

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

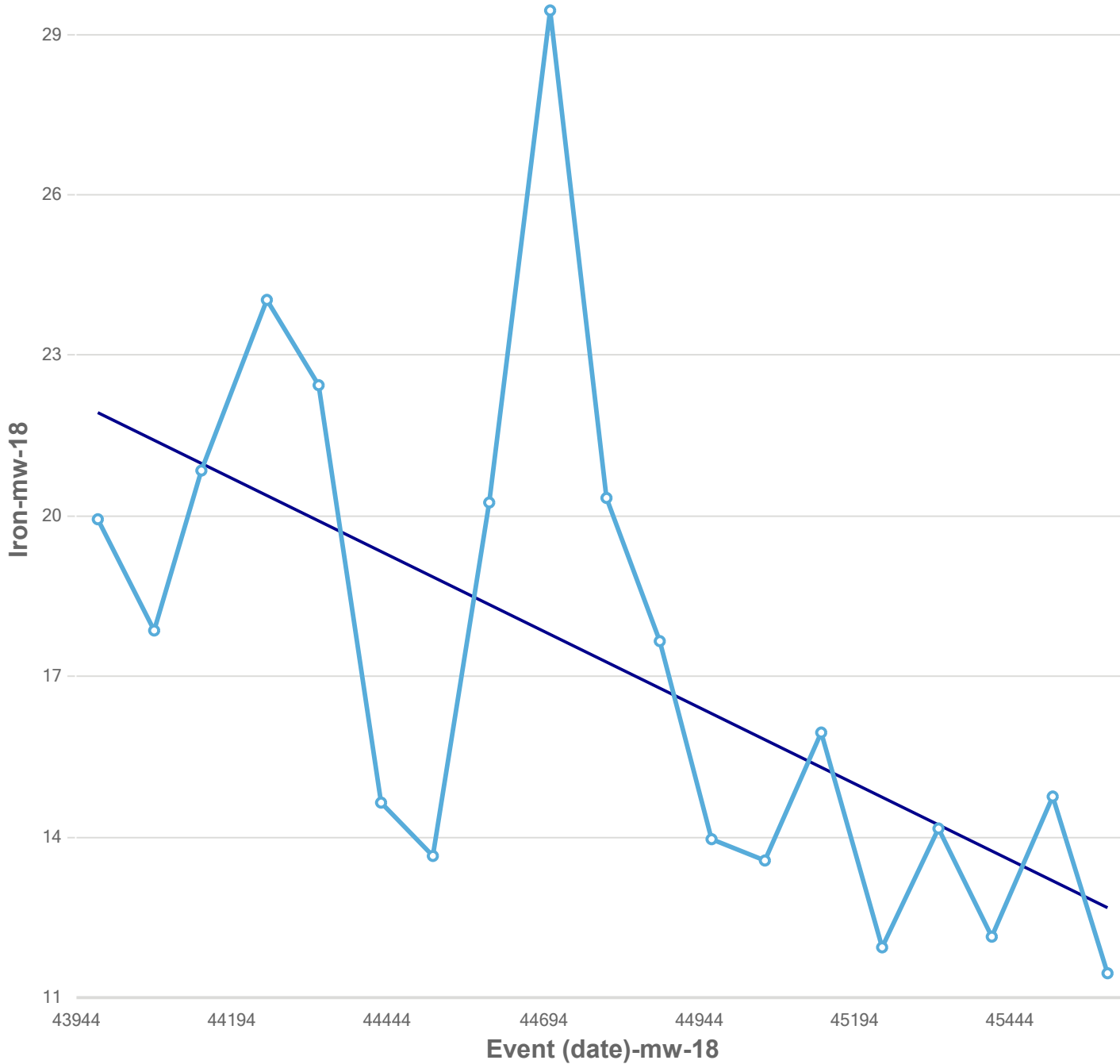
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-0.9796
M-K Test Value (S)	-29
Tabulated p-value	0.1660
Approximate p-value	0.1636

OLS Regression Line (Blue)

OLS Regression Slope	-0.0002
OLS Regression Intercept	12.8747

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

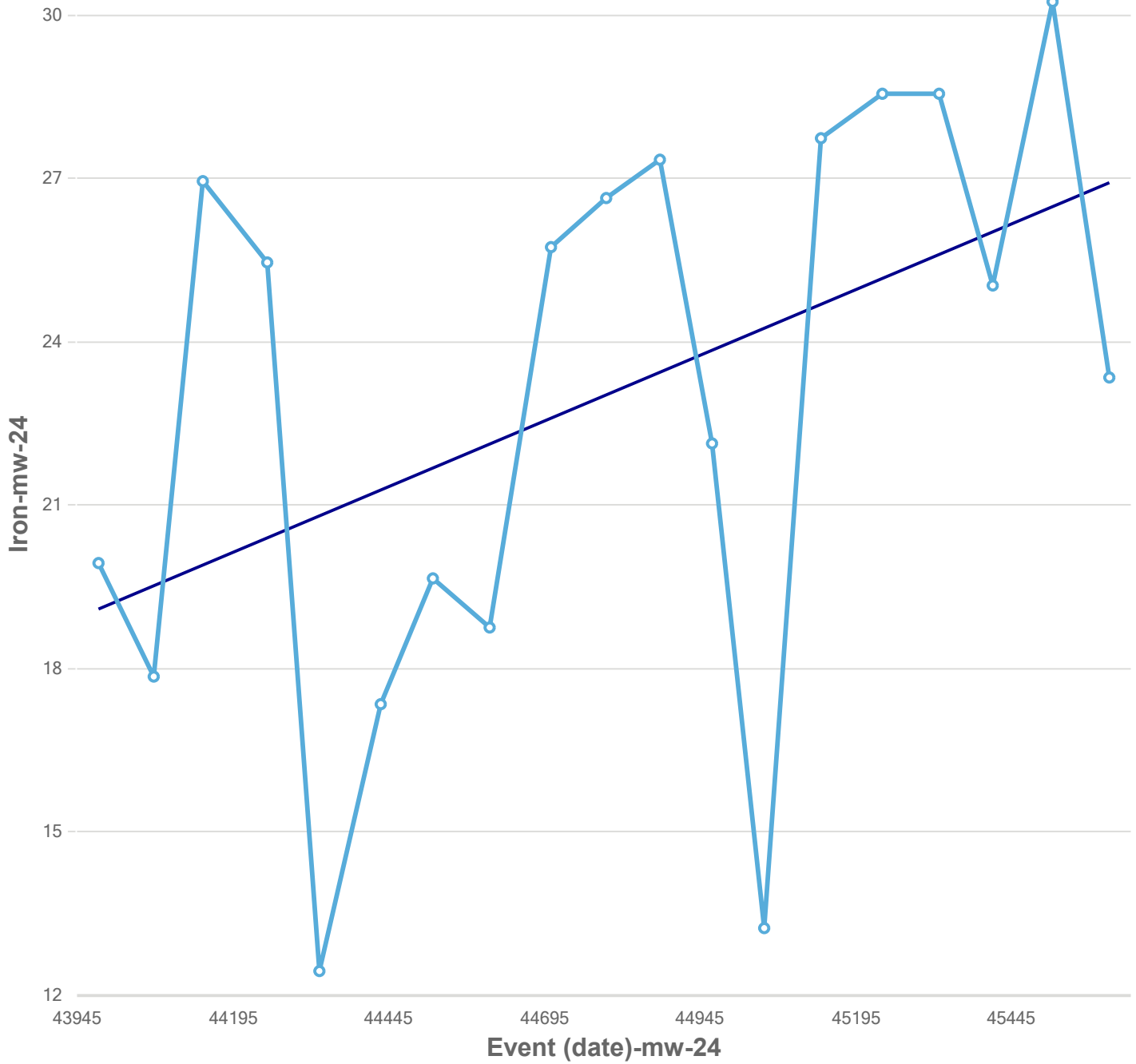
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-2.8688
M-K Test Value (S)	-83
Tabulated p-value	0.0020
Approximate p-value	0.0021

OLS Regression Line (Blue)

OLS Regression Slope	-0.0057
OLS Regression Intercept	272.3969

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test

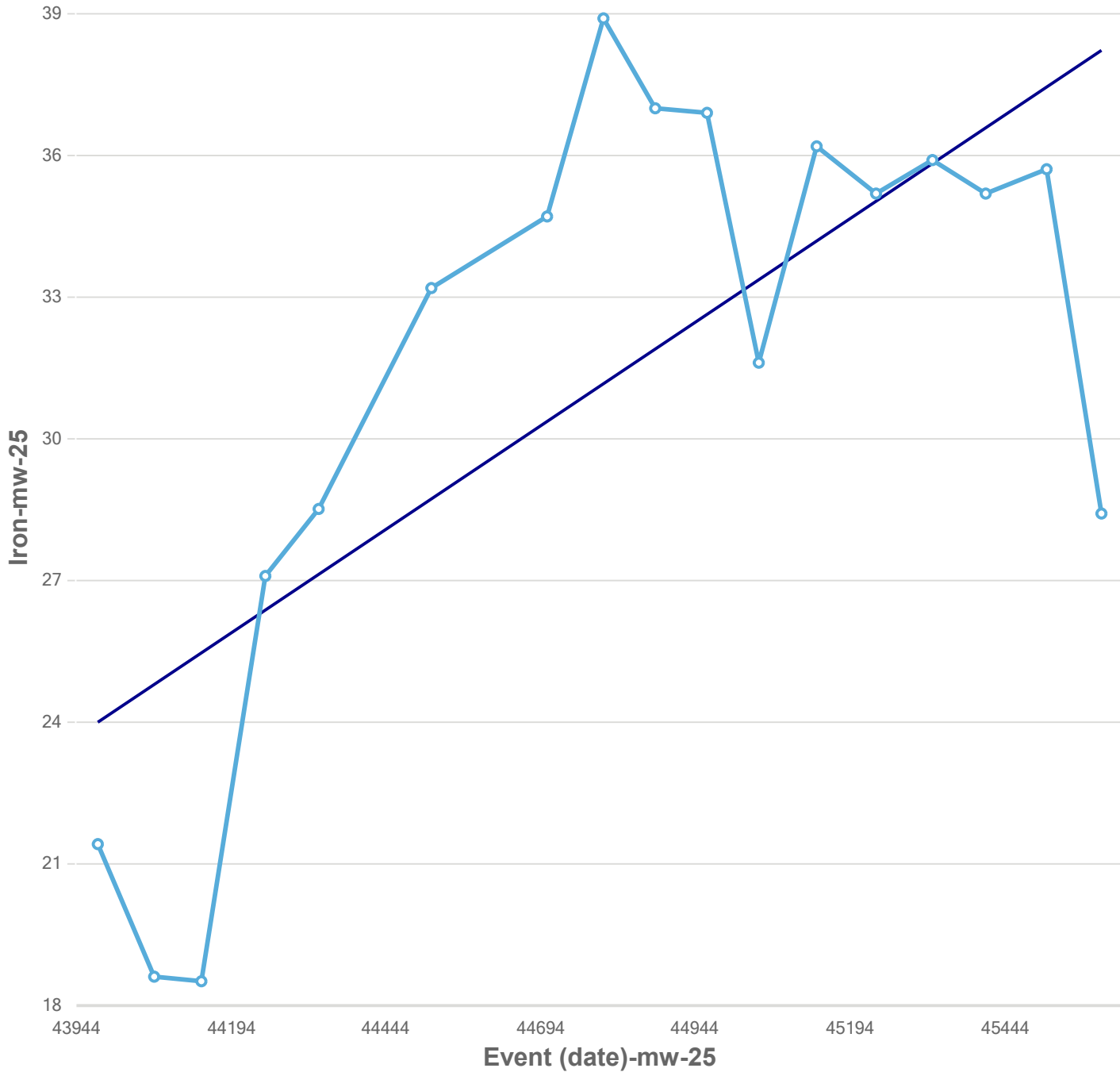


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	2.2054
M-K Test Value (S)	64
Tabulated p-value	0.0120
Approximate p-value	0.0137

OLS Regression Line (Blue)	
OLS Regression Slope	0.0048
OLS Regression Intercept	-192.8986

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

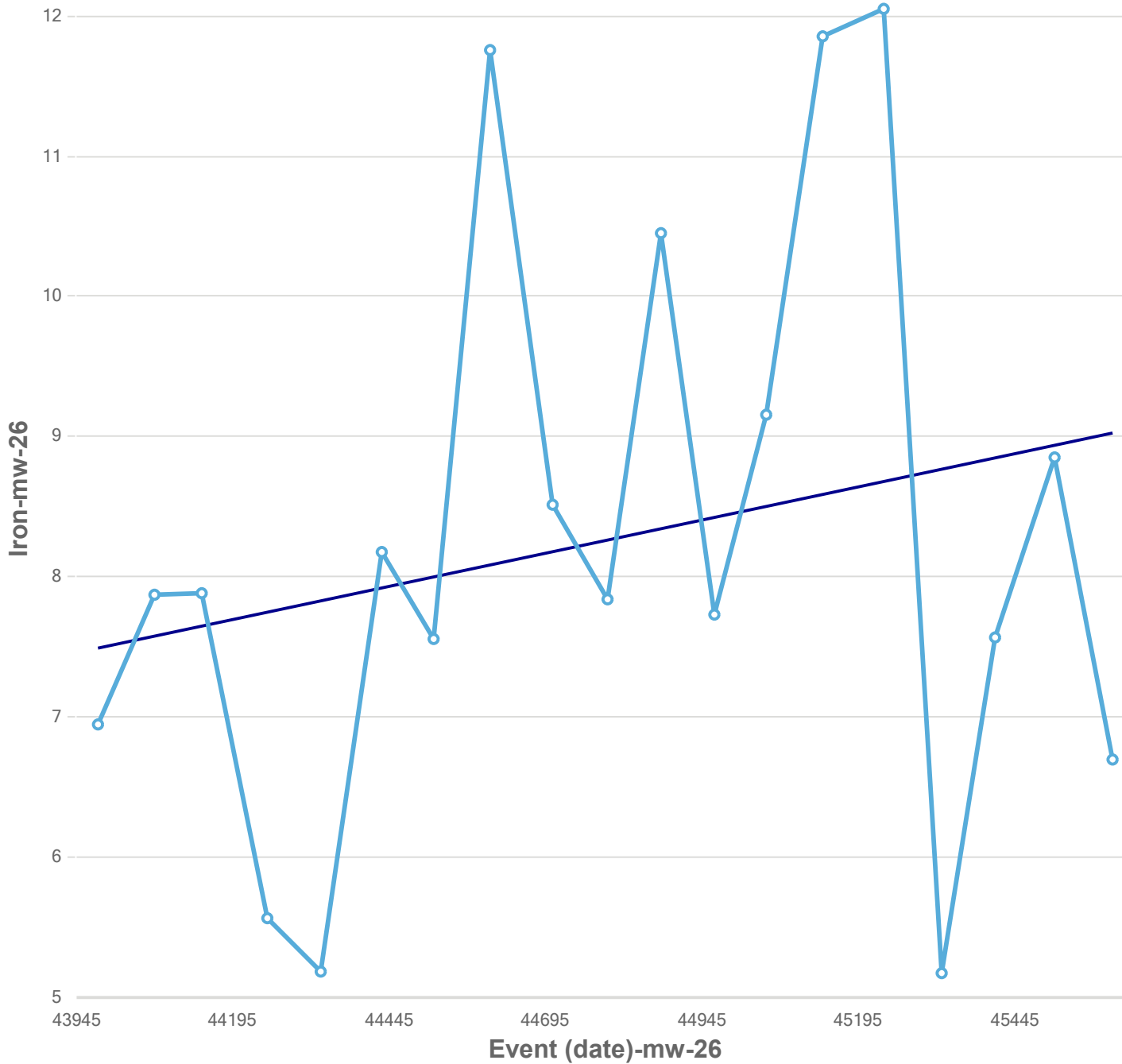
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2556
Standardized Value of S	1.8965
M-K Test Value (S)	47
Tabulated p-value	0.0320
Approximate p-value	0.0289

OLS Regression Line (Blue)

OLS Regression Slope	0.0088
OLS Regression Intercept	-361.9849

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

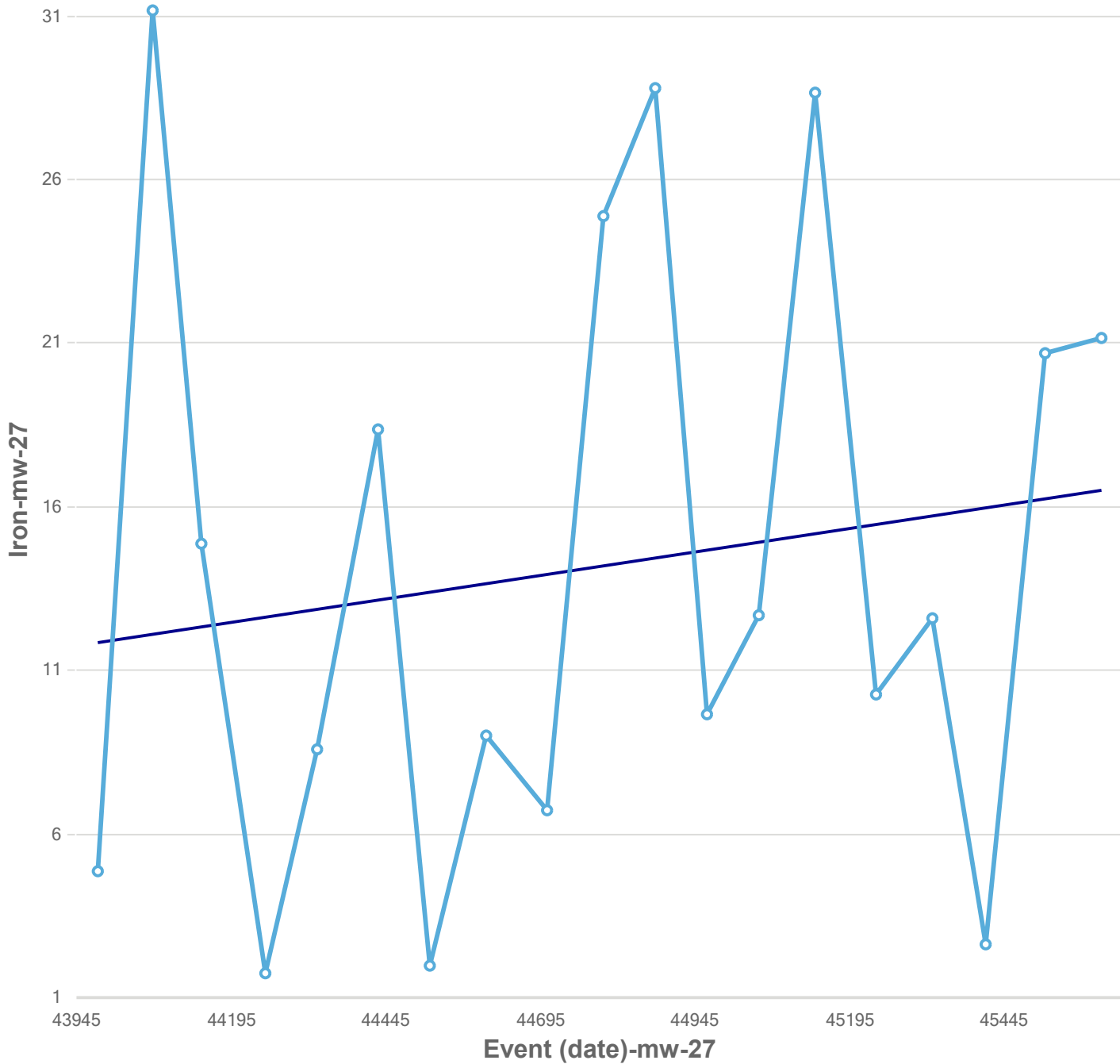
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	0.9096
M-K Test Value (S)	27
Tabulated p-value	0.1840
Approximate p-value	0.1815

OLS Regression Line (Blue)

OLS Regression Slope	0.0009
OLS Regression Intercept	-33.6830

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test

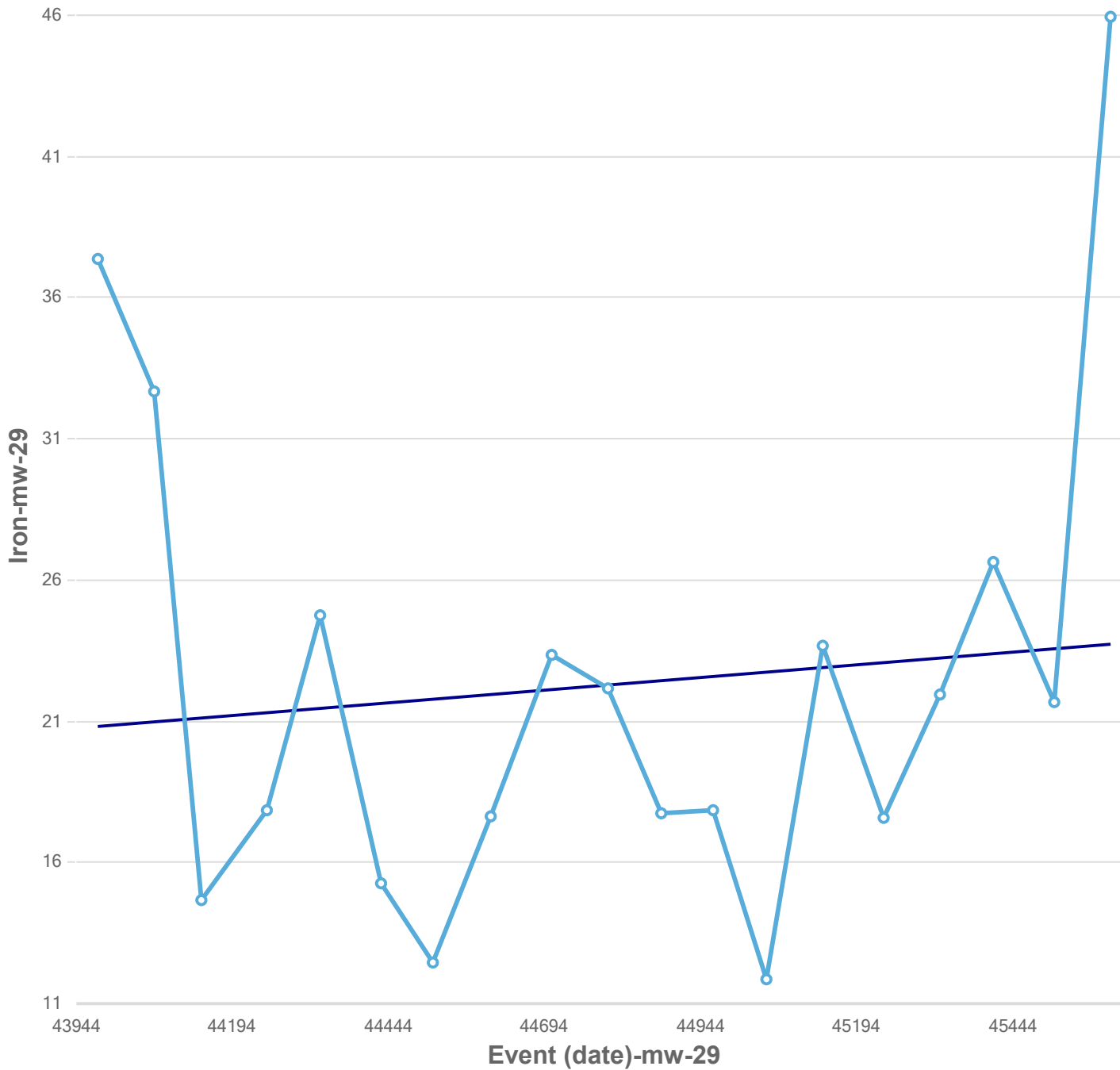


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	1.0496
M-K Test Value (S)	31
Tabulated p-value	0.1490
Approximate p-value	0.1470

OLS Regression Line (Blue)	
OLS Regression Slope	0.0029
OLS Regression Intercept	-114.7718

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

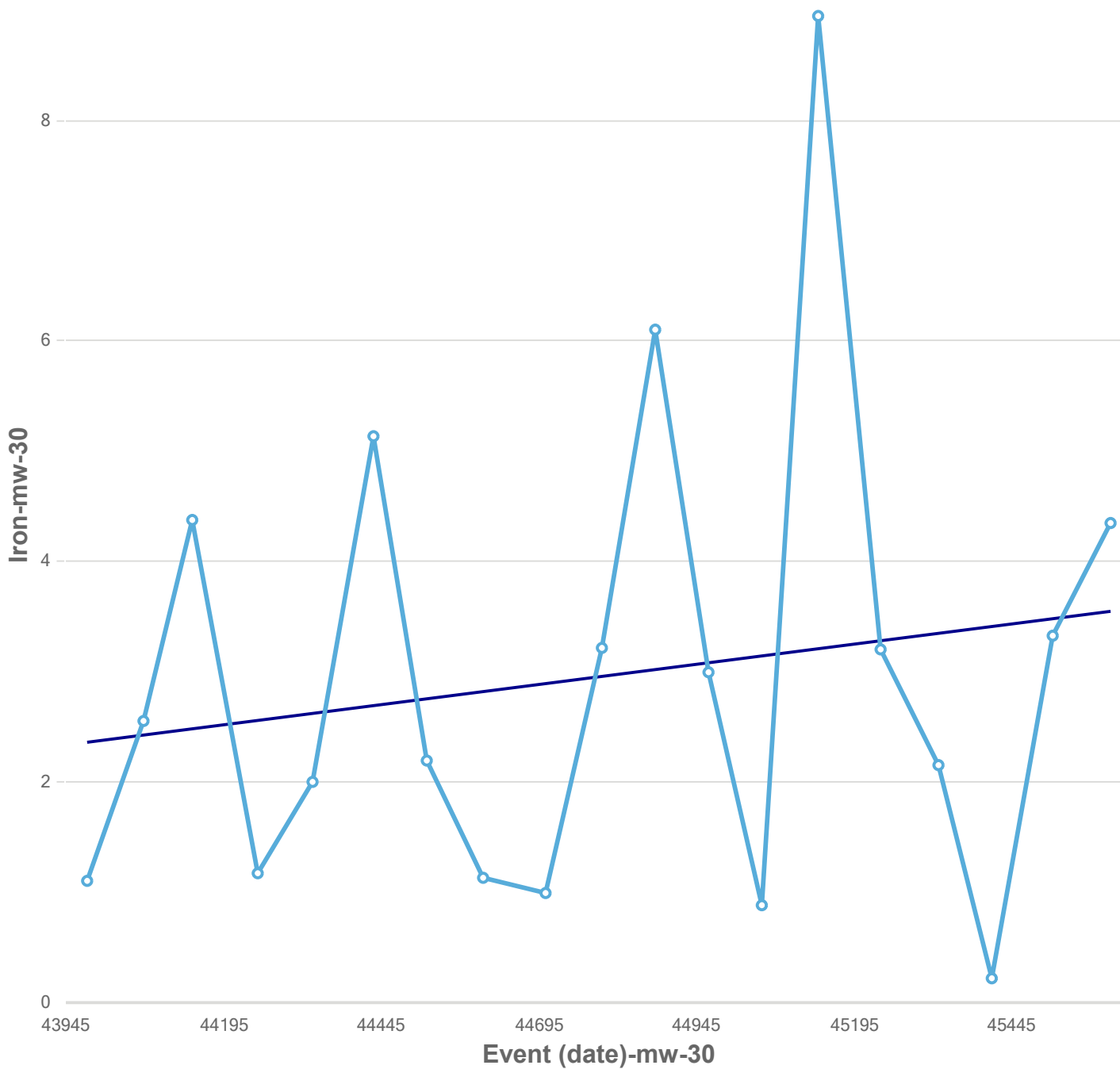
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	0.3151
M-K Test Value (S)	10
Tabulated p-value	0.3650
Approximate p-value	0.3764

OLS Regression Line (Blue)

OLS Regression Slope	0.0018
OLS Regression Intercept	-57.3353

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

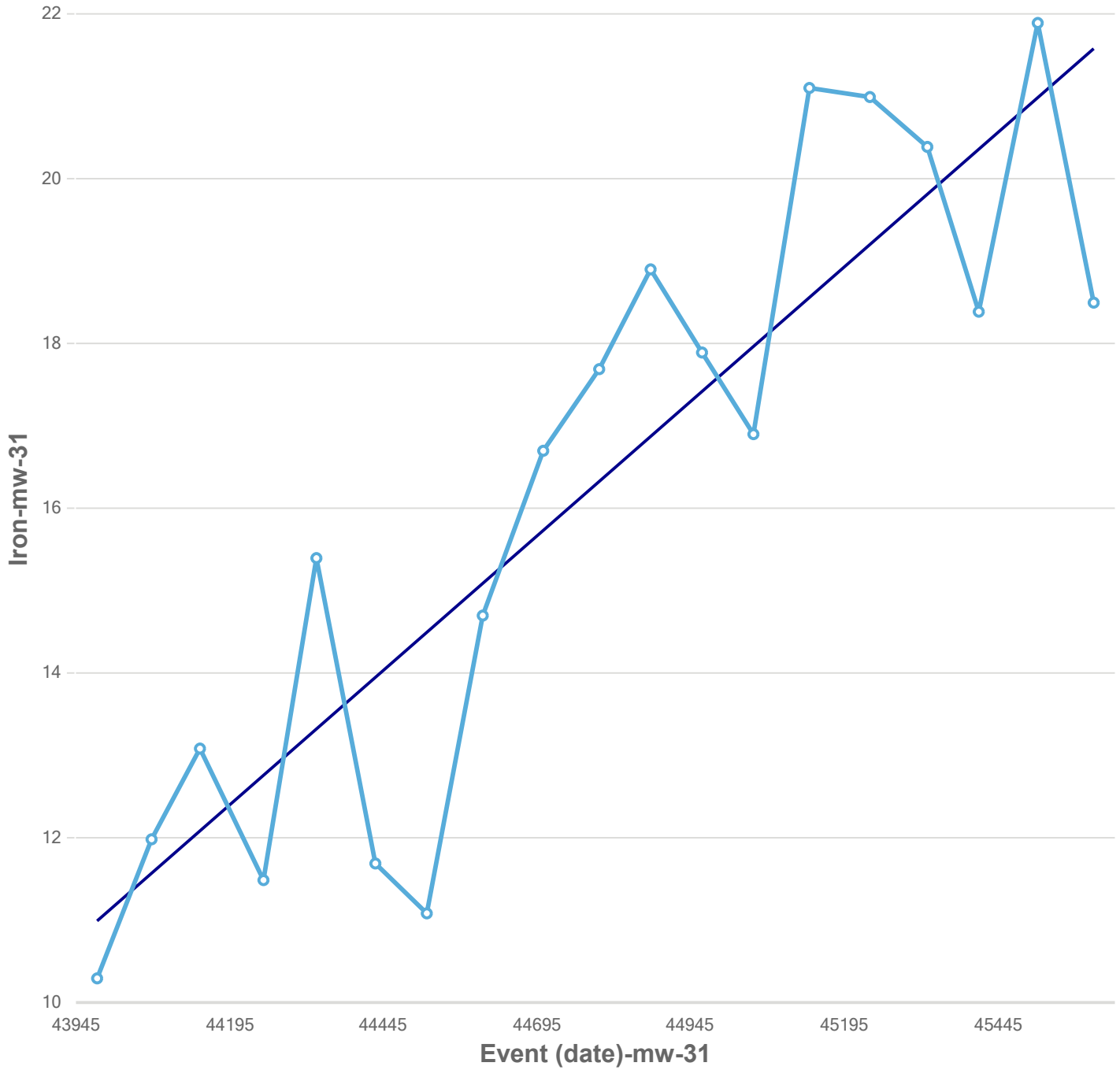
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	0.5598
M-K Test Value (S)	17
Tabulated p-value	0.2900
Approximate p-value	0.2878

