Jacobs

Northwest Pipe Company
Portland Plant
ECSI No. 138

2022 Annual Groundwater Monitoring Report

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Northwest Pipe Company

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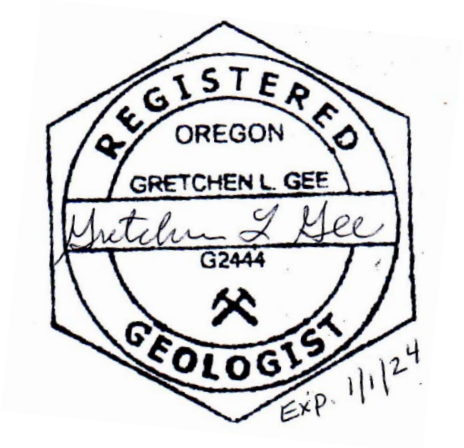

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Executive Summary

This report presents the results of groundwater monitoring conducted in 2022 at the Northwest Pipe Company (Northwest Pipe) Portland Plant (the Site) located at 12005 North Burgard Road, Portland, Oregon. Shallow groundwater in a portion of the Southeast Area of the Site contains volatile organic compounds (VOCs) at concentrations that exceed the U.S. Environmental Protection Agency (EPA) Record of Decision (ROD) Table 17 cleanup levels (CULs) for groundwater at the Portland Harbor Superfund site. Northwest Pipe has conducted investigations and focused remedial actions to address environmental conditions at the Site since it began operations at the Site in 1982. As established in the *Remedial Investigation and Source Control Evaluation*, finalized in 2021, monitored natural attenuation (MNA) is the current remedy and source control measure selected for VOCs in groundwater at the Site. Groundwater monitoring is intended to confirm that natural attenuation of VOCs in the shallow groundwater continues to be an effective remedy and source control measure.

In accordance with the MNA Work Plan (Jacobs 2022) approved by the Oregon Department of Environmental Quality on September 20, 2022, groundwater monitoring was conducted quarterly for the three wells installed in 2022 and semiannually for the other wells in the MNA network. Quarterly events were conducted June 29 and December 6, 2022, and at the same time as the semiannual events on April 11 through 14 and September 13 through 15, 2022. Data obtained were used to evaluate MNA at the Site following the protocol outlined in the EPA guidance document *Performance Monitoring of MNA Remedies for VOCs in Ground Water* (2004). Prior sampling at the Site established the Southeast Area conceptual site model that groundwater contamination is limited to the shallow aquifer and VOCs do not extend below the confining layer. Groundwater in the shallow aquifer discharges to Terminal 4 Slip 1 of the Willamette River, approximately 1,000 feet downgradient from the Southeast Area. Groundwater monitoring performed since 2016 shows that concentrations in groundwater samples from wells closest to the river are consistently below ROD CULs.

Groundwater monitoring conducted in 2022 at Northwest Pipe confirms that natural attenuation of VOCs in the shallow groundwater at the Southeast Area is occurring, is effective, and is protective (that is, there are no adverse effects in the form of VOCs at concentrations above the Portland Harbor ROD CULs reaching the river). The most recent groundwater data confirm the long-standing conceptual site model by way of the following:

- The Northwest Pipe groundwater source area has been remediated.
- Groundwater flow observations in 2022 show the plume is stable.
- Analysis for geochemical indicators of natural attenuation demonstrates the geochemical environment continues to be favorable to degradation of site-related VOCs by reductive dechlorination to maintain plume stability and decrease plume extent.
- New wells installed in 2022 on the Port site provide additional information on the lateral extent of the plume and increase the area monitored under the MNA program. The addition of three monitoring wells further allows for an early warning of the potential migration of VOCs to the Willamette River, in the unlikely event that it would occur.
- Groundwater quality analysis demonstrates the plume is not migrating beyond previously determined horizontal or vertical boundaries.
- Concentrations of VOCs remaining in on-site and off-site groundwater are relatively low, and there is consistent evidence in monitoring data collected since 2016 that groundwater containing VOCs does not reach the Willamette River above protective levels established in the ROD.

- Groundwater monitoring at the Site indicates that the groundwater plume is stable and decreasing, consistent with EPA guidance.
- Potential human health and ecological risks are addressed by MNA.

The groundwater monitoring work completed in 2022 at the Site confirms that MNA currently is satisfying the source control objective for the Site. Accordingly, groundwater monitoring will continue as scheduled in the MNA Work Plan.

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Appendixes (provided in electronic format)

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Acronyms and Abbreviations

°C	degree(s) Celsius
µg/L	microgram(s) per liter
µmol/L	micromole(s) per liter
A	annually
bgs	below ground surface
CUL	cleanup level
DCE	dichloroethene
DEQ	Oregon Department of Environmental Quality
EPA	U.S. Environmental Protection Agency
ft/day	foot per day
ft/ft	foot per foot
mg/kg	milligram(s) per kilogram
mg/L	milligram(s) per liter
MNA	monitored natural attenuation
Northwest Pipe	Northwest Pipe Company
OAR	Oregon Administrative Rule
PCE	tetrachloroethene
Port	Port of Portland
Q	quarterly
RBC	risk-based concentration
RI	Remedial Investigation
ROD	Record of Decision
SA	semiannually
SAP	Sampling and Analysis Plan
SCE	Source Control Evaluation
Site	Northwest Pipe Company Portland Plant
TCE	trichloroethene
TOC	total organic carbon
USGS	U.S. Geological Survey
VOC	volatile organic compound

1. Introduction

Jacobs has prepared this annual groundwater monitoring report on behalf of Northwest Pipe Company (Northwest Pipe) located at 12005 North Burgard Road, Portland, Oregon. Shallow groundwater in a portion of the Southeast Area (Figure 1-1) of the Northwest Pipe Portland Plant (the Site) contains volatile organic compounds (VOCs) at concentrations that exceed the U.S. Environmental Protection Agency (EPA) Record of Decision (ROD) Table 17 cleanup levels (CULs) for groundwater at the Portland Harbor Superfund site. This report presents the results of groundwater monitoring associated with the Southeast Area completed in 2022 in accordance with the *Monitored Natural Attenuation Work Plan* (Jacobs 2022) approved by the Oregon Department of Environmental Quality (DEQ) on September 20, 2022. This report presents an evaluation of the data and discussion regarding the ability of natural attenuation to prevent adverse effects from VOCs to the Willamette River at concentrations above the Portland Harbor ROD CULs. This report was prepared following the guidance for evaluating monitored natural attenuation MNA provided in the EPA document *Performance Monitoring of MNA Remedies for VOCs in Ground Water* (2004).

Northwest Pipe has conducted investigations and focused remedial actions to address environmental conditions at the Site since it began operations at the Site in 1982. The investigations and remedial actions conducted have provided environmental data defining the nature and extent of constituents at the Site and documented the effectiveness of the targeted remedial actions taken by Northwest Pipe. A Remedial Investigation (RI) and Source Control Evaluation (SCE) were conducted under the 2004 *Voluntary Agreement for Remedial Investigation and Source Control Evaluation* (DEQ agreement LQDVC-NWR-04-01). The RI/SCE, finalized in 2021, documented the environmental investigations and remedial actions conducted at the Site over more than 30 years (Jacobs 2021b). As established in the RI/SCE, MNA is the current remedy and source control measure selected for VOCs in groundwater at the Site. Groundwater monitoring is intended to confirm that natural attenuation of VOCs in the shallow groundwater continues to be an effective remedy under DEQ's Hazardous Substance Remedial Action Rules (Oregon Administrative Rule [OAR] 340-122-0040) and source control measure under the EPA and DEQ Joint Source Control Strategy (DEQ and EPA 2005).

This annual groundwater monitoring report focuses on the 2022 monitoring of VOCs in the Southeast Area shallow groundwater in accordance with the MNA Work Plan (Jacobs 2022). This report is organized as follows:

- Section 1—Introduction
- Section 2—Groundwater Monitoring Network and Function
- Section 3—2022 Groundwater Monitoring Summary
- Section 4—Review of Southeast Area Conceptual Site Model
- Section 5— MNA Data Evaluation
- Section 6—Conclusions
- Section 7—References

2. Groundwater Monitoring Network and Function

The VOCs of concern include tetrachloroethene (PCE) and its breakdown products trichloroethene (TCE), cis-1,2-dichloroethene (cis-1,2-DCE), and vinyl chloride. The purpose of the groundwater monitoring at Northwest Pipe is to confirm that natural attenuation of VOCs in the shallow groundwater at the Southeast Area is occurring, is effective, and is protective (that is, there are no adverse effects in the form of VOCs at concentrations above the Portland Harbor ROD CULs reaching the river). This section describes how the groundwater monitoring network and sampling frequency were enhanced as outlined in the MNA Work Plan to facilitate this goal.

2.1 Monitoring Network

Monitoring well locations were selected using criteria presented in EPA's *Performance Monitoring MNA Remedies for VOCs in Ground Water* (EPA 2004). Three new monitoring wells (MW-10, MW-11, and MW-12) were installed at the Site in March 2022 after DEQ email approval on January 26, 2022. The well network for long-term MNA monitoring is depicted on Figure 2-1. The network includes the three new wells and previously existing wells, and is based on the following rationale to fulfill the criteria in EPA guidance (2004):

- Upgradient uncontaminated groundwater relative to the zone of contamination – Well MW-02 is in the upgradient portion of the Site and meets the requirement for an uncontaminated area because it rarely has detectable VOC concentrations. MW-02 also is used for background concentrations in evaluating geochemical conditions at the Site.
- Source area/main plume core – Well MW-06 is in the general area of a former aboveground storage tank, a suspected source area. Well MW-06 has historically had higher levels of VOC concentrations compared to other wells and likely represents conditions in the plume core. Well MW-03 is in the main plume body in the area closer to the Site property boundary.
- Cross-gradient – Well MW-01 and MW-04 monitor VOC concentrations along the eastern margin of the plume in the plume core area. The proposed network also includes Well T4S1MW-22 and T4S1MW-23, both wells are on Port of Portland (Port) property and monitor the lateral extent of VOC concentrations.
- Uncontaminated downgradient parts of the aquifer – Wells T4S1MW-03S and T4S1MW-09 on Port property are uncontaminated and show groundwater quality prior to discharge to the Willamette River Terminal 4 Slip 1.
- Distinct geochemical zones – The geochemistry of groundwater on the Site differs from that on the Port's site, as described in Section 3.3. The network includes wells in the Southeast Area (MW-01 through MW-06), which has elevated concentrations. Wells on the Port site (MW-10, MW-11, MW-12, T4S1MW-22, T4S1MW-23, T4S1MW-09, and T4S1MW-03S) have lower- to nondetectable concentrations. These wells are used to monitor three geochemical zones: one for the Southeast Area, one with low VOC concentrations on the Port site, and one with nondetectable concentrations on the Port site.
- Groundwater flow characterization – Groundwater-level monitoring includes three more wells in addition to those targeted for sampling (Tables 2-1 and 3-1). This network of monitoring wells provides a sufficient basis to confirm that the already well-documented flow direction remains consistent with past observations.
- High-permeability zones – No high-permeability zones have been identified within the plume area other than the area monitored by MW-05, where slug testing and water level response during purging

and sampling have identified a localized aquifer zone of higher permeability than encountered in other nearby wells.

The construction information for the monitoring wells selected for the MNA program are summarized in the Sampling and Analysis Plan (SAP) included in the MNA Work Plan (Jacobs 2022). Figure 2-1 shows the MNA monitoring well network and the groundwater flow direction from the most recent sampling event.

Table 2-1. Well Construction Details for MNA Program

Well	Coordinates		Screened Interval (feet bgs)		Total Depth (feet bgs)	Well Use in MNA Network
	Northing (feet)	Easting (feet)	Screen Top	Screen Bottom		
MW-01	7621115.44	715674.70	14	24	25	Water Quality and Water Level
MW-02	7620821.90	715683.93	10.5	20.5	22	Water Quality and Water Level
MW-03	7620850.03	715487.66	14.5	24.5	26	Water Quality and Water Level
MW-04	7621087.85	715497.29	16.5	26.5	27	Water Quality and Water Level
MW-05	7621060.97	715816.63	17.5	27.5	28	Water Quality and Water Level
MW-06	7621020.40	715649.12	18.5	28.5	29	Water Quality and Water Level
MW-10	715211.03	7620361.85	9.0	29.0	29	Water Quality and Water Level
MW-11	715191.86	7620738.32	15.0	35.0	35	Water Quality and Water Level
MW-12	715222.46	7621019.27	15.0	30.0	30	Water Quality and Water Level
T4S1MW-02S	7621214.97	714998.33	20	30	30	Water Level Only
T4S1MW-03S	7620492.60	714732.19	20	30	30	Water Quality and Water Level
T4S1MW-09	7620519.44	714609.19	20	30	30	Water Quality and Water Level
T4S1MW-10	7620514.97	714448.17	10	20	20	Water Level Only
T4S1MW-22	7621091.96	715327.08	13	23	30	Water Quality and Water Level
T4S1MW-23	7620347.24	715358.39	15	25	30	Water Quality and Water Level
T4S1MW-25	7620880.20	714518.94	10	20	20	Water Level Only

Note:

Coordinate System: North American Datum 1983 State Plane Oregon North (U.S. feet)

bgs = below ground surface

2.2 Groundwater Monitoring Frequency

In accordance with EPA guidance (2004), the sampling frequency of the monitoring program is designed to accomplish the following:

- Provide timely warning of impacts on receptors.
- Detect VOC releases to groundwater that warn of possible plume expansion.
- Detect changes in plume size and concentration.
- Determine temporal variability of data.
- Detect changes in geochemistry that warn of changes in attenuation.
- Yield data necessary to reliably evaluate progress toward VOC reduction objectives.

In accordance with EPA guidance, quarterly monitoring is conducted for the three new monitoring wells to establish baseline conditions, observe seasonal trends including response to recharge, and estimate attenuation rates for key constituents (EPA 2004). Quarterly monitoring for the three new wells, and semiannual monitoring for the other wells in the MNA network, will be conducted for 2 years in accordance with the approved MNA Work Plan (Jacobs 2022). Following this 2-year period, the monitoring frequency will transition to annual frequency for all wells. Groundwater depth-to-water measurements are performed on all wells in the monitoring program (Table 2-1) during sampling events prior to purging and sample collection. The approved monitoring schedule is presented in Table 2-2.

Table 2-2. Sampling Frequency by Well

Well	2022	2023	2024	2025	2026
MW-01	SA	SA	A	A	A
MW-02	SA	SA	A	A	A
MW-03	SA	SA	A	A	A
MW-04	SA	SA	A	A	A
MW-05	SA	SA	A	A	A
MW-06	SA	SA	A	A	A
MW-10	Q	Q	A	A	A
MW-11	Q	Q	A	A	A
MW-12	Q	Q	A	A	A
T4S1MW-03S	SA	SA	A	A	A
T4S1MW-09	SA	SA	A	A	A
T4S1MW-22	SA	SA	A	A	A
T4S1MW-23	SA	SA	A	A	A

A = annually

Q = quarterly

SA = semiannually

EPA guidance supports reducing monitoring over time in situations where hydrologic, geochemical, and contaminant trends are stable and the conceptual site model is verified by measured site data (EPA 2004). Reduction in groundwater monitoring to an annual rate after initial data are collected on the three new wells is supported by the consistent data collected since consistent groundwater monitoring began in 2016, the relatively slow groundwater velocity, and the active reductive dechlorination occurring at the Site.

3. 2022 Groundwater Monitoring Summary

In accordance with the MNA Work Plan, groundwater monitoring was conducted quarterly for the three wells installed in 2022 and semiannually for the other wells in the MNA network. Quarterly events were conducted June 29 and December 6, 2022 at the same time as the semiannual events on April 11 through 14 and September 13 through 15, 2022. Groundwater monitoring parameters for long-term monitoring included VOCs and natural attenuation parameters. Time-sensitive parameters (that is, pH, temperature, specific conductance, dissolved oxygen, oxidation-reduction potential, and turbidity) were measured in the field at the time of sample collection.

3.1 Groundwater-level Measurements

Groundwater levels were measured during the semiannual events when all wells were monitored. Measurements were made at all wells listed in Table 3-1 prior to sampling. Potentiometric contour maps for April 11, 2022 and September 12, 2022 are presented on Figures 3-1 and 3-2, respectively. The depth-to-water level at one well, MW-03, was not measured during the April event due to inaccessibility as finished steel pipe was being stored over the well. Reconnaissance of well locations is planned to check the accessibility of wells prior to future events to prevent recurrence of this issue.

3.2 Water Quality Sampling Summary

Groundwater samples were collected using EPA low-flow sampling techniques. Parameters measured in the field at the time of sample collection are reported on Table 3-2. Collected samples were submitted for analysis to Eurofins TestAmerica Laboratory, in Seattle, Washington, and Eurofins Calscience LLC, in Tustin, California. Groundwater laboratory analysis was performed for selected VOCs (PCE, TCE, cis-1,2-DCE, and vinyl chloride) to provide the agency-requested updated information on plume stability and to evaluate fate and transport. Analysis for geochemical indicators of natural attenuation (chloride, nitrate as nitrite, sulfate, total organic carbon [TOC], ferrous iron, carbon dioxide, and methane) was conducted to provide further evidence of site conditions favorable for natural enhanced reductive dechlorination. Carbon dioxide was measured in the field during the April, September, and December 2022 events and by the laboratory during the June 2022 event. Copies of the analytical laboratory reports for groundwater samples are provided in Appendix A. In 2022, all monitoring wells were sampled in accordance with the SAP (Table 2-2). All wells were functional and accessible for water quality sampling. One field duplicate was collected during each event, at well MW-06 during semiannual events and at well MW-10 during quarterly events. No deviations from the SAP were noted.

3.3 Data Quality Review

A data quality evaluation was prepared for each monitoring event in 2022 (Appendix B). The completed data quality review procedure for each event included the following activities:

- Reviewing the case narrative, when available, from the laboratory report, noting any issues that were identified by the laboratory.
- Calculating hold times and comparing them with EPA's recommended maximum hold times. For the measured analytes, the hold times were calculated from information presented in the analytical laboratory reports.

- Reviewing the notes and definitions from the laboratory report, which are at the end of each report. Notes were reviewed to determine whether any sample results needed to be qualified. If results were qualified, the note and analyte were listed in the associated technical memoranda included as Appendix B.

For laboratory analytical reports submitted in 2022, the data quality evaluations present the number and type of samples per event, the sampling dates, qualified data (listed by the issue encountered), the parameter, and the sample locations and dates affected (Appendix B). The data sets were determined to be usable with the addition of selected flags. The precision and accuracy of the data, as measured by field and laboratory quality control indicators, demonstrate that the SAP goals for project use were met. Natural attenuation parameters are presented in Table 3-3, and VOC data are presented in Table 3-4. VOC data are screened against ROD CULs selected from Table 17 of the *Portland Harbor ROD* (EPA 2017) (Table 3-4). CULs were selected from Remedial Action Objectives 4 and 8 associated with migration of contaminated groundwater. CULs reflect changes from the *Errata for Portland Harbor ROD* (EPA 2018) and Errata #2 for *Portland Harbor ROD* (EPA 2020).

4. Review of Southeast Area Conceptual Site Model

The Southeast Area of the Site has been the subject of environmental investigation and monitoring since the late 1980s. Contamination in shallow soil at a localized area within what is now referred to as the Southeast Area was discovered in 1989, evidently associated with a former aboveground tank that had been located near current monitoring well MW-06 (Dames & Moore 1989). The tank and associated contaminated soil were subsequently removed in coordination with DEQ oversight (Crosby & Overton 1989). Follow-up investigations in the Southeast Area identified VOCs in shallow groundwater. The VOCs of concern in the Southeast Area are PCE and its breakdown products TCE, cis-1,2- DCE, and vinyl chloride. Although TCE is a breakdown product of PCE, it was also used as a commercially available solvent; its presence may be attributable, in part, to the historical use of products containing TCE. Groundwater contamination is limited to the shallow aquifer, and sampling at the Site determined that VOCs do not extend below the confining layer, the top of which is situated at approximately 28 feet bgs. Groundwater in the shallow aquifer discharges to Terminal 4 Slip 1 of the Willamette River, approximately 1,000 feet downgradient from the Southeast Area. Groundwater monitoring has shown that concentrations in groundwater samples from wells closest to the river are below ROD CULs.

4.1 Hydrologic Setting

The Site occupies a former alluvial floodplain of the Willamette River, as shown in an 1897 U.S. Geological Survey (USGS) map of the area (USGS 1897) (selected hydrographic features from which are depicted on Figure 4-1). The historical location of a former alluvial channel, identified by the USGS as Gatton Creek, was offsite to the east of the Site and flowed south to the area now occupied by Terminal 4 Slip 1. Dredged material consisting of silty sand was used to fill and level the area in early 1941 (OSC 1945). The Linnton USGS 7.5-minute topographic map indicates that the current topography of the Site is relatively flat (USGS 1961). Surface elevations range from 30 to 35 feet above mean sea level, with elevations in the northern part of the Site slightly lower than in the southern part. Native surface soil at the Site has been covered by fill, modified by re-grading and construction, and capped by pavement or structures. Fill and fluvial/lacustrine deposits extend from the ground surface to at least 258 feet bgs and are composed of interbedded silt, sand, and gravel layers, consisting of the following distinct zones:

- A shallow zone of fine sand and silty sand fill material (0 to 28 feet bgs), saturated in its lower half under unconfined conditions and underlain by a low-permeability confining layer. Elevated VOC concentrations have been determined to be limited to this shallow unconfined aquifer (Jacobs 2021b).
- An upper confining layer of low-permeability silt with sparsely interbedded sand from approximately 28 feet to 161 feet bgs. The top of this confining layer represents the historical ground surface prior to site filling and development. Principal sandy horizons within the upper confining layer are from 98 to 118 feet bgs and from 129 to 133 feet bgs.
- A deep, confined, water-bearing zone of sand and gravel from 161 feet to 221 feet bgs, in which the Site's production well is screened.
- A deep confining layer from 221 to at least 258 feet bgs (maximum depth of the Site's production well).

Following the guidance presented by EPA (2004), cross sections through the monitoring network in the general direction of groundwater flow and perpendicular to groundwater flow were developed and are presented on Figure 4-2. The subsurface information gained from the new wells installed in 2022 served to supplement the understanding of the subsurface geology along the flow path on the Port site. Figure 4-2 illustrates how the Northwest Pipe Site generally has more subsurface variability with layers of

finer grained material than the Port site, particularly in wells MW-05 and MW-06. The lower hydraulic conductivity associated with the finer grained material present in the subsurface slows groundwater movement on the Site. The elevation of the bottom of the shallow aquifer was similar in all the borings along and perpendicular to the flow path and is observed at approximately 5 to 8 feet elevation (North American Vertical Datum of 1988).

In 2022, the depth to groundwater in the shallow aquifer ranged from 9.06 feet to 12.55 feet bgs on the Site and from 7.31 feet to 19.18 feet bgs on the Port site (Table 3-1). These depths are consistent with the historical range for the Northwest Pipe Site of 6 to 14 feet bgs (Jacobs 2021b). The depth to groundwater is shallower in the central part of the Site. A groundwater divide occurs between the IT Slip north–northwest of the Site and the Terminal 4 Slip 1 southwest of the Site, with groundwater occurring deeper on the northern and southern edges of the Site. The groundwater flow direction in the southeastern portion of the Site is consistently south–southwest toward Slip 1; though the gradient is generally flat and localized, temporal flow directions between wells can vary. Groundwater levels in the shallow aquifer are influenced by the Willamette River stage closer to the slip and recharge from precipitation closer to the Site. Groundwater depth measurements and water quality sampling performed in 2022 captured both wet (April) and dry (September) season conditions.

The hydraulic gradient across the Site is low but increases approaching Slip 1. For the Site, the gradient between wells MW-06 and MW-03 were calculated to range from 0.0003 foot per foot (ft/ft) in April to 0.0007 ft/ft in September. The gradient leaving the Southeast Area and across approximately a third of the flow path on the Port site was calculated between wells MW-03 and MW-10. The gradient was found to increase approximately an order of magnitude from that on the Site, to 0.003 ft/ft in April and 0.002 ft/ft in September. Between wells MW-11 and T4S1MW-03S, gradient further increased to 0.01 ft/ft in April and 0.006 ft/ft in September. These gradients are consistent with those previously observed across the Site and Port (Jacobs 2021b). The addition of well MW-11 serves to better refine the conceptual site model by supporting that the gradient increases gradually along the flow path and more quickly closer to Slip 1. This low hydraulic gradient, and corresponding long travel time, across the Southeast Area and the Port site allows contaminant concentrations to be reduced by reductive dechlorination. Short duration periods of hydraulic gradient reversal or stagnation localized to the Southeast Area further slow groundwater movement toward Slip 1 and serve to prolong the exposure of contaminant concentrations to optimal reducing conditions as discussed in Section 4.2.

4.2 Geochemical Environment

Reductive dechlorination is most effective in the range corresponding to sulfate reduction and methanogenesis (which occurs through the reduction of carbon dioxide) (EPA 1998, 2004). Groundwater chemistry that indicates sulfate-reducing or methanogenic conditions in the Southeast Area include the following:

- Low dissolved oxygen concentrations, typically less than 0.5 milligram per liter (mg/L)
- Low oxidation-reduction potential, typically less than 50 millivolts and preferably below -100 millivolts
- Low concentrations of nitrate, typically less than 1 mg/L
- Presence of ferrous iron (Fe^{2+}), which results from the reduction of ferric iron (Fe^{3+}), at concentrations greater than 1 mg/L

Natural attenuation parameters were measured in 2005 and from 2016 through 2022 to evaluate the potential for reductive dechlorination based on geochemical conditions at the Site (Table 3-3). The dissolved oxygen and oxidation-reduction potential levels measured at site monitoring wells typically

meet the criteria for sulfate-reducing or methanogenic conditions listed previously. Additionally, the pH of groundwater measured at the Site is within the range amenable to microorganism survival, and the alkalinity is sufficient for buffering the pH against acids naturally produced by bacteria during biodegradation.

The natural attenuation data also were evaluated using EPA's screening worksheet to assess the potential for reductive dechlorination based on geochemical conditions (EPA 1998). The evaluation was performed using data from MW-02 for background conditions for both the 2005 and 2016 through 2022 data sets. For data representing the plume core of VOCs, wells MW-01, MW-04, and MW-06 were selected for 2005, and wells MW-05 and MW-06 were selected for 2016 through 2022. Although the evaluation and determinations about the presence of ongoing biodegradation are intended for use with data from the plume core (EPA 1998), the potential for reductive dechlorination on the Port site also was evaluated for the upgradient portion of the site and the downgradient portion of the site. The newly installed wells MW-10, MW-11, and MW-12 were evaluated to represent the upgradient portion of the site using 2022 data, and wells T4S1MW-03S and T4S1MW-09 were used to represent the downgradient portion of the site using data from 2016 through 2022.

The points awarded during the screening performed in the worksheet are interpreted as presented in Table 4-1 (EPA 1998).

Table 4-1. Interpretation of Points Awarded during Screening

Score	Interpretation
0 to 5	Inadequate evidence for anaerobic biodegradation of chlorinated organics
6 to 14	Limited evidence for anaerobic biodegradation of chlorinated organics
15 to 20	Adequate evidence for anaerobic biodegradation of chlorinated organics
>20	**Strong evidence for anaerobic biodegradation of chlorinated organics**

Note:

biodegradation = reductive dechlorination

Table 4-2 contains the worksheet along with scores assigned to the Northwest Pipe facility and the upgradient and downgradient portions of the Port site for 2016 through 2022. The total score of 23 for the Northwest Pipe data falls within the "strong evidence" category identified by EPA for VOC degradation via reductive dechlorination (EPA 1998) (Table 4-1), indicating that geochemical conditions at the Site are well-suited to reductive dechlorination and consistent with the observed limited migration of VOCs. The upgradient portion of the Port site receives a total score of 17, falling within the category of "adequate evidence" category identified by EPA for VOC degradation via reductive dechlorination (EPA 1998) (Table 4-1), indicating that geochemical conditions are still conducive to reductive dechlorination. Data provided by the new wells installed in 2022 provide the evidence that reductive dechlorination is continuing on the Port site, further allowing for the degradation of VOCs before they reach Slip 1.

The worksheet score for the downgradient portion of the Port of Portland is 4 for data collected from 2016 through 2022, falling within the "inadequate evidence" category identified by EPA for VOC degradation via reductive dechlorination (EPA 1998). This score is expected because many of the factors in the worksheet target predictable geochemical changes that are known to occur during biodegradation (EPA 1998). In the absence of chlorinated VOCs, many of these geochemical changes would not be present. Moreover, it is important to note that the wells selected for this portion of the flow path are closest to the slip and located far downgradient from the Southeast Area where VOC concentrations

already have undergone significant reductive dechlorination. These results are meaningful because they indicate that the interval of the aquifer between MW-06 and MW-03 is removing a substantial fraction of the VOCs from groundwater. Furthermore, the continued biodegradation occurring downgradient between MW-03 and MW-11 is further reducing concentrations to acceptable levels. This evaluation shows MNA is an effective and protective remedy for the groundwater in the Southeast Area and that the geochemical environment supports VOC degradation via reductive dechlorination.

Table 4-2. Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes

Analysis	Concentration in Most Contaminated Zone[a]	Interpretation	Value	Northwest Pipe	Port of Portland Upgradient	Port of Portland Downgradient
				2016 to 2022	2022	2016 to 2022
Dissolved Oxygen	< 0.5 mg/L	Tolerated; suppresses the reductive pathway at higher concentrations	3	3	0	0
Nitrate	< 1 mg/L	At higher concentrations, may compete with reductive pathway	2	2	2	0
Iron II	> 1 mg/L	Reductive pathway possible	3	3	3	0
Sulfate	< 20 mg/L	At higher concentrations, may compete with reductive pathway	2	2	2	2
Sulfide	> 1 mg/L	Reductive pathway possible	3	ND	ND	ND
Methane	> 0.5 mg/L	Ultimate reductive Breakdown product	3	3	3	0
Oxidation-reduction Potential	< 50 millivolts	Reductive pathway likely	2	1	1	0
pH	5 < pH < 9	Optimal range for reductive pathway	0	0	0	0
TOC	> 20 mg/L	Carbon and energy source; drives dechlorination; can be natural or anthropogenic	2	0	0	0
Temperature	>20°C	At T > 20°C, biochemical process is accelerated	1	0	0	0
Carbon Dioxide	> 2x background[a]	Ultimate oxidative breakdown product	1	1	0	0
Alkalinity	> 2x background[a]	Results from interaction between carbon dioxide and aquifer minerals	1	ND	ND	ND
Chloride	> 2x background[a]	Breakdown product of organic chlorine	2	2	0	0

Table 4-2. Analytical Parameters and Weighting for Preliminary Screening for Anaerobic Biodegradation Processes

Analysis	Concentration in Most Contaminated Zone[a]	Interpretation	Value	Northwest Pipe 2016 to 2022	Port of Portland Upgradient 2022	Port of Portland Downgradient 2016 to 2022
Hydrogen	> 1 nM	Reductive pathway possible	3	ND	ND	ND
TCE	–	Breakdown product of PCE	2[b]	2	2	0
DCE	–	Breakdown product of TCE	2[b]	2	2	0
Vinyl Chloride	–	Breakdown product of DCE	2[b]	2	2	2
		Total Score		**23**	**17**	**4**

[a] Data from MW-02 are used to indicate background conditions. MW-05 and MW-06 are used for 2016 to 2022. The newly installed wells MW-10, MW-11, and MW-12 were evaluated to represent the upgradient portion of the Port site using 2022 data, and wells T4S1MW-03S and T4S1MW-09 were used to represent the downgradient portion of the Port site using data from 2016 through 2022.

[b] Points awarded only if it can be shown that the compound is a breakdown product (that is, not a constituent of the source material). The presence of TCE and further breakdown products, combined with the limited migration distance away from the area of highest concentration, indicate that TCE, DCE, and vinyl chloride are breakdown products.

Notes:

ND = Not determined. Assigned a value of zero; the actual value, if data were available, may be higher.
°C = degree(s) Celsius
nM = nanomoles per liter
Source Area Remediation

Soil associated with a former aboveground tank located near current monitoring well MW-06 (Dames & Moore 1989) was remediated in 1989. Following excavation, confirmation sampling was performed, and low levels of PCE were detected in soil. Confirmation soil sample results ranged from below the reporting limit of 0.005 milligram per kilogram (mg/kg) in two samples to a maximum of 0.17 mg/kg PCE from the eastern wall of the excavation. This work was done in communication with DEQ, which considered the site a low-priority project (DEQ 1989). Although it was done several years before DEQ issued its risk-based decision-making guidance, the post-remedial action confirmation samples showed PCE levels in soil after remediation were well below potentially applicable risk-based decision-making values. Because this potential source area has been remediated in the past, the source area was capped in 2009/2010, and no other on-site potential source area has been identified in more than 25 years of investigation at the site, the source control element of an on-site MNA remedy (EPA 2004) has been met.

5. Monitored Natural Attenuation Data Evaluation

This annual groundwater report was developed in accordance with MNA guidance (EPA 2004) and the MNA Work Plan (Jacobs 2022). This report presents groundwater data collected in 2022 which, including data collected before that, provide evidence in support of the MNA decision for VOCs in Southeast Area groundwater.

5.1 VOC Concentrations in the Southeast Area

Low-level VOC concentrations in the Southeast Area have decreased substantially since monitoring began in the early 2000s, and recent concentrations demonstrate that MNA is an effective source control measure and remedial action for groundwater. Samples in the Southeast Area were collected from six wells in the area from 2001 through 2005, 2007, and 2016 through 2022. Groundwater sampling using Geoprobes was conducted in 2001, 2002, and 2004. Four Port wells were included in the monitoring program from 2016 through 2021, and an additional three Port wells added 2022.

Historical VOC concentrations in groundwater in the Southeast Area collected from 2001 through 2005 are shown on Figure 5-1. The highest historical concentrations of PCE occurred near MW-06 and MW-01 close to the location of the former aboveground tank, with lower concentrations detected both upgradient (MW-05) and downgradient (MW-03 and MW-04) of these wells. Groundwater monitoring resumed in 2016 and has been conducted semiannually since then.

VOC concentrations in monitoring wells for both the Site and Port site from 2016 through 2022 are shown on Figures 5-2 and 5-3, respectively. Trend plots for this time period are presented on Figures 5-4, 5-5, and 5-6. These data show the wells with the highest VOC concentrations are consistently wells MW-05 and MW-06. By comparison, MW-01, MW-03, and MW-04 have shown consistently moderate concentrations, and MW-02 and the Port property wells have concentrations near or less than the laboratory reporting limits for VOCs.

In September 2022, MW-02 exhibited values of cis-1,2-DCE and vinyl chloride approximately 1 order of magnitude greater than those usually observed. This spike appears to have only involved those two constituents, as PCE and TCE concentrations were within the range normally observed. Concentrations of cis-1,2-DCE and vinyl chloride were likewise an order of magnitude lower than usual at well MW-06, approximately 200 feet to the east of MW-02. These observations suggest the core of the plume may have moved slightly west of its usual location closer to MW-06. To assess what may have caused this condition, Willamette River stage height measurements were compared for 2022 to average conditions between 2007 and 2022. The data for 2022 show a month-and-a-half period of unusually high river stage, from early June to mid-July (Figure 5-7). This period of high river stage ended in a steep decline (steeper than typical) followed by typical low river stage, and then (beginning in September) even lower-than-typical river stage until recovery to more normal levels started in mid to late October. The sampling event was conducted in September prior to the recovery to more normal levels. The unusual high river stage, lasting for several weeks, would cause a general rise in water levels both in Willamette River tributaries as well as in aquifers hydraulically connected to the river. Then, when the river stage underwent its unusually steep decline, that would have caused a stronger-than-normal westerly gradient in the aquifer underlying the site. Although not definitive, this sequence of events could have caused the plume core to be pulled slightly west of where it typically flows. Future water level and water quality monitoring under the approved MNA Work Plan (Jacobs 2022), including at MW-02, should provide a more complete understanding of this anomaly.

The newly installed wells (MW-10, MW-11, and MW-12) on the Port site were installed perpendicular to the groundwater flow path at the downgradient edge of the plume. The VOC concentrations observed in

2022 support that these wells are near the leading edge of the plume just prior to where reductive dechlorination is anticipated to have degraded concentrations below laboratory reporting limits. The data obtained from these wells suggest the centerline of the plume is in the area monitored by MW-11 and MW-12. These wells improve the confidence in the assessment of the lateral extent of the plume and increases the lateral area monitored as requested by DEQ (DEQ 2021). The addition of three monitoring wells further allows for an early warning of potential changes in groundwater quality that may have relevance to the evaluation of protectiveness of the MNA remedy with respect to the Willamette River.

Data collected from 2016 through 2022 exhibit normal and expected temporal variability in concentrations. However, the maximum value of the most highly concentrated VOC identified in data (PCE in MW-05; 4,400 micrograms per liter [µg/L] measured in May 2019) is less than half the maximum concentration previously detected in groundwater at the site (PCE in GP-1; 9,800 µg/L measured in 2001). This reduction in the concentration of PCE is consistent with a stable or decreasing plume that is controlled by the natural attenuation processes.

5.2 Evidence of Plume Stability

Jacobs reviewed EPA documents and other supporting information on plume stability in the context of MNA decision-making to evaluate the stability of the Southeast Area VOC plume.

5.2.1 Evaluation of Plume Stability Using EPA Criteria (1999)

As stated in *Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites*, "sites where the contaminant plumes are no longer increasing in extent, or are shrinking, would be the most appropriate candidates for MNA remedies" (EPA 1999). The factors that characterize plume stability outlined by EPA (1999) are as follows:

- The plume area is not expanding.
- The geochemical environment is favorable to degradation of site-related constituents.

When defining the plume area, EPA (1999) states that a plume boundary is more realistically defined by a zone rather than a line, and concentration fluctuations occurring within this zone likely result from factors such as analytical, seasonal, or spatial variations, and may or may not be indicative of a trend in plume migration. One way to counter this variability is presented in later EPA guidance (2004), which states that data from downgradient limits of a plume should be considered in a group of wells to determine stable or decreasing trends compared to previous sampling rounds (EPA 2004).

The Southeast Area plume meets the metrics for stability presented in these documents as evidenced by VOC concentrations in the plume's margin, in downgradient wells, and in the soil gas investigation performed in 2021 (Jacobs 2021a). The results of the soil gas sampling indicate that the downgradient migration of VOCs in groundwater is limited because nearly all the passive soil gas sampler results on Port property showed no detectable chlorinated ethenes. Furthermore, wells at the plume margins (such as MW-03 and T4S1MW-22) have shown clearly decreasing trends in the concentrations of parent VOCs. The wells closest to Terminal 4 Slip 1 (T4S1MW-03S and T4S1MW-09) have not had detectable VOCs since Northwest Pipe began consistent groundwater monitoring in 2016.

As described in Section 4.2, trends in concentrations in wells within the plume interior exhibit temporal variability. According to EPA (2004), contaminant concentrations at individual sampling points may exhibit fluctuations, including small-scale expansion and shrinkage in response to groundwater flow mechanics and biological degradation rates throughout the year. In addition, VOC concentrations in individual wells may fluctuate with changes in plume configuration caused by oscillations in groundwater

flow (EPA 2004). Concentrations in MW-03 are a good example of this characteristic. Although some concentrations were higher in 2016 than previously measured in 2005, concentrations of PCE and TCE have been consistently decreasing since monitoring resumed in 2016. Likewise, cross-gradient wells T4S1MW-22 and T4S1MW-23 both show much lower concentrations in recent monitoring than were found in historical samples, as do wells closer to the source area, MW-01 and MW-04. Minor variations in concentration in the plume interior are expected, commonly observed, and are consistent with a stable to decreasing condition as long as the areal extent of the plume does not expand.

After eliminating the effect of the molecular weights of the different constituents by converting concentration data to micromoles per liter, the downward trends of PCE and TCE to their breakdown products (cis-1,2-DCE and vinyl chloride) are illustrated in wells MW-06 and MW-03 (Figure 5-8). PCE is a definitive parent compound, while TCE may be a parent compound or a breakdown product of PCE. The presence and increasing magnitude of the breakdown products of PCE and TCE are evidence that reductive dechlorination is active in the Southeast Area.

Figure 5-9 presents the average molar concentration for 2022 parallel to groundwater flow along the centerline of the plume. This plot includes the three highest-concentration wells in the Southeast Area (MW-05, MW-06, and MW-03), new well MW-11 on the Port site, and a Port well closest to Terminal 4 Slip 1 (T4S1MW-03S). Molar concentrations of PCE, TCE, and cis-1,2-DCE are all highest in MW-05 and decrease progressively from MW-06 to MW-03 to MW-11 and are nondetect at the well closest to the slip at T4S1MW-03S. Vinyl chloride is also highest in MW-05, but lower in MW-06 than MW-03. VOC concentrations are substantially reduced on the Site, and all average VOC molar concentrations are less than 0.05 micromole per liter beyond MW-11, over 700 feet from Slip 1. VOCs are below detection limits and ROD CULs in Port well T4S1MW-03S (or neighboring well T4S1MW-09), over 100 feet distant from the slip. This pattern shows effective and protective degradation of the plume of VOCs by natural attenuation processes.

5.2.2 Evaluation of Plume Stability Using Criteria in EPA (1998)

EPA's *Technical Protocol for Evaluating Natural Attenuation of Chlorinated Solvents in Ground Water* (1998) states the determination of plume stability should be based on the following:

- Contaminant properties, including volatility, sorptive properties, and biodegradability
- Aquifer properties, including hydraulic gradient, hydraulic conductivity, porosity, and concentrations of native organic material in the aquifer matrix (fractional organic carbon, or f_{oc})
- The location of the plume and contaminant source relative to potential receptor exposure points (that is, the distance between the leading edge of the plume and the potential receptor exposure points)

The first point in support of plume stability is addressed by the screening worksheet described in Section 4.1, also included in EPA (1998), which integrates the contaminant properties, including volatility, sorptive properties, f_{oc} (from the second point), and biodegradability. When screened, site data scored in the "strong evidence" category, indicating that geochemical conditions at the Site support reductive dechlorination and are consistent with the data demonstrating limited migration of VOCs.

Regarding the second point in EPA's (1998) protocol in support of plume stability, aquifer properties were investigated using aquifer testing in November 2016 to provide additional site-specific information on aquifer hydraulic characteristics and better determine the groundwater flow velocity at the site (Jacobs 2021b). Single-well rising head tests, commonly referred to as slug-withdrawal tests, were performed on three of the six monitoring wells on the Site (MW-05, MW-06, and MW-03) and two Port wells (T4S1MW-22 and T4S1MW-03S). The typical hydraulic conductivity for the shallow aquifer along the flow path ranges from approximately 2 to 25 feet per day (ft/day). The hydraulic conductivity of

MW-05 was calculated to be higher than the typical range (130 ft/day), indicating that this well is screened in a localized zone of higher hydraulic conductivity. The higher hydraulic conductivity at this well is reflected in observations of minimal drawdown during sampling; however, this zone of higher hydraulic conductivity is bounded by lower conductivity in the downgradient direction and that lower conductivity will ultimately determine the rate of flow through this area (Jacobs 2021b). The average hydraulic conductivity over the flow path is 12.5 ft/day.

Groundwater flow direction is consistently south to southwest toward Terminal 4 Slip 1 on the Port site, downgradient of the Southeast Area. The hydraulic gradient increases approaching Terminal 4 Slip 1, from an average of 0.005 ft/ft from the boundary of the Site through the middle of the Port site, transitioning to an average of 0.01 ft/ft near the slip (Jacobs 2021b)[1]. Water levels on the Port site, particularly closer to the Terminal 4 Slip 1, are more susceptible to influence from river stage because of closer proximity to surface water. This effect is most pronounced in wells located closest to the Terminal 4 Slip 1. On the Site, the hydraulic gradient appears to be nearly flat and more variable than further south, but flow is predominantly southerly as well. The observed variability in hydraulic gradient appears to be caused by a combination of the gradual gradient and short-term aquifer response to changes in river stage or precipitation events. The groundwater flow direction in the area of MW-04, to the east of the high-concentration area, appears to vary seasonally with westerly and, infrequently, northerly flow directions. The decrease in hydraulic gradient (an average of 0.0006 ft/ft) across the Southeast Area compared to the Port site, causes slower groundwater flow compared to the Port site. Groundwater levels farther away from surface water, such as at the Southeast Area, have less sensitivity to changes in river stage. Actual groundwater movement during short periods of hydraulic gradient reversal are minimal because of the combination of low hydraulic gradient, low hydraulic conductivity, and the brief duration of gradient reversal. When considering retardation of VOCs dissolved in groundwater caused by sorption/desorption onto organic carbon in the aquifer matrix, the movement of VOCs would be much less than suggested by calculations of groundwater flow.

Using these site-specific parameters, groundwater velocity can be calculated for the Southeast Area using a version of Darcy's Law:

$$v = K * i/n$$

where:

v = groundwater velocity (ft/day)
K = hydraulic conductivity (ft/day)
i = hydraulic gradient (ft/ft)
n = effective porosity (unitless)

The average hydraulic conductivity (12.5 ft/day), hydraulic gradient (0.005 ft/day), and typical effective porosity based on soil type (0.2) results in a groundwater velocity across the Southeast Area and the northern Port property of 0.31 ft/day.

Regarding the third point in the EPA (1998) protocol in support of plume stability, the slow rate of groundwater flow and the distance from the Southeast Area to the river (1,370 feet from MW-06 to Terminal 4 Slip 1) provides sufficient distance between the leading edge of the plume and the potential receptor exposure point at the river, thereby addressing the third point in EPA (1998) establishing plume

[1] 2022 hydraulic gradient observations averaged 0.002 ft/ft across the Northwest Pipe site and the middle of the Port site, and 0.008 ft/ft closer to Slip 1. The hydraulic gradient values used in this analysis have been maintained at average levels to be conservative.

stability. Therefore, data for the Southeast Area support all three points, thus verifying plume stability as described in EPA guidance (1998).

According to the evaluation presented in this work plan by the metrics outlined in EPA guidance on MNA, the VOC plume in the Southeast Area is stable.

5.3 Protectiveness of MNA Remedy

The primary transport pathways from the source area to potential receptors include the following: (1) shallow groundwater discharge to off-site surface water, (2) contact with shallow groundwater during excavation activities, and (3) volatilization of VOCs from shallow groundwater to indoor and outdoor air. Conclusions from the human health risk screening for groundwater as presented in the RI/SCE (Jacobs 2021b) are that maximum VOC concentrations in groundwater do not pose an unacceptable risk to human health or the environment, as summarized for each pathway below:

- **Groundwater Discharge to Off-site Surface Water** – Groundwater samples collected at wells closest to the river have not exceeded ROD CULs, indicating that there is no unacceptable risk to human health from the groundwater-to-surface-water pathway. Groundwater samples collected at wells closest to the river have not exceeded DEQ Level II screening level values for potential aquatic, bird, or mammalian receptors, indicating that there is no unacceptable risk to ecological receptors from a groundwater-to-surface-water pathway. Furthermore, the soil gas investigation conducted in 2021 indicate that the groundwater-to-surface-water (Willamette River at Terminal 4 Slip 1) transport pathway is incomplete (Jacobs 2021a).
- **Shallow Groundwater in a Potential Excavation** –Data generated since groundwater monitoring resumed in 2016 (and continues to the present) confirm that the risk posed by recent and current concentrations is below the DEQ hazard index target of 1. This data reflects current risk at the Site by accounting for continued and active degradation of VOCs. Contact with groundwater through excavation work is controlled by the Site's Contaminated Media Management Plan (included as an appendix to the RI/SCE [Jacobs 2021b]). The media management plan includes worker notification, health and safety precautions, and proper management and disposal of groundwater encountered during a potential excavation.
- **Volatilization from Shallow Groundwater to Indoor and Outdoor Air** – Maximum detected concentrations for groundwater samples collected from on-site and off-site monitoring wells and Geoprobe samples were compared to DEQ groundwater vapor intrusion risk-based concentrations (RBCs), groundwater outdoor air RBCs, and groundwater in an excavation RBCs. None of the VOC concentrations, either historical or current, exceeded indoor or outdoor air occupational worker RBCs.

The risk assessment presented in the RI/SCE (Jacobs 2021b) concluded that no excess human health or ecological risk exists from VOCs in the Southeast Area of the Site. In addition, given the ongoing process of reductive dechlorination, VOC concentrations in the Southeast Area of the Site are continuing to attenuate below levels of potential concern before reaching surface water.

6. Conclusions

Groundwater monitoring conducted in 2022 at Northwest Pipe confirms that natural attenuation of VOCs in the shallow groundwater at the Southeast Area is occurring, is effective, and is protective (that is, there are no adverse effects in the form of VOCs at concentrations above the Portland Harbor ROD CULs). The most recent groundwater data confirms the long-standing conceptual site model by way of the following:

- The Northwest Pipe groundwater source area has been remediated.
- Groundwater flow observations in 2022 showed the plume is stable.
- Analysis for geochemical indicators of natural attenuation demonstrates the geochemical environment continues to be favorable to degradation of site-related VOCs by reductive dechlorination to maintain plume stability.
- New wells installed in 2022 on the Port site provide additional information on the lateral extent of the plume and increase the area monitored under the MNA program. The addition of three monitoring wells further allows for an early warning of the potential migration of contaminants to the Willamette River, in the unlikely event that this would occur.
- Analysis indicates the plume is not migrating beyond previously-documented horizontal or vertical boundaries.
- Concentrations of VOCs remaining in on-site and off-site groundwater are relatively low, and there is consistent evidence in monitoring data collected since 2016 that groundwater containing VOCs above protective levels established in the ROD does not reach the Willamette River.
- Groundwater monitoring at the site indicates that the groundwater plume is stable or decreasing, consistent with EPA guidance.
- Human health and ecological risk are addressed by MNA.

MNA is currently satisfying the source control objective for the Site and is an effective remedy under DEQ's Hazardous Substance Remedial Action Rules (OAR 340-122-0040) and source control measure under the EPA and DEQ Joint Source Control Strategy (DEQ and EPA 2005). Long-term groundwater monitoring will continue as scheduled in the MNA Work Plan.

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Tables

Table 3-1
Groundwater and Willamette River Elevation Measurements
Northwest Pipe Company Portland Plant

Well ID	Measurement Point Elevation[1] (ft)	Ground Surface Elevation[1] (ft)	Measurement Date	Depth to Water (ft bgs)	Elevation[1] (ft)
MW-01	30.64	30.99	10/25/2016	12.96	17.68
			1/10/2017	11.60	19.04
			1/30/2017	11.23	19.41
			4/25/2017	9.64	21.00
			7/24/2017	11.05	19.59
			12/4/2018	13.89	16.75
			5/7/2019	12.76	17.88
			10/7/2019	13.87	16.77
			4/21/2020	12.88	17.76
			10/20/2020	14.15	16.49
			4/13/2021	12.28	18.36
			10/26/2021	13.89	16.75
	33.82	34.17	4/11/2022	11.97	21.85
			9/12/2022	12.81	21.01
MW-02	27.66	27.97	10/25/2016	10.04	17.62
			1/10/2017	8.70	18.96
			1/30/2017	8.22	19.44
			4/25/2017	6.66	21.00
			7/24/2017	8.16	19.50
			12/4/2018	10.98	16.68
			5/7/2019	9.84	17.82
			10/7/2019	10.92	16.74
			4/21/2020	9.97	17.69
			10/20/2020	11.23	16.43
			4/13/2021	9.36	18.30
			10/26/2021	10.95	16.71
	30.85	31.16	4/11/2022	9.06	21.79
			9/12/2022	9.91	20.94
MW-03	29.15	29.38	10/25/2016	11.63	17.52
			1/10/2017	10.20	18.95
			1/30/2017	9.69	19.46
			4/25/2017	8.09	21.06
			7/24/2017	9.82	19.33
			12/4/2018	12.66	16.49
			5/7/2019	11.42	17.73
			10/7/2019	12.59	16.56
			4/21/2020	11.56	17.59
			10/20/2020	12.89	16.26
			4/13/2021	10.91	18.24
			10/26/2021	12.49	16.66
	32.34	32.57	4/11/2022	NM	NM
			9/12/2022	11.49	20.85
MW-04	30.12	30.77	10/25/2016	12.50	17.62
			1/10/2017	11.07	19.05
			1/30/2017	10.62	19.50
			4/25/2017	9.00	21.12
			7/24/2017	10.64	19.48
			12/4/2018	13.49	16.63
			5/7/2019	12.29	17.83
			10/7/2019	13.46	16.66
			4/21/2020	12.42	17.70
			10/20/2020	13.74	16.38
			4/13/2021	11.76	18.36
			10/26/2021	13.38	16.74
	33.30	33.95	4/11/2022	11.43	21.87
			9/12/2022	12.34	20.96

Table 3-1
Groundwater and Willamette River Elevation Measurements
Northwest Pipe Company Portland Plant

Well ID	Measurement Point Elevation[1] (ft)	Ground Surface Elevation[1] (ft)	Measurement Date	Depth to Water (ft bgs)	Elevation[1] (ft)
MW-05	30.38	30.74	10/25/2016	12.70	17.68
			1/10/2017	11.38	19.00
			1/30/2017	10.98	19.40
			4/25/2017	9.44	20.94
			7/24/2017	10.82	19.56
			12/4/2018	13.60	16.78
			5/7/2019	12.51	17.87
			10/7/2019	13.58	16.80
			4/21/2020	12.64	17.74
			10/20/2020	13.86	16.52
			4/13/2021	12.05	18.33
			10/26/2021	13.62	16.76
	33.57	33.93	4/11/2022	11.78	21.79
			9/12/2022	12.55	21.02
MW-06	29.82	30.06	10/25/2016	12.16	17.66
			1/10/2017	10.80	19.02
			1/30/2017	10.38	19.44
			4/25/2017	8.79	21.03
			7/24/2017	10.27	19.55
			12/4/2018	13.11	16.71
			5/7/2019	11.96	17.86
			10/7/2019	13.06	16.76
			4/21/2020	12.08	17.74
			10/20/2020	13.35	16.47
			4/13/2021	11.47	18.35
			10/26/2021	13.08	16.74
	33.01	33.25	4/11/2022	11.15	21.86
			9/12/2022	12.00	21.01
MW-10[2]	32.17	32.51	4/11/2022	11.00	21.17
			6/29/2022	10.02	22.15
			9/12/2022	11.92	20.25
			12/6/2022	12.12	20.05
MW-11[2]	32.06	32.43	4/11/2022	11.30	20.76
			6/29/2022	10.00	22.06
			9/12/2022	11.78	20.28
			12/6/2022	12.08	19.98
MW-12[2]	35.42	36.30	4/11/2022	13.76	21.66
			6/29/2022	13.25	22.17
			9/12/2022	14.81	20.61
			12/6/2022	15.19	20.23
T4S1MW-02S	35.27	35.59	10/25/2016	18.35	16.92
			1/10/2017	16.52	18.75
			1/30/2017	16.10	19.17
			4/25/2017	14.15	21.12
			7/24/2017	16.39	18.88
			12/4/2018	19.39	15.88
			5/7/2019	17.89	17.38
			10/7/2019	19.29	15.98
			4/21/2020	17.98	17.29
			10/20/2020	19.51	15.76
			4/13/2021	17.22	18.05
			10/26/2021	19.23	16.04
	38.46	38.78	4/11/2022	16.89	21.57
			9/12/2022	18.00	20.46

Table 3-1
Groundwater and Willamette River Elevation Measurements
Northwest Pipe Company Portland Plant

Well ID	Measurement Point Elevation[1] (ft)	Ground Surface Elevation[1] (ft)	Measurement Date	Depth to Water (ft bgs)	Elevation[1] (ft)
T4S1MW-03S	32.91	33.36	10/25/2016	19.04	13.87
			1/10/2017	18.04	14.87
			1/30/2017	17.61	15.30
			4/25/2017	15.65	17.26
			7/24/2017	18.09	14.82
			12/4/2018	19.85	13.06
			5/7/2019	18.75	14.16
			10/7/2019	19.75	13.16
			4/21/2020	18.91	14.00
			10/20/2020	19.85	13.06
			4/13/2021	18.48	14.43
			10/26/2021	19.61	13.30
	36.09	36.54	4/11/2022	22.75	13.34
			9/12/2022	18.94	17.15
T4S1MW-09	33.47	33.75	10/25/2016	19.33	14.14
			1/10/2017	18.47	15.00
			1/30/2017	18.10	15.37
			4/25/2017	16.46	17.01
			7/24/2017	18.51	14.96
			12/4/2018	19.99	13.48
			5/7/2019	19.01	14.46
			10/7/2019	19.88	13.59
			4/21/2020	19.11	14.36
			10/20/2020	19.93	13.54
			4/13/2021	18.68	14.79
			10/26/2021	19.77	13.70
	36.65	36.93	4/11/2022	18.52	18.13
			9/12/2022	19.18	17.47
T4S1MW-10	22.22	22.53	10/25/2016	8.16	14.06
			1/10/2017	7.44	14.78
			1/30/2017	7.20	15.02
			4/25/2017	5.65	16.57
			7/24/2017	7.57	14.65
			12/4/2018	8.75	13.47
			5/7/2019	8.02	14.20
			10/7/2019	8.67	13.55
			4/21/2020	8.01	14.21
			10/20/2020	8.71	13.51
			4/13/2021	7.61	14.61
			10/26/2021	8.56	13.66
	25.40	25.71	4/11/2022	7.31	18.09
			9/12/2022	8.03	17.37
T4S1MW-17	31.06	31.34	10/25/2016	14.89	16.17
			1/10/2017	13.43	17.63
			1/30/2017	12.87	18.19
			4/25/2017	11.31	19.75
			7/24/2017	13.75	17.31
			12/4/2018	16.68	14.38
			5/7/2019	14.81	16.25
			10/7/2019	16.51	14.55
			4/21/2020	16.44	14.62
			10/20/2020	16.86	14.20
			4/13/2021	15.95	15.11
	34.24	34.52	10/26/2021	16.89	17.35

Table 3-1
Groundwater and Willamette River Elevation Measurements
Northwest Pipe Company Portland Plant

Well ID	Measurement Point Elevation[1] (ft)	Ground Surface Elevation[1] (ft)	Measurement Date	Depth to Water (ft bgs)	Elevation[1] (ft)
T4S1MW-22	32.95	33.30	10/25/2016	15.46	17.49
			1/10/2017	13.95	19.00
			1/30/2017	13.44	19.51
			4/25/2017	11.78	21.17
			7/24/2017	13.63	19.32
			12/4/2018	16.50	16.45
			5/7/2019	15.34	17.61
			10/7/2019	16.47	16.48
			4/21/2020	15.34	17.61
			10/20/2020	16.74	16.21
			4/13/2021	14.85	18.10
			10/26/2021	16.39	16.56
	36.14	36.49	4/11/2022	14.31	21.83
			9/12/2022	15.29	20.85
T4S1MW-23	31.21	31.45	10/25/2016	13.72	17.49
			1/10/2017	12.44	18.77
			1/30/2017	11.82	19.39
			4/25/2017	10.45	20.76
			7/24/2017	12.34	18.87
			12/4/2018	14.98	16.23
			5/7/2019	13.72	17.49
			10/7/2019	14.89	16.32
			4/21/2020	13.90	17.31
			10/20/2020	15.20	16.01
			4/13/2021	13.30	17.91
			10/26/2021	14.81	16.40
	34.39	34.63	4/11/2022	12.99	21.40
			9/12/2022	13.90	20.49
T4S1MW-25	30.95	31.38	10/25/2016	15.11	15.84
			1/10/2017	13.46	17.49
			1/30/2017	12.95	18.00
			4/25/2017	11.16	19.79
			7/24/2017	13.54	17.41
			12/4/2018	16.03	14.92
			5/7/2019	14.57	16.38
			10/7/2019	15.88	15.07
			4/21/2020	14.68	16.27
			10/20/2020	16.02	14.93
			4/13/2021	14.00	16.95
			10/26/2021	15.79	15.16
	34.14	34.57	4/11/2022	13.75	20.39
			9/12/2022	14.77	19.37
Willamette River[3]			10/25/2016		5.03
			1/10/2017		6.82
			1/30/2017		6.07
			4/25/2017		14.88
			7/24/2017		4.00
			12/4/2018		2.20
			5/7/2019		6.02
			10/7/2019		-0.01
			4/21/2020		2.97
			10/20/2020		2.42
			4/13/2021		3.20
			10/26/2021		3.67
			4/11/2022		3.86
			6/29/2022		11.24
			9/12/2022		2.56
			12/6/2022		3.19

Table 3-1

Groundwater and Willamette River Elevation Measurements

Northwest Pipe Company Portland Plant

Well ID	Measurement Point Elevation[1] (ft)	Ground Surface Elevation[1] (ft)	Measurement Date	Depth to Water (ft bgs)	Elevation[1] (ft)

Notes:

ft bgs = feet below ground surface

NGVD29 = National Geodetic Vertical Datum of 1929

NAVD88 = North American Vertical Datum of 1988

[1]Elevations prior to April 2022 are in NGVD29, after April 2022, elevations are in NAVD88.

