January 31, 2022

Andrew Smith, Site Manager
Department of Ecology
PO Box 47775
Olympia, Washington 98504-7775

Subject: **2021 Groundwater Monitoring Report**
NuStar Vancouver Annex Facility
5420 NW Fruit Valley Road
Vancouver, Washington
019001-008-03

Dear Mr. Smith:

Enclosed, please find the *2021 Groundwater Monitoring Report* that has been prepared on behalf of NuStar Terminals Operations Partnership, L.P. (NuStar) by GeoEngineers, Inc. (GeoEngineers). The enclosed report presents the results of four quarters of groundwater monitoring conducted in 2021 at the NuStar Vancouver Annex Facility.

If you have any questions or would like to discuss this further, please contact Amanda Spencer at (503) 577-1535 or myself at (503) 807-3835.

Sincerely,

Stephanie Salisbury, L.G.
Associate Geologist

Enclosure
2021 Groundwater Monitoring Report (electronic via email and 2 hard copies)

cc: Renee Robinson, NuStar Energy, L.P. (electronic deliverable)
Aaron Flett, NuStar Energy, L.P. (electronic deliverable)
Jeff Hibner, NuStar Energy, L.P. (electronic deliverable)
Stephan Rosen, NuStar Energy, L.P. (electronic deliverable)
Chris Chan, NuStar Energy, L.P. (electronic deliverable)

2021 Annual Groundwater Monitoring Report

NuStar Vancouver Annex Terminal
5420 NW Fruit Valley Road
Vancouver, Washington

for
NuStar Terminals Operations Partnership, L.P.

January 31, 2022

GeoEngineers
Earth Science + Technology

2021 Annual Groundwater Monitoring Report

NuStar Vancouver Annex Terminal
5420 NW Fruit Valley Road
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GeoEngineers

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2021 Annual Groundwater Monitoring Report

NuStar Vancouver Annex Terminal
5420 NW Fruit Valley Road
Vancouver, Washington

File No. 19001-008-03

January 31, 2022

Prepared for:

NuStar Terminals Operations Partnership, L.P.

Prepared by:

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1/31/2022

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1.0 INTRODUCTION

This groundwater monitoring report was prepared by GeoEngineers, Inc. (GeoEngineers) on behalf of NuStar Terminals Operations Partnership L.P. (NuStar) for groundwater monitoring conducted in 2021 at the NuStar Vancouver Annex Terminal located at 5420 NW Fruit Valley Road, Vancouver, Washington (the Facility). A location map for the Facility is provided on Facility Location Map, Figure 1; a site plan is provided on Site Plan, Figure 2.

On July 12, 2012, NuStar submitted a draft Feasibility Study (FS) to the Washington State Department of Ecology (Ecology) in accordance with Agreed Order (AO) No. 09-TC-S DE5250 between Ecology and NuStar (Ash Creek, 2012). The technical basis of the FS was the Remedial Investigation (RI) and Risk Assessment (RA) documented in the Remedial Investigation and Risk Assessment Report (RI/RA Report) submitted to Ecology in December 2010 (Ash Creek, 2010) and approved by Ecology on June 23, 2011. The draft FS proposed monitored natural attenuation to address residual hydrocarbon constituents in groundwater in the eastern portion of the Facility. On October 16, 2013, Ecology provided NuStar with comments on the draft FS. In the months following receipt, NuStar held several meetings with Ecology to discuss Ecology's comments on the FS, as well as additional comments that were presented to NuStar in a February 4, 2014 meeting. The meetings culminated in a Final Project Coordinator's Decision (the "Decision") issued by Ecology on August 26, 2014, which established a series of steps for collecting additional data to support submittal of a revised FS.

Between 2014 and 2020, multiple soil and groundwater investigations were conducted as part of the Supplemental Remedial Investigation process. The additional data requested by Ecology included additional sitewide groundwater monitoring and additional groundwater investigation near historical borings SB-8 and SB-9 located in the western portion of the terminal. Results of the additional investigation indicated the presence of petroleum hydrocarbons in groundwater at concentrations above Washington Model Toxics Control Act (MTCA) Method A Cleanup Levels in two apparently isolated areas in the vicinity of historical borings SB-8 and SB-9 (Apex, 2015). Seven additional monitoring wells (MW-5 through MW-10 and MW-8D) were installed at the locations shown on Figure 2 for continued groundwater monitoring. Additionally, a limited area of affected groundwater was identified in the central portion of the facility near the vapor recovery unit. A pilot study was conducted in the vicinity of well MW-5 in 2017 to evaluate the efficacy of injecting chemical oxidants to address the petroleum hydrocarbons and to support preparation of the Feasibility Study (Cascadia, 2019a).

In total, more than 90 soil borings have been installed at the site, facilitating the collection and analysis of 115 soil samples and 108 grab groundwater samples. Thirteen monitoring wells in total have been installed over the course of the project, which are currently monitored on a quarterly basis.

In accordance with the Final Project Coordinator's Decision, a Supplemental RI and Revised FS report was submitted to Ecology on June 1, 2020. The report was revised per Ecology comments and resubmitted on October 23, 2020, for final approval. Ecology approved the report on October 30, 2020. The report detailed the aforementioned investigations conducted between 2014 and 2020, evaluated potential cleanup alternatives and provided a recommended cleanup action for the Facility. The approved cleanup actions include source area soil removal followed by installation of a groundwater recirculation system in two limited areas in the western portion of the Facility. The approved cleanup action also includes the injection of plume stabilization compounds to address the limited area of affected groundwater in the central area near the vapor recovery unit. Institutional controls and soil management plans will be implemented in the

limited area of affected soil in the eastern portion of the Facility near the truck loading areas. The approved cleanup action also includes continued routine groundwater monitoring at the Facility.