OLS Regression Line (Blue)

OLS Regression Slope	0.0007
OLS Regression Intercept	-29.6880

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

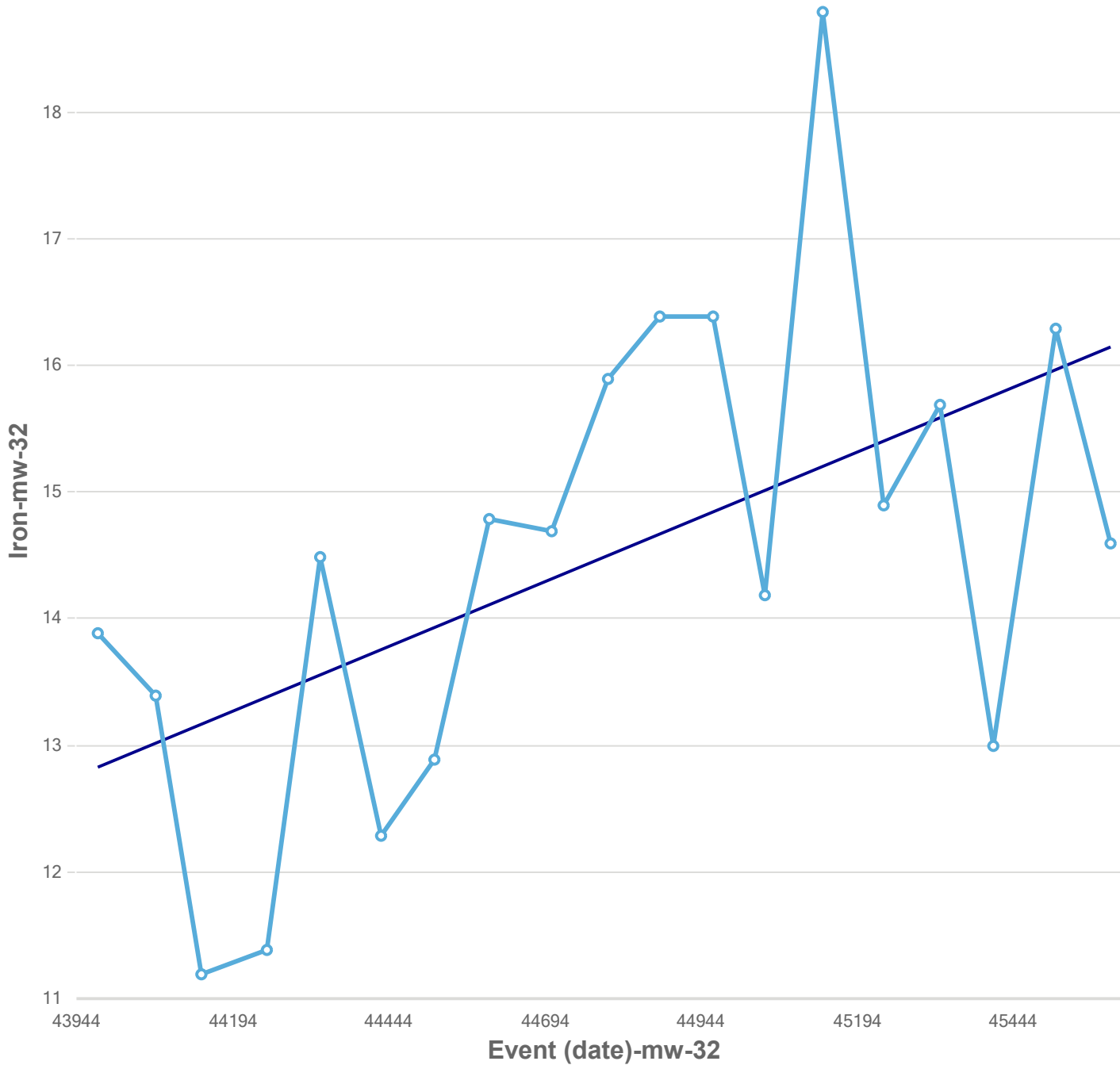
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	4.0583
M-K Test Value (S)	117
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0065
OLS Regression Intercept	-275.8968

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

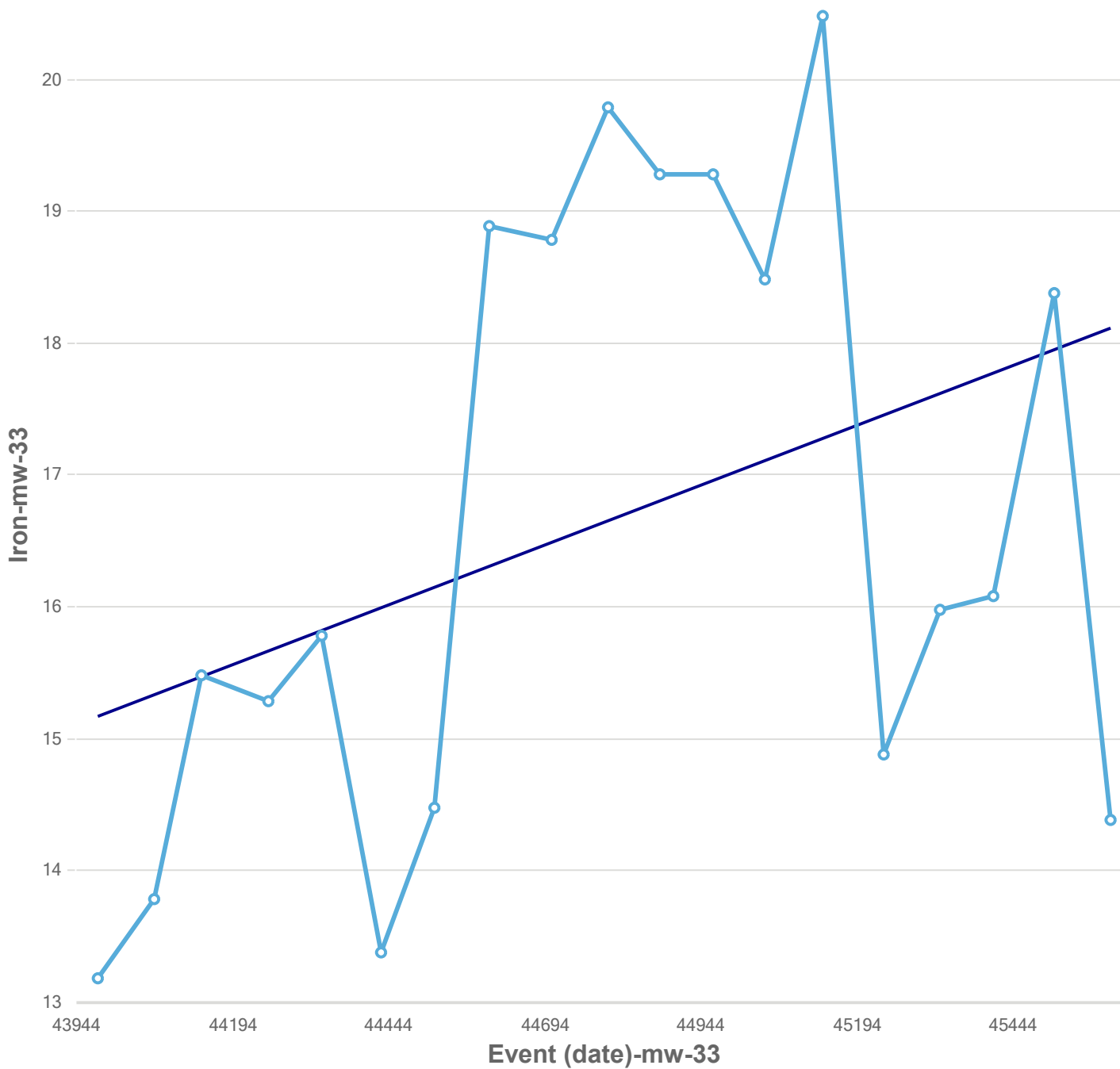
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	2.4155
M-K Test Value (S)	70
Tabulated p-value	0.0060
Approximate p-value	0.0079

OLS Regression Line (Blue)

OLS Regression Slope	0.0020
OLS Regression Intercept	-77.2605

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test

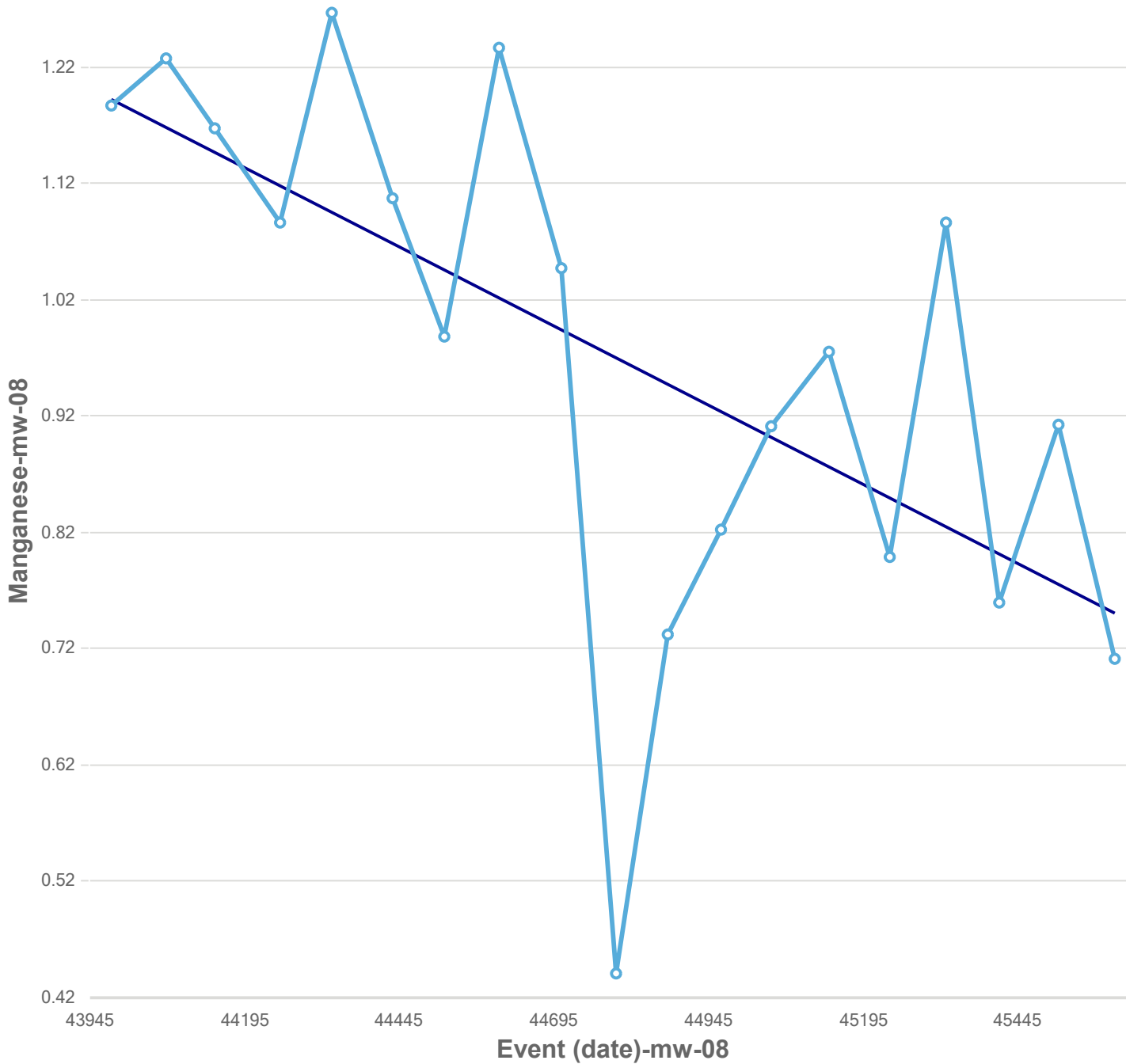


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	1.5753
M-K Test Value (S)	46
Tabulated p-value	0.0540
Approximate p-value	0.0576

OLS Regression Line (Blue)	
OLS Regression Slope	0.0018
OLS Regression Intercept	-64.2494

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

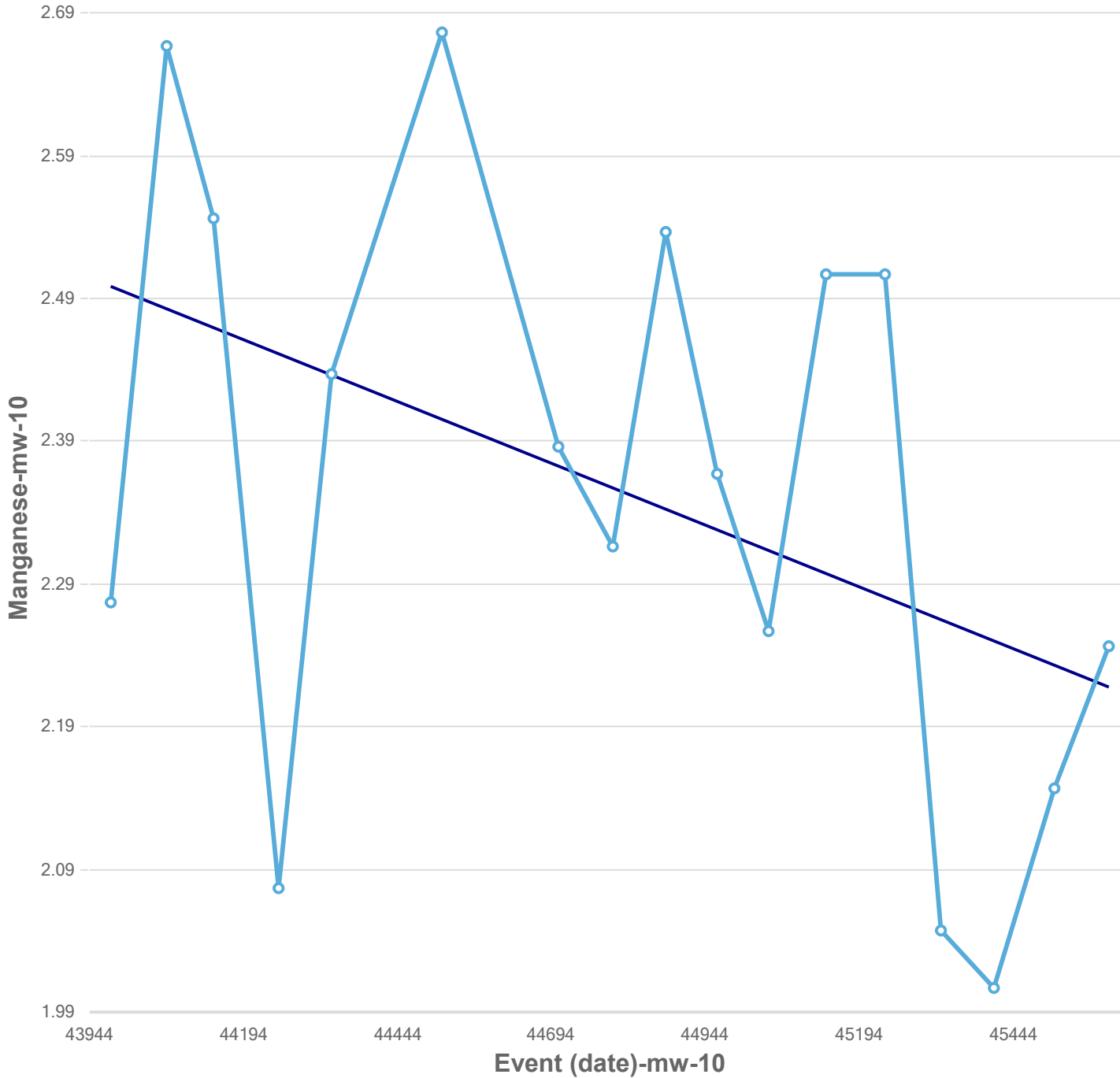
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	-2.9756
M-K Test Value (S)	-86
Tabulated p-value	0.0010
Approximate p-value	0.0015

OLS Regression Line (Blue)

OLS Regression Slope	-0.0003
OLS Regression Intercept	13.1497

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test

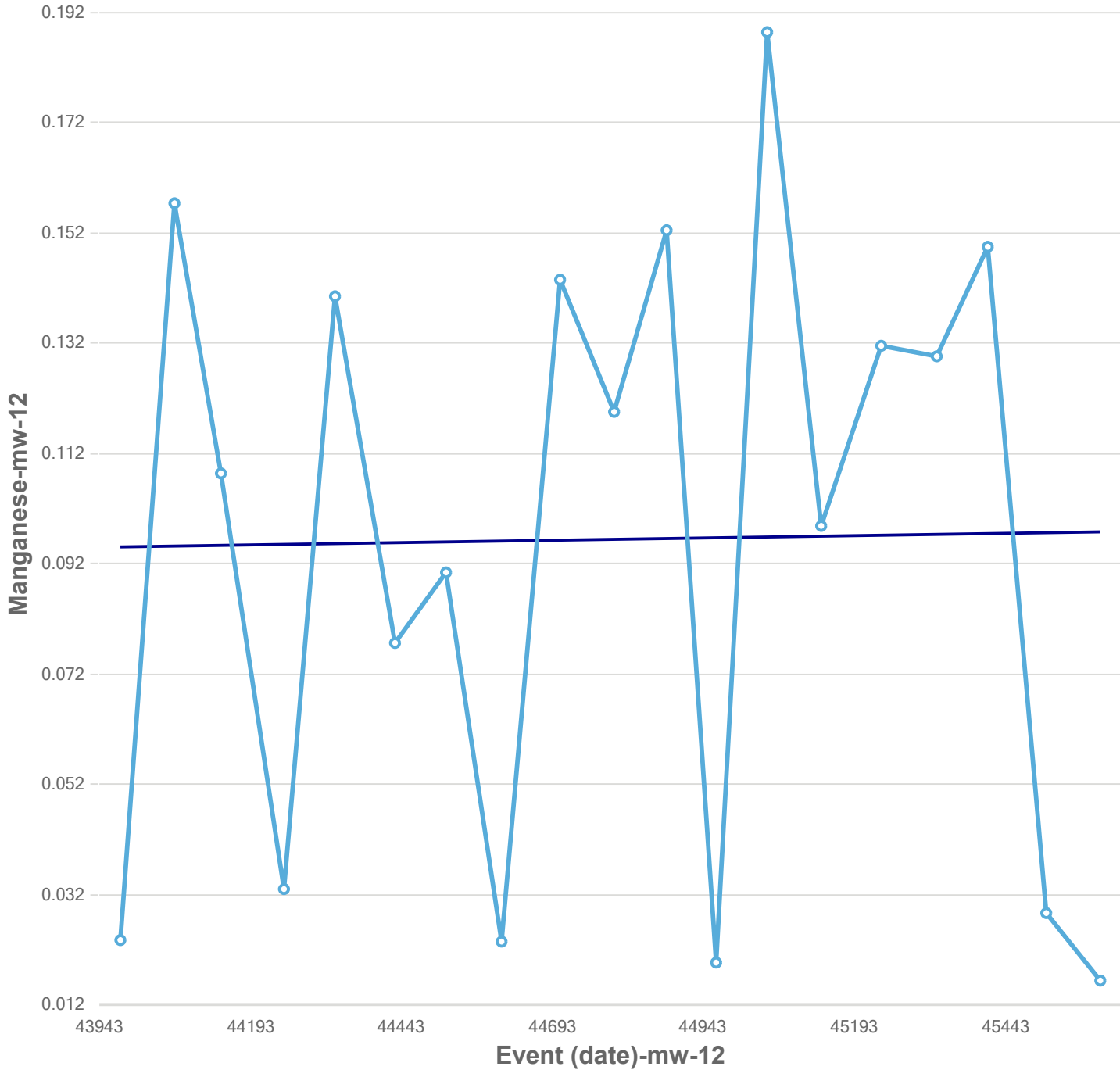


Mann-Kendall Trend Analysis	
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2556
Standardized Value of S	-1.9789
M-K Test Value (S)	-49
Tabulated p-value	0.0230
Approximate p-value	0.0239

OLS Regression Line (Blue)	
OLS Regression Slope	-0.0002
OLS Regression Intercept	10.1124

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test

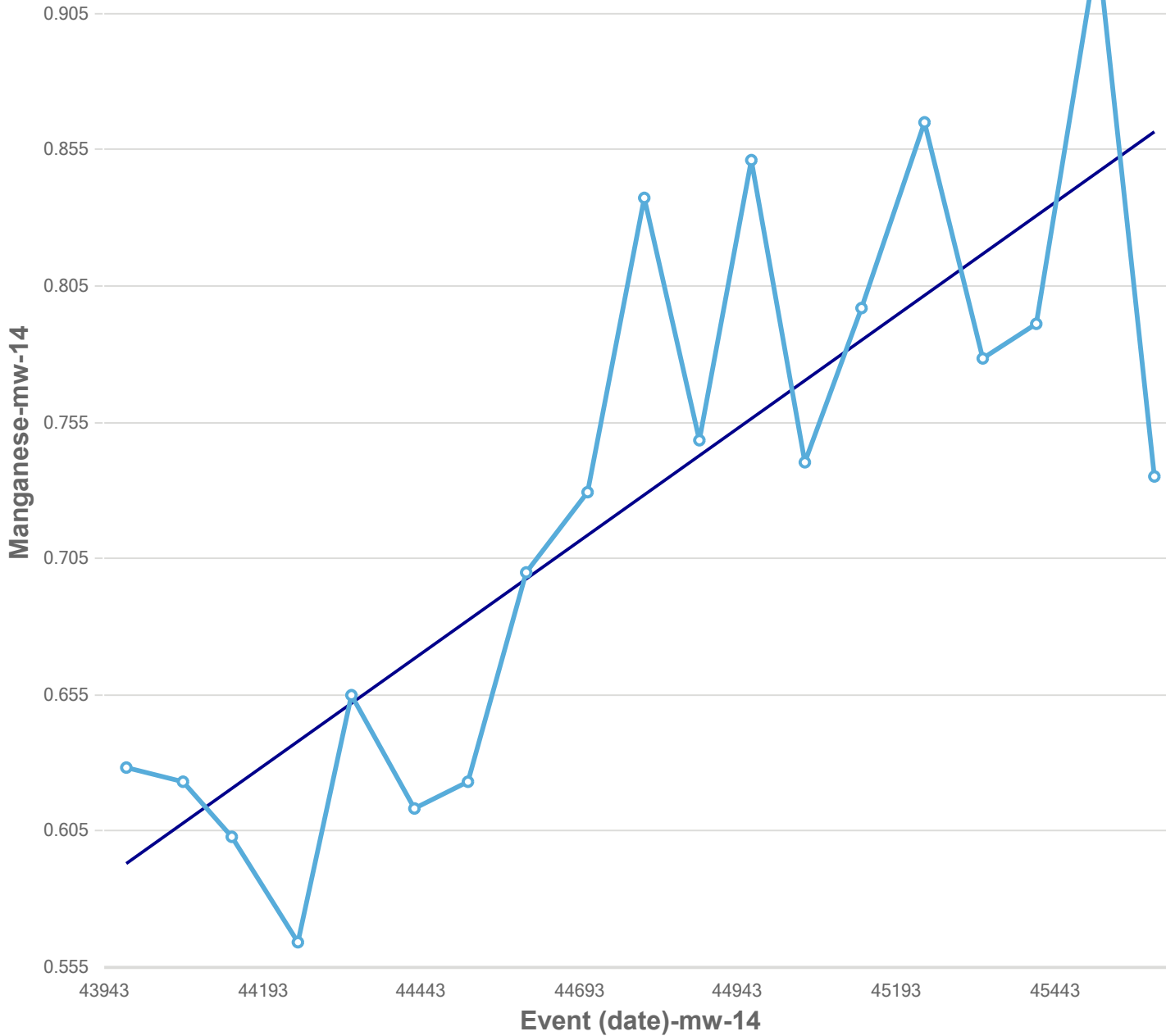


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	0.0000
M-K Test Value (S)	-1
Tabulated p-value	0.5000
Approximate p-value	0.5000

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.0168

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

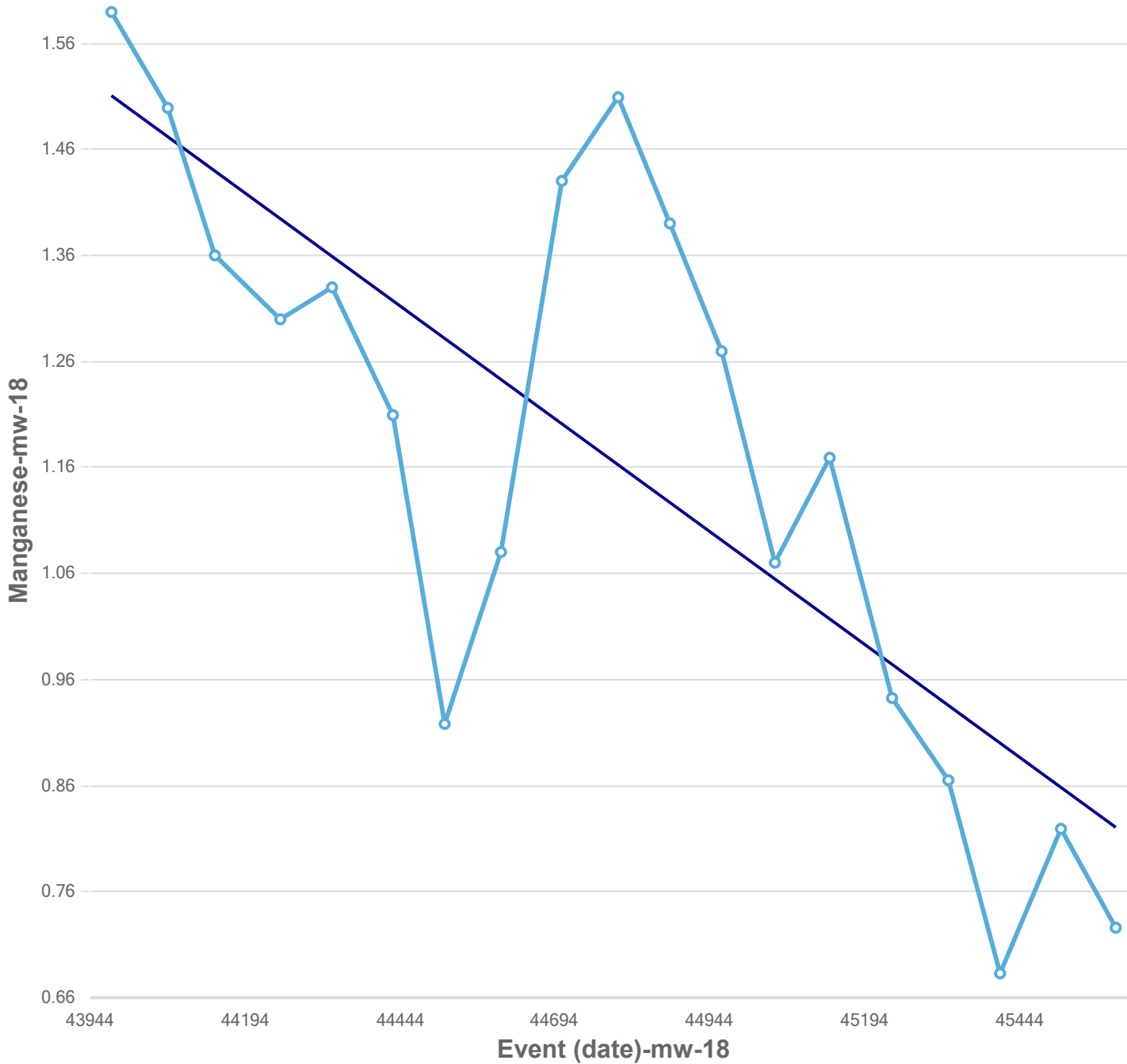
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	3.5357
M-K Test Value (S)	102
Tabulated p-value	0.0000
Approximate p-value	0.0002

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-6.6672

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test

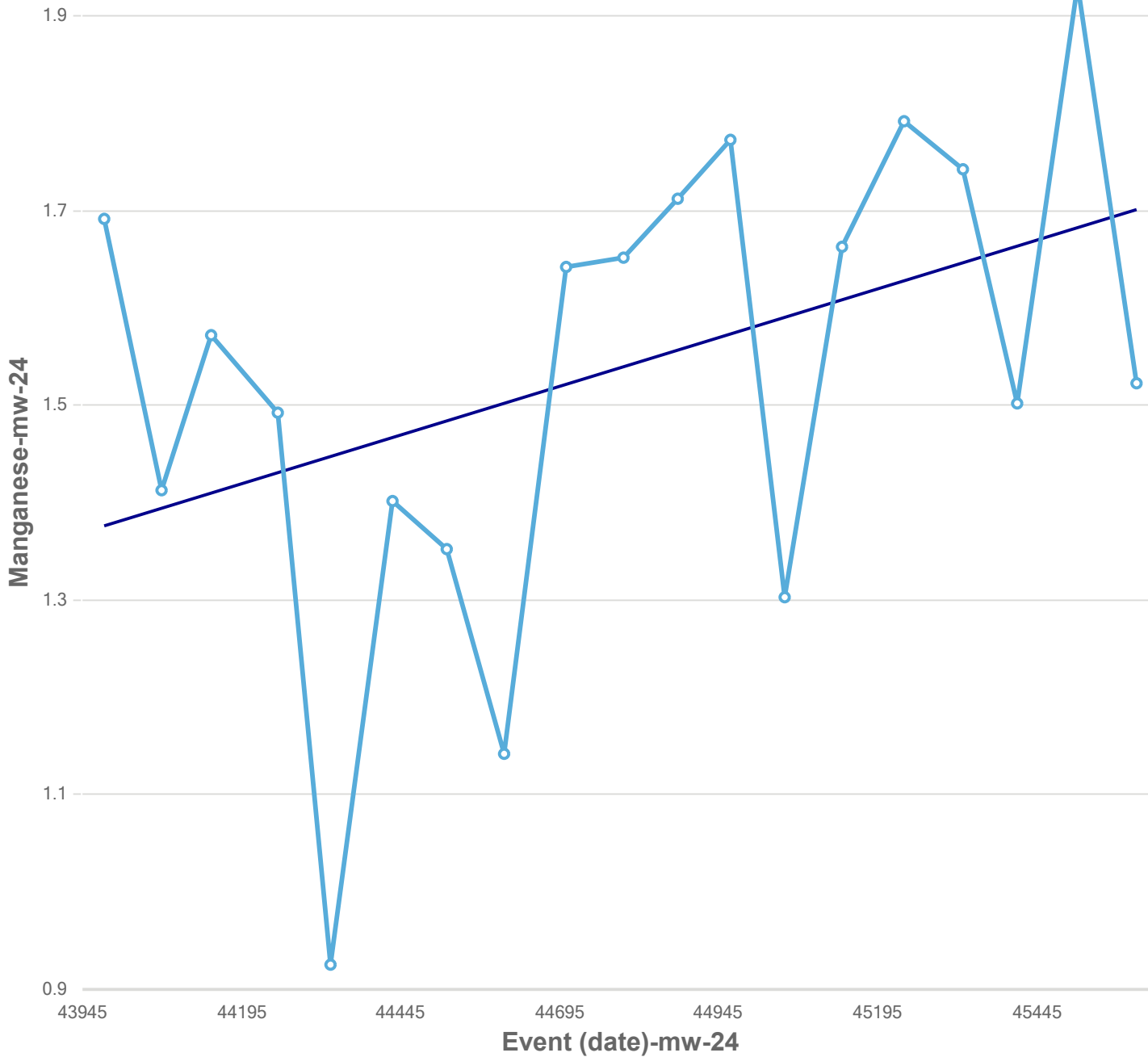


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-3.7085
M-K Test Value (S)	-107
Tabulated p-value	0.0000
Approximate p-value	0.0001

OLS Regression Line (Blue)	
OLS Regression Slope	-0.0004
OLS Regression Intercept	20.1908

Statistically significant evidence of a decreasing trend at the specified level of significance.