[2]MW-10, MW-11, and MW-12 were installed in March 2022. Wells are sampled quarterly.

[3]The Willamette River stage measurement for the second semi-annual event of 2022 was measured at the Morrison Bridge river gauge (USGS 14211720) on 9/12/2022 at 11:50 AM.

Table 3-2
Groundwater Quality Field Parameters
Northwest Pipe Company Portland Plant

Well	Date Sampled	Temperature (°C)	pH	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
Northwest Pipe Company Wells							
MW-01	10/26/2016	15.9	6.42	352	0.26	6	6.8
	2/2/2017	16.0	6.64	385	0.01	-36	3.1
	5/1/2017	15.5	6.56	423	0.12	36	3.0
	7/26/2017	17.2	6.46	513	0.08	66	1.0
	12/6/2018	15.0	6.61	460	0.47	-32	1.0
	5/9/2019	16.4	6.48	889	0.92	93	1.7
	10/9/2019	11.7	6.46	458	0.32	-16	1.9
	4/23/2020	15.5	6.37	401	0.74	97	3.1
	10/22/2020	15.7	6.45	500	0.32	53	3.6
	4/15/2021	15.5	6.53	449	0.16	-9	4.2
	10/28/2021	16.6	6.49	443	0.45	46	0.8
	4/13/2022	11.4	6.85	406	0.34	102	0.1
	9/15/2022	16.9	6.32	496	0.42	45	3.3
MW-02	10/26/2016	16.8	6.90	197	0.24	-138	0.7
	2/1/2017	15.4	6.97	202	0.09	-136	8.2
	4/27/2017	15.0	7.11	240	0.20	-142	8.1
	7/25/2017	20.1	6.74	244	0.07	-141	1.0
	12/5/2018	15.8	7.10	265	0.36	-167	1.6
	5/8/2019	17.1	7.03	501	0.52	-136	4.6
	10/8/2019	13.7	6.87	246	0.26	-106	0.9
	4/22/2020	15.2	6.94	484	0.15	-170	<5[1]
	10/21/2020	17.4	6.96	332	0.52	-139	0.5
	4/14/2021	15.8	6.80	291	0.95	-116	0.5
	10/27/2021	17.7	7.05	281	1.21	-155	0.8
	4/13/2022	11.5	7.31	284	0.23	-129	0.0
	9/14/2022	19.6	7.36	302	0.13	-138	1.9
MW-03	10/26/2016	16.4	6.61	281	0.32	-88	2.6
	2/2/2017	15.9	6.76	321	0.26	-68	3.2
	5/1/2017	15.5	6.56	334	0.07	-43	3.5
	7/27/2017	17.0	6.55	360	0.08	-69	2.6
	12/7/2018	14.6	6.74	372	1.02	-43	5.8
	5/9/2019	15.8	6.67	691	0.44	-37	6.3
	10/9/2019	12.2	6.49	342	0.80	-33	4.6
	4/23/2020	14.8	6.60	276	0.26	-74	10.6
	10/22/2020	15.3	6.67	345	0.31	-85	3.6
	4/15/2021	15.4	6.65	339	0.23	-19	16.5
	10/28/2021	16.6	6.58	309	0.46	-46	6.7
	4/14/2022	10.3	7.20	333	0.29	-50	11.7
	9/14/2022	16.1	6.85	346	0.25	-59	15.4
MW-04	10/26/2016	14.8	6.34	323	0.28	-59	4.1
	2/1/2017	14.3	6.39	440	0.32	-45	1.3
	4/27/2017	13.0	6.60	337	0.22	-59	5.0
	7/26/2017	15.1	6.42	374	0.13	-66	8.1
	12/6/2018	14.3	6.53	403	0.53	-48	1.3
	5/8/2019	14.5	6.47	777	0.92	-30	1.4
	10/8/2019	11.7	6.19	418	0.24	-26	0.5
	4/22/2020	14.4	6.38	673	0.75	-41	1.2
	10/21/2020	15.4	6.33	467	0.39	-32	0.5
	4/14/2021	14.6	6.60	300	0.41	32	0.6
	10/27/2021	16.2	6.28	316	0.54	1	1.0
	4/13/2022	9.8	6.68	267	0.31	60	0.0
	9/15/2022	15.5	6.42	289	0.46	-41	0.8

Table 3-2
Groundwater Quality Field Parameters
Northwest Pipe Company Portland Plant

Well	Date Sampled	Temperature (°C)	pH	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
MW-05	10/26/2016	15.5	6.50	375	0.17	-52	1.2
	2/2/2017	15.7	6.59	426	0.33	77	1.8
	5/1/2017	15.4	6.60	360	0.11	-40	0.5
	7/27/2017	18.0	6.46	390	0.11	19	2.2
	12/7/2018	13.5	6.71	386	0.62	-7	1.0
	5/9/2019	16.7	6.39	748	0.79	97	1.2
	10/9/2019	12.7	6.42	394	0.31	-19	0.3
	4/23/2020	16.0	6.35	354	0.63	-10	0.9
	10/22/2020	16.5	6.48	431	0.25	-36	0.7
	4/15/2021	16.6	6.25	404	0.19	-1	0.4
	10/28/2021	17.0	6.33	386	0.20	-18	0.6
	4/14/2022	11.7	7.15	341	0.24	-78	0.7
	9/15/2022	17.6	6.57	301	0.23	-22	1.7
MW-06	10/26/2016	15.9	6.47	266	0.15	-76	2.7
	2/2/2017	15.5	6.54	299	0.20	-47	2.8
	5/1/2017	15.7	6.35	310	0.13	20	4.4
	7/27/2017	16.6	6.27	322	0.07	-9	10.7
	12/7/2018	14.3	6.61	395	0.66	-49	13.4
	5/9/2019	17.8	6.42	712	0.70	31	36.1
	10/9/2019	12.0	6.38	339	0.14	-36	2.1
	4/23/2020	15.6	6.24	282	0.36	20	5.7
	10/22/2020	15.4	6.47	358	0.21	-46	0.5
	4/15/2021	16.3	6.23	386	0.18	-21	7.7
	10/28/2021	16.1	6.21	379	0.81	-6	2.0
	4/14/2022	11.3	6.93	444	0.42	14	0.4
	9/15/2022	16.6	6.31	426	0.24	-1	0.5
Northwest Pipe Company Wells on Port of Portland Property [2]							
MW-10	4/12/2022	11.0	7.17	285	0.27	-109	8.2
	6/29/2022	15.8	6.81	122	1.08	65	48.0
	9/13/2022	15.4	7.28	282	0.11	-111	0.5
	12/6/2022	13.7	6.97	269	0.42	-116	1.0
MW-11	4/12/2022	9.7	6.85	226	0.24	-7	1.4
	6/29/2022	15.4	6.76	263	0.00	-17	2.9
	9/13/2022	15.2	6.77	268	0.16	-54	1.9
	12/6/2022	13.7	6.83	241	0.88	-83	2.4
MW-12	4/12/2022	9.2	6.70	266	0.88	-27	9.4
	6/29/2022	14.9	6.63	203	2.17	18	19.5
	9/13/2022	15.4	6.92	280	1.87	-25	2.8
	12/6/2022	14.2	6.56	295	3.63	-11	1.7
Port of Portland Wells							
T4S1MW-03S	10/25/2016	14.2	6.42	245	0.86	72	0.5
	2/1/2017	14.3	6.65	111	5.19	145	0.8
	4/26/2017	13.2	6.62	87	8.96	167	1.6
	7/25/2017	16.0	6.46	164	4.46	115	0.3
	12/5/2018	13.4	6.53	203	0.63	161	0.2
	5/8/2019	14.5	6.55	338	2.34	145	0.3
	10/7/2019	11.2	6.26	171	0.47	47	0.3
	4/21/2020	14.3	6.32	181	3.11	207	0.5
	10/20/2020	14.6	6.10	151	0.81	125	0.2
	4/13/2021	15.0	6.60	148	5.15	70	0.6
	10/26/2021	14.8	6.35	164	0.73	102	0.3
	4/11/2022	8.5	6.52	181	5.44	146	2.8
	9/14/2022	16.1	6.65	168	2.13	74	0.7

Table 3-2
Groundwater Quality Field Parameters
Northwest Pipe Company Portland Plant

Well	Date Sampled	Temperature (°C)	pH	Specific Conductance (µS/cm)	Dissolved Oxygen (mg/L)	Oxidation Reduction Potential (mV)	Turbidity (NTU)
T4S1MW-09	10/25/2016	14.9	6.51	278	3.27	-53	1.6
	2/1/2017	14.9	6.67	234	2.87	-41	0.9
	4/26/2017	14.3	6.51	200	0.98	-20	4.2
	7/25/2017	16.0	6.45	216	1.77	96	1.8
	12/5/2018	14.8	6.76	176	1.49	187	0.5
	5/8/2019	14.4	6.26	393	5.52	194	1.2
	10/7/2019	12.1	6.46	201	1.42	64	0.5
	4/21/2020	15.5	6.41	200	4.38	182	0.7
	10/20/2020	17.6	6.20	211	1.63	89	0.1
	4/13/2021	16.6	6.50	188	3.15	52	0.3
	10/26/2021	15.4	6.59	225	1.19	151	0.4
	4/11/2022	10.7	6.48	171	4.20	66	0.8
	9/14/2022	16.3	6.72	198	2.86	91	0.7
T4S1MW-22	10/25/2016	15.7	6.35	217	0.33	97	4.0
	2/1/2017	14.4	6.40	255	0.30	132	1.2
	4/27/2017	15.0	6.36	232	1.20	169	1.4
	7/26/2017	16.0	6.25	242	0.88	117	0.7
	12/6/2018	15.0	6.47	281	0.63	149	0.3
	5/8/2019	15.8	6.22	651	1.13	123	1.2
	10/8/2019	12.4	6.16	321	0.26	42	1.0
	4/22/2020	15.7	6.26	522	0.85	138	0.6
	10/21/2020	16.1	6.25	290	0.22	104	0.4
	4/14/2021	15.7	6.14	261	1.13	50	0.2
	10/27/2021	16.4	6.20	262	0.28	98	0.3
	4/13/2022	10.1	6.65	254	0.99	120	0.0
	9/13/2022	16.9	6.27	299	0.34	98	1.2
T4S1MW-23	10/25/2016	15.1	6.49	165	0.90	39	1.2
	2/1/2017	14.2	6.54	177	1.31	51	1.4
	4/27/2017	14.9	6.53	161	1.12	92	1.9
	7/26/2017	18.0	6.57	165	1.47	61	0.6
	12/6/2018	13.8	6.67	182	1.14	80	1.0
	5/9/2019	14.6	6.37	438	1.34	101	1.5
	10/8/2019	12.0	6.31	202	1.79	33	1.0
	4/22/2020	15.1	6.32	469	1.24	123	1.6
	10/21/2020	16.3	6.35	291	1.19	87	1.1
	4/14/2021	15.8	6.51	225	1.39	30	0.8
	10/27/2021	15.7	6.30	236	1.66	88	0.2
	4/12/2022	10.1	6.69	219	2.23	102	0.2
	9/13/2022	16.7	6.57	246	2.44	97	0.8

Notes:

[1]Hach 2100Q was not reading values below 5; cause of this was not determined.

[2]MW-10, MW-11, and MW-12 were installed in March 2022. Wells are sampled quaterly.

pH was analyzed at the laboratory due to field meter malfunction for MW-02, MW-04, T4S1MW-03S, and T4S1MW-09 for the April 2021 event.

°C = degrees Celsius
mg/L = milligrams per liter
mV = millivolts
µS/cm = microsiemens per centimeter
NTU = Nephelometric Turbidity Units

Table 3-3
Groundwater Quality Analytical Data for Natural Attenuation Parameters
Northwest Pipe Company Portland Plant

		Natural Attenuation Parameters (mg/L)							
Sample ID	*Sample Date*	**Chloride**	**Nitrate-N**	**Sulfate**	**TOC**	**Iron, dissolved**	**Ferrous Iron[1]**	**Carbon Dioxide[1]**	**Methane**
Northwest Pipe Company Wells									
MW-01	10/26/2016	2.46	0.37 J	10.1	1	1.59	--	81	1.25
	2/2/2017	3.69	0.061	4.71	0.84	3.01	--	68.2	1.74
	5/1/2017	4	0.029	3.57	1.34	1.53	--	82.6	3.12
	7/26/2017	5.29	4.22	29.3	1.28	0.01	--	10.3	0.177
	12/6/2018	2.5	0.2	8.5	1.2	--	4.72	50	0.62
	5/9/2019	2.7	0.5 U	12	1.2	--	0.08	95	0.31
	10/9/2019	2.5	0.6	11	1.3	--	2.69	80	0.99
	4/23/2020	2.4	1.1 J	12	1.2	--	0.00	72	0.22
	10/22/2020	2.0	0.93	14	1.3	--	0.18	70	0.42
	4/15/2021	2.5 U	0.63	13 J	1.2	--	0.00	90	0.011
	10/28/2021	2.3	0.27	7.6	0.99	--	0.71	85	0.11
	4/13/2022	2.4	0.34	8.9	1.4	--	0.00	60	0.05
	9/15/2022	2.9	3.3	18	1.4	--	0.00	95	0.026
MW-02	10/26/2016	1.98	0.023 J	4.15	1.48	5.45	--	29.6	3.68
	2/1/2017	2.5	0.39	8.09	1.23	5.39	--	17.6	3.3
	4/27/2017	2.47	0.31	5.37	1.6	1.34	--	15.6	3.42
	7/25/2017	3.14	0.27	5.88	1.52	5.91	--	19.3	5.33
	12/5/2018	2.9	0.02 U	2.5	1.6	--	4.94	34	7.3
	5/8/2019	2.9 U	0.044 J	0.92 J	1.3	--	3.64	40	7.2
	10/8/2019	2.9 J	0.02 U	1.5 J	1.4	--	2.52	30	7.7
	4/22/2020	3.6	0.51	0.8 J	1.5	--	2.35	17	4.8
	10/21/2020	2.9	0.024 J	1.4	1.4	--	2.84	40	4.5
	4/14/2021	4.3	0.13 U	1.6	1.5	--	6.00	50	5.3
	10/27/2021	2.7	0.037 J	1.3 J	1.2	--	6.48	30	4.3
	4/13/2022	2.8	0.057 J	1.5	1.7	--	1.85	40	3.5
	9/14/2022	2.7	0.11 J	3.4	1.6	--	5.13	45	1.8
MW-03	10/26/2016	3.61	0.018 J	10.2	1.27	6.14	--	53.6	1.48
	2/2/2017	3.92	0.018	10.4	0.93	4.46	--	44.1	0.734
	5/1/2017	5.47	0.0028 U	12.1	1.27	3.32	--	53.9	0.748
	7/27/2017	5.19	0.011	9.48	1.33	6.31	--	57.6	2.67
	12/7/2018	3.8	0.02 U	10	1.5	--	2.96	45	2.2
	5/9/2019	4.3	0.2 U	9.4	1.3	--	2.72	60	2.3
	10/9/2019	4.2	0.031 J	10	1.6	--	3.12	60	2.6
	4/23/2020	4.1	0.29	7.3	1.4	--	1.27	23	1.7
	10/22/2020	3.1	0.08 J	7.0	1.4	--	5.18	40	1.1
	4/15/2021	4.5	0.13 U	9.1	1.4	--	2.77	55	0.49
	10/28/2021	3.3	0.2	7.7	1.4	--	2.58	50	0.39
	4/14/2022	3.3	0.031 J	12.0	1.4	--	2.32	45	0.19
	9/14/2022	3.3	0.03 U	9	1.5	--	5.86	55	0.11
MW-04	10/26/2016	3	0.043 J	5.7	1.21	12.9	--	104	1.46
	2/1/2017	4.9	0.0028 U	4.42	1.09	9.75	--	98.4	1.86
	4/27/2017	4.52	0.011	2.35	1.40	9.83	--	82	1.21
	7/26/2017	4.1	0.023	2.55	0.72	10.0	--	82.9	1.78
	12/6/2018	3.3	0.046 J	4.1	1.7	--	2.96	80	2.9
	5/8/2019	3.4 U	0.058 J	3.7	1.3	--	10.08	85	1.4
	10/8/2019	3.2	0.053 J	3.9	1.5	--	2.95	150	2.7
	4/22/2020	3.7	0.29	3.9	1.4	--	2.00	55	0.62
	10/21/2020	2.7	0.024 J	4.1 N	1.4	--	1.59	95	0.7
	4/14/2021	4	0.031 U	3.5	1.2	--	0.39	50	0.1
	10/27/2021	5.3	0.1 J	5.1	1.2	--	3.18	60	0.37
	4/13/2022	10	0.03 U	3.5	1.3	--	0.28	25	0.044
	9/15/2022	15	0.03 U	3	1.4	--	2.22	65	0.11

Table 3-3
Groundwater Quality Analytical Data for Natural Attenuation Parameters
Northwest Pipe Company Portland Plant

		Natural Attenuation Parameters (mg/L)							
Sample ID	*Sample Date*	**Chloride**	**Nitrate-N**	**Sulfate**	**TOC**	**Iron, dissolved**	**Ferrous Iron[1]**	**Carbon Dioxide[1]**	**Methane**
MW-05	10/26/2016	5.36	0.34 J	20.5	1.67	4.46	--	75.1	1.16
	2/2/2017	7.03	0.57	29.7	1.5	0.0137 U	--	74.9	0.887
	5/1/2017	4.87	0.0028 U	11.9	1.33	4.17	--	50.5	2.31
	7/27/2017	6.53	1.05	20.9	1.28	2.14	--	63.8	1.19
	12/7/2018	3.5	0.02 U	7.1	1.6	--	1.85	40	1.7
	5/9/2019	4.8	1.0	17	1.5	--	0.05	60	0.17
	10/9/2019	5.2	0.15 J	12	1.9	--	3.78	65	3.0
	4/23/2020	6	2.4	18	1.8	--	2.18	42	0.63
	10/22/2020	4.3	0.48	12	1.9	--	2.94	75	1.20
	4/15/2021	6.5	0.26 U	22	1.7	--	0.33	85	0.28
	10/28/2021	4.1	0.66	13	1.7	--	3.62	75	0.94
	4/14/2022	3.8	0.03 U	5.9	1.9	--	1.62	60	1.20
	9/15/2022	5	0.9	7.7	1.2	--	0.7	55	0.35
MW-06	10/26/2016	5.07	0.016 J	5.17	1.25	7.29	--	57.1	2.28
	2/2/2017	6.12	0.0028 U	9.27	1.15	6.10	--	60.5	0.623
	5/1/2017	6.2	0.0028 U	13.9	1.27	3.53	--	81.8	0.206
	7/27/2017	5.18	0.0084 J	13.7	1.05	3.24	--	78.6	0.214 J
	12/7/2018	5.2	0.02 U	8.7	1.5	--	1.87	55	3.5
	5/9/2019	5.8	0.13 U	17	1.5	--	1.41	90	0.37
	10/9/2019	5.5	0.039 J	9.4	1.8	--	4.40	80	3.1
	4/23/2020	6.3	0.23	14	1.5	--	1.56	34	0.61
	10/22/2020	5.5	0.021 J	9.5	1.7	--	4.88	95	1.2
	4/15/2021	8.2	0.096 U	15	1.5	--	1.71	110	0.28
	10/28/2021	5.4	0.12 J	11	1.4	--	3.18	100	0.76
	4/14/2022	4.1	0.03 U	25	1.8	--	1.76	100	0.58
	9/15/2022	2.8	0.03 U	22	1.6	--	1.46	150	0.036 J
MW-06	10/26/2016	5.05	0.017 J	5.36	1.15	7.4	--	59.5	2.04
Duplicate	2/2/2017	5.95	0.003 J	9.09	1.12	6.09	--	62.3	0.666
	5/1/2017	6.21	0.0028 U	14	1.4	3.6	--	82.3	0.265
	7/27/2017	5.21	0.01	13.6	1.16	3.22	--	80	0.382 J
	12/7/2018	5.2	0.02 U	8.8	1.5	--	1.87	55	4.1
	5/9/2019	5.7	0.14 U	17	1.6	--	1.41	90	0.35
	10/9/2019	5.5	0.035 J	9.7	2.1	--	4.40	80	2.9
	4/23/2020	6.3	0.23	13	1.4	--	1.56	44	0.59
	10/22/2020	5.4	0.02 U	9.3	1.7	--	4.88	95	1.3
	4/15/2021	8.3	0.093 U	15	1.6	--	1.71	110	0.23
	10/28/2021	5.3	0.16 J	11	1.4	--	3.18	100	0.8
	4/14/2022	4.1	0.03 U	25	1.8	--	1.76	100	0.057
	9/15/2022	2.8	0.03 U	23	1.5	--	1.46	150	0.018 J
Northwest Pipe Company Wells on Port of Portland Property [1]									
MW-10[2]	4/12/2022	2.6	0.03 U	2	2.5	--	1.77	35	1.2
	6/29/2022	1.6	0.20	5.4	0.79	--	0	7.4	0.0011
	9/13/2022	1.8	0.03 U	1.8	2	--	6.08	40	0.86
	12/6/2022	2.3	0.03 U	2.1	2.5	--	2.02	30	1 J
MW-10[2]	6/29/2022	1.7	0.21	5.4	0.76	--	0	7.3	0.0012
Duplicate	12/6/2022	2.3	0.03 UJ	2.3	2.4	--	2.02	30	0.41 J
MW-11[2]	4/12/2022	3.3	0.03 U	2.8	1.3	--	0.48	30	1.4
	6/29/2022	4.3	0.03 U	4.5	1.4	--	1.75	18	1.9
	9/13/2002	4.2	0.072 J	4.9	1.5	--	2.27	45	0.95
	12/6/2022	3.5	0.076 J	4.1	1.4	--	3.17	40	1.1
MW-12[2]	4/12/2022	2.5	0.088 J	4	1.6	--	1.58	35	0.27
	6/29/2022	2.1	0.17 J	3.5	1.2	--	2.41	20	0.21
	9/13/2022	2.6	0.22	3.3	1.3	--	5.90	70	0.41
	12/6/2022	4.6	0.44	7.2	1.4	--	3.09	55	0.33

Table 3-3
Groundwater Quality Analytical Data for Natural Attenuation Parameters
Northwest Pipe Company Portland Plant

		Natural Attenuation Parameters (mg/L)							
Sample ID	*Sample Date*	**Chloride**	**Nitrate-N**	**Sulfate**	**TOC**	**Iron, dissolved**	**Ferrous Iron[1]**	**Carbon Dioxide[1]**	**Methane**
Port of Portland Wells									
T4S1MW-03S	10/25/2016	5.1 J	5.19 J	24.7 J	0.85 J	0.0304 J	--	26.2 J	0.0291 J
	2/1/2017	0.86	1.23	4.54	0.39 J	0.01 U	--	13.9	0.0101 J
	4/26/2017	0.71	0.44	2.56	0.5	0.01 U	--	9.6	0.00515 U
	7/25/2017	1.9	3.79	12.4	0.56	0.01 U	--	18.1	0.00495 U
	12/5/2018	1.6	1.2	13	0.82 J	--	0	37.5	0.1 U
	5/8/2019	1.5 U	1.4	6.9	0.63	--	0.05	24	0.00025 U
	10/7/2019	1.2	1.2	8.6	0.84	--	0.01	24	0.16
	4/21/2020	1.3	4.8 J	15	0.72	--	0.55	15	0.00089 J
	10/20/2020	1.2	1.6	11	0.73	--	0.09	26	0.1
	4/13/2021	1.3 U	4.6 J	6.9	0.77 U	--	0.00	24	0.0007 J
	10/26/2021	1.5	0.6	7.7	0.67	--	0.07	25	0.08
	4/11/2022	1.1 J	3.0	10	0.99	--	0.00	32	0.00011 U
	9/14/2022	1.3 J	1.2	4.8	0.86	--	0.03	40	0.00044
T4S1MW-09	10/25/2016	2.76 J	1.23 J	5.97 J	1.09 J	7.62	--	49.1 J	2.64 J
	2/1/2017	1.7	2.94	5.66	0.61	4.41	--	29	1.22
	4/26/2017	1.65	1.87	5.95	0.7	2.00	--	27.3	0.0225 J
	7/25/2017	2.34	1.94	7.16	0.69	0.0321 J	--	30.8	0.0225 J
	12/5/2018	1.8	1.2	5.6	0.66 J	--	0	27.5	0.00025 U
	5/8/2019	1.6 U	1.8	7	0.53	--	0.08	26	0.0024
	10/7/2019	1 J	1.3	6.3 J	0.55	--	0.01	26	0.0036
	4/21/2020	1.3	2.7	7.7	0.55	--	0.02	13	0.0069
	10/20/2020	1.4	1.7	10	0.83	--	0.21	30	0.033
	4/13/2021	1.9 U	2.4	11	0.9 U	--	0.11	36	0.046
	10/26/2021	1.8	1.9	9.3	0.75	--	0.09	40	0.0025
	4/11/2022	1.6	1.5 J	5.6	0.78	--	0	30	0.0017
	9/14/2022	1.5	1.7	6.5	0.74	--	0	36	0.0031
T4S1MW-22	10/25/2016	2.8 J	0.095 J	5.49 J	1.19 J	0.01 U	--	48.4 J	0.0159 J
	2/1/2017	4.56	0.039	8.9	1.09	0.01 U	--	84.5	0.0334
	4/27/2017	3.38	0.92	10	1.18	0.01 U	--	49.1	0.00605 U
	7/26/2017	4.78	0.36	7.9	1.15	0.01 U	--	60	0.0154 J
	12/6/2018	6.1	0.02 U	15	1.3	--	0.00	50	0.16
	5/8/2019	7.9	0.11 J	11	1.2	--	0.05	85	0.041
	10/8/2019	7.3	0.02 U	16	1.6	--	0.01	60	0.016
	4/22/2020	5	0.73	7.7	1.3	--	0.00	40	0.023
	10/21/2020	4.4	0.021 J	6.5	1.5	--	0.00	50	0.0096
	4/14/2021	5.4	0.2 U	9.7	1.3	--	0.02	80	0.018
	10/27/2021	4.8	0.034 J	5.3	1.3 J	--	0.11	50	0.0097
	4/13/2022	6.9	0.23	5.7	1.4	--	0.00	40	0.0011
	9/13/2022	6.6	0.26	7.4	1.4	--	0.10	70	0.0038

Table 3-3

Groundwater Quality Analytical Data for Natural Attenuation Parameters

Northwest Pipe Company Portland Plant

		Natural Attenuation Parameters (mg/L)							
Sample ID	*Sample Date*	**Chloride**	**Nitrate-N**	**Sulfate**	**TOC**	**Iron, dissolved**	**Ferrous Iron[1]**	**Carbon Dioxide[1]**	**Methane**
T4S1MW-23	10/25/2016	3.92 J	0.27 J	7.67 J	0.65 J	0.221	--	52.9 J	0.00507 J
	2/1/2017	4.24	0.58	8.74	0.68	0.185	--	26.9	0.0379
	4/27/2017	3.36	0.42	7.76	0.78	0.0545 J	--	20.4	0.00712 J
	7/26/2017	4.07	0.36	4.83	1.18	0.11	--	27.5	0.0196 J
	12/6/2018	3.6	0.42	10	0.79 J	--	0.02	26	0.068
	5/9/2019	13	0.48 U	8.3	0.67	--	0.08	36	0.016
	10/8/2019	8.5	0.4	6.6	0.78	--	0.05	28	0.067
	4/22/2020	28	1.2	7.5	0.58	--	0.03	16	0.0087
	10/21/2020	30	0.96	8.3	0.82	--	0.00	35	0.0024
	4/14/2021	14 J	0.5 J	9.3 J	0.81 U	--	0.00	40	0.0031
	10/27/2021	9	0.71	7.7	0.72	--	0.10	32	0.0027
	4/12/2022	6.8	0.75	7.2	0.95	--	0.16	15	0.0029
	9/13/2022	7.8	0.91	6	1.1	--	0.00	35	0.0062

Notes:

mg/L = milligrams per Liter

TOC = Total Organic Carbon

[1] Parameter has been measured in the field since 2017. Carbon dioxide was measured using RSK 175 for the April 2020 and June 2022 sampling event.

[2]MW-10, MW-11, and MW-12 were installed in March 2022. Wells are sampled quaterly.

J - the analyte was detected, but the analytical laboratory has flagged the associated numerical value as estimated.

U - the analyte was analyzed for but was not detected above the detection limit.

Table 3-4

Groundwater Quality Analytical Data for Volatile Organic Compounds

Northwest Pipe Company Portland Plant

		Volatile Organic Compounds (µg/L)			
		PCE	TCE	cis-1,2-DCE	VC
Portland Harbor ROD Concentrations (µg/L) [1]		*0.24*	*0.6*	*70*	*0.022*
Northwest Pipe Company Wells					
MW-01	10/26/2016	158	22.8	113	16.7
(1,280 feet to river)	2/2/2017	71.1	14.9	107	29.9
	5/1/2017	61.7	13.0	220	51.6
	7/26/2017	197	26.7	174	8.51
	12/6/2018	98.0	13	160	19.0
	5/9/2019	220	28	100	3.80
	10/9/2019	150	18	140	17.0
	4/23/2020	260	29	110	5.2
	10/22/2020	220	26	160	22.0
	4/15/2021	280	24	58	0.5
	10/28/2021	130	23	120	19.0
	4/13/2022	140	23	60	3.2 J
	9/15/2022	210	21	74	2.9 J
MW-02	10/26/2016	0.0598	0.15 U	0.15 U	0.0652
(1,140 feet to river)	2/1/2017	0.169	0.15 U	0.200 J	0.0370
	4/27/2017	0.224	0.15 U	0.210 J	0.0115 J
	7/25/2017	0.451	0.15 U	0.410 J	0.0190 J
	12/5/2018	0.1 U	0.1 U	1.40	2.60
	5/8/2019	0.1 U	0.1 U	0.360	1.20
	10/8/2019	0.1 U	0.1 U	0.760	2.90
	4/23/2020	0.1 U	0.1 U	0.290	0.68
	10/21/2020	0.1 U	0.1 U	0.660	2.60
	4/14/2021	0.1 U	0.1 U	0.260	0.60
	10/27/2021	0.1 U	0.1 U	1.5	4.9
	4/13/2022	0.16 J	0.1 J	3.8	3.6 J
	9/14/2022	0.22	0.066 U	43	36 J
MW-03	10/26/2016	630	221	428	22.8
(975 feet to river)	2/2/2017	483	178	502	20.8
	5/1/2017	657	283	847	26.1
	7/27/2017	550	209	670	29.9
	12/7/2018	490	160	850	46.0
	5/9/2019	370	100	860	46.0
	10/9/2019	530	160	990	62.0
	4/23/2020	170	58	730	42.0
	10/22/2020	250	54	360	36.0
	4/15/2021	160	42	510	43.0
	10/28/2021	130	26	300	57.0
	4/14/2022	130	34	410	70.0 J
	9/14/2022	68	16	200	53 J

Table 3-4
Groundwater Quality Analytical Data for Volatile Organic Compounds
Northwest Pipe Company Portland Plant

		Volatile Organic Compounds (µg/L)			
		PCE	TCE	cis-1,2-DCE	VC
Portland Harbor ROD Concentrations (µg/L) [1]		*0.24*	*0.6*	*70*	*0.022*
MW-04	10/26/2016	28.2	38.4	111	4.45
(1,130 feet to river)	2/1/2017	12.4	20.3	119	9.73
	4/27/2017	14.4	29.7	116	16.6
	7/26/2017	18.5	35.4	137	9.43
	12/6/2018	16.0	19.0	190	4.60
	5/8/2019	5.40	8.40	150	6.10
	10/8/2019	10.0	16.0	120	5.60
	4/22/2020	4.9	8.8	170	4.00
	10/21/2020	12.0	12.0	110	3.70 J
	4/14/2021	5.0	10.0	120	1.70
	10/27/2021	13.0	8.2 J	110	2.50
	4/13/2022	6.0	13	110	2.50 J
	9/15/2022	2.8	6.0	44	11 J
MW-05	10/26/2016	3,510	195	1,160	40.4
(1,370 feet to river)	2/2/2017	4,150	208	1,240	39.5
	5/1/2017	949	92	634	70.7
	7/27/2017	3,640	170	1,730	7.58 J
	12/7/2018	1,200	85	1,600	77.0
	5/9/2019	4,400	240	1,700	14.0
	10/9/2019	2,300	140	2,200	120
	4/23/2020	3,600	170	1,900	34
	10/22/2020	2,400	150	1,200	87
	4/15/2021	3,700	170	1,800	26
	10/28/2021	2,200	180	760	56
	4/14/2022	1,900	110	960	170 J
	9/15/2022	2,600 J	180	1,200	61
MW-06	10/26/2016	287	60.4	1,160	170
(1,200 feet to river)	2/2/2017	805	147	1,590	51.0
	5/1/2017	1,280	225	1,530	21.9
	7/27/2017	810	128	1,080	18.3
	12/7/2018	430	110	1,300	130
	5/9/2019	980	210	1,900	40.0
	10/9/2019	520	110	1,700	110 J
	4/23/2020	920	160	2,000	55
	10/22/2020	560	110	1,700	150
	4/15/2021	810	210	2,100	71
	10/28/2021	590	120	1,500	92
	4/14/2022	360	91	1,100	30 J
	9/15/2022	230	48 J	190 J	0.65 U
MW-06	10/26/2016	299	70.9	1,130	177
Duplicate	2/2/2017	760	145	1,600	53.9
(1,200 feet to river)	5/1/2017	1,280	228	1,550	20.7
	7/27/2017	728	123	1,080	22.5
	12/7/2018	400	110	1,400	130
	5/9/2019	1,000	220	1,900	44.0
	10/9/2019	600	130	1,800	150 J
	4/23/2020	900	160	2,000	67
	10/22/2020	620	130	1,900	170
	4/15/2021	830	220	2,200	69
	10/28/2021	620	130	1,500	91
	4/14/2022	350	94	980	21 J
	9/15/2022	240 J	68 J	290 J	3.8

Table 3-4
Groundwater Quality Analytical Data for Volatile Organic Compounds
Northwest Pipe Company Portland Plant

		Volatile Organic Compounds (µg/L)			
		PCE	TCE	cis-1,2-DCE	VC
Portland Harbor ROD Concentrations (µg/L) [1]		*0.24*	*0.6*	*70*	*0.022*
Northwest Pipe Company Wells on Port of Portland Property [2]					
MW-10 *(570 feet to river)*	4/12/2022	0.084 U	0.28	4.7	1.1
	6/29/2022	0.54	0.26 U	0.067 J	0.017 J
	9/13/2022	0.084 U	0.19 J	2.0	0.66
	12/6/2022	0.024 J	0.23	4.9	0.26
MW-10[2]	6/29/2022	0.46	0.23	0.062 J	0.016 J
Duplicate	12/6/2022	0.022 J	0.22	4.9	0.26
MW-11 *(670 feet to river)*	4/12/2022	1.6	0.8	46	26
	6/29/2022	1.2	1.1 U	64	52
	9/13/2022	2.1	1.1	32	32
	12/6/2022	1.8	0.7	19	19
MW-12 *(880 feet to river)*	4/12/2022	2.8	3.9	45	7.6
	6/29/2022	1.8	3.3	42	6
	9/13/2022	2.1	3.8	44	8.6
	12/6/2022	2.3	4.4	34	3.8
Port of Portland Wells (Upgradient to Downgradient)					
T4S1MW-22	10/25/2016	1.46 J	4.60 J	2.77 J	0.0499 J
(1,010 feet to river)	2/1/2017	1.28	4.29	5.36	0.106
	4/27/2017	1.43	3.56	2.11	0.022
	7/26/2017	1.71	3.00	3.78	0.0638
	12/6/2018	1.4	4.6	5.8	0.076 J
	5/8/2019	1.8	4.4	7.5	0.33
	10/8/2019	1.3	3.4	7.4	0.18
	4/22/2020	1.1	3.3	7.0	0.32
	10/21/2020	0.94	2.8	7.9 J	0.17
	4/14/2021	1.7	2.7	5.0	0.14
	10/27/2021	1.1	2.7	4.8	0.20
	4/13/2022	1.5	2.6	3.6	0.20 J
	9/13/2022	1.6	2.2	3.6	0.41
T4S1MW-23	10/25/2016	1.59 J	0.15 UJ	0.700 J	0.008 UJ
(710 feet to river)	2/1/2017	0.937	0.41 J	0.650	0.0188 J
	4/27/2017	1.07	0.39 J	0.420 J	0.008 U
	7/26/2017	1.21	0.29 J	0.15 U	0.008 U
	12/6/2018	1.8	0.61	1.40	0.023 J
	5/9/2019	1.9	0.50	0.34	0.02 U
	10/8/2019	1.6	0.40	0.58	0.02 U
	4/22/2020	1.6	0.37	0.18 J	0.02 U
	10/21/2020	1.8	0.33	1.50	0.02 U
	4/14/2021	1.3	0.37	0.23	0.02 U
	10/27/2021	1.3	0.47	0.59	0.02 U
	4/12/2022	1.3	0.41	0.89	0.032
	9/13/2022	1.5	0.29	0.17 J	0.013 UJ
T4S1MW-03S	10/25/2016	0.112 J	0.15 UJ	0.15 UJ	0.008 UJ
(160 feet to river)	2/1/2017	0.230	0.15 U	0.15 U	0.008 U
	4/26/2017	0.117	0.15 U	0.15 U	0.008 U
	7/25/2017	0.0508	0.15 U	0.15 U	0.008 U
	12/5/2018	0.1 U	0.1 U	0.1 U	0.02 U
	5/8/2019	0.1 U	0.1 U	0.1 U	0.02 U
	10/7/2019	0.1 U	0.1 U	0.1 U	0.02 U
	4/21/2020	0.1 U	0.1 U	0.1 U	0.02 U
	10/20/2020	0.1 U	0.1 U	0.1 U	0.02 U
	4/13/2021	0.1 U	0.1 U	0.1 U	0.02 U
	10/26/2021	0.1 U	0.1 U	0.1 U	0.02 U

Table 3-4

Groundwater Quality Analytical Data for Volatile Organic Compounds

Northwest Pipe Company Portland Plant

		Volatile Organic Compounds (µg/L)			
		PCE	TCE	cis-1,2-DCE	VC
Portland Harbor ROD Concentrations (µg/L) [1]		*0.24*	*0.6*	*70*	*0.022*
	4/11/2022	0.084 U	0.066 U	0.055 U	0.013 U
	9/14/2022	0.084 U	0.066 U	0.055 U	0.013 U
T4S1MW-09	10/25/2016	0.0191 J	0.15 UJ	0.15 UJ	0.0197 J
(145 feet to river)	2/1/2017	0.0177 J	0.15 U	0.15 U	0.0113 J
	4/26/2017	0.005 U	0.15 U	0.15 U	0.008 U
	7/25/2017	0.0139 J	0.15 U	0.15 U	0.008 U
	12/5/2018	0.1 U	0.1 U	0.1 U	0.02 U
	5/8/2019	0.1 U	0.1 U	0.1 U	0.02 U
	10/7/2019	0.1 U	0.1 U	0.1 U	0.02 U
	4/21/2020	0.1 U	0.1 U	0.1 U	0.02 U
	10/20/2020	0.1 U	0.1 U	0.1 U	0.02 U
	4/13/2021	0.1 U	0.1 U	0.1 U	0.02 U
	10/26/2021	0.1 U	0.1 U	0.1 U	0.02 U
	4/11/2022	0.084 U	0.066 U	0.055 U	0.013 U
	9/14/2022	0.084 U	0.066 U	0.055 U	0.013 U

Notes:

µg/L = micrograms per Liter

Shaded values exceed identified ROD concentrations.

[1]ROD concentrations are selected from Table 17 of the Portland Harbor Record of Decision (U.S. Environmental Protection Agency Region 10, 2017). Values were selected from remedial action objectives (RAOs) 4 and 8 associated with migration of contaminated groundwater. Values reflect changes from ROD Errata #1 (EPA 2018) and #2 (EPA 2020).

[2]MW-10, MW-11, and MW-12 were installed in March 2022. Wells are sampled quaterly.

Distances to the river are direct, instead of along flow paths, which can vary.

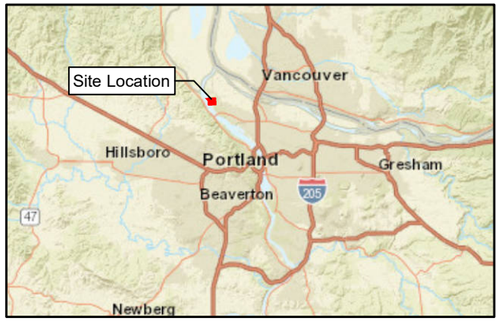
B - Analyte was found in the blank and sample.

J - the analyte was detected, but the analytical laboratory has flagged the associated numerical value as estimated.

U - the analyte was analyzed for but was not detected above the detection limit.

UJ - the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Figures



LEGEND

- Northwest Pipe Site Boundary
- Burgard Industrial Park
- Felton Property

N

0 250 500 1,000
Feet

Figure 1-1. Vicinity Map
Northwest Pipe Company
Portland, Oregon

Jacobs

\\PDXFPP01\PROJ\NORTHWESTPIPECOMPANY\485880PORTHARBSUP\GIS\MAPFILES\2021\MNA WORK PLAN\FIGURE1-1_VICINITYMAP.MXD GGEE 10/8/2021 2:37:13 PM

LEGEND

MNA Monitoring Network

- Groundwater Quality Monitoring Well
- Groundwater Quality Monitoring Well Installed in 2022
- Monitoring Well for Water Level Monitoring Only
- Northwest Pipe Site Boundary

N

0 70 140 280

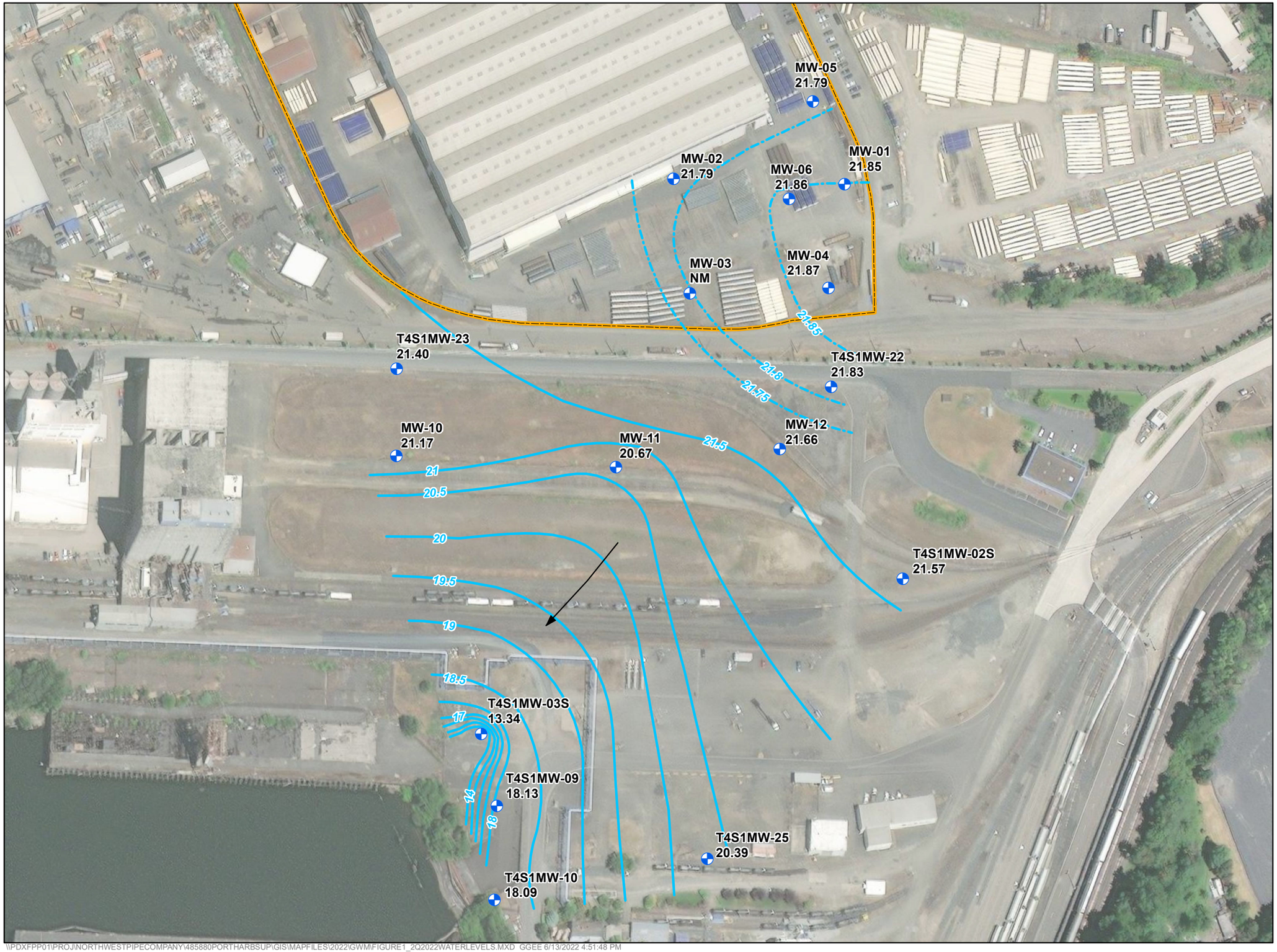
Feet

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2-1. MNA Monitoring Well Network
Northwest Pipe Company
Portland, Oregon

Jacobs

\\PDXFPP01\PROJ\NORTHWESTPIPECOMPANY\485880PORTHARBSUP\GIS\MAPFILES\2023\FIGURE2-1_MNANETWORK.MXD GGEE 3/5/2023 10:52:37 AM



LEGEND

- Investigation Wells
- Groundwater Elevation Contour (0.5 ft contour interval, ft NAVD88)
- Groundwater Elevation Contour (0.05 ft contour interval, to show detail in the NW Pipe Southeast Area, ft NAVD88)
- Groundwater Flow Direction
- Northwest Pipe Site Boundary

Note: Groundwater levels measured between 10:42 AM and 12:10 PM on April 11, 2022. During this period, the Willamette River stage increased by 0.52 feet, as measured at the Morrison Bridge river gauge (USGS 14211720).

N

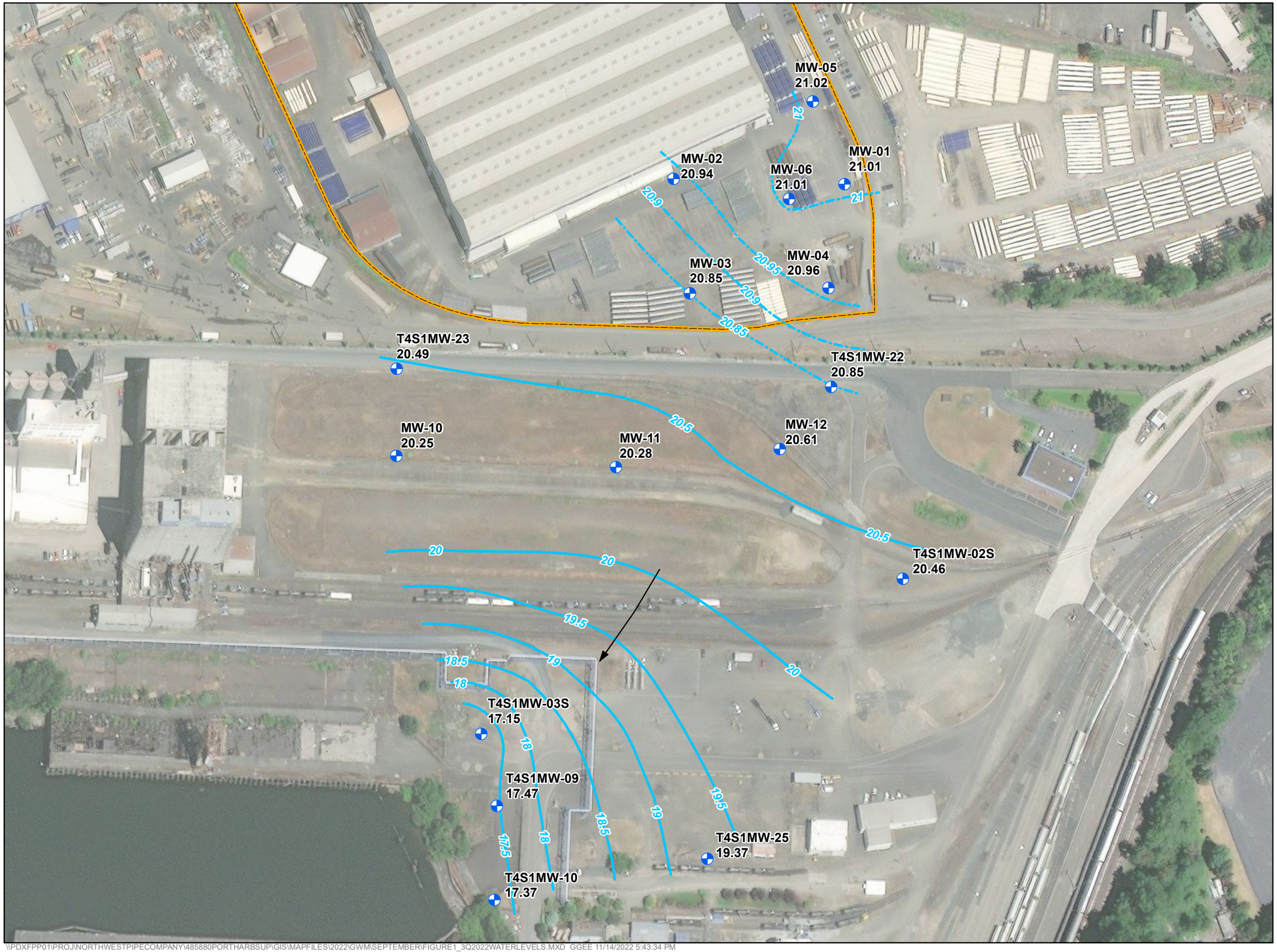
0 75 150 300
Feet

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 3-1. Groundwater Elevation Contour Map Southeast Area, April 11, 2022
Northwest Pipe Company
Portland, Oregon

Jacobs

\\PDXFPP01\PROJ\NORTHWESTPIPECOMPANY\485880PORTHARBSUP\GIS\MAPFILES\2022\GWM\FIGURE1_2Q2022WATERLEVELS.MXD GGEE 6/13/2022 4:51:48 PM



LEGEND

- Investigation Wells
- Groundwater Elevation Contour (0.5 ft contour interval, ft NAVD88)
- Groundwater Elevation Contour (0.05 ft contour interval, to show detail in the NW Pipe Southeast Area, ft NAVD88)
- Groundwater Flow Direction
- Northwest Pipe Site Boundary

Note: Groundwater levels measured between 10:26 AM and 11:26 PM on September 12, 2022. During this period, the Willamette River stage decreased by 0.31 feet, as measured at the Morrison Bridge river gauge (USGS 14211720).

N

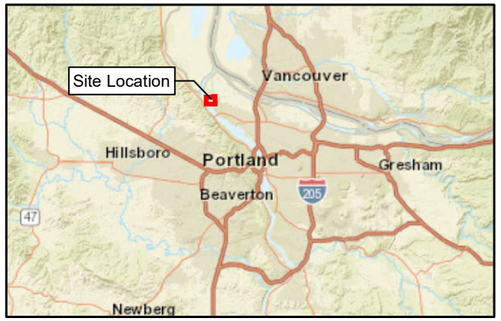
0 75 150 300
Feet

Service Layer Credits: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Figure 3-2. Groundwater Elevation Contour Map Southeast Area, September 12, 2022
Northwest Pipe Company
Portland, Oregon

Jacobs

\\PDXFPP01\PROJ\NORTHWESTPIPECOMPANY\485880PORTHARBSUP\GIS\MAPFILES\2022\GWM\SEPTEMBER\FIGURE1_3Q2022WATERLEVELS.MXD GGEE 11/14/2022 5:43:34 PM



LEGEND

1897 Surface Water Features

- Historical Waterbody
- Historical Marsh/Mudflat
- Historical Gatton Creek[1]
- Northwest Pipe Site Boundary

Note:
[1]The depicted location of historical Gatton Creek is based on its mapped location shown by the U.S. Geological Survey in its 1897 topographic map of the area. However, the historical creek channel may have shifted to the east or west over time, as is common for stream channels, before it was buried by fill placed in the area in the early 1940s.