Ecology has prepared a draft Agreed Order for cleanup action. NuStar has reviewed and provided feedback on the draft Agreed Order and Ecology is currently finalizing its review of the draft Agreed Order. The Agreed Order will then be made available for public comment and will include a Draft Corrective Action Plan. Following public comment, the Cleanup Action Plan will be finalized and included as an exhibit to the Agreed Order, and the Agreed Order will be finalized for execution by Ecology and NuStar.

NuStar initiated quarterly monitoring at the Facility in the fourth quarter of 2017. This report presents the results of the quarterly monitoring program conducted in 2021.

1.1. Site location, Description and History

Location. The Facility address is 5420 NW Fruit Valley Road, Vancouver, Washington 98660 (Latitude: N45° 39.70', Longitude: W122° 41.66'), as shown on Figure 1. The Facility is located on Clark County Tax Lot (TL) No. 147360.

Physical Features. Figure 2 is a Site Plan. The Facility is approximately 31 acres and is roughly rectangular, with dimensions of approximately 800 by 1,800 feet. The Facility is located in a mixed industrial-agricultural area and currently includes aboveground storage tanks (ASTs) containing jet fuel and methanol (seven ASTs ranging in size from 30,000 to 3,000,000 gallons); a covered truck refueling rack with two smaller volume ASTs (an approximately 400-gallon AST, which stores anti-static additive [ASA] and a 7,500-gallon AST containing fuel system icing inhibitor [FSII] additive); and several buildings used for equipment storage and offices. A former underground storage tank (UST) associated with a vapor recovery system was also located on the Facility and was removed in 2001. The vapor recovery system remains on site but is no longer used. The surface of the Facility is comprised of graveled areas and grass fields, with asphalt-paved roads providing access to the fueling areas, ASTs and office buildings.

Property History. Support Terminals Operating Partnership, L.P. (STOP) purchased the Facility from Cenex Harvest States Cooperative (Cenex) in 2003. In March 2008, NuStar acquired STOP.

The property was developed in 1957 as a truck loading terminal. Records are unclear if the Facility was developed by Cenex. Historically, chemicals and other products stored at the Facility included liquid fertilizers and refined petroleum products such as gasoline, diesel and kerosene, denatured alcohol and petroleum product additives. A transmix tank is present in the western portion of the Facility (Figure 2), and this is typically where waste (such as from tank-bottom cleanouts or the oil/water separator) would be stored prior to off-site disposal or recycling. The transmix tank is no longer in use.

1.2. Geology and Hydrogeology

This section presents the geology and hydrogeology as discussed in the RI/RA Report (Ash Creek, 2010).

1.2.1. Geology

Regional Geology. The regional geology is summarized below and is based on reports prepared by Pacific Groundwater Group (PGG; 2001) and AMEC (2002). The vicinity of the Facility is dominated by three primary units: Recent Alluvial deposits, the Pleistocene Alluvial deposits and the Troutdale Formation.

The Recent Alluvial deposits are the upper unit with deposits approximately 55 feet thick and consist of fine-grained silt and sand within the areas investigated near Vancouver Lake. The Pleistocene Alluvial deposits are approximately 95 to 115 feet thick and consist of coarse-grained sand and gravel. The Pleistocene Alluvial deposits originate from alluvial deposits from the Columbia River and deposits from the catastrophic Missoula Floods. The Troutdale Formation underlies the Pleistocene Alluvial deposits and can be greater than 1,000 feet thick. It is made up of cemented sandy gravels and semi-consolidated sands, silts and clays.

Site Geology. During previous Facility investigations performed by others, soil borings have been installed to depths of up to 50 feet below ground surface (bgs) at the Facility. During a 2007 Facility investigation conducted by Ash Creek Associates (Ash Creek, 2007), one boring was completed to a depth of 72 feet bgs. Recent investigations in the western portion of the Facility included installing borings up to depths of 65 feet bgs.

The Recent Alluvial deposits underlying the western portion of the Facility consist of silt and silty clay with some fine sand to depths of approximately 20 to 25 feet bgs. Below 20 to 25 feet bgs, the Recent Alluvial deposits consist of layers of fine- to medium-grained sand to a depth of at least 65 feet bgs. On the eastern portion of the Facility, fine sand or sandy silt with variable layers of sand or silty sand is encountered to a depth of approximately 10 feet bgs. Below 10 feet bgs, the Recent Alluvial deposits in the eastern portion of the Facility consist of layers of fine- to medium-grained sand to a depth of approximately 50 to 60 feet bgs. The Pleistocene Alluvial deposits are encountered below the Recent Alluvial deposits and consist of sand and/or gravel layers of varying thicknesses.

1.2.2. Hydrogeology

Regional Hydrogeology. The regional aquifers, Recent Alluvial Aquifer (RAA); Pleistocene Alluvial Aquifer (PAA); and the aquifers of the Troutdale Formation, follow the regional geology discussed above. The regional hydrogeology summarized below is based on reports prepared in support of Clark Public Utilities (CPU) South Lake Wellfield (PGG, 2001; PGG, 2009) and by Ash Creek (2008a and 2008b).

The RAA is unconfined and receives recharge directly from the land surface and/or surface water features. The PAA directly underlies the RAA and is a productive aquifer with high well yields (several thousand gallons per minute [gpm] without significant drawdown). The groundwater flow system is highly influenced by local surface water bodies. The Columbia River, Vancouver Lake, Vancouver Lake Flushing Channel and Lake River form natural hydrologic boundaries to the groundwater flow system. Tidal influences and seasonal variations in surface water runoff cause dynamic variation in the stage of the Columbia River and resulting adjustments in the stages of the other three connected surface water bodies. The groundwater flow system is also influenced by tidal and seasonal variations in the surface water bodies. Regionally, it is anticipated that groundwater within the RAA and PAA near the Facility would have a net gradient toward Vancouver Lake and the Columbia River.