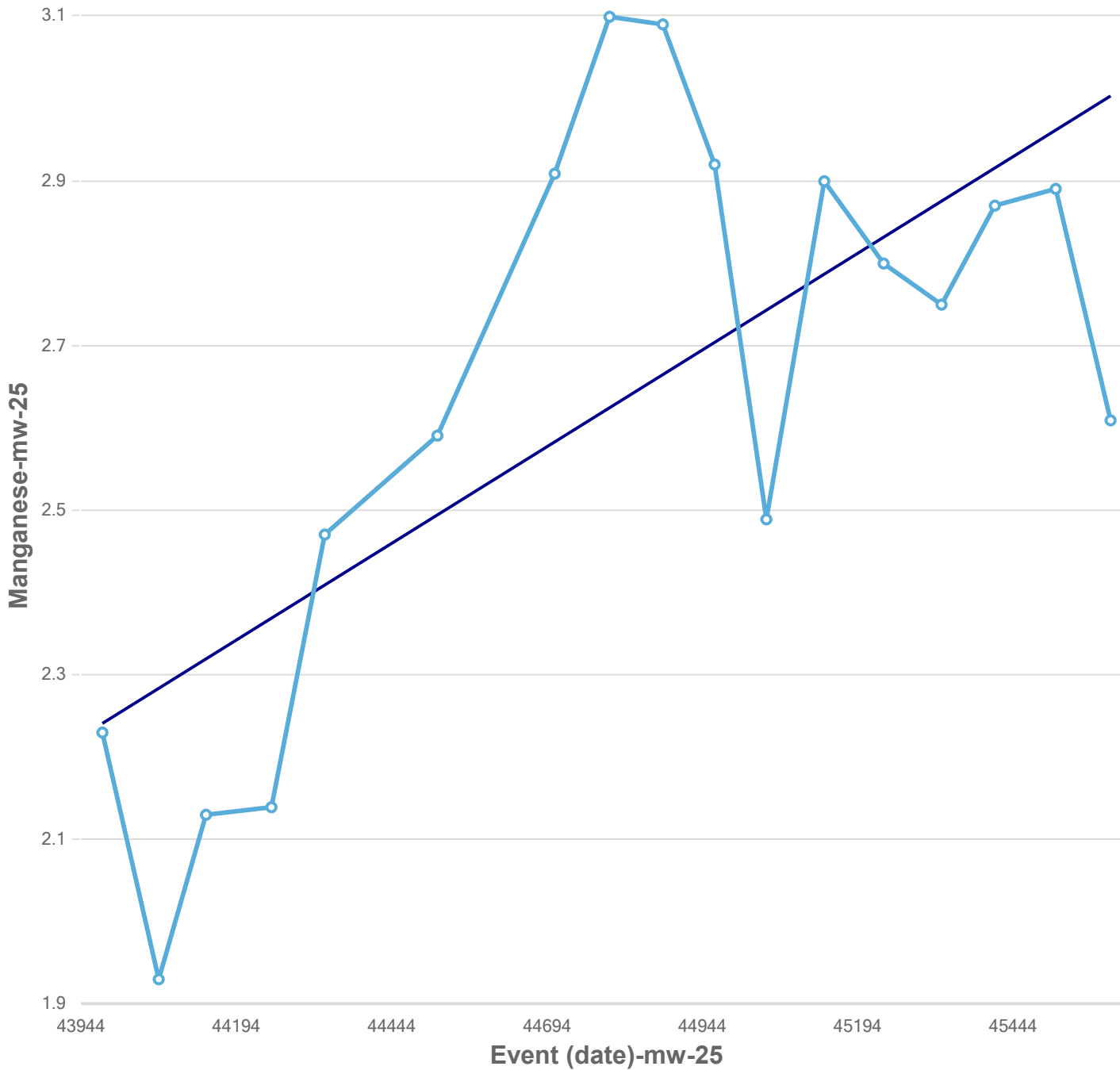
Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	1.8192
M-K Test Value (S)	53
Tabulated p-value	0.0340
Approximate p-value	0.0344
OLS Regression Line (Blue)	
OLS Regression Slope	0.0002
OLS Regression Intercept	-7.4181

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test

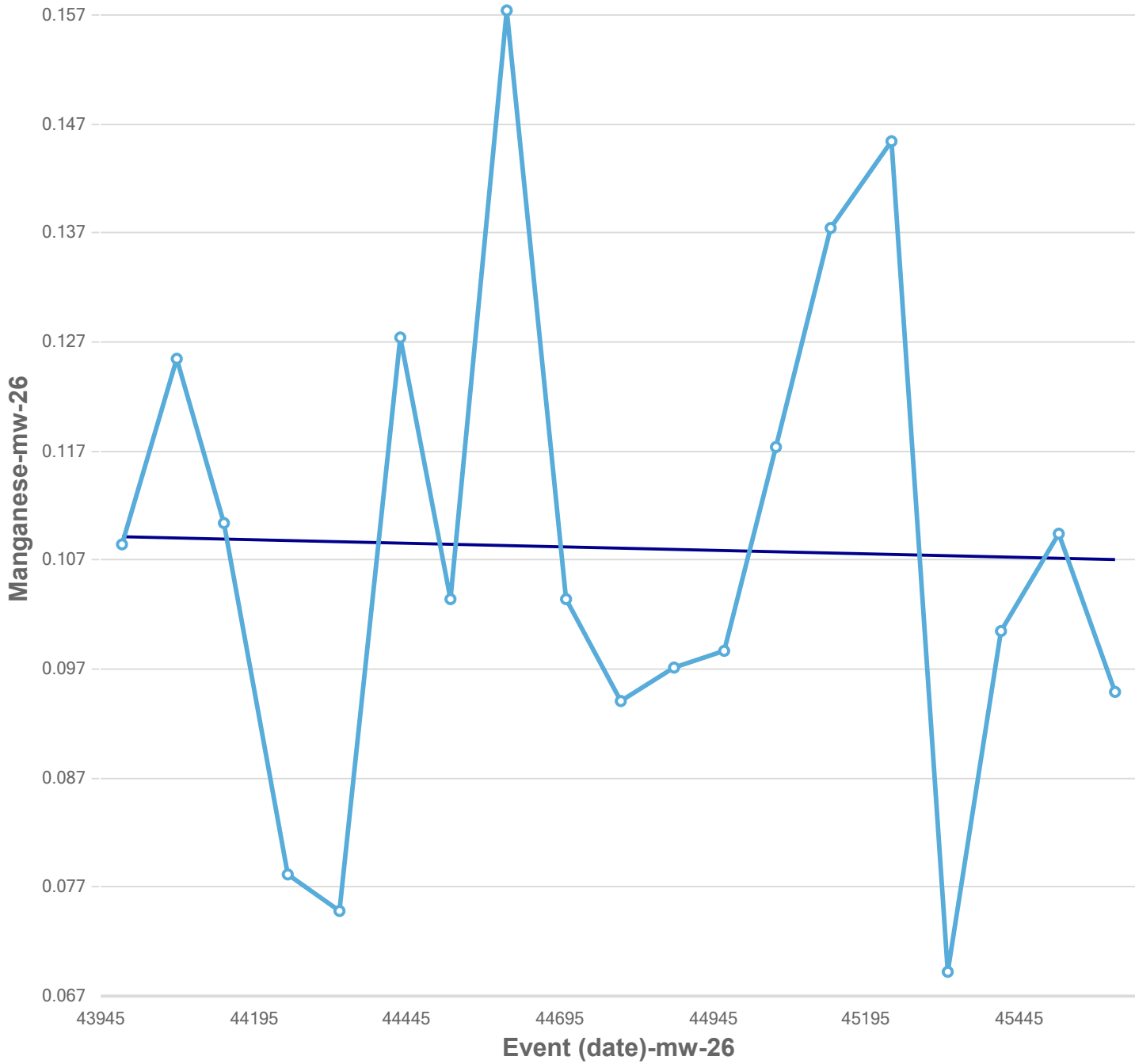


Mann-Kendall Trend Analysis	
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2762
Standardized Value of S	1.8537
M-K Test Value (S)	46
Tabulated p-value	0.0320
Approximate p-value	0.0319

OLS Regression Line (Blue)	
OLS Regression Slope	0.0005
OLS Regression Intercept	-18.4482

Statistically significant evidence of an increasing trend at the specified level of significance.

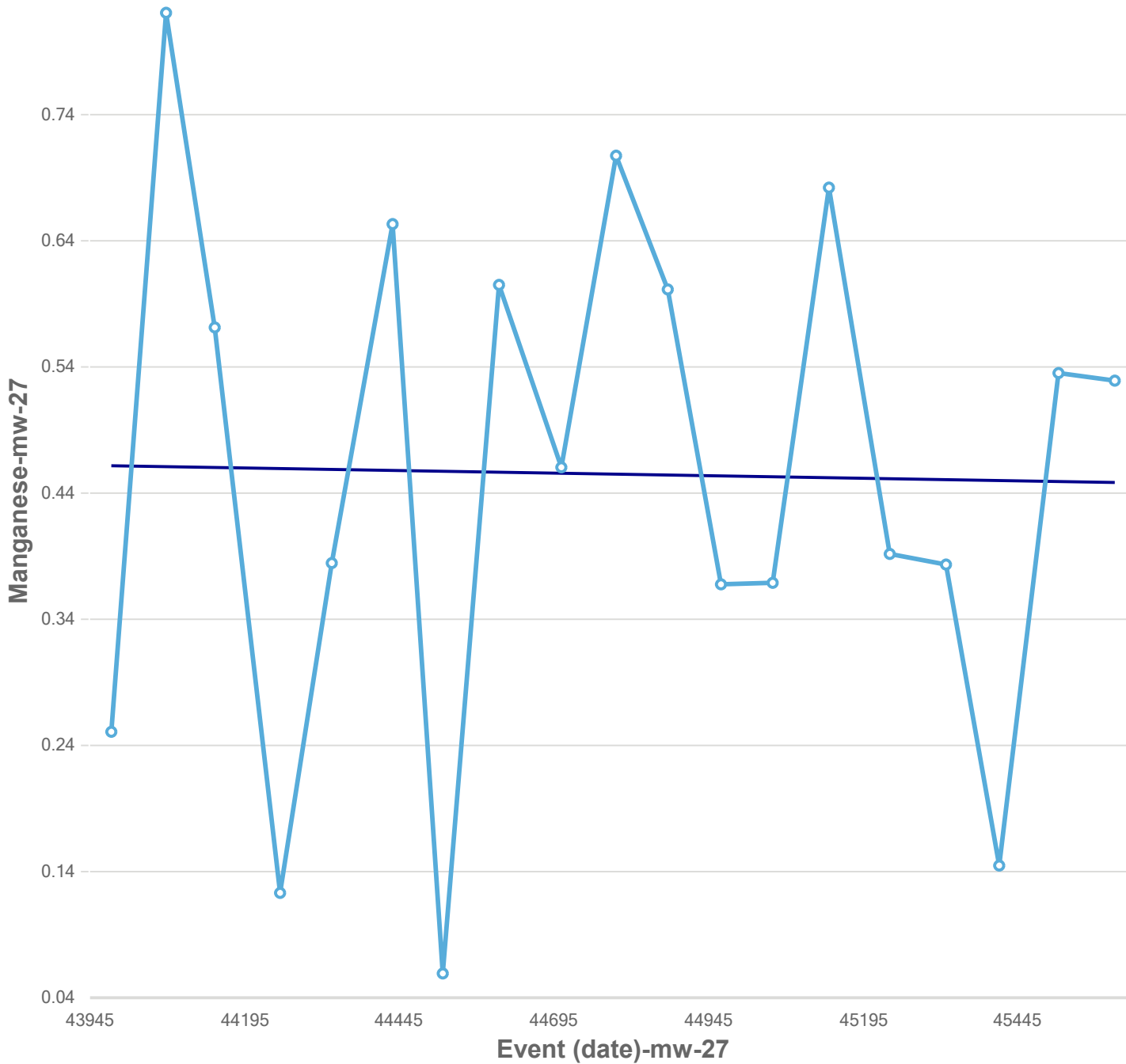
Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	-0.2450
M-K Test Value (S)	-8
Tabulated p-value	0.3910
Approximate p-value	0.4032
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.1664

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

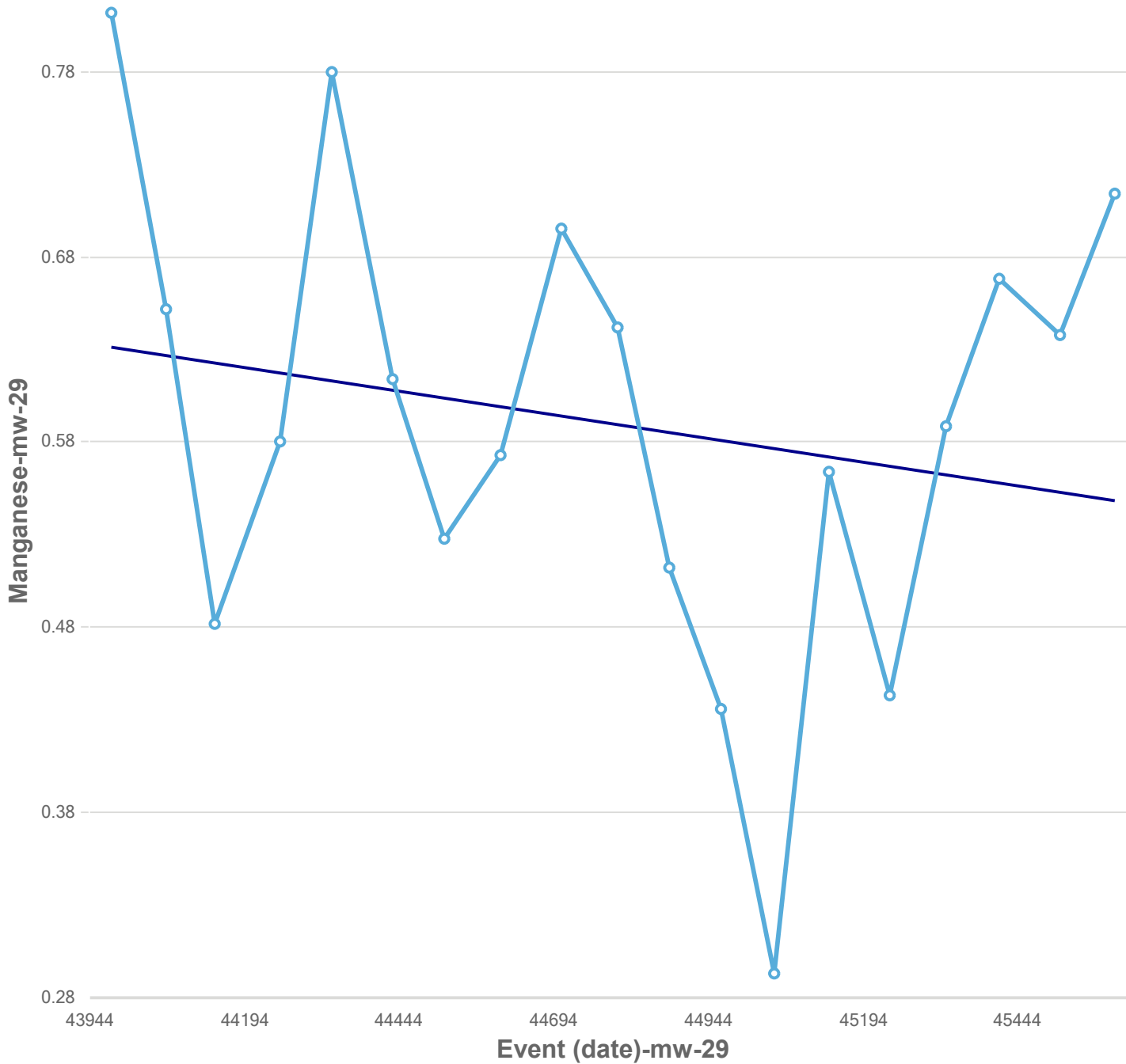
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-0.2099
M-K Test Value (S)	-7
Tabulated p-value	0.4180
Approximate p-value	0.4169

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	0.8307

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

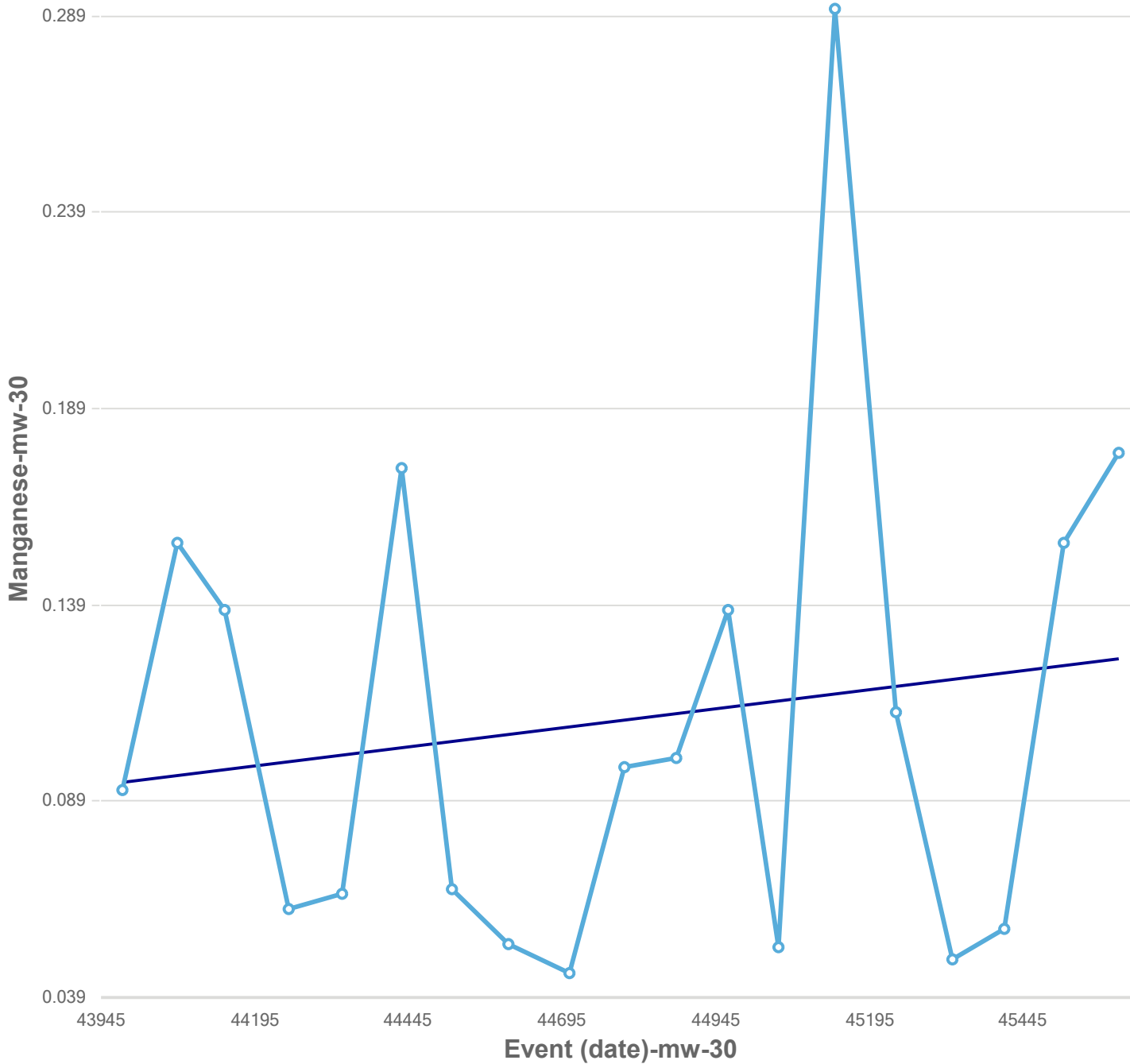
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-0.5598
M-K Test Value (S)	-17
Tabulated p-value	0.2900
Approximate p-value	0.2878

OLS Regression Line (Blue)

OLS Regression Slope	-0.0001
OLS Regression Intercept	2.8756

Insufficient statistical evidence of a significant trend at the specified level of significance.

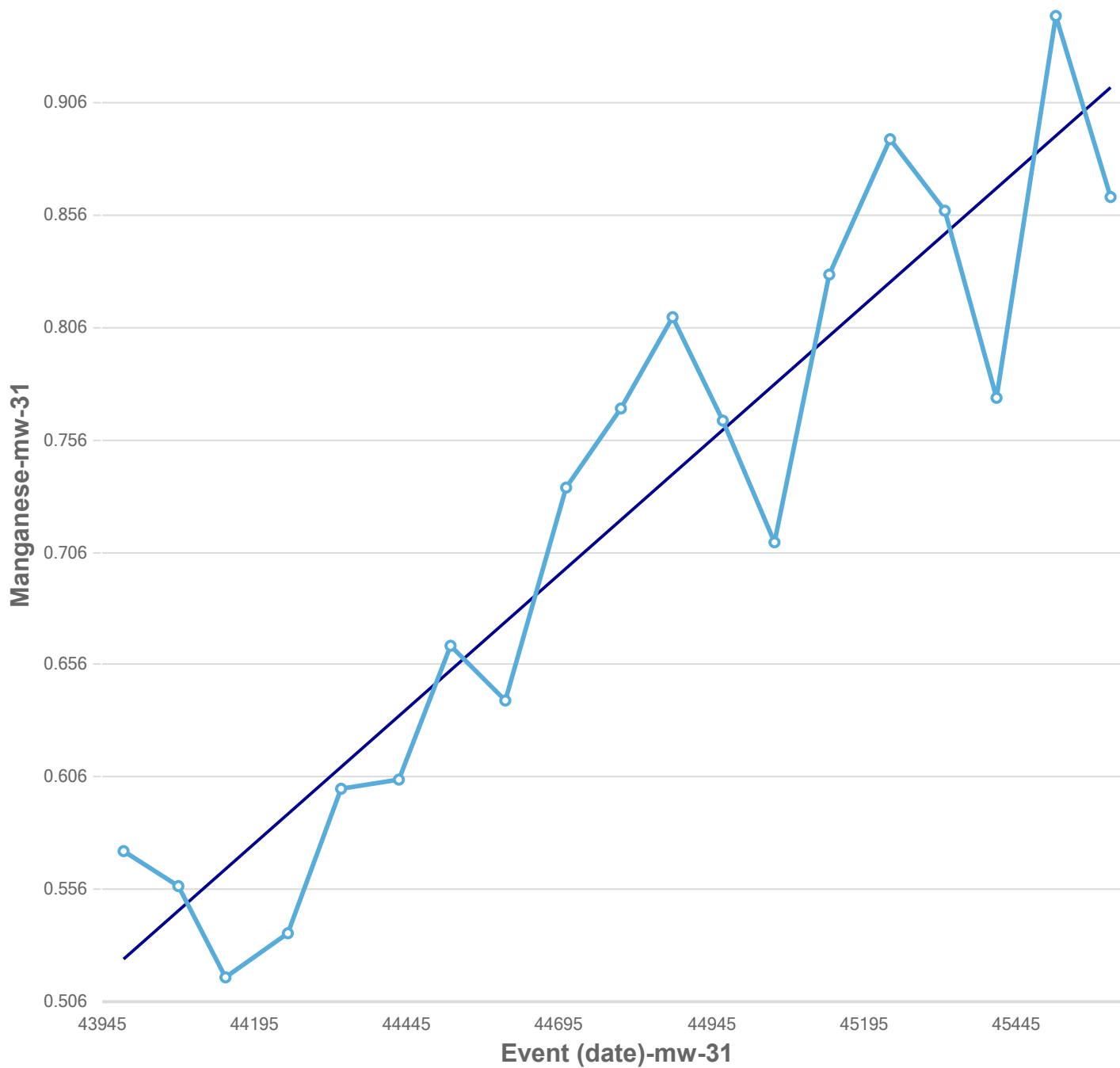
Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5482
Standardized Value of S	0.3503
M-K Test Value (S)	11
Tabulated p-value	0.3650
Approximate p-value	0.3631
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	-0.7604

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

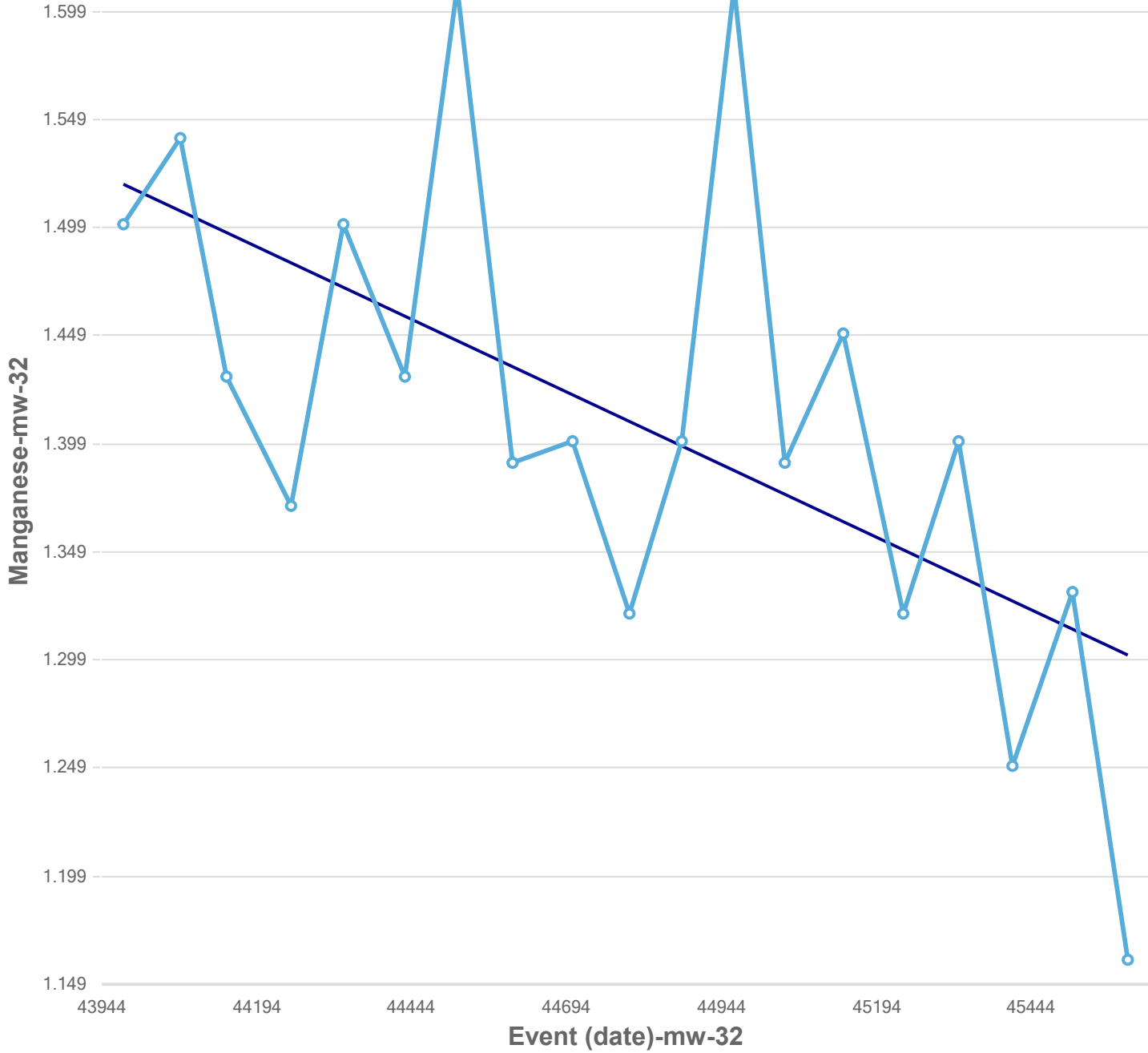
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	4.6181
M-K Test Value (S)	133
Tabulated p-value	0.0000
Approximate p-value	0.0000

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-10.0035

Statistically significant evidence of an increasing trend at the specified level of significance.

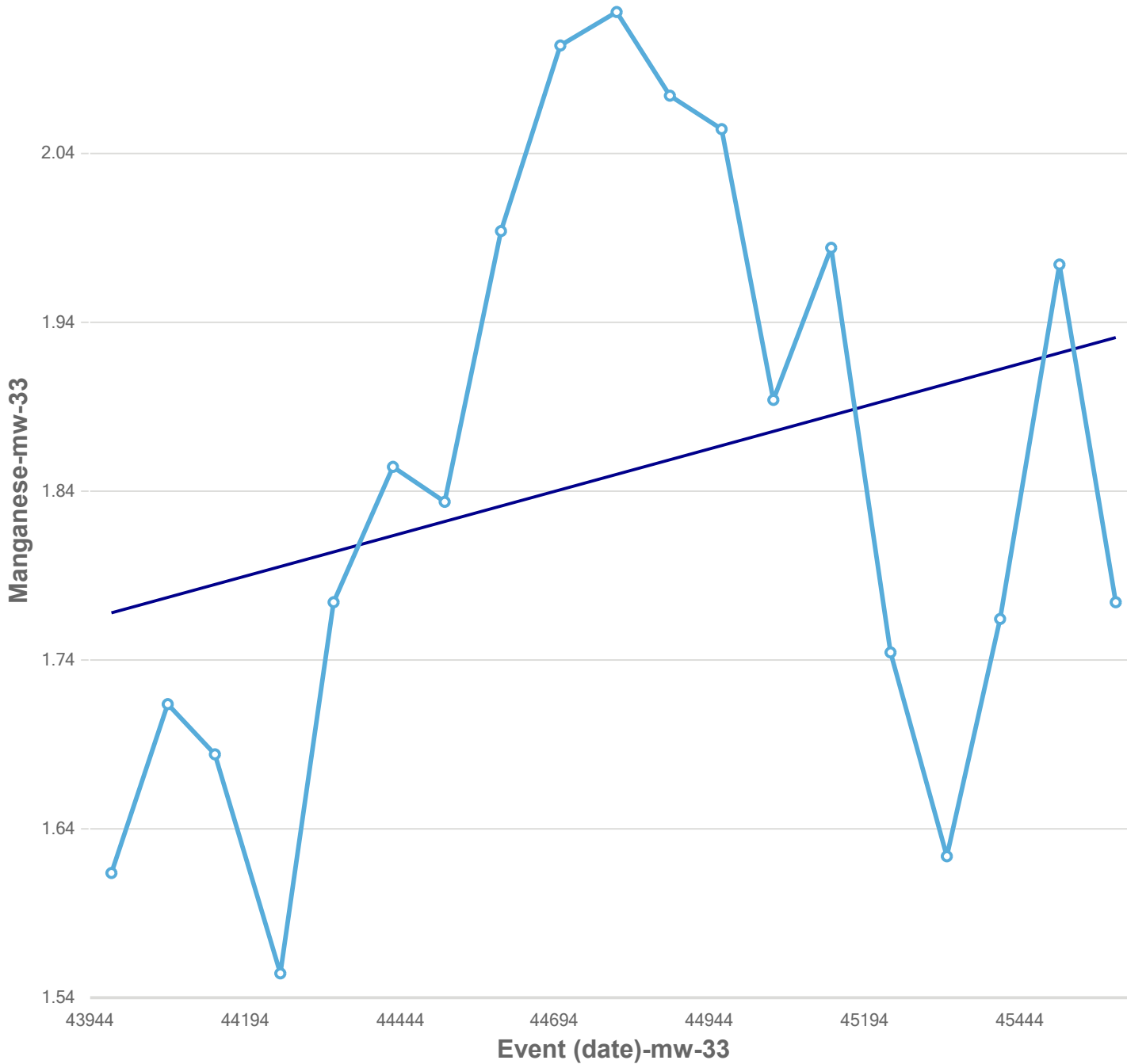
Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.4312
Standardized Value of S	-2.6028
M-K Test Value (S)	-75
Tabulated p-value	0.0040
Approximate p-value	0.0046
OLS Regression Line (Blue)	
OLS Regression Slope	-0.0001
OLS Regression Intercept	7.4236

Statistically significant evidence of a decreasing trend at the specified level of significance.