N

0 200 400 800
Feet

Figure 4-1. Selected Hydrologic Features from 1897 Map Digitized onto Current Aerial
Northwest Pipe Company
Portland, Oregon

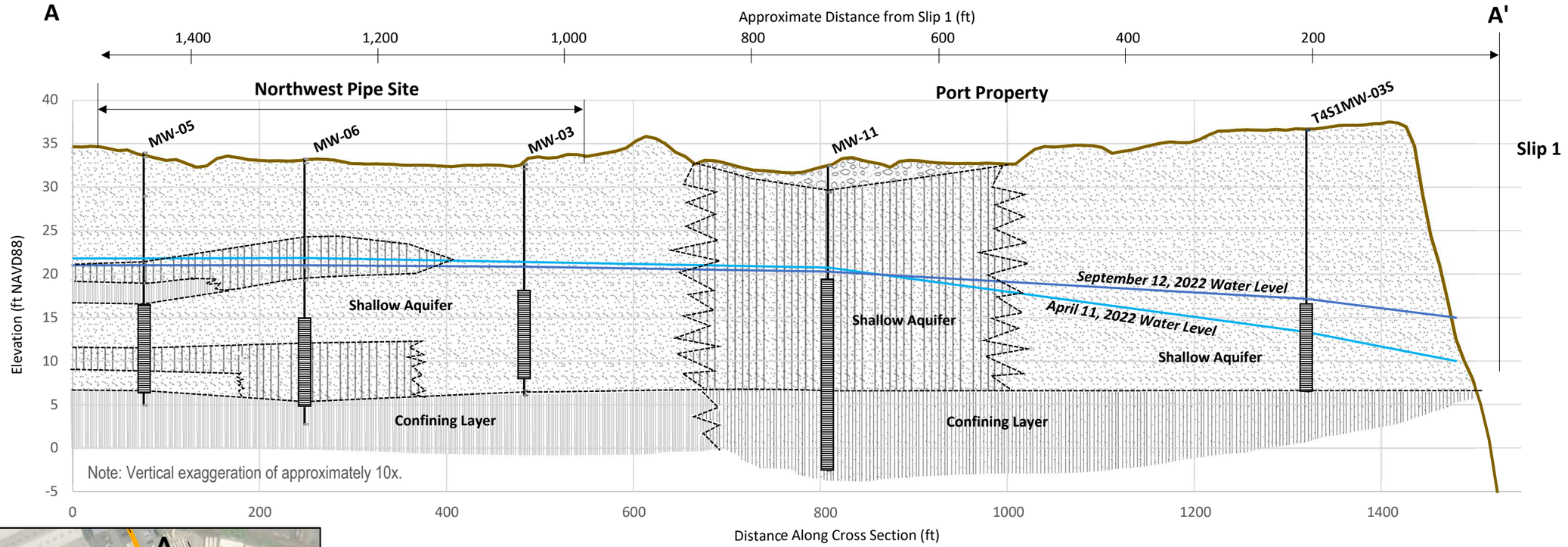
Jacobs

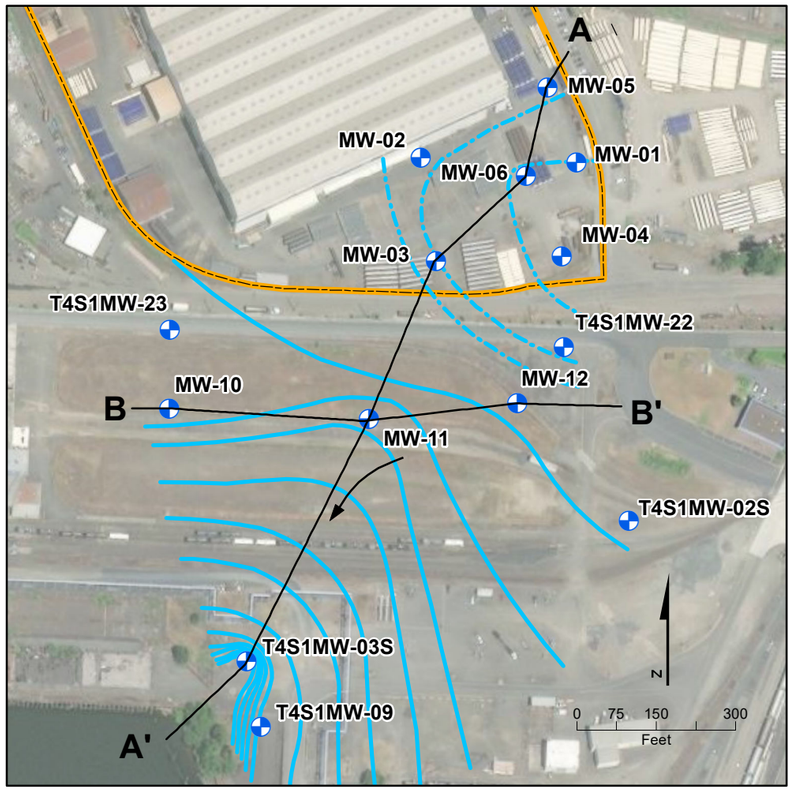
Observed Lithology

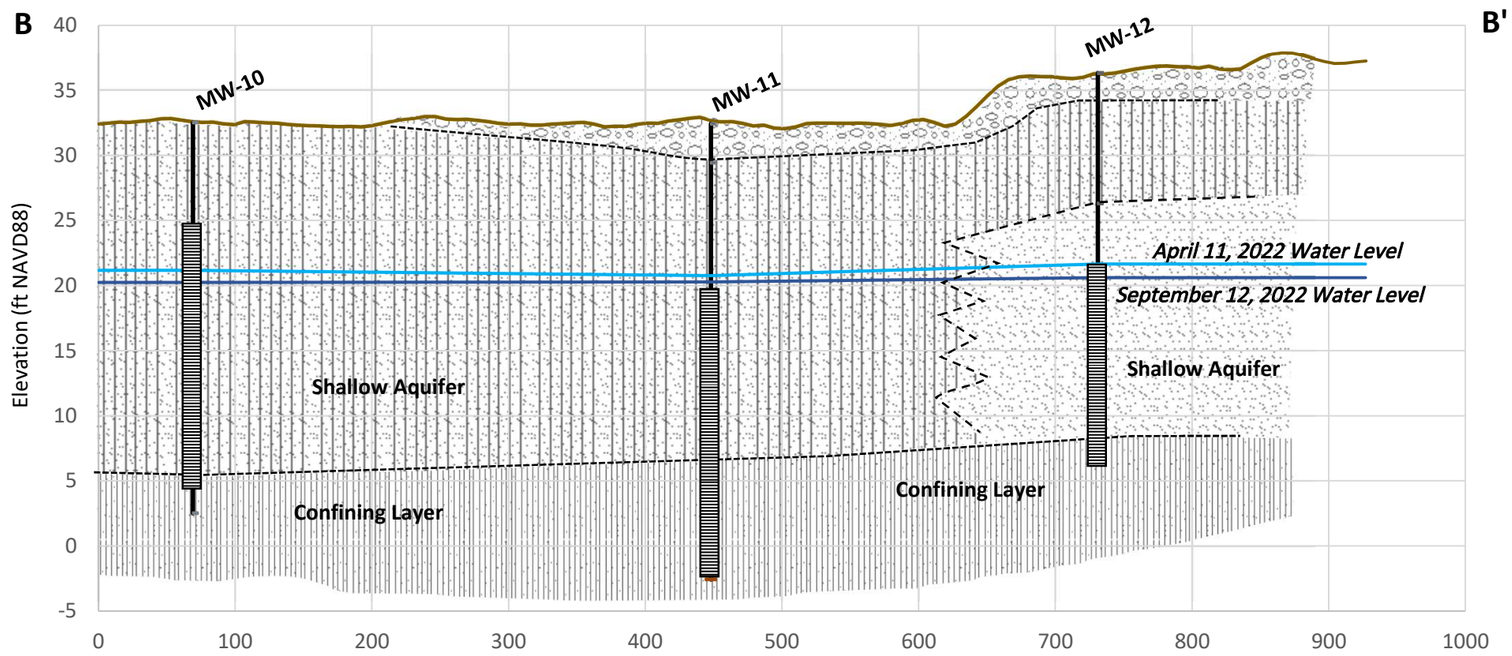
- Gravel with Silt and Sand
- Fine to Medium Sand
- Silty Sand
- Sandy Silt
- Silt

Well Location

Screened Interval







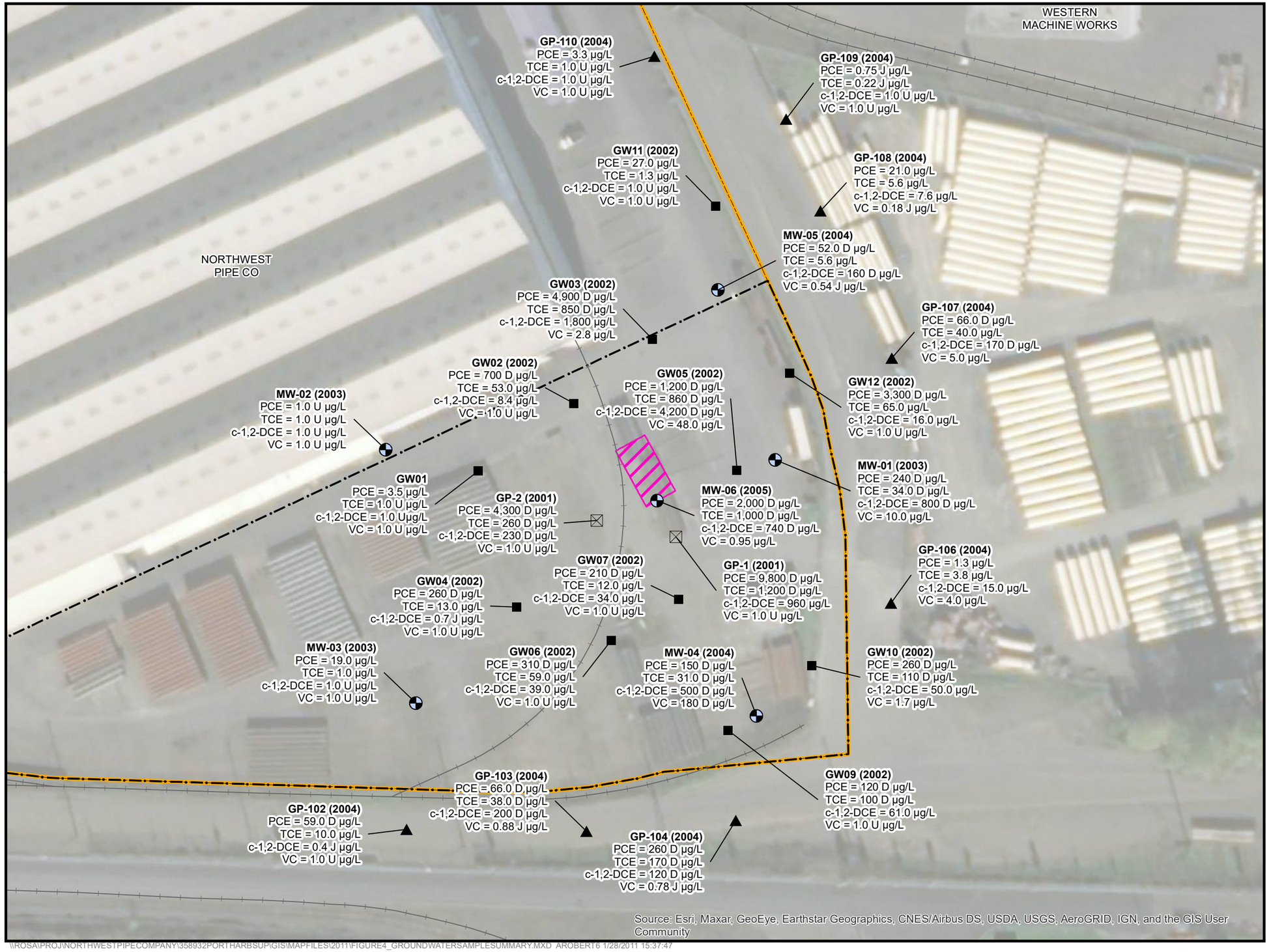
LEGEND

- Investigation Wells
- Groundwater Elevation Contour
- Groundwater Flow Direction
- Northwest Pipe Site Boundary

\\PDXFPP01\PROJ\NORTHWESTPIPECOMPANY\485880PORTHARBSUP\GIS\MAPFILES\2023\WORKING_CROSSSECTIONS.MXD GGEE 3/4/2023 4:42:27 PM

Figure 4-2. Geologic Cross Sections Parallel (A-A') and Perpendicular (B-B') to Groundwater Flow
Northwest Pipe Company
Portland, Oregon

Jacobs



LEGEND

Groundwater Sample Location

- September, 2001 Geoprobe Sample
- August, 2002 Geoprobe Sample
- 2003 - Present Monitoring Well Location
- July, 2004 Geoprobe Sample
- Approximate Location of Former Waste Oil Tank[1]
- Railroad Line
- Leased Property Boundary
- Northwest Pipe Site Boundary

Notes:
µg/L = micrograms per Liter
PCE = tetrachloroethene
TCE = trichloroethene
c-1,2-DCE = cis-1,2-dichloroethene
VC = vinyl chloride
U = nondetect
J = estimated
D = dilution
[1] Dames & Moore, 1989

N

0 37.5 75 150
Feet

Figure 5-1. VOCs in Groundwater 2001 through 2005
Northwest Pipe Company
Portland, Oregon

Jacobs

\\ROSA\PROJ\NORTHWESTPIPECOMPANY\358932PORTHARBSUP\GIS\MAPFILES\2011\FIGURE4_GROUNDWATERSAMPLESUMMARY.MXD AROBERT6 1/28/2011 15:37:47

MW-06

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	287 / 299	60.4 / 70.9	1,160 / 1,130	170 / 177
2/1/2017	805 / 760	147 / 145	1,590 / 1,600	51.0 / 53.9
5/1/2017	1,280 / 1,280	225 / 228	1,530 / 1,550	21.9 / 20.7
7/27/2017	810 / 728	128 / 123	1,080 / 1,080	18.3 / 22.5
12/7/2018	430 / 400	110 / 110	1,300 / 1,400	130 / 130
5/9/2019	980 / 1,000	210 / 220	1,900 / 1,900	40 / 44
10/9/2019	520 / 600	110 / 130	1,700 / 1,800	110 J / 150 J
4/23/2020	920 / 900	160 / 160	2,000 / 2,000	55 / 67
10/22/2020	560 / 620	110 / 130	1,700 / 1,900	150 / 170
4/15/2021	810 / 830	210 / 220	2,100 / 2,200	71 / 69
10/28/2021	590 / 620	120 / 130	1,500 / 1,500	92 / 91
4/14/2022	360 /350	91 / 94	1,100 / 980	30 J/ 21 J
9/15/2022	230 / 240 J	48 J / 68 J	190 J / 290 J	0.65 U / 3.8

MW-05

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	3,510	195	1,160	40.4
2/2/2017	4,150	208	1,240	39.5
5/1/2017	949	92	634	70.7
7/27/2017	3,640	170	1,730	7.58 J
12/7/2018	1,200	85	1,600	77.0
5/9/2019	4,400	240	1,700	14.0
10/9/2019	2,300	140	2,200	120
4/23/2020	3,600	170	1,900	34.0
10/22/2020	2,400	150	1,200	87.0
4/15/2021	3,700	170	1,800	26
10/28/2021	2,200	180	760	56
4/14/2022	1,900	110	960	170 J
9/15/2022	2,600 J	180	1,200	61

MW-02

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	0.0598	0.15 U	0.15 U	0.0652
2/1/2017	0.169	0.15 U	0.200 J	0.0370
4/27/2017	0.224	0.15 U	0.210 J	0.0115 J
7/25/2017	0.451	0.15 U	0.410 J	0.0190 J
12/5/2018	0.1 U	0.1 U	1.40	2.60
5/8/2019	0.1 U	0.1 U	0.360	1.20
10/8/2019	0.1 U	0.1 U	0.760	2.90
4/23/2020	0.1 U	0.1 U	0.290	0.68
10/21/2020	0.1 U	0.1 U	0.660	2.60
4/14/2021	0.1 U	0.1 U	0.260	0.60
10/27/2021	0.1 U	0.1 U	1.5	4.9
4/13/2022	0.16 J	0.1 J	3.8	3.6 J
9/14/2022	0.22	0.066 U	43	36 J

MW-01

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	158	22.8	113	16.7
2/2/2017	71.1	14.9	107	29.9
5/1/2017	61.7	13.0	220	51.6
7/26/2017	197	26.7	174	8.51
12/6/2018	98.0	13.0	160	19.0
5/9/2019	220	28.0	100	3.80
10/9/2019	150	18.0	140	17.0
4/23/2020	260	29.0	110	5.20
10/22/2020	220	26.0	160	22.0
4/15/2021	280	24.0	58	0.5
10/28/2021	130	23.0	120	19.0
4/13/2022	140	23.0	60	3.2 J
9/15/2022	210	21	74	2.9 J

MW-03

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	630	221	428	22.8
2/2/2017	483	178	502	20.8
5/1/2017	657	283	847	26.1
7/27/2017	550	209	670	29.9
12/7/2018	490	160	850	46.0
5/9/2019	370	100	860	46.0
10/9/2019	530	160	990	62.0
4/23/2020	170	58	730	42.0
10/22/2020	250	54	360	36.0
4/15/2021	160	42	510	43.0
10/28/2021	130	26	300	57.0
4/14/2022	130	34	410	70.0 J
9/14/2022	68	16	200	53.0 J

MW-04

	PCE	TCE	cis-1,2-DCE	VC
10/26/2016	28.2	38.4	111	4.45
2/1/2017	12.4	20.3	119	9.73
4/27/2017	14.4	29.7	116	16.6
7/26/2017	18.5	35.4	137	9.43
12/6/2018	16.0	19.0	190	4.60
5/8/2019	5.40	8.40	150	6.10
10/8/2019	10.0	16.0	120	5.60
4/22/2020	4.9	8.8	170	4.00
10/21/2020	12.0	12.0	110	3.70 J
4/14/2021	5.0	10.0	120	1.70
10/27/2021	13.0	8.2 J	110	2.50
4/13/2022	6.0	13.0	110	2.50 J
9/15/2022	2.8	6.0	44	11 J

LEGEND

- Investigation Wells
- Groundwater Elevation Contour (0.5 ft contour interval, ft NGVD29)
- Groundwater Elevation Contour (0.05 ft contour interval, to show detail in the NW Pipe Southeast Area, ft NGVD29)
- Groundwater Flow Direction
- Northwest Pipe Facility Boundary

Notes:
All chlorinated volatile organic compound (VOC) concentrations are reported in micrograms per liter (µg/L).
PCE = Tetrachloroethene; TCE = Trichloroethene; cis-1,2-DCE = cis-1,2-Dichloroethene; VC = Vinyl Chloride
D - the sample was diluted for analysis.
U - the analyte was analyzed for but was not detected above the detection limit.
J - the analyte was detected, but the analytical laboratory has flagged the associated numerical value as estimated.
UJ - the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Shaded values exceed ROD concentrations selected from Table 17 of the Portland Harbor Record of Decision (U.S. Environmental Protection Agency Region 10, 2017). Values were selected from remedial action objectives (RAOs) 4 and 8 associated with migration of contaminated groundwater. The following values are used:
PCE = 0.24, TCE = 0.6, cis-1,2-DCE = 70, and VC = 0.022. All values in µg/L.

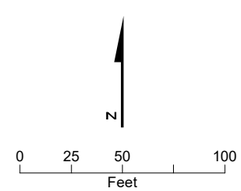
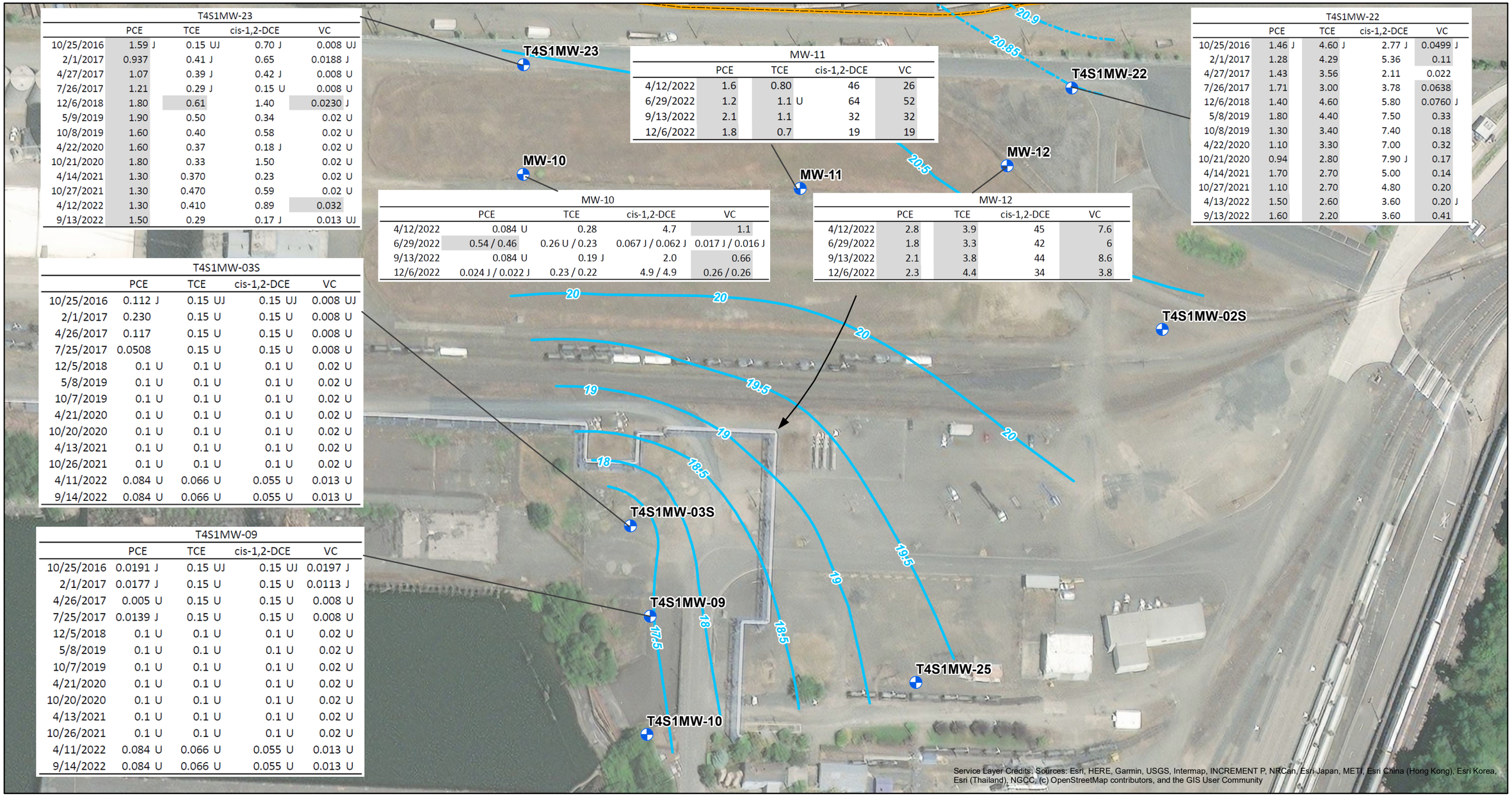


Figure 5-2. Southeast Area VOC Concentrations October 2016 through September 2022
Northwest Pipe Company
Portland, Oregon

Jacobs



T4S1MW-23

	PCE	TCE	cis-1,2-DCE	VC
10/25/2016	1.59 J	0.15 UJ	0.70 J	0.008 UJ
2/1/2017	0.937	0.41 J	0.65	0.0188 J
4/27/2017	1.07	0.39 J	0.42 J	0.008 U
7/26/2017	1.21	0.29 J	0.15 U	0.008 U
12/6/2018	1.80	0.61	1.40	0.0230 J
5/9/2019	1.90	0.50	0.34	0.02 U
10/8/2019	1.60	0.40	0.58	0.02 U
4/22/2020	1.60	0.37	0.18 J	0.02 U
10/21/2020	1.80	0.33	1.50	0.02 U
4/14/2021	1.30	0.370	0.23	0.02 U
10/27/2021	1.30	0.470	0.59	0.02 U
4/12/2022	1.30	0.410	0.89	0.032
9/13/2022	1.50	0.29	0.17 J	0.013 UJ

T4S1MW-03S

	PCE	TCE	cis-1,2-DCE	VC
10/25/2016	0.112 J	0.15 UJ	0.15 UJ	0.008 UJ
2/1/2017	0.230	0.15 U	0.15 U	0.008 U
4/26/2017	0.117	0.15 U	0.15 U	0.008 U
7/25/2017	0.0508	0.15 U	0.15 U	0.008 U
12/5/2018	0.1 U	0.1 U	0.1 U	0.02 U
5/8/2019	0.1 U	0.1 U	0.1 U	0.02 U
10/7/2019	0.1 U	0.1 U	0.1 U	0.02 U
4/21/2020	0.1 U	0.1 U	0.1 U	0.02 U
10/20/2020	0.1 U	0.1 U	0.1 U	0.02 U
4/13/2021	0.1 U	0.1 U	0.1 U	0.02 U
10/26/2021	0.1 U	0.1 U	0.1 U	0.02 U
4/11/2022	0.084 U	0.066 U	0.055 U	0.013 U
9/14/2022	0.084 U	0.066 U	0.055 U	0.013 U

T4S1MW-09

	PCE	TCE	cis-1,2-DCE	VC
10/25/2016	0.0191 J	0.15 UJ	0.15 UJ	0.0197 J
2/1/2017	0.0177 J	0.15 U	0.15 U	0.0113 J
4/26/2017	0.005 U	0.15 U	0.15 U	0.008 U
7/25/2017	0.0139 J	0.15 U	0.15 U	0.008 U
12/5/2018	0.1 U	0.1 U	0.1 U	0.02 U
5/8/2019	0.1 U	0.1 U	0.1 U	0.02 U
10/7/2019	0.1 U	0.1 U	0.1 U	0.02 U
4/21/2020	0.1 U	0.1 U	0.1 U	0.02 U
10/20/2020	0.1 U	0.1 U	0.1 U	0.02 U
4/13/2021	0.1 U	0.1 U	0.1 U	0.02 U
10/26/2021	0.1 U	0.1 U	0.1 U	0.02 U
4/11/2022	0.084 U	0.066 U	0.055 U	0.013 U
9/14/2022	0.084 U	0.066 U	0.055 U	0.013 U

MW-11

	PCE	TCE	cis-1,2-DCE	VC
4/12/2022	1.6	0.80	46	26
6/29/2022	1.2	1.1 U	64	52
9/13/2022	2.1	1.1	32	32
12/6/2022	1.8	0.7	19	19

MW-10

	PCE	TCE	cis-1,2-DCE	VC
4/12/2022	0.084 U	0.28	4.7	1.1
6/29/2022	0.54 / 0.46	0.26 U / 0.23	0.067 J / 0.062 J	0.017 J / 0.016 J
9/13/2022	0.084 U	0.19 J	2.0	0.66
12/6/2022	0.024 J / 0.022 J	0.23 / 0.22	4.9 / 4.9	0.26 / 0.26

MW-12

	PCE	TCE	cis-1,2-DCE	VC
4/12/2022	2.8	3.9	45	7.6
6/29/2022	1.8	3.3	42	6
9/13/2022	2.1	3.8	44	8.6
12/6/2022	2.3	4.4	34	3.8

T4S1MW-22

	PCE	TCE	cis-1,2-DCE	VC
10/25/2016	1.46 J	4.60 J	2.77 J	0.0499 J
2/1/2017	1.28	4.29	5.36	0.11
4/27/2017	1.43	3.56	2.11	0.022
7/26/2017	1.71	3.00	3.78	0.0638
12/6/2018	1.40	4.60	5.80	0.0760 J
5/8/2019	1.80	4.40	7.50	0.33
10/8/2019	1.30	3.40	7.40	0.18
4/22/2020	1.10	3.30	7.00	0.32
10/21/2020	0.94	2.80	7.90 J	0.17
4/14/2021	1.70	2.70	5.00	0.14
10/27/2021	1.10	2.70	4.80	0.20
4/13/2022	1.50	2.60	3.60	0.20 J
9/13/2022	1.60	2.20	3.60	0.41

LEGEND

- Investigation Wells
- Groundwater Elevation Contour (September 2022) (0.5 ft contour interval, ft NAVD88)
- Groundwater Elevation Contour (September 2022) (0.05 ft contour interval, to show detail in the NW Pipe Southeast Area, ft NAVD88)
- Groundwater Flow Direction
- Northwest Pipe Facility Boundary

Notes:
All chlorinated volatile organic compound (VOC) concentrations are reported in micrograms per liter (µg/L).
PCE = Tetrachloroethene; TCE = Trichloroethene; cis-1,2-DCE = cis-1,2-Dichloroethene; VC = Vinyl Chloride
D - the sample was diluted for analysis.
U - the analyte was analyzed for but was not detected above the detection limit.
J - the analyte was detected, but the analytical laboratory has flagged the associated numerical value as estimated.
UJ - the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
Shaded values exceed ROD concentrations selected from Table 17 of the Portland Harbor Record of Decision (U.S. Environmental Protection Agency Region 10, 2017). Values were selected from remedial action objectives (RAOs) 4 and 8 associated with migration of contaminated groundwater. The following values are used: PCE = 0.24, TCE = 0.6, cis-1,2-DCE = 70, and VC = 0.022. All values in µg/L.

N

0 45 90 180
Feet

Figure 5-3. Port of Portland VOC Concentrations October 2016 through December 2022
Northwest Pipe Company
Portland, Oregon

Jacobs

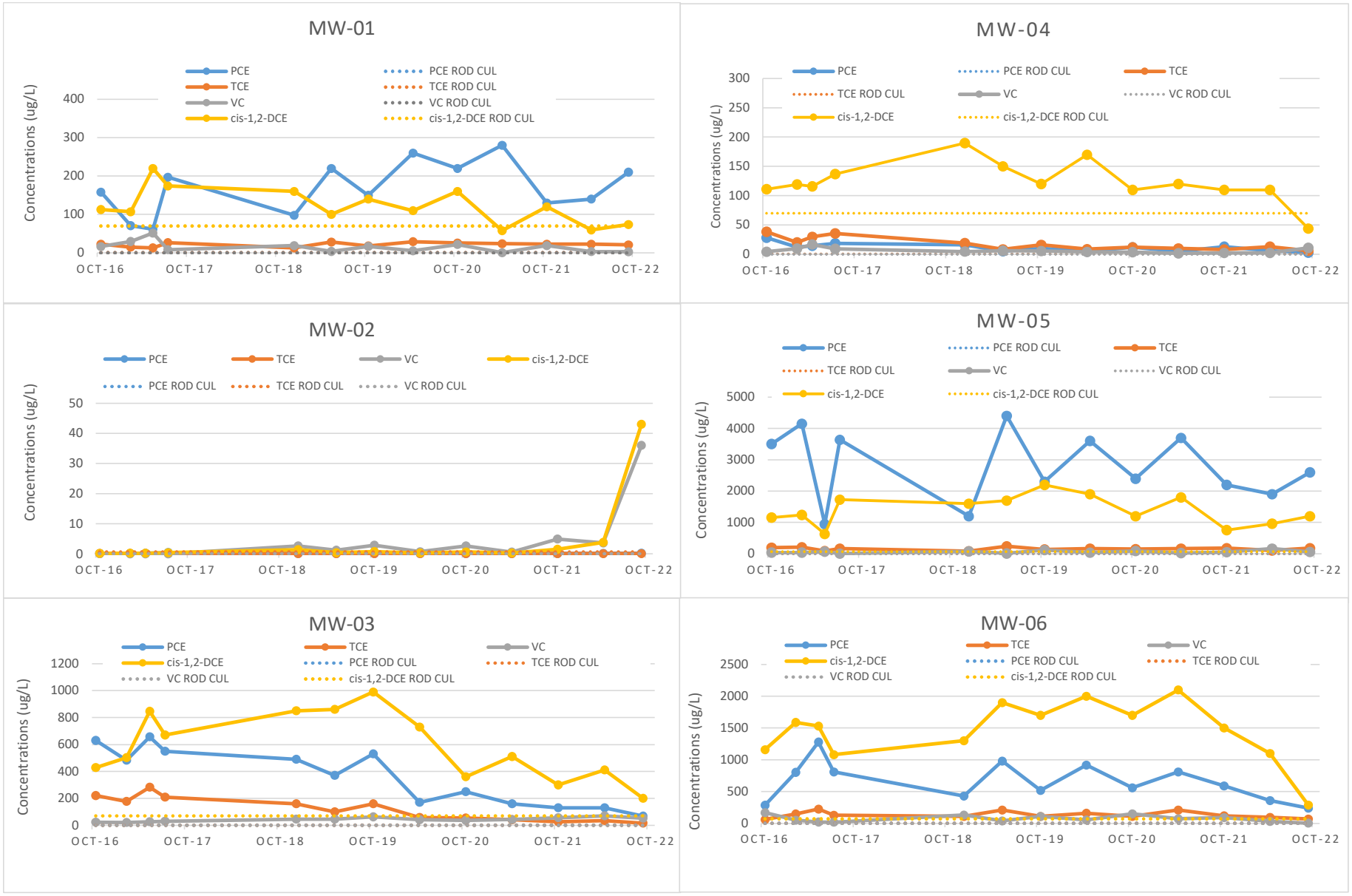
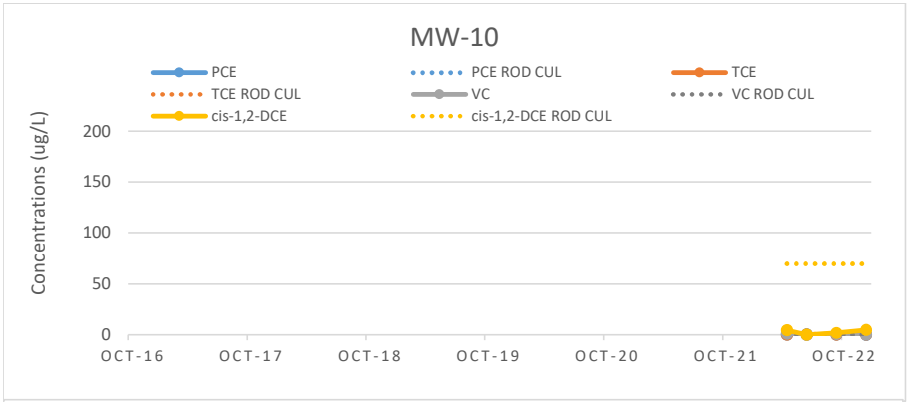
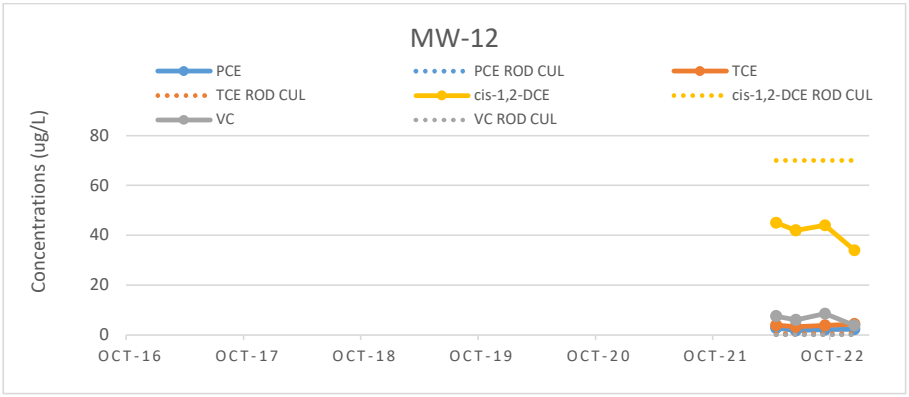


Figure 5-4. VOC Trend Plots in the Southeast Area (2016 - 2022)

Northwest Pipe Company
Portland, Oregon

Jacobs





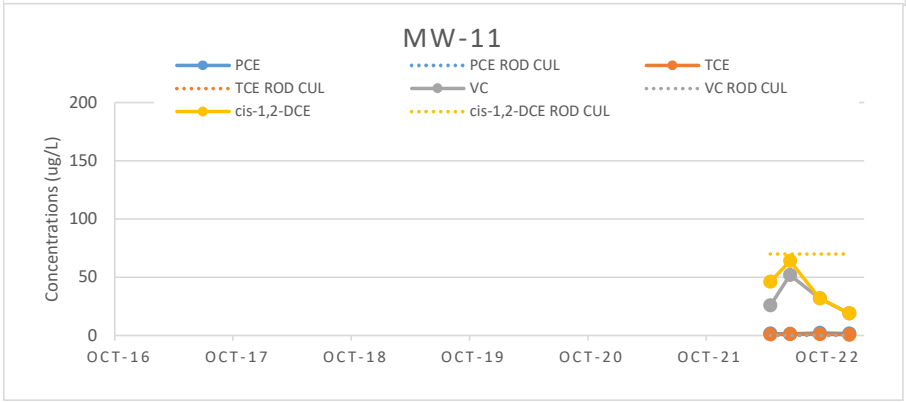


Figure 5-5. VOC Trend Plots in the New Port Wells (2022)

Northwest Pipe Company
Portland, Oregon

Jacobs

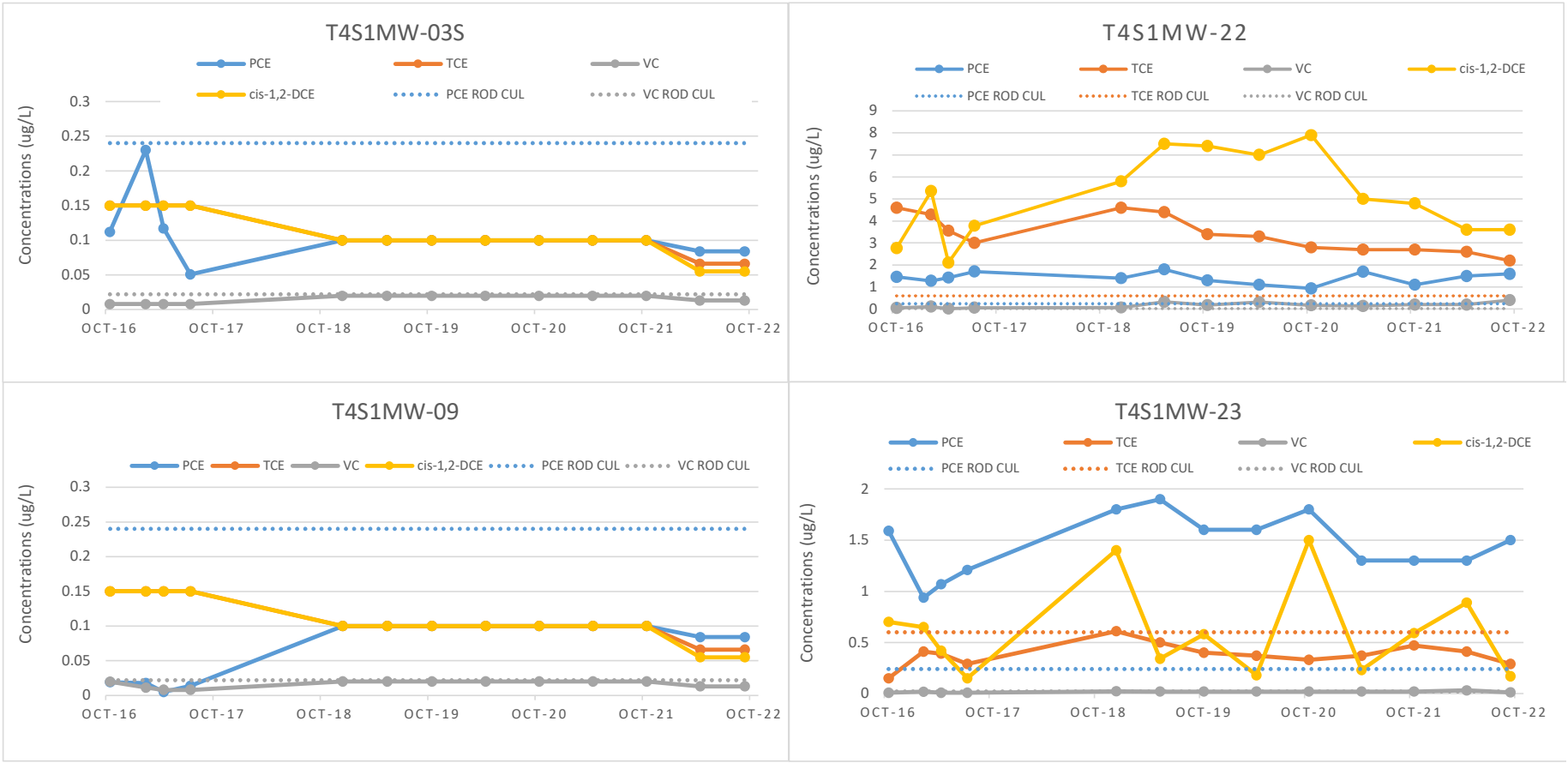


Figure 5-6. VOC Trend Plots in Previously Existing Port Wells (2016 - 2022)

Northwest Pipe Company
Portland, Oregon

Jacobs

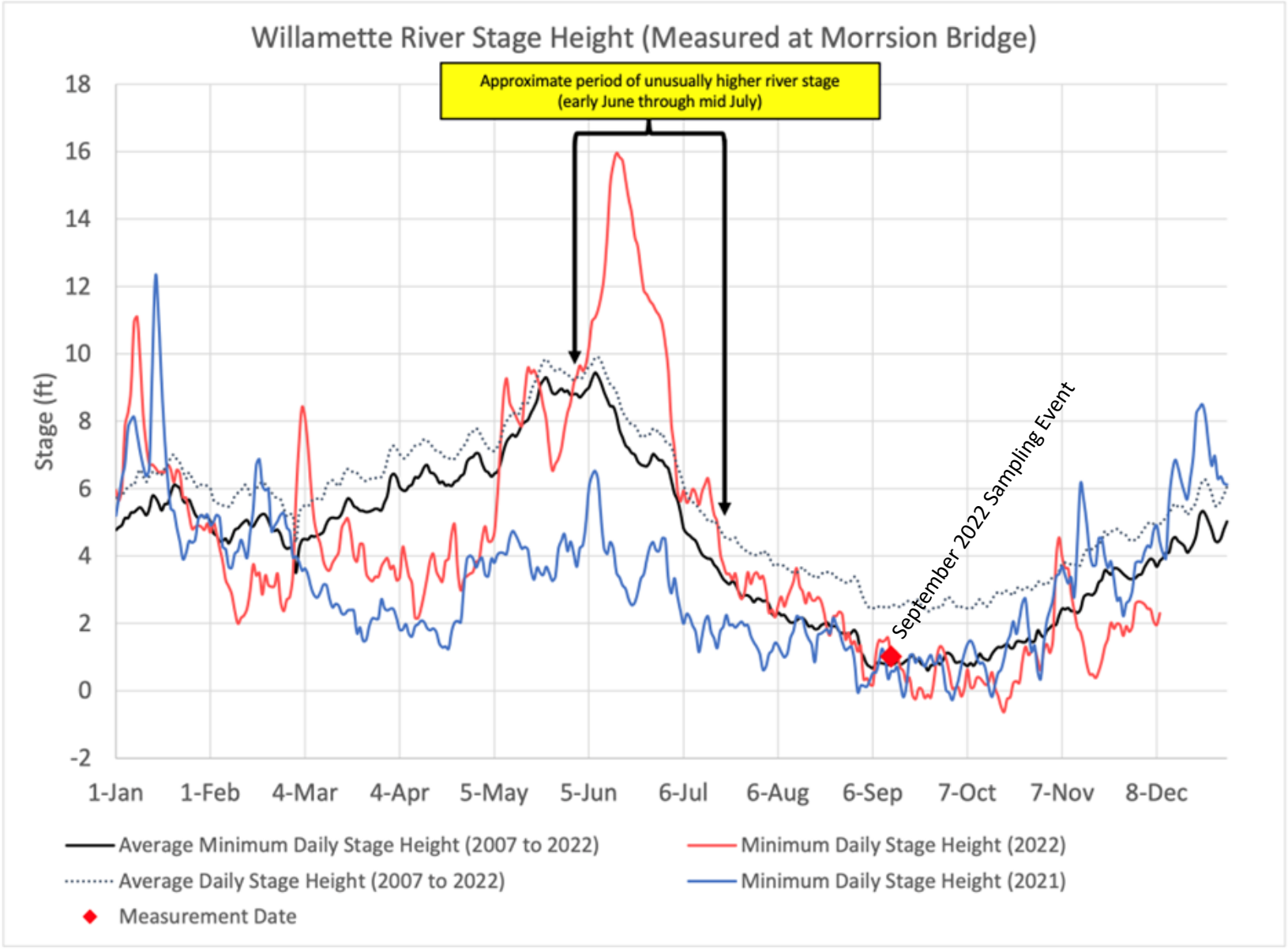
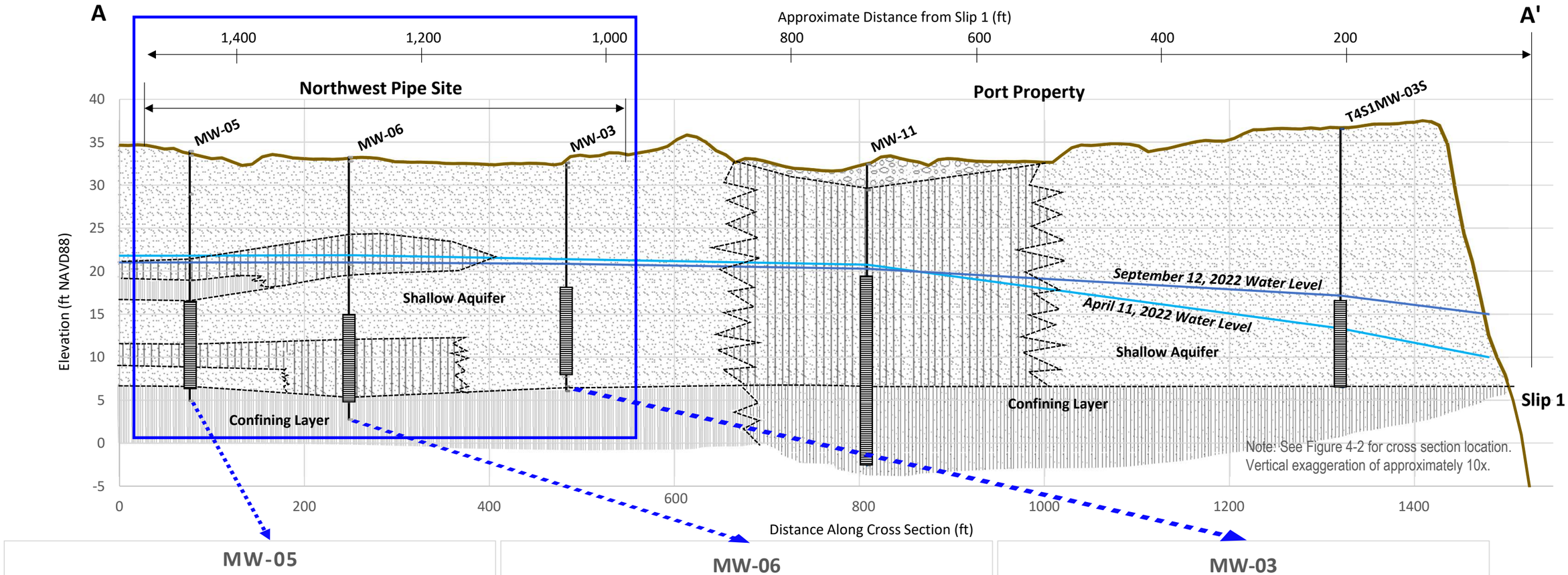
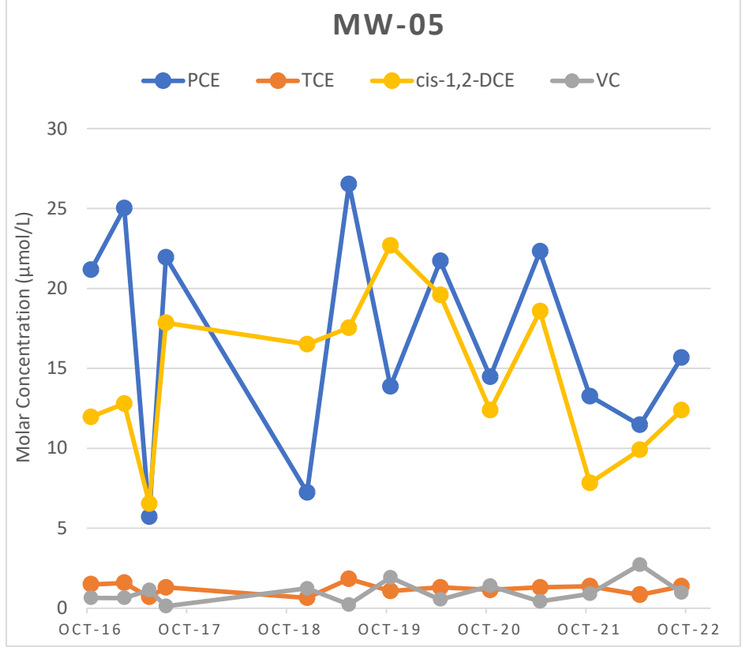
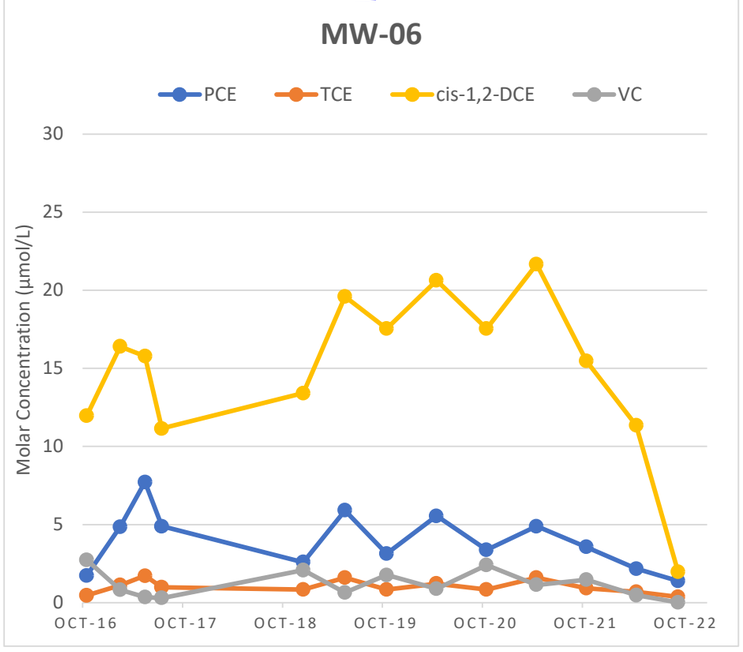


Figure 5-7
Willamette River Stage Data
Northwest Pipe Company
Portland, Oregon







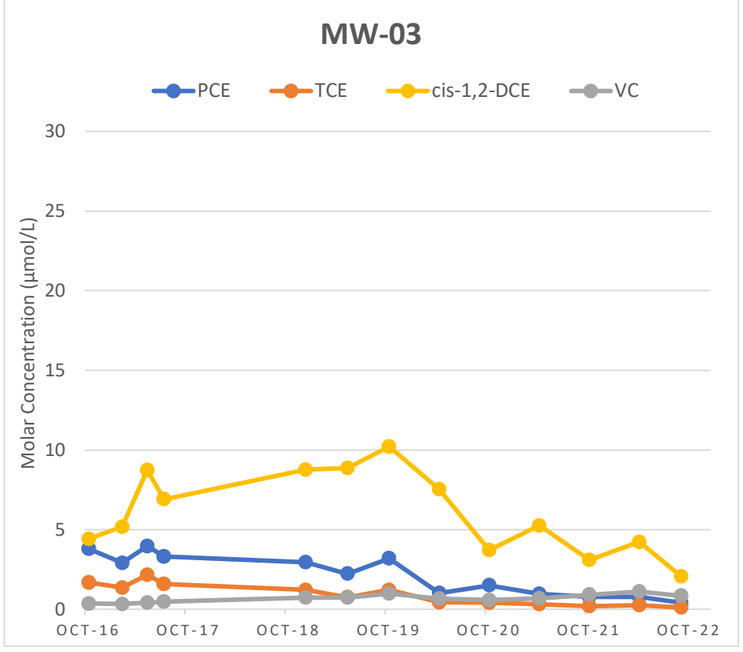
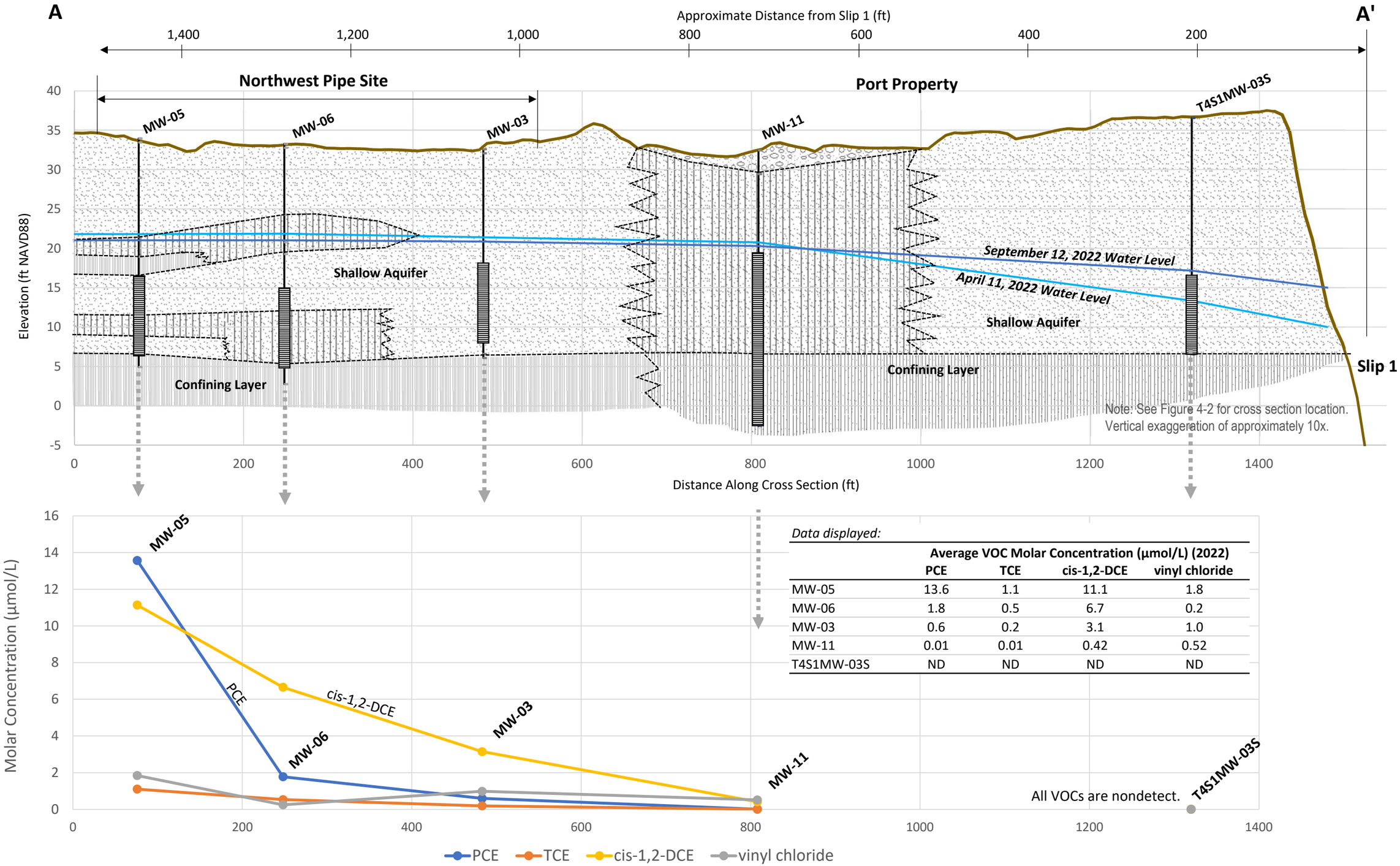


Figure 5-8
Trends in Molar Concentrations for Selected Wells (2016 - 2022)
Northwest Pipe Company
Portland, Oregon



Data displayed:

	Average VOC Molar Concentration (µmol/L) (2022)			
	PCE	TCE	cis-1,2-DCE	vinyl chloride
MW-05	13.6	1.1	11.1	1.8
MW-06	1.8	0.5	6.7	0.2
MW-03	0.6	0.2	3.1	1.0
MW-11	0.01	0.01	0.42	0.52
T4S1MW-03S	ND	ND	ND	ND

Figure 5-9
Average VOC Molar Concentrations for Selected Wells (2022)
Northwest Pipe Company
Portland, Oregon

Appendix A
Laboratory Analytical Reports

Provided in electronic format

April 2022

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-112511-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
4/26/2022 10:28:09 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Case Narrative

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112511-1

Job ID: 580-112511-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-112511-1

Comments
No additional comments.

Receipt
The samples were received on 4/12/2022 9:45 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -3.0º C.

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method 300.0: The following sample: T4S1MW09-041122-0 (580-112511-1), was prepared within the holding time window (04/13/2022 14:00) and set in sequence for ion chromatography; but due to the duration (approx. ten minute) of cyclic analytical runs, the sample was not analyzed by the instrument until the holding time window had expired (04/13/2022 14:50).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW09-041122-0
Lab Sample ID: 580-112511-1
Date Collected: 04/11/22 14:00
Matrix: Water
Date Received: 04/12/22 09:45

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 22:41	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 22:41	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 22:41	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 22:41	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 120*		*04/13/22 22:41*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/13/22 22:41*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/13/22 22:41*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*04/13/22 22:41*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**17**		1.0	0.11	ug/L			04/15/22 16:37	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1.6**		1.5	0.43	mg/L			04/13/22 14:39	1
NO3 as N	**1.5**	**H**	0.20	0.030	mg/L			04/13/22 14:39	1
Sulfate	**5.6**		1.5	0.80	mg/L			04/13/22 14:39	1
Carbon, Total Organic	**0.78**		0.50	0.26	mg/L			04/25/22 22:44	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW03S-041122-0
Lab Sample ID: 580-112511-2
Date Collected: 04/11/22 15:50
Matrix: Water
Date Received: 04/12/22 09:45

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 23:06	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 23:06	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 23:06	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 23:06	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*04/13/22 23:06*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/13/22 23:06*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/13/22 23:06*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*04/13/22 23:06*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/18/22 11:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**1.1**	**J**	1.5	0.43	mg/L			04/13/22 14:51	1
NO3 as N	**3.0**		0.20	0.030	mg/L			04/13/22 14:51	1
Sulfate	**10**		1.5	0.80	mg/L			04/13/22 14:51	1
Carbon, Total Organic	**0.99**		0.50	0.26	mg/L			04/25/22 23:08	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-041122
Lab Sample ID: 580-112511-3
Date Collected: 04/11/22 08:00
Matrix: Water
Date Received: 04/12/22 09:45

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 18:34	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 18:34	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 18:34	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 18:34	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*04/13/22 18:34*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/13/22 18:34*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/13/22 18:34*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*04/13/22 18:34*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-387385/6
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 17:20	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 17:20	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 17:20	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 17:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/13/22 17:20*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/13/22 17:20*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/13/22 17:20*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/13/22 17:20*	*1*

Lab Sample ID: LCS 580-387385/3
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.89		ug/L		98	72 - 120
Tetrachloroethene	5.00	4.96		ug/L		99	75 - 124
Trichloroethene	5.00	4.86		ug/L		97	72 - 120
Vinyl chloride	5.00	5.23		ug/L		105	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-387385/4
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.74		ug/L		95	72 - 120	3	22
Tetrachloroethene	5.00	4.87		ug/L		97	75 - 124	2	20
Trichloroethene	5.00	4.70		ug/L		94	72 - 120	3	22
Vinyl chloride	5.00	5.11		ug/L		102	41 - 150	2	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-226956/4
Matrix: Water
Analysis Batch: 226956

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/15/22 11:35	1

Lab Sample ID: LCS 570-226956/2
Matrix: Water
Analysis Batch: 226956

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	12.8		ug/L		99	80 - 120

Lab Sample ID: LCSD 570-226956/3
Matrix: Water
Analysis Batch: 226956

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	11.7		ug/L		90	80 - 120	9	20

Lab Sample ID: MB 570-227380/4
Matrix: Water
Analysis Batch: 227380

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/18/22 11:18	1

Lab Sample ID: LCS 570-227380/2
Matrix: Water
Analysis Batch: 227380

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.6		ug/L		105	80 - 120

Lab Sample ID: LCSD 570-227380/3
Matrix: Water
Analysis Batch: 227380

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	14.3		ug/L		111	80 - 120	5	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-387465/3
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			04/13/22 14:04	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 580-387465/4
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	5.02		mg/L		100	90 - 110

Lab Sample ID: LCSD 580-387465/5
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	5.00	5.02		mg/L		100	90 - 110	0	15

Lab Sample ID: MB 580-387467/3
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			04/13/22 14:04	1
Sulfate	ND		1.5	0.80	mg/L			04/13/22 14:04	1

Lab Sample ID: LCS 580-387467/4
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	51.7		mg/L		103	90 - 110
Sulfate	50.0	51.0		mg/L		102	90 - 110

Lab Sample ID: LCSD 580-387467/5
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	51.7		mg/L		103	90 - 110	0	15
Sulfate	50.0	51.0		mg/L		102	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-229124/95
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			04/25/22 12:38	1

Lab Sample ID: LCS 570-229124/96
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Carbon, Total Organic	5.03	4.93		mg/L		98	85 - 115

Method: SM 5310D - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCSD 570-229124/97
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	4.81		mg/L		96	85 - 115	2	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW09-041122-0
Lab Sample ID: 580-112511-1

Date Collected: 04/11/22 14:00
Matrix: Water
Date Received: 04/12/22 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 22:41	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	226956	04/15/22 16:37	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 14:39	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387467	04/13/22 14:39	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/25/22 22:44	UAPD	ECL 4

Client Sample ID: T4S1MW03S-041122-0
Lab Sample ID: 580-112511-2

Date Collected: 04/11/22 15:50
Matrix: Water
Date Received: 04/12/22 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 23:06	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	227380	04/18/22 11:45	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 14:51	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387467	04/13/22 14:51	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/25/22 23:08	UAPD	ECL 4

Client Sample ID: TB-041122
Lab Sample ID: 580-112511-3

Date Collected: 04/11/22 08:00
Matrix: Water
Date Received: 04/12/22 09:45

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 18:34	JBT	FGS SEA

Laboratory References:

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112511-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	CA300001	01-31-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112511-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-112511-1	T4S1MW09-041122-0	Water	04/11/22 14:00	04/12/22 09:45
580-112511-2	T4S1MW03S-041122-0	Water	04/11/22 15:50	04/12/22 09:45
580-112511-3	TB-041122	Water	04/11/22 08:00	04/12/22 09:45

580-112511 Chain of Custody

Chain of Custody Record

eurofins Environment Testing America

Client Contact: Laura Tochko	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-48000-15393.3
	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:			
City: Portland	TAT Requested (days):			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D_LL - (MOD) Volatiles, standard list, low leve	RSK_175 - Methane	SM5310D - Total Organic Carbon	300.0_28D, 300_48HR	Total Number of containers	Special Instructions/Note:
				Preservation Code:			A	A	S	N		
T4SIMW09-041122-0	4/11/22	1400	G	Water			3	3	1	1	8	
T4SIMW035-041122-0	↓	1550	G	Water			3	3	1	1	8	
TB-041122	↓	0800	G	Water			3				3	
				Water								
				Water								
				Water								
				Water								
				Water								
				Water								
				Water								
				Water								

Possible Hazard Identification

☐ *Non-Hazard* ☐ *Flammable* ☐ *Skin Irritant* ☐ *Poison B* ☐ *Unknown* ☐ *Radiological*

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ *Return To Client* ☒ *Disposal By Lab* ☐ *Archive For ______ Months*

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LAURA TOCHKO [signature]	4/11/22 1700	JACOBS	[signature]	4/12/22 915	EFGS

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks: IR8 -3.0/-2.8 Lg White/wet/Bub FedEx AO wrs

Ver: 06/08/2021

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone 253-922-2310

Chain of Custody Record

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Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-102446 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-112511-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 5/2/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022-add on	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note.
			Preservation Code:							
T4S1MW09-041122-0 (580-112511-1)	4/11/22	14.00 Pacific		Water			X	X	4	
T4S1MW03S-041122-0 (580-112511-2)	4/11/22	15.50 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For _____ Months*
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Tom Blankenship	4/12/22		Olga Oneles	04/14/22 1040	EC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.
		3.2/4.9 IR-92

Ver: 06/08/2021

4/26/2022

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112511-1

Login Number: 112511
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112511-1

Login Number: 112511
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 04/14/22 08:12 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-112574-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
4/27/2022 6:13:19 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 580-112574-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-112574-1

Comments
No additional comments.