Site Hydrogeology. In the west tank farm area, depth to first encountered groundwater is typically 16 to 20 feet bgs and in the eastern portion of the site, near the former truck loading area; depth to groundwater typically ranges from 13 to 32 feet bgs.

First encountered groundwater at the Facility corresponds to the silt and fine- to medium-grained sand of the RAA. Shallow groundwater flow at the Facility is typically, under static conditions, flat with a slight gradient (0.0002 foot per foot [ft/ft]) to the southeast (AMEC, 2002; SECOR, 2003; Ash Creek, 2009).

2.0 GROUNDWATER MONITORING—2021

A comprehensive quarterly groundwater monitoring program was conducted in 2021 to monitor groundwater conditions at the site. The monitoring included the gauging and sampling of shallow monitoring wells MW-1 through MW-11, and deeper monitoring wells MW-5D and MW-8D using the Standard Operating Procedures (SOPs) included as Appendix A. The quarterly events were conducted from February 25 through 26; May 4 through 5; August 10 through 11; and November 16 through 17, 2021.

2.1. Groundwater Elevation Measurements

Fluid level measurements were recorded to the nearest 0.01 foot from the surveyed top of monitoring well casing. (Note: Well MW-11 was installed in February 2019 and the top of casing has not been surveyed; however, depth to groundwater measurements were recorded during each monitoring event.) Depth to groundwater was measured using an electronic water level indicator probe. Although separate phase hydrocarbons (SPH) have not been observed at the site, the wells are assessed using an electronic water/hydrocarbon interface probe to document their absence.

Depth to groundwater and groundwater elevations for 2021 are provided in Groundwater Elevation Data—2021, Table 1. Historical groundwater elevation data collected from 2007 through 2021 are included in Appendix B. Copies of the well gauging forms are provided in Appendix C.

Figures 3 through 6 present groundwater elevation contour maps for each of the four quarterly monitoring events. The groundwater elevations in well MW-1 appeared anomalous in several of the events relative to nearby well data and historical measurements; therefore, the groundwater elevations for well MW-1 were not used in the contouring. The top of casing elevation for well MW-1 will be verified by a licensed surveyor in the first quarter 2022. If the current top of casing elevation is no longer accurate, the survey information will be updated in future reports.

2.1.1. Separate Phase Hydrocarbons

SPH or sheen have not been observed in Facility wells, to date, and were not observed during 2021.

2.1.2. Groundwater Elevation

Consistent with previous years, the groundwater gradient was generally flat with a magnitude across the site that ranged between 0.00009 to 0.0005 ft/ft in 2021. The following subsections discuss the depth to groundwater and groundwater gradients observed for each quarterly event.

2.1.2.1. First Quarter 2021

Depths to groundwater ranged from 14.52 to 29.01 feet bgs in wells MW-1 through MW-4 located in the eastern portion of the Facility, corresponding to a range in groundwater elevations of 11.16 to 12.20 feet above Mean Sea Level (MSL). Depths to groundwater in wells MW- 5 through MW-10, located in the western area, ranged from 10.53 to 18.15 feet bgs, corresponding to elevations of 10.91 to 11.24 feet above MSL.

Groundwater Elevation Contour Map—February 2021, Figure 3, provides a groundwater elevation contour map for the groundwater measurements collected in February 2021 during the first quarter 2021 monitoring event. As shown on Figure 3, the groundwater gradient was to the south at a magnitude of approximately 0.0005 ft/ft.

2.1.2.2. Second Quarter 2021

Depths to groundwater ranged from 17.08 to 30.52 feet bgs in wells MW-1 through MW-4 located in the eastern portion of the Facility, corresponding to a range in groundwater elevations of 9.64 to 9.71 feet above MSL. Depths to groundwater in wells MW-5 through MW-10, located in the western tank area, ranged from 12.07 to 19.69 feet bgs, corresponding to elevations of 9.60 to 9.70 feet above MSL.

Groundwater Elevation Contour Map—May 2021, Figure 4, provides a groundwater elevation contour map for the groundwater measurements collected in May 2021 during the second quarter 2021 monitoring event. As shown on Figure 4, the groundwater gradient was essentially flat, with a magnitude measuring approximately 0.00009 ft/ft. The measured groundwater elevation was slightly higher in wells MW-3, MW-4, MW-8 and MW-9 than other monitoring wells, indicating a slight flow direction to the southwest.

2.1.2.3. Third Quarter 2021

Depths to groundwater ranged from 19.77 to 32.30 feet bgs in wells MW-1 through MW-4 located in the eastern portion of the site, corresponding to a range in groundwater elevations of 6.95 to 7.95 feet above MSL. Depths to groundwater in wells MW-5 through MW-10, located in the western tank area, ranged from 13.59 to 21.45 feet bgs, corresponding to elevations ranging between 7.94 to 8.08 feet above MSL.

Groundwater Elevation Contour Map—August 2021, Figure 5, provides a groundwater elevation contour map for the groundwater measurements collected in August 2021 during the third quarter 2021 monitoring event. As shown on Figure 5, the groundwater gradient was essentially flat, with a magnitude measuring approximately 0.0001 ft/ft across the site. The measured groundwater elevation was slightly higher in wells MW-5, MW-7 and MW-8 than other monitoring wells, indicating a slight flow direction to the southeast.