Mann-Kendall Trend Test

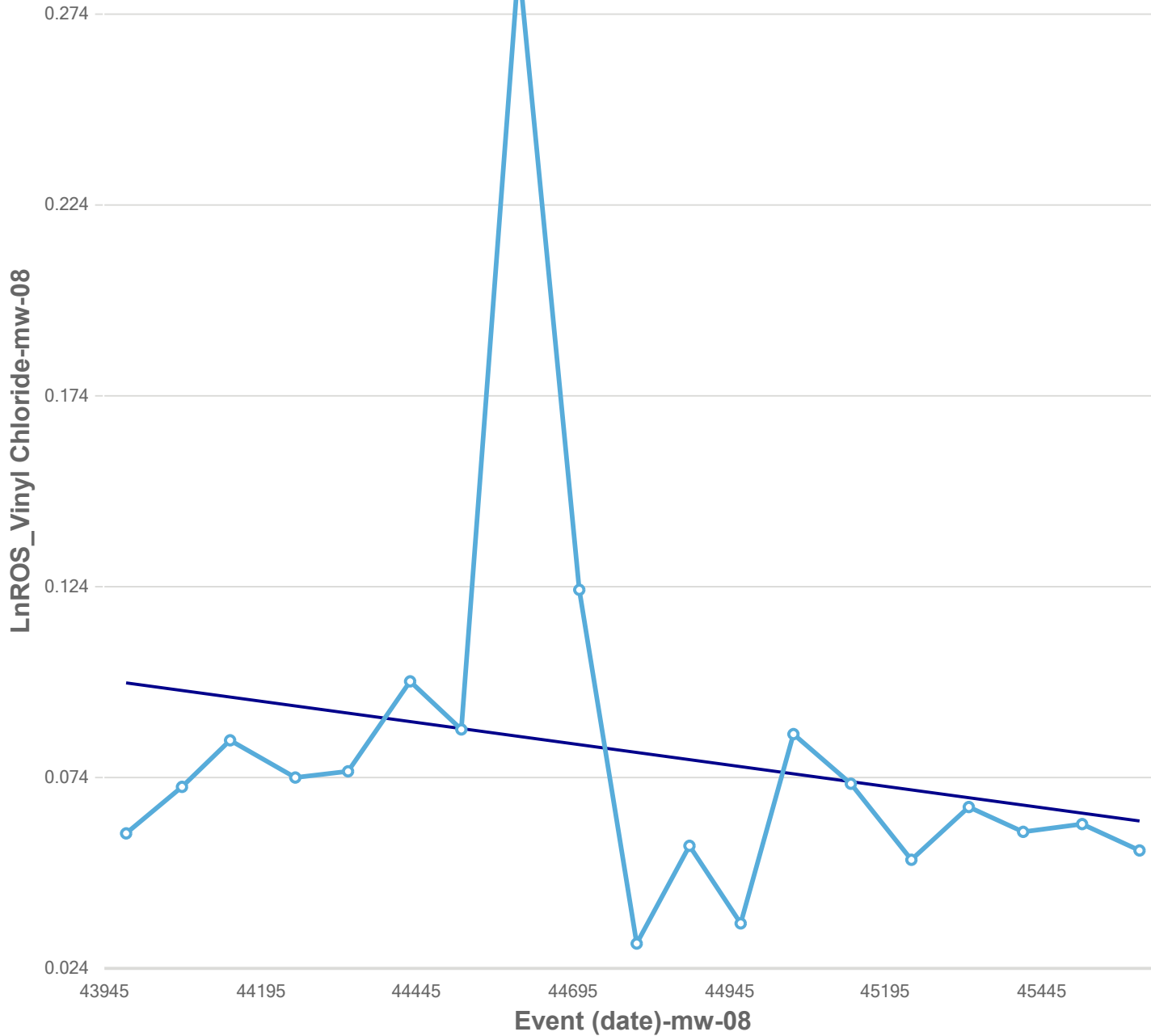


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	1.0852
M-K Test Value (S)	32
Tabulated p-value	0.1330
Approximate p-value	0.1389

OLS Regression Line (Blue)	
OLS Regression Slope	0.0001
OLS Regression Intercept	-2.6768

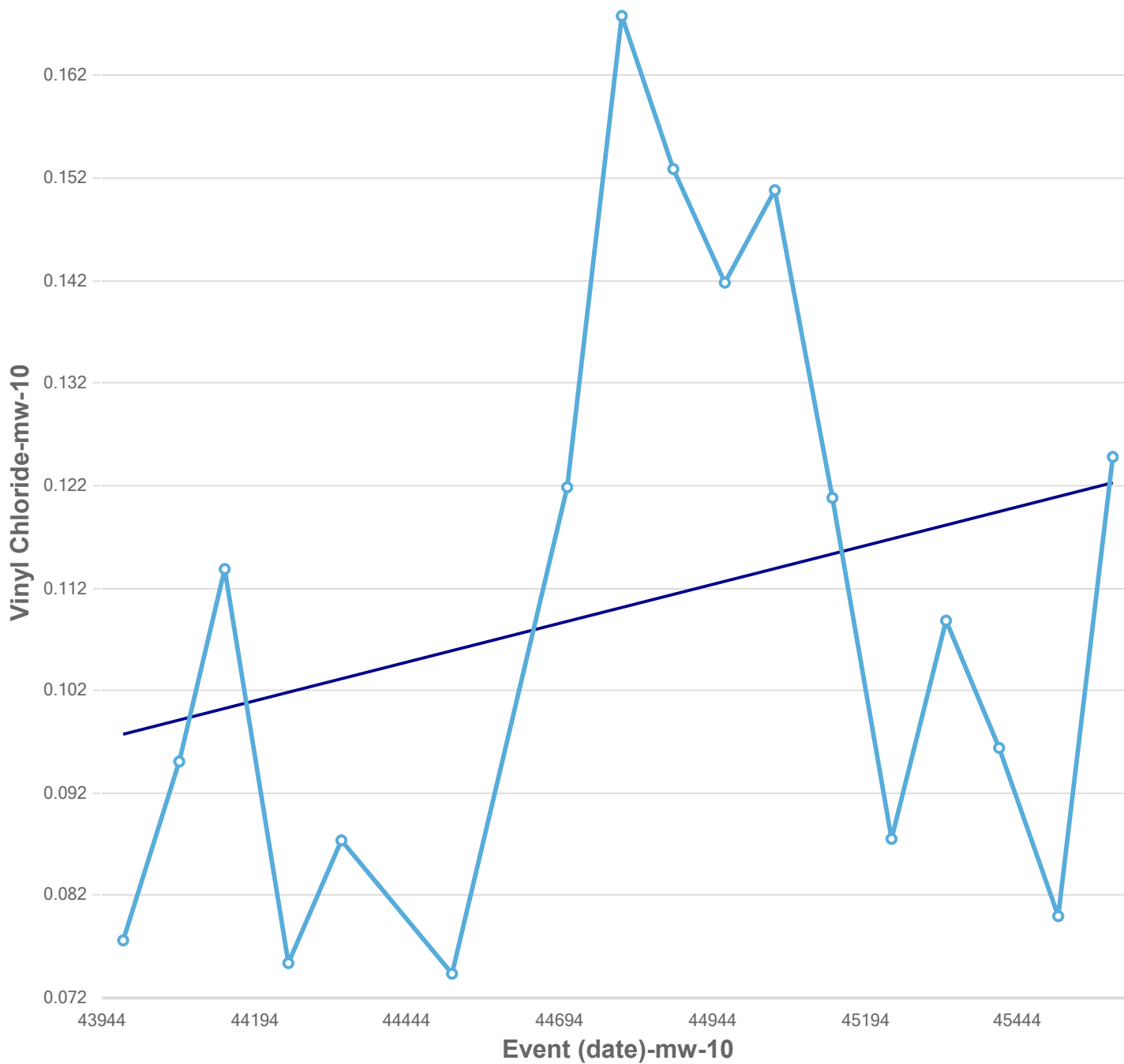
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-1.1895
M-K Test Value (S)	-35
Tabulated p-value	0.1190
Approximate p-value	0.1171
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	1.0719
Insufficient statistical evidence of a significant trend at the specified level of significance.	

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

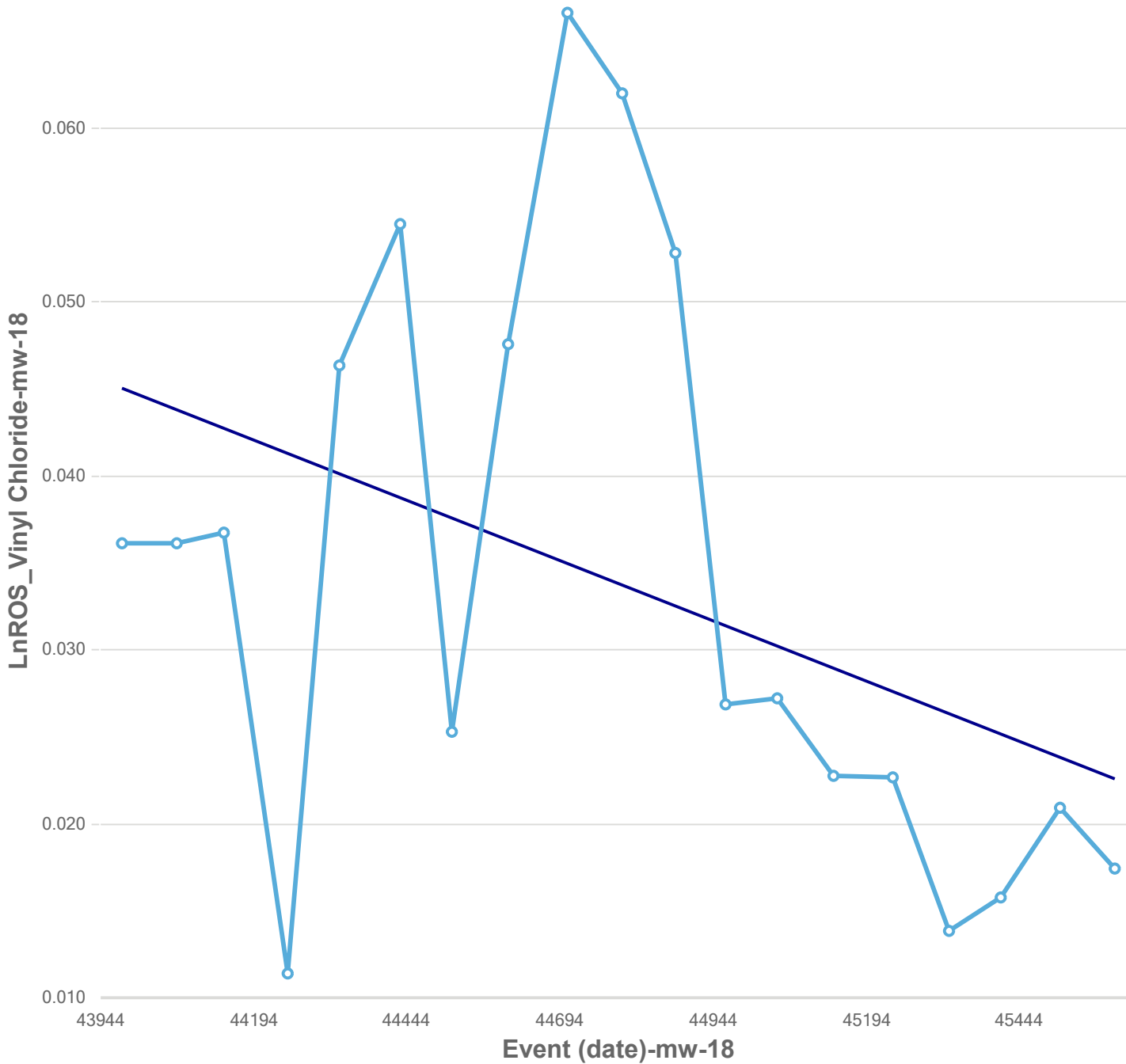
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2762
Standardized Value of S	0.7003
M-K Test Value (S)	18
Tabulated p-value	0.2450
Approximate p-value	0.2419

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	-0.5690

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test

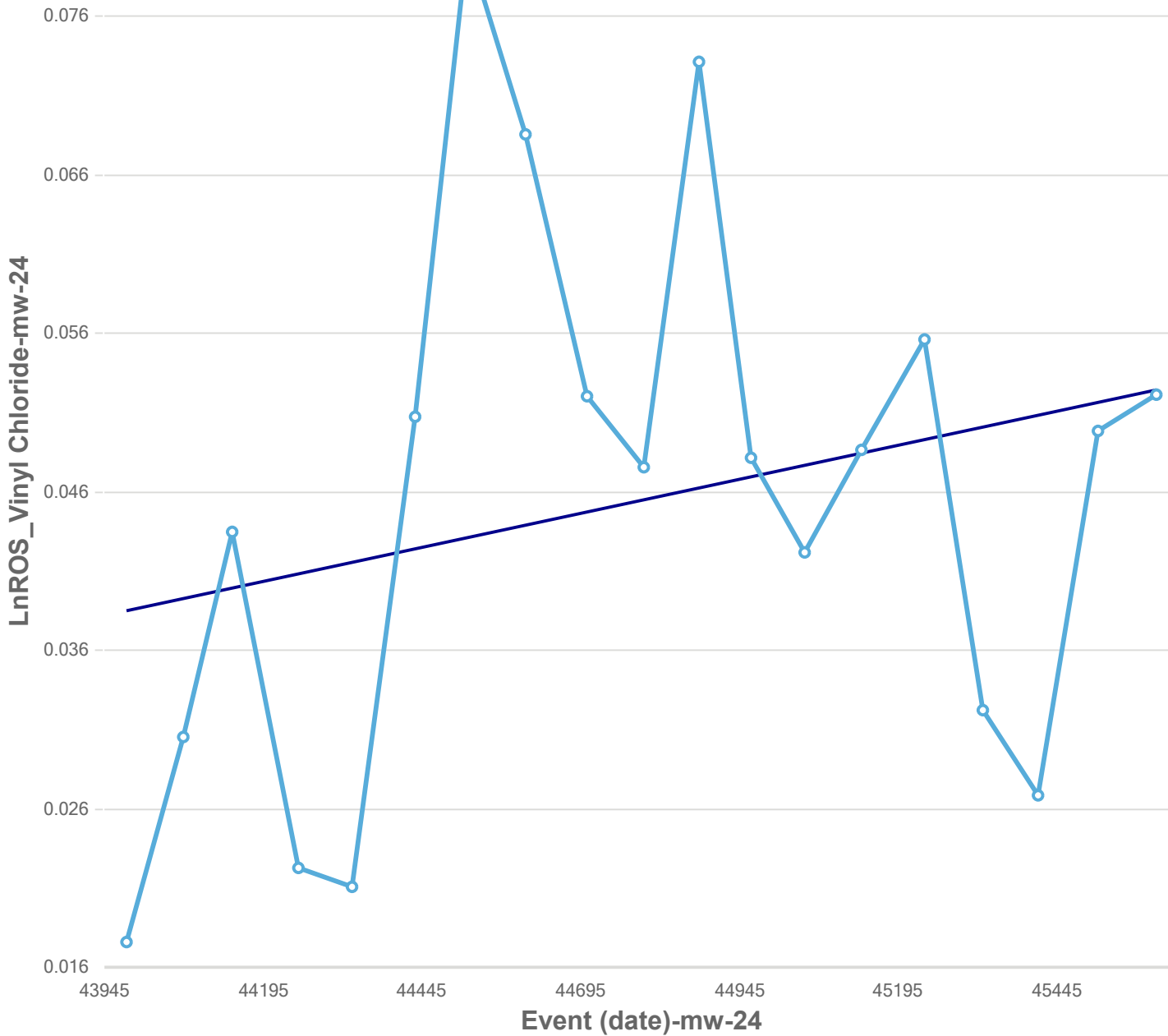


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	-1.9254
M-K Test Value (S)	-56
Tabulated p-value	0.0250
Approximate p-value	0.0271

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.6523

Statistically significant evidence of a decreasing trend at the specified level of significance.

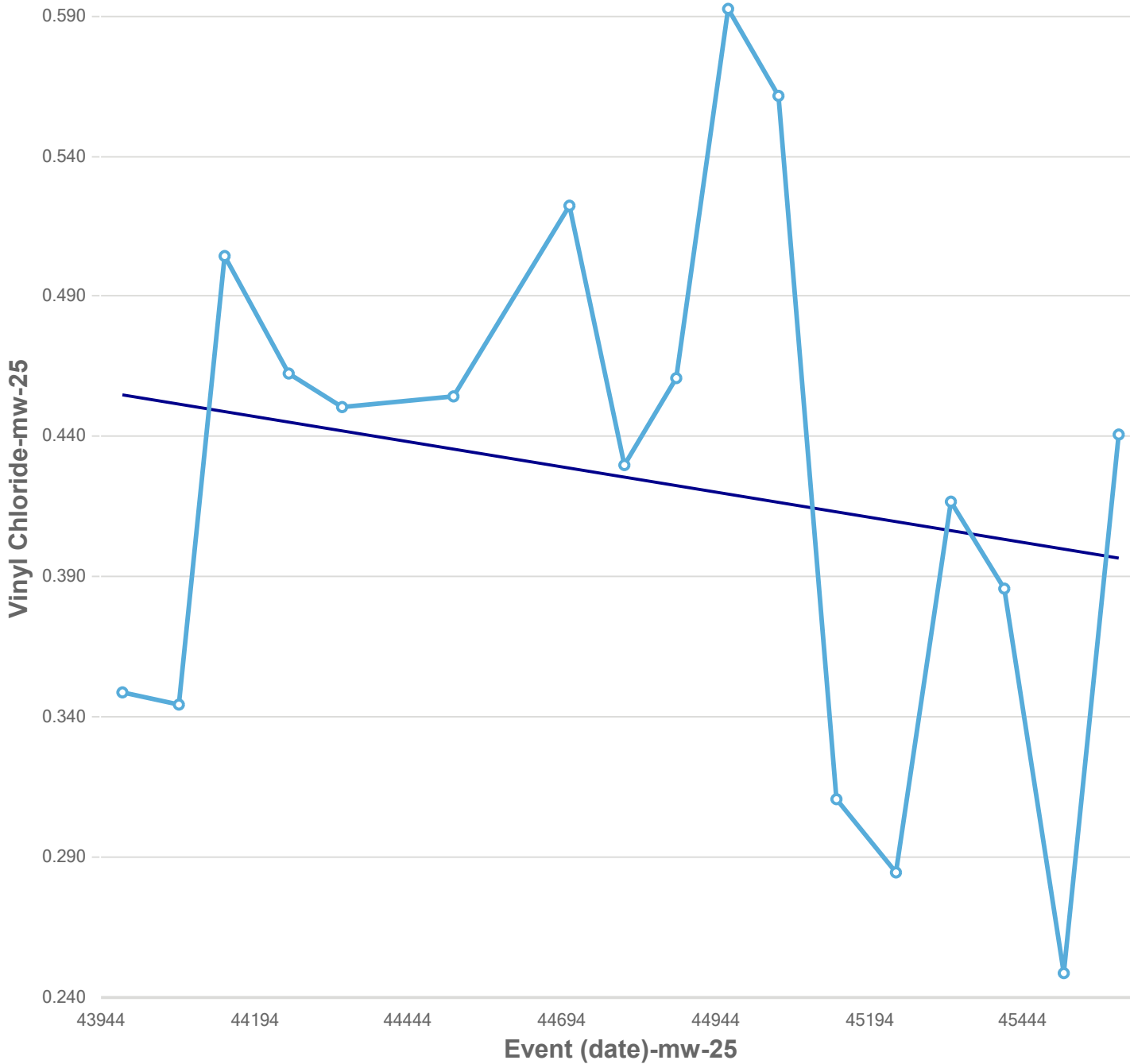
Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	1.1895
M-K Test Value (S)	35
Tabulated p-value	0.1190
Approximate p-value	0.1171
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	-0.3382

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

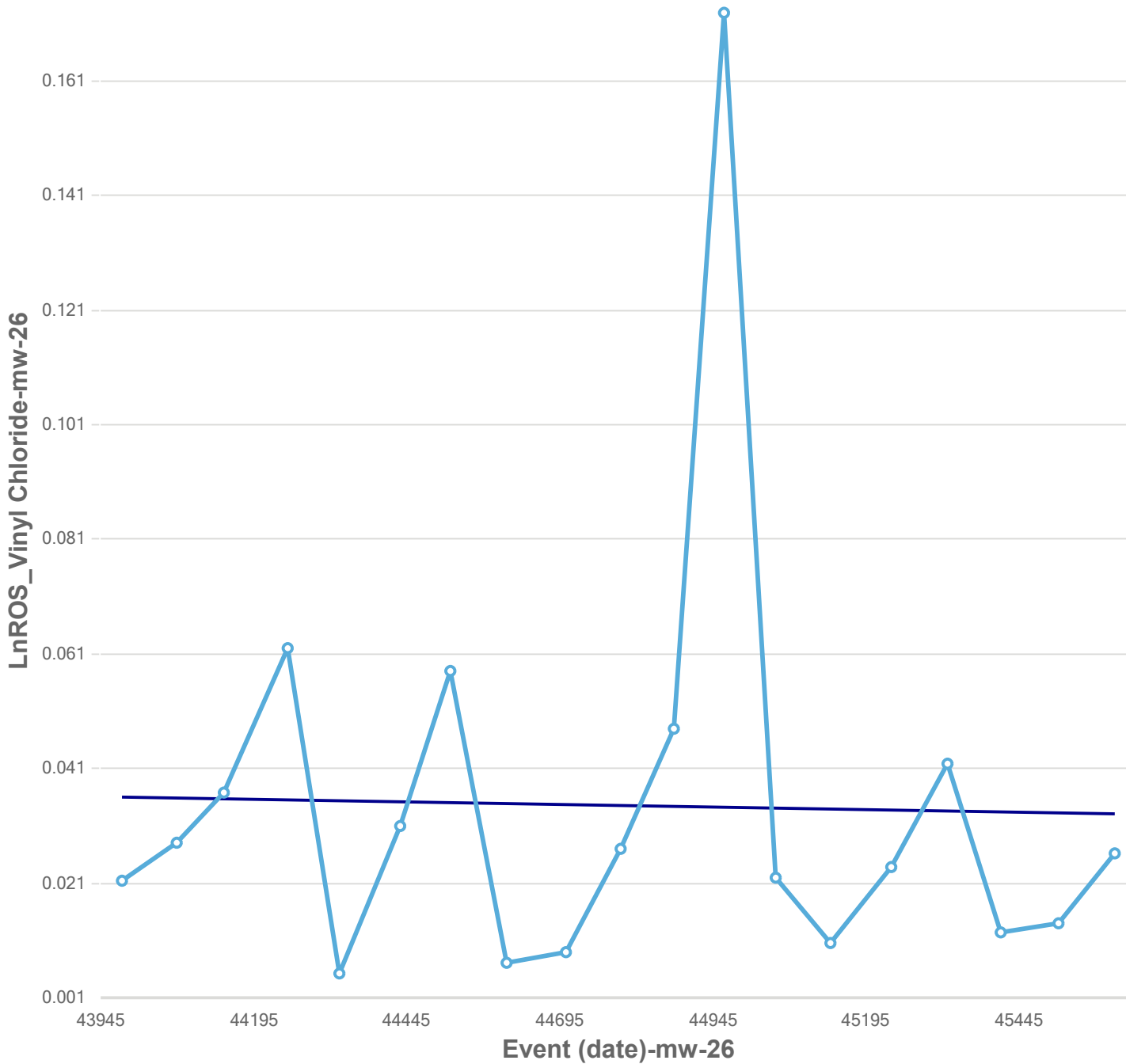
n	17
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	24.2762
Standardized Value of S	-0.9474
M-K Test Value (S)	-24
Tabulated p-value	0.1740
Approximate p-value	0.1717

OLS Regression Line (Blue)

OLS Regression Slope	0.0000
OLS Regression Intercept	2.0262

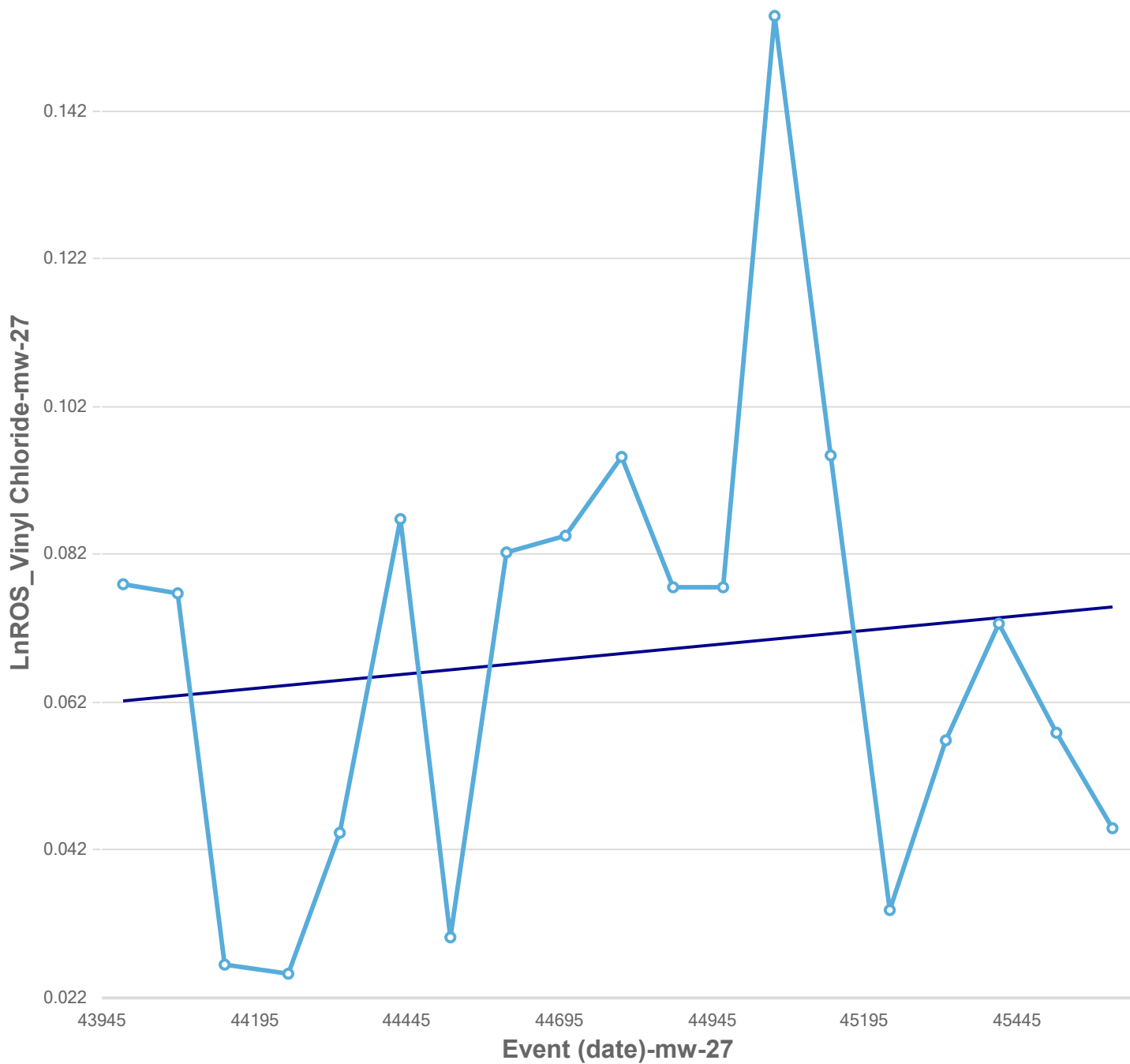
Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-0.2099
M-K Test Value (S)	-7
Tabulated p-value	0.4180
Approximate p-value	0.4169
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.1136
Insufficient statistical evidence of a significant trend at the specified level of significance.	