Receipt
The samples were received on 4/13/2022 10:00 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.2º C.

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW11-041222-0 (580-112574-2). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW12-041222-0
Lab Sample ID: 580-112574-1

Date Collected: 04/12/22 09:45
Matrix: Water
Date Received: 04/13/22 10:00

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	45		0.20	0.055	ug/L			04/13/22 23:31	1
Tetrachloroethene	2.8		0.20	0.084	ug/L			04/13/22 23:31	1
Trichloroethene	3.9		0.20	0.066	ug/L			04/13/22 23:31	1
Vinyl chloride	7.6		0.020	0.013	ug/L			04/13/22 23:31	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*04/13/22 23:31*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*04/13/22 23:31*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/13/22 23:31*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*04/13/22 23:31*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	270		8.0	0.87	ug/L			04/20/22 14:16	8

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.5		1.5	0.43	mg/L			04/13/22 17:12	1
NO3 as N	0.088	J	0.20	0.030	mg/L			04/13/22 17:12	1
Sulfate	4.0		1.5	0.80	mg/L			04/13/22 17:12	1
Carbon, Total Organic	1.6		0.50	0.26	mg/L			04/24/22 05:46	1

Client Sample ID: MW11-041222-0
Lab Sample ID: 580-112574-2

Date Collected: 04/12/22 11:20
Matrix: Water
Date Received: 04/13/22 10:00

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	1.6		0.20	0.084	ug/L			04/13/22 23:55	1
Trichloroethene	0.80		0.20	0.066	ug/L			04/13/22 23:55	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*04/13/22 23:55*	*1*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*		*04/13/22 23:55*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*04/13/22 23:55*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*04/13/22 23:55*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	46		1.0	0.28	ug/L			04/14/22 20:25	5
Vinyl chloride	26		0.10	0.065	ug/L			04/14/22 20:25	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*04/14/22 20:25*	*5*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/14/22 20:25*	*5*
Dibromofluoromethane (Surr)	*92*		*80 - 120*		*04/14/22 20:25*	*5*
Toluene-d8 (Surr)	*103*		*80 - 120*		*04/14/22 20:25*	*5*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	1400		8.0	0.87	ug/L			04/20/22 13:42	8

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.3		1.5	0.43	mg/L			04/13/22 17:35	1
NO3 as N	ND		0.20	0.030	mg/L			04/13/22 17:35	1
Sulfate	2.8		1.5	0.80	mg/L			04/13/22 17:35	1
Carbon, Total Organic	1.3		0.50	0.26	mg/L			04/24/22 06:10	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW10-041222-0
Lab Sample ID: 580-112574-3
Date Collected: 04/12/22 12:45
Matrix: Water
Date Received: 04/13/22 10:00

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**4.7**		0.20	0.055	ug/L			04/14/22 00:19	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/14/22 00:19	1
Trichloroethene	**0.28**		0.20	0.066	ug/L			04/14/22 00:19	1
Vinyl chloride	**1.1**		0.020	0.013	ug/L			04/14/22 00:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/14/22 00:19*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/14/22 00:19*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/14/22 00:19*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*04/14/22 00:19*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1200**		8.0	0.87	ug/L			04/20/22 14:41	8

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**2.6**		1.5	0.43	mg/L			04/13/22 17:47	1
NO3 as N	ND		0.20	0.030	mg/L			04/13/22 17:47	1
Sulfate	**2.0**		1.5	0.80	mg/L			04/13/22 17:47	1
Carbon, Total Organic	**2.5**		0.50	0.26	mg/L			04/24/22 06:34	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-041222
Lab Sample ID: 580-112574-4
Date Collected: 04/12/22 08:00
Matrix: Water
Date Received: 04/13/22 10:00

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 18:58	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 18:58	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 18:58	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 18:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*04/13/22 18:58*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*04/13/22 18:58*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/13/22 18:58*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/13/22 18:58*	*1*

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW23-041222-0
Lab Sample ID: 580-112574-5

Date Collected: 04/12/22 14:10
Matrix: Water
Date Received: 04/13/22 10:00

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.89		0.20	0.055	ug/L			04/14/22 00:44	1
Tetrachloroethene	1.3		0.20	0.084	ug/L			04/14/22 00:44	1
Trichloroethene	0.41		0.20	0.066	ug/L			04/14/22 00:44	1
Vinyl chloride	0.032		0.020	0.013	ug/L			04/14/22 00:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*04/14/22 00:44*	*1*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*		*04/14/22 00:44*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/14/22 00:44*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*04/14/22 00:44*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	29		1.0	0.11	ug/L			04/20/22 15:43	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.8		1.5	0.43	mg/L			04/13/22 17:59	1
NO3 as N	0.75		0.20	0.030	mg/L			04/13/22 17:59	1
Sulfate	7.2		1.5	0.80	mg/L			04/13/22 17:59	1
Carbon, Total Organic	0.95		0.50	0.26	mg/L			04/24/22 06:58	1

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-387385/6
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/13/22 17:20	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/13/22 17:20	1
Trichloroethene	ND		0.20	0.066	ug/L			04/13/22 17:20	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/13/22 17:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/13/22 17:20*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/13/22 17:20*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/13/22 17:20*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/13/22 17:20*	*1*

Lab Sample ID: LCS 580-387385/3
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.89		ug/L		98	72 - 120
Tetrachloroethene	5.00	4.96		ug/L		99	75 - 124
Trichloroethene	5.00	4.86		ug/L		97	72 - 120
Vinyl chloride	5.00	5.23		ug/L		105	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-387385/4
Matrix: Water
Analysis Batch: 387385

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.74		ug/L		95	72 - 120	3	22
Tetrachloroethene	5.00	4.87		ug/L		97	75 - 124	2	20
Trichloroethene	5.00	4.70		ug/L		94	72 - 120	3	22
Vinyl chloride	5.00	5.11		ug/L		102	41 - 150	2	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-387490/6
Matrix: Water
Analysis Batch: 387490

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/14/22 16:20	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/14/22 16:20	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*101*		*80 - 120*		*04/14/22 16:20*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/14/22 16:20*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/14/22 16:20*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/14/22 16:20*	*1*

Lab Sample ID: LCS 580-387490/3
Matrix: Water
Analysis Batch: 387490

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			5.00	4.97		ug/L		99	72 - 120		
Vinyl chloride			5.00	4.72		ug/L		94	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*98*		*80 - 120*
Toluene-d8 (Surr)	*105*		*80 - 120*

Lab Sample ID: LCSD 580-387490/4
Matrix: Water
Analysis Batch: 387490

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	4.94		ug/L		99	72 - 120	0	22
Vinyl chloride			5.00	6.30		ug/L		126	41 - 150	29	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*105*		*80 - 120*
Dibromofluoromethane (Surr)	*96*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-227957/4
Matrix: Water
Analysis Batch: 227957

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/20/22 11:23	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 570-227957/2
Matrix: Water
Analysis Batch: 227957

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.3		ug/L		103	80 - 120

Lab Sample ID: LCSD 570-227957/3
Matrix: Water
Analysis Batch: 227957

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	13.2		ug/L		102	80 - 120	1	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-387465/3
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			04/13/22 14:04	1

Lab Sample ID: LCS 580-387465/4
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	5.02		mg/L		100	90 - 110

Lab Sample ID: LCSD 580-387465/5
Matrix: Water
Analysis Batch: 387465

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	5.00	5.02		mg/L		100	90 - 110	0	15

Lab Sample ID: MB 580-387467/3
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			04/13/22 14:04	1
Sulfate	ND		1.5	0.80	mg/L			04/13/22 14:04	1

Lab Sample ID: LCS 580-387467/4
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	51.7		mg/L		103	90 - 110
Sulfate	50.0	51.0		mg/L		102	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-387467/5
Matrix: Water
Analysis Batch: 387467

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride			50.0	51.7		mg/L		103	90 - 110	0	15
Sulfate			50.0	51.0		mg/L		102	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-229124/4
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			04/23/22 20:47	1

Lab Sample ID: LCS 570-229124/5
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon, Total Organic			5.03	4.86		mg/L		97	85 - 115		

Lab Sample ID: LCSD 570-229124/6
Matrix: Water
Analysis Batch: 229124

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	4.80		mg/L		95	85 - 115	1	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW12-041222-0
Lab Sample ID: 580-112574-1
Date Collected: 04/12/22 09:45
Matrix: Water
Date Received: 04/13/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 23:31	JBT	FGS SEA
Total/NA	Analysis	RSK-175		8	227957	04/20/22 14:16	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 17:12	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387467	04/13/22 17:12	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/24/22 05:46	UAPD	ECL 4

Client Sample ID: MW11-041222-0
Lab Sample ID: 580-112574-2
Date Collected: 04/12/22 11:20
Matrix: Water
Date Received: 04/13/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 23:55	JBT	FGS SEA
Total/NA	Analysis	8260D	DL	5	387490	04/14/22 20:25	JBT	FGS SEA
Total/NA	Analysis	RSK-175	DL	8	227957	04/20/22 13:42	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 17:35	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387467	04/13/22 17:35	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/24/22 06:10	UAPD	ECL 4

Client Sample ID: MW10-041222-0
Lab Sample ID: 580-112574-3
Date Collected: 04/12/22 12:45
Matrix: Water
Date Received: 04/13/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/14/22 00:19	JBT	FGS SEA
Total/NA	Analysis	RSK-175		8	227957	04/20/22 14:41	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 17:47	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387467	04/13/22 17:47	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/24/22 06:34	UAPD	ECL 4

Client Sample ID: TB-041222
Lab Sample ID: 580-112574-4
Date Collected: 04/12/22 08:00
Matrix: Water
Date Received: 04/13/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/13/22 18:58	JBT	FGS SEA

Client Sample ID: T4S1MW23-041222-0
Lab Sample ID: 580-112574-5
Date Collected: 04/12/22 14:10
Matrix: Water
Date Received: 04/13/22 10:00

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387385	04/14/22 00:44	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	227957	04/20/22 15:43	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387465	04/13/22 17:59	JHR	FGS SEA

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112574-1

Client Sample ID: T4S1MW23-041222-0

Date Collected: 04/12/22 14:10
Date Received: 04/13/22 10:00

Lab Sample ID: 580-112574-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	387467	04/13/22 17:59	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229124	04/24/22 06:58	UAPD	ECL 4

Laboratory References:

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112574-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	CA300001	01-31-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112574-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-112574-1	MW12-041222-0	Water	04/12/22 09:45	04/13/22 10:00
580-112574-2	MW11-041222-0	Water	04/12/22 11:20	04/13/22 10:00
580-112574-3	MW10-041222-0	Water	04/12/22 12:45	04/13/22 10:00
580-112574-4	TB-041222	Water	04/12/22 08:00	04/13/22 10:00
580-112574-5	T4S1MW23-041222-0	Water	04/12/22 14:10	04/13/22 10:00

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-48000-15393.2
Client Contact: Laura Tochko	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 2 of 3
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #: 112574
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:			
City: Portland	TAT Requested (days): STD			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D_LL - (MOD) Volatiles, standard list, low leve	RSK_175 - Methane	SM5310D - Total Organic Carbon	300.0_28D, 300_48HR	Total Number of containers	Special Instructions/Note:
Preservation Code:							A	A	S	N		
MW12-041222-0	4/12/22	0945	G	Water	N		3	3	1	1	8	
MW11-041222-0		1120		Water			3	3	1	1	8	
MW10-041222-0		1245		Water			3	3	1	1	8	
TB-041222		0830		Water			3				3	
TH51MW23-041222-0		1410		Water			3	3	1	1	8	
				Water								
				Water								

Therm. ID: IR8 Cor: 2.2 ° Unc: 2.4 °
Cooler Dsc: LR
Packing: Bub
Cust. Seal: Yes ___ No ___
Blue Ice, (Wet) Dry, None
FedEx: P.U
UPS: ___
Lab Cour: ___
Other: ___

580-112574 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For ___ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LAURA TOCHKO	4/12/22 1600	JACOBS		4/13/22 1000	EENT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-48000-15393.2
Client Contact: Laura Tochko	Phone: 425 891 2355	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 3
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #: 112574
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:			
City: Portland	TAT Requested (days): STD			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D_LL - (MOD) Volatiles, standard list, low leve	RSK_175 - Methane	SM6310D - Total Organic Carbon	300.0_28D, 300_48HR	Total Number of containers	Special Instructions/Note:
			Preservation Code				A	A	S	N		
MW12-041222-0	4/12/22	0945	G	Water	N		2	3	1	1	7	
MW11-041222-0		1120		Water			3	3	1	1	8	
MW10-041222-0		1245		Water			3	3	1	1	8	
TB-041222		0800		Water			3				2	
TH51MW23-041222-0		1410		Water			3	3	1	1	8	
				Water								
				Water								

580-112574 Chain of Custody

Therm. ID: IR8 Cor: 2.2 ° Unc: 2.4 °
Cooler Dsc: LR
Packing: Bub
Cust. Seal: Yes ___ No ___
Blue Ice, Wet, Dry, None
FedEx: P.O
UPS:
Lab Cour:
Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☑ Disposal By Lab ☐ Archive For ___ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LAURA TOCHKO	4/12/22 1600	JACOBS		4/13/22 1000	EENT
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact Δ Yes Δ No | Custody Seal No.

Cooler Temperature(s) °C and Other Remarks

Ver: 06/08/2021

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-102521 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline Matlock@et.eurofinsus com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-112574-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 4/26/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note.
			Preservation Code:							
MW12-041222-0 (580-112574-1)	4/12/22	09 45 Pacific		Water			X	X	4	
MW11-041222-0 (580-112574-2)	4/12/22	11 20 Pacific		Water			X	X	4	
MW10-041222-0 (580-112574-3)	4/12/22	12.45 Pacific		Water			X	X	4	
T4S1MW23-041222-0 (580-112574-5)	4/12/22	14 10 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
[illegible]	4/14/22 1507	EETN	[signature]	4/15/22 1015	EC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.
		0.9/2.6 1k 9 2

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112574-1

Login Number: 112574
List Number: 1
Creator: Blankinship, Tom X

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112574-1

Login Number: 112574
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 04/15/22 01:54 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-112641-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
4/30/2022 9:12:10 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Job ID: 580-112641-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-112641-1

Comments
No additional comments.

Receipt
The samples were received on 4/14/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was -0.5º C.

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW04-041322-0 (580-112641-3) and MW01-041322-0 (580-112641-4). Elevated reporting limits (RLs) are provided.

Method 8260D: 1,2-Dichloroethane-d4 (Surr) and Dibromofluoromethane (Surr) recovery for the following sample was outside the upper control limit: TB-041322 (580-112641-5). Chemically associated analytes that are ND are reported.

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-388180 recovered outside control limits for the following analytes: Vinyl chloride.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*1	LCS/LCSD RPD exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
S1+	Surrogate recovery exceeds control limits, high biased.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4SIMW22-041322-0
Lab Sample ID: 580-112641-1
Date Collected: 04/13/22 08:45
Matrix: Water
Date Received: 04/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	3.6		0.20	0.055	ug/L			04/18/22 05:58	1
Tetrachloroethene	1.5		0.20	0.084	ug/L			04/18/22 05:58	1
Trichloroethene	2.6		0.20	0.066	ug/L			04/18/22 05:58	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*117*		*80 - 120*		*04/18/22 05:58*	*1*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*04/18/22 05:58*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 120*		*04/18/22 05:58*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*		*04/18/22 05:58*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.20	*1	0.020	0.013	ug/L			04/21/22 21:23	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*04/21/22 21:23*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/21/22 21:23*	*1*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*04/21/22 21:23*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/21/22 21:23*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	11		1.0	0.11	ug/L			04/22/22 12:27	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.9		1.5	0.43	mg/L			04/14/22 19:01	1
NO3 as N	0.23		0.20	0.030	mg/L			04/14/22 19:01	1
Sulfate	5.7		1.5	0.80	mg/L			04/14/22 19:01	1
Carbon, Total Organic	1.4		0.50	0.26	mg/L			04/24/22 14:11	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW02-041322-0
Lab Sample ID: 580-112641-2
Date Collected: 04/13/22 10:30
Matrix: Water
Date Received: 04/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	3.8		0.20	0.055	ug/L			04/18/22 06:22	1
Tetrachloroethene	0.16	J	0.20	0.084	ug/L			04/18/22 06:22	1
Trichloroethene	0.10	J	0.20	0.066	ug/L			04/18/22 06:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*119*		*80 - 120*		*04/18/22 06:22*	*1*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*04/18/22 06:22*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 120*		*04/18/22 06:22*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*04/18/22 06:22*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	3.6	*1	0.020	0.013	ug/L			04/21/22 21:48	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*04/21/22 21:48*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*04/21/22 21:48*	*1*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/21/22 21:48*	*1*
Toluene-d8 (Surr)	*103*		*80 - 120*		*04/21/22 21:48*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	3500		20	2.2	ug/L			04/25/22 12:39	20

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.8		1.5	0.43	mg/L			04/14/22 19:13	1
NO3 as N	0.057	J	0.20	0.030	mg/L			04/14/22 19:13	1
Sulfate	1.5		1.5	0.80	mg/L			04/14/22 19:13	1
Carbon, Total Organic	1.7		0.50	0.26	mg/L			04/24/22 14:33	1

Client Sample ID: MW04-041322-0
Lab Sample ID: 580-112641-3

Date Collected: 04/13/22 11:55
Matrix: Water
Date Received: 04/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	6.0		0.20	0.084	ug/L			04/18/22 06:46	1
Trichloroethene	13		0.20	0.066	ug/L			04/18/22 06:46	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*116*		*80 - 120*		*04/18/22 06:46*	*1*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*04/18/22 06:46*	*1*
Dibromofluoromethane (Surr)	*116*		*80 - 120*		*04/18/22 06:46*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*04/18/22 06:46*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	110		1.0	0.28	ug/L			04/21/22 22:13	5
Vinyl chloride	2.5	*1	0.10	0.065	ug/L			04/21/22 22:13	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/21/22 22:13*	*5*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*04/21/22 22:13*	*5*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*04/21/22 22:13*	*5*
Toluene-d8 (Surr)	*105*		*80 - 120*		*04/21/22 22:13*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	44		1.0	0.11	ug/L			04/22/22 13:41	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	10		1.5	0.43	mg/L			04/14/22 19:36	1
NO3 as N	ND		0.20	0.030	mg/L			04/14/22 19:36	1
Sulfate	3.5		1.5	0.80	mg/L			04/14/22 19:36	1
Carbon, Total Organic	1.3		0.50	0.26	mg/L			04/24/22 14:55	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW01-041322-0
Lab Sample ID: 580-112641-4
Date Collected: 04/13/22 13:20
Matrix: Water
Date Received: 04/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	23		0.20	0.066	ug/L			04/18/22 07:11	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*114*		*80 - 120*		*04/18/22 07:11*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*04/18/22 07:11*	*1*
Dibromofluoromethane (Surr)	*119*		*80 - 120*		*04/18/22 07:11*	*1*
Toluene-d8 (Surr)	*89*		*80 - 120*		*04/18/22 07:11*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	60		1.0	0.28	ug/L			04/21/22 22:38	5
Tetrachloroethene	140		1.0	0.42	ug/L			04/21/22 22:38	5
Vinyl chloride	3.2	*1	0.10	0.065	ug/L			04/21/22 22:38	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*04/21/22 22:38*	*5*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/21/22 22:38*	*5*
Dibromofluoromethane (Surr)	*95*		*80 - 120*		*04/21/22 22:38*	*5*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/21/22 22:38*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	50		1.0	0.11	ug/L			04/22/22 14:13	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.4		1.5	0.43	mg/L			04/14/22 19:48	1
NO3 as N	0.34		0.20	0.030	mg/L			04/14/22 19:48	1
Sulfate	8.9		1.5	0.80	mg/L			04/14/22 19:48	1
Carbon, Total Organic	1.4		0.50	0.26	mg/L			04/24/22 15:18	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-041322
Lab Sample ID: 580-112641-5
Date Collected: 04/13/22 08:00
Matrix: Water
Date Received: 04/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/18/22 01:05	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/18/22 01:05	1
Trichloroethene	ND		0.20	0.066	ug/L			04/18/22 01:05	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/18/22 01:05	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*121*	*S1+*	*80 - 120*		*04/18/22 01:05*	*1*
4-Bromofluorobenzene (Surr)	*89*		*80 - 120*		*04/18/22 01:05*	*1*
Dibromofluoromethane (Surr)	*124*	*S1+*	*80 - 120*		*04/18/22 01:05*	*1*
Toluene-d8 (Surr)	*93*		*80 - 120*		*04/18/22 01:05*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-387689/6
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/17/22 23:52	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/17/22 23:52	1
Trichloroethene	ND		0.20	0.066	ug/L			04/17/22 23:52	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/17/22 23:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*80 - 120*		*04/17/22 23:52*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*04/17/22 23:52*	*1*
Dibromofluoromethane (Surr)	*114*		*80 - 120*		*04/17/22 23:52*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*04/17/22 23:52*	*1*

Lab Sample ID: LCS 580-387689/3
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.55		ug/L		91	72 - 120
Tetrachloroethene	5.00	5.30		ug/L		106	75 - 124
Trichloroethene	5.00	4.69		ug/L		94	72 - 120
Vinyl chloride	5.00	3.10		ug/L		62	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 580-387689/4
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	5.04		ug/L		101	72 - 120	10	22
Tetrachloroethene	5.00	5.16		ug/L		103	75 - 124	3	20
Trichloroethene	5.00	5.03		ug/L		101	72 - 120	7	22
Vinyl chloride	5.00	3.38		ug/L		68	41 - 150	9	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*
Dibromofluoromethane (Surr)	*107*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-388180/6
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/21/22 17:16	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/21/22 17:16	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/21/22 17:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/21/22 17:16*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/21/22 17:16*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/21/22 17:16*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/21/22 17:16*	*1*

Lab Sample ID: LCS 580-388180/3
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			5.00	4.52		ug/L		90	72 - 120		
Tetrachloroethene			5.00	5.20		ug/L		104	75 - 124		
Vinyl chloride			5.00	4.94		ug/L		99	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*95*		*80 - 120*
Toluene-d8 (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 580-388180/4
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	4.47		ug/L		89	72 - 120	1	22
Tetrachloroethene			5.00	4.94		ug/L		99	75 - 124	5	20
Vinyl chloride			5.00	6.91	*1	ug/L		138	41 - 150	33	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-228520/4
Matrix: Water
Analysis Batch: 228520

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/22/22 11:02	1

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: LCS 570-228520/2
Matrix: Water
Analysis Batch: 228520

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.2		ug/L		102	80 - 120

Lab Sample ID: LCSD 570-228520/3
Matrix: Water
Analysis Batch: 228520

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	13.2		ug/L		102	80 - 120	0	20

Lab Sample ID: MB 570-229053/3
Matrix: Water
Analysis Batch: 229053

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/25/22 11:12	1

Lab Sample ID: LCS 570-229053/2
Matrix: Water
Analysis Batch: 229053

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.3		ug/L		103	80 - 120

Lab Sample ID: LCSD 570-229053/4
Matrix: Water
Analysis Batch: 229053

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	13.3		ug/L		103	80 - 120	0	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-387744/7
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			04/14/22 16:52	1

Lab Sample ID: LCS 580-387744/8
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	4.94		mg/L		99	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-387744/9
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N			5.00	4.95		mg/L		99	90 - 110	0	15

Lab Sample ID: 580-112641-4 MS
Matrix: Water
Analysis Batch: 387744

Client Sample ID: MW01-041322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
NO3 as N	0.34		5.00	5.08		mg/L		95	90 - 110		

Lab Sample ID: 580-112641-4 MSD
Matrix: Water
Analysis Batch: 387744

Client Sample ID: MW01-041322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	0.34		5.00	5.08		mg/L		95	90 - 110	0	15

Lab Sample ID: MB 580-387746/3
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			04/14/22 16:52	1
Sulfate	ND		1.5	0.80	mg/L			04/14/22 16:52	1

Lab Sample ID: LCS 580-387746/4
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			50.0	51.4		mg/L		103	90 - 110		
Sulfate			50.0	50.6		mg/L		101	90 - 110		

Lab Sample ID: LCSD 580-387746/5
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride			50.0	51.4		mg/L		103	90 - 110	0	15
Sulfate			50.0	50.6		mg/L		101	90 - 110	0	15

Lab Sample ID: 580-112641-4 MS
Matrix: Water
Analysis Batch: 387746

Client Sample ID: MW01-041322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride	2.4		50.0	53.0		mg/L		101	90 - 110		
Sulfate	8.9		50.0	59.9		mg/L		102	90 - 110		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 580-112641-4 MSD
Matrix: Water
Analysis Batch: 387746

Client Sample ID: MW01-041322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	2.4		50.0	53.0		mg/L		101	90 - 110	0	15
Sulfate	8.9		50.0	60.0		mg/L		102	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-229043/33
Matrix: Water
Analysis Batch: 229043

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			04/24/22 10:09	1

Lab Sample ID: LCS 570-229043/34
Matrix: Water
Analysis Batch: 229043

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon, Total Organic			5.03	4.55		mg/L		90	85 - 115		

Lab Sample ID: LCSD 570-229043/35
Matrix: Water
Analysis Batch: 229043

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	4.56		mg/L		91	85 - 115	0	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4SIMW22-041322-0
Lab Sample ID: 580-112641-1
Date Collected: 04/13/22 08:45
Matrix: Water
Date Received: 04/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 05:58	JBT	FGS SEA
Total/NA	Analysis	8260D	RA	1	388180	04/21/22 21:23	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228520	04/22/22 12:27	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/14/22 19:01	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/14/22 19:01	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229043	04/24/22 14:11	UAPD	ECL 4

Client Sample ID: MW02-041322-0
Lab Sample ID: 580-112641-2
Date Collected: 04/13/22 10:30
Matrix: Water
Date Received: 04/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 06:22	JBT	FGS SEA
Total/NA	Analysis	8260D	RA	1	388180	04/21/22 21:48	JBT	FGS SEA
Total/NA	Analysis	RSK-175		20	229053	04/25/22 12:39	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/14/22 19:13	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/14/22 19:13	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229043	04/24/22 14:33	UAPD	ECL 4

Client Sample ID: MW04-041322-0
Lab Sample ID: 580-112641-3
Date Collected: 04/13/22 11:55
Matrix: Water
Date Received: 04/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 06:46	JBT	FGS SEA
Total/NA	Analysis	8260D	DL	5	388180	04/21/22 22:13	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228520	04/22/22 13:41	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/14/22 19:36	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/14/22 19:36	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229043	04/24/22 14:55	UAPD	ECL 4

Client Sample ID: MW01-041322-0
Lab Sample ID: 580-112641-4
Date Collected: 04/13/22 13:20
Matrix: Water
Date Received: 04/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 07:11	JBT	FGS SEA
Total/NA	Analysis	8260D	DL	5	388180	04/21/22 22:38	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228520	04/22/22 14:13	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/14/22 19:48	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/14/22 19:48	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	229043	04/24/22 15:18	UAPD	ECL 4

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112641-1

Client Sample ID: TB-041322

Date Collected: 04/13/22 08:00
Date Received: 04/14/22 09:30

Lab Sample ID: 580-112641-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 01:05	JBT	FGS SEA

Laboratory References:

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112641-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	CA300001	01-31-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112641-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-112641-1	T4SIMW22-041322-0	Water	04/13/22 08:45	04/14/22 09:30
580-112641-2	MW02-041322-0	Water	04/13/22 10:30	04/14/22 09:30
580-112641-3	MW04-041322-0	Water	04/13/22 11:55	04/14/22 09:30
580-112641-4	MW01-041322-0	Water	04/13/22 13:20	04/14/22 09:30
580-112641-5	TB-041322	Water	04/13/22 08:00	04/14/22 09:30

580-112641 Chain of Custody

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-48000-15393.1
Client Contact: Laura Tochko	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:			
City: Portland	TAT Requested (days): STD			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D_LL - (MOD) Volatiles, standard list, low leve	RSK_175 - Methane	SM5310D - Total Organic Carbon	300.0_28D, 300_48HR	Total Number of containers	Special Instructions/Note:
			Preservation Code:				A	A	S	N		
TW SIMW22 -041322-0	4/13/22	0845	G	Water	N		2	2	1	1	6	
MW02 - 041322-0		1020		Water								
MW04 -041322-0		1155		Water								
MW01 -041322-0		1320		Water								
TE-041322		0800		Water							3	
				Water								
				Water								
				Water								
				Water								
				Water								
				Water								

Therm. ID: IR8 Cor: -0.5 ° Unc: -0.3°
Cooler Dsc: B FedEx: NO
Packing: Bub UPS:
Cust. Seal: Yes No Lab Cour:
Blue Ice, Wet, Dry, None Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LAURA TOCHKO	4/13/22 1500	JACOBS		4/14/22 0930	EETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Temperature Contr
IF THIS SHIPMENT IS DELAY
STORE REFRIGERATED (2°
RT 451 1 12:00 A 9330 04.16
ST 3
580-112641 Waybill
ORIGIN ID:TCMA (253) 922-2310
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E
FIFE, WA 98424
UNITED STATES US
DATE: 15APR22
GT: 43.75 LB
CAD: 989746/CAFE351
BILL SENDER
TO SHIPPING/RECEIVING
EUROFINS ENVIRONMENT TESTING SOUT
2841 DOW AVENUE, SUITE 100
TUSTIN CA 92780
(714) 895-5494
REF S580-48171
PO YES
Fe
SATURDAY 1
TRK# 0201 5743 5597 9330
PRIORITY OVERI
WO DTHA
92
CA-US
Part # 159471-434 MTW EXP 03/23
eurofins | Environment Testing TestAmerica
1791847
Custody Seal
DATE
SIGNATURE

Environment Testing
TestAmerica

1791852

eurofins | Environment Testing TestAmerica

ORIGIN ID:TCMA (253) 922-2310
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E

FIFE, WA 98424
UNITED STATES US

SHIP DATE: 18APR22
ACTWGT: 10.30 LB
CAD: 989746/CAFE3512

BILL SENDER

TO SHIPPING/RECEIVING
EUROFINS ENVIRONMENT TESTING SOUTHW
2841 DOW AVENUE, SUITE 100

TUSTIN CA 92780
(714) 895-5494
PO YES

REF S580-48142

FedEx Express

TRK# 0201 5743 5597 9693

TUE - 19 APR 10:30A
PRIORITY OVERNIGHT

92 DTHA

92780
CA-US SNA

Part # 159471-434 MTW EXP 03/23

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-102599 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-112641-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 5/4/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
T4SIMW22-041322-0 (580-112641-1)	4/13/22	08 45 Pacific		Water			X	X	3	
MW02-041322-0 (580-112641-2)	4/13/22	10 30 Pacific		Water			X	X	3	
MW04-041322-0 (580-112641-3)	4/13/22	11 55 Pacific		Water			X	X	3	
MW01-041322-0 (580-112641-4)	4/13/22	13.20 Pacific		Water			X	X	3	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I, II III IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1		4/15/22 1458	EET TN			
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 4/16/22 1040	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No. 1791807	Cooler Temperature(s) °C and Other Remarks. 2.1/3.8 IR96

Ver: 06/08/2021

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-102599 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-112641-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 5/4/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes.

A - HCL	M - Hexane
B - NaOH	N - None
C - Zn Acetate	O - AsNaO2
D - Nitric Acid	P - Na2O4S
E - NaHSO4	Q - Na2SO3
F - MeOH	R - Na2S2O3
G - Amchlor	S - H2SO4
H - Ascorbic Acid	T - TSP Dodecahydrate
I - Ice	U - Acetone
J - DI Water	V - MCAA
K - EDTA	W - pH 4-5
L - EDA	Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/-Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
T4SIMW22-041322-0 (580-112641-1)	4/13/22	08 45 Pacific		Water			X	X	3	1
MW02-041322-0 (580-112641-2)	4/13/22	10 30 Pacific		Water			X	X	3	1
MW04-041322-0 (580-112641-3)	4/13/22	11 55 Pacific		Water			X	X	3	1
MW01-041322-0 (580-112641-4)	4/13/22	13:20 Pacific		Water			X	X	3	1

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
Unconfirmed	☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months
Deliverable Requested I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Tom Blanton	4/18/22		Edgar Meleas	4/19/22 1000	EC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks: 1.3/3.0 IR-96

Ver: 06/08/2021

Page 23 of 25

4/30/2022

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112641-1

Login Number: 112641
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112641-1

Login Number: 112641
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 04/18/22 01:23 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

eurofins | Environment Testing America

ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-112673-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
5/20/2022 10:05:58 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112673-1

Job ID: 580-112673-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-112673-1

Comments
No additional comments.

Receipt
The samples were received on 4/15/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 2.2º C.

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW03-041422-0 (580-112673-2), MW05-041422-0 (580-112673-3), MW06-041422-0 (580-112673-4) and MW100-041422-0 (580-112673-5). Elevated reporting limits (RLs) are provided.

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-387689 recovered outside acceptance criteria, low biased, for Vinyl chloride. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated samples were non-detect for the analyte(s), the data are reported.

Method 8260D: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for analytical batch 580-388180 recovered outside control limits for the following analytes: Vinyl chloride.

Method 8260D: Due to a laboratory incident (small fire damaging the TCLP room), the TCLP for Volatiles analysis on the following sample was unable to be completed within holding time: IDW-SO-041422 (580-112673-6). The results have been reported with H-flags.

Method 8260D: The method blank for preparation batch 580-389326 and analytical batch 580-389415 contained 1,2,4-Trichlorobenzene above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

Method 8260D: The CCV for preparation batch 580-389326 and analytical batch 580-389415 recovered outside control limits for the following analyte(s): Bromomethane, Chloroethane, Trichlorofluoromethane, Methylene Chloride, 1,2-Dibromo-3-Chloropropane, Napthalene. Bromomethane, Chloroethane, Trichlorofluoromethane, Methylene Chloride, 1,2-Dibromo-3-Chloropropane, Napthalene has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed. These results have been reported and qualified.

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-389415 recovered outside acceptance criteria, low biased, for Methyl tert-butyl ether, 1,1-Dichloroethane, Vinyl Chloride, 2,2-Dichloropropane, and cis-1,2-Dichloroethene. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated samples were non-detect for the analyte(s), the data are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC/MS Semi VOA
Method 8270E: Due to a laboratory incident (small fire damaging the TCLP room), the TCLP for Semivolatiles analysis on the following sample was unable to be completed within holding time: IDW-SO-041422 (580-112673-6). The results have been reported with H-flags.

Method 8270E: The continuing calibration verification (CCV) associated with batch 580-390029 recovered above the upper control limit for Dimethyl phthalate and Diethyl phthalate. The samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: CCVIS 580-390029/3.

Method 8270E: The minimum response factor (RF) criteria for the continuing calibration verification (CCV) analyzed in batch 580-390029 was outside criteria for the following analyte: N-Nitrosodi-n-propylamine. As indicated in the reference method, sample analysis may proceed; however, any detection or non-detection for the affected analyte is considered estimated.

Method 8270E: The laboratory control sample and/or the laboratory control sample duplicate (LCS/LCSD) for preparation batches

Job ID: 580-112673-1 (Continued)

Laboratory: Eurofins Seattle (Continued)

580-389177 and 580-389905 and analytical batch 580-390029 recovered outside control limits for the following analyte: 4-Chloroaniline. 4-Chloroaniline has been identified as a poor performing analyte when analyzed using this method; therefore, re-extraction/re-analysis was not performed.

Method 8270E: The RPD of the laboratory control sample (LCS) and laboratory control sample duplicate (LCSD) for preparation batches 580-389177 and 580-389905 and analytical batch 580-390029 recovered outside control limits for the following analytes: Benzyl alcohol and Pentachlorophenol.

Method 8270E: The following analyte recovered outside control limits for the LCSD associated with preparation batches 580-389177 and 580-389905 and analytical batch 580-390029: Fluoranthene. This is not indicative of a systematic control problem because these were random marginal exceedances. Qualified results have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Metals
Method 6020B: The method blank for analytical batch 580-389495 contained Lead above the method detection limit. This target analyte concentration was less than half of the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
Method 1311: EPA Method 1311 requires the room temperature to be maintained at 23 +/- 2 degrees Celsius for the duration of the leaching process. For batch 580-389326, the temperature exceeded this range by 0.9 Celsius. As a result, the test was not fully compliant with the requirements of 40 CFR Part 261.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
*1	LCS/LCSD RPD exceeds control limits.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC/MS Semi VOA

Qualifier	Qualifier Description
*-	LCS and/or LCSD is outside acceptance limits, low biased.
*1	LCS/LCSD RPD exceeds control limits.
B	Compound was found in the blank and sample.
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F1	MS and/or MSD recovery exceeds control limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points

Glossary (Continued)

Abbreviation	These commonly used abbreviations may or may not be present in this report.
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-041422
Lab Sample ID: 580-112673-1
Date Collected: 04/14/22 08:00
Matrix: Water
Date Received: 04/15/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/18/22 00:16	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/18/22 00:16	1
Trichloroethene	ND		0.20	0.066	ug/L			04/18/22 00:16	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/18/22 00:16	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*118*		*80 - 120*		*04/18/22 00:16*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*04/18/22 00:16*	*1*
Dibromofluoromethane (Surr)	*120*		*80 - 120*		*04/18/22 00:16*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*04/18/22 00:16*	*1*

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW03-041422-0
Lab Sample ID: 580-112673-2

Date Collected: 04/14/22 09:30
Matrix: Water
Date Received: 04/15/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	410		10	2.8	ug/L			04/21/22 23:52	50
Tetrachloroethene	130		10	4.2	ug/L			04/21/22 23:52	50
Trichloroethene	34		10	3.3	ug/L			04/21/22 23:52	50
Vinyl chloride	70	*1	1.0	0.65	ug/L			04/21/22 23:52	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*04/21/22 23:52*	*50*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/21/22 23:52*	*50*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/21/22 23:52*	*50*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/21/22 23:52*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	190		1.0	0.11	ug/L			04/23/22 01:45	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.3		1.5	0.43	mg/L			04/15/22 13:05	1
NO3 as N	0.031	J	0.20	0.030	mg/L			04/15/22 13:05	1
Sulfate	12		1.5	0.80	mg/L			04/15/22 13:05	1
Carbon, Total Organic	1.4		0.50	0.26	mg/L			05/07/22 22:12	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW05-041422-0
Lab Sample ID: 580-112673-3
Date Collected: 04/14/22 12:10
Matrix: Water
Date Received: 04/15/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	960		10	2.8	ug/L			04/22/22 00:17	50
Tetrachloroethene	1900		10	4.2	ug/L			04/22/22 00:17	50
Trichloroethene	110		10	3.3	ug/L			04/22/22 00:17	50
Vinyl chloride	170	*1	1.0	0.65	ug/L			04/22/22 00:17	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*04/22/22 00:17*	*50*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*04/22/22 00:17*	*50*
Dibromofluoromethane (Surr)	*91*		*80 - 120*		*04/22/22 00:17*	*50*
Toluene-d8 (Surr)	*110*		*80 - 120*		*04/22/22 00:17*	*50*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	1200		4.0	0.44	ug/L			04/24/22 03:19	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	3.8		1.5	0.43	mg/L			04/15/22 13:17	1
NO3 as N	ND		0.20	0.030	mg/L			04/15/22 13:17	1
Sulfate	5.9		1.5	0.80	mg/L			04/15/22 13:17	1
Carbon, Total Organic	1.9		0.50	0.26	mg/L			05/07/22 22:34	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW06-041422-0
Lab Sample ID: 580-112673-4
Date Collected: 04/14/22 10:35
Matrix: Water
Date Received: 04/15/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1100		10	2.8	ug/L			04/22/22 00:41	50
Tetrachloroethene	360		10	4.2	ug/L			04/22/22 00:41	50
Trichloroethene	91		10	3.3	ug/L			04/22/22 00:41	50
Vinyl chloride	30	*1	1.0	0.65	ug/L			04/22/22 00:41	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*99*		*80 - 120*		*04/22/22 00:41*	*50*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*04/22/22 00:41*	*50*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/22/22 00:41*	*50*
Toluene-d8 (Surr)	*103*		*80 - 120*		*04/22/22 00:41*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	58		1.0	0.11	ug/L			04/24/22 03:46	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.1		1.5	0.43	mg/L			04/15/22 13:40	1
NO3 as N	ND	F1	0.20	0.030	mg/L			04/15/22 13:40	1
Sulfate	25		1.5	0.80	mg/L			04/15/22 13:40	1
Carbon, Total Organic	1.8		0.50	0.26	mg/L			05/07/22 22:57	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW100-041422-0
Lab Sample ID: 580-112673-5
Date Collected: 04/14/22 12:00
Matrix: Water
Date Received: 04/15/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	980		10	2.8	ug/L			04/22/22 01:05	50
Tetrachloroethene	350		10	4.2	ug/L			04/22/22 01:05	50
Trichloroethene	94		10	3.3	ug/L			04/22/22 01:05	50
Vinyl chloride	21	*1	1.0	0.65	ug/L			04/22/22 01:05	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 120*		*04/22/22 01:05*	*50*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*04/22/22 01:05*	*50*
Dibromofluoromethane (Surr)	*96*		*80 - 120*		*04/22/22 01:05*	*50*
Toluene-d8 (Surr)	*98*		*80 - 120*		*04/22/22 01:05*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	57		1.0	0.11	ug/L			04/24/22 05:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.1		1.5	0.43	mg/L			04/15/22 14:15	1
NO3 as N	ND		0.20	0.030	mg/L			04/15/22 14:15	1
Sulfate	25		1.5	0.80	mg/L			04/15/22 14:15	1
Carbon, Total Organic	1.8		0.50	0.26	mg/L			05/07/22 23:19	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: IDW-SO-041422
Lab Sample ID: 580-112673-6
Date Collected: 04/14/22 12:45
Matrix: Solid
Date Received: 04/15/22 09:30

Method: EPA 8260D - Volatile Organic Compounds by GC/MS - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND	H	100	53	ug/L			05/04/22 16:20	100
Chloromethane	ND	H	100	28	ug/L			05/04/22 16:20	100
Vinyl chloride	ND	H	100	22	ug/L			05/04/22 16:20	100
Bromomethane	ND	H	100	21	ug/L			05/04/22 16:20	100
Chloroethane	ND	H	100	35	ug/L			05/04/22 16:20	100
Trichlorofluoromethane	ND	H	100	36	ug/L			05/04/22 16:20	100
1,1-Dichloroethene	ND	H	100	28	ug/L			05/04/22 16:20	100
Methylene Chloride	ND	H	300	140	ug/L			05/04/22 16:20	100
trans-1,2-Dichloroethene	ND	H	100	39	ug/L			05/04/22 16:20	100
1,1-Dichloroethane	ND	H	100	22	ug/L			05/04/22 16:20	100
2,2-Dichloropropane	ND	H	100	32	ug/L			05/04/22 16:20	100
cis-1,2-Dichloroethene	ND	H	100	35	ug/L			05/04/22 16:20	100
Bromochloromethane	ND	H	100	29	ug/L			05/04/22 16:20	100
Chloroform	ND	H	100	26	ug/L			05/04/22 16:20	100
1,1,1-Trichloroethane	ND	H	100	39	ug/L			05/04/22 16:20	100
Carbon tetrachloride	ND	H	100	30	ug/L			05/04/22 16:20	100
1,1-Dichloropropene	ND	H	100	29	ug/L			05/04/22 16:20	100
Benzene	ND	H	100	24	ug/L			05/04/22 16:20	100
1,2-Dichloroethane	ND	H	100	42	ug/L			05/04/22 16:20	100
Trichloroethene	ND	H	100	26	ug/L			05/04/22 16:20	100
1,2-Dichloropropane	ND	H	100	18	ug/L			05/04/22 16:20	100
Dibromomethane	ND	H	100	34	ug/L			05/04/22 16:20	100
Bromodichloromethane	ND	H	100	29	ug/L			05/04/22 16:20	100
cis-1,3-Dichloropropene	ND	H	100	42	ug/L			05/04/22 16:20	100
Toluene	**57**	**J H**	100	39	ug/L			05/04/22 16:20	100
trans-1,3-Dichloropropene	ND	H	100	41	ug/L			05/04/22 16:20	100
1,1,2-Trichloroethane	ND	H	100	24	ug/L			05/04/22 16:20	100
Tetrachloroethene	ND	H	100	41	ug/L			05/04/22 16:20	100
1,3-Dichloropropane	ND	H	100	35	ug/L			05/04/22 16:20	100
Dibromochloromethane	ND	H	100	43	ug/L			05/04/22 16:20	100
1,2-Dibromoethane	ND	H	100	40	ug/L			05/04/22 16:20	100
Chlorobenzene	ND	H	100	44	ug/L			05/04/22 16:20	100
Ethylbenzene	ND	H	100	50	ug/L			05/04/22 16:20	100
1,1,1,2-Tetrachloroethane	ND	H	100	18	ug/L			05/04/22 16:20	100
1,1,2,2-Tetrachloroethane	ND	H	100	52	ug/L			05/04/22 16:20	100
m-Xylene & p-Xylene	ND	H	200	53	ug/L			05/04/22 16:20	100
o-Xylene	ND	H	100	39	ug/L			05/04/22 16:20	100
Styrene	ND	H	100	53	ug/L			05/04/22 16:20	100
Bromoform	ND	H	100	51	ug/L			05/04/22 16:20	100
Isopropylbenzene	ND	H	100	44	ug/L			05/04/22 16:20	100
Bromobenzene	ND	H	100	43	ug/L			05/04/22 16:20	100
N-Propylbenzene	ND	H	100	50	ug/L			05/04/22 16:20	100
1,2,3-Trichloropropane	ND	H	100	41	ug/L			05/04/22 16:20	100
2-Chlorotoluene	ND	H	100	51	ug/L			05/04/22 16:20	100
1,3,5-Trimethylbenzene	ND	H	100	55	ug/L			05/04/22 16:20	100
4-Chlorotoluene	ND	H	100	38	ug/L			05/04/22 16:20	100
t-Butylbenzene	ND	H	200	58	ug/L			05/04/22 16:20	100
1,2,4-Trimethylbenzene	ND	H	300	61	ug/L			05/04/22 16:20	100
sec-Butylbenzene	ND	H	100	49	ug/L			05/04/22 16:20	100

Client Sample ID: IDW-SO-041422
Lab Sample ID: 580-112673-6
Date Collected: 04/14/22 12:45
Matrix: Solid
Date Received: 04/15/22 09:30

Method: EPA 8260D - Volatile Organic Compounds by GC/MS - TCLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,3-Dichlorobenzene	ND	H	100	48	ug/L			05/04/22 16:20	100
4-Isopropyltoluene	ND	H	100	28	ug/L			05/04/22 16:20	100
1,4-Dichlorobenzene	ND	H	100	46	ug/L			05/04/22 16:20	100
n-Butylbenzene	ND	H	100	44	ug/L			05/04/22 16:20	100
1,2-Dichlorobenzene	ND	H	100	46	ug/L			05/04/22 16:20	100
1,2-Dibromo-3-Chloropropane	ND	H	300	57	ug/L			05/04/22 16:20	100
1,2,4-Trichlorobenzene	ND	H	100	33	ug/L			05/04/22 16:20	100
1,2,3-Trichlorobenzene	ND	H	200	43	ug/L			05/04/22 16:20	100
Hexachlorobutadiene	ND	H	300	79	ug/L			05/04/22 16:20	100
Naphthalene	**190**	**J H**	300	93	ug/L			05/04/22 16:20	100
Methyl tert-butyl ether	ND	H	100	44	ug/L			05/04/22 16:20	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*99*		*80 - 120*		*05/04/22 16:20*	*100*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*05/04/22 16:20*	*100*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*05/04/22 16:20*	*100*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*05/04/22 16:20*	*100*

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	ND	H	5.0	0.80	ug/L		05/09/22 09:51	05/10/22 20:54	1
Bis(2-chloroethyl)ether	ND	H	0.50	0.15	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Chlorophenol	ND	H	5.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
1,3-Dichlorobenzene	ND	H	2.0	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
1,4-Dichlorobenzene	ND	H	2.0	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzyl alcohol	ND	H *1	25	0.90	ug/L		05/09/22 09:51	05/10/22 20:54	1
1,2-Dichlorobenzene	ND	H	2.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Methylphenol	ND	H	3.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
3 & 4 Methylphenol	ND	H	3.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
N-Nitrosodi-n-propylamine	ND	H	2.0	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1
Hexachloroethane	ND	H	5.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
Nitrobenzene	ND	H	5.0	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Isophorone	ND	H	2.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Nitrophenol	ND	H	5.0	0.35	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4-Dimethylphenol	ND	H	20	0.80	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzoic acid	ND	H	50	6.7	ug/L		05/09/22 09:51	05/10/22 20:54	1
Bis(2-chloroethoxy)methane	ND	H	3.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4-Dichlorophenol	ND	H	5.0	1.0	ug/L		05/09/22 09:51	05/10/22 20:54	1
1,2,4-Trichlorobenzene	ND	H	2.0	0.45	ug/L		05/09/22 09:51	05/10/22 20:54	1
Naphthalene	ND	H	2.0	0.80	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Chloroaniline	ND	H *-	10	0.75	ug/L		05/09/22 09:51	05/10/22 20:54	1
Hexachlorobutadiene	ND	H	5.0	0.40	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Chloro-3-methylphenol	ND	H	3.0	0.65	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Methylnaphthalene	ND	H	2.0	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1
Hexachlorocyclopentadiene	ND	H	5.0	0.70	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4,6-Trichlorophenol	ND	H	3.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4,5-Trichlorophenol	ND	H	2.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Chloronaphthalene	ND	H	5.0	0.35	ug/L		05/09/22 09:51	05/10/22 20:54	1
2-Nitroaniline	ND	H	5.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
Dimethyl phthalate	**0.33**	**J H B**	3.0	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1

Client Sample ID: IDW-SO-041422
Lab Sample ID: 580-112673-6

Date Collected: 04/14/22 12:45
Matrix: Solid
Date Received: 04/15/22 09:30

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) - TCLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acenaphthylene	ND	H	5.0	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,6-Dinitrotoluene	ND	H	2.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
3-Nitroaniline	ND	H	15	0.80	ug/L		05/09/22 09:51	05/10/22 20:54	1
Acenaphthene	ND	H	2.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4-Dinitrophenol	ND	H	25	2.3	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Nitrophenol	ND	H	50	8.5	ug/L		05/09/22 09:51	05/10/22 20:54	1
Dibenzofuran	ND	H	2.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
2,4-Dinitrotoluene	ND	H	5.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
Diethyl phthalate	ND	H	5.0	0.75	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Chlorophenyl phenyl ether	ND	H	3.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
Fluorene	ND	H	1.3	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Nitroaniline	ND	H	10	1.1	ug/L		05/09/22 09:51	05/10/22 20:54	1
4,6-Dinitro-2-methylphenol	ND	H	10	2.8	ug/L		05/09/22 09:51	05/10/22 20:54	1
N-Nitrosodiphenylamine	ND	H	5.0	0.35	ug/L		05/09/22 09:51	05/10/22 20:54	1
4-Bromophenyl phenyl ether	ND	H	3.0	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1
Hexachlorobenzene	ND	H	3.0	0.40	ug/L		05/09/22 09:51	05/10/22 20:54	1
Pentachlorophenol	ND	H *1	25	2.6	ug/L		05/09/22 09:51	05/10/22 20:54	1
Phenanthrene	**0.60**	**J H**	5.0	0.60	ug/L		05/09/22 09:51	05/10/22 20:54	1
Anthracene	ND	H	5.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
Di-n-butyl phthalate	ND	H	50	15	ug/L		05/09/22 09:51	05/10/22 20:54	1
Fluoranthene	ND	H *-	1.3	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1
Pyrene	ND	H	5.0	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Butyl benzyl phthalate	ND	H	20	1.4	ug/L		05/09/22 09:51	05/10/22 20:54	1
3,3'-Dichlorobenzidine	ND	H	5.0	0.60	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzo[a]anthracene	ND	H	1.3	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
Chrysene	ND	H	1.3	0.45	ug/L		05/09/22 09:51	05/10/22 20:54	1
Bis(2-ethylhexyl) phthalate	ND	H	15	3.7	ug/L		05/09/22 09:51	05/10/22 20:54	1
Di-n-octyl phthalate	ND	H	5.0	0.65	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzo[a]pyrene	ND	H	1.3	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Indeno[1,2,3-cd]pyrene	ND	H	2.0	0.65	ug/L		05/09/22 09:51	05/10/22 20:54	1
Dibenz(a,h)anthracene	ND	H	1.3	0.35	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzo[g,h,i]perylene	ND	H	1.3	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Carbazole	ND	H	3.0	0.50	ug/L		05/09/22 09:51	05/10/22 20:54	1
1-Methylnaphthalene	ND	H	5.0	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzo[b]fluoranthene	ND	H	1.3	0.20	ug/L		05/09/22 09:51	05/10/22 20:54	1
Benzo[k]fluoranthene	ND	H	1.3	0.25	ug/L		05/09/22 09:51	05/10/22 20:54	1
bis(chloroisopropyl) ether	ND	H	1.3	0.30	ug/L		05/09/22 09:51	05/10/22 20:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorophenol (Surr)	*71*		*25 - 127*	*05/09/22 09:51*	*05/10/22 20:54*	*1*
Phenol-d5 (Surr)	*54*		*26 - 120*	*05/09/22 09:51*	*05/10/22 20:54*	*1*
Nitrobenzene-d5 (Surr)	*63*		*29 - 139*	*05/09/22 09:51*	*05/10/22 20:54*	*1*
2-Fluorobiphenyl	*55*		*36 - 120*	*05/09/22 09:51*	*05/10/22 20:54*	*1*
2,4,6-Tribromophenol (Surr)	*54*		*39 - 137*	*05/09/22 09:51*	*05/10/22 20:54*	*1*
Terphenyl-d14 (Surr)	*73*		*66 - 150*	*05/09/22 09:51*	*05/10/22 20:54*	*1*

Method: EPA 6020B - Metals (ICP/MS) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.010	0.0020	mg/L		05/03/22 15:40	05/04/22 21:48	10
Barium	**0.36**		0.012	0.0021	mg/L		05/03/22 15:40	05/04/22 21:48	10

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112673-1

Client Sample ID: IDW-SO-041422
Date Collected: 04/14/22 12:45
Date Received: 04/15/22 09:30

Lab Sample ID: 580-112673-6
Matrix: Solid

Method: EPA 6020B - Metals (ICP/MS) - TCLP (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Cadmium	0.00068	J	0.0040	0.00037	mg/L		05/03/22 15:40	05/04/22 21:48	10
Chromium	0.0020	J	0.0080	0.0017	mg/L		05/03/22 15:40	05/04/22 21:48	10
Lead	0.0017	J B	0.0040	0.00040	mg/L		05/03/22 15:40	05/04/22 21:48	10
Selenium	ND		0.080	0.021	mg/L		05/03/22 15:40	05/04/22 21:48	10
Silver	ND		0.0040	0.00025	mg/L		05/03/22 15:40	05/04/22 21:48	10

Method: EPA 7470A - Mercury (CVAA) - TCLP

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0030	0.0015	mg/L		05/03/22 12:13	05/03/22 19:40	1

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-387689/6
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/17/22 23:52	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/17/22 23:52	1
Trichloroethene	ND		0.20	0.066	ug/L			04/17/22 23:52	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/17/22 23:52	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*115*		*80 - 120*		*04/17/22 23:52*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*04/17/22 23:52*	*1*
Dibromofluoromethane (Surr)	*114*		*80 - 120*		*04/17/22 23:52*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*04/17/22 23:52*	*1*

Lab Sample ID: LCS 580-387689/3
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			5.00	4.55		ug/L		91	72 - 120		
Tetrachloroethene			5.00	5.30		ug/L		106	75 - 124		
Trichloroethene			5.00	4.69		ug/L		94	72 - 120		
Vinyl chloride			5.00	3.10		ug/L		62	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 580-387689/4
Matrix: Water
Analysis Batch: 387689

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	5.04		ug/L		101	72 - 120	10	22
Tetrachloroethene			5.00	5.16		ug/L		103	75 - 124	3	20
Trichloroethene			5.00	5.03		ug/L		101	72 - 120	7	22
Vinyl chloride			5.00	3.38		ug/L		68	41 - 150	9	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*
4-Bromofluorobenzene (Surr)	*110*		*80 - 120*
Dibromofluoromethane (Surr)	*107*		*80 - 120*
Toluene-d8 (Surr)	*100*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-388180/6
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			04/21/22 17:16	1
Tetrachloroethene	ND		0.20	0.084	ug/L			04/21/22 17:16	1
Trichloroethene	ND		0.20	0.066	ug/L			04/21/22 17:16	1
Vinyl chloride	ND		0.020	0.013	ug/L			04/21/22 17:16	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*		*04/21/22 17:16*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*04/21/22 17:16*	*1*
Dibromofluoromethane (Surr)	*94*		*80 - 120*		*04/21/22 17:16*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*04/21/22 17:16*	*1*

Lab Sample ID: LCS 580-388180/3
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.52		ug/L		90	72 - 120
Tetrachloroethene	5.00	5.20		ug/L		104	75 - 124
Trichloroethene	5.00	4.56		ug/L		91	72 - 120
Vinyl chloride	5.00	4.94		ug/L		99	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*95*		*80 - 120*
Toluene-d8 (Surr)	*110*		*80 - 120*