2.1.2.4. Fourth Quarter 2021

Depths to groundwater ranged from 16.74 to 30.11 feet bgs in wells MW-1 through MW-4 located in the eastern portion of the site, corresponding to a range in groundwater elevations of 9.98 to 10.14 feet above MSL. Depths to groundwater in wells MW-5 through MW-10, located in the western tank area, ranged from 11.41 to 19.27 feet bgs, corresponding to elevations ranging between 10.01 to 10.26 feet above MSL.

Groundwater Elevation Contour Map—November 2021, Figure 6, provides a groundwater elevation contour map for the groundwater measurements collected in November 2021 during the fourth quarter 2021 groundwater monitoring event. At the western portion of the Site, there was a groundwater gradient of approximately 0.0003 ft/ft to the east and at the eastern portion of the site, there was a gradient of 0.0005 ft/ft to the west.

2.2. Groundwater Sampling and Analysis

The following describes the field methods, analytical results and quality assurance/quality control (QA/QC) procedures for groundwater sampling conducted at the Facility in 2021.

2.2.1. Methods and Procedures

Samples were collected from each well in accordance with the low-flow sampling SOPs provided in Appendix A. In brief, Facility monitoring wells were purged prior to sample collection, utilizing a peristaltic pump with the intake of the tubing placed midway within the screened interval of the monitoring well. Monitoring wells were purged until field parameters (pH, conductivity, temperature, oxidation-reduction potential [ORP] and dissolved oxygen [DO]) stabilized. Following stabilization of parameters, groundwater samples were collected directly from the discharge tube of the peristaltic pump into laboratory-supplied containers. Field sampling forms are provided in Appendix C.

Samples were labeled and placed in ice-cooled chests for transport, under chain-of-custody protocol, to Apex Laboratories of Tigard, Oregon, for the following analyses:

- Benzene, toluene, ethylbenzene and xylenes (BTEX), methyl tert-butyl ether (MTBE) and naphthalene by U.S. Environmental Protection Agency (EPA) Method 8260D; and
- Total petroleum hydrocarbons gasoline (TPHg) by Method NWTPH-Gx and total petroleum hydrocarbons diesel (TPHd) and total petroleum hydrocarbons in the motor oil carbon range (TPHo) by Method NWTPH-Dx.

2.2.2. Analytical Methods

Analytical results for the 2021 groundwater monitoring events are summarized in Summary of Analytical Results – Monitoring Wells, Table 2. Historical analytical groundwater data collected from 2007 through 2021 are tabulated in Appendix D. Copies of the laboratory analytical reports are contained in Appendix E. It should be noted that the reporting limit for benzene and toluene for samples from well MW-5 was elevated during the May 4, 2021 sampling event. The well was resampled for BTEX (only) on June 15, 2021. Table 2 includes the results from both sampling events. The results on Figure 7 depict the results from June 15, 2021.

Groundwater analytical results for 2021 for BTEX/Naphthalene and TPHg and TPHd concentrations are displayed for each Facility monitoring well on BTEX and Naphthalene in Groundwater—2021, Figure 7, and TPHg and TPHd in Groundwater—2021, Figure 8, respectively.

Eastern Area (Wells MW-1 through MW-4, and MW-11)

TPHg, TPHd, BTEX, MTBE and naphthalene were all either non-detect or below MTCA Method A Levels in wells MW-1 through MW-4. Well MW-11, located adjacent to the vapor recovery unit, had variable BTEX, TPHg, TPHd and naphthalene concentrations with some results above MTCA Method A Cleanup Levels. Specifically, ethylbenzene and xylenes were below MTCA Method A Cleanup Levels during the first and fourth quarters of 2021, but above during quarters two and three. TPHd was below MTCA Method A Cleanup Levels during the first quarter and not detected (above the reporting limit of <0.189 mg/L) in the fourth quarter of 2021, but slightly above during the second and third quarters. Naphthalene was below MTCA Method A Cleanup Levels during the first quarter and not detected (above the reporting limit of <0.2 and <0.02 mg/L, respectively) in the third and fourth quarters. Toluene, TPHo and MTBE concentrations were either non-detect or below MTCA Method A Cleanup Levels in well M-11. As shown on Figures 7 and 8, well MW-11 is surrounded by wells MW-1 through MW-4, demonstrating that the TPH and BTEX concentrations in groundwater remain limited in extent in this area.

Western Area (Shallow Wells MW-5 through MW-10, and Deeper Wells MW-5D and MW-8D)

Compliance Wells (Shallow Wells MW-7 through MW-10 and Deeper Well MW-8D)

Throughout the year, TPH, BTEX, MTBE and naphthalene were non-detect in wells MW-7 through MW-10, and MW-8D; these results are consistent with historical data.

Monitoring Wells (Shallow Wells MW-5 and MW-6 and Deeper Well MW-5D)

TPH was detected slightly above method reporting limits in well MW-5D during the first through third quarter of 2021; TPH was non-detect in well MW-5D during the fourth quarter of 2021. TPHg, TPHd and naphthalene were detected in well MW-5 at concentrations above MTCA Method A Cleanup Levels during each quarterly event. Benzene, ethylbenzene, toluene, xylenes, MTBE and TPHo were either not detected or were below MTCA Method A Cleanup Levels in the groundwater samples from well MW-5.

TPHo and MTBE were not detected above method reporting limits in well MW-6 during 2021. Toluene and xylene concentrations were below MTCA Method A Cleanup Levels in well MW-6. Consistent with previous results, TPHg, TPHd, benzene, ethylbenzene and naphthalene were detected above MTCA Method A Cleanup Levels.

The groundwater monitoring results during 2021 are consistent with previous results that indicate the dissolved-phase hydrocarbons are limited both vertically and laterally, and appear to be in two distinct and separate plumes, each localized around wells MW-5 and MW-6, respectively.