Mann-Kendall Trend Test

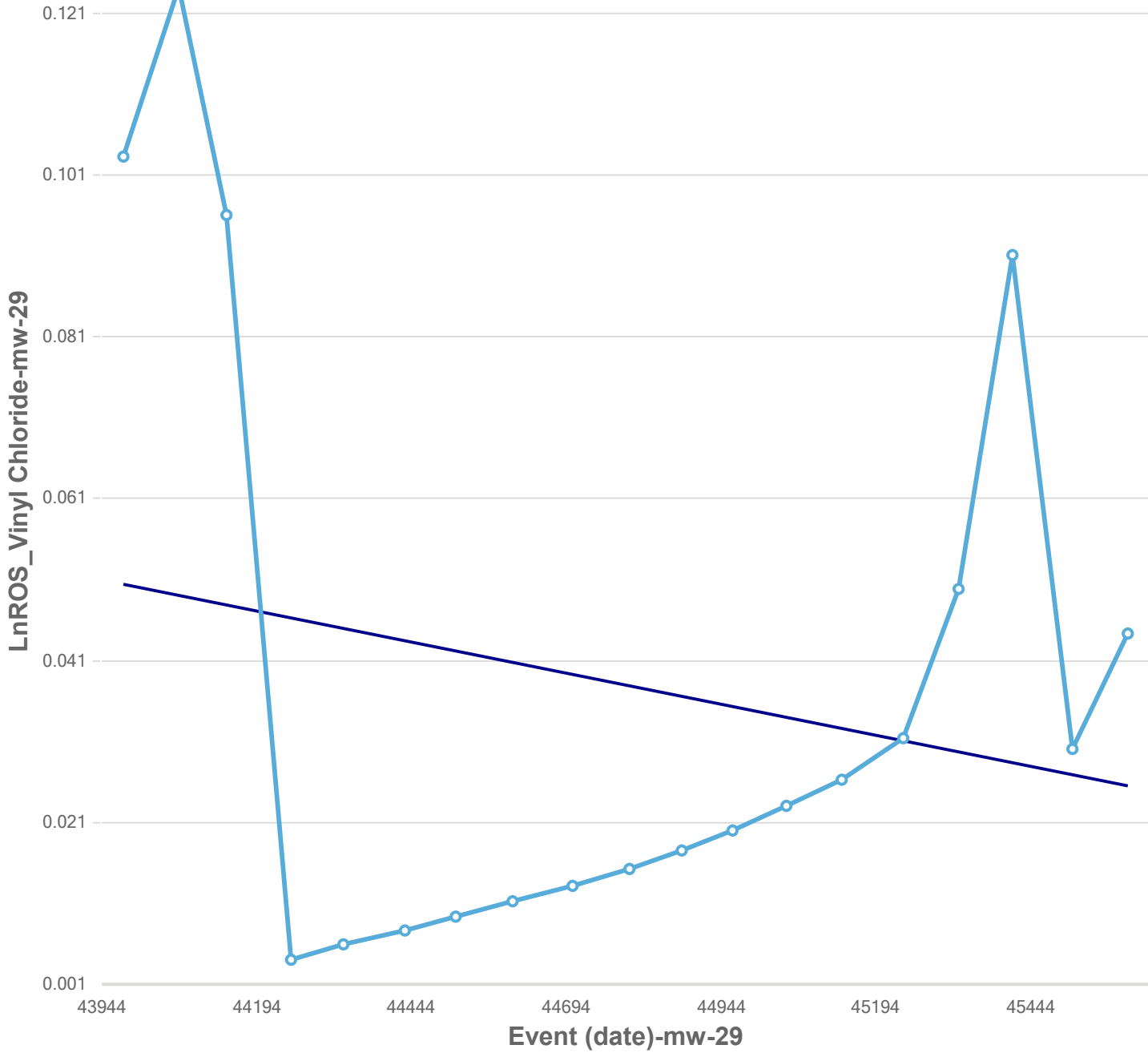


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	0.3499
M-K Test Value (S)	11
Tabulated p-value	0.3650
Approximate p-value	0.3632

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	-0.2814

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test

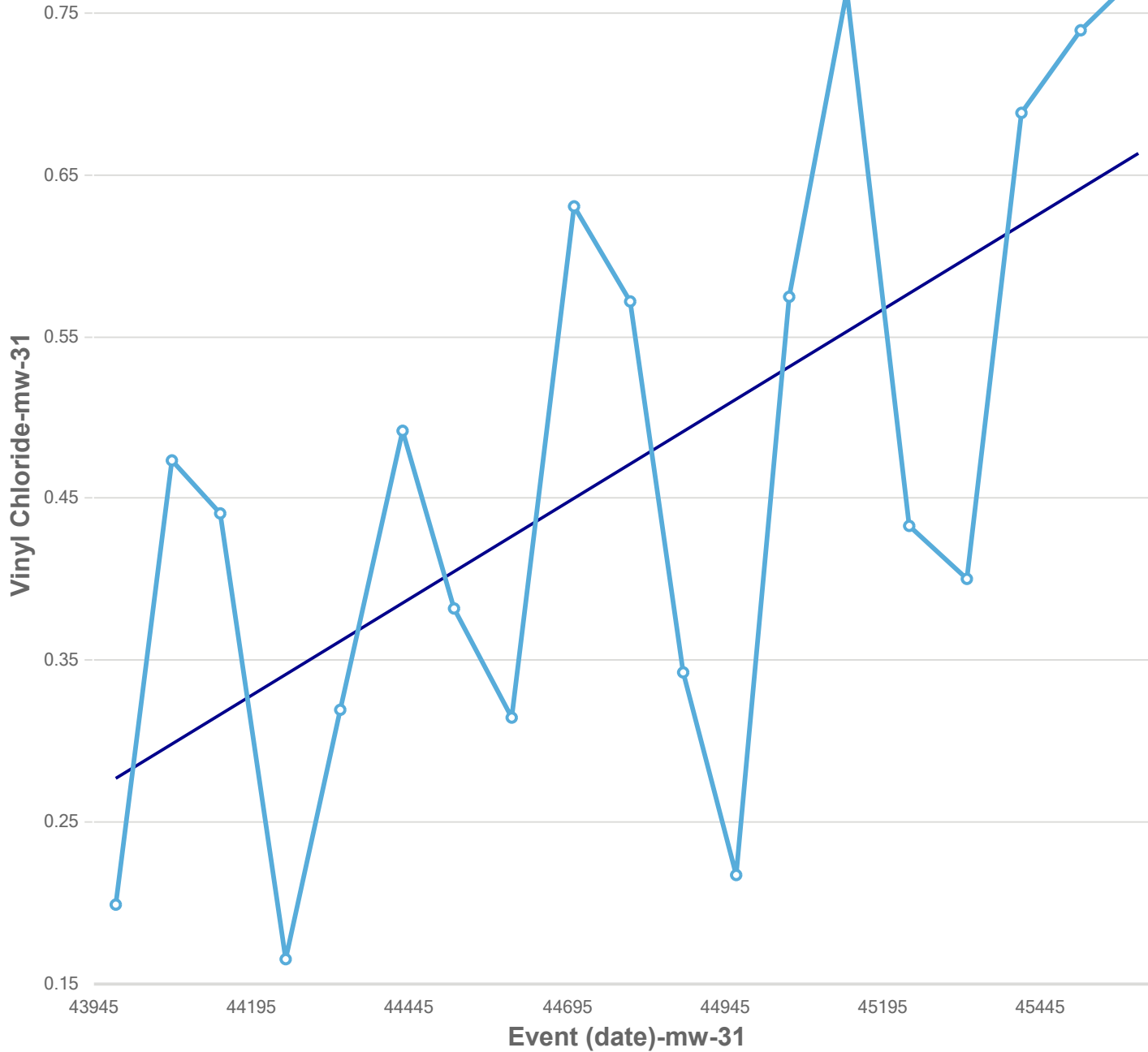


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	2.0991
M-K Test Value (S)	61
Tabulated p-value	0.0170
Approximate p-value	0.0179

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.7261

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis

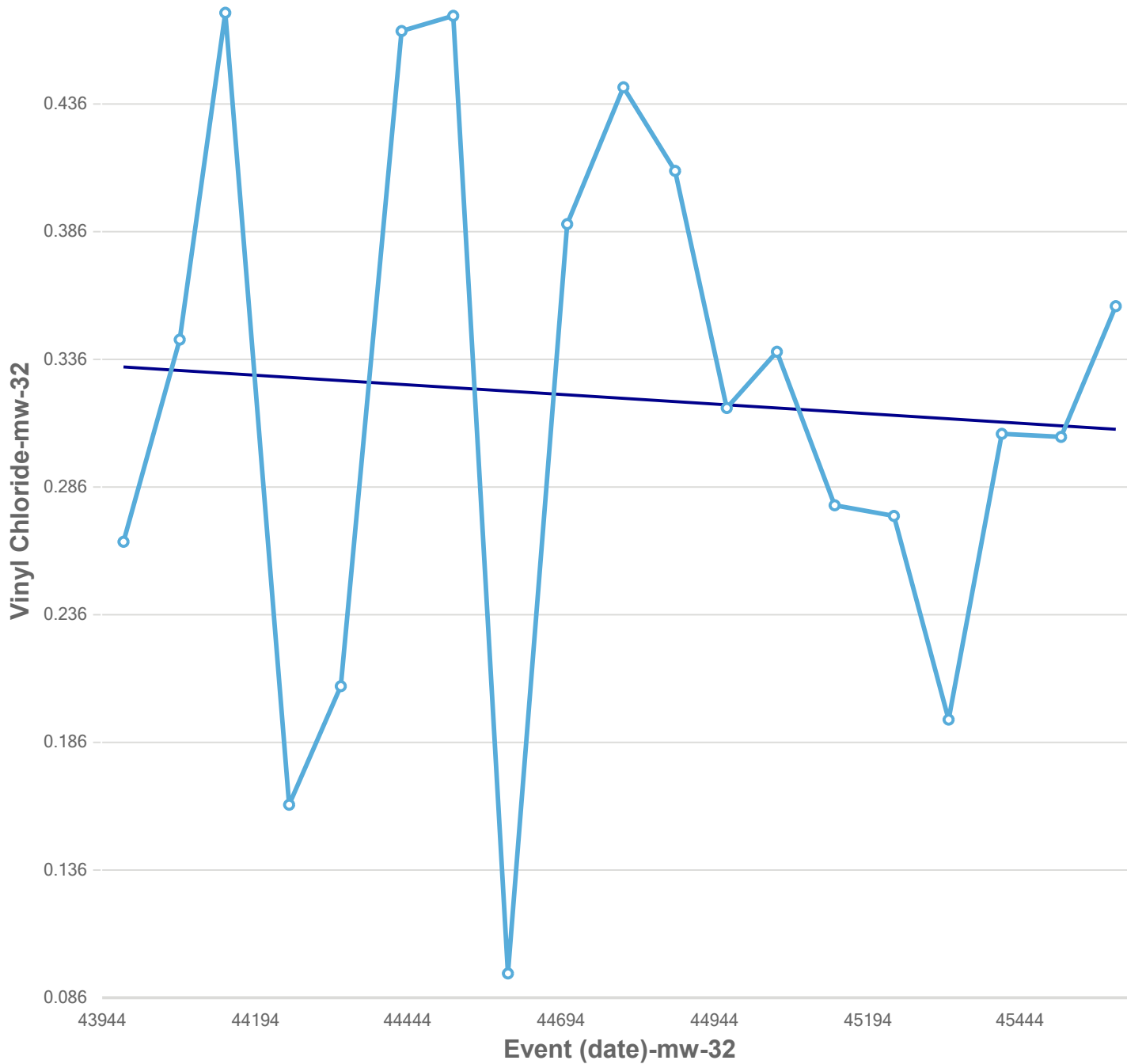
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	2.5889
M-K Test Value (S)	75
Tabulated p-value	0.0040
Approximate p-value	0.0048

OLS Regression Line (Blue)

OLS Regression Slope	0.0002
OLS Regression Intercept	-10.1725

Statistically significant evidence of an increasing trend at the specified level of significance.

Mann-Kendall Trend Test

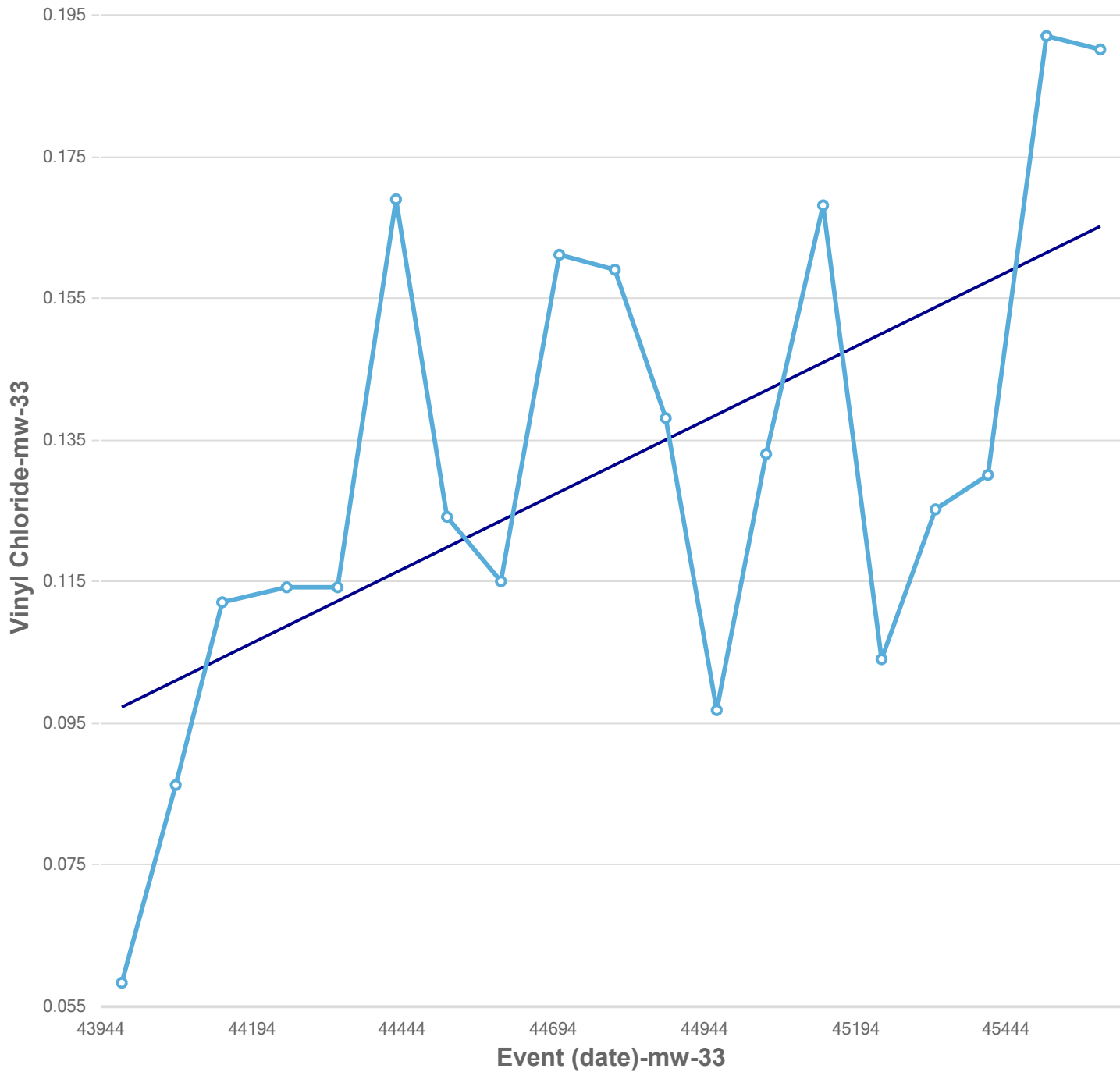


Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5832
Standardized Value of S	-0.6997
M-K Test Value (S)	-21
Tabulated p-value	0.2450
Approximate p-value	0.2421

OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	0.9899

Insufficient statistical evidence of a significant trend at the specified level of significance.

Mann-Kendall Trend Test



Mann-Kendall Trend Analysis	
n	19
Confidence Coefficient	0.9500
Level of Significance	0.0500
Standard Deviation of S	28.5657
Standardized Value of S	2.6255
M-K Test Value (S)	76
Tabulated p-value	0.0030
Approximate p-value	0.0043
OLS Regression Line (Blue)	
OLS Regression Slope	0.0000
OLS Regression Intercept	-1.7464

Statistically significant evidence of an increasing trend at the specified level of significance.

Appendix D3

Groundwater Monitoring Well
Data and Field Forms

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: _____	Turn-around Requested: 2 weeks	Date: <u>2/6/2024</u>
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: <u>1</u> of <u>2</u>
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: _____ Cooler Temps: _____

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments	
Samplers: Chris Bourgeois HWA					cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn							
Sample ID	Date	Time	Matrix	Number of Containers										
SPL-GW-MW12-0224			water	13	X	X	X							MS/MSD
SPL-GW-MW14-0224			water	7	X	X	X							
SPL-GW-MW29-0224	2/6/24	1600	water	7	X	X	X							
SPL-GW-MW18-0224			water	7	X	X	X							
SPL-GW-MW32-0224	2/5/24	1120	water	7	X	X	X							
SPL-GW-MW33-0224	2/5/24	1015	water	7	X	X	X							
SPL-GW-MW10-0224	2/5/24	1245	water	7	X	X	X							
SPL-GW-MW60-0224			water	7	X	X	X							
SPL-GW-MW80-0224	2/6/24	—	water	2	X	X								

Comments/Special Instructions	Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <u>Richard Anderson</u>	Printed Name: <u>Phillip Bates</u>	Printed Name:	Printed Name:
	Company: <u>TRM Geosciences</u>	Company: <u>AR</u>	Company:	Company:
	Date & Time: <u>2/6/24 4:45 pm</u>	Date & Time: <u>2/10/24 16:45</u>	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

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 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 2/6/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 1 Cooler Temps: 5, 4

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments	
Client Project #: 553-1550-067		Samplers: Chris Bourgeois HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn							
Sample ID	Date	Time	Matrix	Number of Containers										
SPL-GW-MW25-0224	2/5/24	1400	water	13	X	X	X						MS/MSD	
SPL-GW-MW30-0224			water	7	X	X	X							
SPL-GW-MW31-0224			water	7	X	X	X							
SPL-GW-MW24-0224	2/6/24	1320	water	7	X	X	X							
SPL-GW-MW26-0224	2/6/24	1445	water	7	X	X	X							
SPL-GW-MW08-0224	2/6/24	0910	water	7	X	X	X							
SPL-GW-MW27-0224	2/6/24	1120	water	7	X	X	X							
SPL-GW-MW61-0224	2/5/24	1500	water	7	X	X	X							
SPL-GW-MW81-0224			water	2	X	X								

Comments/Special Instructions	Relinquished by: (Signature) <i>ll</i>	Received by: (Signature) <i>Phillip B...</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <i>Richard Anderson</i>	Printed Name: <i>Phillip B...</i>	Printed Name:	Printed Name:
	Company: <i>Hunt Geosciences</i>	Company: <i>AR</i>	Company:	Company:
	Date & Time: <i>2/6/24 4:45pm</i>	Date & Time: <i>2/6/24 16:45</i>	Date & Time:	Date & Time:

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Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 2/7/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: Cooler Temps: 2.8

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments	
Sample ID	Date	Time	Matrix	Number of Containers	cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn							
SPL-GW-MW12-0224	2/7/24	955	water	13	X	X	X							MS/MSD
SPL-GW-MW14-0224	2/7/24	1145	water	7	X	X	X							
SPL-GW-MW29-0224			water	7	X	X	X							
SPL-GW-MW18-0224	2/7/24	840	water	7	X	X	X							
SPL-GW-MW32-0224			water	7	X	X	X							
SPL-GW-MW33-0224			water	7	X	X	X							
SPL-GW-MW10-0224			water	7	X	X	X							
SPL-GW-MW60-0224	2/7/24	1030	water	7	X	X	X							
SPL-GW-MW80-0224			water	2	X	X								

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Richard Anderson	Printed Name: Kevin Cruz	Printed Name:	Printed Name:
	Company: HWA Geosciences	Company: ARIC	Company:	Company:
	Date & Time: 2/7/24 2:47 pm	Date & Time: 020724 1447	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.



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 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 2/7/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: Cooler Temps: 2.8

Client Project Name: SPU South Park Landfill					Analysis Requested										Notes/Comments	
Client Project #: 553-1550-067		Samplers: Chris Bourgeois HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn									
Sample ID	Date	Time	Matrix	Number of Containers												
SPL-GW-MW25-0224			water	13	X	X	X									MS/MSD
SPL-GW-MW30-0224	2/2/24	1315	water	7	X	X	X									
SPL-GW-MW31-0224	2/7/24	1415	water	7	X	X	X									
SPL-GW-MW24-0224			water	7	X	X	X									
SPL-GW-MW26-0224			water	7	X	X	X									
SPL-GW-MW08-0224			water	7	X	X	X									
SPL-GW-MW27-0224			water	7	X	X	X									
SPL-GW-MW61-0224			water	7	X	X	X									
SPL-GW-MW81-0224	2/7/24	-	water	2	X	X										

Comments/Special Instructions	Relinquished by: (Signature) 	Received by: (Signature) 	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Paul Anderson	Printed Name: Kevin Cruz	Printed Name:	Printed Name:
	Company: HWA Geoservices	Company: ARIC	Company:	Company:
	Date & Time: 2/7/24 2:47 pm	Date & Time: 020724 1447	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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Water Level Measurement Field Report

DATE <u>2/5/2024</u>	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER <u>cold, overcast</u>	TEMP <u>46's</u> ° at <u>7:30 AM</u> AM <u>46's</u> ° at <u>9:30 AM</u> PM
PRESENT AT SITE <u>C. Bourgeois & R. Anderson</u>	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	8:10	5.47		TOC	15.3	10-15	1.52
MW-14	7:35	2.23		TOC	21.8	11.5-21.5	0.8
* MW-29	7:56	5.69		TOC	30	20-30	-0.29
MW-18	8:19	13.73		TOC	40.4	30-40	1.25
MW-25	8:30	12.16		TOC	27	22-27	2.79
MW-32	9:29	9.12		TOC	24	19-24	-0.44
* MW-33	9:27	10.23 9.33	9.33	TOC	25	20-25	-0.47
MW-26	8:58	8.00		TOC	25	15-25	2.39
MW-27	9:03	6.67		TOC	20	10-20	2.04
MW-10	8:30	11.41		TOC	45	35-45	1.65
MW-24	8:56	7.21		TOC	45.3	35-45	1.56
MW-08	9:05	6.70		TOC	45.6	35.5 - 45.5	1.88
MW-30	8:40	8.48		TOC	13	8-13	-0.53
MW-31	8:45	9.33		TOC	23	18-23	-0.46

Comments: not a typo!!

* MW-33 monument flooded. Allowed to equilibrate for 5 min.

TOC - top of PVC casing SG - staff gauge

SIGNED: Ch...

* MW-29 not flooded above TOC which is abnormal. Plug seemed sealed. MW-29 opened 5 minutes before reading. See back.

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 2/6/24

Well ID: MW-08

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.6-45.6

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.81

Purge Water Disposal Method: O/W/S

Purge Device peristaltic

Pump Intake Depth: 40.0 ft

Begin Purge Time: 830

End Purge Time: 910

Time	Depth to Water (feet below MP)	PSP	Pump Setting	ml/min	litres Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
840	6.88		25	270	1.25	10.8	1.12	1591	6.97	-63.6	4.27	fairly clear
845	"		"	"	2.50	10.8	0.77	1364	6.95	-79.9	1.12	"
850	"		"	"	3.1	10.9	0.50	1565	6.94	-86.6	1.11	"
855	"		"	"	4.0	10.9	0.40	1564	6.93	-91.5	1.08	"
900	"		"	"	4.0	10.9	0.34	1559	6.92	-93.7	1.06	"
905	"		"	"	5.5	10.9	0.27	1551	6.92	-95.5	1.15	"
910	"		"	"								

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW08-0224

Time Collected: 910

Weather: overcast, drizzle

Sample Description (Color, Turbidity, Odor, Other): clear odorless

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

no maintenance required.
faulty cap on one V.C bottle. has bubble

South Park Landfill

Project No.: 553-1550-067

Date: 2/5/20

Well ID: MW-10

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.41

Purge Water Disposal Method: O/WS

Purge Device: peristaltic

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1210

End Purge Time: 1240

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1215	11.42	2.2	250	"	13.3	0.38	1282	6.74	-65.0	1.03	Fairly clear
1220	"	"	"	"	13.4	0.34	1423	6.72	-102.6	3.03	"
1225	11.41	"	"	"	13.4	0.28	1450	6.76	-117.3	0.98	"
1230	"	"	"	"	13.5	0.24	1488	6.80	-125.9	4.03	"
1235	11.40	"	"	"	13.4	0.23	1494	6.81	-129.1	2.21	"
1240	"	"	"	"	13.4	0.22	1499	6.82	-131.4	3.65	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW10-0224

Time Collected: 1245

Weather: Drizzle; W/S F

Sample Description (Color, Turbidity, Odor, Other): Fairly clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

~~No additional information required~~

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/24 Well ID: MW-12

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 10.0-15.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 5.41 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 12.5 ft

Begin Purge Time: 9:10 End Purge Time: 9:45

Time	Depth to Water (feet below MP)	PSI	Pump Setting	Purge Rate	ml/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:15	5.41		9	275		~1.0	10.3	2.53	350.1	6.73	39.1	7.18	clear
9:20	5.41		"	"		2.5	10.3	1.63	354.8	6.67	59.1	7.21	"
9:25	5.41		"	"		3.75	10.4	1.46	354.9	6.65	68.0	4.17	"
9:30	5.41		"	"		5.0	10.4	1.33	357.3	6.64	72.9	4.67	"
9:35	5.41		"	"		6.5	10.3	1.21	356.3	6.64	78.0	4.08	"
9:40	5.41		"	"		7.25	10.3	1.12	360.9	6.64	77.4	4.17	"
9:45	5.41		"	"		8.5	10.4	1.10	365.2	6.65	71.0	4.11	"
							10.4	1.09					

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW12-0224 Time Collected: 9:55 Weather: overcast; mild 40's F

Sample Description (Color, Turbidity, Odor, Other): Sparsely turbidity in sample

Sample Analyses: cis-1,3-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: SPL-GW_MW60-0224 to 1030

MS/MSD Collected: Yes No

Additional Information/Comments

Proper tubing at well head; current set up working fine

South Park Landfill

Project No.: 553-1550-067

Date: 2/7/24

Well ID: MW-18

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 30.0-40.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 13.88

Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump

Pump Intake Depth: 35.0 ft

Begin Purge Time: 800

End Purge Time: 840

Time	Depth to Water (feet below MP)	PSC Pump Setting	m/min Purge Rate	L Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
810	13.88	21	275	0.75	12.8	2.12	506.8	7.02	54.1	4.80	Rel. clear
815	"	"	"	3.50	13.2	0.70	570.7	6.97	-52.2	3.81	"
820	"	"	"	4.75	13.4	0.48	575.9	6.96	-63.7	7.12	"
825	13.89	"	"	6.50	13.3	0.32	581.3	6.96	-71.6	7.51	slightly yellow
830	"	"	"	7.90	13.3	0.29	585.4	6.96	-75.7	7.83	"
835	"	"	"	9.10	13.3	0.25	589.3	6.96	-79.0	7.21	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW18-0224

Time Collected: 840

Weather: Sunny, 50's F

Sample Description (Color, Turbidity, Odor, Other):

slightly yellow w/ some flecks

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected:

Yes

No

If yes, ID: _____

MS/MSD Collected:

Yes

No

Additional Information/Comments

No maintenance required, but proper tubing could help.

South Park Landfill

Project No.: 553-1550-067

Date: 2/6/24

Well ID: MW-24

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 7.30

Purge Water Disposal Method: OWS

Purge Device: dedicated bladder pump

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1150

End Purge Time: 1315

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1200	7.30	25	250	2.0	11.6	0.49	1046	6.76	-50.2	38.9	slightly yellow
1205	7.32	"	"	3.0	11.7	0.29	1063	6.77	-70.3	14.2	"
1210	"	"	"	4.0	11.7	0.22	1066	6.77	-80.5	8.74	relatively clear
1215	"	"	"	5.1	11.7	0.20	1066	6.77	-84.9	44.7	slightly yellow
1220	"	"	"	6.1	11.8	0.19	1066	6.77	-87.1	65.0	" & Phos
1225	"	"	"	7.4	11.7	0.18	1065	6.77	-88.8	74.2	"
1230	"	"	"	8.1	11.8	0.16	1065	6.78	-90.0	76.0	"
1235	"	"	"	9.0	12.0	0.16	1065	6.77	-91.3	67.2	"
1240	"	"	"	10.0	12.2	0.13	1064	6.77	-92.2	61.2	"
1245	"	"	"	12.1	12.1	0.10	1067	6.77	-93.5	30.0	"
1250	"	"	"	12.75	11.0	0.17	1059	6.79	-92.2	30.1	"
1255	"	"	"	13.5	11.8	0.14	1066	6.78	-93.8	25.2	"
1300	"	"	"	14.25	11.7	0.13	1066	6.78	-93.8	19.5	"
1305	"	"	"	~15.25	11.8	0.16	1067	6.78	-94.5	13.1	"
1310	"	"	"	~16.25	11.8	0.13	1067	6.78	-95.0	9.38	"
1315	"	"	"	0.75	11.8	0.12	1063	6.77	-95.1	8.78	"
				1.75	11.9	0.12	1067	6.78	-95.6	9.01	"

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW24-0224

Time Collected: 1320

Weather: Breezy, 40's F

Sample Description (Color, Turbidity, Odor, Other):

clear, odorless

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No

If yes, ID:

MS/MSD Collected: Yes No

Additional Information/Comments

needs new lock

South Park Landfill

Project No.: 553-1550-067 Date: 2/6/27 Well ID: MW-26

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.07 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 20.0 ft

Begin Purge Time: 1358 End Purge Time: 1440

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1400	8.02	18	250	5.5	12.0	2.37	313.1	6.44	-43.3	4.14	clear
1405	8.02	"	"	6.25	12.0	1.20	241.5	6.37	-20.3	34.2	* visible turb.
1410	"	"	"	7.6	12.0	0.64	253.6	6.32	-7.2	17.1	"
1415	"	"	"	8.8	12.1	0.49	247.7	6.31	-0.9	17.3	"
1420	"	"	"	11.0	12.0	0.39	242.3	6.30	3.3	6.71	"
1425	"	"	"	11.75	12.0	0.37	242.1	6.29	5.5	7.61	"
1430	"	"	"	12.5	12.1	0.33	241.1	6.29	6.9	4.61	"
1435	"	"	"	13.5	12.0	0.30	242.4	6.29	8.3	3.52	"
1440	"	"	"	15	12.1	0.26	243.5	6.29	9.5	3.62	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW26-0224 Time Collected: 1445 Weather: cold, overcast

Sample Description (Color, Turbidity, Odor, Other): clear, odorless

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

No maintenance necessary

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 2/6/24

Well ID: MW-27

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.75 Purge Water Disposal Method: OWS

Purge Device: dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 732 End Purge Time: 1115

Time	Depth to Water (feet below MP)	10 25 ps: ml/min Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
940	6.80	215	215	~10 L	10.3	3.03	342.3	6.83	29.4	719	opaque orange
945	6.82	"	"	10.75	10.4	2.00	323.4	6.68	45.1	756	less opaque
950	6.77	"	"	11.25	10.5	1.20	316.5	6.63	51.0	240	"
955	6.77	"	225	17.75	10.7	0.75	326.7	6.63	39.1	127	much less orange
1000	"	"	"	17.25	10.8	0.56	340.9	6.62	26.3	71.7	"
1005	"	"	"	17.25	10.9	0.42	358.9	6.67	15.2	39.2	"
1010	"	"	"	~15.25	11.0	0.32	384.0	6.67	2.8	29.7	"
1015	6.71	"	"	0.25	11.0	3.61	406.8	6.65	-8.1	27.2	"
1020	"	"	"	~1.0	11.0	3.42	408.4	6.64	-12.6	24.6	"
1025	"	"	"	3.25	11.1	3.10	420.1	6.65	-20.2	22.4	"
1030	"	"	"	4.0	11.1	3.00	425.9	6.64	-25.7	21.4	clear
1035	"	"	"	5.25	11.1	2.74	432.1	6.65	-30.2	20.5	"
1040	"	"	"	"	11.1	2.54	435.2	6.65	-34.7	18.0	"
1045	"	"	"	"	11.1	2.50	437.8	6.68	-38.0	17.4	"
1050	"	"	"	"	11.1	2.22	439.0	6.66	-40.8	18.1	"
1055	"	"	"	"	11.1	2.17	444.4	6.66	-43.8	14.7	"
1100	"	"	"	"	11.1	2.03	445.9	6.66	-46.0	14.8	"
1105	"	"	"	"	11.1	1.88	447.9	6.66	-47.8	14.6	"
1110	"	"	"	"	11.1	1.85	448.2	6.66	-49.0	13.0	"
1115	"	"	"	"	11.1	1.76	450.5	6.67	-50.4	13.5	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW27-0224 Time Collected: 1120 Weather: cold, overcast

Sample Description (Color, Turbidity, Odor, Other): _____

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

no account the monument lid needs repair, also ballards bent. Modern machine using cleaning equipment on them.