Lab Sample ID: LCSD 580-388180/4
Matrix: Water
Analysis Batch: 388180

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.47		ug/L		89	72 - 120	1	22
Tetrachloroethene	5.00	4.94		ug/L		99	75 - 124	5	20
Trichloroethene	5.00	4.52		ug/L		90	72 - 120	1	22
Vinyl chloride	5.00	6.91	*1	ug/L		138	41 - 150	33	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*108*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: EPA 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-389326/7-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dichlorodifluoromethane	ND		100	53	ug/L			05/04/22 15:57	100
Chloromethane	ND		100	28	ug/L			05/04/22 15:57	100
Vinyl chloride	ND		100	22	ug/L			05/04/22 15:57	100
Bromomethane	ND		100	21	ug/L			05/04/22 15:57	100
Chloroethane	ND		100	35	ug/L			05/04/22 15:57	100
Trichlorofluoromethane	ND		100	36	ug/L			05/04/22 15:57	100
1,1-Dichloroethene	ND		100	28	ug/L			05/04/22 15:57	100
Methylene Chloride	ND		300	140	ug/L			05/04/22 15:57	100
trans-1,2-Dichloroethene	ND		100	39	ug/L			05/04/22 15:57	100
1,1-Dichloroethane	ND		100	22	ug/L			05/04/22 15:57	100
2,2-Dichloropropane	ND		100	32	ug/L			05/04/22 15:57	100
cis-1,2-Dichloroethene	ND		100	35	ug/L			05/04/22 15:57	100
Bromochloromethane	ND		100	29	ug/L			05/04/22 15:57	100
Chloroform	ND		100	26	ug/L			05/04/22 15:57	100
1,1,1-Trichloroethane	ND		100	39	ug/L			05/04/22 15:57	100
Carbon tetrachloride	ND		100	30	ug/L			05/04/22 15:57	100
1,1-Dichloropropene	ND		100	29	ug/L			05/04/22 15:57	100
Benzene	ND		100	24	ug/L			05/04/22 15:57	100
1,2-Dichloroethane	ND		100	42	ug/L			05/04/22 15:57	100
Trichloroethene	ND		100	26	ug/L			05/04/22 15:57	100
1,2-Dichloropropane	ND		100	18	ug/L			05/04/22 15:57	100
Dibromomethane	ND		100	34	ug/L			05/04/22 15:57	100
Bromodichloromethane	ND		100	29	ug/L			05/04/22 15:57	100
cis-1,3-Dichloropropene	ND		100	42	ug/L			05/04/22 15:57	100
Toluene	ND		100	39	ug/L			05/04/22 15:57	100
trans-1,3-Dichloropropene	ND		100	41	ug/L			05/04/22 15:57	100
1,1,2-Trichloroethane	ND		100	24	ug/L			05/04/22 15:57	100
Tetrachloroethene	ND		100	41	ug/L			05/04/22 15:57	100
1,3-Dichloropropane	ND		100	35	ug/L			05/04/22 15:57	100
Dibromochloromethane	ND		100	43	ug/L			05/04/22 15:57	100
1,2-Dibromoethane	ND		100	40	ug/L			05/04/22 15:57	100
Chlorobenzene	ND		100	44	ug/L			05/04/22 15:57	100
Ethylbenzene	ND		100	50	ug/L			05/04/22 15:57	100
1,1,1,2-Tetrachloroethane	ND		100	18	ug/L			05/04/22 15:57	100
1,1,2,2-Tetrachloroethane	ND		100	52	ug/L			05/04/22 15:57	100
m-Xylene & p-Xylene	ND		200	53	ug/L			05/04/22 15:57	100
o-Xylene	ND		100	39	ug/L			05/04/22 15:57	100
Styrene	ND		100	53	ug/L			05/04/22 15:57	100
Bromoform	ND		100	51	ug/L			05/04/22 15:57	100
Isopropylbenzene	ND		100	44	ug/L			05/04/22 15:57	100
Bromobenzene	ND		100	43	ug/L			05/04/22 15:57	100
N-Propylbenzene	ND		100	50	ug/L			05/04/22 15:57	100
1,2,3-Trichloropropane	ND		100	41	ug/L			05/04/22 15:57	100
2-Chlorotoluene	ND		100	51	ug/L			05/04/22 15:57	100
1,3,5-Trimethylbenzene	ND		100	55	ug/L			05/04/22 15:57	100
4-Chlorotoluene	ND		100	38	ug/L			05/04/22 15:57	100
t-Butylbenzene	ND		200	58	ug/L			05/04/22 15:57	100
1,2,4-Trimethylbenzene	ND		300	61	ug/L			05/04/22 15:57	100

Method: EPA 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-389326/7-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Method Blank
Prep Type: TCLP

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
sec-Butylbenzene	ND		100	49	ug/L			05/04/22 15:57	100
1,3-Dichlorobenzene	ND		100	48	ug/L			05/04/22 15:57	100
4-Isopropyltoluene	ND		100	28	ug/L			05/04/22 15:57	100
1,4-Dichlorobenzene	ND		100	46	ug/L			05/04/22 15:57	100
n-Butylbenzene	ND		100	44	ug/L			05/04/22 15:57	100
1,2-Dichlorobenzene	ND		100	46	ug/L			05/04/22 15:57	100
1,2-Dibromo-3-Chloropropane	ND		300	57	ug/L			05/04/22 15:57	100
1,2,4-Trichlorobenzene	50.1	J	100	33	ug/L			05/04/22 15:57	100
1,2,3-Trichlorobenzene	ND		200	43	ug/L			05/04/22 15:57	100
Hexachlorobutadiene	ND		300	79	ug/L			05/04/22 15:57	100
Naphthalene	ND		300	93	ug/L			05/04/22 15:57	100
Methyl tert-butyl ether	ND		100	44	ug/L			05/04/22 15:57	100

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
Toluene-d8 (Surr)	*98*		*80 - 120*		*05/04/22 15:57*	*100*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*05/04/22 15:57*	*100*
Dibromofluoromethane (Surr)	*99*		*80 - 120*		*05/04/22 15:57*	*100*
1,2-Dichloroethane-d4 (Surr)	*92*		*80 - 120*		*05/04/22 15:57*	*100*

Lab Sample ID: LCS 580-389326/8-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Lab Control Sample
Prep Type: TCLP

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Dichlorodifluoromethane	1000	1000		ug/L		100	20 - 150
Chloromethane	1000	957		ug/L		96	25 - 150
Vinyl chloride	1000	703		ug/L		70	31 - 150
Bromomethane	1000	661		ug/L		66	36 - 150
Chloroethane	1000	535		ug/L		54	38 - 150
Trichlorofluoromethane	1000	743		ug/L		74	45 - 148
1,1-Dichloroethene	1000	1020		ug/L		102	70 - 129
Methylene Chloride	1000	1080		ug/L		108	77 - 125
trans-1,2-Dichloroethene	1000	993		ug/L		99	75 - 120
1,1-Dichloroethane	1000	998		ug/L		100	80 - 120
2,2-Dichloropropane	1000	1070		ug/L		107	66 - 126
cis-1,2-Dichloroethene	1000	983		ug/L		98	76 - 120
Bromochloromethane	1000	958		ug/L		96	78 - 120
Chloroform	1000	1030		ug/L		103	78 - 127
1,1,1-Trichloroethane	1000	1010		ug/L		101	74 - 130
Carbon tetrachloride	1000	993		ug/L		99	72 - 129
1,1-Dichloropropene	1000	1020		ug/L		102	74 - 120
Benzene	1000	986		ug/L		99	80 - 122
1,2-Dichloroethane	1000	953		ug/L		95	69 - 126
Trichloroethene	1000	1030		ug/L		103	80 - 125
1,2-Dichloropropane	1000	982		ug/L		98	80 - 120
Dibromomethane	1000	977		ug/L		98	80 - 120
Bromodichloromethane	1000	1010		ug/L		101	75 - 124
cis-1,3-Dichloropropene	1000	988		ug/L		99	77 - 120

Method: EPA 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCS 580-389326/8-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Lab Control Sample
Prep Type: TCLP

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Toluene	1000	1060		ug/L		106	80 - 120
trans-1,3-Dichloropropene	1000	979		ug/L		98	76 - 122
1,1,2-Trichloroethane	1000	937		ug/L		94	80 - 121
Tetrachloroethene	1000	1160		ug/L		116	76 - 125
1,3-Dichloropropane	1000	926		ug/L		93	79 - 120
Dibromochloromethane	1000	1010		ug/L		101	73 - 125
1,2-Dibromoethane	1000	930		ug/L		93	79 - 126
Chlorobenzene	1000	1010		ug/L		101	80 - 120
Ethylbenzene	1000	1050		ug/L		105	80 - 120
1,1,1,2-Tetrachloroethane	1000	1020		ug/L		102	79 - 120
1,1,2,2-Tetrachloroethane	1000	906		ug/L		91	74 - 124
m-Xylene & p-Xylene	1000	1040		ug/L		104	80 - 120
o-Xylene	1000	1010		ug/L		101	80 - 120
Styrene	1000	1030		ug/L		103	76 - 122
Bromoform	1000	1000		ug/L		100	56 - 139
Isopropylbenzene	1000	1030		ug/L		103	80 - 123
Bromobenzene	1000	1130		ug/L		113	80 - 120
N-Propylbenzene	1000	1050		ug/L		105	80 - 122
1,2,3-Trichloropropane	1000	960		ug/L		96	76 - 124
2-Chlorotoluene	1000	1070		ug/L		107	80 - 120
1,3,5-Trimethylbenzene	1000	1060		ug/L		106	80 - 122
4-Chlorotoluene	1000	1050		ug/L		105	73 - 129
t-Butylbenzene	1000	1060		ug/L		106	75 - 123
1,2,4-Trimethylbenzene	1000	1050		ug/L		105	80 - 120
sec-Butylbenzene	1000	1020		ug/L		102	78 - 122
1,3-Dichlorobenzene	1000	1040		ug/L		104	77 - 127
4-Isopropyltoluene	1000	1030		ug/L		103	77 - 126
1,4-Dichlorobenzene	1000	1050		ug/L		105	80 - 120
n-Butylbenzene	1000	1020		ug/L		102	57 - 133
1,2-Dichlorobenzene	1000	1010		ug/L		101	80 - 120
1,2-Dibromo-3-Chloropropane	1000	857		ug/L		86	65 - 133
1,2,4-Trichlorobenzene	1000	891		ug/L		89	61 - 148
1,2,3-Trichlorobenzene	1000	906		ug/L		91	65 - 150
Hexachlorobutadiene	1000	879		ug/L		88	74 - 131
Naphthalene	1000	826		ug/L		83	63 - 150
Methyl tert-butyl ether	1000	951		ug/L		95	72 - 120

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
Toluene-d8 (Surr)	*101*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*

Method: EPA 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-389326/9-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Dichlorodifluoromethane	1000	963		ug/L		96	20 - 150	4	33
Chloromethane	1000	979		ug/L		98	25 - 150	2	26
Vinyl chloride	1000	705		ug/L		70	31 - 150	0	26
Bromomethane	1000	734		ug/L		73	36 - 150	10	33
Chloroethane	1000	578		ug/L		58	38 - 150	8	28
Trichlorofluoromethane	1000	895		ug/L		89	45 - 148	18	35
1,1-Dichloroethene	1000	1020		ug/L		102	70 - 129	0	23
Methylene Chloride	1000	1120		ug/L		112	77 - 125	4	18
trans-1,2-Dichloroethene	1000	1070		ug/L		107	75 - 120	7	21
1,1-Dichloroethane	1000	984		ug/L		98	80 - 120	1	15
2,2-Dichloropropane	1000	1050		ug/L		105	66 - 126	2	22
cis-1,2-Dichloroethene	1000	1020		ug/L		102	76 - 120	4	20
Bromochloromethane	1000	978		ug/L		98	78 - 120	2	13
Chloroform	1000	1020		ug/L		102	78 - 127	1	14
1,1,1-Trichloroethane	1000	1010		ug/L		101	74 - 130	0	19
Carbon tetrachloride	1000	1000		ug/L		100	72 - 129	1	19
1,1-Dichloropropene	1000	1000		ug/L		100	74 - 120	2	14
Benzene	1000	974		ug/L		97	80 - 122	1	14
1,2-Dichloroethane	1000	965		ug/L		96	69 - 126	1	11
Trichloroethene	1000	1010		ug/L		101	80 - 125	1	13
1,2-Dichloropropane	1000	975		ug/L		98	80 - 120	1	14
Dibromomethane	1000	992		ug/L		99	80 - 120	2	11
Bromodichloromethane	1000	1000		ug/L		100	75 - 124	1	13
cis-1,3-Dichloropropene	1000	978		ug/L		98	77 - 120	1	35
Toluene	1000	1010		ug/L		101	80 - 120	5	13
trans-1,3-Dichloropropene	1000	977		ug/L		98	76 - 122	0	20
1,1,2-Trichloroethane	1000	938		ug/L		94	80 - 121	0	14
Tetrachloroethene	1000	1160		ug/L		116	76 - 125	0	13
1,3-Dichloropropane	1000	910		ug/L		91	79 - 120	2	19
Dibromochloromethane	1000	997		ug/L		100	73 - 125	1	13
1,2-Dibromoethane	1000	921		ug/L		92	79 - 126	1	12
Chlorobenzene	1000	1010		ug/L		101	80 - 120	0	10
Ethylbenzene	1000	1020		ug/L		102	80 - 120	3	14
1,1,1,2-Tetrachloroethane	1000	1020		ug/L		102	79 - 120	0	16
1,1,2,2-Tetrachloroethane	1000	900		ug/L		90	74 - 124	1	25
m-Xylene & p-Xylene	1000	1000		ug/L		100	80 - 120	3	14
o-Xylene	1000	994		ug/L		99	80 - 120	2	16
Styrene	1000	1020		ug/L		102	76 - 122	0	16
Bromoform	1000	1010		ug/L		101	56 - 139	1	21
Isopropylbenzene	1000	1010		ug/L		101	80 - 123	2	19
Bromobenzene	1000	1120		ug/L		112	80 - 120	1	24
N-Propylbenzene	1000	1030		ug/L		103	80 - 122	2	22
1,2,3-Trichloropropane	1000	968		ug/L		97	76 - 124	1	26
2-Chlorotoluene	1000	1050		ug/L		105	80 - 120	2	20
1,3,5-Trimethylbenzene	1000	1050		ug/L		105	80 - 122	1	21
4-Chlorotoluene	1000	1050		ug/L		105	73 - 129	1	29
t-Butylbenzene	1000	1060		ug/L		106	75 - 123	1	21
1,2,4-Trimethylbenzene	1000	1040		ug/L		104	80 - 120	1	16

Method: EPA 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-389326/9-A
Matrix: Solid
Analysis Batch: 389415

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
sec-Butylbenzene			1000	1010		ug/L		101	78 - 122	0	15
1,3-Dichlorobenzene			1000	1080		ug/L		108	77 - 127	4	35
4-Isopropyltoluene			1000	1040		ug/L		104	77 - 126	1	20
1,4-Dichlorobenzene			1000	1070		ug/L		107	80 - 120	2	17
n-Butylbenzene			1000	1030		ug/L		103	57 - 133	1	14
1,2-Dichlorobenzene			1000	1040		ug/L		104	80 - 120	4	15
1,2-Dibromo-3-Chloropropane			1000	902		ug/L		90	65 - 133	5	25
1,2,4-Trichlorobenzene			1000	936		ug/L		94	61 - 148	5	27
1,2,3-Trichlorobenzene			1000	965		ug/L		96	65 - 150	6	33
Hexachlorobutadiene			1000	962		ug/L		96	74 - 131	9	22
Naphthalene			1000	860		ug/L		86	63 - 150	4	33
Methyl tert-butyl ether			1000	975		ug/L		98	72 - 120	2	18

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
Toluene-d8 (Surr)	*99*		*80 - 120*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*99*		*80 - 120*
1,2-Dichloroethane-d4 (Surr)	*92*		*80 - 120*

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 580-389177/10-D
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389905

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Phenol	ND		5.0	0.80	ug/L		05/09/22 09:51	05/10/22 18:33	1
Bis(2-chloroethyl)ether	ND		0.50	0.15	ug/L		05/09/22 09:51	05/10/22 18:33	1
2-Chlorophenol	ND		5.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
1,3-Dichlorobenzene	ND		2.0	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
1,4-Dichlorobenzene	ND		2.0	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzyl alcohol	ND		25	0.90	ug/L		05/09/22 09:51	05/10/22 18:33	1
1,2-Dichlorobenzene	ND		2.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
2-Methylphenol	ND		3.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
3 & 4 Methylphenol	ND		3.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
N-Nitrosodi-n-propylamine	ND		2.0	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
Hexachloroethane	ND		5.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
Nitrobenzene	ND		5.0	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Isophorone	ND		2.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
2-Nitrophenol	ND		5.0	0.35	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4-Dimethylphenol	ND		20	0.80	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzoic acid	ND		50	6.7	ug/L		05/09/22 09:51	05/10/22 18:33	1
Bis(2-chloroethoxy)methane	ND		3.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4-Dichlorophenol	ND		5.0	1.0	ug/L		05/09/22 09:51	05/10/22 18:33	1
1,2,4-Trichlorobenzene	ND		2.0	0.45	ug/L		05/09/22 09:51	05/10/22 18:33	1
Naphthalene	ND		2.0	0.80	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Chloroaniline	ND		10	0.75	ug/L		05/09/22 09:51	05/10/22 18:33	1
Hexachlorobutadiene	ND		5.0	0.40	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Chloro-3-methylphenol	ND		3.0	0.65	ug/L		05/09/22 09:51	05/10/22 18:33	1

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-389177/10-D
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389905

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
2-Methylnaphthalene	ND		2.0	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
Hexachlorocyclopentadiene	ND		5.0	0.70	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4,6-Trichlorophenol	ND		3.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4,5-Trichlorophenol	ND		2.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
2-Chloronaphthalene	ND		5.0	0.35	ug/L		05/09/22 09:51	05/10/22 18:33	1
2-Nitroaniline	ND		5.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
Dimethyl phthalate	0.592	J	3.0	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
Acenaphthylene	ND		5.0	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,6-Dinitrotoluene	ND		2.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
3-Nitroaniline	ND		15	0.80	ug/L		05/09/22 09:51	05/10/22 18:33	1
Acenaphthene	ND		2.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4-Dinitrophenol	ND		25	2.3	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Nitrophenol	ND		50	8.5	ug/L		05/09/22 09:51	05/10/22 18:33	1
Dibenzofuran	ND		2.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
2,4-Dinitrotoluene	ND		5.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
Diethyl phthalate	1.45	J	5.0	0.75	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Chlorophenyl phenyl ether	ND		3.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
Fluorene	ND		1.3	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Nitroaniline	ND		10	1.1	ug/L		05/09/22 09:51	05/10/22 18:33	1
4,6-Dinitro-2-methylphenol	ND		10	2.8	ug/L		05/09/22 09:51	05/10/22 18:33	1
N-Nitrosodiphenylamine	ND		5.0	0.35	ug/L		05/09/22 09:51	05/10/22 18:33	1
4-Bromophenyl phenyl ether	ND		3.0	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
Hexachlorobenzene	ND		3.0	0.40	ug/L		05/09/22 09:51	05/10/22 18:33	1
Pentachlorophenol	ND		25	2.6	ug/L		05/09/22 09:51	05/10/22 18:33	1
Phenanthrene	ND		5.0	0.60	ug/L		05/09/22 09:51	05/10/22 18:33	1
Anthracene	ND		5.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
Di-n-butyl phthalate	ND		50	15	ug/L		05/09/22 09:51	05/10/22 18:33	1
Fluoranthene	ND		1.3	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1
Pyrene	ND		5.0	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Butyl benzyl phthalate	ND		20	1.4	ug/L		05/09/22 09:51	05/10/22 18:33	1
3,3'-Dichlorobenzidine	ND		5.0	0.60	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzo[a]anthracene	ND		1.3	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
Chrysene	ND		1.3	0.45	ug/L		05/09/22 09:51	05/10/22 18:33	1
Bis(2-ethylhexyl) phthalate	ND		15	3.7	ug/L		05/09/22 09:51	05/10/22 18:33	1
Di-n-octyl phthalate	ND		5.0	0.65	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzo[a]pyrene	ND		1.3	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Indeno[1,2,3-cd]pyrene	ND		2.0	0.65	ug/L		05/09/22 09:51	05/10/22 18:33	1
Dibenz(a,h)anthracene	ND		1.3	0.35	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzo[g,h,i]perylene	ND		1.3	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Carbazole	ND		3.0	0.50	ug/L		05/09/22 09:51	05/10/22 18:33	1
1-Methylnaphthalene	ND		5.0	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzo[b]fluoranthene	ND		1.3	0.20	ug/L		05/09/22 09:51	05/10/22 18:33	1
Benzo[k]fluoranthene	ND		1.3	0.25	ug/L		05/09/22 09:51	05/10/22 18:33	1
bis(chloroisopropyl) ether	ND		1.3	0.30	ug/L		05/09/22 09:51	05/10/22 18:33	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
2-Fluorophenol (Surr)	*74*		*25 - 127*	*05/09/22 09:51*	*05/10/22 18:33*	*1*
Phenol-d5 (Surr)	*54*		*26 - 120*	*05/09/22 09:51*	*05/10/22 18:33*	*1*

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 580-389177/10-D
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389905

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Nitrobenzene-d5 (Surr)	*61*		*29 - 139*	*05/09/22 09:51*	*05/10/22 18:33*	*1*
2-Fluorobiphenyl	*64*		*36 - 120*	*05/09/22 09:51*	*05/10/22 18:33*	*1*
2,4,6-Tribromophenol (Surr)	*44*		*39 - 137*	*05/09/22 09:51*	*05/10/22 18:33*	*1*
Terphenyl-d14 (Surr)	*76*		*66 - 150*	*05/09/22 09:51*	*05/10/22 18:33*	*1*

Lab Sample ID: LCS 580-389177/7-C
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 389905

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Phenol	10.0	6.00		ug/L		60	36 - 120
Bis(2-chloroethyl)ether	10.0	6.14		ug/L		61	36 - 141
2-Chlorophenol	10.0	6.42		ug/L		64	46 - 124
1,3-Dichlorobenzene	10.0	5.97		ug/L		60	38 - 120
1,4-Dichlorobenzene	10.0	5.61		ug/L		56	39 - 120
Benzyl alcohol	10.0	2.14	J	ug/L		21	10 - 150
1,2-Dichlorobenzene	10.0	5.61		ug/L		56	38 - 120
2-Methylphenol	10.0	7.06		ug/L		71	42 - 134
3 & 4 Methylphenol	10.0	6.41		ug/L		64	45 - 120
N-Nitrosodi-n-propylamine	10.0	6.24		ug/L		62	40 - 130
Hexachloroethane	10.0	5.55		ug/L		55	30 - 131
Nitrobenzene	10.0	7.28		ug/L		73	49 - 120
Isophorone	10.0	6.91		ug/L		69	40 - 128
2-Nitrophenol	10.0	6.81		ug/L		68	54 - 130
2,4-Dimethylphenol	10.0	6.39	J	ug/L		64	32 - 132
Benzoic acid	20.0	16.5	J	ug/L		83	61 - 150
Bis(2-chloroethoxy)methane	10.0	6.90		ug/L		69	33 - 130
2,4-Dichlorophenol	10.0	6.53		ug/L		65	45 - 127
1,2,4-Trichlorobenzene	10.0	6.47		ug/L		65	46 - 120
Naphthalene	10.0	6.27		ug/L		63	50 - 120
4-Chloroaniline	10.0	ND	*-	ug/L		4	10 - 120
Hexachlorobutadiene	10.0	6.74		ug/L		67	43 - 120
4-Chloro-3-methylphenol	10.0	5.90		ug/L		59	35 - 134
2-Methylnaphthalene	10.0	6.47		ug/L		65	40 - 134
Hexachlorocyclopentadiene	10.0	4.88	J	ug/L		49	20 - 128
2,4,6-Trichlorophenol	10.0	7.35		ug/L		74	51 - 121
2,4,5-Trichlorophenol	10.0	8.14		ug/L		81	67 - 120
2-Chloronaphthalene	10.0	6.06		ug/L		61	46 - 120
2-Nitroaniline	10.0	7.19		ug/L		72	54 - 127
Dimethyl phthalate	10.0	8.19		ug/L		82	56 - 125
Acenaphthylene	10.0	6.47		ug/L		65	53 - 123
2,6-Dinitrotoluene	10.0	7.80		ug/L		78	60 - 124
3-Nitroaniline	10.0	2.82	J	ug/L		28	28 - 120
Acenaphthene	10.0	6.63		ug/L		66	44 - 120
2,4-Dinitrophenol	20.0	7.53	J	ug/L		38	10 - 128
4-Nitrophenol	20.0	20.5	J	ug/L		102	10 - 150
Dibenzofuran	10.0	7.10		ug/L		71	53 - 120
2,4-Dinitrotoluene	10.0	7.11		ug/L		71	63 - 120

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 580-389177/7-C
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 389905

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Diethyl phthalate	10.0	9.05		ug/L		91	55 - 133
4-Chlorophenyl phenyl ether	10.0	7.68		ug/L		77	55 - 120
Fluorene	10.0	7.62		ug/L		76	56 - 126
4-Nitroaniline	10.0	5.18	J	ug/L		52	29 - 139
4,6-Dinitro-2-methylphenol	20.0	9.07	J	ug/L		45	20 - 120
N-Nitrosodiphenylamine	10.0	7.65		ug/L		77	50 - 126
4-Bromophenyl phenyl ether	10.0	7.91		ug/L		79	52 - 120
Hexachlorobenzene	10.0	7.63		ug/L		76	55 - 120
Pentachlorophenol	20.0	21.6	J	ug/L		108	53 - 131
Phenanthrene	10.0	7.36		ug/L		74	64 - 120
Anthracene	10.0	6.71		ug/L		67	62 - 120
Di-n-butyl phthalate	10.0	ND		ug/L		81	37 - 150
Fluoranthene	10.0	7.07		ug/L		71	68 - 124
Pyrene	10.0	7.29		ug/L		73	58 - 126
Butyl benzyl phthalate	10.0	7.27	J	ug/L		73	49 - 150
3,3'-Dichlorobenzidine	20.0	7.19		ug/L		36	10 - 128
Benzo[a]anthracene	10.0	6.29		ug/L		63	60 - 134
Chrysene	10.0	6.29		ug/L		63	62 - 133
Bis(2-ethylhexyl) phthalate	10.0	7.70	J	ug/L		77	53 - 150
Di-n-octyl phthalate	10.0	9.19		ug/L		92	58 - 150
Benzo[a]pyrene	10.0	7.63		ug/L		76	65 - 127
Indeno[1,2,3-cd]pyrene	10.0	7.41		ug/L		74	47 - 127
Dibenz(a,h)anthracene	10.0	6.81		ug/L		68	47 - 130
Benzo[g,h,i]perylene	10.0	6.74		ug/L		67	43 - 140
Carbazole	10.0	7.07		ug/L		71	70 - 150
1-Methylnaphthalene	10.0	6.85		ug/L		69	49 - 120
Benzo[b]fluoranthene	10.0	7.51		ug/L		75	63 - 123
Benzo[k]fluoranthene	10.0	7.68		ug/L		77	55 - 136
bis(chloroisopropyl) ether	10.0	5.62		ug/L		56	29 - 149

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
2-Fluorophenol (Surr)	*59*		*25 - 127*
Phenol-d5 (Surr)	*60*		*26 - 120*
Nitrobenzene-d5 (Surr)	*62*		*29 - 139*
2-Fluorobiphenyl	*56*		*36 - 120*
2,4,6-Tribromophenol (Surr)	*67*		*39 - 137*
Terphenyl-d14 (Surr)	*87*		*66 - 150*

Lab Sample ID: LCSD 580-389177/8-C
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP
Prep Batch: 389905

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Phenol	10.0	5.35		ug/L		53	36 - 120	11	35
Bis(2-chloroethyl)ether	10.0	5.67		ug/L		57	36 - 141	8	35
2-Chlorophenol	10.0	6.05		ug/L		60	46 - 124	6	35
1,3-Dichlorobenzene	10.0	4.71		ug/L		47	38 - 120	24	35
1,4-Dichlorobenzene	10.0	4.74		ug/L		47	39 - 120	17	35

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-389177/8-C
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP
Prep Batch: 389905

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzyl alcohol	10.0	3.33	J *1	ug/L		33	10 - 150	44	35
1,2-Dichlorobenzene	10.0	4.70		ug/L		47	38 - 120	18	35
2-Methylphenol	10.0	7.25		ug/L		72	42 - 134	3	35
3 & 4 Methylphenol	10.0	5.73		ug/L		57	45 - 120	11	35
N-Nitrosodi-n-propylamine	10.0	6.10		ug/L		61	40 - 130	2	35
Hexachloroethane	10.0	4.45	J	ug/L		44	30 - 131	22	35
Nitrobenzene	10.0	5.70		ug/L		57	49 - 120	24	35
Isophorone	10.0	5.88		ug/L		59	40 - 128	16	35
2-Nitrophenol	10.0	7.99		ug/L		80	54 - 130	16	30
2,4-Dimethylphenol	10.0	5.10	J	ug/L		51	32 - 132	23	35
Benzoic acid	20.0	15.4	J	ug/L		77	61 - 150	7	35
Bis(2-chloroethoxy)methane	10.0	5.10		ug/L		51	33 - 130	30	35
2,4-Dichlorophenol	10.0	6.51		ug/L		65	45 - 127	0	35
1,2,4-Trichlorobenzene	10.0	5.90		ug/L		59	46 - 120	9	35
Naphthalene	10.0	5.78		ug/L		58	50 - 120	8	31
4-Chloroaniline	10.0	ND	*-	ug/L		4	10 - 120	4	35
Hexachlorobutadiene	10.0	5.92		ug/L		59	43 - 120	13	28
4-Chloro-3-methylphenol	10.0	6.53		ug/L		65	35 - 134	10	35
2-Methylnaphthalene	10.0	6.38		ug/L		64	40 - 134	1	35
Hexachlorocyclopentadiene	10.0	4.98	J	ug/L		50	20 - 128	2	35
2,4,6-Trichlorophenol	10.0	7.72		ug/L		77	51 - 121	5	31
2,4,5-Trichlorophenol	10.0	7.57		ug/L		76	67 - 120	7	26
2-Chloronaphthalene	10.0	6.30		ug/L		63	46 - 120	4	34
2-Nitroaniline	10.0	7.47		ug/L		75	54 - 127	4	29
Dimethyl phthalate	10.0	8.97		ug/L		90	56 - 125	9	27
Acenaphthylene	10.0	6.66		ug/L		67	53 - 123	3	32
2,6-Dinitrotoluene	10.0	7.33		ug/L		73	60 - 124	6	32
3-Nitroaniline	10.0	3.58	J	ug/L		36	28 - 120	24	35
Acenaphthene	10.0	6.61		ug/L		66	44 - 120	0	34
2,4-Dinitrophenol	20.0	7.31	J	ug/L		37	10 - 128	3	35
4-Nitrophenol	20.0	20.6	J	ug/L		103	10 - 150	1	35
Dibenzofuran	10.0	7.41		ug/L		74	53 - 120	4	27
2,4-Dinitrotoluene	10.0	7.77		ug/L		78	63 - 120	9	23
Diethyl phthalate	10.0	9.29		ug/L		93	55 - 133	3	27
4-Chlorophenyl phenyl ether	10.0	8.27		ug/L		83	55 - 120	7	26
Fluorene	10.0	7.79		ug/L		78	56 - 126	2	29
4-Nitroaniline	10.0	4.47	J	ug/L		45	29 - 139	15	35
4,6-Dinitro-2-methylphenol	20.0	7.79	J	ug/L		39	20 - 120	15	35
N-Nitrosodiphenylamine	10.0	7.28		ug/L		73	50 - 126	5	28
4-Bromophenyl phenyl ether	10.0	7.34		ug/L		73	52 - 120	7	35
Hexachlorobenzene	10.0	7.41		ug/L		74	55 - 120	3	35
Pentachlorophenol	20.0	13.1	J *1	ug/L		66	53 - 131	49	23
Phenanthrene	10.0	6.43		ug/L		64	64 - 120	13	29
Anthracene	10.0	6.69		ug/L		67	62 - 120	0	32
Di-n-butyl phthalate	10.0	ND		ug/L		73	37 - 150	10	26
Fluoranthene	10.0	6.70	*-	ug/L		67	68 - 124	5	26
Pyrene	10.0	6.44		ug/L		64	58 - 126	12	28
Butyl benzyl phthalate	10.0	6.97	J	ug/L		70	49 - 150	4	25
3,3'-Dichlorobenzidine	20.0	5.19		ug/L		26	10 - 128	32	35

Method: EPA 8270E - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCSD 580-389177/8-C
Matrix: Solid
Analysis Batch: 390029

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP
Prep Batch: 389905

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Benzo[a]anthracene			10.0	6.23		ug/L		62	60 - 134	1	26
Chrysene			10.0	6.32		ug/L		63	62 - 133	0	29
Bis(2-ethylhexyl) phthalate			10.0	7.37	J	ug/L		74	53 - 150	4	24
Di-n-octyl phthalate			10.0	7.94		ug/L		79	58 - 150	15	28
Benzo[a]pyrene			10.0	7.07		ug/L		71	65 - 127	8	30
Indeno[1,2,3-cd]pyrene			10.0	6.08		ug/L		61	47 - 127	20	26
Dibenz(a,h)anthracene			10.0	5.51		ug/L		55	47 - 130	21	29
Benzo[g,h,i]perylene			10.0	5.57		ug/L		56	43 - 140	19	25
Carbazole			10.0	7.45		ug/L		75	70 - 150	5	30
1-Methylnaphthalene			10.0	6.51		ug/L		65	49 - 120	5	34
Benzo[b]fluoranthene			10.0	6.55		ug/L		66	63 - 123	14	35
Benzo[k]fluoranthene			10.0	6.66		ug/L		67	55 - 136	14	27
bis(chloroisopropyl) ether			10.0	4.67		ug/L		47	29 - 149	18	35

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
2-Fluorophenol (Surr)	*51*		*25 - 127*
Phenol-d5 (Surr)	*45*		*26 - 120*
Nitrobenzene-d5 (Surr)	*61*		*29 - 139*
2-Fluorobiphenyl	*58*		*36 - 120*
2,4,6-Tribromophenol (Surr)	*56*		*39 - 137*
Terphenyl-d14 (Surr)	*77*		*66 - 150*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-228522/4
Matrix: Water
Analysis Batch: 228522

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/22/22 11:02	1

Lab Sample ID: LCS 570-228522/2
Matrix: Water
Analysis Batch: 228522

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methane			12.9	13.8		ug/L		106	80 - 120		

Lab Sample ID: LCSD 570-228522/3
Matrix: Water
Analysis Batch: 228522

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane			12.9	14.5		ug/L		112	80 - 120	5	20

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: MB 570-228970/4
Matrix: Water
Analysis Batch: 228970

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			04/24/22 02:15	1

Lab Sample ID: LCS 570-228970/2
Matrix: Water
Analysis Batch: 228970

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.5		ug/L		104	80 - 120

Lab Sample ID: LCSD 570-228970/3
Matrix: Water
Analysis Batch: 228970

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	12.3		ug/L		95	80 - 120	9	20

Method: EPA 6020B - Metals (ICP/MS)

Lab Sample ID: MB 580-389177/10-C
Matrix: Solid
Analysis Batch: 389495

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389310

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.010	0.0020	mg/L		05/03/22 15:40	05/04/22 21:44	10
Barium	ND		0.012	0.0021	mg/L		05/03/22 15:40	05/04/22 21:44	10
Cadmium	ND		0.0040	0.00037	mg/L		05/03/22 15:40	05/04/22 21:44	10
Chromium	ND		0.0080	0.0017	mg/L		05/03/22 15:40	05/04/22 21:44	10
Lead	0.000632	J	0.0040	0.00040	mg/L		05/03/22 15:40	05/04/22 21:44	10
Selenium	ND		0.080	0.021	mg/L		05/03/22 15:40	05/04/22 21:44	10
Silver	ND		0.0040	0.00025	mg/L		05/03/22 15:40	05/04/22 21:44	10

Lab Sample ID: MB 580-389177/6-B
Matrix: Solid
Analysis Batch: 389495

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389310

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.010	0.0020	mg/L		05/03/22 15:40	05/04/22 21:40	10
Barium	ND		0.012	0.0021	mg/L		05/03/22 15:40	05/04/22 21:40	10
Cadmium	ND		0.0040	0.00037	mg/L		05/03/22 15:40	05/04/22 21:40	10
Chromium	ND		0.0080	0.0017	mg/L		05/03/22 15:40	05/04/22 21:40	10
Lead	0.000635	J	0.0040	0.00040	mg/L		05/03/22 15:40	05/04/22 21:40	10
Selenium	ND		0.080	0.021	mg/L		05/03/22 15:40	05/04/22 21:40	10
Silver	ND		0.0040	0.00025	mg/L		05/03/22 15:40	05/04/22 21:40	10

Lab Sample ID: LCS 580-389177/7-B
Matrix: Solid
Analysis Batch: 389495

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 389310

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Arsenic	1.00	1.02		mg/L		102	80 - 120

Method: EPA 6020B - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-389177/7-B
Matrix: Solid
Analysis Batch: 389495

Client Sample ID: Lab Control Sample
Prep Type: TCLP
Prep Batch: 389310

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Barium	1.00	1.02		mg/L		102	80 - 120
Cadmium	1.00	1.02		mg/L		102	80 - 120
Chromium	1.00	1.08		mg/L		108	80 - 120
Lead	1.00	1.06		mg/L		106	80 - 120
Selenium	1.00	0.961		mg/L		96	80 - 120
Silver	1.00	1.05		mg/L		105	80 - 120

Lab Sample ID: LCSD 580-389177/8-B
Matrix: Solid
Analysis Batch: 389495

Client Sample ID: Lab Control Sample Dup
Prep Type: TCLP
Prep Batch: 389310

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Arsenic	1.00	1.02		mg/L		102	80 - 120	0	20
Barium	1.00	1.03		mg/L		103	80 - 120	1	20
Cadmium	1.00	1.03		mg/L		103	80 - 120	1	20
Chromium	1.00	1.08		mg/L		108	80 - 120	0	20
Lead	1.00	1.06		mg/L		106	80 - 120	0	20
Selenium	1.00	0.938		mg/L		94	80 - 120	2	20
Silver	1.00	1.05		mg/L		105	80 - 120	0	20

Method: EPA 7470A - Mercury (CVAA)

Lab Sample ID: LCS 580-389269/6-A
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 389269

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	0.0200	0.0207		mg/L		103	80 - 120

Lab Sample ID: LCSD 580-389269/7-A
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 389269

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	0.0200	0.0205		mg/L		102	80 - 120	1	20

Lab Sample ID: MB 580-389177/10-B
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: Method Blank
Prep Type: TCLP
Prep Batch: 389269

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	ND		0.0030	0.0015	mg/L		05/03/22 12:13	05/03/22 19:32	1

Lab Sample ID: 580-112673-6 MS
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: IDW-SO-041422
Prep Type: TCLP
Prep Batch: 389269

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Mercury	ND		0.0200	0.0208		mg/L		104	80 - 120

Method: EPA 7470A - Mercury (CVAA) (Continued)

Lab Sample ID: 580-112673-6 MSD
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: IDW-SO-041422
Prep Type: TCLP
Prep Batch: 389269

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Mercury	ND		0.0200	0.0200		mg/L		100	80 - 120	4	20

Lab Sample ID: 580-112673-6 DU
Matrix: Solid
Analysis Batch: 389430

Client Sample ID: IDW-SO-041422
Prep Type: TCLP
Prep Batch: 389269

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Mercury	ND		ND		mg/L				NC	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-387744/26
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			04/15/22 11:19	1

Lab Sample ID: LCS 580-387744/27
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
NO3 as N			5.00	4.85		mg/L		97	90 - 110		

Lab Sample ID: LCSD 580-387744/28
Matrix: Water
Analysis Batch: 387744

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N			5.00	4.86		mg/L		97	90 - 110	0	15

Lab Sample ID: 580-112673-4 MS
Matrix: Water
Analysis Batch: 387744

Client Sample ID: MW06-041422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
NO3 as N	ND	F1	5.00	4.70		mg/L		94	90 - 110		

Lab Sample ID: 580-112673-4 MSD
Matrix: Water
Analysis Batch: 387744

Client Sample ID: MW06-041422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	ND	F1	5.00	4.69		mg/L		94	90 - 110	0	15

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 580-387746/30
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			04/15/22 11:19	1
Sulfate	ND		1.5	0.80	mg/L			04/15/22 11:19	1

Lab Sample ID: LCS 580-387746/31
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	50.3		mg/L		101	90 - 110
Sulfate	50.0	49.3		mg/L		99	90 - 110

Lab Sample ID: LCSD 580-387746/32
Matrix: Water
Analysis Batch: 387746

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	50.3		mg/L		101	90 - 110	0	15
Sulfate	50.0	49.3		mg/L		99	90 - 110	0	15

Lab Sample ID: 580-112673-4 MS
Matrix: Water
Analysis Batch: 387746

Client Sample ID: MW06-041422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	4.1		50.0	54.9		mg/L		102	90 - 110
Sulfate	25		50.0	76.1		mg/L		102	90 - 110

Lab Sample ID: 580-112673-4 MSD
Matrix: Water
Analysis Batch: 387746

Client Sample ID: MW06-041422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	4.1		50.0	54.9		mg/L		101	90 - 110	0	15
Sulfate	25		50.0	76.0		mg/L		101	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-232731/4
Matrix: Water
Analysis Batch: 232731

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			05/07/22 18:33	1

Lab Sample ID: LCS 570-232731/5
Matrix: Water
Analysis Batch: 232731

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Carbon, Total Organic	5.03	5.64		mg/L		112	85 - 115

Method: SM 5310D - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCSD 570-232731/6
Matrix: Water
Analysis Batch: 232731

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	5.72		mg/L		114	85 - 115	1	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-041422
Lab Sample ID: 580-112673-1
Date Collected: 04/14/22 08:00
Matrix: Water
Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	387689	04/18/22 00:16	JBT	FGS SEA

Client Sample ID: MW03-041422-0
Lab Sample ID: 580-112673-2
Date Collected: 04/14/22 09:30
Matrix: Water
Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		50	388180	04/21/22 23:52	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228522	04/23/22 01:45	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/15/22 13:05	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/15/22 13:05	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	232731	05/07/22 22:12	UAPD	ECL 4

Client Sample ID: MW05-041422-0
Lab Sample ID: 580-112673-3
Date Collected: 04/14/22 12:10
Matrix: Water
Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		50	388180	04/22/22 00:17	JBT	FGS SEA
Total/NA	Analysis	RSK-175	DL	4	228970	04/24/22 03:19	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/15/22 13:17	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/15/22 13:17	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	232731	05/07/22 22:34	UAPD	ECL 4

Client Sample ID: MW06-041422-0
Lab Sample ID: 580-112673-4
Date Collected: 04/14/22 10:35
Matrix: Water
Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		50	388180	04/22/22 00:41	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228970	04/24/22 03:46	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/15/22 13:40	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/15/22 13:40	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	232731	05/07/22 22:57	UAPD	ECL 4

Client Sample ID: MW100-041422-0
Lab Sample ID: 580-112673-5
Date Collected: 04/14/22 12:00
Matrix: Water
Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		50	388180	04/22/22 01:05	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	228970	04/24/22 05:04	I9H5	ECL 4
Total/NA	Analysis	300.0		1	387744	04/15/22 14:15	JHR	FGS SEA
Total/NA	Analysis	300.0		1	387746	04/15/22 14:15	JHR	FGS SEA

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112673-1

Client Sample ID: MW100-041422-0

Lab Sample ID: 580-112673-5

Date Collected: 04/14/22 12:00

Matrix: Water

Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	SM 5310D		1	232731	05/07/22 23:19	UAPD	ECL 4

Client Sample ID: IDW-SO-041422

Lab Sample ID: 580-112673-6

Date Collected: 04/14/22 12:45

Matrix: Solid

Date Received: 04/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
TCLP	Leach	1311			389326	05/03/22 16:50	JLS	FGS SEA
TCLP	Analysis	EPA 8260D		100	389415	05/04/22 16:20	B1M	FGS SEA
TCLP	Leach	1311			389177	05/02/22 15:46	JLS	FGS SEA
TCLP	Prep	3510C			389905	05/09/22 09:51	KLW	FGS SEA
TCLP	Analysis	EPA 8270E		1	390029	05/10/22 20:54	TL1	FGS SEA
TCLP	Leach	1311			389177	05/02/22 15:46	JLS	FGS SEA
TCLP	Prep	3010A			389310	05/03/22 15:40	JLS	FGS SEA
TCLP	Analysis	EPA 6020B		10	389495	05/04/22 21:48	FCW	FGS SEA
TCLP	Leach	1311			389177	05/02/22 15:46	JLS	FGS SEA
TCLP	Prep	7470A			389269	05/03/22 12:13	JLS	FGS SEA
TCLP	Analysis	EPA 7470A		1	389430	05/03/22 19:40	ABP	FGS SEA

Laboratory References:

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-112673-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	CA300001	01-31-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-112673-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-112673-1	TB-041422	Water	04/14/22 08:00	04/15/22 09:30
580-112673-2	MW03-041422-0	Water	04/14/22 09:30	04/15/22 09:30
580-112673-3	MW05-041422-0	Water	04/14/22 12:10	04/15/22 09:30
580-112673-4	MW06-041422-0	Water	04/14/22 10:35	04/15/22 09:30
580-112673-5	MW100-041422-0	Water	04/14/22 12:00	04/15/22 09:30
580-112673-6	IDW-SO-041422	Solid	04/14/22 12:45	04/15/22 09:30

580-112673 Chain of Custody

Chain of Custody Record

eurofins | Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-48000-15393.1
Client Contact: Laura Tochko	Phone: 425-891-2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:			
City: Portland	TAT Requested (days): STD			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

	Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	8260D_LL - (MOD) Volatiles, standard list, low leve	RSK_175 - Methane	SM5310D - Total Organic Carbon	300.0_28D, 300_48HR	TCLP SVOC + TCLP METAL	TCLP VOC	Total Number of containers	Special Instructions/Note:
	Preservation Code:							A	A	S	N				
1	TB-041422	4/14/22	0800	G	Water	N		3	3	1	1			3	
2	MW03-041422-0		0930		Water			3	3	1	1			8	
3	MW05-041422-0		1210		Water									8	
4	MW06-041422-0		1035		Water									8	
5	MW100-041422-0		1200		Water									8	
6	IDW-SO-041422	4/14/22	1245	C	~~Water~~ S	N						1	1	2	MULTNOMAH COUNTY
					Water										
					Water										
					Water										
					Water										
					Water										

Possible Hazard Identification

☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	LAURA TOCHKO	04/14/22 1400	JACOBS	Tom B	4/15/22 0930	EETN
2	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: Fed Po lgwhite/wet/bub 13 2.2/2.4 W

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
Temperature Contr
IF THIS SHIPMENT IS DELAY
STORE REFRIGERATED (2°
RT 451 1 12:00 A 9330 04.16
ST 3
ORIGIN ID:TCMA (253) 922-2310
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E
FIFE, WA 98424
UNITED STATES US
DATE: 15APR22
GT: 43.75 LB
CAD: 989746/CAFE351
BILL SENDER
TO SHIPPING/RECEIVING
EUROFINS ENVIRONMENT TESTING SOUT
2841 DOW AVENUE, SUITE 100
TUSTIN CA 92780
(714) 895-5494
REF 8580-48171
PO YES
Fe
SATURDAY 1
TRK# 0201 5743 5597 9330
PRIORITY OVERI
WO DTHA
92
CA-US
Part # 159471-434 MTW EXP 03/23
Environment Testing
TestAmerica
eurofins
1791847
Custody Seal
DATE
SIGNATURE
580-112673 Waybill

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-102599 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline Matlock@et.eurofinsus com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-112673-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 5/5/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes.

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MW03-041422-0 (580-112673-2)	4/14/22	09 30 Pacific		Water			X	X	4	
MW05-041422-0 (580-112673-3)	4/14/22	12 10 Pacific		Water			X	X	4	
MW06-041422-0 (580-112673-4)	4/14/22	10 35 Pacific		Water			X	X	4	
MW100-041422-0 (580-112673-5)	4/14/22	12.00 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II, III, IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
1	[signature]	4/15/22 1458	EFIN	[signature] Fedex		
2	Relinquished by:	Date/Time:	Company	Received by: [signature]	Date/Time: 4/16/22 1040	Company EC
3	Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No 179847	Cooler Temperature(s) °C and Other Remarks: 2.1/3.8 IR9C

Ver: 06/08/2021

5/20/2022

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112673-1

Login Number: 112673
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-112673-1

Login Number: 112673
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 04/18/22 01:20 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

June 2022

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-115401-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
7/22/2022 11:47:32 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Job ID: 580-115401-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-115401-1

Comments
No additional comments.

Receipt
The samples were received on 6/30/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.4º C.

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW11-062922-0 (580-115401-2). Elevated reporting limits (RLs) are provided.

Method 8260D: The method blank for analytical batch 580-395867 contained Trichloroethene above the method detection limit. This target analyte concentration was less than the reporting limit (RL); therefore, re-extraction and/or re-analysis of samples was not performed.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc. Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW10-062922-0
Lab Sample ID: 580-115401-1

Date Collected: 06/29/22 14:10
Matrix: Water
Date Received: 06/30/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.067	J	0.20	0.055	ug/L			07/04/22 23:10	1
Tetrachloroethene	0.54		0.20	0.084	ug/L			07/04/22 23:10	1
Trichloroethene	0.26	B	0.20	0.066	ug/L			07/04/22 23:10	1
Vinyl chloride	0.017	J	0.020	0.013	ug/L			07/04/22 23:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*80 - 120*		*07/04/22 23:10*	*1*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*		*07/04/22 23:10*	*1*
Dibromofluoromethane (Surr)	*118*		*80 - 120*		*07/04/22 23:10*	*1*
Toluene-d8 (Surr)	*96*		*80 - 120*		*07/04/22 23:10*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon dioxide	7400		5.0	2.6	ug/L			07/05/22 13:21	1
Methane	1.1		1.0	0.11	ug/L			07/05/22 11:07	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.6		1.5	0.43	mg/L			06/30/22 18:52	1
NO3 as N	0.20		0.20	0.030	mg/L			06/30/22 18:52	1
Sulfate	5.4		1.5	0.80	mg/L			06/30/22 18:52	1
Carbon, Total Organic	0.79		0.50	0.26	mg/L			07/20/22 02:55	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW11-062922-0
Lab Sample ID: 580-115401-2
Date Collected: 06/29/22 15:50
Matrix: Water
Date Received: 06/30/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	64		1.0	0.28	ug/L			07/05/22 01:38	5
Tetrachloroethene	1.2		1.0	0.42	ug/L			07/05/22 01:38	5
Trichloroethene	1.1	B	1.0	0.33	ug/L			07/05/22 01:38	5
Vinyl chloride	52		0.10	0.065	ug/L			07/05/22 01:38	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*80 - 120*		*07/05/22 01:38*	*5*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*07/05/22 01:38*	*5*
Dibromofluoromethane (Surr)	*112*		*80 - 120*		*07/05/22 01:38*	*5*
Toluene-d8 (Surr)	*97*		*80 - 120*		*07/05/22 01:38*	*5*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon dioxide	18000		20	10	ug/L			07/05/22 14:32	4
Methane	1900		8.0	0.87	ug/L			07/05/22 12:13	8

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.3		1.5	0.43	mg/L			06/30/22 19:04	1
NO3 as N	ND		0.20	0.030	mg/L			06/30/22 19:04	1
Sulfate	4.5		1.5	0.80	mg/L			06/30/22 19:04	1
Carbon, Total Organic	1.4		0.50	0.26	mg/L			07/20/22 03:19	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW12-062922-0
Lab Sample ID: 580-115401-3
Date Collected: 06/29/22 17:15
Matrix: Water
Date Received: 06/30/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	42		0.20	0.055	ug/L			07/04/22 23:35	1
Tetrachloroethene	1.8		0.20	0.084	ug/L			07/04/22 23:35	1
Trichloroethene	3.3	B	0.20	0.066	ug/L			07/04/22 23:35	1
Vinyl chloride	6.0		0.020	0.013	ug/L			07/04/22 23:35	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*80 - 120*		*07/04/22 23:35*	*1*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*		*07/04/22 23:35*	*1*
Dibromofluoromethane (Surr)	*115*		*80 - 120*		*07/04/22 23:35*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*07/04/22 23:35*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon dioxide	20000		20	10	ug/L			07/05/22 14:52	4
Methane	210		1.0	0.11	ug/L			07/05/22 12:53	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.1		1.5	0.43	mg/L			06/30/22 19:15	1
NO3 as N	0.17	J	0.20	0.030	mg/L			06/30/22 19:15	1
Sulfate	3.5		1.5	0.80	mg/L			06/30/22 19:15	1
Carbon, Total Organic	1.2		0.50	0.26	mg/L			07/20/22 03:43	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW100-062922-0
Lab Sample ID: 580-115401-4
Date Collected: 06/29/22 12:00
Matrix: Water
Date Received: 06/30/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.062	J	0.20	0.055	ug/L			07/07/22 18:22	1
Tetrachloroethene	0.46		0.20	0.084	ug/L			07/07/22 18:22	1
Trichloroethene	0.23		0.20	0.066	ug/L			07/07/22 18:22	1
Vinyl chloride	0.016	J	0.020	0.013	ug/L			07/07/22 18:22	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*80 - 120*		*07/07/22 18:22*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*07/07/22 18:22*	*1*
Dibromofluoromethane (Surr)	*116*		*80 - 120*		*07/07/22 18:22*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*07/07/22 18:22*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon dioxide	7300		20	10	ug/L			07/05/22 15:15	4
Methane	1.2		1.0	0.11	ug/L			07/05/22 13:35	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.7		1.5	0.43	mg/L			06/30/22 19:50	1
NO3 as N	0.21		0.20	0.030	mg/L			06/30/22 19:50	1
Sulfate	5.4		1.5	0.80	mg/L			06/30/22 19:50	1
Carbon, Total Organic	0.76		0.50	0.26	mg/L			07/20/22 04:07	1

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-115401-1

Client Sample ID: TB-062922
Date Collected: 06/29/22 08:00
Date Received: 06/30/22 09:30

Lab Sample ID: 580-115401-5
Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			07/05/22 15:57	1
Tetrachloroethene	ND		0.20	0.084	ug/L			07/05/22 15:57	1
Trichloroethene	ND		0.20	0.066	ug/L			07/05/22 15:57	1
Vinyl chloride	ND		0.020	0.013	ug/L			07/05/22 15:57	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*80 - 120*		*07/05/22 15:57*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*07/05/22 15:57*	*1*
Dibromofluoromethane (Surr)	*112*		*80 - 120*		*07/05/22 15:57*	*1*
Toluene-d8 (Surr)	*95*		*80 - 120*		*07/05/22 15:57*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-395867/6
Matrix: Water
Analysis Batch: 395867

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			07/04/22 17:50	1
Tetrachloroethene	ND		0.20	0.084	ug/L			07/04/22 17:50	1
Trichloroethene	0.0691	J	0.20	0.066	ug/L			07/04/22 17:50	1
Vinyl chloride	ND		0.020	0.013	ug/L			07/04/22 17:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*		*07/04/22 17:50*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*07/04/22 17:50*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*07/04/22 17:50*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*07/04/22 17:50*	*1*

Lab Sample ID: LCS 580-395867/3
Matrix: Water
Analysis Batch: 395867

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.16		ug/L		103	72 - 120
Tetrachloroethene	5.00	5.06		ug/L		101	75 - 124
Trichloroethene	5.00	5.05		ug/L		101	72 - 120
Vinyl chloride	5.00	5.33		ug/L		107	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-395867/4
Matrix: Water
Analysis Batch: 395867

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	5.03		ug/L		101	72 - 120	2	22
Tetrachloroethene	5.00	4.92		ug/L		98	75 - 124	3	20
Trichloroethene	5.00	4.86		ug/L		97	72 - 120	4	22
Vinyl chloride	5.00	5.07		ug/L		101	41 - 150	5	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*107*		*80 - 120*
Dibromofluoromethane (Surr)	*104*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-395963/6
Matrix: Water
Analysis Batch: 395963

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			07/05/22 15:32	1
Tetrachloroethene	ND		0.20	0.084	ug/L			07/05/22 15:32	1
Trichloroethene	ND		0.20	0.066	ug/L			07/05/22 15:32	1
Vinyl chloride	ND		0.020	0.013	ug/L			07/05/22 15:32	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 120*		*07/05/22 15:32*	*1*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*		*07/05/22 15:32*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*07/05/22 15:32*	*1*
Toluene-d8 (Surr)	*98*		*80 - 120*		*07/05/22 15:32*	*1*

Lab Sample ID: LCS 580-395963/3
Matrix: Water
Analysis Batch: 395963

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			5.00	4.69		ug/L		94	72 - 120		
Tetrachloroethene			5.00	4.61		ug/L		92	75 - 124		
Trichloroethene			5.00	4.48		ug/L		90	72 - 120		
Vinyl chloride			5.00	4.92		ug/L		98	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-395963/4
Matrix: Water
Analysis Batch: 395963

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	4.54		ug/L		91	72 - 120	3	22
Tetrachloroethene			5.00	4.43		ug/L		89	75 - 124	4	20
Trichloroethene			5.00	4.41		ug/L		88	72 - 120	2	22
Vinyl chloride			5.00	4.56		ug/L		91	41 - 150	8	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-396239/6
Matrix: Water
Analysis Batch: 396239

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			07/07/22 13:50	1
Tetrachloroethene	ND		0.20	0.084	ug/L			07/07/22 13:50	1
Trichloroethene	ND		0.20	0.066	ug/L			07/07/22 13:50	1
Vinyl chloride	ND		0.020	0.013	ug/L			07/07/22 13:50	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*80 - 120*		*07/07/22 13:50*	*1*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*		*07/07/22 13:50*	*1*
Dibromofluoromethane (Surr)	*110*		*80 - 120*		*07/07/22 13:50*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*07/07/22 13:50*	*1*

Lab Sample ID: LCS 580-396239/3
Matrix: Water
Analysis Batch: 396239

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.07		ug/L		101	72 - 120
Tetrachloroethene	5.00	5.06		ug/L		101	75 - 124
Trichloroethene	5.00	4.96		ug/L		99	72 - 120
Vinyl chloride	5.00	6.22		ug/L		124	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Lab Sample ID: LCSD 580-396239/4
Matrix: Water
Analysis Batch: 396239

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.94		ug/L		99	72 - 120	3	22
Tetrachloroethene	5.00	4.96		ug/L		99	75 - 124	2	20
Trichloroethene	5.00	4.84		ug/L		97	72 - 120	2	22
Vinyl chloride	5.00	5.91		ug/L		118	41 - 150	5	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*106*		*80 - 120*
Dibromofluoromethane (Surr)	*103*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-246656/4
Matrix: Water
Analysis Batch: 246656

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon dioxide	ND		5.0	2.6	ug/L			07/05/22 11:11	1

Lab Sample ID: LCS 570-246656/2
Matrix: Water
Analysis Batch: 246656

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon dioxide			543	494		ug/L		91	80 - 120		

Lab Sample ID: LCSD 570-246656/3
Matrix: Water
Analysis Batch: 246656

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon dioxide			543	498		ug/L		92	80 - 120	1	20

Lab Sample ID: MB 570-246663/4
Matrix: Water
Analysis Batch: 246663

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			07/05/22 10:19	1

Lab Sample ID: LCS 570-246663/2
Matrix: Water
Analysis Batch: 246663

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methane			12.9	12.3		ug/L		95	80 - 120		

Lab Sample ID: LCSD 570-246663/3
Matrix: Water
Analysis Batch: 246663

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane			12.9	11.9		ug/L		92	80 - 120	3	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-395773/3
Matrix: Water
Analysis Batch: 395773

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			06/30/22 17:07	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 580-395773/4
Matrix: Water
Analysis Batch: 395773

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	5.18		mg/L		104	90 - 110

Lab Sample ID: LCSD 580-395773/5
Matrix: Water
Analysis Batch: 395773

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	5.00	5.18		mg/L		104	90 - 110	0	15

Lab Sample ID: 580-115401-3 MS
Matrix: Water
Analysis Batch: 395773

Client Sample ID: MW12-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	0.17	J	5.00	5.01		mg/L		97	90 - 110

Lab Sample ID: 580-115401-3 MSD
Matrix: Water
Analysis Batch: 395773

Client Sample ID: MW12-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	0.17	J	5.00	5.01		mg/L		97	90 - 110	0	15

Lab Sample ID: MB 580-395780/13
Matrix: Water
Analysis Batch: 395780

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			06/30/22 17:07	1
Sulfate	ND		1.5	0.80	mg/L			06/30/22 17:07	1

Lab Sample ID: LCS 580-395780/14
Matrix: Water
Analysis Batch: 395780

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.7		mg/L		105	90 - 110
Sulfate	50.0	51.1		mg/L		102	90 - 110

Lab Sample ID: LCSD 580-395780/15
Matrix: Water
Analysis Batch: 395780

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	52.8		mg/L		106	90 - 110	0	15
Sulfate	50.0	51.1		mg/L		102	90 - 110	0	15

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 580-115401-3 MS
Matrix: Water
Analysis Batch: 395780

Client Sample ID: MW12-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	2.1		50.0	56.6		mg/L		109	90 - 110
Sulfate	3.5		50.0	57.3		mg/L		108	90 - 110

Lab Sample ID: 580-115401-3 MSD
Matrix: Water
Analysis Batch: 395780

Client Sample ID: MW12-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	2.1		50.0	56.5		mg/L		109	90 - 110	0	15
Sulfate	3.5		50.0	57.2		mg/L		107	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-250454/33
Matrix: Water
Analysis Batch: 250454

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			07/20/22 00:55	1

Lab Sample ID: LCS 570-250454/34
Matrix: Water
Analysis Batch: 250454

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Carbon, Total Organic	5.03	5.12		mg/L		102	85 - 115

Lab Sample ID: LCSD 570-250454/35
Matrix: Water
Analysis Batch: 250454

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic	5.03	5.03		mg/L		100	85 - 115	2	20

Lab Sample ID: 580-115401-1 MS
Matrix: Water
Analysis Batch: 250454

Client Sample ID: MW10-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Carbon, Total Organic	0.79		5.03	5.81		mg/L		100	31 - 145

Lab Sample ID: 580-115401-1 MSD
Matrix: Water
Analysis Batch: 250454

Client Sample ID: MW10-062922-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic	0.79		5.03	5.98		mg/L		103	31 - 145	3	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-115401-1

Client Sample ID: MW10-062922-0

Lab Sample ID: 580-115401-1
Date Collected: 06/29/22 14:10
Matrix: Water
Date Received: 06/30/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	395867	07/04/22 23:10	JBT	FGS SEA
Total/NA	Analysis	RSK-175		1	246656	07/05/22 13:21	DU6U	ECL 4
Total/NA	Analysis	RSK-175		1	246663	07/05/22 11:07	DU6U	ECL 4
Total/NA	Analysis	300.0		1	395773	06/30/22 18:52	JHR	FGS SEA
Total/NA	Analysis	300.0		1	395780	06/30/22 18:52	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	250454	07/20/22 02:55	UAPD	ECL 4

Client Sample ID: MW11-062922-0

Lab Sample ID: 580-115401-2
Date Collected: 06/29/22 15:50
Matrix: Water
Date Received: 06/30/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		5	395867	07/05/22 01:38	JBT	FGS SEA
Total/NA	Analysis	RSK-175	DL	4	246656	07/05/22 14:32	DU6U	ECL 4
Total/NA	Analysis	RSK-175	DL	8	246663	07/05/22 12:13	DU6U	ECL 4
Total/NA	Analysis	300.0		1	395773	06/30/22 19:04	JHR	FGS SEA
Total/NA	Analysis	300.0		1	395780	06/30/22 19:04	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	250454	07/20/22 03:19	UAPD	ECL 4

Client Sample ID: MW12-062922-0

Lab Sample ID: 580-115401-3
Date Collected: 06/29/22 17:15
Matrix: Water
Date Received: 06/30/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	395867	07/04/22 23:35	JBT	FGS SEA
Total/NA	Analysis	RSK-175		4	246656	07/05/22 14:52	DU6U	ECL 4
Total/NA	Analysis	RSK-175		1	246663	07/05/22 12:53	DU6U	ECL 4
Total/NA	Analysis	300.0		1	395773	06/30/22 19:15	JHR	FGS SEA
Total/NA	Analysis	300.0		1	395780	06/30/22 19:15	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	250454	07/20/22 03:43	UAPD	ECL 4

Client Sample ID: MW100-062922-0

Lab Sample ID: 580-115401-4
Date Collected: 06/29/22 12:00
Matrix: Water
Date Received: 06/30/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	396239	07/07/22 18:22	JBT	FGS SEA
Total/NA	Analysis	RSK-175		4	246656	07/05/22 15:15	DU6U	ECL 4
Total/NA	Analysis	RSK-175		1	246663	07/05/22 13:35	DU6U	ECL 4
Total/NA	Analysis	300.0		1	395773	06/30/22 19:50	JHR	FGS SEA
Total/NA	Analysis	300.0		1	395780	06/30/22 19:50	JHR	FGS SEA
Total/NA	Analysis	SM 5310D		1	250454	07/20/22 04:07	UAPD	ECL 4

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-115401-1

Client Sample ID: TB-062922
Date Collected: 06/29/22 08:00
Date Received: 06/30/22 09:30

Lab Sample ID: 580-115401-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260D		1	395963	07/05/22 15:57	JBT	FGS SEA

Laboratory References:

ECL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

FGS SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-115401-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-07-22

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	01-31-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-115401-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-115401-1	MW10-062922-0	Water	06/29/22 14:10	06/30/22 09:30
580-115401-2	MW11-062922-0	Water	06/29/22 15:50	06/30/22 09:30
580-115401-3	MW12-062922-0	Water	06/29/22 17:15	06/30/22 09:30
580-115401-4	MW100-062922-0	Water	06/29/22 12:00	06/30/22 09:30
580-115401-5	TB-062922	Water	06/29/22 08:00	06/30/22 09:30

Chain of Custody Record

eurofins | Environment Testing America

580-115401 Chain of Custody

Client Contact: Laura Tochko	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-49413-15861.1
Company: Jacobs Engineering Group, Inc.	Phone: 425 871 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin:	Page: Page 1 of 1
Address: 2020 SW Fourth Ave, 3rd Floor	PWSID:	Due Date Requested:		Job #:
City: Portland		TAT Requested (days): STD		
State, Zip: OR, 97201		Compliance Project: Δ Yes Δ No		
Phone: 530-229-3203(Tel)		PO #: 3600021519		
Email: Laura.Tochko@jacobs.com		WO #:		
Project Name: Northwest Pipe Company GW 2022		Project #: 58017730		
Site:		SSOW#:		

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA; M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2O3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - pH 4-5; Y - Trizma; Z - other (specify); Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D, 300_48HR	RSK_175 - Methane	8260D_LL - (MOD) Volatiles, standard list, low leve	SM5310D - Total Organic Carbon	RSK_175_CO2 - RSK-175 CO2 (if needed)	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A	A	S	N		
MW10-062922-0	6/29/22	1410	G	Water			1	3	3	1	3	11	
MW11-062922-0		1550		Water								11	
MW12-062922-0		1715		Water								11	
MW100-062922-0		1200		Water								11	
TB-062922	6/29/22	0800		Water					3			3	

Therm. ID: A3 Cor: 3.4 Unc: 2.8
Cooler Dsc: LB
Packing: Bub
Cust. Seal: Yes ✓ No
Blue Ice, Wet, Dry, None
FedEx: P.O
UPS:
Lab Cour:
Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Laura Tochko	Date/Time: 6/29/22 1830	Company: JACOBS	Received by:	Date/Time: 6/30/22 0930	Company: ETN
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks:


eurofins | Environment Testing TestAmerica
Temperature Contr
IF THIS SHIPMENT IS DELAYED IN TRANSI
STORE REFRIGERATED (2° TO 8° C / 36° TO 4
1781102
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E
FIFE, WA 98424
UNITED STATES US
CAD: 989746/CAFE3512
BILL SENDER
TO SHIPPING/RECEIVING
EUROFINS ENVIRONMENT TESTING SOUTHW
2841 DOW AVENUE, SUITE 100
TUSTIN CA 92780
(714) 895-5494
REF S580-49509
PO YES
FedEx
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SATURDAY 12:00
PRIORITY OVERNIGH
MASTER
WO DTHA
92780
CA-US SNA
Part # 159471-434 MTW EXP 02/23
Custody Seal
SIGNATURE
DATE
7-1-22
eurofins | Environment Testing TestAmerica
1781102
eurofins | Environment Testing TestAmerica
Temperature Co
580-115401 Waybill
1781103
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E
FIFE, WA 98424
UNITED STATES US
CAD: 989746/CAFE35
BILL SENDER
SHIPPING/RECEIVING
EUROFINS ENVIRONMENT TESTING SOUT
2841 DOW AVENUE, SUITE 100
TUSTIN CA 92780
(714) 895-5494
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str# 5894 8313 4875
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WO DTHA
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Custody Seal
SIGNATURE
DATE
7-1-22
eurofins | Environment Testing TestAmerica
1781103

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins | Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-105690 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-115401-1
Address: 2841 Dow Avenue Suite 100	Due Date Requested: 7/21/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes.