2.2.3. Quality Assurance/Quality Control (QA/QC)

QA/QC samples consisted of field duplicate samples, field trip blanks, laboratory method blanks, matrix spike/matrix spike duplicates (MS/MSD), laboratory control samples (LCS) and surrogate spike samples. The field and laboratory QA/QC results and an evaluation of the results to ascertain the usability of the data are included with the laboratory data sheets in Appendix E.

The QA/QC review of the data indicates:

- Samples were received by the analytical laboratory on ice below 6°C in good condition and in the appropriate laboratory-supplied sample containers.
- The samples were analyzed within their respective method holding times.
- The reporting limits for BTEX in well MW-5 from the second quarter sampling event (May 4, 2021) were elevated due to an excessive dilution at the laboratory. Well MW-5 was re-sampled on June 15, 2021, and the reporting limits were not elevated. The analytical results for the resampling event are reported in Table 2 and on Figure 7.
- The recovery for the MS sample was within control limits with the following exceptions:
    - From report A1K0890 (fourth quarter 2021), a matrix spike analysis was performed on a blank (batch 21K0914) and percent recovery for benzene, toluene, ethylbenzene and xylenes was outside of control limits. Because a duplicate matrix spike analysis had percent recovery within method control limits for the same batch, no data were flagged.
- The recovery for the LCS sample was within control limits, with the following exceptions:

    - From report A1E0226 (second quarter 2021), a LCS analysis was performed on a blank (batch 1050334) and percent recovery for naphthalene was outside of EPA criteria for method 8260D. Because there was adequate sensitivity for analysis, no data were flagged.

- From report A1E0226 (second quarter 2021), an LCS/LCSD analysis was performed on a blank (batch 1050234) and the relative percent difference (RPD) for xylenes was outside of the acceptable range of +-/- 30 percent. A second LCSD duplicate was analyzed and was within acceptable criteria; therefore, no data were flagged.
- Surrogate recoveries were within the acceptable range.
- No compounds were detected in the trip blanks or laboratory method blanks with the exception of benzene and toluene in well MW-5 during third quarter 2021 (report A1H0365) and benzene in well MW-5 during fourth quarter 2021 (report A1K0890). The reporting level was raised due to possible carryover from a previous sample. The data were flagged R-06.
- The RPD between the field samples and field duplicates was within control range, with the exception (report A1C0004; first quarter 2021) that the RPD for the samples from well MW-5 was greater than 30 percent for benzene. The data were flagged Q-42.

The overall QA objectives have been met and the data are of acceptable quality for use in this project.

3.0 FUTURE WORK

In December 2021, Ecology approved a revised Monitoring Well Installation Work Plan, which proposed installation of additional monitoring wells to supplement the existing well network to aid in monitoring remedial progress following implementation of the cleanup action plan at the Facility. One additional shallow well and two deeper (sand zone) wells will be installed. One of the deeper wells will be installed near existing well MW-6 to form a shallow/deeper well pair. The second deeper and one shallow well will be installed as a shallow/deeper well pair located downgradient of existing well MW-11. Fieldwork is planned for early February 2022. The new wells and well MW-11 will be surveyed by a licensed surveyor for vertical and lateral control. As mentioned in Section 2.1, the top of casing elevation for well MW-1 will also be verified during the well installation and surveying event. A summary of well installation activities and the results from the first round of well monitoring will be provided in a brief letter report to Ecology within 45 days of receiving analytical data from the well sampling.

Quarterly groundwater monitoring will continue in 2022. Following the completion of quarterly monitoring in 2022, an Annual 2022 Groundwater Monitoring Report will be prepared during the first quarter of 2023. A supplemental remedial investigation and revised feasibility study was submitted to and approved by Ecology in October 2020. A draft cleanup action plan for the site has been prepared and will be implemented under a future Agreed Order with Ecology.

4.0 REFERENCES

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TABLES

GeoEngineers

Table 1

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-1	02/25/21	26.72	14.5-24.5	--	14.52	--	12.20
	05/04/21	26.72		--	17.08	--	9.64
	08/10/21	26.72		--	19.77	--	6.95
	11/16/21	26.72		--	16.74	--	9.98
MW-2	02/25/21	38.27	20-35	--	27.11	--	11.16
	05/04/21	38.27		--	28.59	--	9.68
	08/10/21	38.27		--	30.34	--	7.93
	11/16/21	38.27		--	28.13	--	10.14
MW-3	02/25/21	39.17	24.5-34.5	--	27.91	--	11.26
	05/04/21	39.17		--	29.47	--	9.70
	08/10/21	39.17		--	31.22	--	7.95
	11/16/21	39.17		--	29.06	--	10.11
MW-4	02/25/21	40.23	20-35	--	29.01	--	11.22
	05/04/21	40.23		--	30.52	--	9.71
	08/10/21	40.23		--	32.30	--	7.93
	11/16/21	40.23		--	30.11	--	10.12
MW-5	02/25/21	27.03	10-25	--	15.83	--	11.20
	05/04/21	27.03		--	17.42	--	9.61
	08/10/21	27.03		--	18.98	--	8.05
	11/16/21	27.03		--	16.80	--	10.23
MW-5D	02/25/21	26.71	35-45	--	15.63	--	11.08
	05/04/21	26.71		--	17.05	--	9.66
	08/10/21	26.71		--	18.64	--	8.07
	11/16/21	26.71		--	16.50	--	10.21
MW-6	02/25/21	27.33	10-25	--	16.16	--	11.17
	05/04/21	27.33		--	17.72	--	9.61
	08/10/21	27.33		--	19.39	--	7.94
	11/16/21	27.33		--	17.09	--	10.24
MW-7	02/25/21	21.67	10-25	--	10.53	--	11.14
	05/04/21	21.67		--	12.07	--	9.6
	08/10/21	21.67		--	13.59	--	8.08
	11/16/21	21.67		--	11.41	--	10.26
MW-8	02/25/21	27.68	10-25	--	16.44	--	11.24
	05/04/21	27.68		--	17.98	--	9.70
	08/10/21	27.68		--	19.64	--	8.04
	11/16/21	27.68		--	17.67	--	10.01