South Park Landfill

Project No.: 553-1550-067 Date: 2/7/24 Well ID: MW-30

Sampling Organization: Parametrix Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.67 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 1220 End Purge Time: 1310

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate ^{ml/min}	Cum. Vol. Purged ^L	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1225	8.67	2.5	2.75	1.75	11.7	1.76	400.7	6.87	3.3	79.8	Lowish
1230	"	"	"	2.90	11.7	0.47	416.3	6.81	20.1	12.6	Rel. clear
1235	"	"	"	4.00	11.7	0.34	425.7	6.82	23.9	9.45	"
1240	"	"	"	5.50	11.8	0.30	426.4	6.77	26.6	8.75	"
1245	8.70	"	"	7.00	11.7	0.39	420.2	6.80	28.2	5.21	"
1250	"	"	"	8.75	11.7	0.53	410.2	6.74	32.0	7.35	Flakes
1255	8.71	"	"	10.50	11.8	0.65	399.5	6.76	34.2	4.11	Rel. clear
1300	8.73	"	"	12.00	11.7	0.76	344.7	6.72	38.2	3.45	Rel. clear
1305	"	"	"	13.50	11.7	0.75	396.3	6.73	38.6	4.81	"
1310	"	"	"	15.00	11.6	0.79	395.4	6.73	41.5	2.86	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 < 5 NTU	

Sampling Data

Sample ID: SPL-GW_MW30-0224 Time Collected: 1315 Weather: clear, mild 40's

Sample Description (Color, Turbidity, Odor, Other): clear, odorless

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

No maintenance necessary

South Park Landfill

Project No.: 553-1550-067

Date: 2/7/24

Well ID: MW-31

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 18.0-23.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.45

Purge Water Disposal Method: O/W

Purge Device peristaltic pump

Pump Intake Depth: 20.5ft

Begin Purge

Time: 1315

End Purge Time: 1415

Time	Depth to Water (feet below MP)	psi	gal/min	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1320	9.45	15	260	"	13.2	1.08	468.1	6.66	24.1	48.0	slightly yellow
1325	"	"	"	2.0	13.6	0.45	568.7	6.75	-23.7	37.5	"
1330	"	"	"	2.95	13.7	0.32	592.6	6.77	-38.8	27.5	"
1335	"	"	"	3.90	13.7	0.26	597.5	6.80	-45.8	18.7	"
1340	"	"	"	4.50	13.7	0.23	599.7	6.79	-48.7	12.8	"
1345	"	"	"	6.00	13.7	0.22	599.7	6.78	-52.7	15.8	"
1350	"	"	"	6.50	13.7	0.23	599.0	6.78	-54.2	10.2	"
1355	"	"	"	8.00	13.7	0.19	598.9	6.77	-55.7	9.80	"
1400	"	"	"	8.90	13.7	0.20	598.1	6.76	-56.8	11.2	"
1405	"	"	"	9.20	13.7	0.19	597.8	6.76	-57.9	11.0	"
1410	"	"	"	10.50	13.8	0.23	594.6	6.76	-58.4	10.9	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW_MW31-0224

Time Collected: 1415

Weather: Sunny; low 50's F

Sample Description (Color, Turbidity, Odor, Other): slightly yellow

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

no maintenance

South Park Landfill

Project No.: 553-1550-067

Date: 2/5/24

Well ID: MW-32

Sampling Organization: Parametrix

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.12 Purge Water Disposal Method: OWS

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 10:47 End Purge Time: 11:15

Time	Depth to Water (feet below 9.25 MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1050	9.25	2.5	260	0.25	13.4	0.68	886	6.85	-106.7	2.81	large flecks
1055	9.25	"	"	2.0	13.4	0.43	877	6.85	-112.1	2.46	
1100	"	"	"	3.25	13.5	0.35	867	6.83	-114.2	6.80	Jet black flecks
1105	"	"	"	4.5	13.5	0.33	866	6.83	-114.5	2.72	"
1110	"	"	"	"	13.5	0.30	867	6.82	-114.1	0.62	"
1115	"	"	"	"	13.5	0.28	868	6.82	-114.2	1.18	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW32-0224 Time Collected: 1120 Weather: Overcast - 40's F

Sample Description (Color, Turbidity, Odor, Other): Slightly yellow

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

No maintenance required on well

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 		Turn-around Requested: 2 weeks		Date: 5/2/2024		Analytical Resources, Incorporated Analytical Chemists and Consultants 4611 South 134th Place, Suite 100 Tukwila, WA 98168 206-695-6200 206-695-6201 (fax)													
ARI Client Company: Min Soon Yim, Seattle Public Utility		Phone: 206 684-7693		Page: 2 of 2															
Client Contact: Laura Lee, Parametrix		Phone: 206 394-3665		No. of Coolers: 															
Client Project Name: SPU South Park Landfill				Analysis Requested						Notes/Comments									
Client Project #: 553-1550-067		Samplers: Chris Bourgeois HWA & Richard Anderson HWA				cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn											
Sample ID	Date	Time	Matrix	Number of Containers															
SPL-GW-MW25-0524	5/1/24	1000	water	7	X				X	X									
SPL-GW-MW30-0524			water	13	X				X	X									MS/MSD
SPL-GW-MW31-0524			water	7	X				X	X									
SPL-GW-MW24-0524			water	7	X				X	X									
SPL-GW-MW26-0524			water	7	X				X	X									
SPL-GW-MW08-0524			water	7	X				X	X									
SPL-GW-MW27-0524			water	7	X				X	X									
SPL-GW-MW61-0524			water	7	X				X	X									
SPL-GW-MW81-0524			water	2	X	X													
Comments/Special Instructions	Relinquished by: (Signature) <i>Chris Bourgeois</i>		Received by: (Signature) <i>Emma Stewart</i>		Relinquished by: (Signature)		Received by: (Signature)												
	Printed Name: Chris Bourgeois		Printed Name: Emma Stewart		Printed Name:		Printed Name:												
	Company: HWA		Company: ARI		Company:		Company:												
	Date & Time: 5/2/24		Date & Time: 5/2/24 08:27		Date & Time:		Date & Time:												


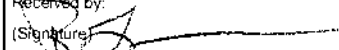
Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 5/3/2024
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: Cooler Temps:

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments	
Samplers: Chris Bourgeois HWA & Richard Anderson HWA					cis-1,2-DCE	Vinyl Chloride	Total Fe. Mn							
Sample ID	Date	Time	Matrix	Number of Containers										
SPL-GW-MW12-0524			water	7	X	X	X							
SPL-GW-MW14-0524			water	13	X	X	X							MS/MSD
SPL-GW-MW29-0524			water	7	X	X	X							
SPL-GW-MW18-0524	5/2/24	1140	water	7	X	X	X							
SPL-GW-MW32-0524			water	7	X	X	X							
SPL-GW-MW33-0524			water	7	X	X	X							
SPL-GW-MW10-0524			water	7	X	X	X							
SPL-GW-MW60-0524			water	7	X	X	X							
SPL-GW-MW80-0524			water	2	X	X								
Comments/Special Instructions	Relinquished by: (Signature) 	Received by: (Signature) 			Relinquished by: (Signature)				Received by: (Signature)					
	Printed Name: Richard Anderson	Printed Name: R. Boeseemann			Printed Name:				Printed Name:					
	Company: HWA	Company: ARI			Company:				Company:					
	Date & Time: 5/3/24 1005	Date & Time: 5-3-24 10:05			Date & Time:				Date & Time:					


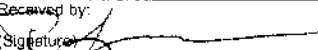
Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 5/3/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: Cooler Temps:

Client Project Name: SPU South Park Landfill					Analysis Requested										Notes/Comments			
Client Project #: 553-1550-067		Samplers: Chris Bourgeois HWA & Richard Anderson HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn											
Sample ID	Date	Time	Matrix	Number of Containers														
SPL-GW-MW25-0524			water	7	X	X	X											
SPL-GW-MW30-0524	5/2/24	930	water	13	X	X	X											MS/MSD
SPL-GW-MW31-0524	5/2/24	1040	water	7	X	X	X											
SPL-GW-MW24-0524	5/2/24	1240	water	7	X	X	X											
SPL-GW-MW26-0524	5/2/24	1345	water	7	X	X	X											
SPL-GW-MW08-0524	5/3/24	810	water	7	X	X	X											
SPL-GW-MW27-0524	5/3/24	935	water	7	X	X	X											
SPL-GW-MW61-0524	5/2/24	1000	water	7	X	X	X											
SPL-GW-MW81-0524	5/3/24	—	water	2	X	X												
Comments/Special Instructions	Relinquished by: (Signature) 			Received by: (Signature) 			Relinquished by: (Signature)			Received by: (Signature)								
	Printed Name: Richard Anderson HWA			Printed Name: R. Leese			Printed Name:			Printed Name:								
	Company: HWA			Company: ART			Company:			Company:								
	Date & Time: 5/3/24 1005			Date & Time: 5-3-24 10 05			Date & Time:			Date & Time:								

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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Water Level Measurement Field Report

DATE <u>5/1/24</u>	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER <u>Partly cloudy</u>	TEMP <u>low 50s</u> ° at <u>735</u> AM <u>high 50's</u> ° at <u>900</u> PM
PRESENT AT SITE <u>C. Bourgeois & P. Anderson</u>	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	<u>7:38</u>	<u>5.89</u>		TOC	15.3	10-15	1.52
MW-14	<u>7:44</u>	<u>2.45</u>		TOC	21.8	11.5-21.5	0.8
MW-29	<u>7:52</u>	<u>6.72</u>		TOC	30	20-30	-0.29
MW-18	<u>8:00</u>	<u>15.07</u>		TOC	40.4	30-40	1.25
MW-25	<u>8:33</u>	<u>13.64</u> 13.62		TOC	27	22-27	2.79
MW-32	<u>8:08</u>	<u>10.71</u>		TOC	24	19-24	-0.44
MW-33	<u>8:09</u>	<u>10.59</u>		TOC	25	20-25	-0.47
MW-26	<u>8:47</u>	<u>9.38</u>		TOC	25	15-25	2.39
MW-27	<u>9:00</u>	8.00 <u>8.08</u>		TOC	20	10-20	2.04
MW-10	<u>8:39</u>	<u>12.91</u>		TOC	45	35-45	1.65
MW-24	<u>8:45</u>	<u>8.62</u>		TOC	45.3	35-45	1.56
MW-08	<u>8:59</u>	<u>8.15</u>		TOC	45.6	35.5 - 45.5	1.88
MW-30	<u>8:40</u>	<u>9.90</u>		TOC	13	8-13	-0.53
MW-31	<u>8:42</u>	<u>10.79</u>		TOC	23	18-23	-0.46

Comments:

MW-25 = 13.64

TOC – top of PVC casing SG – staff gauge

SIGNED: *ChVB*

MW-29 Not flooded (unusual)

South Park Landfill

Project No.: 553-1550-067

Date: 5/1/24

Well ID: MW-10

Sampling Organization: Parametrix / HVA

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 12.88

Purge Water Disposal Method: OWS

Purge Device: peristaltic

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1018

End Purge Time: 1055

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1020	12.88	3.2	300	1.5	13.9	4.32	1237	6.63	-63.4	4.08	Rel. clear
1025	"	"	"	3.5	13.9	2.05	1374	6.67	-99.5	1.64	"
1030	"	"	"	4.5	14.0	1.37	1339	6.68	-104.3	2.03	"
1035	"	"	"	6.5	14.1	0.92	1364	6.74	-111.7	0.96	"
1040	"	"	"	8.5	13.8	0.62	1398	6.78	-104.9	0.48	"
1045	"	"	"	10.0	14.0	0.44	1400	6.79	-116.1	0.40	"
1050	"	"	"	12.0	14.0	0.34	1419	6.79	-117.1	0.44	"
1055	"	"	"	14.0	14.0	0.25	1426	6.81	-118.5	0.39	"
Stabilization Criteria					3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 < 5 NTU	

Sampling Data

Sample ID: SPL-GW-MW10-0524

Time Collected: 1100

Weather: sunny, warm

Sample Description (Color, Turbidity, Odor, Other): clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

tubing difficult to lower to target depth.

South Park Landfill

Project No.: 553-1550-067

Date: 5/1/24

Well ID: MW-14

Sampling Organization: Parametrix / HWA

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 11.5-21.5

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 2.59

Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump

Pump Intake Depth: 16.5 ft

Begin Purge Time: 1420

End Purge Time: 1532

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1430	2.59	20	"	2.00	13.9	0.31	569.0	6.94	-20.1	591	yellow turbid
1435	"	"	"	3.75	13.8	0.10	512.0	6.83	-61.7	185	"
1440	"	"	"	4.00	13.7	0.07	483.3	6.77	-48.0	122	"
1445	"	"	"	6.0	13.6	---	456.4	6.73	-24.7	57.5	clearing turbid
1450	"	"	"	6.9	13.7	---	454.7	6.72	-32.2	38.0	"
1455	2.58	"	"	8.0	13.6	---	453.2	6.72	-20.6	128	"
1500	"	"	"	8.9	13.5	---	452.8	6.71	-30.4	14.9	"
1505	"	"	"	10.2	13.6	---	452.7	6.71	-30.1	12.2	"
1510	"	"	"	11.9	13.5	---	453.3	6.72	-29.2	11.6	clearing - P
1515	"	"	"	13.0	13.5	---	453.4	6.72	-29.3	7.78	"
1520	"	"	"	14.5	13.6	---	454.0	6.72	-29.4	6.61	"
1525	"	"	"	15.5	13.6	---	452.6	6.71	-29.0	6.88	"
1530	"	"	"	16.5	13.5	0.01	454.7	6.72	-28.3	6.25	"

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW14-0524

Time Collected: 1535

Weather: Sunny, 60°

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: SPL-GW-MW60-0524 @ 1600

MS/MSD Collected: Yes No

Additional Information/Comments

* DO slashed out on YSI reader

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/24 Well ID: MW-18

Sampling Organization: Parametrix / hwa Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 15.01 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 35.0 ft

Begin Purge Time: 1113 End Purge Time: 1135

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1115	15.01	21	250	0.75	14.4	3.11	531.7	6.75	-44.7	4.97	Rel. clear
1120	"	"	"	2.50	14.4	0.34	553.2	6.77	-61.9	2.17	"
1125	"	"	"	4.00	14.4	0.16	558.6	6.77	-67.9	2.33	"
1130	"	"	"	5.00	14.3	0.04	564.1	6.77	-72.3	1.73	"
1135	"	"	"	7.00	17.5	---	564.9	6.78	-75.2	1.73*	"

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW18-0524 Time Collected: 1140 Weather: Sunny; low 60s

Sample Description (Color, Turbidity, Odor, Other): clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

* correct!

South Park Landfill

Project No.: 553-1550-067

Date: 5/2/24

Well ID: MW-24

Sampling Organization: Parametrix / NWA

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.60

Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1216

End Purge Time: 1235

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1220	8.85	22	250	2.0	12.5	0.33	1066	6.67	-59.6	4.56	Rel. clear
1225	"	"	"	3.0	12.2	0.06	1073	6.68	-72.1	4.05	"
1230	"	"	225	4.0	12.2	---	1082	6.77	-78.5	3.83	"
1235	8.61	"	"	5.0	12.3	---	1089	6.69	-81.9	2.38	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW24-0524

Time Collected: 1240

Weather: Sunny; low 60's

Sample Description (Color, Turbidity, Odor, Other): Rel. clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments: Lock in extremely poor condition - replace

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/24 Well ID: MW-26
 Sampling Organization: Parametrix / HVA Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 15.0-25.0 Well Casing/Diameter: PVC/2 in
 Initial Depth of Water (Ft below TOC): 9.35 Purge Water Disposal Method: OWS
 Purge Device: dedicated bladder pump Pump Intake Depth: 20.0 ft
 Begin Purge Time: 1253 End Purge Time: 1342

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1300	9.35	15	250	2.0	12.3	2.35	324.1	6.19	27.3	82.0	yellowish-hue
1305	"	"	"	3.0	12.3	1.73	300.8	6.18	29.2	28.7	"
1310	"	"	"	4.1	12.3	1.50	298.3	6.18	28.9	16.9	"
1315	"	"	"	5.5	12.3	0.95	294.7	6.17	29.4	8.69	"
1320	"	"	"	7.0	12.4	0.72	293.8	6.17	28.8	8.64	"
1325	"	"	"	8.9	12.3	0.58	293.8	6.16	28.6	4.48	"
1330	"	"	"	10.0	12.3	0.47	293.7	6.16	27.8	4.28	"
1335	"	"	"	11.0	12.3	0.38	293.4	6.17	27.0	3.88	"
1340	"	"	"	12.0	12.3	0.35	292.7	6.17	26.7	4.08	"

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW_MW26-0524 Time Collected: 1345 Weather: Sunny; low 60's
 Sample Description (Color, Turbidity, Odor, Other): slight yellow hue
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese
 Duplicate Sample Collected: Yes No If yes, ID: _____
 MS/MSD Collected: Yes No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 5/3/24 Well ID: MW-27

Sampling Organization: Parametrix / AWA Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 10.0-20.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.09 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 15.0 ft

Begin Purge Time: 831 End Purge Time: 932

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
835	8.09	20	250	0.3	11.3	3.22	338.5	6.69	36.1	12.8	yellow & flaky
840	"	"	"	1.2	11.4	2.34	322.0	6.59	60.9	64.2	"
845	"	"	"	2.5	11.5	0.87	304.0	6.58	68.0	36.4	"
850	"	"	"	3.5	11.6	0.48	297.3	6.57	66.8	34.9	"
855	"	"	"	4.5	11.7	0.29	291.2	6.57	61.3	18.4	"
900	"	"	"	5.5	11.7	0.20	290.8	6.57	57.2	13.9	"
905	"	"	"	6.5	11.8	0.12	292.0	6.58	51.6	13.6	"
910	"	"	"	7.5	11.8	0.08	294.3	6.58	45.8	10.6	"
915	"	"	"	8.5	11.9	0.04	296.7	6.58	40.0	10.1	"
920	"	"	"	9.5	12.0	0.05	300.1	6.59	34.9	7.84	clearing up
925	"	"	"	10.5	12.1	0.04	302.7	6.59	29.9	7.36	"
930	"	"	"	11.5	12.1	---	305.0	6.59	25.8	7.65	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW27-0524 Time Collected: 935 Weather: Sunny, 60's

Sample Description (Color, Turbidity, Odor, Other): clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

* ---- that's the readout on DO

South Park Landfill

5/1/24

Project No.: 553-1550-067

Date: ~~5/1/22~~

Well ID: MW-29

Sampling Organization: Parametrix *AWA*

Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 20.0-30.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 6.77

Purge Water Disposal Method: O/WS

Purge Device peristaltic pump

Pump Intake Depth: 25.0 ft

Begin Purge Time: 1633

End Purge Time: 1715

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1640	7.95	2.75	250	2.00	12.4	0.08	1018	6.64	-90.6	18.2	floky
1645	8.22	"	"	3.40	12.3	0.48	991	6.68	-88.0	11.9	slightly floky
1650	8.26	"	"	4.90	12.4	1.01	934	6.69	-82.5	4.67	clearing up
1655	8.27	"	"	6.50	12.3	1.10	924	6.70	-83.9	4.67*	"
1700	"	"	"	8.50	12.2	0.96	925	6.71	-87.3	3.24	"
1705	"	"	"	9.50	12.2	0.89	919	6.72	-91.9	1.82	"
1710	"	"	"	11.00	12.2	0.83	910	6.75	-96.0	1.46	"
1715	"	"	"	12.00	12.1	0.84	906	6.75	-98.1	1.21	"
Stabilization Criteria				3%	10%, or 3<0.5	3%	± 0.1	± 10 mv	10% or 3 < 5 NTU		

Sampling Data

Sample ID: SPL-GW_MW29-0524

Time Collected: 1720

Weather: Sunny, 60°F

Sample Description (Color, Turbidity, Odor, Other):

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID:

MS/MSD Collected: Yes No

Additional Information/Comments

6.66 → 6.77 → 6.77

* 2 in sequence

South Park Landfill

Project No.: 553-1550-067 Date: 5/2/24 Well ID: MW-30

Sampling Organization: Parametrix / HVA Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 8.0-13.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 9.91 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 10.5 ft

Begin Purge Time: 9:04 End Purge Time: 9:25

well in C

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
9:10	10.09	2.5	250	4.0	12.0	0.15	599.4	6.41	71.8	37.0	yellow huc
9:15	10-10	"	"	5.5	12.0	0.16	611.1	6.41	68.2	4.13	rel. clear
9:20	"	"	"	6.5	12.0	0.14	613.9	6.40	66.2	3.73	rel. clear
9:25	"	"	"	8.0	12.0	0.13	615.6	6.40	66.5	2.00	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW30-0524 Time Collected: 9:30 Weather: Partly cloudy; high 50s

Sample Description (Color, Turbidity, Odor, Other): yellow huc

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese @ 1000

Duplicate Sample Collected: Yes No If yes, ID: SPL-GW_MW61-0524

MS/MSD Collected: Yes No

Additional Information/Comments

South Park Landfill

Project No.: 553-1550-067 Date: 5/1/27 Well ID: MW-32

Sampling Organization: Parametrix / HWA Samplers: C. Bourgeois & R. Anderson

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 10.55 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1140 End Purge Time: 1210

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1145	10.55	2.5	250	1.5	14.7	0.08	768	6.85	-92.2	19.6	plates present
1150	"	"	"	2.9	14.4	0.01	790	6.86	-106.2	11.4	"
1155	10.56	"	"	4.0	14.4	0.02	793	6.88	-109.4	8.17	some plates
1200	"	"	"	5.5	14.7	0.01	795	6.88	-111.5	4.10	rel. clear
1205	"	"	"	6.5	14.8	0.01	796	6.88	-113.3	3.27	"
1210	10.57	"	"	8.0	14.5	0.02	801	6.87	-113.0	2.98	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW_MW32-0524 Time Collected: 1215 Weather: Sunny; low 60's

Sample Description (Color, Turbidity, Odor, Other): clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 8/6/24

Well ID: MW-31

Sampling Organization: Parametrix

Samplers: R. Anderson & Avril Fosbre

Purge Data Screened Interval (ft bgs): 18.0-23.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.56

Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump

Pump Intake Depth: 20.5ft

Begin Purge

Time: 0819

End Purge Time: 0858

Time	Depth to Water (feet below MP)	PSI Pump Setting	ml/min Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
0825	11.52	17.1	275	1.9	14.3	0.86	505	6.19	-41.6	40.1	S. BROWN, SULPHUROUS; ^W
0830	11.52			3.0	14.3	1.32	516	6.24	-56.4	19.0	S. WHT. PARTICULATE
0835	11.52			4.3	14.2	0.65	522	6.27	-64.9	9.14	CLEAR, N.O., S. PAR ^W
0840	11.52			5.9	14.2	0.47	523	6.30	-69.7	6.08	CLEAR, N.O., N.S.
0845	11.52			7.3	14.2	0.47	524	6.33	-73.7	4.80	" "
0850	11.52			8.6	14.2	0.36	525	6.33	-75.5	4.52	" "
0855				10.1	14.2	0.32	524	6.33	-77.1	3.99	" "

* EACH DISAGREES

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW31-0824

Time Collected: 0900

Weather: 60s , OVERCAST

Sample Description (Color, Turbidity, Odor, Other): clear w/ slight odor

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No

If yes, ID: SPL-GW-MW61-0824

MS/MSD Collected: Yes No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/7/24 Well ID: MW-14

Sampling Organization: Parametrix Samplers: R. Anderson & Avril Fosbre

Purge Data Screened Interval (ft bgs): 11.5-21.5 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 2.43 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 16.5 ft

Begin Purge Time: 1012 End Purge Time: 1041

Time	Depth to Water (feet below MP)	PSI Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1020		15	290	1.3	15.8	1.00	591	6.81	-44.0	2.96	CLEAR, S. SULPHUR
1025	2.42			2.3	15.8	0.63	588	6.74	-38.8	1.72	"
1030				3.5	15.9	0.41	591	6.72	-37.7	1.34	V.S. ODOR
1035	2.42			4.6	15.8	0.30	592	6.72	-38.0	1.50	N.O.
1040				6.0	15.8	0.24	593	6.72	-39.0	1.13	"
1045	2.42										

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

Sample ID: SPL-GW-MW14-0824 Time Collected: 1045 Weather: 60s, CLEAR

Sample Description (Color, Turbidity, Odor, Other): CLEAR, N.O., N.S.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 8/7/24 Well ID: MW-25

Sampling Organization: Parametrix Samplers: R. Anderson & Avril Fosbre

Purge Data Screened Interval (ft bgs): 22.0-27.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 14.37 Purge Water Disposal Method: O/WS

Purge Device dedicated bladder pump Pump Intake Depth: 24.5 ft

Begin Purge Time: 1255 End Purge Time: 1327

Time	Depth to Water (feet below MP)	PSI Pump Setting	ml/min Purge Rate	L Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1305	14.37	18	260	1.5	14.9	1.11	1155	6.58	-48.3	3.11	CLEAR, N.S., PHOSPHORUS
1310				2.8	14.8	0.60	1171	6.60	-60.2	2.41	N.S. V.S. N.H.T. PAR
1315	14.37			4.0	14.8	0.43	1176	6.61	-66.3	0.96	" "
1320				5.2	14.7	0.31	1180	6.62	-70.4	1.20	CLEAR, N.S., V.S.
1325	14.37			6.5	14.7	0.32	1182	6.64	-74.5	0.87	" "

Stabilization Criteria 3% 10% 3% ± 0.1 ± 10 mv 10% or 3 < 5 NTU

Sampling Data

OR < 0.5

Sample ID: SPL-GW-MW25-0824 Time Collected: 1330 Weather: 60s, CLEAR

Sample Description (Color, Turbidity, Odor, Other): CLEAR, N.O., N.S.

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

Water Level Measurement Field Report

DATE 8/6/24	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER <i>Partly cloudy</i>	TEMP <i>low 50's</i> ° at <i>607</i> AM <i>low 50's</i> ° at <i>739</i> PM
PRESENT AT SITE: <i>Rudolf Anderson & April Forber</i>	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
MW-12	713	6.64		TOC	15.3	10-15	1.52
MW-14	708	3.42		TOC	21.8	11.5-21.5	0.8
* MW-29	702	8.91		TOC	30	20-30	-0.29
MW-18	641	15.98		TOC	40.4	30-40	1.25
MW-25	722	14.40		TOC	27	22-27	2.79
MW-32	739	11.41		TOC	24	19-24	-0.44
MW-33	735	11.58		TOC	25	20-25	-0.47
MW-26	620	10.25		TOC	25	15-25	2.39
MW-27	632	8.99		TOC	20	10-20	2.04
MW-10	723	13.66		TOC	45	35-45	1.65
+ MW-24	N/A	N/A		TOC	45.3	35-45	1.56
MW-08	631	9.04		TOC	45.6	35.5-45.5	1.88
MW-30	610	10.79		TOC	13	8-13	-0.53
MW-31	607	11.54		TOC	23	18-23	-0.46

Comments: *10 mins to equilibrate
 + Broken lock required off site assistance given no bolt cutters were on hand. when ~~arrived~~ at 1330, depth to water was 9.54'

TOC – top of PVC casing SG – staff gauge

SIGNED:



Rudolf Anderson

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 8/7/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: 1 Cooler Temps: 5000

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments		
Samplers: Richard Anderson & Avril Fosbre HWA					cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn								
Sample ID	Date	Time	Matrix	Number of Containers											
SPL-GW-MW12-0824	8/7/24	945	water	7	X	X	X								
SPL-GW-MW14-0824	8/7/24	1045	water	7	X	X	X								
SPL-GW-MW29-0824	8/7/24	810	water	13	X	X	X								MS/MSD
SPL-GW-MW18-0824	8/7/24	1065	water	7	X	X	X								
SPL-GW-MW32-0824	8/7/24	1210	water	7	X	X	X								
SPL-GW-MW33-0824			water	7	X	X	X								
SPL-GW-MW10-0824	8/7/24	1520	water	7	X	X	X								
SPL-GW-MW60-0824			water	7	X	X	X								
SPL-GW-MW80-0824			water	2	X	X									
Comments/Special Instructions	Relinquished by: (Signature)		Received by: (Signature)			Relinquished by: (Signature)			Received by: (Signature)						
	Printed Name: Richard Anderson		Printed Name: Matthew Deane			Printed Name:			Printed Name:						
	Company: HWA		Company: ARILL			Company:			Company:						
	Date & Time: 8/7/24 1631		Date & Time: 08/07/24 (63)			Date & Time:			Date & Time:						

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.



Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 8/7/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 1 Cooler Temps: 5.60C

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

Client Project Name: SPU South Park Landfill					Analysis Requested										Notes/Comments		
Client Project #: 553-1550-067		Samplers: Richard Anderson & Avril Fosbre HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn										
Sample ID	Date	Time	Matrix	Number of Containers													
SPL-GW-MW25-0824	8/7/24	1330	water	7	X	X	X										
SPL-GW-MW30-0824			water	7	X	X	X										
SPL-GW-MW31-0824			water	13	X	X	X									MS/MSD	
SPL-GW-MW24-0824			water	7	X	X	X										
SPL-GW-MW26-0824			water	7	X	X	X										
SPL-GW-MW08-0824			water	7	X	X	X										
SPL-GW-MW27-0824			water	7	X	X	X										
SPL-GW-MW61-0824			water	7	X	X	X										
SPL-GW-MW81-0824			water	2	X	X											

Comments/Special Instructions	Relinquished by: (Signature) 	Received by: (Signature) 	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Richard Anderson	Printed Name: Mattm Deam	Printed Name:	Printed Name:
	Company: HWA	Company: ARCC	Company:	Company:
	Date & Time: 8/7/24 1631	Date & Time: 08/07/24 1631	Date & Time:	Date & Time:

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 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 8/6/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: Cooler Temps:

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments		
Client Project #: 553-1550-067		Samplers: Richard Anderson & Avril Fosbre HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn								
Sample ID	Date	Time	Matrix	Number of Containers											
SPL-GW-MW25-0824			water	7	X	X	X								
SPL-GW-MW30-0824	8/6/24	1000	water	X6	X	X	X								
SPL-GW-MW31-0824	8/6/24	0900	water	13	X	X	X								MS/MSD
SPL-GW-MW24-0824	8/6/24	1405	water	7	X	X	X								
SPL-GW-MW26-0824	8/6/24	1315	water	7	X	X	X								
SPL-GW-MW08-0824	8/6/24	1115	water	7	X	X	X								
SPL-GW-MW27-0824	8/6/24	1210	water	7	X	X	X								
SPL-GW-MW61-0824	8/6/24	0945	water	7	X	X	X								
SPL-GW-MW84-0824			water	2	X	X									
Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>			Received by: (Signature) <i>[Signature]</i>			Relinquished by: (Signature)			Received by: (Signature)					
	Printed Name: Richard Anderson			Printed Name: Savannah Wright			Printed Name:			Printed Name:					
	Company: HWA			Company: Ari			Company:			Company:					
	Date & Time: 8/6/24 1645			Date & Time: 8-6-24 16:36			Date & Time:			Date & Time:					

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

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 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 8/6/24
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: of
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: Cooler: Temps:

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments		
Samplers: Richard Anderson & Avril Fosbre HWA					cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn								
Sample ID	Date	Time	Matrix	Number of Containers											
SPL-GW-MW12-0824			water	7	X	X	X								
SPL-GW-MW14-0824			water	7	X	X	X								
SPL-GW-MW29-0824			water	13	X	X	X								MS/MSD
SPL-GW-MW18-0824			water	7	X	X	X								
SPL-GW-MW32-0824			water	7	X	X	X								
SPL-GW-MW33-0824	8/6/24	1510	water	7	X	X	X								
SPL-GW-MW10-0824			water	7	X	X	X								
SPL-GW-MW60-0824			water	7	X	X	X								
SPL-GW-MW80-0824	8/6/24		water	2	X	X									
Comments/Special Instructions	Relinquished by: (Signature)		Received by: (Signature)			Relinquished by: (Signature)			Received by: (Signature)						
	Printed Name: Richard Anderson		Printed Name: Savannah Wright			Printed Name:			Printed Name:						
	Company: HWA		Company: AR			Company:			Company:						
	Date & Time: 8/6/24 1645		Date & Time: 8-6-24 16:36			Date & Time:			Date & Time:						

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Water Level Measurement Field Report

DATE: <u>11/4/2024</u>	JOB NO. 553-1550-067
PROJECT: South Park Landfill	CLIENT: Seattle Public Utilities
LOCATION: Seattle, WA	
WEATHER: <u>Rain, 50°F</u>	TEMP: <u>50°F</u> ° at <u>8</u> AM ° at <u></u> PM
PRESENT AT SITE: <u>Krista Keski-Hynnila, Nicole Kapise, + Richard Anderson</u>	

THE FOLLOWING WAS NOTED:

WELL NUMBER	Time	Measured Depth to Water (ft from TOC or SG level)	Total Measured Well Depth (ft from TOC)	Measuring Point	Total Well Depth (ft bgs)	Screen Interval (ft bgs)	SU (ft)
5.59 MW-12	0850	8.359		TOC	15.3	10-15	1.52
MW-14	0844	2.81		TOC	21.8	11.5-21.5	0.8
MW-29	0837	8.4434		TOC	30	20-30	-0.29
MW-18	0857	15.72		TOC	40.4	30-40	1.25
MW-25	0939	14.19		TOC	27	22-27	2.79
MW-32	0919	11.17		TOC	24	19-24	-0.44
MW-33	0912	11.29		TOC	25	20-25	-0.47
MW-26	0802	10.03		TOC	25	15-25	2.39
MW-27	0812	8.81		TOC	20	10-20	2.04
MW-10	0937	13.45		TOC	45	35-45	1.65
MW-24	0804	9.43		TOC	45.3	35-45	1.56
MW-08	0814	8.84		TOC	45.6	35.5 - 45.5	1.88
10.81 MW-30	755	10.89		TOC	13	8-13	-0.53
MW-31	750	11.39		TOC	23	18-23	-0.46

Comments:

TOC – top of PVC casing SG – staff gauge

SIGNED: *[Signature]*

Krista Keski-Hynnila

one bolt started, down bolt 5
H₂O
has 3 plug no lock
need tool
10.81

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 11/4/2024

Well ID: MW-10

Sampling Organization: Parametrix

Samplers: Richard Anderson and Krista Keski-Hynnala

Purge Data Screened Interval (ft bgs): 35.0-45.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 1344 @ 1007

Purge Water Disposal Method: OWS

Purge Device: peristaltic

Pump Intake Depth: 40.0 ft

Begin Purge Time: 1008

End Purge Time: 1036

Time	Depth to Water (feet below MP)	notch Pump Setting	ML/min Purge Rate	Liters Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1015	13.43	3	250/min	2.60	13.7	1.51	1401	6.57	-119.98	5.54	mostly clear
1020	13.43	3	"	4.15	13.9	5.10	1433	6.68	-134.00	5.02	"
1025	"	3	"	6	13.9	0.34	1435	6.71	-138.50	3.23	"
1030	"	"	"	7	13.9	0.22	1441	6.73	-141.7	3.38	"
1035	"	"	"	8.8	13.9	0.18	1450	6.76	-144.8	2.81	"
				9							

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW10-1124

Time Collected: 1040

Weather: rain, 50°F

Sample Description (Color, Turbidity, Odor, Other): clear, no odor

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

missing lock

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/4/24 Well ID: MW-32

Sampling Organization: Parametrix Samplers: Richard Anderson and Krista Keski-Hynnala

Purge Data Screened Interval (ft bgs): 19.0-24.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 11.14 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 21.5 ft

Begin Purge Time: 1317 End Purge Time: 1356

Time	Depth to Water (feet below MP)	notch Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1320	11.14	3	275	0.90	14.2	0.51	847	6.79	-95.7	211	brown turbid, flakes
1325	"	"	"	2.25	14.2	0.23	832	6.81	-105.2	182	gray turbid, flakes
1330	"	"	"	4.25	14.2	0.15	829	6.79	-104.7	266	"
1335	"	"	"	6.00	14.2	0.10	830	6.80	-113.2	41.6	minor turbidity / flakes
1340	"	"	"	7.90	14.2	0.07	827	6.80	-114.0	18.6	"
1345	"	"	"	9.25	14.3	0.08	829	6.80	-115.2	4.31	clear
1350	"	"	"	11.00	14.2	0.07	827	6.81	-116.5	4.43	"
1355	"	"	"	12.50	14.2	0.08	824	6.80	-116.6	2.25	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW32-1124 Time Collected: 1400 Weather: Sunny; 50's F; windy

Sample Description (Color, Turbidity, Odor, Other): First VOA slightly turbid; others clear

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

//

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/4/24 Well ID: MW-18
 Sampling Organization: Parametrix Samplers: Richard Anderson and Krista Keski-Hynnla

Purge Data Screened Interval (ft bgs): 30.0-40.0 Well Casing/Diameter: PVC/2 in
 Initial Depth of Water (Ft below TOC): 15.77 Purge Water Disposal Method: O/WS
 Purge Device dedicated bladder pump Pump Intake Depth: 35.0 ft
 Begin Purge Time: 1525 1425 End Purge Time: 1451

Time	Depth to Water (feet below MP)	Pump Setting	Purge Rate	Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1430	15.79	50 ft	250	0.40	15.6	2.49	525.8	6.80	-44.8	7.34	Mostly Clear
1435	15.77	"	"	2.00	14.8	0.98	547.1	6.69	-60.6	4.48	"
1440	15.79	"	"	2.75	14.3	2.05	558.2	6.71	-72.4	2.43	"
1445	15.78	"	"	3.90	14.6	0.32	562.2	6.76	-78.4	0.89	"
1450	15.77	"	"	4.50	14.5	0.25	565.3	6.77	-81.3	0.14	"

Stabilization Criteria 3% 10%, or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW18-1124 Time Collected: 1455 Weather: Sunny, 50's
 Sample Description (Color, Turbidity, Odor, Other): clear, no odor
 Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese
 Duplicate Sample Collected: Yes No If yes, ID: SPL-GW-MW60-1124 @ 1600
 MS/MSD Collected: Yes No

Additional Information/Comments

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067 Date: 11/5/2024 Well ID: MW-29

Sampling Organization: Parametrix Samplers: Richard Anderson and Krista Keski-Hynnala

Purge Data Screened Interval (ft bgs): 20.0-30.0 Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.15 Purge Water Disposal Method: O/WS

Purge Device peristaltic pump Pump Intake Depth: 25.0 ft

Begin Purge Time: 0900 End Purge Time: 0950

Time	Depth to Water (feet below MP)	Notch Pump Setting	µl/min Purge Rate	Liters Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
0905	9.35	3	300	1.00	12.5	0.65	620.5	6.70	-67.0	246	murky, brownish grey
0910	9.33	4	"	2.10	12.4	0.20	621.5	6.73	-94.5	58.5	"
0915	9.25	"	"	3.00	12.6	0.28	624.0	6.73	-95.5	358	"
0920	9.80	"	"	4.40	12.4	0.16	612.4	6.72	-97.4	105	mostly clear
0925	9.96	"	"	6.10	12.4	0.13	612.9	6.73	-98.2	33.0	"
0930	10.01	"	"	7.90	12.4	0.12	618.0	6.76	-101.2	24.0	"
0935	10.02	"	"	10.0	12.5	0.10	618.0	6.78	-103.2	14.9	"
0940	10.05	"	"	12.0	12.5	0.10	616.0	6.80	-105.0	13.1	"
0945	10.05	"	"	13.5	12.4	0.10	617.5	6.81	-106.8	12.6	"
0950	"	"	"	15.5	12.4	0.09	614.7	6.82	-109.8	12.2	"

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW29-1124 Time Collected: 0955 Weather: Sunny, 50°F

Sample Description (Color, Turbidity, Odor, Other): mostly clear, no odor

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments

Water became a bit more turbid while collecting poly bottle sample

GROUNDWATER SAMPLE COLLECTION FORM

South Park Landfill

Project No.: 553-1550-067

Date: 11/6/2024

Well ID: MW-27

Sampling Organization: Parametrix

Samplers: Richard Anderson and Krista Keski-Hynnila

Purge Data Screened Interval (ft bgs): 10.0-20.0

Well Casing/Diameter: PVC/2 in

Initial Depth of Water (Ft below TOC): 8.94

Purge Water Disposal Method: O/WS

Purge Device: dedicated bladder pump

Pump Intake Depth: 15.0 ft

Begin Purge Time: 1000

End Purge Time: 1020

Depth to Water (feet below MP)

ft Pump Setting

Mill/min Purge Rate

Liters Cum. Vol. Purged

Temp (°C)

DO (mg/L)

Specific Conductivity (µS/cm)

pH (units)

ORP (mv)

Turbidity (NTU)

Comments

Time	Depth to Water (feet below MP)	ft Pump Setting	Mill/min Purge Rate	Liters Cum. Vol. Purged	Temp (°C)	DO (mg/L)	Specific Conductivity (µS/cm)	pH (units)	ORP (mv)	Turbidity (NTU)	Comments
1005	8.94	45	300	1.9	13.2	0.93	614.2	6.52	-491	8.37	mostly clear
1000	"	"	"	3.4	13.3	0.48	571.6	6.44	-49.5	8.24	"
1010	"	"	"	5.0	13.3	0.38	574.0	6.44	-53.9	4.81	"
1015	"	"	"	6.5	13.2	0.23	578.3	6.44	-59.0	5.18	"
1020	"	"	"	8.4	13.2	0.19	582.2	6.45	-62.5	5.07	"
1025											

Stabilization Criteria 3% 10% , or 3<0.5 3% ± 0.1 ± 10 mv 10% or 3 <5 NTU

Sampling Data

Sample ID: SPL-GW-MW27-1124

Time Collected: 1025

Weather: Sunny, 55°F

Sample Description (Color, Turbidity, Odor, Other): clear, no odor

Sample Analyses: cis-1,2-DCE, vinyl chloride, total iron, total manganese

Duplicate Sample Collected: Yes No If yes, ID: _____

MS/MSD Collected: Yes No

Additional Information/Comments: no lock

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 11/5/2024
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 2
Client Contact: Laura Lee	Phone: 206 394-3665	No. of Coolers: 2 Cooler Temps: 10.4, 5.8

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments			
Samplers: Richard Anderson & Krista Keski-Hynnala HWA					cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn									
Sample ID	Date	Time	Matrix	Number of Containers												
SPL-GW-MW12-1124	11/5/24	0835	water	7	X	X	X									
SPL-GW-MW14-1124	11/5/24	1050	water	7	X	X	X									
SPL-GW-MW29-1124	11/5/24	0955	water	7	X	X	X									
SPL-GW-MW18-1124	11/4/24	1455	water	13	X	X	X							MS/MSD		
SPL-GW-MW32-1124	11/4/24	1400	water	7	X	X	X									
SPL-GW-MW33-1124	11/4/24	1255	water	7	X	X	X									
SPL-GW-MW10-1124	11/4/24	1040	water	7	X	X	X									
SPL-GW-MW60-1124	11/4/24	1600	water	7	X	X	X									
SPL-GW-MW80-1124	11/5/24	---	water	2	X	X										
Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>				Received by: (Signature) <i>[Signature]</i>				Relinquished by: (Signature)				Received by: (Signature)			
	Printed Name: Krista Keski-Hynnala				Printed Name: R. Leeseemann				Printed Name:				Printed Name:			
	Company: HWA Geosciences				Company: ARI				Company:				Company:			
	Date & Time: 11/5/2024 1335				Date & Time: 11-5-24 1335				Date & Time:				Date & Time:			

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number: _____	Turn-around Requested: 2 weeks	Date: 11/5/2024
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 2 of 2
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 2 Cooler Temps: _____

Client Project Name: SPU South Park Landfill					Analysis Requested										Notes/Comments	
Client Project #: 553-1550-067		Samplers: Richard Anderson & Krista Keski-Hynnala HWA			dis-1,2-DCE	Vinyl Chloride	Total Fe, Mn									
Sample ID	Date	Time	Matrix	Number of Containers												
SPL-GW-MW25-1124	11/4/24	1121	water	7	X	X	X									
SPL-GW-MW30-1124	11/5/24	1135	water	7	X	X	X									
SPL-GW-MW31-1124	11/5/24	1240	water	7	X	X	X									
SPL-GW-MW24-1124			water	13	X	X	X									MS/MSD
SPL-GW-MW26-1124			water	7	X	X	X									
SPL-GW-MW00-1124			water	7	X	X	X									
SPL-GW-MW27-1124			water	7	X	X	X									
SPL-GW-MW61-1124			water	7	X	X	X									
SPL-GW-MW81-1124			water	2	X	X										

Comments/Special Instructions	Relinquished by: (Signature)	Received by: (Signature)	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Krista Keski-Hynnala	Printed Name: R Leesemann	Printed Name:	Printed Name:
	Company: HWA Geosciences	Company: ARI	Company:	Company:
	Date & Time: 11/5/2024 1335	Date & Time: 11-5-24 1335	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)

ARI Assigned Number:	Turn-around Requested: 2 weeks	Date: 11/6/2024
ARI Client Company: Min Soon Yim, Seattle Public Utility	Phone: 206 684-7693	Page: 1 of 1
Client Contact: Laura Lee, Parametrix	Phone: 206 394-3665	No. of Coolers: 1 Cooler Temps: 6.4 °C

Client Project Name: SPU South Park Landfill					Analysis Requested								Notes/Comments	
Client Project #: 553-1550-067		Samplers: Richard Anderson & Krista Keski-Hynnala HWA			cis-1,2-DCE	Vinyl Chloride	Total Fe, Mn							
Sample ID	Date	Time	Matrix	Number of Containers										
SPL-GW-MW25-1124			water	7	X	X	X							
SPL-GW-MW30-1124			water	7	X	X	X							
SPL-GW-MW31-1124			water	7	X	X	X							
SPL-GW-MW24-1124	11/6/2024	0915	water	13	X	X	X							MS/MSD
SPL-GW-MW26-1124	11/6/2024	0830	water	7	X	X	X							
SPL-GW-MW08-1124	11/6/2024	1105	water	7	X	X	X							
SPL-GW-MW27-1124	11/6/2024	1025	water	7	X	X	X							
SPL-GW-MW61-1124	11/6/2024	1000	water	7	X	X	X							
SPL-GW-MW81-1124	11/6/2024		water	2	X	X								

Comments/Special Instructions	Relinquished by: (Signature) <i>Krista Keski-Hynnala</i>	Received by: (Signature) <i>Matthew Daniel</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <i>Krista Keski-Hynnala</i>	Printed Name: <i>Matthew Daniel</i>	Printed Name:	Printed Name:
	Company: <i>HWA Geosciences</i>	Company: <i>ARCC</i>	Company:	Company:
	Date & Time: <i>11/6/2024 1140</i>	Date & Time: <i>11/6/24 1140</i>	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Appendix D4

Laboratory Reports

(contained in Volume II)

Appendix D5

Data Validation Memoranda

1st Quarter 2024

First Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

Seattle Public Utilities

700 Fifth Avenue, Suite 4900
Seattle, WA 98124-4018

Prepared by

Parametrix

719 2nd Avenue, Suite 200
Seattle, WA 98104
T. 206.394.3700 F. 1.855.542.6353
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In Association with



CITATION

Parametrix and HWA GeoSciences, Inc., 2024. First Quarter 2024
Groundwater Sampling Event South Park Landfill - Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
March 2024.

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- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

1. PROJECT NARRATIVE

1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill First Quarter 2024 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW29-0224	24B0127-01	MW-29	X	X	X
SPL-GW-MW32-0224	24B0127-02	MW-32	X	X	X
SPL-GW-MW33-0224	24B0127-03	MW-33	X	X	X
SPL-GW-MW10-0224	24B0127-04	MW-10	X	X	X
SPL-GW-MW80-0224	24B0127-05	TRIP BLANK	X	X	
SPL-GW-MW25-0224	24B0127-06	MW-25	X	X	X
SPL-GW-MW24-0224	24B0127-07	MW-24	X	X	X
SPL-GW-MW26-0224	24B0127-08	MW-26	X	X	X
SPL-GW-MW08-0224	24B0127-09	MW-08	X	X	X
SPL-GW-MW27-0224	24B0127-10	MW-27	X	X	X
SPL-GW-MW61-0224	24B0127-11	MW-25 DUP	X	X	X
SPL-GW-MW12-0224	24B0164-01	MW-12	X	X	X
SPL-GW-MW14-0224	24B0164-02	MW-14	X	X	X
SPL-GW-MW18-0224	24B0164-03	MW-18	X	X	X
SPL-GW-MW60-0224	24B0164-04	MW-12 DUP	X	X	X
SPL-GW-MW30-0223	24B0164-05	MW-30	X	X	X
SPL-GW-MW31-0223	24B0164-06	MW-31	X	X	X
SPL-GW-MW81-0224	24B0164-07	TRIP BLANK	X	X	

Groundwater samples were collected on February 5, 6, and 7, 2024 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 24B0127 and 24B0164. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

Field Duplicates

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0224 is a duplicate of SPL-GW-MW12-0224. Sample SPL-GW-MW61-0224 is a duplicate of SPL-GW-MW25-0224.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$, where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

Trip Blanks

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0224 and SPL-GW-MW81-0224) in ARI Work Orders 24B0127 and 24B0164.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 5.4 degrees C for batch 24B0127 and 2.8 degrees C for batch 24B0164, indicating adequate temperature control for sample preservation. No data were therefore qualified based on temperature issues.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The cooler receipt form associated with ARI work order 24B0127 indicated that not all VOA vials were free of air bubbles; however, no VOA vials were identified as having bubbles in the preservation confirmation section. The cooler receipt form associated with ARI work order 24B0164 did not indicate whether all the VOA vials were free of air bubbles; however, no VOA vials were identified as having bubbles in the preservation confirmation section. The laboratory did not indicate that there was insufficient sample for any VOC analysis, therefore no data were qualified based on VOC integrity issues.

2. DATA VALIDATION REPORT CIS-1,2-DCE BY EPA METHOD SW8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24B0127-06 and 24B0164-01 (SPL-GW-MW25-0224 and SPL-GW-MW12-0224) in cis-1,2-DCE batches BMB0362 and BMB0356, respectively. The duplicate and MS/MSD RPDs were within control limits; however, the percent recovery of cis-1,2-DCE was out of control low in the MS and/or MSD for both batches. Cis-1,2-DCE was not detected in either sample; therefore the cis-1,2-DCE results for samples 24B0127-06 and 24B0164-01 have been flagged UJ, as not detected above a detection limit that may be inaccurate or imprecise.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

QC requirement findings further discussed in following sections (if required):

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	Field duplicates
Laboratory Control Sample (LCS)	

Notes:

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below, but no data were qualified.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24B0127-06 and 24B0164-01 (SPL-GW-MW25-0224 and SPL-GW-MW12-0224) in total metals batches BMB0461 and BMB0414, respectively. The duplicate and MS/MSD RPDs were within control limits. However, the lab noted that for manganese in both batches, the natural concentration of the spiked analyte was so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. No data were qualified because in all cases the spike was less than 25 percent of the sample value.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/2016.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/2017.
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- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
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- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
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- EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.
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Appendix A

Data Qualifier Definitions and Criteria Tables



DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH ≤ 2	If >6 deg. C but ≤ 10 deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> If sample result <CRQL, qualify U report at CRQL If sample result \geq CRQL, use professional judgement
		If blank \geq CRQL: <ul style="list-style-type: none"> If sample result <CRQL, qualify U and report at CRQL If sample result \geq but < blank result, qualify U and report at sample result If sample result \geq CRQL and $\geq 2x$ blank results, report sample result and J+ qualify or no qualification
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> J if $\%R < 20\%$, or $20\% < \%R < \text{Lower limit}$, or $\%R$ or RPD $> \text{Upper limit}$ For non-detects: <ul style="list-style-type: none"> R if $\%R < 20\%$, UJ if $20\% < \%R < \text{Lower limit}$
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> $\%R < \text{Lower Limit}$, qualify J-+; $\%R > \text{Upper Limit}$, qualify J+- For non-detects: <ul style="list-style-type: none"> $\%R <$, qualify results R; if $\%R \geq$ No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> • %R < Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit \leq %R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: <ul style="list-style-type: none"> • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit \leq %R < specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to $\text{pH} < 2$ For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with $\text{pH} \geq 2$ and pH not adjusted, or technical holding > 180 days, qualify J- For non-detects: $\text{pH} \geq 2$ and pH not adjusted, or technical holding > 180 days, qualify R
Method Blank	One per batch $< \text{CRQL}$	<p>If blank $< \text{CRQL}$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{QL}$: Report at QL and qualify U Sample $\geq \text{QL}$: J+ or no qualification <p>If blank result $\leq (-\text{MDL})$ but $> (-\text{QL})$:</p> <ul style="list-style-type: none"> Sample Detect: qualify J- or no qualification Sample Non-detect: qualify UJ <p>If blank result $\geq \text{CRQL}$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{CRQL}$: Report at QL and qualify U Sample result $\geq \text{CRQL}$ but $< 10 \times$ the Blank results: Report at Blank Result and qualify J+ or R $\geq 10 \times$ Blank results, no qualification <p>If blank result $\leq (-\text{QL})$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{CRQL}$ or $\geq \text{CRQL}$ but $< 10 \times \text{CRQL}$, qualify J- Sample Non-detect qualify UJ Sample result $\geq 10 \times \text{QL}$, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	<p>For detects:</p> <ul style="list-style-type: none"> If %R $< 40\%$ or 40-69%, J- If %R 70-130%, no qualification If %R 131-151%, J+ If %R $> 150\%$, R <p>For non-detects:</p> <ul style="list-style-type: none"> If %R $< 40\%$, R If %R 40-69%, UJ If %R $> 70\%$, no qualification

**Validation Guidelines for Metals Analysis by GC/MS
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >= 4x the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: <ul style="list-style-type: none"> • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >= 5x CRQL OR CQRL if sample results <5x CRQL	If results >= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> • J if detect, • UJ if non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis



Data Validation		South Park Landfill							
QA/QC completed by: Chris Bourgeois		3/13/2024							
ARI Work Order		24B0164							
Sample numbers:		SPL-GW-MW12-0224; SPL-GW-MW60-0224							
Sample Date:		2/7/2024							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in RL?
units = ug/L		MW-12	MW-60						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	<0.0200	<0.0200	NA	NA	NA		0.0200	y
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	1.14	1.28	1.21	-0.14	12	y	1.80	
Manganese	mg/L	0.130	0.150	0.14	-0.02	14	y	0.0250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Data Validation		South Park Landfill							
QA/QC completed by: Chris Bourgeois		3/13/2024							
ARI Work Order		24B0127							
Sample numbers:		SPL-GW-MW25-0224; SPL-GW-MW61-0224							
Sample Date:		2/5/2024							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in RL?
units = ug/L		MW-25	MW-61						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	0.417	0.411	0.414	0.0060	1	y	0.0200	
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	35.6	33.6	34.6	2.00	6	y	0.360	
Manganese	mg/L	2.73	2.69	2.71	0.040	1	y	0.00500	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table



Table C.1
Qualified Data Summary Table First Quarter 2024 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW25-0224	24B0127-06	EPA 8260D	cis-1,2-DCE	ND	ug/L	U	UJ	UJ
SPL-GW-MW12-0224	24B0164-01	EPA 8260D	cis-1,2-DCE	ND	ug/L	U	UJ	UJ

Qualifiers:

U – The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ – The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

2nd Quarter 2024

Second Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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CITATION

Parametrix, Inc., 2024. Second Quarter 2024 Groundwater Sampling Event
South Park Landfill - Data Validation Report.
Prepared by Parametrix, Seattle, Washington.
June 2024.

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- A Data Qualifier Definitions and Criteria Tables
- B Field Duplicate Analysis
- C Qualified Data Summary Table

ACRONYMS AND ABBREVIATIONS

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

1. PROJECT NARRATIVE

1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Second Quarter 2024 Groundwater Monitoring Event. A complete list of samples is provided below.

Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW12-0524	24E0067-01	MW-12	X	X	X
SPL-GW-MW14-0524	24E0067-02	MW-14	X	X	X
SPL-GW-MW29-0524	24E0067-03	MW-29	X	X	X
SPL-GW-MW32-0524	24E0067-04	MW-32	X	X	X
SPL-GW-MW33-0524	24E0067-05	MW-33	X	X	X
SPL-GW-MW10-0524	24E0067-06	MW-10	X	X	X
SPL-GW-MW60-0524	24E0067-07	MW-14 DUP	X	X	X
SPL-GW-MW80-0524	24E0067-08	TRIP BLANK	X	X	
SPL-GW-MW25-0524	24E0067-09	MW-25	X	X	X
SPL-GW-MW18-0524	24E0106-01	MW-18	X	X	X
SPL-GW-MW30-0524	24E0106-02	MW-30	X	X	X
SPL-GW-MW31-0524	24E0106-03	MW-31	X	X	X
SPL-GW-MW24-0524	24E0106-04	MW-24	X	X	X
SPL-GW-MW26-0524	24E0106-05	MW-26	X	X	X
SPL-GW-MW08-0524	24E0106-06	MW-08	X	X	X
SPL-GW-MW27-0524	24E0106-07	MW-30	X	X	X
SPL-GW-MW61-0524	24E0106-08	MW-30 DUP	X	X	X
SPL-GW-MW81-0524	24E0106-09	TRIP BLANK	X	X	

Groundwater samples were collected on May 1, 2, and 3, 2024 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 24E0067 and 24E0106. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), *EPA Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

Field Duplicates

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-0524 is a duplicate of SPL-GW-MW14-0524. Sample SPL-GW-MW61-0524 is a duplicate of SPL-GW-MW30-0524.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$, where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

Trip Blanks

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0524 and SPL-GW-MW81-0524) in ARI Work Orders 24E0067 and 24E0106.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures for the two batches were 2.9 degrees C for batch 24E0067 and 1.7 degrees C for batch 24E0106, indicating adequate temperature control for sample preservation. The laboratory did not report any frozen samples, therefore no data were qualified as a result of container temperatures below 2.0 degrees C. No data were therefore qualified based on temperature issues.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials submitted in batch 24E0067 were free of air bubbles, and one VOA vial (laboratory Container ID 24E0106-01 B) submitted in batch 24E0106 contained air bubbles. This could possibly be due to sample collection methods or in some cases (particularly at landfills), dissolved methane present in groundwater forms bubbles in the VOA vials after collection. The laboratory did not indicate that there was insufficient sample for any VOC analysis, therefore no data were qualified based on VOC integrity issues.

2. DATA VALIDATION REPORT CIS-1,2-DCE BY EPA METHOD SW8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24E0067-02 and 24E0106-02 (SPL-GW-MW14-0524 and SPL-GW-MW30-0524) in cis-1,2-DCE batches BME0063 and BME0101, respectively. The duplicate and MS/MSD RPDs were within control limits; however, the percent recovery of cis-1,2-DCE was out of control low in both the MS and MSD for batch BME0063. Cis-1,2-DCE was not detected in the associated sample; therefore, the cis-1,2-DCE result for sample 24E0067-02 has been flagged UJ, as not detected above a detection limit that may be inaccurate or imprecise.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. DATA VALIDATION REPORT VINYL CHLORIDE BY EPA METHOD 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

QC requirement findings further discussed in following sections (if required):

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. DATA VALIDATION REPORT SELECT METALS BY EPA METHOD 6020B

This section documents the review of metals (total iron and manganese) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	Field duplicates
Laboratory Control Sample (LCS)	

Notes:

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below, but no data were qualified.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24E0067-02 and 24E0106-02 (SPL-GW-MW14-0524 and SPL-GW-MW30-0524) in total metals batches BME0317 and BME0345, respectively. The MS percent recoveries and MS/MSD RPDs were within advisory control limits, except percent recovery for total manganese which was out of control high in both the MS and MSD for batch BME0317. However, in both cases, the natural concentration of the spiked analyte was over 10 times greater than the concentration spiked, therefore no data were qualified.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. REFERENCES

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/2016.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/2017.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
- EPA (U.S. Environmental Protection Agency). 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA240R-02/004.
- EPA. 2009. Guidance for Labeling Externally Validated Laboratory Analytical data for Superfund Use. EPA 540-R-08-005. January 13, 2009.
- EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.
- EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables



DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH ≤ 2	If >6 deg. C but ≤ 10 deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> If sample result <CRQL, qualify U report at CRQL If sample result \geq CRQL, use professional judgement
		If blank \geq CRQL: <ul style="list-style-type: none"> If sample result <CRQL, qualify U and report at CRQL If sample result \geq but < blank result, qualify U and report at sample result If sample result \geq CRQL and $\geq 2x$ blank results, report sample result and J+ qualify or no qualification
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> J if $\%R < 20\%$, or $20\% < \%R < \text{Lower limit}$, or $\%R$ or RPD $> \text{Upper limit}$ For non-detects: <ul style="list-style-type: none"> R if $\%R < 20\%$, UJ if $20\% < \%R < \text{Lower limit}$
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> $\%R < \text{Lower Limit}$, qualify J-+; $\%R > \text{Upper Limit}$, qualify J+- For non-detects: <ul style="list-style-type: none"> $\%R <$, qualify results R; if $\%R \geq$ No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> • %R < Expanded Lower Limit (10%), qualify results J- • Expanded Lower Limit \leq %R < specified Lower Limit, qualify results J- • %R > specified Upper Limit, qualify results J+ For non-detects: <ul style="list-style-type: none"> • %R < Expanded lower limit (10%), qualify results R • Expanded Lower Limit \leq %R < specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD < 35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only If no guidance available, qualify associated samples for contaminants found in field blanks based on the criteria for Method Blanks

**Validation Guidelines for Metals Analysis by ICP-MS
 (Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to $\text{pH} < 2$ For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with $\text{pH} \geq 2$ and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: $\text{pH} \geq 2$ and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch $< \text{CRQL}$	<p>If blank $< \text{CRQL}$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{QL}$: Report at QL and qualify U Sample $\geq \text{QL}$: J+ or no qualification <p>If blank result $\leq (-\text{MDL})$ but $> (-\text{QL})$:</p> <ul style="list-style-type: none"> Sample Detect: qualify J- or no qualification Sample Non-detect: qualify UJ <p>If blank result $\geq \text{CRQL}$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{CRQL}$: Report at QL and qualify U Sample result $\geq \text{CRQL}$ but $< 10 \times$ the Blank results: Report at Blank Result and qualify J+ or R $\geq 10 \times$ Blank results, no qualification <p>If blank result $\leq (-\text{QL})$:</p> <ul style="list-style-type: none"> Sample Detect $< \text{CRQL}$ or $\geq \text{CRQL}$ but $< 10 \times \text{CRQL}$, qualify J- Sample Non-detect qualify UJ Sample result $\geq 10 \times \text{QL}$, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	<p>For detects:</p> <ul style="list-style-type: none"> If %R $< 40\%$ or 40-69%, J- If %R 70-130%, no qualification If %R 131-151%, J+ If %R $> 150\%$, R <p>For non-detects:</p> <ul style="list-style-type: none"> If %R $< 40\%$, R If %R 40-69%, UJ If %R $> 70\%$, no qualification

**Validation Guidelines for Metals Analysis by GC/MS
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >= 4x the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> • J- if %R <30 to 74% • J+ if %R>125% • No qualification if %R 75-125% For Non-detects: <ul style="list-style-type: none"> • R if %R<30%, • UJ if %R <75% or • No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >= 5x CRQL OR CQRL if sample results <5x CRQL	If results >= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> • J if detect, • UJ if non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis



Data Validation		South Park Landfill							
QA/QC completed by: Chris Bourgeois		6/24/2024							
ARI Work Order		24E0067							
Sample numbers:		SPL-GW-MW14-0524; SPL-GW-MW60-0524							
Sample Date:		5/1/2024							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in RL?
units = ug/L		MW-14	MW-60						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	<0.0200	<0.0200	NA	NA	NA		0.0200	y
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	3.49	3.55	3.52	-0.06	2	y	1.80	
Manganese	mg/L	0.791	0.814	0.8025	-0.02	3	y	0.0250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Data Validation		South Park Landfill							
QA/QC completed by: Chris Bourgeois		6/24/2024							
ARI Work Order		24E0106							
Sample numbers:		SPL-GW-MW30-0524; SPL-GW-MW61-0524							
Sample Date:		5/2/2024							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in RL?
units = ug/L		MW-30	MW-61						
cis-1,2-DCE	ug/L	0.25	0.32	0.285	-0.07	25	y	0.20	
Vinyl chloride	ug/L	0.0827	0.0849	0.0838	-0.0022	3	y	0.0200	
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	0.539	0.563	0.6	-0.02	4	y	0.360	
Manganese	mg/L	0.0566	0.0557	0.05615	0.001	2	y	0.00500	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table



Table C.1
Qualified Data Summary Table Second Quarter 2024 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW14-0524	24E0067-02	EPA 8260D	cis-1,2-DCE	ND	ug/L	U	UJ	UJ

Qualifiers:

- U – The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ – The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

3rd Quarter 2024



Third Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for



**Seattle
Public
Utilities**

October 2024

ParametriX

Third Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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700 Fifth Avenue, Suite 4900
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October 2024 | 553-1500-067 (05.00)

Citation

Parametrix. 2024. Third Quarter 2024
Groundwater Sampling Event
South Park Landfill
Data Validation Report.
Prepared for Seattle Public Utilities
by Parametrix, Seattle, Washington.
October 2024.