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM6310D/ Total Organic Carbon	RSK_175_CO2/ RSK-175 CO2 (If needed)	Total Number of containers	Special Instructions/Note:
			Preservation Code:								
MW10-062922-0 (580-115401-1)	6/29/22	14.10 Pacific		Water			X	X	X	7	
MW11-062922-0 (580-115401-2)	6/29/22	15.50 Pacific		Water			X	X	X	7	
MW12-062922-0 (580-115401-3)	6/29/22	17 15 Pacific		Water			X	X	X	7	
MW100-062922-0 (580-115401-4)	6/29/22	12.00 Pacific		Water			X	X	X	7	
TB-062922 (580-115401-5)	6/29/22	08 00 Pacific		Water			X		X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	*Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III, IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements.

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time: 7/1/22 1210	Company: EETN	Received by: Fedex	Date/Time:	Company
Relinquished by: Fedex	Date/Time:	Company	Received by:	Date/Time: 7/2/22 1130	Company: IEC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No: 178110?, 178110?	Cooler Temperature(s) °C and Other Remarks: 1.5/3.2, 1.8/3.5 IR96

Ver: 06/08/2021

7/22/2022

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-115401-1

Login Number: 115401
List Number: 1
Creator: Greene, Ashton R

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-115401-1

Login Number: 115401
List Number: 2
Creator: Ortiz-Luis, Michael

List Source: Eurofins Calscience
List Creation: 07/02/22 01:14 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	1781102, 1781103
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.2, 3.5
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

September 2022

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-117879-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
10/3/2022 10:09:50 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Job ID: 580-117879-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-117879-1

Comments
No additional comments.

Receipt
The samples were received on 9/14/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.8º C.

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW11-091322-0 (580-117879-1). Elevated reporting limits (RLs) are provided.

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-404333 recovered outside acceptance criteria, low biased, for 1,1-Dichloroethene and Vinyl chloride. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated samples were non-detect for the analyte(s), the data are reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc. Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW11-091322-0
Lab Sample ID: 580-117879-1

Date Collected: 09/13/22 10:20
Matrix: Water
Date Received: 09/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	32		1.0	0.28	ug/L			09/19/22 22:41	5
Tetrachloroethene	2.1		1.0	0.42	ug/L			09/19/22 22:41	5
Trichloroethene	1.1		1.0	0.33	ug/L			09/19/22 22:41	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*80 - 120*		*09/19/22 22:41*	*5*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*09/19/22 22:41*	*5*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*09/19/22 22:41*	*5*
Toluene-d8 (Surr)	*105*		*80 - 120*		*09/19/22 22:41*	*5*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	32		0.10	0.065	ug/L			09/21/22 06:32	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*09/21/22 06:32*	*5*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*09/21/22 06:32*	*5*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*09/21/22 06:32*	*5*
Toluene-d8 (Surr)	*99*		*80 - 120*		*09/21/22 06:32*	*5*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	950		4.0	0.44	ug/L			09/22/22 16:28	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	4.2		1.5	0.43	mg/L			09/14/22 22:58	1
NO3 as N	0.072	J	0.20	0.030	mg/L			09/14/22 22:58	1
Sulfate	4.9		1.5	0.80	mg/L			09/14/22 22:58	1
Carbon, Total Organic	1.5		0.50	0.26	mg/L			09/30/22 12:46	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW10-091322-0
Lab Sample ID: 580-117879-2
Date Collected: 09/13/22 11:55
Matrix: Water
Date Received: 09/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	2.0		0.20	0.055	ug/L			09/20/22 04:28	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/20/22 04:28	1
Trichloroethene	0.19	J	0.20	0.066	ug/L			09/20/22 04:28	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*80 - 120*		*09/20/22 04:28*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*09/20/22 04:28*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 120*		*09/20/22 04:28*	*1*
Toluene-d8 (Surr)	*106*		*80 - 120*		*09/20/22 04:28*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.66		0.020	0.013	ug/L			09/21/22 05:20	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 120*		*09/21/22 05:20*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*09/21/22 05:20*	*1*
Dibromofluoromethane (Surr)	*98*		*80 - 120*		*09/21/22 05:20*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*09/21/22 05:20*	*1*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	860		4.0	0.44	ug/L			09/22/22 17:37	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.8		1.5	0.43	mg/L			09/14/22 23:10	1
NO3 as N	ND		0.20	0.030	mg/L			09/14/22 23:10	1
Sulfate	1.8		1.5	0.80	mg/L			09/14/22 23:10	1
Carbon, Total Organic	2.0		0.50	0.26	mg/L			09/30/22 13:09	1

Client Sample ID: MW12-091322-0
Lab Sample ID: 580-117879-3

Date Collected: 09/13/22 13:35
Matrix: Water
Date Received: 09/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	44		0.20	0.055	ug/L			09/20/22 04:54	1
Tetrachloroethene	2.1		0.20	0.084	ug/L			09/20/22 04:54	1
Trichloroethene	3.8		0.20	0.066	ug/L			09/20/22 04:54	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*107*		*80 - 120*		*09/20/22 04:54*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*09/20/22 04:54*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*09/20/22 04:54*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*09/20/22 04:54*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	8.6		0.020	0.013	ug/L			09/21/22 05:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*09/21/22 05:44*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*09/21/22 05:44*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*09/21/22 05:44*	*1*
Toluene-d8 (Surr)	*102*		*80 - 120*		*09/21/22 05:44*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	410		1.0	0.11	ug/L			09/22/22 19:15	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	2.6		1.5	0.43	mg/L			09/14/22 23:22	1
NO3 as N	0.22		0.20	0.030	mg/L			09/14/22 23:22	1
Sulfate	3.3		1.5	0.80	mg/L			09/14/22 23:22	1
Carbon, Total Organic	1.3		0.50	0.26	mg/L			09/30/22 13:31	1

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117879-1

Client Sample ID: T4S1MW23-091322-0

Date Collected: 09/13/22 15:20
Date Received: 09/14/22 09:30

Lab Sample ID: 580-117879-4

Matrix: Water

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	0.17	J	0.20	0.055	ug/L			09/20/22 05:19	1
Tetrachloroethene	1.5		0.20	0.084	ug/L			09/20/22 05:19	1
Trichloroethene	0.29		0.20	0.066	ug/L			09/20/22 05:19	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/20/22 05:19	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*80 - 120*		*09/20/22 05:19*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*09/20/22 05:19*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*09/20/22 05:19*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*09/20/22 05:19*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	6.2		1.0	0.11	ug/L			09/22/22 19:55	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.8		1.5	0.43	mg/L			09/14/22 23:33	1
NO3 as N	0.91		0.20	0.030	mg/L			09/14/22 23:33	1
Sulfate	6.0		1.5	0.80	mg/L			09/14/22 23:33	1
Carbon, Total Organic	1.1		0.50	0.26	mg/L			09/30/22 13:53	1

Client Sample ID: T4S1MW22-091322-0

Lab Sample ID: 580-117879-5

Date Collected: 09/13/22 16:40

Matrix: Water

Date Received: 09/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	3.6		0.20	0.055	ug/L			09/20/22 05:43	1
Tetrachloroethene	1.6		0.20	0.084	ug/L			09/20/22 05:43	1
Trichloroethene	2.2		0.20	0.066	ug/L			09/20/22 05:43	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*112*		*80 - 120*		*09/20/22 05:43*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*09/20/22 05:43*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*09/20/22 05:43*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*09/20/22 05:43*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	0.41		0.020	0.013	ug/L			09/21/22 06:08	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*104*		*80 - 120*		*09/21/22 06:08*	*1*
4-Bromofluorobenzene (Surr)	*94*		*80 - 120*		*09/21/22 06:08*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*09/21/22 06:08*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*09/21/22 06:08*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	3.8		1.0	0.11	ug/L			09/23/22 14:00	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	6.6		1.5	0.43	mg/L			09/15/22 00:32	1
NO3 as N	0.26		0.20	0.030	mg/L			09/15/22 00:32	1
Sulfate	7.4		1.5	0.80	mg/L			09/15/22 00:32	1
Carbon, Total Organic	1.4		0.50	0.26	mg/L			09/30/22 15:00	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-091322
Lab Sample ID: 580-117879-6
Date Collected: 09/13/22 08:00
Matrix: Water
Date Received: 09/14/22 09:30

Method: 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/20/22 02:24	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/20/22 02:24	1
Trichloroethene	ND		0.20	0.066	ug/L			09/20/22 02:24	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/20/22 02:24	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*80 - 120*		*09/20/22 02:24*	*1*
4-Bromofluorobenzene (Surr)	*96*		*80 - 120*		*09/20/22 02:24*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*09/20/22 02:24*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*09/20/22 02:24*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-404281/6
Matrix: Water
Analysis Batch: 404281

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/19/22 14:53	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/19/22 14:53	1
Trichloroethene	ND		0.20	0.066	ug/L			09/19/22 14:53	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/19/22 14:53	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*109*		*80 - 120*		*09/19/22 14:53*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*09/19/22 14:53*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*09/19/22 14:53*	*1*
Toluene-d8 (Surr)	*107*		*80 - 120*		*09/19/22 14:53*	*1*

Lab Sample ID: LCS 580-404281/3
Matrix: Water
Analysis Batch: 404281

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.20		ug/L		104	72 - 120
Tetrachloroethene	5.00	4.90		ug/L		98	75 - 124
Trichloroethene	5.00	5.02		ug/L		100	72 - 120
Vinyl chloride	5.00	3.37		ug/L		67	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*95*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Lab Sample ID: LCSD 580-404281/4
Matrix: Water
Analysis Batch: 404281

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	5.23		ug/L		105	72 - 120	1	22
Tetrachloroethene	5.00	4.94		ug/L		99	75 - 124	1	20
Trichloroethene	5.00	4.99		ug/L		100	72 - 120	1	22
Vinyl chloride	5.00	3.49		ug/L		70	41 - 150	3	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*99*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-404333/6
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/20/22 01:59	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/20/22 01:59	1
Trichloroethene	ND		0.20	0.066	ug/L			09/20/22 01:59	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/20/22 01:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*80 - 120*		*09/20/22 01:59*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*09/20/22 01:59*	*1*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*09/20/22 01:59*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*09/20/22 01:59*	*1*

Lab Sample ID: LCS 580-404333/3
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.06		ug/L		101	72 - 120
Tetrachloroethene	5.00	4.89		ug/L		98	75 - 124
Trichloroethene	5.00	5.01		ug/L		100	72 - 120
Vinyl chloride	5.00	2.95		ug/L		59	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*105*		*80 - 120*

Lab Sample ID: LCSD 580-404333/4
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	5.03		ug/L		101	72 - 120	1	22
Tetrachloroethene	5.00	4.89		ug/L		98	75 - 124	0	20
Trichloroethene	5.00	4.97		ug/L		99	72 - 120	1	22
Vinyl chloride	5.00	3.44		ug/L		69	41 - 150	16	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*93*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-404483/6
Matrix: Water
Analysis Batch: 404483

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			09/21/22 00:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*09/21/22 00:30*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*09/21/22 00:30*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*09/21/22 00:30*	*1*
Toluene-d8 (Surr)	*104*		*80 - 120*		*09/21/22 00:30*	*1*

Lab Sample ID: LCS 580-404483/3
Matrix: Water
Analysis Batch: 404483

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Vinyl chloride			5.00	5.09		ug/L		102	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*100*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 580-404483/4
Matrix: Water
Analysis Batch: 404483

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Vinyl chloride			5.00	5.15		ug/L		103	41 - 150	1	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*107*		*80 - 120*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*101*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-266435/4
Matrix: Water
Analysis Batch: 266435

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			09/22/22 10:51	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 570-266435/2
Matrix: Water
Analysis Batch: 266435

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.2		ug/L		102	80 - 120

Lab Sample ID: LCSD 570-266435/3
Matrix: Water
Analysis Batch: 266435

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	13.2		ug/L		102	80 - 120	0	20

Lab Sample ID: MB 570-266787/4
Matrix: Water
Analysis Batch: 266787

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			09/23/22 11:06	1

Lab Sample ID: LCS 570-266787/2
Matrix: Water
Analysis Batch: 266787

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	13.1		ug/L		102	80 - 120

Lab Sample ID: LCSD 570-266787/3
Matrix: Water
Analysis Batch: 266787

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	13.1		ug/L		101	80 - 120	1	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-404337/3
Matrix: Water
Analysis Batch: 404337

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			09/14/22 15:09	1
Sulfate	ND		1.5	0.80	mg/L			09/14/22 15:09	1

Lab Sample ID: LCS 580-404337/4
Matrix: Water
Analysis Batch: 404337

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	48.8		mg/L		98	90 - 110
Sulfate	50.0	49.0		mg/L		98	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-404337/5
Matrix: Water
Analysis Batch: 404337

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride			50.0	48.7		mg/L		97	90 - 110	0	15
Sulfate			50.0	49.0		mg/L		98	90 - 110	0	15

Lab Sample ID: 580-117879-4 MS
Matrix: Water
Analysis Batch: 404337

Client Sample ID: T4S1MW23-091322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	7.8		50.0	57.9		mg/L		100	90 - 110
Sulfate	6.0		50.0	57.7		mg/L		103	90 - 110

Lab Sample ID: 580-117879-4 MSD
Matrix: Water
Analysis Batch: 404337

Client Sample ID: T4S1MW23-091322-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	7.8		50.0	58.0		mg/L		100	90 - 110	0	15
Sulfate	6.0		50.0	57.8		mg/L		104	90 - 110	0	15

Lab Sample ID: MB 580-404341/3
Matrix: Water
Analysis Batch: 404341

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			09/14/22 15:09	1

Lab Sample ID: LCS 580-404341/4
Matrix: Water
Analysis Batch: 404341

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N			5.00	4.67		mg/L		93	90 - 110

Lab Sample ID: LCSD 580-404341/5
Matrix: Water
Analysis Batch: 404341

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N			5.00	4.68		mg/L		94	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-268913/3
Matrix: Water
Analysis Batch: 268913

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			09/30/22 08:42	1

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117879-1

Method: SM 5310D - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 570-268913/4
Matrix: Water
Analysis Batch: 268913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon, Total Organic			5.03	5.21		mg/L		103	85 - 115		

Lab Sample ID: LCSD 570-268913/5
Matrix: Water
Analysis Batch: 268913

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	5.22		mg/L		104	85 - 115	0	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW11-091322-0
Lab Sample ID: 580-117879-1
Date Collected: 09/13/22 10:20
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	RA	5	404483	JBT	EET SEA	09/21/22 06:32
Total/NA	Analysis	8260D		5	404281	JBT	EET SEA	09/19/22 22:41
Total/NA	Analysis	RSK-175	DL	4	266435	DU6U	EET CAL 4	09/22/22 16:28
Total/NA	Analysis	300.0		1	404337	JHR	EET SEA	09/14/22 22:58
Total/NA	Analysis	300.0		1	404341	JHR	EET SEA	09/14/22 22:58
Total/NA	Analysis	SM 5310D		1	268913	UAPD	EET CAL 4	09/30/22 12:46

Client Sample ID: MW10-091322-0
Lab Sample ID: 580-117879-2
Date Collected: 09/13/22 11:55
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	RA	1	404483	JBT	EET SEA	09/21/22 05:20
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 04:28
Total/NA	Analysis	RSK-175	DL	4	266435	DU6U	EET CAL 4	09/22/22 17:37
Total/NA	Analysis	300.0		1	404337	JHR	EET SEA	09/14/22 23:10
Total/NA	Analysis	300.0		1	404341	JHR	EET SEA	09/14/22 23:10
Total/NA	Analysis	SM 5310D		1	268913	UAPD	EET CAL 4	09/30/22 13:09

Client Sample ID: MW12-091322-0
Lab Sample ID: 580-117879-3
Date Collected: 09/13/22 13:35
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	RA	1	404483	JBT	EET SEA	09/21/22 05:44
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 04:54
Total/NA	Analysis	RSK-175		1	266435	DU6U	EET CAL 4	09/22/22 19:15
Total/NA	Analysis	300.0		1	404337	JHR	EET SEA	09/14/22 23:22
Total/NA	Analysis	300.0		1	404341	JHR	EET SEA	09/14/22 23:22
Total/NA	Analysis	SM 5310D		1	268913	UAPD	EET CAL 4	09/30/22 13:31

Client Sample ID: T4S1MW23-091322-0
Lab Sample ID: 580-117879-4
Date Collected: 09/13/22 15:20
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 05:19
Total/NA	Analysis	RSK-175		1	266435	DU6U	EET CAL 4	09/22/22 19:55
Total/NA	Analysis	300.0		1	404337	JHR	EET SEA	09/14/22 23:33
Total/NA	Analysis	300.0		1	404341	JHR	EET SEA	09/14/22 23:33
Total/NA	Analysis	SM 5310D		1	268913	UAPD	EET CAL 4	09/30/22 13:53

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW22-091322-0
Lab Sample ID: 580-117879-5

Date Collected: 09/13/22 16:40
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D	RA	1	404483	JBT	EET SEA	09/21/22 06:08
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 05:43
Total/NA	Analysis	RSK-175		1	266787	DU6U	EET CAL 4	09/23/22 14:00
Total/NA	Analysis	300.0		1	404337	JHR	EET SEA	09/15/22 00:32
Total/NA	Analysis	300.0		1	404341	JHR	EET SEA	09/15/22 00:32
Total/NA	Analysis	SM 5310D		1	268913	UAPD	EET CAL 4	09/30/22 15:00

Client Sample ID: TB-091322
Lab Sample ID: 580-117879-6

Date Collected: 09/13/22 08:00
Matrix: Water
Date Received: 09/14/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 02:24

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-117879-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-08-23

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	02-02-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117879-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-117879-1	MW11-091322-0	Water	09/13/22 10:20	09/14/22 09:30
580-117879-2	MW10-091322-0	Water	09/13/22 11:55	09/14/22 09:30
580-117879-3	MW12-091322-0	Water	09/13/22 13:35	09/14/22 09:30
580-117879-4	T4S1MW23-091322-0	Water	09/13/22 15:20	09/14/22 09:30
580-117879-5	T4S1MW22-091322-0	Water	09/13/22 16:40	09/14/22 09:30
580-117879-6	TB-091322	Water	09/13/22 08:00	09/14/22 09:30

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-50461-15861.3
Client Contact: Laura Tochko	Phone: 425 8912855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page ~~3 of 3~~ 1 OF 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested: STD			
City: Portland	TAT Requested (days): 14 DAYS			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D, 300_48HR	RSK_175 - Methane	SM5310D - Total Organic Carbon	8260D_LL - (MOD) Volatiles, standard list, low leve	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A	S	A		
MW11-091322-0	9/13/22	1020	G	Water	N	N	X	X	X	X	8	
MW10-091322-0		1155		Water								
MW12-091322-0		1335		Water								
T481MW23-091322-0		1520		Water								
T451MW22-091322-0		1640		Water								
TB-091322		0800		Water							2	
				Water								
				Water								
				Water								
				Water								
				Water								

580-117879 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
LAURA TOCHKO	9/13/22 1800	JACOBS		9/14/22 0930	EEN
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by:	Date/Time:	Company	Received by:		

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Re

Therm. ID: A3 Cor: 1.8 ° Unc: 1.7 °
Cooler Dsc: 16
Packing: Bub
Cust. Seal: Yes No
Blue Ice, Wet, Dry, None
FedEx: P10
UPS:
Lab Cour:
Other:

08/2021

10/3/2022

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-108977 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-117879-1
Address: 2841 Dow Avenue, Suite 100	Due Date Requested: 10/4/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022-add on	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL
B - NaOH
C - Zn Acetate
D - Nitric Acid
E - NaHSO4
F - MeOH
G - Amchlor
H Ascorbic Acid
I - Ice
J - DI Water
K - EDTA
L - EDA
M - Hexane
N - None
O - AsNaO2
P - Na2O4S
Q - Na2SO3
R - Na2S2O3
S - H2SO4
T - TSP Dodecahydrate
U - Acetone
V - MCAA
W - pH 4-5
Y - Trizma
Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MW11-091322-0 (580-117879-1)	9/13/22	10 20 Pacific		Water			X	X	4	
MW10-091322-0 (580-117879-2)	9/13/22	11.55 Pacific		Water			X	X	4	
MW12-091322-0 (580-117879-3)	9/13/22	13.35 Pacific		Water			X	X	4	
T4S1MW23-091322-0 (580-117879-4)	9/13/22	15 20 Pacific		Water			X	X	4	
T4S1MW22-091322-0 (580-117879-5)	9/13/22	16 40 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	9/15/22 1540	EETN	Fedex		
Relinquished by: Fedex	Date/Time:	Company	Received by:	Date/Time: 9/16/22 1000	Company EC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☒ Yes ☐ No	Custody Seal No 178185	Cooler Temperature(s) °C and Other Remarks 2.1/2.1 SC12

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117879-1

Login Number: 117879
List Number: 1
Creator: Presley, Kim A

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117879-1

Login Number: 117879
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 09/16/22 05:43 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-117910-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
10/9/2022 9:05:10 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117910-1

Job ID: 580-117910-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-117910-1

Comments
No additional comments.

Receipt
The samples were received on 9/15/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 1.4º C.

GC/MS VOA
Method 8260D: The following sample was diluted to bring the concentration of target analytes within the calibration range: MW03-091422-0 (580-117910-1). Elevated reporting limits (RLs) are provided.

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-405162 recovered above the upper control limit for Vinyl chloride. The following samples associated with this CCV were non-detects for the affected analytes; therefore, the data have been reported. The associated samples are impacted: T4S1MW03s-091422-0 (580-117910-3), T4S1MW09-091422-0 (580-117910-4) and (CCVIS 580-405162/2).

Method 8260D: The CCV associated with analytical batch 580-405162 was outside of control limits high for Vinyl chloride. The following sample contained detections for Vinyl Chloride: MW03-091422-0 (580-117910-1) and MW02-091422-0 (580-117910-2). Re-analysis was performed outside of analytical holding time, therefore ,all data is reported.

Method 8260D: Reanalysis of the following samples was performed outside of the analytical holding time due to the CCV from the initial analysis being outside of control limits for Vinyl Chloride and sample results outside of calibration limits: MW03-091422-0 (580-117910-1) and MW02-091422-0 (580-117910-2). All data is reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time

GC VOA

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW03-091422-0
Lab Sample ID: 580-117910-1
Date Collected: 09/14/22 09:15
Matrix: Water
Date Received: 09/15/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	200		10	2.8	ug/L			09/27/22 22:16	50
Tetrachloroethene	68		10	4.2	ug/L			09/27/22 22:16	50
Trichloroethene	16		10	3.3	ug/L			09/27/22 22:16	50
Vinyl chloride	53		1.0	0.65	ug/L			09/27/22 22:16	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*09/27/22 22:16*	*50*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*09/27/22 22:16*	*50*
Dibromofluoromethane (Surr)	*109*		*80 - 120*		*09/27/22 22:16*	*50*
Toluene-d8 (Surr)	*102*		*80 - 120*		*09/27/22 22:16*	*50*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	67	H	1.0	0.65	ug/L			10/03/22 22:04	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*111*		*80 - 120*		*10/03/22 22:04*	*50*
4-Bromofluorobenzene (Surr)	*85*		*80 - 120*		*10/03/22 22:04*	*50*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*10/03/22 22:04*	*50*
Toluene-d8 (Surr)	*98*		*80 - 120*		*10/03/22 22:04*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	110		1.0	0.11	ug/L			09/20/22 12:16	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	3.3		1.5	0.43	mg/L			09/15/22 16:32	1
NO3 as N (MCAWW 300.0)	ND		0.20	0.030	mg/L			09/15/22 16:32	1
Sulfate (MCAWW 300.0)	9.0		1.5	0.80	mg/L			09/15/22 16:32	1
Carbon, Total Organic (SM 5310D)	1.5		0.50	0.26	mg/L			10/03/22 16:58	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW02-091422-0
Lab Sample ID: 580-117910-2
Date Collected: 09/14/22 10:40
Matrix: Water
Date Received: 09/15/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	43		0.20	0.055	ug/L			09/27/22 19:27	1
Tetrachloroethene	0.22		0.20	0.084	ug/L			09/27/22 19:27	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 19:27	1
Vinyl chloride	36		0.020	0.013	ug/L			09/27/22 19:27	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*80 - 120*		*09/27/22 19:27*	*1*
4-Bromofluorobenzene (Surr)	*86*		*80 - 120*		*09/27/22 19:27*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*09/27/22 19:27*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*09/27/22 19:27*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	38	H	0.020	0.013	ug/L			10/03/22 20:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*84*		*80 - 120*		*10/03/22 20:51*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*10/03/22 20:51*	*1*
Dibromofluoromethane (Surr)	*109*		*80 - 120*		*10/03/22 20:51*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*10/03/22 20:51*	*1*

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	1800		4.0	0.44	ug/L			09/20/22 14:15	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	2.7		1.5	0.43	mg/L			09/15/22 16:43	1
NO3 as N (MCAWW 300.0)	0.11	J	0.20	0.030	mg/L			09/15/22 16:43	1
Sulfate (MCAWW 300.0)	3.4		1.5	0.80	mg/L			09/15/22 16:43	1
Carbon, Total Organic (SM 5310D)	1.6		0.50	0.26	mg/L			10/03/22 17:22	1

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117910-1

Client Sample ID: T4S1MW03s-091422-0

Date Collected: 09/14/22 12:00
Date Received: 09/15/22 09:30

Lab Sample ID: 580-117910-3

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 19:51	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 19:51	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 19:51	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 19:51	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*09/27/22 19:51*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*09/27/22 19:51*	*1*
Dibromofluoromethane (Surr)	*111*		*80 - 120*		*09/27/22 19:51*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*09/27/22 19:51*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**0.44**	**J**	1.0	0.11	ug/L			09/20/22 14:59	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	**1.3**	**J**	1.5	0.43	mg/L			09/15/22 16:55	1
NO3 as N (MCAWW 300.0)	**1.2**		0.20	0.030	mg/L			09/15/22 16:55	1
Sulfate (MCAWW 300.0)	**4.8**		1.5	0.80	mg/L			09/15/22 16:55	1
Carbon, Total Organic (SM 5310D)	**0.86**		0.50	0.26	mg/L			10/03/22 17:46	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: T4S1MW09-091422-0
Lab Sample ID: 580-117910-4
Date Collected: 09/14/22 13:20
Matrix: Water
Date Received: 09/15/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 20:15	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 20:15	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 20:15	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 20:15	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*		*09/27/22 20:15*	*1*
4-Bromofluorobenzene (Surr)	*84*		*80 - 120*		*09/27/22 20:15*	*1*
Dibromofluoromethane (Surr)	*114*		*80 - 120*		*09/27/22 20:15*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*09/27/22 20:15*	*1*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**3.1**		1.0	0.11	ug/L			09/20/22 15:34	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	**1.5**		1.5	0.43	mg/L			09/15/22 17:07	1
NO3 as N (MCAWW 300.0)	**1.7**		0.20	0.030	mg/L			09/15/22 17:07	1
Sulfate (MCAWW 300.0)	**6.5**		1.5	0.80	mg/L			09/15/22 17:07	1
Carbon, Total Organic (SM 5310D)	**0.74**		0.50	0.26	mg/L			10/03/22 18:09	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-091422
Lab Sample ID: 580-117910-5
Date Collected: 09/14/22 08:00
Matrix: Water
Date Received: 09/15/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 02:25	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 02:25	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 02:25	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 02:25	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*		*09/27/22 02:25*	*1*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*09/27/22 02:25*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*09/27/22 02:25*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*09/27/22 02:25*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-404955/6
Matrix: Water
Analysis Batch: 404955

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 01:37	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 01:37	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 01:37	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 01:37	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*98*		*80 - 120*		*09/27/22 01:37*	*1*
4-Bromofluorobenzene (Surr)	*91*		*80 - 120*		*09/27/22 01:37*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*09/27/22 01:37*	*1*
Toluene-d8 (Surr)	*97*		*80 - 120*		*09/27/22 01:37*	*1*

Lab Sample ID: LCS 580-404955/3
Matrix: Water
Analysis Batch: 404955

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
cis-1,2-Dichloroethene			5.00	4.30		ug/L		86	72 - 120		
Tetrachloroethene			5.00	4.89		ug/L		98	75 - 124		
Trichloroethene			5.00	4.84		ug/L		97	72 - 120		
Vinyl chloride			5.00	5.81		ug/L		116	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*104*		*80 - 120*
Dibromofluoromethane (Surr)	*100*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-404955/4
Matrix: Water
Analysis Batch: 404955

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene			5.00	4.41		ug/L		88	72 - 120	3	22
Tetrachloroethene			5.00	4.74		ug/L		95	75 - 124	3	20
Trichloroethene			5.00	4.56		ug/L		91	72 - 120	6	22
Vinyl chloride			5.00	5.50		ug/L		110	41 - 150	6	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*102*		*80 - 120*
Dibromofluoromethane (Surr)	*102*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-405162/6
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 14:11	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 14:11	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 14:11	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 14:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 120*		*09/27/22 14:11*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*09/27/22 14:11*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*09/27/22 14:11*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*09/27/22 14:11*	*1*

Lab Sample ID: LCS 580-405162/3
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.88		ug/L		98	72 - 120
Tetrachloroethene	5.00	5.18		ug/L		104	75 - 124
Trichloroethene	5.00	4.26		ug/L		85	72 - 120
Vinyl chloride	5.00	5.80		ug/L		116	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-405162/4
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.68		ug/L		94	72 - 120	4	22
Tetrachloroethene	5.00	5.18		ug/L		104	75 - 124	0	20
Trichloroethene	5.00	4.34		ug/L		87	72 - 120	2	22
Vinyl chloride	5.00	5.71		ug/L		114	41 - 150	2	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-405827/6
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	ND		0.020	0.013	ug/L			10/03/22 15:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*10/03/22 15:35*	*1*
4-Bromofluorobenzene (Surr)	*85*		*80 - 120*		*10/03/22 15:35*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*10/03/22 15:35*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*10/03/22 15:35*	*1*

Lab Sample ID: LCS 580-405827/3
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Vinyl chloride			5.00	5.53		ug/L		111	41 - 150		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*80 - 120*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*93*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-405827/4
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Vinyl chloride			5.00	5.83		ug/L		117	41 - 150	5	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-265491/4
Matrix: Water
Analysis Batch: 265491

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			09/20/22 11:03	1

Method: RSK-175 - Dissolved Gases (GC) (Continued)

Lab Sample ID: LCS 570-265491/2
Matrix: Water
Analysis Batch: 265491

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Methane			12.9	12.0		ug/L		93	80 - 120		

Lab Sample ID: LCSD 570-265491/3
Matrix: Water
Analysis Batch: 265491

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane			12.9	11.7		ug/L		90	80 - 120	3	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-404536/3
Matrix: Water
Analysis Batch: 404536

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			09/15/22 15:45	1
Sulfate	ND		1.5	0.80	mg/L			09/15/22 15:45	1

Lab Sample ID: LCS 580-404536/4
Matrix: Water
Analysis Batch: 404536

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			50.0	49.0		mg/L		98	90 - 110		
Sulfate			50.0	49.5		mg/L		99	90 - 110		

Lab Sample ID: LCSD 580-404536/5
Matrix: Water
Analysis Batch: 404536

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride			50.0	49.0		mg/L		98	90 - 110	0	15
Sulfate			50.0	49.4		mg/L		99	90 - 110	0	15

Lab Sample ID: 580-117910-4 MS
Matrix: Water
Analysis Batch: 404536

Client Sample ID: T4S1MW09-091422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride	1.5		50.0	51.8		mg/L		101	90 - 110		
Sulfate	6.5		50.0	58.8		mg/L		104	90 - 110		

Lab Sample ID: 580-117910-4 MSD
Matrix: Water
Analysis Batch: 404536

Client Sample ID: T4S1MW09-091422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	1.5		50.0	52.2		mg/L		101	90 - 110	1	15
Sulfate	6.5		50.0	59.0		mg/L		105	90 - 110	0	15

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: MB 580-404544/3
Matrix: Water
Analysis Batch: 404544

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			09/15/22 15:45	1

Lab Sample ID: LCS 580-404544/4
Matrix: Water
Analysis Batch: 404544

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	4.69		mg/L		94	90 - 110

Lab Sample ID: LCSD 580-404544/5
Matrix: Water
Analysis Batch: 404544

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	5.00	4.69		mg/L		94	90 - 110	0	15

Lab Sample ID: 580-117910-4 MS
Matrix: Water
Analysis Batch: 404544

Client Sample ID: T4S1MW09-091422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	1.7		5.00	6.46		mg/L		95	90 - 110

Lab Sample ID: 580-117910-4 MSD
Matrix: Water
Analysis Batch: 404544

Client Sample ID: T4S1MW09-091422-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	1.7		5.00	6.47		mg/L		96	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-269618/4
Matrix: Water
Analysis Batch: 269618

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			10/03/22 13:23	1

Lab Sample ID: LCS 570-269618/5
Matrix: Water
Analysis Batch: 269618

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Carbon, Total Organic	5.03	5.02		mg/L		100	85 - 115

Method: SM 5310D - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCSD 570-269618/6
Matrix: Water
Analysis Batch: 269618

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	5.08		mg/L		101	85 - 115	1	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW03-091422-0
Lab Sample ID: 580-117910-1
Date Collected: 09/14/22 09:15
Matrix: Water
Date Received: 09/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		50	405162	TL1	EET SEA	09/27/22 22:16
Total/NA	Analysis	8260D	RA	50	405827	JBT	EET SEA	10/03/22 22:04
Total/NA	Analysis	RSK-175		1	265491	DU6U	EET CAL 4	09/20/22 12:16
Total/NA	Analysis	300.0		1	404536	JHR	EET SEA	09/15/22 16:32
Total/NA	Analysis	300.0		1	404544	JHR	EET SEA	09/15/22 16:32
Total/NA	Analysis	SM 5310D		1	269618	UAPD	EET CAL 4	10/03/22 16:58

Client Sample ID: MW02-091422-0
Lab Sample ID: 580-117910-2
Date Collected: 09/14/22 10:40
Matrix: Water
Date Received: 09/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	405162	TL1	EET SEA	09/27/22 19:27
Total/NA	Analysis	8260D	RA	1	405827	JBT	EET SEA	10/03/22 20:51
Total/NA	Analysis	RSK-175	DL	4	265491	DU6U	EET CAL 4	09/20/22 14:15
Total/NA	Analysis	300.0		1	404536	JHR	EET SEA	09/15/22 16:43
Total/NA	Analysis	300.0		1	404544	JHR	EET SEA	09/15/22 16:43
Total/NA	Analysis	SM 5310D		1	269618	UAPD	EET CAL 4	10/03/22 17:22

Client Sample ID: T4S1MW03s-091422-0
Lab Sample ID: 580-117910-3
Date Collected: 09/14/22 12:00
Matrix: Water
Date Received: 09/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	405162	TL1	EET SEA	09/27/22 19:51
Total/NA	Analysis	RSK-175		1	265491	DU6U	EET CAL 4	09/20/22 14:59
Total/NA	Analysis	300.0		1	404536	JHR	EET SEA	09/15/22 16:55
Total/NA	Analysis	300.0		1	404544	JHR	EET SEA	09/15/22 16:55
Total/NA	Analysis	SM 5310D		1	269618	UAPD	EET CAL 4	10/03/22 17:46

Client Sample ID: T4S1MW09-091422-0
Lab Sample ID: 580-117910-4
Date Collected: 09/14/22 13:20
Matrix: Water
Date Received: 09/15/22 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	405162	TL1	EET SEA	09/27/22 20:15
Total/NA	Analysis	RSK-175		1	265491	DU6U	EET CAL 4	09/20/22 15:34
Total/NA	Analysis	300.0		1	404536	JHR	EET SEA	09/15/22 17:07
Total/NA	Analysis	300.0		1	404544	JHR	EET SEA	09/15/22 17:07
Total/NA	Analysis	SM 5310D		1	269618	UAPD	EET CAL 4	10/03/22 18:09

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117910-1

Client Sample ID: TB-091422

Date Collected: 09/14/22 08:00
Date Received: 09/15/22 09:30

Lab Sample ID: 580-117910-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	404955	JBT	EET SEA	09/27/22 02:25

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-117910-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-08-23

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	02-02-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117910-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-117910-1	MW03-091422-0	Water	09/14/22 09:15	09/15/22 09:30
580-117910-2	MW02-091422-0	Water	09/14/22 10:40	09/15/22 09:30
580-117910-3	T4S1MW03s-091422-0	Water	09/14/22 12:00	09/15/22 09:30
580-117910-4	T4S1MW09-091422-0	Water	09/14/22 13:20	09/15/22 09:30
580-117910-5	TB-091422	Water	09/14/22 08:00	09/15/22 09:30

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-50461-15861.2
Client Contact: Laura Tochko	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page ~~2 of 3~~ 1 OF 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:
Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested: STD			
City: Portland	TAT Requested (days): 14 DAYS			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300_0_28D, 300_48HR	RSK_175 - Methane	SM5310D - Total Organic Carbon	8260D_LL - (MOD) Volatiles, standard list, low level	Total Number of containers	Special Instructions/Note:
				Preservation Code:	X	X	N	A	S	A	X	
MW03-091422-0	9/14/22	0915	G	Water	N	N	X	X	X	X	8	
MW02-091422-0	↓	1040	↓	Water	↓	↓	↓	↓	↓	↓	↓	
T4S1MW03S-091422-0	↓	1200	↓	Water	↓	↓	↓	↓	↓	↓	↓	
T4S1MW09-091422-0	↓	1320	↓	Water	↓	↓	↓	↓	↓	↓	↓	
TB-091422	↓	0800	↓	Water	↓	↓				↓	2	
				Water								
				Water								
				Water								
				Water								
				Water								
				Water								

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA

M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
LAURA TOCHKO (signature)	9/14/22 1445	JACOBS	(signature)	9/15/22 0930	EETSEA
Relinquished by	Date/Time	Company	Received by	Date/Time	Company
Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks:

Therm. ID: A2 Cor: 1.4 ° Unc: 0.8 °
Cooler Dsc: LGB
Packing: Bub
Cust. Seal: Yes / No
Blue Ice, Wet, Dry, None
FedEx: PO
UPS:
Lab Cour: PO
Other:

Ver: 06/08/2021

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-109038 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-117910-1
Address: 2841 Dow Avenue Suite 100	Due Date Requested: 10/5/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA, 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note:
			Preservation Code:							
MW03-091422-0 (580-117910-1)	9/14/22	09 15 Pacific		Water			X	X	4	
MW02-091422-0 (580-117910-2)	9/14/22	10 40 Pacific		Water			X	X	4	
T4S1MW03s-091422-0 (580-117910-3)	9/14/22	12:00 Pacific		Water			X	X	4	
T4S1MW09-091422-0 (580-117910-4)	9/14/22	13.20 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon out subcontract laboratories This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I II III IV Other (specify) Primary Deliverable Rank. 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date:	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	9/16/22 1523	EETN			
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
				9/17/22 1045	EC
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No	Custody Seal No: 1781835	Cooler Temperature(s) °C and Other Remarks: 2.4/2.4-12

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117910-1

Login Number: 117910
List Number: 1
Creator: Presley, Kim A

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117910-1

Login Number: 117910
List Number: 2
Creator: Ortiz-Luis, Michael

List Source: Eurofins Calscience
List Creation: 09/18/22 05:14 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	1781835
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	2.4
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

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ANALYTICAL REPORT

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-117973-1
Client Project/Site: Northwest Pipe Company GW 2022

For:
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Attn: Bernice Kidd

Authorized for release by:
10/9/2022 9:21:06 PM

Pauline Matlock, Project Manager
(253)922-2310
Pauline.Matlock@et.eurofinsus.com

Table of Contents

Job ID: 580-117973-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-117973-1

Comments
No additional comments.

Receipt
The samples were received on 9/16/2022 9:30 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 3.3º C.

GC/MS VOA
Method 8260D: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW01-091522-0 (580-117973-1), MW04-091522-0 (580-117973-2), MW06-091522-0 (580-117973-3), MW05-091522-0 (580-117973-4) and MW100-091522-0 (580-117973-5). Elevated reporting limits (RLs) are provided.

Method 8260D: The continuing calibration verification (CCV) associated with batch 580-404333 recovered outside acceptance criteria, low biased, for 1,1-Dichloroethene and Vinyl chloride. A reporting limit (RL) standard was analyzed, and the target analytes are detected. Since the associated samples were non-detect for the analytes, the data are reported.

Method 8260D: The CCV associated with analytical batch 580-405162 was outside of control limits high for Vinyl chloride. The following samples contained detections for Vinyl Chloride: MW01-091522-0 (580-117973-1) and MW04-091522-0 (580-117973-2). Re-analysis was performed outside of analytical holding time, therefore ,all data is reported.

Method 8260D: The following sample contained potential carry over for Trichloroethene: MW06-091522-0 (580-117973-3). Re-analysis was performed outside of analytical holding time, therefore, all data is reported.

Method 8260D: The following samples contain results outside of calibration range for Tetrachloroethene, cis-1,2-Dichloroethene, and Trichloroethene: MW05-091522-0 (580-117973-4) and MW100-091522-0 (580-117973-5). Re-analysis was performed outside of analytical holding time, therefore, all data is reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

VOA Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117973-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
E	Result exceeded calibration range.
H	Sample was prepped or analyzed beyond the specified holding time

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117973-1

Client Sample ID: MW01-091522-0

Date Collected: 09/15/22 08:55
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-1

Matrix: Water

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	74		1.0	0.28	ug/L			09/27/22 21:28	5
Tetrachloroethene	210		1.0	0.42	ug/L			09/27/22 21:28	5
Trichloroethene	21		1.0	0.33	ug/L			09/27/22 21:28	5
Vinyl chloride	2.9		0.10	0.065	ug/L			09/27/22 21:28	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*		*09/27/22 21:28*	*5*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*09/27/22 21:28*	*5*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*09/27/22 21:28*	*5*
Toluene-d8 (Surr)	*104*		*80 - 120*		*09/27/22 21:28*	*5*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	3.9	H	0.10	0.065	ug/L			10/03/22 21:15	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*		*10/03/22 21:15*	*5*
4-Bromofluorobenzene (Surr)	*84*		*80 - 120*		*10/03/22 21:15*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*10/03/22 21:15*	*5*
Toluene-d8 (Surr)	*97*		*80 - 120*		*10/03/22 21:15*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	26		1.0	0.11	ug/L			09/21/22 16:44	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	2.9		1.5	0.43	mg/L			09/17/22 01:55	1
NO3 as N (MCAWW 300.0)	3.3		0.20	0.030	mg/L			09/17/22 01:55	1
Sulfate (MCAWW 300.0)	18		1.5	0.80	mg/L			09/17/22 01:55	1
Carbon, Total Organic (SM 5310D)	1.4		0.50	0.26	mg/L			10/01/22 06:55	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117973-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW04-091522-0
Lab Sample ID: 580-117973-2
Date Collected: 09/15/22 10:15
Matrix: Water
Date Received: 09/16/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	44		1.0	0.28	ug/L			09/27/22 21:52	5
Tetrachloroethene	2.8		1.0	0.42	ug/L			09/27/22 21:52	5
Trichloroethene	6.0		1.0	0.33	ug/L			09/27/22 21:52	5
Vinyl chloride	11		0.10	0.065	ug/L			09/27/22 21:52	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*09/27/22 21:52*	*5*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*09/27/22 21:52*	*5*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*09/27/22 21:52*	*5*
Toluene-d8 (Surr)	*104*		*80 - 120*		*09/27/22 21:52*	*5*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Vinyl chloride	12	H	0.10	0.065	ug/L			10/03/22 21:39	5

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*80 - 120*		*10/03/22 21:39*	*5*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*10/03/22 21:39*	*5*
Dibromofluoromethane (Surr)	*102*		*80 - 120*		*10/03/22 21:39*	*5*
Toluene-d8 (Surr)	*102*		*80 - 120*		*10/03/22 21:39*	*5*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	110		1.0	0.11	ug/L			09/21/22 17:10	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	15		1.5	0.43	mg/L			09/17/22 02:07	1
NO3 as N (MCAWW 300.0)	ND		0.20	0.030	mg/L			09/17/22 02:07	1
Sulfate (MCAWW 300.0)	3.0		1.5	0.80	mg/L			09/17/22 02:07	1
Carbon, Total Organic (SM 5310D)	1.4		0.50	0.26	mg/L			10/01/22 07:19	1

Client Sample ID: MW06-091522-0
Lab Sample ID: 580-117973-3

Date Collected: 09/15/22 11:45
Matrix: Water
Date Received: 09/16/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	**190**		10	2.8	ug/L			09/29/22 21:08	50
Tetrachloroethene	**230**		10	4.2	ug/L			09/29/22 21:08	50
Trichloroethene	**48**		10	3.3	ug/L			09/29/22 21:08	50
Vinyl chloride	ND		1.0	0.65	ug/L			09/29/22 21:08	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*09/29/22 21:08*	*50*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*09/29/22 21:08*	*50*
Dibromofluoromethane (Surr)	*105*		*80 - 120*		*09/29/22 21:08*	*50*
Toluene-d8 (Surr)	*99*		*80 - 120*		*09/29/22 21:08*	*50*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Trichloroethene	**57**	**H**	10	3.3	ug/L			10/03/22 22:28	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*10/03/22 22:28*	*50*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*10/03/22 22:28*	*50*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*10/03/22 22:28*	*50*
Toluene-d8 (Surr)	*97*		*80 - 120*		*10/03/22 22:28*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**36**		1.0	0.11	ug/L			09/21/22 17:52	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	**2.8**		1.5	0.43	mg/L			09/17/22 02:19	1
NO3 as N (MCAWW 300.0)	ND		0.20	0.030	mg/L			09/17/22 02:19	1
Sulfate (MCAWW 300.0)	**22**		1.5	0.80	mg/L			09/17/22 02:19	1
Carbon, Total Organic (SM 5310D)	**1.6**		0.50	0.26	mg/L			10/01/22 07:42	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117973-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW05-091522-0
Lab Sample ID: 580-117973-4
Date Collected: 09/15/22 13:00
Matrix: Water
Date Received: 09/16/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	1200		10	2.8	ug/L			09/29/22 21:32	50
Tetrachloroethene	2600	E	10	4.2	ug/L			09/29/22 21:32	50
Trichloroethene	180		10	3.3	ug/L			09/29/22 21:32	50
Vinyl chloride	61		1.0	0.65	ug/L			09/29/22 21:32	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*		*09/29/22 21:32*	*50*
4-Bromofluorobenzene (Surr)	*87*		*80 - 120*		*09/29/22 21:32*	*50*
Dibromofluoromethane (Surr)	*100*		*80 - 120*		*09/29/22 21:32*	*50*
Toluene-d8 (Surr)	*97*		*80 - 120*		*09/29/22 21:32*	*50*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Tetrachloroethene	2600	H	20	8.4	ug/L			10/03/22 23:16	100

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*80 - 120*		*10/03/22 23:16*	*100*
4-Bromofluorobenzene (Surr)	*88*		*80 - 120*		*10/03/22 23:16*	*100*
Dibromofluoromethane (Surr)	*100*		*80 - 120*		*10/03/22 23:16*	*100*
Toluene-d8 (Surr)	*100*		*80 - 120*		*10/03/22 23:16*	*100*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	350		1.0	0.11	ug/L			09/21/22 19:01	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	5.0		1.5	0.43	mg/L			09/17/22 02:30	1
NO3 as N (MCAWW 300.0)	0.90		0.20	0.030	mg/L			09/17/22 02:30	1
Sulfate (MCAWW 300.0)	7.7		1.5	0.80	mg/L			09/17/22 02:30	1
Carbon, Total Organic (SM 5310D)	1.2		0.50	0.26	mg/L			10/01/22 08:06	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117973-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW100-091522-0
Lab Sample ID: 580-117973-5

Date Collected: 09/15/22 12:00
Matrix: Water
Date Received: 09/16/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	290	E	0.20	0.055	ug/L			09/29/22 20:44	1
Tetrachloroethene	240	E	0.20	0.084	ug/L			09/29/22 20:44	1
Trichloroethene	68	E	0.20	0.066	ug/L			09/29/22 20:44	1
Vinyl chloride	3.8		0.020	0.013	ug/L			09/29/22 20:44	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*89*		*80 - 120*		*09/29/22 20:44*	*1*
4-Bromofluorobenzene (Surr)	*85*		*80 - 120*		*09/29/22 20:44*	*1*
Dibromofluoromethane (Surr)	*106*		*80 - 120*		*09/29/22 20:44*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*09/29/22 20:44*	*1*

Method: SW846 8260D - Volatile Organic Compounds by GC/MS - RA

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	210	H	10	2.8	ug/L			10/03/22 22:52	50
Tetrachloroethene	210	H	10	4.2	ug/L			10/03/22 22:52	50
Trichloroethene	61	H	10	3.3	ug/L			10/03/22 22:52	50

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*95*		*80 - 120*		*10/03/22 22:52*	*50*
4-Bromofluorobenzene (Surr)	*86*		*80 - 120*		*10/03/22 22:52*	*50*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*10/03/22 22:52*	*50*
Toluene-d8 (Surr)	*102*		*80 - 120*		*10/03/22 22:52*	*50*

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	18		1.0	0.11	ug/L			09/21/22 19:47	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	2.8		1.5	0.43	mg/L			09/17/22 03:41	1
NO3 as N (MCAWW 300.0)	ND		0.20	0.030	mg/L			09/17/22 03:41	1
Sulfate (MCAWW 300.0)	23		1.5	0.80	mg/L			09/17/22 03:41	1
Carbon, Total Organic (SM 5310D)	1.5		0.50	0.26	mg/L			10/01/22 08:29	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-117973-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: TB-091522
Lab Sample ID: 580-117973-6
Date Collected: 09/15/22 08:00
Matrix: Water
Date Received: 09/16/22 09:30

Method: SW846 8260D - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/20/22 03:14	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/20/22 03:14	1
Trichloroethene	ND		0.20	0.066	ug/L			09/20/22 03:14	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/20/22 03:14	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*110*		*80 - 120*		*09/20/22 03:14*	*1*
4-Bromofluorobenzene (Surr)	*93*		*80 - 120*		*09/20/22 03:14*	*1*
Dibromofluoromethane (Surr)	*107*		*80 - 120*		*09/20/22 03:14*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*09/20/22 03:14*	*1*

Method: 8260D - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-404333/6
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/20/22 01:59	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/20/22 01:59	1
Trichloroethene	ND		0.20	0.066	ug/L			09/20/22 01:59	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/20/22 01:59	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*108*		*80 - 120*		*09/20/22 01:59*	*1*
4-Bromofluorobenzene (Surr)	*95*		*80 - 120*		*09/20/22 01:59*	*1*
Dibromofluoromethane (Surr)	*103*		*80 - 120*		*09/20/22 01:59*	*1*
Toluene-d8 (Surr)	*108*		*80 - 120*		*09/20/22 01:59*	*1*