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-8D	02/25/21	27.87	35-45	--	16.76	--	11.11
	05/04/21	27.87		--	18.24	--	9.63
	08/10/21	27.87		--	19.80	--	8.07
	11/16/21	27.87		--	17.42	--	10.45
MW-9	02/25/21	29.39	10-25	--	18.15	--	11.24
	05/04/21	29.39		--	19.69	--	9.70
	08/10/21	29.39		--	21.45	--	7.94
	11/16/21	29.39		--	19.27	--	10.12
MW-10	02/25/21	28.71	10-25	--	17.80	--	10.91
	05/04/21	28.71		--	19.06	--	9.65
	08/10/21	28.71		--	20.74	--	7.97
	11/16/21	28.71		--	18.48	--	10.23
MW-11	02/25/21	NS	10-25	--	15.91	--	NS
	05/04/21	NS		--	17.79	--	NS
	08/10/21	NS		--	19.31	--	NS
	11/16/21	NS		--	17.75	--	NS

Notes:

1. Survey elevations determined by Bluedot Group surveying, November 2017.
2. Reference elevation (i.e., top of casing) relative to NAVD 88 (North American Vertical Datum of 1988), feet above mean sea level.
3. feet above MSL = feet above mean sea level.
4. NS = Not surveyed
5. -- = SPH (separate phase hydrocarbons) not measured/observed.
6. bgs = below ground surface.

Table 2

Summary of Analytical Results - Monitoring Wells

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-1	2/26/2021	<0.100	0.313 F-11	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	0.152 F-11	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	0.250 F-11	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-2	2/25/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0748	<0.15	<0.0002	<0.001	<0.0005	<0.0015	0.0053	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	0.0113	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	0.00278	<0.002
MW-3	2/25/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-4	2/26/2021	<0.100	<0.0800	<0.160	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0748	<0.150	<0.0002	<0.001	0.00073	0.00181	<0.001	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-5	2/25/2021	**27.5**	**1.82 F-18**	<0.150	0.0026 Q-42	<0.01	0.13	0.626	<0.01	**1.55**
	2/25/2021 DUP	**27.2**	**2.14 F-18**	<0.163	<0.002	<0.01	0.127	0.616	<0.01	**1.55**
	5/4/2021	**15.8**	**2.09 F-20**	<0.151	<0.01	<0.05	0.108	0.458	<0.05	**1.31**
	6/15/2021	NS	NS	NS	<0.001	<0.005	0.142	0.655	NS	NS
	8/10/2021	**15.2**	**2.59 F-13, F-20**	<0.381	<0.00024 R-06	<0.0012 R-06	0.135	0.628	<0.001	**1.36**
	11/16/2021	**13.9**	**2.15 F-18**	<0.381	<0.000220 R-06	0.00116	0.197	0.610	<0.001	**1.43**
	11/16/2021 DUP	**11.5**	**1.84 F-18**	<0.381	<0.0002	0.00117	0.164	0.468	<0.001	**1.19**

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-5D	2/25/2021	**0.126**	**0.240 F-11 F-20**	<0.154	<0.0002	<0.001	0.00093	<0.0015	<0.001	<0.002
	5/4/2021	**0.208**	**0.158 F-11F-20**	<0.152	<0.0002	<0.001	0.00359	<0.0015	<0.001	<0.002
	8/10/2021	<0.100	**0.470**	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-6	2/25/2021	**15.2**	**5.66 F-11 F-20**	<0.154	**0.230**	0.0325	**1.86**	0.263	<0.01	**0.371**
	5/5/2021	**11.2**	**5.83 F-20**	<0.152	**0.152**	<0.05	**1.75**	0.186	<0.05	**0.248**
	8/11/2021	**14.0**	**6.07 F-20**	<0.377	**0.175**	0.0287	**1.88**	0.327	<0.001	**0.384**
	8/11/2021 DUP	**13.8**	**6.36 F-20**	<0.377	**0.174**	0.0289	**1.89**	0.312	<0.001	**0.386**
	11/17/2021	**11.1**	**8.27**	<0.388	**0.181**	0.0223	**1.50**	0.208	<0.001	**0.281**
MW-7	2/25/2021	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-8	2/25/2021	<0.100	<0.0833	<0.167	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.192	<0.385	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-8D	2/25/2021	<0.100	<0.0833	<0.167	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-9	2/25/2021	<0.100	<0.0777	<0.155	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-10	2/26/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-11	2/26/2021	**3.42**	0.152 F-11 F-20	<0.151	0.0044	0.00563	0.370	0.594	<0.001	0.0575
	5/5/2021	**49.4**	0.598 F-11F-20	<0.151	**0.0250**	0.620	**4.54**	**10.8**	<0.05	**0.287**
	5/5/2021 DUP	**49.6**	0.644 F-11F-20	<0.151	**0.0245**	0.620	**4.53**	**10.6**	<0.05	**0.284**
	8/11/2021	**41.4**	0.673 F-11 F-20	<0.381	**0.00902**	0.196	**2.58**	**8.60**	<0.001	<0.2
	11/17/2021	**2.26**	<0.189	<0.377	**0.0218**	0.00502	0.544	0.0218	<0.001	<0.02
Washington DOE MTCA Method A Cleanup Level		0.8	0.5	0.5	0.005	1	0.7	1	0.02	0.16