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- B Field Duplicate Analysis
- C Qualified Data Summary Table

Acronyms and Abbreviations

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

1. Project Narrative

1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Third Quarter 2024 Groundwater Monitoring Event. A complete list of samples is provided below (Table 1-1).

Table 1-1. Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW33-0824	24H0113-01	MW-33	X	X	X
SPL-GW-MW80-0824	24H0113-02	TRIP BLANK	X	X	
SPL-GW-MW30-0824	24H0116-01	MW-30	X	X	X
SPL-GW-MW31-0824	24H0116-02	MW-31	X	X	X
SPL-GW-MW24-0824	24H0116-03	MW-24	X	X	X
SPL-GW-MW26-0824	24H0116-04	MW-26	X	X	X
SPL-GW-MW08-0824	24H0116-05	MW-08	X	X	X
SPL-GW-MW27-0824	24H0116-06	MW-27	X	X	X
SPL-GW-MW61-0824	24H0116-07	MW-31 DUP	X	X	X
SPL-GW-MW12-0824	24H0168-01	MW-12	X	X	X
SPL-GW-MW14-0824	24H0168-02	MW-14	X	X	X
SPL-GW-MW29-0824	24H0168-03	MW-29	X	X	X
SPL-GW-MW18-0824	24H0168-04	MW-18	X	X	X
SPL-GW-MW32-0824	24H0168-05	MW-32	X	X	X
SPL-GW-MW10-0824	24H0168-06	MW-10	X	X	X
SPL-GW-MW60-0824	24H0168-07	MW-29 DUP	X	X	X
SPL-GW-MW25-0824	24H0168-08	MW-25	X	X	X
SPL-GW-MW81-0824	24H0168-09	TRIP BLANK	X	X	

Groundwater samples were collected on August 6 and 7, 2024 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 24H0113, 24H0116 and 24H0168. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA

2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 2009) at a Stage 2A level. Data qualifier definitions, reasons, and validation criteria are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

Field Duplicates

Two field duplicate samples were analyzed. Sample SPL-GW-MW61-0824 is a duplicate of SPL-GW-MW31-0824. Sample SPL-GW-MW60-0824 is a duplicate of SPL-GW-MW29-0824.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$, where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

Trip Blanks

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-0824 and SPL-GW-MW81-0824) in ARI Work Orders 24H0113 and 24H0168.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Temperatures were 8.5 degrees C for batch 24H0113 and 24H0116, suggesting inadequate time to cool between sampling and delivery, and 5.6 degrees C for batch 24H0168, indicating adequate temperature control for sample preservation. The slightly elevated temperature for batch 24H0113 and 24H0116 was below 10 degrees C, in which case professional

judgement may be used per EPA guidance. Therefore, no data were therefore qualified based on temperature issues.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials submitted were free of air bubbles. Therefore, no data were qualified based on VOC integrity issues.

2. Data Validation Report cis-1,2-DCE by EPA Method SW8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24H0116-02 and 24H0168-03 (SPL-GW-MW31-0824 and SPL-GW-MW29-0824) in cis-1,2-DCE batches BMH0151 and BMH0239, respectively. The duplicate and MS/MSD RPDs were within control limits; however, the percent recovery of cis-1,2-DCE was out of control low in both the MS and MSD for batch BMH0239. Cis-1,2-DCE was not detected in the associated sample; therefore, the cis-1,2-DCE result for sample 24H0168-03 has been flagged UJ, as not detected above a detection limit that may be inaccurate or imprecise.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. Data Validation Report Vinyl Chloride by EPA Method 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates ¹
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

¹ Quality control results are discussed below. QC requirement findings further discussed in following sections (if required):

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Field Duplicate

The results for sample SPL-GW-MW29-0824 and its field duplicate SPL-GW-MW60-0824 were not within 5x the RL. Therefore, the result for SPL-GW-MW29-0824 was qualified “UJ” as estimated.

3.4 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. Data Validation Report Select Metals by EPA Method 6020B

This section documents the review of metals (total iron and manganese) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	Field duplicates
Laboratory Control Sample (LCS)	

Notes:

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below, but no data were qualified.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24H0116-02 and 24H0168-03 (SPL-GW-MW31-0824 and SPL-GW-MW29-0824) in batches BMH0376 and BMH0417, respectively. The MS percent recoveries and MS/MSD RPDs were within advisory control limits, except percent recovery for total iron and total manganese which were out of control high in both the MS and MSD for batch BMH0376 and the MS in batch BMH0417. However, in both cases, the natural concentration of the spiked analyte was over four times greater than the concentration spiked, therefore no data were qualified.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. References

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/2016.
- ARI (Analytical Resources Inc.). 2017. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS with Universal Cell Technology, SOP 543S, Version 003.3, Revision Date 2/23/2017.
- ARI. 2020a. Quality Assurance Plan. Revision 17.0. 6/11/2020.
- ARI. 2020b. Standard Operating Procedure, Volatile Organic Analysis SOP 700S, Version 022, Revision Date 2/12/2020.
- ARI. 2020c. Standard Operating Procedure, Volatile Organic Analysis Selected Ion Mass Spectrometry, SOP 703S, Version 13, Revision Date 2/12/2020.
- Ecology. 2021. Draft South Park Landfill Final Cleanup Action Plan: Appendix A Landfill Post-Closure Operations, Maintenance, and Monitoring Plan, Amended 2021. Washington State Department of Ecology Toxics Cleanup Program. Olympia, WA.
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- EPA. 2020a. National Functional Guidelines for Inorganic Superfund Data Review. EPA 540R- 2017-001. November.
- EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS
(Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH ≤ 2	If >6 deg. C but ≤ 10 deg. C, use professional judgement J/UJ if greater than 10 deg. C
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> ▪ If sample result <CRQL, qualify U report at CRQL ▪ If sample result \geq CRQL, use professional judgement
		If blank \geq CRQL: <ul style="list-style-type: none"> ▪ If sample result <CRQL, qualify U and report at CRQL ▪ If sample result \geq but < blank result, qualify U and report at sample result ▪ If sample result \geq CRQL and $\geq 2x$ blank results, report sample result and J+ qualify or no qualification
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> ▪ J if $\%R < 20\%$, or $20\% < \%R < \text{Lower limit}$, or $\%R$ or RPD $> \text{Upper limit}$ For non-detects: <ul style="list-style-type: none"> ▪ R if $\%R < 20\%$, UJ if $20\% < \%R < \text{Lower limit}$
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> ▪ $\%R < \text{Lower Limit}$, qualify J+; $\%R > \text{Upper Limit}$, qualify J+- For non-detects: <ul style="list-style-type: none"> ▪ $\%R <$, qualify results R; If $\%R \geq$ No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> ▪ %R < Expanded Lower Limit (10%), qualify results J- ▪ Expanded Lower Limit \leq %R < specified Lower Limit, qualify results J- ▪ %R > specified Upper Limit, qualify results J+ For non-detects: <ul style="list-style-type: none"> ▪ %R < Expanded lower limit (10%), qualify results R ▪ Expanded Lower Limit \leq %R < specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only

**Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH ≥ 2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH ≥ 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> ▪ Sample Detect <QL: Report at QL and qualify U ▪ Sample \geq QL: J+ or no qualification If blank result \leq (-MDL) but > (-QL): <ul style="list-style-type: none"> ▪ Sample Detect: qualify J- or no qualification ▪ Sample Non-detect: qualify UJ If blank result \geq CRQL: <ul style="list-style-type: none"> ▪ Sample Detect < CRQL: Report at QL and qualify U ▪ Sample result \geq CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R ▪ $\geq 10x$ Blank results, no qualification If blank result \leq (-QL): <ul style="list-style-type: none"> ▪ Sample Detect < CRQL or \geq CRQL but <10x CRQL, qualify J- ▪ Sample Non-detect qualify UJ ▪ Sample result $\geq 10x$ QL, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: <ul style="list-style-type: none"> ▪ If %R < 40% or 40-69%, J- ▪ If %R 70-130%, no qualification ▪ If %R 131-151%, J+ ▪ If %R >150%, R For non-detects: <ul style="list-style-type: none"> ▪ If %R <40%, R ▪ If %R 40-69%, UJ ▪ If %R >70%, no qualification

**Validation Guidelines for Metals Analysis by GC/MS
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If >= 4x the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> ▪ J- if %R <30 to 74% ▪ J+ if %R>125% ▪ No qualification if %R 75-125% For Non-detects: <ul style="list-style-type: none"> ▪ R if %R<30%, ▪ UJ if %R <75% or ▪ No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples >= 5x CRQL OR CQRL if sample results <5x CRQL	If results >= 5x CRQL and RPD>20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> ▪ J if detect, ▪ UJ if non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation		South Park Landfill							
QA/QC completed by: Lisa Gilbert		9/24/2024							
ARI Work Order		24H0168							
Sample numbers:		SPL-GW-MW29-0824; SPL-GW-MW60-0824							
Sample Date:		8/7/24							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in 5x RL?
units = ug/L		MW-29	MW-60						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	<0.0200	0.126	NA	NA	NA		0.0200	n
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	21.4	21.8	21.6	-0.40	2	y	0.720/0.360	
Manganese	mg/L	0.636	0.593	0.6145	0.043	7	y	0.0100/0.00500	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Data Validation		South Park Landfill							
QA/QC completed by: Lisa Gilbert		9/24/2024							
ARI Work Order		24H0116							
Sample numbers:		SPL-GW-MW31-0824; SPL-GW-MW61-0824							
Sample Date:		8/6/24							
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in 5x RL?
units = ug/L		MW-31	MW-61						
cis-1,2-DCE	ug/L	0.33	0.34	0.335	-0.01	3	y	0.20	
Vinyl chloride	ug/L	0.741	0.793	0.767	-0.05	7	y	0.0200	
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
Iron	mg/L	22.2	20.0	21.1	2.20	10	y	1.80/0.180	
Manganese	mg/L	0.945	0.835	0.89	0.11	12	y	0.0250/0.00250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table

Table C.1. Qualified Data Summary Table Third Quarter 2024 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW29-0824	24H0168-03	EPA 8260D	cis-1,2-DCE	<0.020	ug/L	U	UJ	UJ
SPL-GW-MW29-0824	24H0168-03	EPA 8260D	Vinyl chloride	<0.0200	ug/L	U	UJ	UJ

Qualifiers:

U – The analyte was analyzed for but was not detected above the reported sample quantitation limit.

UJ – The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

4th Quarter 2024



Fourth Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for



**Seattle
Public
Utilities**

January 2025

ParametriX

Fourth Quarter 2024 Groundwater Sampling Event South Park Landfill Data Validation Report

Prepared for

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In Association with



January 2025

Citation

Parametrix. 2025. Fourth Quarter 2024 Groundwater
Sampling Event South Park Landfill Data Validation Report.
Prepared for Seattle Public Utilities
by Parametrix, Seattle, Washington.
January 2025.

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APPENDICES

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- B Field Duplicate Analysis
- C Qualified Data Summary Table

Acronyms and Abbreviations

CRQL	Contract Reporting Quantitation Limit
EPA	U.S. Environmental Protection Agency
LCS	Laboratory control standard
LCSD	Laboratory control standard duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
RPD	Relative percent difference
QC	Quality control
VOC	Volatile organic compound

1. Project Narrative

1.1 Overview of Data Validation

This report summarizes the results of the Compliance Screening performed on the groundwater and field quality control (QC) sample data for the South Park Landfill Fourth Quarter 2024 Groundwater Monitoring Event. A complete list of samples is provided below (Table 1-1).

Table 1-1. Project Sample Index

Sample ID	Lab ID	Sample Location	8260D	8260D-SIM	6020B Total Fe, Mn
SPL-GW-MW12-1124	24K0087-01	MW-12	X	X	X
SPL-GW-MW14-1124	24K0087-02	MW-14	X	X	X
SPL-GW-MW29-1124	24K0087-03	MW-29	X	X	X
SPL-GW-MW18-1124	24K0087-04	MW-18	X	X	X
SPL-GW-MW32-1124	24K0087-05	MW-32	X	X	X
SPL-GW-MW33-1124	24K0087-06	MW-33	X	X	X
SPL-GW-MW10-1124	24K0087-07	MW-10	X	X	X
SPL-GW-MW60-1124	24K0087-08	MW-18 DUP	X	X	X
SPL-GW-MW80-1124	24K0087-09	TRIP BLANK	X	X	
SPL-GW-MW25-1124	24K0087-10	MW-25	X	X	X
SPL-GW-MW30-1124	24K0087-11	MW-30	X	X	X
SPL-GW-MW31-1124	24K0087-12	MW-31	X	X	X
SPL-GW-MW24-1124	24K0161-01	MW-24	X	X	X
SPL-GW-MW26-1124	24K0161-02	MW-26	X	X	X
SPL-GW-MW08-1124	24K0161-03	MW-08	X	X	X
SPL-GW-MW27-1124	24K0161-04	MW-27	X	X	X
SPL-GW-MW61-1124	24K0161-05	MW-24 DUP	X	X	X
SPL-GW-MW81-1124	24K0161-06	TRIP BLANK	X	X	

Groundwater samples were collected on November 4, 5, and 6, 2024 and submitted to Analytical Resources, LLC (ARI) located in Tukwila, Washington for chemical analyses. The chemical analyses were performed under ARI Work Orders 24K0087 and 24K0161. The analytical methods include the following:

- Cis-1,2-DCE—U.S. Environmental Protection Agency (EPA) Method SW8260D
- Vinyl chloride—EPA Method 8260D-SIM
- Select metals (total iron and manganese) - EPA Method 6020B

The data were reviewed using guidance and QC criteria documented in the analytical methods, U.S. Environmental Protection Agency (EPA) *National Functional Guidelines for Inorganic Data Review* (EPA 2020a), *National Functional Guidelines for Organic Data Review* (EPA 2020b), EPA *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (EPA 2009), and the *South Park Landfill Operations, Maintenance and Monitoring Plan* (OMMP; Appendix A of the South Park Landfill Cleanup Action Plan [Ecology 2021]).

In accordance with the OMMP, to generate data of sufficient quality, the following approach for groundwater samples will be followed:

- Field and laboratory QC samples (field replicates, trip blanks, and temperature blanks) will be used for assessing data quality.
- Laboratory QA will be implemented and maintained as described in the accredited laboratory's Quality Assurance Plan (ARI 2020a) and Standard Operating Procedures (ARI 2016, 2017, 2020b, 2020c) and in Table 3 (from OMMP and presented in Appendix B).
- Data summary packages will be generated, and the documentation provided will be sufficient to perform a Level I data quality review.

The goal in assigning data assessment qualifiers is to assist in proper data interpretation. If values are estimated (J or UJ), data may be used for site evaluation and risk assessment purposes, but reasons for data qualification should be taken into consideration when interpreting sample concentrations. If values are assigned an R, the data are to be rejected and should not be used for any site evaluation purposes. When compounds are analyzed at multiple dilutions, select results will be assigned a Do Not Report (DNR) qualification as a more appropriate result is reported from another dilution. If values have no data qualifier assigned, then the data meet the data quality objectives as stated in the documents and methods referenced above.

The data were evaluated in accordance with EPA guidance (EPA 2020a, 2020b, and 2009) at a Stage 2A level. Data qualifier definitions, reasons, and simplified validation criteria based on the EPA guidance are included as Appendix A. Analysis of field duplicates are presented in Appendix B. Qualified data are summarized in Appendix C.

Field Duplicates

Two field duplicate samples were analyzed. Sample SPL-GW-MW60-1124 is a duplicate of SPL-GW-MW18-1124. Sample SPL-GW-MW61-1124 is a duplicate of SPL-GW-MW24-1124.

Appendix B presents the calculated Relative Percent Differences (RPDs) for field duplicate samples. $RPDs = \text{difference} / \text{average} = ((X1-X2) / (X1+X2)/2) \times 100$, where X1 is the sample and X2 is the duplicate sample concentration. RPD is a measure of analytical precision. Precision is a measure of the variability in the results of replicate measurements due to random error.

Trip Blanks

Two trip blanks were analyzed for selected VOCs (SPL-GW-MW80-1124 and SPL-GW-MW81-1124) in ARI Work Orders 24K0087 and 24K0161.

Sample Temperature

Although no temperature blanks were prepared, the laboratory measured the cooler interior temperatures on receipt. Samples associated with work order 24K0087 were delivered in two coolers. The temperature for one of these coolers was 5.8 degrees, indicating adequate temperature control for sample preservation. The other cooler temperature was 10.4 degrees C, suggesting inadequate time to cool between sampling and delivery. The last sample collected on November 5th, 2024, SPL-GW-MW31-1124, was collected in the field at 12:40. The field temperature of this sample was 14.5 degrees C. Samples were received by the lab at 13:35, leaving insufficient time for the cooler temperature to drop to below 6 degrees C. It is with professional judgement that no sample results associated with work order 24K0087 be qualified based on cooler temperature, as the samples were delivered to the laboratory with minimal holding time.

Samples associated with work order 24K0161 were delivered in one cooler and the cooler temperature was 6.4 degrees C. The slightly elevated temperature in batch 24K0161 was below 10 degrees C and professional judgement may be used per EPA guidance. Therefore, no data was qualified based on temperature for sample results associated with work order 24K0161.

Hold Times

All method-defined hold times for all samples were met prior to extraction and analysis.

VOC Sample Integrity

The laboratory reported that all VOA vials submitted were free of air bubbles. Therefore, no data were qualified based on VOC integrity issues.

2. Data Validation Report cis-1,2-DCE by EPA Method SW8260D

This section documents the review of VOC analytical data for groundwater and field QC samples and the associated laboratory QC samples.

2.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

2.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field Duplicates
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below.

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

2.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24K0087-04 and 24K0161-01 (SPL-GW-MW18-1124 and SPL-GW-MW24-1124) in cis-1,2-DCE batches BMK0166 and BMK0181, respectively. The MS/MSD RPDs were within control limits in both batches; however, the percent recovery of cis-1,2-DCE was out of control low in both the MS and MSD for batch BMK0181. Cis-1,2-DCE was not detected in the associated sample; therefore, the cis-1,2-DCE result for sample 24K0161-01 has been flagged UJ, as the analyte was not detected, but the quantification limit is approximate and may be inaccurate or imprecise.

2.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

3. Data Validation Report Vinyl Chloride by EPA Method 8260D-SIM

This section documents the review of vinyl chloride analytical data for groundwater and field QC samples and the associated laboratory QC samples.

3.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

3.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Surrogate recoveries
Extraction and analysis holding times	Target analyte list
Blank contamination (method and trip)	Reporting limits and reported results
Laboratory control sample (LCS) and LCS duplicate (LCSD)	Field duplicates ¹
Matrix Spike (MS) and Matrix Spike Duplicate (MSD)	

Notes:

¹ Quality control results are discussed below. QC requirement findings further discussed in following sections (if required):

Appendix A presents data validation criteria tables for organic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

3.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by the sample surrogate, LCS, and LCSD percent recovery values. Precision was acceptable, as demonstrated by the LCS/LCSD RPD.

All data, as reported by the laboratory, are acceptable for use.

4. Data Validation Report Select Metals by EPA Method 6020B

This section documents the review of metals (total iron and manganese) analytical data for groundwater and field QC samples and the associated laboratory QC samples.

4.1 Data Package Completeness

The laboratory submitted all required deliverables. The laboratory followed adequate corrective action processes and all anomalies were discussed in the case narrative.

4.2 Technical Data Validation

The QC requirements that were reviewed are listed below.

QC Requirements

Cooler temperature and preservation	Laboratory Duplicate
Extraction and analysis holding times	Target analyte list
Blank contamination (method)	Reporting limits and reported results
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) ¹	Field duplicates
Laboratory Control Sample (LCS)	

Notes:

QC requirement findings further discussed in following sections (if required):

¹ Quality control results are discussed below, but no data were qualified.

Some of the metals data were the result of a dilution and were flagged with “D” qualifier by the laboratory. The “D” qualifiers were removed from the final data table.

Appendix A presents data validation criteria tables for inorganic compound analysis. QC requirements that were met without exception are not discussed below. QC requirements that required further evaluation and/or had exceptions to the validation criteria are discussed below.

4.2.1 Matrix Spike and Matrix Spike Duplicate

Sample specific QC was performed in association with samples 24K0087-04 and 24K0161-01 (SPL-GW-MW18-1124 and SPL-GW-MW24-1124) in batches BMK0386 and BMK0480, respectively. The MS/MSD RPDs were within advisory control limits in both batches.

The MS and MSD percent recoveries were within control limits, except for the percent recovery in manganese, which were out of control low in both the MS and MSD in batch BMK0386. Manganese was detected in the associated sample; therefore, the manganese result for sample 24K0087-04 has been flagged with a J-, as the result is an estimated quantity, and the result may be biased low. In batch BMK0480, percent recoveries for iron were out of control low in both the MS and MSD, and out of control high for manganese in the MSD. Manganese and iron were detected in the associated sample; therefore, the iron result for sample 24K0161-01 has been flagged with a J-, as the result is an estimated quantity, and the result may be biased low. The manganese result for sample 24K0161-01 was qualified with a J+, as the result is an estimated quantity, and the result may be biased high.

4.3 Overall Assessment

As was determined by this evaluation, the laboratory followed the specified analytical method. Accuracy was acceptable, as demonstrated by MS percent recovery values. Precision was acceptable, as demonstrated by the LCS/laboratory duplicate RPDs.

All data, as reported by the laboratory, are acceptable for use.

5. References

- ARI. 2016. Standard Operating Procedure, Metals Analysis – Nexlon ICP-MS, SOP 545S, Version 001, Revision Date 2/8/2016.
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- EPA. 2020b. National Functional Guidelines for Organic Superfund Data Review. EPA 542-R-20-006. November.

Appendix A

Data Qualifier Definitions and Criteria Tables

DATA VALIDATION QUALIFIER CODES

National Functional Guidelines (EPA 2020)

The following definitions provide brief explanations of the qualifiers assigned to results in the data review process.

- U The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- NJ The analyte has been “tentatively identified” or “presumptively” as present and the associated numerical value represents the approximate concentration (for organics).
- UJ The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.

**Validation Guidelines for Volatile Analysis by GC/MS
(Based on EPA 2020b; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature	Cooler temperature: $\leq 6^{\circ}\text{C}$ HCl to pH ≤ 2	If >6 deg. C Qualify J if detected, UJ if not detected ¹
Hold Time	14 days preserved 7 Days: unpreserved (for aromatics)	Detects: J; Non-detects: J if hold times exceeded
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> ▪ If sample result <CRQL, qualify U report at CRQL ▪ If sample result \geq CRQL, use professional judgement
		If blank \geq CRQL: <ul style="list-style-type: none"> ▪ If sample result <CRQL, qualify U and report at CRQL ▪ If sample result \geq but < blank result, qualify U and report at sample result ▪ If sample result \geq CRQL and $\geq 2x$ blank results, report sample result and J+ qualify or no qualification
Trip Blank	Frequency as per project QAPP <CRQL	Same as method blank for positive results remaining in trip blank after method blank qualifiers are assigned
MS/MSD (recovery)	One per batch Use method acceptance criteria	Qualify original sample only unless other QC indicates systematic problems: For detects: <ul style="list-style-type: none"> ▪ J if $\%R < 20\%$, or $20\% < \%R < \text{Lower limit}$, or $\%R$ or RPD $> \text{Upper limit}$ For non-detects: <ul style="list-style-type: none"> ▪ R if $\%R < 20\%$, UJ if $20\% < \%R < \text{Lower limit}$
MS/MSD (RPD)	One per batch Use method acceptance criteria	For detects: J in original sample if RPD $> \text{Upper limit}$
LCS	One per lab batch	If not performed at specified frequency or concentration or % R not specified: use professional judgment For detects: <ul style="list-style-type: none"> ▪ $\%R < \text{Lower Limit}$, qualify J-+; $\%R > \text{Upper Limit}$, qualify J+- For non-detects: <ul style="list-style-type: none"> ▪ $\%R <$, qualify results R; If $\%R \geq$ No qualification
LCS/LCSD (if required)	One set per batch of 20 samples RPD $< 30\%$	Qualify sample results J/UJ

**Validation Guidelines for Volatile Analysis by GC/MS
 (Based on EPA 2020b; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Surrogates	Added to all samples Within method control limits	Not added or not at specified concentration, use professional judgement. For detects: <ul style="list-style-type: none"> ▪ %R < Expanded Lower Limit (10%), qualify results J- ▪ Expanded Lower Limit \leq %R < specified Lower Limit, qualify results J- ▪ %R > specified Upper Limit, qualify results J+ For non-detects: <ul style="list-style-type: none"> ▪ %R < Expanded lower limit (10%), qualify results R ▪ Expanded Lower Limit \leq %R < specified Lower Limit, qualify results UJ
Field Duplicates	QAPP limits RPD <35% OR in the project-specific SOP. Limits may not apply when sample and dup concentrations are less than 5x QL or limit in the QAPP	J/UJ in original only

¹Updated in Fourth Quarter 2024

**Validation Guidelines for Metals Analysis by ICP-MS
(Based on EPA 2020a; ARI 2020a)**

Validation QC Element	Acceptance Criteria	Action
Cooler Temperature and Preservation	Cooler temperature: $\leq 6^{\circ}\text{C}$ Nitric Acid to pH < 2 For Dissolved Metals: 0.45um filter & preserve after filtration	Professional Judgment—no qualification based on cooler temperature outliers J/UJ if pH preservation requirements are not met
Holding Time	180 days from date sampled	For detects: samples received with pH ≥ 2 and pH not adjusted, or technical holding >180 days, qualify J- For non-detects: pH ≥ 2 and pH not adjusted, or technical holding >180 days, qualify R
Method Blank	One per batch <CRQL	If blank <CRQL: <ul style="list-style-type: none"> ▪ Sample Detect <QL: Report at QL and qualify U ▪ Sample \geq QL: J+ or no qualification If blank result \leq (-MDL) but > (-QL): <ul style="list-style-type: none"> ▪ Sample Detect: qualify J- or no qualification ▪ Sample Non-detect: qualify UJ If blank result \geq CRQL: <ul style="list-style-type: none"> ▪ Sample Detect < CRQL: Report at QL and qualify U ▪ Sample result \geq CRQL but <10 x the Blank results: Report at Blank Result and qualify J+ or R ▪ $\geq 10x$ Blank results, no qualification If blank result \leq (-QL): <ul style="list-style-type: none"> ▪ Sample Detect < CRQL or \geq CRQL but <10x CRQL, qualify J- ▪ Sample Non-detect qualify UJ ▪ Sample result $\geq 10x$ QL, no qualification
Laboratory Control Sample (LCS)	One per matrix per batch Blank Spike: %R within 70%-130%	For detects: <ul style="list-style-type: none"> ▪ If %R < 40% or 40-69%, J- ▪ If %R 70-130%, no qualification ▪ If %R 131-151%, J+ ▪ If %R >150%, R For non-detects: <ul style="list-style-type: none"> ▪ If %R <40%, R ▪ If %R 40-69%, UJ ▪ If %R >70%, no qualification

**Validation Guidelines for Metals Analysis by GC/MS
 (Based on EPA 2020a; ARI 2020a), continued**

Validation QC Element	Acceptance Criteria	Action
Matrix Spike	One per matrix per batch %R 75-125% for samples where results do not exceed 4x spike level. If $\geq 4x$ the spike added, report unqualified.	For detects: <ul style="list-style-type: none"> ▪ J- if %R <30 to 74% ▪ J+ if %R >125% ▪ No qualification if %R 75-125% For Non-detects: <ul style="list-style-type: none"> ▪ R if %R <30%, ▪ UJ if %R <75% or ▪ No qualification if %R 75 to >125
Laboratory Duplicate	One per matrix per batch RPD <20% for samples $\geq 5x$ CRQL OR CQRL if sample results <5x CRQL	If results $\geq 5x$ CRQL and RPD >20% OR if results <5x CRQL and absolute difference >CRQL, <ul style="list-style-type: none"> ▪ J if detect, ▪ UJ if non-detect
Field Duplicate	For results > 5x RL: RPD < 20% For results < 5x RL: Diff < RL	J/UJ in original sample only

Appendix B

Field Duplicate Analysis

Data Validation		South Park Landfill							
QA/QC completed by:	Krista Keski-Hynnila			12/31/2024					
ARI Work Order		24K0087							
Sample numbers:	SPL-GW-MW18-1124; SPL-GW-MW60-1124								
Sample Date:	11/4/24								
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in 5x RL?
units = ug/L		MW-18	MW-60						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	<0.0200	<0.0200	NA	NA	NA		0.0200	y
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
units = mg/L		MW-18	MW-60						
Iron	mg/L	11.6	11.1	11.35	0.50	4	y	0.720	
Manganese	mg/L	0.727	0.688	0.7075	0.0390	6	y	0.0100	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Data Validation		South Park Landfill							
QA/QC completed by:	Krista Keski-Hynnila			12/31/2024					
ARI Work Order		24K0161							
Sample numbers:	SPL-GW-MW24-1124; SPL-GW-MW61-1124								
Sample Date:	11/6/24								
Groundwater		sample	duplicate	avg	diff	rpd	=/<35%	RL	w/in 5x RL?
units = ug/L		MW-24	MW-61						
cis-1,2-DCE	ug/L	<0.20	<0.20	NA	NA	NA		0.20	y
Vinyl chloride	ug/L	0.0524	0.0544	0.0534	-0.0020	4	y	0.0200	
Groundwater		sample	duplicate	avg	diff	rpd	=/<20%	RL	w/in RL?
units = mg/L		MW-24	MW-61						
Iron	mg/L	23.4	22.1	22.75	1.30	6	y	3.60/1.80	
Manganese	mg/L	1.51	1.59	1.55	-0.08	5	y	0.0250	
Comments:									
Calculated duplicate sample RPD = difference / average = ((X1-X2) / (X1+X2)/2)*100									
< = Analyte not detected at laboratory's reporting limit									

Appendix C

Qualified Data Summary Table

Table C.1. Qualified Data Summary Table Fourth Quarter 2024 Groundwater Sampling Event

Sample ID	Lab ID	Method	Analyte	Result	Units	Lab Qualifier	DV Qualifier	Final Qualifier
SPL-GW-MW18-1124	24K0087-04	EPA 6020B	Manganese	0.727	mg/L		J-	J-
SPL-GW-MW24-1124	24K0161-01	EPA 6020B	cis-1,2-Dichloroethene	0.20	ug/L	U	UJ	UJ
SPL-GW-MW24-1124	24K0161-01	EPA 6020B	Iron	23.4	mg/L		J-	J-
SPL-GW-MW24-1124	24K0161-01	EPA 6020B	Manganese	1.51	mg/L		J+	J+

Qualifiers:

- J+ The result is an estimated quantity, but the result may be biased high.
- J- The result is an estimated quantity, but the result may be biased low.
- U - The analyte was analyzed for but was not detected above the reported sample quantitation limit.
- UJ - The analyte was analyzed for but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.