Lab Sample ID: LCS 580-404333/3
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.06		ug/L		101	72 - 120
Tetrachloroethene	5.00	4.89		ug/L		98	75 - 124
Trichloroethene	5.00	5.01		ug/L		100	72 - 120
Vinyl chloride	5.00	2.95		ug/L		59	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*97*		*80 - 120*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*94*		*80 - 120*
Toluene-d8 (Surr)	*105*		*80 - 120*

Lab Sample ID: LCSD 580-404333/4
Matrix: Water
Analysis Batch: 404333

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	5.03		ug/L		101	72 - 120	1	22
Tetrachloroethene	5.00	4.89		ug/L		98	75 - 124	0	20
Trichloroethene	5.00	4.97		ug/L		99	72 - 120	1	22
Vinyl chloride	5.00	3.44		ug/L		69	41 - 150	16	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*96*		*80 - 120*
4-Bromofluorobenzene (Surr)	*98*		*80 - 120*
Dibromofluoromethane (Surr)	*93*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-405162/6
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/27/22 14:11	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/27/22 14:11	1
Trichloroethene	ND		0.20	0.066	ug/L			09/27/22 14:11	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/27/22 14:11	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*80 - 120*		*09/27/22 14:11*	*1*
4-Bromofluorobenzene (Surr)	*92*		*80 - 120*		*09/27/22 14:11*	*1*
Dibromofluoromethane (Surr)	*104*		*80 - 120*		*09/27/22 14:11*	*1*
Toluene-d8 (Surr)	*99*		*80 - 120*		*09/27/22 14:11*	*1*

Lab Sample ID: LCS 580-405162/3
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.88		ug/L		98	72 - 120
Tetrachloroethene	5.00	5.18		ug/L		104	75 - 124
Trichloroethene	5.00	4.26		ug/L		85	72 - 120
Vinyl chloride	5.00	5.80		ug/L		116	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*80 - 120*
4-Bromofluorobenzene (Surr)	*97*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-405162/4
Matrix: Water
Analysis Batch: 405162

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.68		ug/L		94	72 - 120	4	22
Tetrachloroethene	5.00	5.18		ug/L		104	75 - 124	0	20
Trichloroethene	5.00	4.34		ug/L		87	72 - 120	2	22
Vinyl chloride	5.00	5.71		ug/L		114	41 - 150	2	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*80 - 120*
4-Bromofluorobenzene (Surr)	*101*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-405508/6
Matrix: Water
Analysis Batch: 405508

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			09/29/22 17:07	1
Tetrachloroethene	ND		0.20	0.084	ug/L			09/29/22 17:07	1
Trichloroethene	ND		0.20	0.066	ug/L			09/29/22 17:07	1
Vinyl chloride	ND		0.020	0.013	ug/L			09/29/22 17:07	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*90*		*80 - 120*		*09/29/22 17:07*	*1*
4-Bromofluorobenzene (Surr)	*90*		*80 - 120*		*09/29/22 17:07*	*1*
Dibromofluoromethane (Surr)	*101*		*80 - 120*		*09/29/22 17:07*	*1*
Toluene-d8 (Surr)	*100*		*80 - 120*		*09/29/22 17:07*	*1*

Lab Sample ID: LCS 580-405508/3
Matrix: Water
Analysis Batch: 405508

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	4.90		ug/L		98	72 - 120
Tetrachloroethene	5.00	5.31		ug/L		106	75 - 124
Trichloroethene	5.00	4.59		ug/L		92	72 - 120
Vinyl chloride	5.00	5.42		ug/L		108	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*96*		*80 - 120*
Toluene-d8 (Surr)	*102*		*80 - 120*

Lab Sample ID: LCSD 580-405508/4
Matrix: Water
Analysis Batch: 405508

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.82		ug/L		96	72 - 120	2	22
Tetrachloroethene	5.00	5.02		ug/L		100	75 - 124	6	20
Trichloroethene	5.00	4.47		ug/L		89	72 - 120	3	22
Vinyl chloride	5.00	5.49		ug/L		110	41 - 150	1	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*97*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: 8260D - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: MB 580-405827/6
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
cis-1,2-Dichloroethene	ND		0.20	0.055	ug/L			10/03/22 15:35	1
Tetrachloroethene	ND		0.20	0.084	ug/L			10/03/22 15:35	1
Trichloroethene	ND		0.20	0.066	ug/L			10/03/22 15:35	1
Vinyl chloride	ND		0.020	0.013	ug/L			10/03/22 15:35	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*103*		*80 - 120*		*10/03/22 15:35*	*1*
4-Bromofluorobenzene (Surr)	*85*		*80 - 120*		*10/03/22 15:35*	*1*
Dibromofluoromethane (Surr)	*108*		*80 - 120*		*10/03/22 15:35*	*1*
Toluene-d8 (Surr)	*101*		*80 - 120*		*10/03/22 15:35*	*1*

Lab Sample ID: LCS 580-405827/3
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
cis-1,2-Dichloroethene	5.00	5.07		ug/L		101	72 - 120
Tetrachloroethene	5.00	5.48		ug/L		110	75 - 124
Trichloroethene	5.00	5.03		ug/L		101	72 - 120
Vinyl chloride	5.00	5.53		ug/L		111	41 - 150

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*91*		*80 - 120*
4-Bromofluorobenzene (Surr)	*103*		*80 - 120*
Dibromofluoromethane (Surr)	*93*		*80 - 120*
Toluene-d8 (Surr)	*104*		*80 - 120*

Lab Sample ID: LCSD 580-405827/4
Matrix: Water
Analysis Batch: 405827

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
cis-1,2-Dichloroethene	5.00	4.73		ug/L		95	72 - 120	7	22
Tetrachloroethene	5.00	5.35		ug/L		107	75 - 124	3	20
Trichloroethene	5.00	4.29		ug/L		86	72 - 120	16	22
Vinyl chloride	5.00	5.83		ug/L		117	41 - 150	5	32

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*93*		*80 - 120*
4-Bromofluorobenzene (Surr)	*100*		*80 - 120*
Dibromofluoromethane (Surr)	*101*		*80 - 120*
Toluene-d8 (Surr)	*103*		*80 - 120*

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-266045/4
Matrix: Water
Analysis Batch: 266045

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			09/21/22 10:47	1

Lab Sample ID: LCS 570-266045/2
Matrix: Water
Analysis Batch: 266045

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	12.0		ug/L		93	80 - 120

Lab Sample ID: LCSD 570-266045/3
Matrix: Water
Analysis Batch: 266045

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	12.3		ug/L		95	80 - 120	2	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-404567/14
Matrix: Water
Analysis Batch: 404567

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			09/17/22 01:20	1
Sulfate	ND		1.5	0.80	mg/L			09/17/22 01:20	1

Lab Sample ID: LCS 580-404567/15
Matrix: Water
Analysis Batch: 404567

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	52.0		mg/L		104	90 - 110
Sulfate	50.0	50.8		mg/L		102	90 - 110

Lab Sample ID: LCSD 580-404567/16
Matrix: Water
Analysis Batch: 404567

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	52.1		mg/L		104	90 - 110	0	15
Sulfate	50.0	50.9		mg/L		102	90 - 110	0	15

Lab Sample ID: 580-117973-4 MS
Matrix: Water
Analysis Batch: 404567

Client Sample ID: MW05-091522-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	5.0		50.0	58.1		mg/L		106	90 - 110
Sulfate	7.7		50.0	61.9		mg/L		108	90 - 110

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 580-117973-4 MSD
Matrix: Water
Analysis Batch: 404567

Client Sample ID: MW05-091522-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	5.0		50.0	58.2		mg/L		106	90 - 110	0	15
Sulfate	7.7		50.0	61.9		mg/L		108	90 - 110	0	15

Lab Sample ID: MB 580-404572/3
Matrix: Water
Analysis Batch: 404572

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			09/17/22 01:20	1

Lab Sample ID: LCS 580-404572/4
Matrix: Water
Analysis Batch: 404572

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	5.00	5.08		mg/L		102	90 - 110

Lab Sample ID: LCSD 580-404572/5
Matrix: Water
Analysis Batch: 404572

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	5.00	5.09		mg/L		102	90 - 110	0	15

Lab Sample ID: 580-117973-4 MS
Matrix: Water
Analysis Batch: 404572

Client Sample ID: MW05-091522-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec Limits
NO3 as N	0.90		5.00	5.93		mg/L		101	90 - 110

Lab Sample ID: 580-117973-4 MSD
Matrix: Water
Analysis Batch: 404572

Client Sample ID: MW05-091522-0
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N	0.90		5.00	5.94		mg/L		101	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-269211/3
Matrix: Water
Analysis Batch: 269211

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			09/30/22 22:13	1

Method: SM 5310D - Organic Carbon, Total (TOC) (Continued)

Lab Sample ID: LCS 570-269211/4
Matrix: Water
Analysis Batch: 269211

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon, Total Organic			5.03	4.90		mg/L		97	85 - 115		

Lab Sample ID: LCSD 570-269211/5
Matrix: Water
Analysis Batch: 269211

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	4.96		mg/L		99	85 - 115	1	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117973-1

Client Sample ID: MW01-091522-0
Date Collected: 09/15/22 08:55
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	405162	TL1	EET SEA	09/27/22 21:28
Total/NA	Analysis	8260D	RA	5	405827	JBT	EET SEA	10/03/22 21:15
Total/NA	Analysis	RSK-175		1	266045	DU6U	EET CAL 4	09/21/22 16:44
Total/NA	Analysis	300.0		1	404567	JHR	EET SEA	09/17/22 01:55
Total/NA	Analysis	300.0		1	404572	JHR	EET SEA	09/17/22 01:55
Total/NA	Analysis	SM 5310D		1	269211	UAPD	EET CAL 4	10/01/22 06:55

Client Sample ID: MW04-091522-0
Date Collected: 09/15/22 10:15
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		5	405162	TL1	EET SEA	09/27/22 21:52
Total/NA	Analysis	8260D	RA	5	405827	JBT	EET SEA	10/03/22 21:39
Total/NA	Analysis	RSK-175		1	266045	DU6U	EET CAL 4	09/21/22 17:10
Total/NA	Analysis	300.0		1	404567	JHR	EET SEA	09/17/22 02:07
Total/NA	Analysis	300.0		1	404572	JHR	EET SEA	09/17/22 02:07
Total/NA	Analysis	SM 5310D		1	269211	UAPD	EET CAL 4	10/01/22 07:19

Client Sample ID: MW06-091522-0
Date Collected: 09/15/22 11:45
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		50	405508	JBT	EET SEA	09/29/22 21:08
Total/NA	Analysis	8260D	RA	50	405827	JBT	EET SEA	10/03/22 22:28
Total/NA	Analysis	RSK-175		1	266045	DU6U	EET CAL 4	09/21/22 17:52
Total/NA	Analysis	300.0		1	404567	JHR	EET SEA	09/17/22 02:19
Total/NA	Analysis	300.0		1	404572	JHR	EET SEA	09/17/22 02:19
Total/NA	Analysis	SM 5310D		1	269211	UAPD	EET CAL 4	10/01/22 07:42

Client Sample ID: MW05-091522-0
Date Collected: 09/15/22 13:00
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		50	405508	JBT	EET SEA	09/29/22 21:32
Total/NA	Analysis	8260D	RA	100	405827	JBT	EET SEA	10/03/22 23:16
Total/NA	Analysis	RSK-175		1	266045	DU6U	EET CAL 4	09/21/22 19:01
Total/NA	Analysis	300.0		1	404567	JHR	EET SEA	09/17/22 02:30
Total/NA	Analysis	300.0		1	404572	JHR	EET SEA	09/17/22 02:30
Total/NA	Analysis	SM 5310D		1	269211	UAPD	EET CAL 4	10/01/22 08:06

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117973-1

Client Sample ID: MW100-091522-0

Date Collected: 09/15/22 12:00
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	405508	JBT	EET SEA	09/29/22 20:44
Total/NA	Analysis	8260D	RA	50	405827	JBT	EET SEA	10/03/22 22:52
Total/NA	Analysis	RSK-175		1	266045	DU6U	EET CAL 4	09/21/22 19:47
Total/NA	Analysis	300.0		1	404567	JHR	EET SEA	09/17/22 03:41
Total/NA	Analysis	300.0		1	404572	JHR	EET SEA	09/17/22 03:41
Total/NA	Analysis	SM 5310D		1	269211	UAPD	EET CAL 4	10/01/22 08:29

Client Sample ID: TB-091522

Date Collected: 09/15/22 08:00
Date Received: 09/16/22 09:30

Lab Sample ID: 580-117973-6

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	8260D		1	404333	JBT	EET SEA	09/20/22 03:14

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-117973-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-08-23

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	02-02-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-117973-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-117973-1	MW01-091522-0	Water	09/15/22 08:55	09/16/22 09:30
580-117973-2	MW04-091522-0	Water	09/15/22 10:15	09/16/22 09:30
580-117973-3	MW06-091522-0	Water	09/15/22 11:45	09/16/22 09:30
580-117973-4	MW05-091522-0	Water	09/15/22 13:00	09/16/22 09:30
580-117973-5	MW100-091522-0	Water	09/15/22 12:00	09/16/22 09:30
580-117973-6	TB-091522	Water	09/15/22 08:00	09/16/22 09:30

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-50461-15861.1
Client Contact: Laura Tochko	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 1
Company: Jacobs Engineering Group, Inc.	PWSID:	Analysis Requested		Job #:
Address: 2020 SW Fourth Ave. 3rd Floor	Due Date Requested: STD			Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify), Other:
City: Portland	TAT Requested (days): 14			
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No			
Phone: 530-229-3203(Tel)	PO #: 3600021519			
Email: Laura.Tochko@jacobs.com	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D; 300_48HR	RSK_175 - Methane	SM5310D - Total Organic Carbon	8260D_LL - (MOD) Volatiles, standard list, low leve	Total Number of containers	Special Instructions/Note:
			Preservation Code:		X	X	N	A	S	A	X	
MW01-091522-D	9/15/22	0855	G	Water	N	N	X	X	X	X	3	
MW04-091522-D		1015		Water								
MW06-091522-D		1145		Water								
MW05-091522-D		1300		Water								
MW100-091522-D		1200		Water								
TB-091522		0800		Water							4	
				Water								
				Water								
				Water								
				Water								
				Water								

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by	Date/Time	Company	Received by	Date/Time	Company
LAURA TOCHKO	9/15/22 1445	JACOBS		9/16/22 0930	CR
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:		ipany	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:
		A3 - 3.3/3.2

580-117973 Chain of Custody

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424
Phone. 253-922-2310

Chain of Custody Record

eurofins Environment Testing America

Client Information (Sub Contract Lab)	Sampler	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-109122 1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: Eurofins Environment Testing Southwest,		Accreditations Required (See note): NELAP - Oregon		Job #: 580-117973-1
Address: 2841 Dow Avenue Suite 100	Due Date Requested: 10/6/2022			
City: Tustin	TAT Requested (days):			
State, Zip: CA 92780				
Phone: 714-895-5494(Tel)	PO #:			
Email	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	RSK_175/ Methane	SM5310D/ Total Organic Carbon	Total Number of containers	Special Instructions/Note
			Preservation Code.							
MW01-091522-0 (580-117973-1)	9/15/22	08 55 Pacific		Water			X	X	4	
MW04-091522-0 (580-117973-2)	9/15/22	10 15 Pacific		Water			X	X	4	
MW06-091522-0 (580-117973-3)	9/15/22	11 45 Pacific		Water			X	X	4	
MW05-091522-0 (580-117973-4)	9/15/22	13:00 Pacific		Water			X	X	4	
MW100-091522-0 (580-117973-5)	9/15/22	12.00 Pacific		Water			X	X	4	

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method analyte & accreditation compliance upon out subcontract laboratories. This sample shipment is forwarded under chain-of-custody If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately If all requested accreditations are current to date, return the signed Chain of Custody attesting to said complicance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)***
Unconfirmed	☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested I, II III IV Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements

Empty Kit Relinquished by:	Date	Time	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	9/19/22			9/20/22 1000	FE
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact. Δ Yes Δ No	Custody Seal No	Cooler Temperature(s) °C and Other Remarks.
		0 7/1.0 IR SC4

Ver: 06/08/2021

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117973-1

Login Number: 117973
List Number: 1
Creator: Presley, Kim A

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-117973-1

Login Number: 117973
List Number: 2
Creator: Ornelas, Olga

List Source: Eurofins Calscience
List Creation: 09/20/22 04:34 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	N/A	Not Present
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

December 2022

eurofins | Environment Testing

ANALYTICAL REPORT

PREPARED FOR

Attn: Bernice Kidd
Jacobs Engineering Group, Inc.
2525 Airpark Drive
Redding, California 96001

Generated 1/12/2023 11:33:25 AM

JOB DESCRIPTION

Northwest Pipe Company GW 2022

JOB NUMBER

580-120855-1

Eurofins Seattle
5755 8th Street East
Tacoma WA 98424

See page two for job notes and contact information.

Eurofins Seattle

Job Notes

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The data in the report relate to the field sample(s) as received by the laboratory and associated QC. All results have been reviewed and have been found to be compliant with laboratory and accreditation requirements, with the exception of the noted deviation(s). For questions, please contact the Project Manager.

The test results in this report relate only to the samples as received by the laboratory and will meet all requirements of the methodology, with any exceptions noted. This report shall not be reproduced except in full, without the express written approval of the laboratory. All questions should be directed to the Eurofins Environment Testing Northwest, LLC Project Manager.

Authorization

Generated
1/12/2023 11:33:25 AM

Authorized for release by
Pauline Matlock, Project Manager
Pauline.Matlock@et.eurofinsus.com
(253)922-2310

Table of Contents

Job ID: 580-120855-1

Laboratory: Eurofins Seattle

Narrative

Job Narrative
580-120855-1

Comments
No additional comments.

Receipt
The samples were received on 12/7/2022 11:50 AM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.9º C.

Receipt Exceptions
The following samplewas received; however, it was not listed on the Sub Chain-of-Custody (COC): TB-120622 (580-120855-5)

Air Toxics
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

General Chemistry
Method 300.0: The following samples were analyzed outside of preparation holding time due to inclement logistic weather issues: MW100-120622-0 (580-120855-4) and (580-120880-A-3 MSD).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Subcontract non-Sister
See attached subcontract report.

Definitions/Glossary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-120855-1

Qualifiers

General Chemistry

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Client Sample Results

Client: Jacobs Engineering Group, Inc.
Job ID: 580-120855-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW10-120622-0
Lab Sample ID: 580-120855-1

Date Collected: 12/06/22 10:05
Matrix: Water
Date Received: 12/07/22 11:50

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**1000**		4.0	0.44	ug/L			12/15/22 15:01	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	**2.3**		1.5	0.43	mg/L			12/08/22 03:56	1
NO3 as N (MCAWW 300.0)	ND		0.20	0.030	mg/L			12/08/22 03:56	1
Sulfate (MCAWW 300.0)	**2.1**		1.5	0.80	mg/L			12/08/22 03:56	1
Carbon, Total Organic (SM 5310D)	**2.5**		0.50	0.26	mg/L			12/28/22 23:36	1

Client: Jacobs Engineering Group, Inc.
Job ID: 580-120855-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW11-120622-0
Lab Sample ID: 580-120855-2
Date Collected: 12/06/22 12:10
Matrix: Water
Date Received: 12/07/22 11:50

Method: RSK-175 - Dissolved Gases (GC) - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	1100		4.0	0.44	ug/L			12/15/22 15:57	4

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	3.5		1.5	0.43	mg/L			12/08/22 06:05	1
NO3 as N (MCAWW 300.0)	0.076	J	0.20	0.030	mg/L			12/08/22 06:05	1
Sulfate (MCAWW 300.0)	4.1		1.5	0.80	mg/L			12/08/22 06:05	1
Carbon, Total Organic (SM 5310D)	1.4		0.50	0.26	mg/L			12/28/22 23:58	1

Client Sample Results

Client: Jacobs Engineering Group, Inc.
Job ID: 580-120855-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW12-120622-0
Lab Sample ID: 580-120855-3
Date Collected: 12/06/22 13:35
Matrix: Water
Date Received: 12/07/22 11:50

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	330		1.0	0.11	ug/L			12/15/22 16:25	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	4.6		1.5	0.43	mg/L			12/08/22 06:52	1
NO3 as N (MCAWW 300.0)	0.44		0.20	0.030	mg/L			12/08/22 06:52	1
Sulfate (MCAWW 300.0)	7.2		1.5	0.80	mg/L			12/08/22 06:52	1
Carbon, Total Organic (SM 5310D)	1.4		0.50	0.26	mg/L			12/29/22 00:21	1

Client Sample Results

Client: Jacobs Engineering Group, Inc.
Job ID: 580-120855-1
Project/Site: Northwest Pipe Company GW 2022

Client Sample ID: MW100-120622-0
Lab Sample ID: 580-120855-4
Date Collected: 12/06/22 12:00
Matrix: Water
Date Received: 12/07/22 11:50

Method: RSK-175 - Dissolved Gases (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	**410**		1.0	0.11	ug/L			12/15/22 16:54	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride (MCAWW 300.0)	**2.3**		1.5	0.43	mg/L			12/09/22 21:10	1
NO3 as N (MCAWW 300.0)	ND	H	0.20	0.030	mg/L			12/09/22 21:10	1
Sulfate (MCAWW 300.0)	**2.3**		1.5	0.80	mg/L			12/09/22 21:10	1
Carbon, Total Organic (SM 5310D)	**2.4**		0.50	0.26	mg/L			12/29/22 00:43	1

Method: RSK-175 - Dissolved Gases (GC)

Lab Sample ID: MB 570-289277/4
Matrix: Water
Analysis Batch: 289277

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Methane	ND		1.0	0.11	ug/L			12/15/22 11:39	1

Lab Sample ID: LCS 570-289277/2
Matrix: Water
Analysis Batch: 289277

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Methane	12.9	12.4		ug/L		96	80 - 120

Lab Sample ID: LCSD 570-289277/3
Matrix: Water
Analysis Batch: 289277

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Methane	12.9	11.4		ug/L		88	80 - 120	8	20

Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 580-412524/3
Matrix: Water
Analysis Batch: 412524

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			12/08/22 02:58	1
Sulfate	ND		1.5	0.80	mg/L			12/08/22 02:58	1

Lab Sample ID: LCS 580-412524/4
Matrix: Water
Analysis Batch: 412524

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits
Chloride	50.0	50.7		mg/L		101	90 - 110
Sulfate	50.0	49.9		mg/L		100	90 - 110

Lab Sample ID: LCSD 580-412524/5
Matrix: Water
Analysis Batch: 412524

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride	50.0	50.7		mg/L		101	90 - 110	0	15
Sulfate	50.0	49.9		mg/L		100	90 - 110	0	15

Lab Sample ID: MB 580-412528/3
Matrix: Water
Analysis Batch: 412528

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			12/08/22 02:58	1

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCS 580-412528/4
Matrix: Water
Analysis Batch: 412528

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
NO3 as N			5.00	4.92		mg/L		98	90 - 110		

Lab Sample ID: LCSD 580-412528/5
Matrix: Water
Analysis Batch: 412528

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N			5.00	4.92		mg/L		98	90 - 110	0	15

Lab Sample ID: MB 580-412821/4
Matrix: Water
Analysis Batch: 412821

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.5	0.43	mg/L			12/09/22 15:42	1
Sulfate	ND		1.5	0.80	mg/L			12/09/22 15:42	1

Lab Sample ID: LCS 580-412821/1
Matrix: Water
Analysis Batch: 412821

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Chloride			50.0	50.6		mg/L		101	90 - 110		
Sulfate			50.0	49.7		mg/L		99	90 - 110		

Lab Sample ID: LCSD 580-412821/5
Matrix: Water
Analysis Batch: 412821

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Chloride			50.0	50.6		mg/L		101	90 - 110	0	15
Sulfate			50.0	49.7		mg/L		99	90 - 110	0	15

Lab Sample ID: MB 580-412822/3
Matrix: Water
Analysis Batch: 412822

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
NO3 as N	ND		0.20	0.030	mg/L			12/09/22 15:42	1

Lab Sample ID: LCS 580-412822/4
Matrix: Water
Analysis Batch: 412822

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
NO3 as N			5.00	4.91		mg/L		98	90 - 110		

Method: 300.0 - Anions, Ion Chromatography (Continued)

Lab Sample ID: LCSD 580-412822/5
Matrix: Water
Analysis Batch: 412822

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
NO3 as N			5.00	4.91		mg/L		98	90 - 110	0	15

Method: SM 5310D - Organic Carbon, Total (TOC)

Lab Sample ID: MB 570-292190/62
Matrix: Water
Analysis Batch: 292190

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Carbon, Total Organic	ND		0.50	0.26	mg/L			12/28/22 14:26	1

Lab Sample ID: LCS 570-292190/63
Matrix: Water
Analysis Batch: 292190

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec Limits		
Carbon, Total Organic			5.03	5.15		mg/L		102	85 - 115		

Lab Sample ID: LCSD 570-292190/64
Matrix: Water
Analysis Batch: 292190

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec Limits	RPD	RPD Limit
Carbon, Total Organic			5.03	4.98		mg/L		99	85 - 115	3	20

Lab Chronicle

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-120855-1

Client Sample ID: MW10-120622-0
Date Collected: 12/06/22 10:05
Date Received: 12/07/22 11:50

Lab Sample ID: 580-120855-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	RSK-175	DL	4	289277	I9H5	EET CAL 4	12/15/22 15:01
Total/NA	Analysis	300.0		1	412524	JHR	EET SEA	12/08/22 03:56
Total/NA	Analysis	300.0		1	412528	JHR	EET SEA	12/08/22 03:56
Total/NA	Analysis	SM 5310D		1	292190	UAPD	EET CAL 4	12/28/22 23:36

Client Sample ID: MW11-120622-0
Date Collected: 12/06/22 12:10
Date Received: 12/07/22 11:50

Lab Sample ID: 580-120855-2
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	RSK-175	DL	4	289277	I9H5	EET CAL 4	12/15/22 15:57
Total/NA	Analysis	300.0		1	412524	JHR	EET SEA	12/08/22 06:05
Total/NA	Analysis	300.0		1	412528	JHR	EET SEA	12/08/22 06:05
Total/NA	Analysis	SM 5310D		1	292190	UAPD	EET CAL 4	12/28/22 23:58

Client Sample ID: MW12-120622-0
Date Collected: 12/06/22 13:35
Date Received: 12/07/22 11:50

Lab Sample ID: 580-120855-3
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	RSK-175		1	289277	I9H5	EET CAL 4	12/15/22 16:25
Total/NA	Analysis	300.0		1	412524	JHR	EET SEA	12/08/22 06:52
Total/NA	Analysis	300.0		1	412528	JHR	EET SEA	12/08/22 06:52
Total/NA	Analysis	SM 5310D		1	292190	UAPD	EET CAL 4	12/29/22 00:21

Client Sample ID: MW100-120622-0
Date Collected: 12/06/22 12:00
Date Received: 12/07/22 11:50

Lab Sample ID: 580-120855-4
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Analyst	Lab	Prepared or Analyzed
Total/NA	Analysis	RSK-175		1	289277	I9H5	EET CAL 4	12/15/22 16:54
Total/NA	Analysis	300.0		1	412821	JHR	EET SEA	12/09/22 21:10
Total/NA	Analysis	300.0		1	412822	JHR	EET SEA	12/09/22 21:10
Total/NA	Analysis	SM 5310D		1	292190	UAPD	EET CAL 4	12/29/22 00:43

Laboratory References:

EET CAL 4 = Eurofins Calscience Tustin, 2841 Dow Avenue, Tustin, CA 92780, TEL (714)895-5494

EET SEA = Eurofins Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

EMAX Lab. = EMAX Laboratories Inc, 3051 Fujita Street, Torrance, CA 90505

Accreditation/Certification Summary

Client: Jacobs Engineering Group, Inc. Job ID: 580-120855-1
Project/Site: Northwest Pipe Company GW 2022

Laboratory: Eurofins Seattle

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4167	07-08-23

Laboratory: Eurofins Calscience

The accreditations/certifications listed below are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Oregon	NELAP	4175	02-02-23

Sample Summary

Client: Jacobs Engineering Group, Inc.
Project/Site: Northwest Pipe Company GW 2022

Job ID: 580-120855-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-120855-1	MW10-120622-0	Water	12/06/22 10:05	12/07/22 11:50
580-120855-2	MW11-120622-0	Water	12/06/22 12:10	12/07/22 11:50
580-120855-3	MW12-120622-0	Water	12/06/22 13:35	12/07/22 11:50
580-120855-4	MW100-120622-0	Water	12/06/22 12:00	12/07/22 11:50
580-120855-5	TB-120622	Water	12/06/22 08:00	12/07/22 11:50

EMAX LABORATORIES, INC.
3051 Fujita Street
Torrance, CA 90505
Tel: (310)-618-8889

Date: 01-06-2023
EMAX Batch No.: 22L157

Attn: Pauline M. Matlock

TestAmerica, Inc.
5755 8th Street East
Tacoma WA 98424

Subject: Laboratory Report
Project: NW PIPE COMPANY GW MONITORING

Enclosed is the Laboratory report for samples received on 12/09/22.
The data reported relate only to samples listed below :

Sample ID	Control #	Col Date	Matrix	Analysis
MW10-120622-0	L157-01	12/06/22	WATER	VOC SIM
MW11-120622-0	L157-02	12/06/22	WATER	VOC SIM
MW12-120622-0	L157-03	12/06/22	WATER	VOC SIM
MW100-120622-0	L157-04	12/06/22	WATER	VOC SIM
TB-120622	L157-05	12/06/22	WATER	VOC SIM

The results are summarized on the following pages.

Please feel free to call if you have any questions concerning
these results.

Sincerely yours,

Caspar J. Pang
Laboratory Director

EMAX certifies that results included in this report meets all TNI & DOD requirements unless noted in the Case Narrative.

NELAP Accredited Certificate Number CA002912022-22
ANAB Accredited DoD ELAP and ISO/IEC 17025 Certificate Number L2278 Testing
California ELAP Accredited Certificate Number 2672

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins | Environment Testing

22L157

1/12/2023

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-112657.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: Oregon	Page: Page 1 of 1
Company: EMAX Laboratories Inc		Accreditations Required (See note): NELAP - Oregon		Job #: 580-120855-1
Address: 3051 Fujita Street, ,	Due Date Requested: 12/30/2022			
City: Torrance	TAT Requested (days):			
State, Zip: CA, 90505				
Phone:	PO #:			
Email:	WO #:			
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730			
Site:	SSOW#:			

Analysis Requested

Preservation Codes:

A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)

Other:

	Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	SUB (8260_LL to EMAX)/ 8260_LL to EMAX	Total Number of containers	Special Instructions/Note:
				Preservation Code:						
1	MW10-120622-0 (580-120855-1)	12/6/22	10:05 Pacific		Water			X	1	See Attached Instructions
2	MW11-120622-0 (580-120855-2)	12/6/22	12:10 Pacific		Water			X	1	See Attached Instructions
3	MW12-120622-0 (580-120855-3)	12/6/22	13:35 Pacific		Water			X	1	See Attached Instructions
4	MW100-120622-0 (580-120855-4)	12/6/22	12:00 Pacific		Water			X	1	See Attached Instructions
5	TB-120622 (580-120855-5)	12/6/22	08:00 Pacific		Water			X	1	See Attached Instructions

Note: Since laboratory accreditations are subject to change, Eurofins Environment Testing Northwest, LLC places the ownership of method, analyte & accreditation compliance upon our subcontract laboratories. This sample shipment is forwarded under chain-of-custody. If the laboratory does not currently maintain accreditation in the State of Origin listed above for analysis/tests/matrix being analyzed, the samples must be shipped back to the Eurofins Environment Testing Northwest, LLC laboratory or other instructions will be provided. Any changes to accreditation status should be brought to Eurofins Environment Testing Northwest, LLC attention immediately. If all requested accreditations are current to date, return the signed Chain of Custody attesting to said compliance to Eurofins Environment Testing Northwest, LLC.

Possible Hazard Identification *Unconfirmed*	***Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)*** ☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For* _____ *Months*
Deliverable Requested: I, II, III, IV, Other (specify) Primary Deliverable Rank: 2	Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by:	Date/Time: 12/08/22 1502	Company EEN	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time: 12/09/22 09:45	Company EMAX
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks:

Ver: 06/08/2021

Temp 2.2

EMAX LABORATORIES, INC.

REFERENCE: EMAX-SM02 Rev. 12

SAMPLE RECEIPT FORM 1

Type of Delivery	Airbill / Tracking Number	ECN 221157
☑ Fedex ☐ UPS ☐ GSO ☐ Others	616445940276	Recipient Jocelyne Solis-Ramos
☐ EMAX Courier ☐ Client Delivery		Date 12/09/22 Time 09:45

COC INSPECTION

☑ Client Name	☑ Client PM/FC	☐ Sampler Name	☑ Sampling Date/Time	☑ Sample ID	☑ Matrix
☑ Address	☐ Tel # / Fax #	☐ Courier Signature	☑ Analysis Required	☐ Preservative (if any)	☑ TAT
Safety Issues (if any)	☐ High concentrations expected	☐ From Superfund Site	☐ Rad screening required		

Note: _____

PACKAGING INSPECTION

Container	☑ Cooler	☐ Box	☐ Other		
Condition	☐ Custody Seal	☐ Intact	☐ Damaged		
Packaging	☑ Bubble Pack	☐ Styrofoam	☐ Popcorn	☐ Sufficient	☐ _____
Temperatures (Cool, ≤6 °C but not frozen)	☑ Cooler 1 2.8 °C	☐ Cooler 2 _____ °C	☐ Cooler 3 _____ °C	☐ Cooler 4 _____ °C	☐ Cooler 5 _____ °C
	☐ Cooler 6 _____ °C	☐ Cooler 7 _____ °C	☐ Cooler 8 _____ °C	☐ Cooler 9 _____ °C	☐ Cooler 10 _____ °C
Thermometer:	*A - S/N* _____	*B - S/N* 210760237	*C - S/N* _____	*D - S/N* 210760272	

Comments: ☐ **Temperature is out of range. PM was informed IMMEDIATELY.**

Note: _____

DISCREPANCIES

LabSampleID	LabSampleContainerID	Code	ClientSample Label ID / Information	Corrective Action
1-5		D16		FOLLOW STICKER

☐ pH holding time requirement for water samples is 15 mins. Water samples for pH analysis are received beyond 15 minutes from sampling time.

NOTES/OBSERVATIONS:

SAMPLE MATRIX IS DRINKING WATER? ☐ YES ☐ NO

LEGEND:

☐ Continue to next page.

Code	Description- Sample Management
D1	Analysis is not indicated in _____
D2	Analysis mismatch COC vs label
D3	Sample ID mismatch COC vs label
D4	Sample ID is not indicated in _____
D5	Container -[improper] [leaking] [broken]
D6	Date/Time is not indicated in _____
D7	Date/Time mismatch COC vs label
D8	Sample listed in COC is not received
D9	Sample received is not listed in COC
D10	No initial/date on corrections in COC/label
D11	Container count mismatch COC vs received
D12	Container size mismatch COC vs received

Code	Description-Sample Management
D13	Out of Holding Time
D14	Bubble is >6mm
D15	No trip blank in cooler
D16	Preservation not indicated in COC
D17	Preservation mismatch COC vs label
D18	Insufficient chemical preservative
D19	Insufficient Sample
D20	No filtration info for dissolved analysis
D21	No sample for moisture determination
D22	_____
D23	_____
D24	_____

Code	Description-Sample Management
R1	Proceed as indicated in ☐ COC ☐ Label
R2	Refer to attached instruction
R3	Cancel the analysis
R4	Use vial with smallest bubble first
R5	Log-in with latest sampling date and time+1 min
R6	Adjust pH as necessary
R7	Filter and preserved as necessary
R8	_____
R9	_____
R10	_____
R11	_____
R12	_____

REVIEWS:

Sample Labeling Jocelyne Solis-Ramos Date 12/09/22

SRF _____ Date 12/9/22

PM LA for RS Date 12/21/22

ORIGIN ID:TCMA (253) 922-2310
SAMPLE RECEIVING
EUROFINS FRONTIER GLOBAL- SEATTLE
5755 8TH ST E

FIFE, WA 98424
UNITED STATES US

SHIP DATE: 08DEC22
ACTWGT: 1.00 LB
CAD: 989746/CAFE3616

BILL SENDER

TO **SHIPPING/RECEIVING**
EMAX LABORATORIES INC
3051 FUJITA STREET

TORRANCE CA 90505
(253) 922-2310 REF: S580-51940
PO: NO

FedEx Express

TRK# 0201 **6164 8594 0276**

FRI - 09 DEC 10:30A
PRIORITY OVERNIGHT

92 HHRA

90505
CA-US **LAX**

Part # 159471-434 MTW EXP 08/23

REPORTING CONVENTIONS

DATA QUALIFIERS:

Lab Qualifier	AFCEE Qualifier	Description
J	F	Indicates that the analyte is positively identified and the result is less than RL but greater than MDL.
N		Indicates presumptive evidence of a compound.
B	B	Indicates that the analyte is found in the associated method blank as well as in the sample at above QC level.
E	J	Indicates that the result is above the maximum calibration range or estimated value.
*	*	Out of QC limit.

Note: The above qualifiers are used to flag the results unless the project requires a different set of qualification criteria.

ACRONYMS AND ABBREVIATIONS:

CRDL	Contract Required Detection Limit
RL	Reporting Limit
MRL	Method Reporting Limit
PQL	Practical Quantitation Limit
MDL	Method Detection Limit
DO	Diluted out

DATES

The date and time information for leaching and preparation reflect the beginning date and time of the procedure unless the method, protocol, or project specifically requires otherwise.

LABORATORY REPORT FOR

TESTAMERICA, INC.

NW PIPE COMPANY GW MONITORING

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

SDG#: 22L157

CASE NARRATIVE

Client : TESTAMERICA, INC.

Project: NW PIPE COMPANY GW MONITORING

SDG : 22L157

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

A total of five(5) water samples were received on 12/09/22 to be analyzed for Volatile Organics by GC/MS SIM in accordance with Method SW5030B/8260B SIM and project specific requirements.

Holding Time
Samples were analyzed within the prescribed holding time.

Instrument Performance and Calibration
Instrument tune check was performed prior to calibration. Result was within acceptance criteria. Multi-calibration points were generated to establish initial calibration (ICAL). ICAL was verified using secondary source (ICV). Continuing calibration (CCV) was carried out at a frequency required by the project. There was one(1)CCV associated with this SDG. Target analytes in CCV(Data File ID: RLP409) were within calibration acceptance criteria. All calibration requirements were satisfied. Refer to calibration summary forms of ICAL, ICV and CCV for details.

Method Blank
Method blank was prepared and analyzed at the frequency required by the project. For this SDG, one(1) method blank was analyzed. V002L22B - result was compliant to project requirement. Refer to sample result summary form for details.

Lab Control Sample
Lab control sample was prepared and analyzed at a frequency required by the project. For this SDG, one(1) set of LCS/LCD was analyzed. V002L22L/V002L22C were within LCS limits. Refer to LCS summary form for details.

Matrix QC Sample
No matrix QC sample was provided on this SDG.

Surrogate
Surrogates were added on QC and field samples. All surrogate recoveries were within QC limits. Refer to sample result summary forms for details.

Sample Analysis
Samples were analyzed according to prescribed analytical procedures. Results were evaluated in accordance to project requirements. For this SDG, all quality control requirements were met.

LAB CHRONICLE
VOLATILE ORGANICS BY GC/MS SIM

Client : TESTAMERICA, INC.
Project : NW PIPE COMPANY GW MONITORING

SDG NO. : 22L157
Instrument ID : 02

WATER

Client Sample ID	Laboratory Sample ID	Dilution Factor	% Moist	Analysis DateTime	Extraction DateTime	Sample Data FN	Calibration Data FN	Prep. Batch	Notes
LCS1W	V002L22L	1	NA	12/20/2213:39	12/20/2213:39	RLP410	RKP055	V002L22	Lab Control Sample (LCS)
LCD1W	V002L22C	1	NA	12/20/2214:04	12/20/2214:04	RLP411	RKP055	V002L22	LCS Duplicate
MBLK1W	V002L22B	1	NA	12/20/2214:29	12/20/2214:29	RLP412	RKP055	V002L22	Method Blank
580-120855-5	22L157-05	1	NA	12/20/2214:53	12/20/2214:53	RLP413	RKP055	V002L22	Field Sample
580-120855-1	22L157-01	1	NA	12/20/2215:18	12/20/2215:18	RLP414	RKP055	V002L22	Field Sample
580-120855-2	22L157-02	1	NA	12/20/2215:43	12/20/2215:43	RLP415	RKP055	V002L22	Field Sample
580-120855-3	22L157-03	1	NA	12/20/2216:08	12/20/2216:08	RLP416	RKP055	V002L22	Field Sample
580-120855-4	22L157-04	1	NA	12/20/2216:33	12/20/2216:33	RLP417	RKP055	V002L22	Field Sample
580-120855-2	22L157-02I	10	NA	12/20/2217:23	12/20/2217:23	RLP419	RKP055	V002L22	Diluted Sample
580-120855-3	22L157-03I	10	NA	12/20/2217:48	12/20/2217:48	RLP420	RKP055	V002L22	Diluted Sample

FN - Filename
% Moist - Percent Moisture

SAMPLE RESULTS

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client : TESTAMERICA, INC.	Date Collected: 12/06/22 10:05
Project : NW PIPE COMPANY GW MONITORING	Date Received: 12/09/22
Batch No. : 22L157	Date Extracted: 12/20/22 15:18
Sample ID : 580-120855-1	Date Analyzed: 12/20/22 15:18
Lab Samp ID: 22L157-01	Dilution Factor: 1
Lab File ID: RLP414	Matrix: WATER
Ext Btch ID: VOO2L22	% Moisture: NA
Calib. Ref.: RKP055	Instrument ID: 02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	4.9	0.050	0.020
Vinyl Chloride	0.26	0.050	0.020
Tetrachloroethene	0.024J	0.050	0.020
TCE	0.23	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.432	0.500	86	70-130
4-Bromofluorobenzene	0.501	0.500	100	70-130
Toluene-d8	0.498	0.500	100	70-130

Notes:
Sample Amount : 25ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 12:10
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 15:43
Sample ID	: 580-120855-2	Date Analyzed:	12/20/22 15:43
Lab Samp ID:	22L157-02	Dilution Factor:	1
Lab File ID:	RLP415	Matrix:	WATER
Ext Btch ID:	VOO2L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	20E	0.050	0.020
Vinyl Chloride	25E	0.050	0.020
Tetrachloroethene	1.8	0.050	0.020
TCE	0.70	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.445	0.500	89	70-130
4-Bromofluorobenzene	0.509	0.500	102	70-130
Toluene-d8	0.499	0.500	100	70-130

Notes:
Sample Amount : 25ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 12:10
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 17:23
Sample ID	: 580-120855-2	Date Analyzed:	12/20/22 17:23
Lab Samp ID:	22L157-02I	Dilution Factor:	10
Lab File ID:	RLP419	Matrix:	WATER
Ext Btch ID:	VOO2L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	19	0.50	0.20
Vinyl Chloride	19	0.50	0.20
Tetrachloroethene	1.3	0.50	0.20
TCE	0.59	0.50	0.30

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	4.34	5.00	87	70-130
4-Bromofluorobenzene	5.11	5.00	102	70-130
Toluene-d8	4.96	5.00	99	70-130

Notes:
Sample Amount : 2.5ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client : TESTAMERICA, INC.
Project : NW PIPE COMPANY GW MONITORING
Batch No. : 22L157
Sample ID : 580-120855-3
Lab Samp ID: L157-03 #L157-03I
Lab File ID: RLP416 #RLP420
Ext Btch ID: VOO2L22 #VOO2L22
Calib. Ref.: RKP055 #RKP055

Date Collected: 12/06/22 13:35
Date Received: 12/09/22
Date Extracted: 12/20/22 16:08 # 12/20/22 17:48
Date Analyzed: 12/20/22 16:08 # 12/20/22 17:48
Dilution Factor: 1 # 10
Matrix: WATER
% Moisture: NA
Instrument ID: 02 # 02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
# cis-1,2-Dichloroethylene	34	0.50	0.20
# Vinyl Chloride	3.8	0.50	0.20
Tetrachloroethene	2.3	0.050	0.020
TCE	4.4	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.438	0.500	88	70-130
4-Bromofluorobenzene	0.529	0.500	106	70-130
Toluene-d8	0.498	0.500	100	70-130
# 1,2-Dichloroethane-d4	4.36	5.00	87	70-130
# 4-Bromofluorobenzene	5.14	5.00	103	70-130
# Toluene-d8	4.93	5.00	99	70-130

Result(s) associated as marked on the header

Notes:
Sample Amount : 25ml
Prepared by : IRagas
Final Volume : 25ml
Analyzed by : IRagas
Sample Amount : 2.5ml
Prepared by : IRagas
Final Volume : 25ml
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 13:35
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 16:08
Sample ID	: 580-120855-3	Date Analyzed:	12/20/22 16:08
Lab Samp ID:	22L157-03	Dilution Factor:	1
Lab File ID:	RLP416	Matrix:	WATER
Ext Btch ID:	VO02L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	35E	0.050	0.020
Vinyl Chloride	5.5E	0.050	0.020
Tetrachloroethene	2.3	0.050	0.020
TCE	4.4	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.438	0.500	88	70-130
4-Bromofluorobenzene	0.529	0.500	106	70-130
Toluene-d8	0.498	0.500	100	70-130

Notes:
Sample Amount : 25ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 13:35
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 17:48
Sample ID	: 580-120855-3	Date Analyzed:	12/20/22 17:48
Lab Samp ID:	22L157-031	Dilution Factor:	10
Lab File ID:	RLP420	Matrix:	WATER
Ext Btch ID:	VO02L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	34	0.50	0.20
Vinyl Chloride	3.8	0.50	0.20
Tetrachloroethene	1.7	0.50	0.20
TCE	3.6	0.50	0.30

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	4.36	5.00	87	70-130
4-Bromofluorobenzene	5.14	5.00	103	70-130
Toluene-d8	4.93	5.00	99	70-130

Notes:

Sample Amount	: 2.5ml	Final Volume	: 25ml
Prepared by	: IRagas	Analyzed by	: IRagas

Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 12:00
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 16:33
Sample ID	: 580-120855-4	Date Analyzed:	12/20/22 16:33
Lab Samp ID:	22L157-04	Dilution Factor:	1
Lab File ID:	RLP417	Matrix:	WATER
Ext Btch ID:	VQ02L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	4.9	0.050	0.020
Vinyl Chloride	0.26	0.050	0.020
Tetrachloroethene	0.022J	0.050	0.020
TCE	0.22	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.445	0.500	89	70-130
4-Bromofluorobenzene	0.487	0.500	97	70-130
Toluene-d8	0.494	0.500	99	70-130

Notes:
Sample Amount : 25ml Final Volume : 25ml
Prepared by : IRagas Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/06/22 08:00
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/09/22
Batch No.	: 22L157	Date Extracted:	12/20/22 14:53
Sample ID	: 580-120855-5	Date Analyzed:	12/20/22 14:53
Lab Samp ID:	22L157-05	Dilution Factor:	1
Lab File ID:	RLP413	Matrix:	WATER
Ext Btch ID:	V002L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	ND	0.050	0.020
Vinyl Chloride	ND	0.050	0.020
Tetrachloroethene	ND	0.050	0.020
TCE	ND	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.451	0.500	90	70-130
4-Bromofluorobenzene	0.511	0.500	102	70-130
Toluene-d8	0.499	0.500	100	70-130

Notes:
Sample Amount : 25ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

QC SUMMARIES

METHOD SW5030B/8260B SIM
VOLATILE ORGANICS BY GC/MS SIM

Client	: TESTAMERICA, INC.	Date Collected:	12/20/22 14:29
Project	: NW PIPE COMPANY GW MONITORING	Date Received:	12/20/22
Batch No.	: 22L157	Date Extracted:	12/20/22 14:29
Sample ID	: MBLK1W	Date Analyzed:	12/20/22 14:29
Lab Samp ID:	VO02L22B	Dilution Factor:	1
Lab File ID:	RLP412	Matrix:	WATER
Ext Btch ID:	VO02L22	% Moisture:	NA
Calib. Ref.:	RKP055	Instrument ID:	02

PARAMETER(S)	RESULTS (ug/L)	RL (ug/L)	MDL (ug/L)
cis-1,2-Dichloroethylene	ND	0.050	0.020
Vinyl Chloride	ND	0.050	0.020
Tetrachloroethene	ND	0.050	0.020
TCE	ND	0.050	0.030

SURROGATE PARAMETER(S)	RESULT	SPK_AMT	%RECOVERY	QC LIMIT
1,2-Dichloroethane-d4	0.442	0.500	88	70-130
4-Bromofluorobenzene	0.508	0.500	102	70-130
Toluene-d8	0.501	0.500	100	70-130

Notes:
Sample Amount : 25ml
Final Volume : 25ml
Prepared by : IRagas
Analyzed by : IRagas
Detection limits are reported relative to sample result significant figures.

EMAX QUALITY CONTROL DATA
LAB CONTROL SAMPLE ANALYSIS

CLIENT : TESTAMERICA, INC.
PROJECT : NW PIPE COMPANY GW MONITORING
BATCH NO. : 22L157
METHOD : SW5030B/8260B SIM

MATRIX	: WATER		% MOISTURE:NA
DILUTION FACTOR	: 1	1	1
SAMPLE ID	: MBLK1W	LCS1W	LCD1W
LAB SAMPLE ID	: VO02L22B	VO02L22L	VO02L22C
LAB FILE ID	: RLP412	RLP410	RLP411
DATE PREPARED	: 12/20/22 14:29	12/20/22 13:39	12/20/22 14:04
DATE ANALYZED	: 12/20/22 14:29	12/20/22 13:39	12/20/22 14:04
PREP BATCH	: VO02L22	VO02L22	VO02L22
CALIBRATION REF	: RKP055	RKP055	RKP055

ACCESSION:

PARAMETERS	MBResult (ug/L)	SpikeAmt (ug/L)	LCSResult (ug/L)	LCSRec (%)	SpikeAmt (ug/L)	LCDResult (ug/L)	LCDRec (%)	RPD (%)	QCLimit (%)	MaxRPD (%)
cis-1,2-Dichloroethylene	ND	0.500	0.493	99	0.500	0.479	96	3	70-130	20
Vinyl Chloride	ND	0.500	0.519	104	0.500	0.511	102	2	60-140	20
Tetrachloroethene	ND	0.500	0.501	100	0.500	0.503	101	0	70-130	20
TCE	ND	0.500	0.498	100	0.500	0.485	97	3	70-130	20

SURROGATE PARAMETERS	SpikeAmt (ug/L)	LCSResult (ug/L)	LCSRec (%)	SpikeAmt (ug/L)	LCDResult (ug/L)	LCDRec (%)	QCLimit (%)
1,2-Dichloroethane-d4	0.500	0.448	90	0.500	0.428	86	70-130
4-Bromofluorobenzene	0.500	0.500	100	0.500	0.504	101	70-130
Toluene-d8	0.500	0.489	98	0.500	0.496	99	70-130

MB: Method Blank sample LCS: Lab Control Sample LCD: Lab Control Sample Duplicate

Eurofins Seattle
5755 8th Street East
Tacoma, WA 98424
Phone: 253-922-2310

Chain of Custody Record

eurofins
Environment Testing

Client Information	Sampler: LAURA TOCHKO	Lab PM: Matlock, Pauline M	Carrier Tracking No(s):	COC No: 580-51828-15861.1
Client Contact: Laura Tochko	Phone: 425 891 2855	E-Mail: Pauline.Matlock@et.eurofinsus.com	State of Origin: OR	Page: Page 1 of 1
Company: Jacobs Engineering Group, Inc.	PWSID:			Job #:

Address: 2020 SW Fourth Ave, 3rd Floor	Due Date Requested:
City: Portland	TAT Requested (days): STD
State, Zip: OR, 97201	Compliance Project: Δ Yes Δ No
Phone: 530-229-3203(Tel)	PO #: 3600021519
Email: Laura.Tochko@jacobs.com	WO #:
Project Name: Northwest Pipe Company GW 2022	Project #: 58017730
Site:	SSOW#:

Analysis Requested

Preservation Codes:
A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA, M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2O3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - pH 4-5, Y - Trizma, Z - other (specify)
Other:

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	300.0_28D, 300_48HR	RSK_175 - Methane	SM5310D - Total Organic Carbon	8260D_LL - (MOD) Volatiles, standard list, low leve	Total Number of containers	Special Instructions/Note:
			Preservation Code:				N	A	S	A		
MW10-120622-D	12/06/22	1005	G	Water	N	N	X	X	X	X	5	CH4 + VOCs 9DCETHLE
MW11-120622-D		1210		Water							5	
MW12-120622-D		1335		Water							5	
MW100-120622-D		1200		Water							5	
TB-120622		0800		Water							2	

580-120855 Chain of Custody

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
LAURA TOCHKO	12/6/22 1530	JACOBS		12/7/22	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
Relinquished by:	Date/Time:	Company	Received by:		Company

Therm. ID: 13 Cor: 2.9° Unc: 1.8°
Cooler Dsc: Ice
Packing:
Cust. Seal: Yes ___ No ___
Blue Ice, Wet, Dry, None
FedEx:
UPS:
Lab Cour:
Other:

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temp

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-120855-1

Login Number: 120855
List Number: 1
Creator: Holdener, Heather D

List Source: Eurofins Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Login Sample Receipt Checklist

Client: Jacobs Engineering Group, Inc.

Job Number: 580-120855-1

Login Number: 120855
List Number: 2
Creator: Khana, Piyush

List Source: Eurofins Calscience
List Creation: 12/09/22 12:40 PM

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	2072463
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	3.4
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	False	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	False	Received extra samples not listed on COC.
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Appendix B
Data Quality Evaluations

April 2022

Groundwater Data Quality Evaluation for Northwest Pipe Company, Portland, Oregon

PREPARED FOR:	Stephanie Heldt-Sheller/Northwest Pipe Company
PREPARED BY:	Bernice Kidd/Jacobs
REVIEWED BY:	Mark Fesler/Jacobs
REFERENCE:	Northwest Pipe Company GWM Event – April 11 through April 14, 2022
DATE:	June 29, 2022

Introduction

The objective of this data quality evaluation (DQE) is to assess the representativeness and usability of data quality for groundwater quality samples collected to monitor the groundwater at the Northwest Pipe Company. The rationale for monitoring, the data quality objectives (DQOs), and the method for performing this DQE is provided in the *Monitored Natural Attenuation Evaluation Work Plan*, Northwest Pipe Company, Portland Plant, ECSI No. 138, April 2022 (hereafter referred to as the *NWP WP*).

This DQE report is intended as a general data quality assessment designed to summarize data issues and written using guidance from the U.S. Environmental Protection Agency (USEPA) *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a) and USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

Findings

The overall summaries of the data validation findings are contained in Tables 1 through 7 and summarized in the method sections that follow:

- **Table 1**: Sample Chronology – Data Summary. Presents the sample identifiers, methods, sampling dates, received dates, extraction dates, and analysis dates sorted by SDG number.
- **Table 2**: Sample Summary by Chain of Custody – Data Summary. Presents the sample identifiers, sampling dates, and SDG sorted by chain-of-custody (COC) number.
- **Table 3**: Overall Flagging Summary. Presents the number of occurrences for each data validation reason by method.

- **Table 4**: Holding Time – Qualified Data. Presents the data qualified because of holding time criteria exceedances.
- **Table 5**: Field Duplicate Precision – Qualified Data. Presents the data qualified because of field duplicate relative percent difference exceedances.
- **Table 6**: Laboratory Control Sample - Qualified Data. Presents the results that are qualified because of laboratory control sample/laboratory control sample duplicate recovery and relative percent difference exceedances.
- **Table 7**: Site Completeness by Analyte – Qualified Data. Presents the percent completeness by method, analyte, and matrix.

This DQE report includes 13 normal groundwater samples, four trip blanks (TB), and one field duplicate (FD) collected April 11 through April 14,2022. These samples were reported under four sample delivery groups: 580-112511-1, 580-112574-1, 580-112641-1 and 580-112673-1. A list of samples included in this DQE is presented in Table 1. Four methods were used to analyze the groundwater samples and are provided in Table 2. The analyses were performed by Eurofins TestAmerica Laboratory, Seattle, Washington (TAM2) and Eurofins Calscience LLC, Tustin, California (ECL4). Samples were collected and delivered by overnight carrier to TAM2, TAM2 was responsible for shipment of samples to ECL4.

The data were assessed according to the requirements of the *NWP WP* and included a review of:

1. chain of custody documentation;
2. holding-time compliance;
3. required quality control (QC) samples at the specified frequencies;
4. flagging for method blanks and field blanks;
5. laboratory control sample/laboratory control sample duplicates (LCS/LCSD);
6. matrix spike/matrix spike duplicate (MS/MSD) recoveries;

and other method-specific criteria as defined by the *NWP WP*.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags were assigned using the *NFGs* as guidance. These flags, as well as the reason for each flag, are entered into the electronic database and can be found in Table 3. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = the analyte was detected, but the associated numerical value is considered an estimated quantity.
- R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified. No associated value is reported.
- U = the analyte was analyzed for but was not detected above the detection limit.
- UJ = the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Overall Flagging Summary

The overall summaries of the data validation findings are summarized in the following sections. Table 3 provides a flagging summary of overall occurrences for each data validation reason by method.

Temperature

Temperature requirements were met.

Blanks

Method blanks and TBs were analyzed at the required frequency and were free of contamination that affected the sample results.

Holding Times

All holding-time criteria were met with the following exceptions listed in Table 4. Sample T4S1MW09-041122-0 was analyzed approximately 40 minutes outside of the 48-hour holding time for nitrate by Method E300.0A. The associated detected result was qualified as estimated and flagged "J".

Field Duplicates

In accordance with the *NWP WP* one field duplicate (FD) was collected from well MW06, all precision criteria were met with the following exception listed in Table 5. The relative percent difference of vinyl chloride was greater than criteria in the field duplicate set for Method SW8260C. The associated detected results were qualified as estimated and flagged "J".

Laboratory Control Samples

LCS and LCSDs were analyzed at the required frequency and the accuracy and precision criteria were met with the following exception listed in Table 7. The relative percent difference of vinyl chloride was greater than criteria in a LCS/LCSD set for Method SW8260C, associated results are possibly biased. Eight associated detected results were qualified as estimated and flagged "J".

Matrix Spikes

Matrix spikes and matrix spike duplicates were analyzed at the required batch frequency and all accuracy and precision criteria were met.

Chain of Custody

There were no discrepancies.

Overall Assessment

The final activity in the DQE is an assessment of whether the data meets the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process.

The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness was 100 percent for all method/matrix/analyte combinations as shown in Table 7.
2. No data were qualified due to associated blank contamination.
3. A LCS/LCSD relative percent difference exceedance was observed for Method SW8260C; eight results were qualified as estimated.

4. A FD relative percent difference exceedance was observed for Method SW8260C; two results were qualified as estimated.
5. One sample was analyzed outside of holding time for Method E300.0A; one result was qualified as estimated.
6. The precision and accuracy of the data, as measured by field and laboratory QC indicators, demonstrates that the *NWP WP* goals for project use were met.
7. The field crew followed the *NWP WP* and project documents.

Works Cited

Jacobs. 2012. Monitored Natural Attenuation Evaluation Work Plan, Northwest Pipe Company, Portland Plant, ECSI No. 138. April.