Notes:

1. TPHg = Total petroleum hydrocarbons in gasoline carbon range by NW-TPHgx method.
2. TPHd = Total petroleum hydrocarbons in diesel carbon range by NW-TPHdx method.
3. TPHho = Total petroleum hydrocarbons ion heavy oil carbon range NW-TPHdx method.
4. **Bold** values represent concentration that exceeds MTCA Method A cleanup level.
5. mg/L (ppm) = Milligrams per liter (parts per million).
6. TPHg cleanup level dependent on presence of benzene in groundwater. Cleanup level = 0.800 mg/L if benzene is present and 1.00 mg/L if benzene is not present.
7. Washington DOE MTCA Method A cleanup level = Washington Department of Ecology Model Toxics Control Act Method A cleanup level.
8. < = Not detected at or above the specified laboratory method reporting limit (MRL).
9. bgs = below ground surface
10. -- = Sample not analyzed for constituent.

Notes on Quality Assurance/Quality Control Data Qualifiers

A: Data flagged F-11 = The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.

B: Data flagged F-13 = The chromatographic pattern does not resemble the fuel standard used for quantitation.

C: Data flagged F-16 = Results for oil are estimated due to overlap from the reported diesel result.

D: Data flagged F-18 = Result for Diesel (Diesel Range Organics, C12-C24) is due to overlap from Gasoline or a Gasoline Range product.

E: Data flagged F-19 = Results are estimated due to the presence of multiple fuel products.

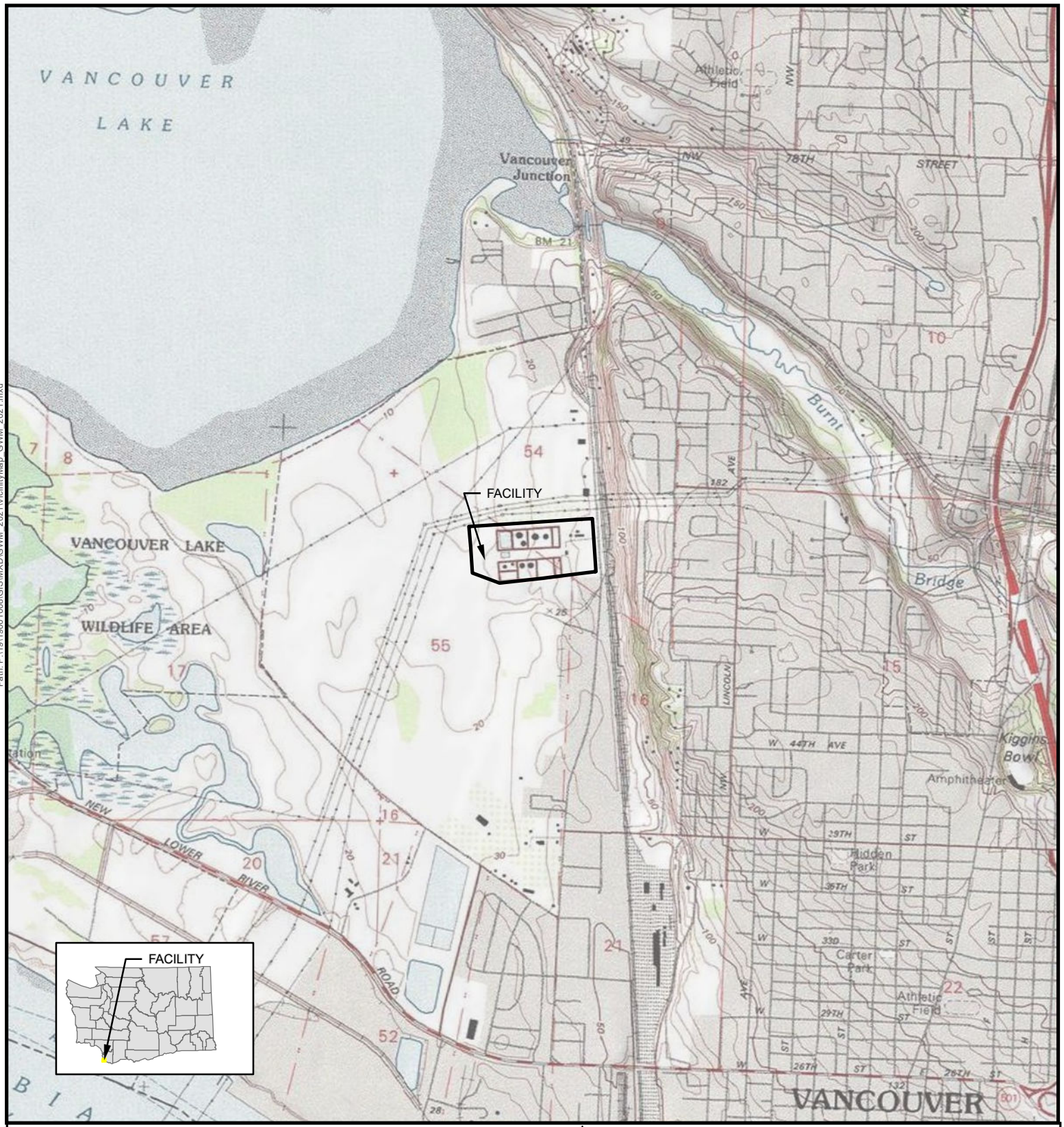
F: Data flagged F-20 = Result for Diesel is estimated due to overlap from Gasoline Range Organics or other VOCs.

R: Data flagged R = The relative percent difference between the sample and duplicate sample is above 30%.