U.S. Environmental Protection Agency (USEPA). 2020a. National Functional Guidelines for Organic Superfund Methods Data Review. November.

U.S. Environmental Protection Agency (USEPA). 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. November.

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
TAM2	580-112511-1	T4S1MW03S-041122-0	E300.0A	4/11/2022	4/12/2022		4/13/2022
ECL4		T4S1MW03S-041122-0	RSK-175	4/11/2022	4/12/2022		4/18/2022
		T4S1MW03S-041122-0	SM5310D	4/11/2022	4/12/2022		4/25/2022
TAM2		T4S1MW03S-041122-0	SW8260C	4/11/2022	4/12/2022	4/13/2022	4/13/2022
		T4S1MW09-041122-0	E300.0A	4/11/2022	4/12/2022		4/13/2022
ECL4		T4S1MW09-041122-0	RSK-175	4/11/2022	4/12/2022		4/15/2022
		T4S1MW09-041122-0	SM5310D	4/11/2022	4/12/2022		4/25/2022
TAM2		T4S1MW09-041122-0	SW8260C	4/11/2022	4/12/2022	4/13/2022	4/13/2022
		TB-041122	SW8260C	4/11/2022	4/12/2022	4/13/2022	4/13/2022
	580-112574-1	MW10-041222-0	E300.0A	4/12/2022	4/13/2022		4/13/2022
ECL4		MW10-041222-0	RSK-175	4/12/2022	4/13/2022		4/20/2022
		MW10-041222-0	SM5310D	4/12/2022	4/13/2022		4/24/2022
TAM2		MW10-041222-0	SW8260C	4/12/2022	4/13/2022	4/14/2022	4/14/2022
		MW11-041222-0	E300.0A	4/12/2022	4/13/2022		4/13/2022
ECL4		MW11-041222-0	RSK-175	4/12/2022	4/13/2022		4/20/2022
		MW11-041222-0	SM5310D	4/12/2022	4/13/2022		4/24/2022
TAM2		MW11-041222-0	SW8260C	4/12/2022	4/13/2022	4/13/2022	4/13/2022
		MW11-041222-0	SW8260C	4/12/2022	4/13/2022	4/14/2022	4/14/2022
		MW12-041222-0	E300.0A	4/12/2022	4/13/2022		4/13/2022
ECL4		MW12-041222-0	RSK-175	4/12/2022	4/13/2022		4/20/2022
		MW12-041222-0	SM5310D	4/12/2022	4/13/2022		4/24/2022
TAM2		MW12-041222-0	SW8260C	4/12/2022	4/13/2022	4/13/2022	4/13/2022
		T4S1MW23-041222-0	E300.0A	4/12/2022	4/13/2022		4/13/2022
ECL4		T4S1MW23-041222-0	RSK-175	4/12/2022	4/13/2022		4/20/2022
		T4S1MW23-041222-0	SM5310D	4/12/2022	4/13/2022		4/24/2022
TAM2		T4S1MW23-041222-0	SW8260C	4/12/2022	4/13/2022	4/14/2022	4/14/2022
		TB-041222	SW8260C	4/12/2022	4/13/2022	4/13/2022	4/13/2022
	580-112641-1	MW01-041322-0	E300.0A	4/13/2022	4/14/2022		4/14/2022
ECL4		MW01-041322-0	RSK-175	4/13/2022	4/14/2022		4/22/2022
		MW01-041322-0	SM5310D	4/13/2022	4/14/2022		4/24/2022
TAM2		MW01-041322-0	SW8260C	4/13/2022	4/14/2022	4/18/2022	4/18/2022
		MW01-041322-0	SW8260C	4/13/2022	4/14/2022	4/21/2022	4/21/2022
		MW01-041322-0MS	E300.0A	4/13/2022	4/14/2022		4/14/2022
		MW01-041322-0SD	E300.0A	4/13/2022	4/14/2022		4/14/2022
		MW02-041322-0	E300.0A	4/13/2022	4/14/2022		4/14/2022
ECL4		MW02-041322-0	RSK-175	4/13/2022	4/14/2022		4/25/2022

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ECL4	580-112641-1	MW02-041322-0	SM5310D	4/13/2022	4/14/2022		4/24/2022
TAM2		MW02-041322-0	SW8260C	4/13/2022	4/14/2022	4/18/2022	4/18/2022
		MW02-041322-0	SW8260C	4/13/2022	4/14/2022	4/21/2022	4/21/2022
		MW04-041322-0	E300.0A	4/13/2022	4/14/2022		4/14/2022
ECL4		MW04-041322-0	RSK-175	4/13/2022	4/14/2022		4/22/2022
		MW04-041322-0	SM5310D	4/13/2022	4/14/2022		4/24/2022
TAM2		MW04-041322-0	SW8260C	4/13/2022	4/14/2022	4/18/2022	4/18/2022
		MW04-041322-0	SW8260C	4/13/2022	4/14/2022	4/21/2022	4/21/2022
		T4SIMW22-041322-0	E300.0A	4/13/2022	4/14/2022		4/14/2022
ECL4		T4SIMW22-041322-0	RSK-175	4/13/2022	4/14/2022		4/22/2022
		T4SIMW22-041322-0	SM5310D	4/13/2022	4/14/2022		4/24/2022
TAM2		T4SIMW22-041322-0	SW8260C	4/13/2022	4/14/2022	4/18/2022	4/18/2022
		T4SIMW22-041322-0	SW8260C	4/13/2022	4/14/2022	4/21/2022	4/21/2022
		TB-041322	SW8260C	4/13/2022	4/14/2022	4/18/2022	4/18/2022
	580-112673-1	MW03-041422-0	E300.0A	4/14/2022	4/15/2022		4/15/2022
ECL4		MW03-041422-0	RSK-175	4/14/2022	4/15/2022		4/23/2022
		MW03-041422-0	SM5310D	4/14/2022	4/15/2022		5/7/2022
TAM2		MW03-041422-0	SW8260C	4/14/2022	4/15/2022	4/21/2022	4/21/2022
		MW05-041422-0	E300.0A	4/14/2022	4/15/2022		4/15/2022
ECL4		MW05-041422-0	RSK-175	4/14/2022	4/15/2022		4/24/2022
		MW05-041422-0	SM5310D	4/14/2022	4/15/2022		5/7/2022
TAM2		MW05-041422-0	SW8260C	4/14/2022	4/15/2022	4/22/2022	4/22/2022
		MW06-041422-0	E300.0A	4/14/2022	4/15/2022		4/15/2022
ECL4		MW06-041422-0	RSK-175	4/14/2022	4/15/2022		4/24/2022
		MW06-041422-0	SM5310D	4/14/2022	4/15/2022		5/7/2022
TAM2		MW06-041422-0	SW8260C	4/14/2022	4/15/2022	4/22/2022	4/22/2022
		MW06-041422-0MS	E300.0A	4/14/2022	4/15/2022		4/15/2022
		MW06-041422-0SD	E300.0A	4/14/2022	4/15/2022		4/15/2022
		MW100-041422-0	E300.0A	4/14/2022	4/15/2022		4/15/2022
ECL4		MW100-041422-0	RSK-175	4/14/2022	4/15/2022		4/24/2022
		MW100-041422-0	SM5310D	4/14/2022	4/15/2022		5/7/2022
TAM2		MW100-041422-0	SW8260C	4/14/2022	4/15/2022	4/22/2022	4/22/2022
		TB-041422	SW8260C	4/14/2022	4/15/2022	4/18/2022	4/18/2022

SDG = sample delivery group

ECL4 = Eurofins Calscience LLC

TAM2 = Eurofins TestAmerica Seattle

TABLE 2

Sample Summary by CoC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
580-112511-1	11-Apr-22	WATER	N	T4S1MW03S-041122-0	580-112511-1	TAM2
			N	T4S1MW03S-041122-0	580-112511-1	ECL4
			N	T4S1MW09-041122-0	580-112511-1	ECL4
			N	T4S1MW09-041122-0	580-112511-1	TAM2
			TB	TB-041122	580-112511-1	TAM2
580-112574-1	12-Apr-22	WATER	N	MW10-041222-0	580-112574-1	ECL4
			N	MW10-041222-0	580-112574-1	TAM2
			N	MW11-041222-0	580-112574-1	TAM2
			N	MW11-041222-0	580-112574-1	ECL4
			N	MW12-041222-0	580-112574-1	ECL4
			N	MW12-041222-0	580-112574-1	TAM2
			N	T4S1MW23-041222-0	580-112574-1	ECL4
			N	T4S1MW23-041222-0	580-112574-1	TAM2
			TB	TB-041222	580-112574-1	TAM2
580-112641-1	13-Apr-22	WATER	N	MW01-041322-0	580-112641-1	TAM2
			N	MW01-041322-0	580-112641-1	ECL4
			MS	MW01-041322-0MS	580-112641-1	TAM2
			SD	MW01-041322-0SD	580-112641-1	TAM2
			N	MW02-041322-0	580-112641-1	TAM2
			N	MW02-041322-0	580-112641-1	ECL4
			N	MW04-041322-0	580-112641-1	ECL4
			N	MW04-041322-0	580-112641-1	TAM2
			N	T4SIMW22-041322-0	580-112641-1	ECL4
			N	T4SIMW22-041322-0	580-112641-1	TAM2
			TB	TB-041322	580-112641-1	TAM2
580-112673-1	14-Apr-22	WATER	N	MW03-041422-0	580-112673-1	ECL4
			N	MW03-041422-0	580-112673-1	TAM2
			N	MW05-041422-0	580-112673-1	TAM2
			N	MW05-041422-0	580-112673-1	ECL4
			N	MW06-041422-0	580-112673-1	TAM2

TABLE 2

Sample Summary by CoC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
580-112673-1	14-Apr-22	WATER	N	MW06-041422-0	580-112673-1	ECL4
			MS	MW06-041422-0MS	580-112673-1	TAM2
			SD	MW06-041422-0SD	580-112673-1	TAM2
			FD	MW100-041422-0	580-112673-1	ECL4
			FD	MW100-041422-0	580-112673-1	TAM2
			TB	TB-041422	580-112673-1	TAM2

SDG = Sample delivery group

ECL4 = Eurofins Calscience LLC

TAM2 = Eurofins TestAmerica Seattle

QAQC Type

FD = Field Duplicate

MS = Matrix Spike

N = Normal

SD = Matrix Spike Duplicate

TB = Trip Blank

TABLE 3

Overall Flagging Summary

Method	Matrix	Validation Reason	Qualifier*	Qualifier Type	Number of Affected Analytes
E300.0A	WATER				
Category = HoldingTime		Holding time exceeded			
			J	Other	1
SW8260C	WATER				
Category = FieldDuplicate		Field duplicate RPD criteria exceeded			
			J	Other	2
Category = LaboratoryControlSample		LCS RPD criteria exceeded			
			J	Other	8

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was detected, but the associated numerical value is considered an estimated quantity.

Qualifier Type:

Protocol = Flagging due to contractor/laboratory protocol violations.
Other = Flagging due to sample, matrix, or field issues not related to Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP) protocol.

TABLE 4

Holding Times - Qualified Data

Method	Matrix	Sample Identification	Analyte	Holding Time	Result	Holding Time Qualifier	Criteria	Final Flag*
E300.0A	WATER	T4S1MW09-041122-0						
			Nitrate-N	2 Days	1.5 mg/L	J	HTa>UCL	J

mg/L = milligrams per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was detected, but the associated numerical value is considered an estimated quantity.

Criteria:

HTa>UCL = Holding time exceeded

TABLE 5

Field Duplicate Precision - Qualified Data

Analyte	Sample Identification	Result	Field Duplicate Qualifier*	Criteria	Validation Comments
Method (Matrix): SW8260C (WATER)					
Vinyl Chloride	MW06-041422-0	30 ug/L	J	FD>RPD	35.29 vs 30
	MW100-041422-0	21 ug/L	J	FD>RPD	35.29 vs 30

RPD = relative percent difference

ug/L = micrograms per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was detected, but the associated numerical value is considered an estimated quantity.

Criteria:

FD>RPD = Field duplicate RPD criteria exceeded

TABLE 6

Laboratory Control Sample - Qualified Data

Analyte	Sample Identification / QAQC Type	Result	LCS Qualifier*	LCS Recovery	Criteria
Method (Matrix): SW8260C (WATER)					
Vinyl chloride	MW01-041322-0 / N DL	3.2 ug/L	J	RPD 33 vs 32	LCSRPD
	MW02-041322-0 / N RE	3.6 ug/L	J	RPD 33 vs 32	LCSRPD
	MW03-041422-0 / N	70 ug/L	J	RPD 33 vs 32	LCSRPD
	MW04-041322-0 / N DL	2.5 ug/L	J	RPD 33 vs 32	LCSRPD
	MW05-041422-0 / N	170 ug/L	J	RPD 33 vs 32	LCSRPD
	MW06-041422-0 / N	30 ug/L	J	RPD 33 vs 32	LCSRPD
	MW100-041422-0 / FD	21 ug/L	J	RPD 33 vs 32	LCSRPD
	T4SIMW22-041322-0 / N RE	0.2 ug/L	J	RPD 33 vs 32	LCSRPD

%R = percent recovery

ug/L = micrograms per liter

QAQC Type

N = Normal Environmental Sample
FD = Field Duplicate

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = The analyte was detected, but the associated numerical value is considered an estimated quantity.

Criteria:

LCSRPD = LCS RPD criteria exceeded

TABLE 7

Site Completeness by Analyte - Qualified Data

Method	Analyte	Matrix	Units	Number of Occurrences							Contractor Completeness (%)	Overall Completeness (%)
				Analyses	Detects	Non-detects	Blank Flags	J-Flags	Contractor R-Flags	Total R-Flags		
E300.0A	Chloride	WATER	MG/L	14	14			1			100	100
	Nitrate-N	WATER	MG/L	14	8	6		4			100	100
	Sulfate	WATER	MG/L	14	14						100	100
RSK-175	Methane	WATER	UG/L	14	13	1					100	100
SM5310D	Total Organic Carbon	WATER	MG/L	14	14						100	100
SW8260C	cis-1,2-Dichloroethene	WATER	UG/L	14	12	2					100	100
	Tetrachloroethene (PCE)	WATER	UG/L	14	11	3		1			100	100
	Trichloroethene (TCE)	WATER	UG/L	14	12	2		1			100	100
	Vinyl Chloride	WATER	UG/L	14	12	2		8			100	100

% = Percent
J-Flags = Estimated results
R-Flags = Rejected results
mg/L = milligrams per liter
ug/L = micrograms per liter

June 2022

Groundwater Data Quality Evaluation for Northwest Pipe Company, Portland, Oregon

PREPARED FOR:	Stephanie Heldt-Sheller/Northwest Pipe Company
PREPARED BY:	Bernice Kidd/Jacobs
REVIEWED BY:	Mark Fesler/Jacobs
REFERENCE:	Northwest Pipe Company GWM Event – June 29, 2022
DATE:	August 8, 2022

Introduction

The objective of this data quality evaluation (DQE) is to assess the representativeness and usability of data quality for groundwater quality samples collected to monitor the groundwater at the Northwest Pipe Company. The rationale for monitoring, the data quality objectives (DQOs), and the method for performing this DQE is provided in the *Monitored Natural Attenuation Evaluation Work Plan*, Northwest Pipe Company, Portland Plant, ECSI No. 138, April 2022 (hereafter referred to as the *NWP WP*).

This DQE report is intended as a general data quality assessment designed to summarize data issues and written using guidance from the U.S. Environmental Protection Agency (USEPA) *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a) and USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

Findings

The overall summaries of the data validation findings are contained in Tables 1 through 5 and summarized in the method sections that follow:

- **Table 1**: Sample Chronology – Data Summary. Presents the sample identifiers, methods, sampling dates, received dates, extraction dates, and analysis dates sorted by SDG number.
- **Table 2**: Sample Summary by Chain of Custody – Data Summary. Presents the sample identifiers, sampling dates, and SDG sorted by chain-of-custody (COC) number.
- **Table 3**: Overall Flagging Summary. Presents the number of occurrences for each data validation reason by method.

- **Table 4**: Blank – Qualified Data. Presents the data qualified because of associated blank contamination.
- **Table 5**: Site Completeness by Analyte – Qualified Data. Presents the percent completeness by method, analyte, and matrix.

This DQE report includes three normal groundwater samples, one trip blank (TB), and one field duplicate (FD) collected June 29,2022. These samples were reported under one sample delivery group: 580-115401-1. A list of samples included in this DQE is presented in Table 1. Four methods were used to analyze the groundwater samples and are provided in Table 2. The analyses were performed by Eurofins TestAmerica Laboratory, Seattle, Washington (TAM2) and Eurofins Calscience LLC, Tustin, California (ECL4). Samples were collected and delivered by overnight carrier to TAM2, TAM2 was responsible for shipment of samples to ECL4.

The data were assessed according to the requirements of the *NWP WP* and included a review of:

1. chain of custody documentation;
2. holding-time compliance;
3. required quality control (QC) samples at the specified frequencies;
4. flagging for method blanks and field blanks;
5. laboratory control sample/laboratory control sample duplicates (LCS/LCSD);
6. matrix spike/matrix spike duplicate (MS/MSD) recoveries;

and other method-specific criteria as defined by the *NWP WP*.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags were assigned using the *NFGs* as guidance. These flags, as well as the reason for each flag, are entered into the electronic database and can be found in Table 3. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = the analyte was detected, but the associated numerical value is considered an estimated quantity.
- R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified. No associated value is reported.
- U = the analyte was analyzed for but was not detected above the detection limit.
- UJ = the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Overall Flagging Summary

The overall summaries of the data validation findings are summarized in the following sections. Table 3 provides a flagging summary of overall occurrences for each data validation reason by method.

Temperature

Temperature requirements were met.

Blanks

Method blanks and TBs were analyzed at the required frequency and were free of contamination that affected the sample results with the following exception listed in Table 4:

Trichloroethene was detected less than the reporting limit in a method blank for Method SW8260C. Two associated sample results detected less than five times the blank concentration after correction for dilution, were qualified as not detected and flagged "U".

Holding Times

All holding-time criteria were met.

Field Duplicates

In accordance with the *NWP WP* one field duplicate (FD) was collected from well MW10, all precision criteria were met .

Laboratory Control Samples

LCS and LCSDs were analyzed at the required frequency and the accuracy and precision criteria were met.

Matrix Spikes

Matrix spikes and matrix spike duplicates were analyzed at the required batch frequency and all accuracy and precision criteria were met.

Chain of Custody

There were no discrepancies.

Overall Assessment

The final activity in the DQE is an assessment of whether the data meets the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process.

The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness was 100 percent for all method/matrix/analyte combinations as shown in Table 5.
2. Two results were qualified as not detected due to associated blank contamination for Method SW8260C.
3. The precision and accuracy of the data, as measured by field and laboratory QC indicators, demonstrates that the *NWP WP* goals for project use were met.
4. The field crew followed the *NWP WP* and project documents.

Works Cited

Jacobs. 2012. Monitored Natural Attenuation Evaluation Work Plan, Northwest Pipe Company, Portland Plant, ECSI No. 138. April.

U.S. Environmental Protection Agency (USEPA). 2020a. National Functional Guidelines for Organic Superfund Methods Data Review. November.

U.S. Environmental Protection Agency (USEPA). 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. November.

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
TAM2	580-115401-1	MW100-062922-0	E300.0A	6/29/2022	6/30/2022		6/30/2022
ECL4		MW100-062922-0	RSK-175	6/29/2022	6/30/2022		7/5/2022
		MW100-062922-0	SM5310D	6/29/2022	6/30/2022		7/20/2022
TAM2		MW100-062922-0	SW8260C	6/29/2022	6/30/2022	7/7/2022	7/7/2022
		MW10-062922-0	E300.0A	6/29/2022	6/30/2022		6/30/2022
ECL4		MW10-062922-0	RSK-175	6/29/2022	6/30/2022		7/5/2022
		MW10-062922-0	SM5310D	6/29/2022	6/30/2022		7/20/2022
TAM2		MW10-062922-0	SW8260C	6/29/2022	6/30/2022	7/4/2022	7/4/2022
ECL4		MW10-062922-0MS	SM5310D	6/29/2022	6/30/2022		7/20/2022
		MW10-062922-0SD	SM5310D	6/29/2022	6/30/2022		7/20/2022
TAM2		MW11-062922-0	E300.0A	6/29/2022	6/30/2022		6/30/2022
ECL4		MW11-062922-0	RSK-175	6/29/2022	6/30/2022		7/5/2022
		MW11-062922-0	SM5310D	6/29/2022	6/30/2022		7/20/2022
TAM2		MW11-062922-0	SW8260C	6/29/2022	6/30/2022	7/5/2022	7/5/2022
		MW12-062922-0	E300.0A	6/29/2022	6/30/2022		6/30/2022
ECL4		MW12-062922-0	RSK-175	6/29/2022	6/30/2022		7/5/2022
		MW12-062922-0	SM5310D	6/29/2022	6/30/2022		7/20/2022
TAM2		MW12-062922-0	SW8260C	6/29/2022	6/30/2022	7/4/2022	7/4/2022
		MW12-062922-0MS	E300.0A	6/29/2022	6/30/2022		6/30/2022
		MW12-062922-0SD	E300.0A	6/29/2022	6/30/2022		6/30/2022
		TB-062922	SW8260C	6/29/2022	6/30/2022	7/5/2022	7/5/2022

SDG = sample delivery group

ECL4 = Eurofins Calscience LLC

TAM2 = Eurofins TestAmerica Seattle

TABLE 2

Sample Summary by CoC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
580-115401-1	29-Jun-22	WATER	FD	MW100-062922-0	580-115401-1	TAM2
			FD	MW100-062922-0	580-115401-1	ECL4
			N	MW10-062922-0	580-115401-1	TAM2
			N	MW10-062922-0	580-115401-1	ECL4
			MS	MW10-062922-0MS	580-115401-1	ECL4
			SD	MW10-062922-0SD	580-115401-1	ECL4
			N	MW11-062922-0	580-115401-1	TAM2
			N	MW11-062922-0	580-115401-1	ECL4
			N	MW12-062922-0	580-115401-1	TAM2
			N	MW12-062922-0	580-115401-1	ECL4
			MS	MW12-062922-0MS	580-115401-1	TAM2
			SD	MW12-062922-0SD	580-115401-1	TAM2
			TB	TB-062922	580-115401-1	TAM2

SDG = Sample delivery group

ECL4 = Eurofins Calscience LLC

TAM2 = Eurofins TestAmerica Seattle

QAQC Type

FD = Field Duplicate

MS = Matrix Spike

N = Normal

SD = Matrix Spike Duplicate

TB = Trip Blank

TABLE 3

Overall Flagging Summary

Method	Matrix	Validation Reason	Qualifier*	Qualifier Type	Number of Affected Analytes
SW8260C	WATER				
Category = Blank		Laboratory blank contamination less than the reporting limit			
			U	Protocol	2

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

U = The analyte was analyzed for but was not detected above the detection limit.

Qualifier Type:

Protocol = Flagging due to contractor/laboratory protocol violations.
Other = Flagging due to sample, matrix, or field issues not related to Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP) protocol.

TABLE 4

Blank - Qualified Data

Analyte	Sample Identification	Result	Blank Contamination Qualifier*	Criteria	Comments
Method (Matrix): SW8260C (WATER)					
Trichloroethene (TCE)					
	MW10-062922-0	0.26 ug/L	U	LB<RL	blank target = 0.0691ug/L
	MW11-062922-0	1.1 ug/L	U	LB<RL	blank target = 0.0691ug/L

ug/L = micrograms per liter

Blank target = concentration of field or laboratory blank.

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

U = The analyte was analyzed for but was not detected above the detection limit.

Criteria:

LB<RL = Laboratory blank contamination less than the reporting limit

TABLE 5

Site Completeness by Analyte - Qualified Data

Method	Analyte	Matrix	Units	Number of Occurrences							Contractor Completeness (%)	Overall Completeness (%)
				Analyses	Detects	Non-detects	Blank Flags	J-Flags	Contractor R-Flags	Total R-Flags		
E300.0A	Chloride	WATER	MG/L	4	4						100	100
	Nitrate-N	WATER	MG/L	4	3	1		1			100	100
	Sulfate	WATER	MG/L	4	4						100	100
RSK-175	Carbon dioxide	WATER	UG/L	4	4						100	100
	Methane	WATER	UG/L	4	4						100	100
SM5310D	Total Organic Carbon	WATER	MG/L	4	4						100	100
SW8260C	cis-1,2-Dichloroethene	WATER	UG/L	4	4			2			100	100
	Tetrachloroethene (PCE)	WATER	UG/L	4	4						100	100
	Trichloroethene (TCE)	WATER	UG/L	4	2	2					100	100
	Vinyl Chloride	WATER	UG/L	4	4			2			100	100

% = Percent
J-Flags = Estimated results
R-Flags = Rejected results
mg/L = milligrams per liter
ug/L = micrograms per liter

September 2022

Groundwater Data Quality Evaluation for Northwest Pipe Company, Portland, Oregon

PREPARED FOR:	Stephanie Heldt-Sheller/Northwest Pipe Company
PREPARED BY:	Bernice Kidd/Jacobs
REVIEWED BY:	Mark Fesler/Jacobs
REFERENCE:	Northwest Pipe Company GWM Event – September 13 through September 15, 2022
DATE:	October 20, 2022

Introduction

The objective of this data quality evaluation (DQE) is to assess the representativeness and usability of data quality for groundwater quality samples collected to monitor the groundwater at the Northwest Pipe Company. The rationale for monitoring, the data quality objectives (DQOs), and the method for performing this DQE is provided in the *Monitored Natural Attenuation Evaluation Work Plan*, Northwest Pipe Company, Portland Plant, ECSI No. 138, April 2022 (hereafter referred to as the *NWP WP*).

This DQE report is intended as a general data quality assessment designed to summarize data issues and written using guidance from the U.S. Environmental Protection Agency (USEPA) *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a) and USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

Findings

The overall summaries of the data validation findings are contained in Tables 1 through 7 and summarized in the method sections that follow:

- **Table 1**: Sample Chronology – Data Summary. Presents the sample identifiers, methods, sampling dates, received dates, extraction dates, and analysis dates sorted by SDG number.
- **Table 2**: Sample Summary by Chain of Custody – Data Summary. Presents the sample identifiers, sampling dates, and SDG sorted by chain-of-custody (COC) number.
- **Table 3**: Overall Flagging Summary. Presents the number of occurrences for each data validation reason by method.

- **Table 4**: Blank and Miscellaneous – Qualified Data. Presents the data qualified because of associated blank contamination or other miscellaneous sampling/analytical issues.
- **Table 5**: Field Duplicate Precision – Qualified Data. Presents the data qualified because of field duplicate relative percent difference exceedances.
- **Table 6**: Calibration Criteria - Qualified Data. Presents the results that are qualified because of initial or continuing calibration exceedances.
- **Table 7**: Site Completeness by Analyte – Qualified Data. Presents the percent completeness by method, analyte, and matrix.

This DQE report includes 13 normal groundwater samples, three trip blanks (TB), and one field duplicate (FD) collected September 13 through September 15, 2022. These samples were reported under three sample delivery groups: 580-117879-1, 580-117910-1 and 580-117973-1. A list of samples included in this DQE is presented in Table 1 and Table 2. Four methods were used to analyze the groundwater samples and are provided in Table 1. The analyses were performed by Eurofins TestAmerica Laboratory, Seattle, Washington (TAM2) and Eurofins Calscience LLC, Tustin, California (ECL4). Samples were collected and delivered by overnight carrier to TAM2, TAM2 was responsible for shipment of samples to ECL4.

The data were assessed according to the requirements of the *NWP WP* and included a review of:

1. chain of custody documentation;
2. holding-time compliance;
3. required quality control (QC) samples at the specified frequencies;
4. flagging for method blanks and field blanks;
5. laboratory control sample/laboratory control sample duplicates (LCS/LCSD);
6. matrix spike/matrix spike duplicate (MS/MSD) recoveries;

and other method-specific criteria as defined by the *NWP WP*.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags were assigned using the *NFGs* as guidance. These flags, as well as the reason for each flag, are entered into the electronic database and can be found in Table 3. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = the analyte was detected, but the associated numerical value is considered an estimated quantity.
- R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified. No associated value is reported.
- U = the analyte was analyzed for but was not detected above the detection limit.
- UJ = the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Overall Flagging Summary

The overall summaries of the data validation findings are summarized in the following sections. Table 3 provides a flagging summary of overall occurrences for each data validation reason by method.

Temperature

Temperature requirements were met.

Blanks

Method blanks and TBs were analyzed at the required frequency and were free of contamination that affected the sample results.

Holding Times

All holding-time criteria were met.

Sample Quantitation

The trichloroethene result in sample MW06-091522-0 was noted as having possible carryover contamination for Method SW8260C, the result is possibly biased high. The associated detected result was qualified as estimated and flagged "J". This exception is listed in Table 4.

Field Duplicates

In accordance with the *NWP WP* one field duplicate (FD) was collected from well MW06, all precision criteria were met with the following exception listed in Table 5.

The relative percent differences of cis-1,2-dichloroethene and trichloroethene were greater than criteria in the field duplicate set for Method SW8260C. The associated detected results were qualified as estimated and flagged "J".

The relative percent difference of methane was greater than criteria in the field duplicate set for Method RSK-175. The associated detected results were qualified as estimated and flagged "J".

Laboratory Control Samples

LCS and LCSDs were analyzed at the required frequency and the accuracy and precision criteria were met.

Matrix Spikes

Matrix spikes and matrix spike duplicates were analyzed at the required batch frequency and all accuracy and precision criteria were met.

Calibration

The following results were reported at concentrations greater than the initial calibration range for Method SW8260C because the dilution analysis was performed outside of holding time. The associated results were qualified as estimated and flagged "J".

- cis-1,2-dichloroethene in sample MW100-091522-0
- trichloroethene in sample MW100-091522-0
- tetrachloroethene in samples MW100-091522-0 and MW05-091522-0

The laboratory case narratives noted vinyl chloride was recovered less than the lower control limit in a continuing calibration verifications for Method SW8260C, indicating associated samples results are possibly biased low. One associated nondetected result in sample T4S1MW23-091322-0 was qualified as estimated and flagged "UJ".

The laboratory case narratives noted vinyl chloride was recovered greater than the upper control limit in the continuing calibration verifications for Method SW8260C, indicating associated samples results are possibly biased high. Four associated detected results in samples MW01-091522-0, MW02-091422-0, MW03-091422-0 and MW04-091522-0 were qualified as estimated and flagged "J".

Chain of Custody

There were no discrepancies.

Overall Assessment

The final activity in the DQE is an assessment of whether the data meets the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process.

The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness was 100 percent for all method/matrix/analyte combinations as shown in Table 7.
2. No data were qualified due to associated blank contamination.
3. One sample result was possibly affected by carryover contamination for Method SW8260C; the result was qualified as estimated.
4. A FD relative percent difference exceedance was observed for Methods RSK-175 and SW8260C; six results were qualified as estimated.
5. Four results were reported greater than initial calibration range for Method SW8260C; the results were qualified as estimated.
6. Continuing calibration exceedances were noted in the case narratives for Method SW8260C; five results were qualified as estimated.
7. The precision and accuracy of the data, as measured by field and laboratory QC indicators, demonstrates that the *NWP WP* goals for project use were met.
8. The field crew followed the *NWP WP* and project documents.

Works Cited

Jacobs. 2012. Monitored Natural Attenuation Evaluation Work Plan, Northwest Pipe Company, Portland Plant, ECSI No. 138. April.

U.S. Environmental Protection Agency (USEPA). 2020a. National Functional Guidelines for Organic Superfund Methods Data Review. November.

U.S. Environmental Protection Agency (USEPA). 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. November.

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
TAM2	580-117879-1	MW10-091322-0	E300.0A	9/13/2022	9/14/2022		9/14/2022
ECL4		MW10-091322-0	RSK-175	9/13/2022	9/14/2022		9/22/2022
		MW10-091322-0	SM5310D	9/13/2022	9/14/2022		9/30/2022
TAM2		MW10-091322-0	SW8260C	9/13/2022	9/14/2022	9/20/2022	9/20/2022
		MW10-091322-0	SW8260C	9/13/2022	9/14/2022	9/21/2022	9/21/2022
		MW11-091322-0	E300.0A	9/13/2022	9/14/2022		9/14/2022
ECL4		MW11-091322-0	RSK-175	9/13/2022	9/14/2022		9/22/2022
		MW11-091322-0	SM5310D	9/13/2022	9/14/2022		9/30/2022
TAM2		MW11-091322-0	SW8260C	9/13/2022	9/14/2022	9/19/2022	9/19/2022
		MW11-091322-0	SW8260C	9/13/2022	9/14/2022	9/21/2022	9/21/2022
		MW12-091322-0	E300.0A	9/13/2022	9/14/2022		9/14/2022
ECL4		MW12-091322-0	RSK-175	9/13/2022	9/14/2022		9/22/2022
		MW12-091322-0	SM5310D	9/13/2022	9/14/2022		9/30/2022
TAM2		MW12-091322-0	SW8260C	9/13/2022	9/14/2022	9/20/2022	9/20/2022
		MW12-091322-0	SW8260C	9/13/2022	9/14/2022	9/21/2022	9/21/2022
		T4S1MW22-091322-0	E300.0A	9/13/2022	9/14/2022		9/15/2022
ECL4		T4S1MW22-091322-0	RSK-175	9/13/2022	9/14/2022		9/23/2022
		T4S1MW22-091322-0	SM5310D	9/13/2022	9/14/2022		9/30/2022
TAM2		T4S1MW22-091322-0	SW8260C	9/13/2022	9/14/2022	9/20/2022	9/20/2022
		T4S1MW22-091322-0	SW8260C	9/13/2022	9/14/2022	9/21/2022	9/21/2022
		T4S1MW23-091322-0	E300.0A	9/13/2022	9/14/2022		9/14/2022
ECL4		T4S1MW23-091322-0	RSK-175	9/13/2022	9/14/2022		9/22/2022
		T4S1MW23-091322-0	SM5310D	9/13/2022	9/14/2022		9/30/2022
TAM2		T4S1MW23-091322-0	SW8260C	9/13/2022	9/14/2022	9/20/2022	9/20/2022
		T4S1MW23-091322-0MS	E300.0A	9/13/2022	9/14/2022		9/14/2022
		T4S1MW23-091322-0SD	E300.0A	9/13/2022	9/14/2022		9/14/2022
		TB-091322	SW8260C	9/13/2022	9/14/2022	9/20/2022	9/20/2022
	580-117910-1	MW02-091422-0	E300.0A	9/14/2022	9/15/2022		9/15/2022
ECL4		MW02-091422-0	RSK-175	9/14/2022	9/15/2022		9/20/2022
		MW02-091422-0	SM5310D	9/14/2022	9/15/2022		10/3/2022
TAM2		MW02-091422-0	SW8260C	9/14/2022	9/15/2022	9/27/2022	9/27/2022
		MW02-091422-0	SW8260C	9/14/2022	9/15/2022	10/3/2022	10/3/2022
		MW03-091422-0	E300.0A	9/14/2022	9/15/2022		9/15/2022
ECL4		MW03-091422-0	RSK-175	9/14/2022	9/15/2022		9/20/2022
		MW03-091422-0	SM5310D	9/14/2022	9/15/2022		10/3/2022
TAM2		MW03-091422-0	SW8260C	9/14/2022	9/15/2022	9/27/2022	9/27/2022

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
TAM2	580-117910-1	MW03-091422-0	SW8260C	9/14/2022	9/15/2022	10/3/2022	10/3/2022
		T4S1MW03s-091422-0	E300.0A	9/14/2022	9/15/2022		9/15/2022
ECL4		T4S1MW03s-091422-0	RSK-175	9/14/2022	9/15/2022		9/20/2022
		T4S1MW03s-091422-0	SM5310D	9/14/2022	9/15/2022		10/3/2022
TAM2		T4S1MW03s-091422-0	SW8260C	9/14/2022	9/15/2022	9/27/2022	9/27/2022
		T4S1MW09-091422-0	E300.0A	9/14/2022	9/15/2022		9/15/2022
ECL4		T4S1MW09-091422-0	RSK-175	9/14/2022	9/15/2022		9/20/2022
		T4S1MW09-091422-0	SM5310D	9/14/2022	9/15/2022		10/3/2022
TAM2		T4S1MW09-091422-0	SW8260C	9/14/2022	9/15/2022	9/27/2022	9/27/2022
		T4S1MW09-091422-0MS	E300.0A	9/14/2022	9/15/2022		9/15/2022
		T4S1MW09-091422-0SD	E300.0A	9/14/2022	9/15/2022		9/15/2022
		TB-091422	SW8260C	9/14/2022	9/15/2022	9/27/2022	9/27/2022
	580-117973-1	MW01-091522-0	E300.0A	9/15/2022	9/16/2022		9/17/2022
ECL4		MW01-091522-0	RSK-175	9/15/2022	9/16/2022		9/21/2022
		MW01-091522-0	SM5310D	9/15/2022	9/16/2022		10/1/2022
TAM2		MW01-091522-0	SW8260C	9/15/2022	9/16/2022	9/27/2022	9/27/2022
		MW01-091522-0	SW8260C	9/15/2022	9/16/2022	10/3/2022	10/3/2022
		MW04-091522-0	E300.0A	9/15/2022	9/16/2022		9/17/2022
ECL4		MW04-091522-0	RSK-175	9/15/2022	9/16/2022		9/21/2022
		MW04-091522-0	SM5310D	9/15/2022	9/16/2022		10/1/2022
TAM2		MW04-091522-0	SW8260C	9/15/2022	9/16/2022	9/27/2022	9/27/2022
		MW04-091522-0	SW8260C	9/15/2022	9/16/2022	10/3/2022	10/3/2022
		MW05-091522-0	E300.0A	9/15/2022	9/16/2022		9/17/2022
ECL4		MW05-091522-0	RSK-175	9/15/2022	9/16/2022		9/21/2022
		MW05-091522-0	SM5310D	9/15/2022	9/16/2022		10/1/2022
TAM2		MW05-091522-0	SW8260C	9/15/2022	9/16/2022	9/29/2022	9/29/2022
		MW05-091522-0	SW8260C	9/15/2022	9/16/2022	10/3/2022	10/3/2022
		MW05-091522-0MS	E300.0A	9/15/2022	9/16/2022		9/17/2022
		MW05-091522-0SD	E300.0A	9/15/2022	9/16/2022		9/17/2022
		MW06-091522-0	E300.0A	9/15/2022	9/16/2022		9/17/2022
ECL4		MW06-091522-0	RSK-175	9/15/2022	9/16/2022		9/21/2022
		MW06-091522-0	SM5310D	9/15/2022	9/16/2022		10/1/2022
TAM2		MW06-091522-0	SW8260C	9/15/2022	9/16/2022	9/29/2022	9/29/2022
		MW06-091522-0	SW8260C	9/15/2022	9/16/2022	10/3/2022	10/3/2022
		MW100-091522-0	E300.0A	9/15/2022	9/16/2022		9/17/2022
ECL4		MW100-091522-0	RSK-175	9/15/2022	9/16/2022		9/21/2022

TABLE 1

Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
ECL4	580-117973-1	MW100-091522-0	SM5310D	9/15/2022	9/16/2022		10/1/2022
TAM2		MW100-091522-0	SW8260C	9/15/2022	9/16/2022	9/29/2022	9/29/2022
		MW100-091522-0	SW8260C	9/15/2022	9/16/2022	10/3/2022	10/3/2022
		TB-091522	SW8260C	9/15/2022	9/16/2022	9/20/2022	9/20/2022

SDG = sample delivery group

ECL4 = Eurofins Calscience LLC

TAM2 = Eurofins TestAmerica Seattle

TABLE 2

Sample Summary by CoC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
580-117879-1	13-Sep-22	WATER	N	MW10-091322-0	580-117879-1	ECL4
			N	MW10-091322-0	580-117879-1	TAM2
			N	MW11-091322-0	580-117879-1	ECL4
			N	MW11-091322-0	580-117879-1	TAM2
			N	MW12-091322-0	580-117879-1	ECL4
			N	MW12-091322-0	580-117879-1	TAM2
			N	T4S1MW22-091322-0	580-117879-1	TAM2
			N	T4S1MW22-091322-0	580-117879-1	ECL4
			N	T4S1MW23-091322-0	580-117879-1	ECL4
			N	T4S1MW23-091322-0	580-117879-1	TAM2
			MS	T4S1MW23-091322-0MS	580-117879-1	TAM2
			SD	T4S1MW23-091322-0SD	580-117879-1	TAM2
			TB	TB-091322	580-117879-1	TAM2
580-117910-1	14-Sep-22	WATER	N	MW02-091422-0	580-117910-1	ECL4
			N	MW02-091422-0	580-117910-1	TAM2
			N	MW03-091422-0	580-117910-1	TAM2
			N	MW03-091422-0	580-117910-1	ECL4
			N	T4S1MW03s-091422-0	580-117910-1	TAM2
			N	T4S1MW03s-091422-0	580-117910-1	ECL4
			N	T4S1MW09-091422-0	580-117910-1	ECL4
			N	T4S1MW09-091422-0	580-117910-1	TAM2
			MS	T4S1MW09-091422-0MS	580-117910-1	TAM2
			SD	T4S1MW09-091422-0SD	580-117910-1	TAM2
			TB	TB-091422	580-117910-1	TAM2
580-117973-1	15-Sep-22	WATER	N	MW01-091522-0	580-117973-1	ECL4
			N	MW01-091522-0	580-117973-1	TAM2
			N	MW04-091522-0	580-117973-1	ECL4
			N	MW04-091522-0	580-117973-1	TAM2
			N	MW05-091522-0	580-117973-1	ECL4
			N	MW05-091522-0	580-117973-1	TAM2
			MS	MW05-091522-0MS	580-117973-1	TAM2

TABLE 2

Sample Summary by CoC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
580-117973-1	15-Sep-22	WATER	SD	MW05-091522-0SD	580-117973-1	TAM2
			N	MW06-091522-0	580-117973-1	ECL4
			N	MW06-091522-0	580-117973-1	TAM2
			FD	MW100-091522-0	580-117973-1	TAM2
			FD	MW100-091522-0	580-117973-1	ECL4
			TB	TB-091522	580-117973-1	TAM2

SDG = Sample delivery group
ECL4 = Eurofins Calscience LLC
TAM2 = Eurofins TestAmerica Seattle

QAQC Type
FD = Field Duplicate
MS = Matrix Spike
N = Normal
SD = Matrix Spike Duplicate
TB = Trip Blank

TABLE 3

Overall Flagging Summary

Method	Matrix	Validation Reason	Qualifier*	Qualifier Type	Number of Affected Results
RSK-175	WATER				
Category = FieldDuplicate		Field duplicate RPD criteria exceeded			
			J	Other	2
SW8260C	WATER				
Category = Blank		Miscellaneous			
			J	Other	1
Category = Calibration		Continuing calibration recovery greater than the upper control limit			
			J	Other	4
Category = Calibration		Continuing calibration recovery less than the lower control limit			
			UJ	Other	1
Category = Calibration		Result greater than linear calibration range			
			J	Other	4
Category = FieldDuplicate		Field duplicate RPD criteria exceeded			
			J	Other	4

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

UJ = The analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately

and precisely measure the analyte in the sample.

Qualifier Type:

Protocol = Flagging due to contractor/laboratory protocol violations.
Other = Flagging due to sample, matrix, or field issues not related to Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP) protocol.

TABLE 4

Blank and Miscellaneous - Qualified Data

Analyte	Sample Identification	Result	Blank Contamination Qualifier*	Criteria	Comments
Method (Matrix): SW8260C (WATER)					
Trichloroethene (TCE)					
	MW06-091522-0	48 ug/L	J	MISC	possible carryover

ug/L = micrograms per liter

Blank target = concentration of field or laboratory blank.

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

Criteria:

MISC = Miscellaneous

TABLE 5

Field Duplicate Precision - Qualified Data

Analyte	Sample Identification	Result	Field Duplicate Qualifier*	Criteria	Validation Comments
Method (Matrix): RSK-175 (WATER)					
Methane	MW06-091522-0	36 ug/L	J	FD>RPD	66.67 vs 30
	MW100-091522-0	18 ug/L	J	FD>RPD	66.67 vs 30
Method (Matrix): SW8260C (WATER)					
cis-1,2-Dichloroethene	MW06-091522-0	190 ug/L	J	FD>RPD	41.67 vs 30
	MW100-091522-0	290 ug/L	J	FD>RPD	41.67 vs 30
Trichloroethene (TCE)	MW06-091522-0	48 ug/L	J	FD>RPD	34.48 vs 30
	MW100-091522-0	68 ug/L	J	FD>RPD	34.48 vs 30

RPD = relative percent difference

ug/L = micrograms per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

Criteria:

FD>RPD = Field duplicate RPD criteria exceeded

TABLE 6

Calibration Criteria - Qualified Data

Analyte	Sample Identification	Result	Calibration Qualifier*	Criteria	Validation Comments
Method (Matrix): SW8260C (WATER)					
cis-1,2-Dichloroethene	MW100-091522-0	290 ug/L	J	>ICLinearRange	reanalysis out of hold
Tetrachloroethene (PCE)	MW05-091522-0	2600 ug/L	J	>ICLinearRange	reanalysis out of hold
	MW100-091522-0	240 ug/L	J	>ICLinearRange	reanalysis out of hold
Trichloroethene (TCE)	MW100-091522-0	68 ug/L	J	>ICLinearRange	reanalysis out of hold
Vinyl Chloride	MW01-091522-0	2.9 ug/L	J	CCV>UCL	noted in case narrative
	MW02-091422-0	36 ug/L	J	CCV>UCL	noted in case narrative
	MW03-091422-0	53 ug/L	J	CCV>UCL	noted in case narrative
	MW04-091522-0	11 ug/L	J	CCV>UCL	noted in case narrative
	T4S1MW23-091322-0	0.013 ug/L	UJ	CCV<LCL	noted in case narrative

%D = percent difference

ug/L = micrograms per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

UJ = The analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately

and precisely measure the analyte in the sample.

Criteria:

>ICLinearRange = Result greater than linear calibration range

CCV<LCL = Continuing calibration recovery less than the lower control limit

CCV>UCL = Continuing calibration recovery greater than the upper control limit

TABLE 7

Site Completeness by Analyte - Qualified Data

Method	Analyte	Matrix	Units	Number of Occurrences							Contractor Completeness (%)	Overall Completeness (%)
				Analyses	Detects	Non-detects	Blank Flags	J-Flags	Contractor R-Flags	Total R-Flags		
E300.0A	Chloride	WATER	MG/L	14	14			1			100	100
	Nitrate-N	WATER	MG/L	14	9	5		2			100	100
	Sulfate	WATER	MG/L	14	14						100	100
RSK-175	Methane	WATER	UG/L	14	14			3			100	100
SM5310D	Total Organic Carbon	WATER	MG/L	14	14						100	100
SW8260C	cis-1,2-Dichloroethene	WATER	UG/L	14	12	2		3			100	100
	Tetrachloroethene (PCE)	WATER	UG/L	14	11	3		2			100	100
	Trichloroethene (TCE)	WATER	UG/L	14	11	3		3			100	100
	Vinyl Chloride	WATER	UG/L	14	10	4		5			100	100

% = Percent
J-Flags = Estimated results
R-Flags = Rejected results
mg/L = milligrams per liter
ug/L = micrograms per liter

December 2022

Groundwater Data Quality Evaluation for Northwest Pipe Company, Portland, Oregon

PREPARED FOR:	Stephanie Heldt-Sheller/Northwest Pipe Company
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REFERENCE:	Northwest Pipe Company GWM Event – December 6, 2022
DATE:	February 7, 2023

Introduction

The objective of this data quality evaluation (DQE) is to assess the representativeness and usability of data quality for groundwater quality samples collected to monitor the groundwater at the Northwest Pipe Company. The rationale for monitoring, the data quality objectives (DQOs), and the method for performing this DQE is provided in the *Monitored Natural Attenuation Evaluation Work Plan*, Northwest Pipe Company, Portland Plant, ECSI No. 138, April 2022 (hereafter referred to as the *NWP WP*).

This DQE report is intended as a general data quality assessment designed to summarize data issues and written using guidance from the U.S. Environmental Protection Agency (USEPA) *National Functional Guidelines for Organic Superfund Methods Data Review* (USEPA 2020a) and USEPA *National Functional Guidelines for Inorganic Superfund Methods Data Review* (USEPA 2020b).

Findings

The overall summaries of the data validation findings are contained in Tables 1 through 6 and summarized in the method sections that follow:

- **Table 1**: Sample Chronology – Data Summary. Presents the sample identifiers, methods, sampling dates, received dates, extraction dates, and analysis dates sorted by SDG number.
- **Table 2**: Sample Summary by Chain of Custody – Data Summary. Presents the sample identifiers, sampling dates, and SDG sorted by chain-of-custody (COC) number.
- **Table 3**: Overall Flagging Summary. Presents the number of occurrences for each data validation reason by method.

- **Table 4**: Holding Time – Qualified Data. Presents the data qualified because of holding time criteria exceedances.
- **Table 5**: Field Duplicate Precision – Qualified Data. Presents the results that are qualified because of FD precision exceedances.
- **Table 6**: Site Completeness by Analyte – Qualified Data. Presents the percent completeness by method, analyte, and matrix.

This DQE report includes three normal groundwater samples, one trip blank (TB), and one field duplicate (FD) collected December 6,2022. These samples were reported under one sample delivery group: 580-120855-1/22L157. A list of samples included in this DQE is presented in Table 1. Four methods were used to analyze the groundwater samples and are also provided in Table 1. The analyses were performed by Eurofins TestAmerica Laboratory, Seattle, Washington (TAM2), Eurofins Calscience LLC, Tustin, California (ECL4) and EMAX Laboratory in Torrance, California (EMXT). Samples were collected and delivered by overnight carrier to TAM2, TAM2 was responsible for shipment of samples to ECL4 and EMXT.

The data were assessed according to the requirements of the *NWP WP* and included a review of:

1. chain of custody documentation;
2. holding-time compliance;
3. required quality control (QC) samples at the specified frequencies;
4. flagging for method blanks and field blanks;
5. laboratory control sample/laboratory control sample duplicates (LCS/LCSD);
6. matrix spike/matrix spike duplicate (MS/MSD) recoveries;

and other method-specific criteria as defined by the *NWP WP*.

Field samples were also reviewed to ascertain field compliance and data quality issues. This included the review of a FD.

Data flags were assigned using the *NFGs* as guidance. These flags, as well as the reason for each flag, are entered into the electronic database and can be found in Table 3. Multiple flags are routinely applied to specific sample method/matrix/analyte combinations, but there will be only one final flag. A final flag is applied to the data and is the most conservative of the applied validation flags. The final flag also includes matrix and blank sample impacts.

The data flags are defined below:

- J = the analyte was detected, but the associated numerical value is considered an estimated quantity.
- R = the sample results are rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified. No associated value is reported.
- U = the analyte was analyzed for but was not detected above the detection limit.
- UJ = the analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

Overall Flagging Summary

The overall summaries of the data validation findings are summarized in the following sections. Table 3 provides a flagging summary of overall occurrences for each data validation reason by method.

Temperature

Temperature requirements were met.

Blanks

Method blanks and TBs were analyzed at the required frequency and were free of contamination that affected the sample results.

Holding Times

All holding-time criteria were met with the following exception listed in Table 4:

Sample MW100-120622-0 was analyzed one day past holding time for nitrate by Method E300.0A. The associated nondetected result was qualified as estimated and flagged "UJ".

Field Duplicates

In accordance with the *NWP WP* one field duplicate (FD) was collected from well MW10, all precision criteria were met with the following exception listed in Table 5:

The relative percent difference of methane was greater than the criteria of 30 percent in the FD set for Method RSK-175. The associated detected results in the FD pair were qualified as estimated and flagged "J".

Laboratory Control Samples

LCS and LCSDs were analyzed at the required frequency and the accuracy and precision criteria were met.

Matrix Spikes

Matrix spikes and matrix spike duplicates were analyzed at the required batch frequency and all accuracy and precision criteria were met.

Chain of Custody

There were no discrepancies.

Overall Assessment

The final activity in the DQE is an assessment of whether the data meets the data quality objectives. The goal of this assessment is to demonstrate that a sufficient number of representative samples were collected and the resulting analytical data can be used to support the decision-making process.

The following summary highlights the data evaluation findings for the above defined events:

1. No data were rejected and completeness was 100 percent for all method/matrix/analyte combinations as shown in Table 6.
2. No data were qualified due to associated blank contamination.
3. One sample was analyzed outside of holding time for Method E300.0A; one result was qualified as estimated.
4. A FD RPD exceedance was observed for Method RSK-175; two associated results were qualified as estimated and flagged "J".

5. The precision and accuracy of the data, as measured by field and laboratory QC indicators, demonstrates that the *NWP WP* goals for project use were met.
6. The field crew followed the *NWP WP* and project documents.

Works Cited

Jacobs. 2012. Monitored Natural Attenuation Evaluation Work Plan, Northwest Pipe Company, Portland Plant, ECSI No. 138. April.

U.S. Environmental Protection Agency (USEPA). 2020a. National Functional Guidelines for Organic Superfund Methods Data Review. November.

U.S. Environmental Protection Agency (USEPA). 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review. November.

TABLE 1. Sample Chronology - Data Summary

Laboratory	SDG	Sample Identification	Method	Sample Date	Receive Date	Extract Date	Analysis Date
EMXT	22L157	MW100-120622-0	SW8260B-SIM	12/6/2022	12/9/2022	12/20/2022	12/20/2022
		MW10-120622-0	SW8260B-SIM	12/6/2022	12/9/2022	12/20/2022	12/20/2022
		MW11-120622-0	SW8260B-SIM	12/6/2022	12/9/2022	12/20/2022	12/20/2022
		MW12-120622-0	SW8260B-SIM	12/6/2022	12/9/2022	12/20/2022	12/20/2022
		TB-120622	SW8260B-SIM	12/6/2022	12/9/2022	12/20/2022	12/20/2022
TAM2	580-120855-1	MW100-120622-0	E300.0A	12/6/2022	12/7/2022		12/9/2022
ECL4		MW100-120622-0	RSK-175	12/6/2022	12/7/2022		12/15/2022
		MW100-120622-0	SM5310D	12/6/2022	12/7/2022		12/29/2022
TAM2		MW10-120622-0	E300.0A	12/6/2022	12/7/2022		12/8/2022
ECL4		MW10-120622-0	RSK-175	12/6/2022	12/7/2022		12/15/2022
		MW10-120622-0	SM5310D	12/6/2022	12/7/2022		12/28/2022
TAM2		MW11-120622-0	E300.0A	12/6/2022	12/7/2022		12/8/2022
ECL4		MW11-120622-0	RSK-175	12/6/2022	12/7/2022		12/15/2022
		MW11-120622-0	SM5310D	12/6/2022	12/7/2022		12/28/2022
TAM2		MW12-120622-0	E300.0A	12/6/2022	12/7/2022		12/8/2022
ECL4		MW12-120622-0	RSK-175	12/6/2022	12/7/2022		12/15/2022
		MW12-120622-0	SM5310D	12/6/2022	12/7/2022		12/29/2022

SDG = sample delivery group

ECL4 = Eurofins Calscience LLC

EMXT = EMAX Laboratories Inc

TAM2 = Eurofins TestAmerica Seattle

TABLE 2. Sample Summary by COC - Data Summary

CoC Number	Sample Date	Matrix	QAQC Type	Sample Identification	SDG	Laboratory
22L157	12/06/2022	WATER	FD	MW100-120622-0	22L157	EMXT
			N	MW10-120622-0	22L157	EMXT
			N	MW11-120622-0	22L157	EMXT
			N	MW12-120622-0	22L157	EMXT
			TB	TB-120622	22L157	EMXT
580-120855-1	12/06/2022	WATER	FD	MW100-120622-0	580-120855-1	TAM2
			FD	MW100-120622-0	580-120855-1	ECL4
			N	MW10-120622-0	580-120855-1	TAM2
			N	MW10-120622-0	580-120855-1	ECL4
			N	MW11-120622-0	580-120855-1	TAM2
			N	MW11-120622-0	580-120855-1	ECL4
			N	MW12-120622-0	580-120855-1	TAM2
			N	MW12-120622-0	580-120855-1	ECL4

SDG = Sample delivery group
ECL4 = Eurofins Calscience LLC
EMXT = EMAX Laboratories Inc
TAM2 = Eurofins TestAmerica Seattle

QAQC Type
FD = Field Duplicate
N = Normal
TB = Trip Blank

TABLE 3. Overall Flagging Summary

Method (Matrix)	Category	Validation Reason	Qualifier*	Qualifier Type	Number of Affected Results
E300.0A (WATER)					
	HoldingTime	Holding time exceeded	UJ	Protocol	1
RSK-175 (WATER)					
	FieldDuplicate	Field duplicate RPD criteria exceeded	J	Other	2

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

UJ = The analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately

and precisely measure the analyte in the sample.

Qualifier Type:

Protocol = Flagging due to contractor/laboratory protocol violations.
Other = Flagging due to sample, matrix, or field issues not related to Quality Assurance Project Plan (QAPP) or Sampling and Analysis Plan (SAP) protocol.

TABLE 4. Holding Times - Qualified Data

Method (Matrix) Sample Identification	Analyte	Holding Time	Result	Holding Time Qualifier	Criteria	Final Flag*
E300.0A (WATER)						
MW100-120622-0	Nitrate-N	3 Days	0.03 mg/L	UJ	HTa>UCL	UJ

mg/L = milligrams per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

UJ = The analyte was not detected above the detection limit. However, the detection limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately

and precisely measure the analyte in the sample.

Criteria:

HTa>UCL = Holding time exceeded

TABLE 5. Field Duplicate Precision - Qualified Data

Method (Matrix) / Analyte	Sample Identification	Result	Field Duplicate Qualifier*	Criteria	Validation Comments
RSK-175 (WATER)					
Methane	MW100-120622-0	410 ug/L	J	FD>RPD	83.69 vs 30
	MW10-120622-0	1000 ug/L	J	FD>RPD	83.69 vs 30

RPD = relative percent difference

ug/L = micrograms per liter

* The most severe flag for each analyte becomes the final validation flag.

Qualifier Description:

J = the analyte was detected at a concentration greater than the method detection limit but less than the reporting limit, or was qualified as estimated due to a QA/QC exceedance.

Criteria:

FD>RPD = Field duplicate RPD criteria exceeded

TABLE 6. Site Completeness by Analyte - Qualified Data

Method	Matrix	Analyte	Units	Number of Occurrences							Contractor Completeness (%)	Overall Completeness (%)
				Analyses	Detects	Non-detects	Blank Flags	J-Flags	Contractor R-Flags	Total R-Flags		
E300.0A	WATER	Chloride	MG/L	4	4						100	100
		Nitrate-N	MG/L	4	2	2		2			100	100
		Sulfate	MG/L	4	4						100	100
RSK-175	WATER	Methane	UG/L	4	4			2			100	100
SM5310D	WATER	Total Organic Carbon	MG/L	4	4						100	100
SW8260B-SIM	WATER	cis-1,2-Dichloroethene	UG/L	4	4						100	100
		Tetrachloroethene (PCE)	UG/L	4	4			2			100	100
		Trichloroethene (TCE)	UG/L	4	4						100	100
		Vinyl Chloride	UG/L	4	4						100	100

% = Percent
J-Flags = Estimated results
R-Flags = Rejected results
mg/L = milligrams per liter
ug/L = micrograms per liter