Q: Data flagged Q = Duplicate analysis was performed on this sample. Relative percent difference for this analyte is outside laboratory control limits.

FIGURES

GeoEngineers



Source: USGS Map obtained from Esri ArcGIS Online

Facility Boundary

0 1,000 2,000
Feet

Facility Location Map

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

GeoEngineers

Figure 1

Path: P:\19\19001008\GIS\MXD\GWM_2021\VicinityMap_GWM_2021.mxd
Print Date: 1/5/2022
Approved By:
Produced By: estrandhagen
Project:

Document Path: P:\191\190\1908\GIS\MXD\GWM_2021\site_plan_GWM_2021.mxd

Notes:
NOTE: Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).

Locations of roads and containments are approximate.

Source:
Aerial from Mapbox.

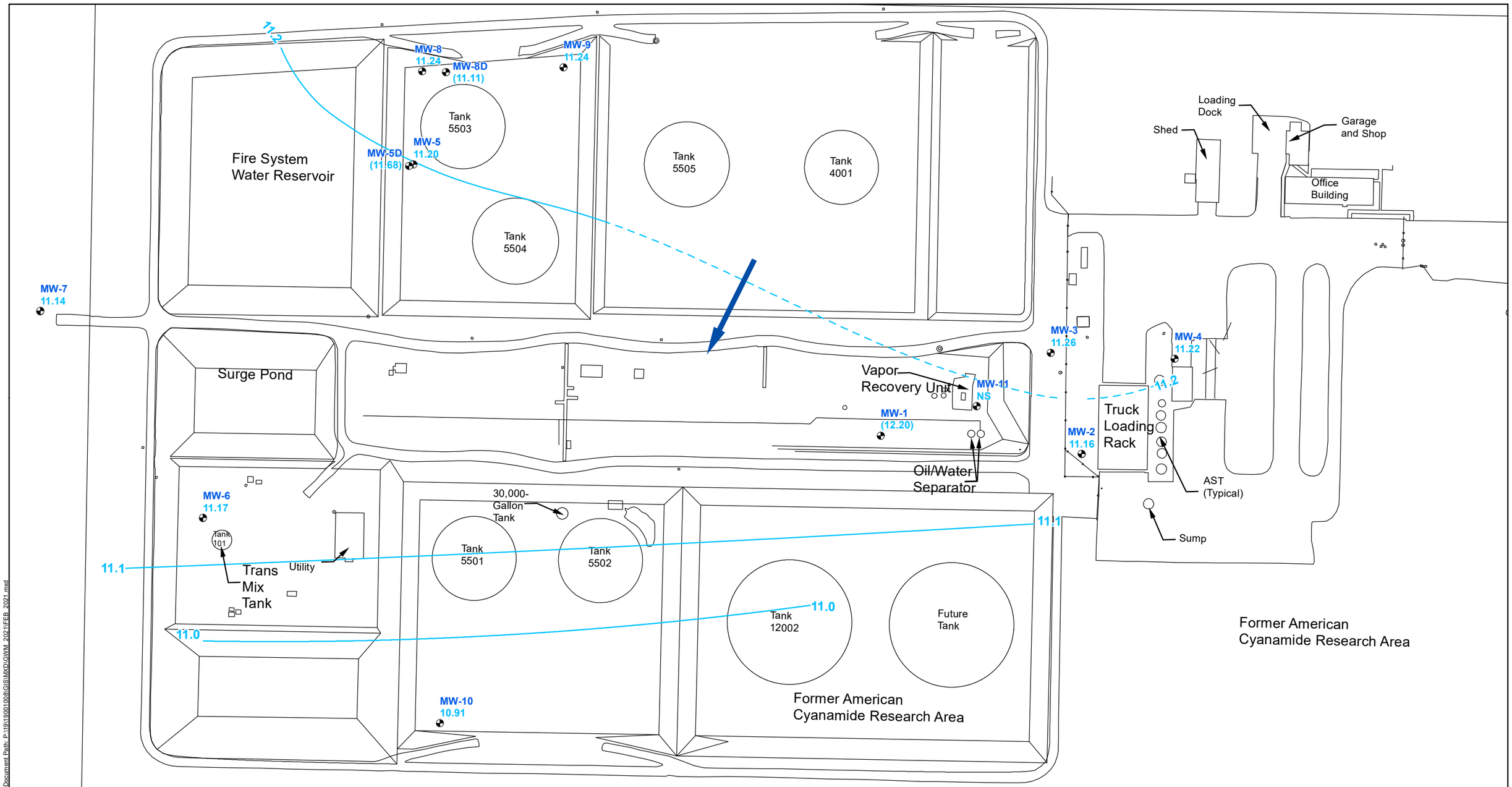
- Groundwater Monitoring Well Location (MW-5D and MW-8D are Deep Monitoring Well Locations)
- Grab Groundwater Sample Location
- Deeper Direct-Push Geoprobe Location
- Historical Temporary Well Location (Approximate)
- Historical Hand Auger Location (Approximate)
- Historical Direct-Push Boring Location (Approximate)
- Soil Boring Location (2014)
- Soil Boring Location (2015)
- Soil Boring Location (2019)

0 25 50 100 Feet

Site Plan

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

1/5/2022		Drawn by: ES		GeoEngineers	Figure 2



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MW-1 — Groundwater Monitoring Well Location

Groundwater Elevation Contour (Dashed Where Inferred)

10.91 — Groundwater Elevation in Feet Above Mean Sea Limit (MSL)

(12.20) — Well Groundwater Elevation in Feet MSL (Not Used for Contouring)

NS — Not Surveyed

Inferred Groundwater Flow Direction

Notes:
1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).

2. Locations of roads and containments are approximate.

3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

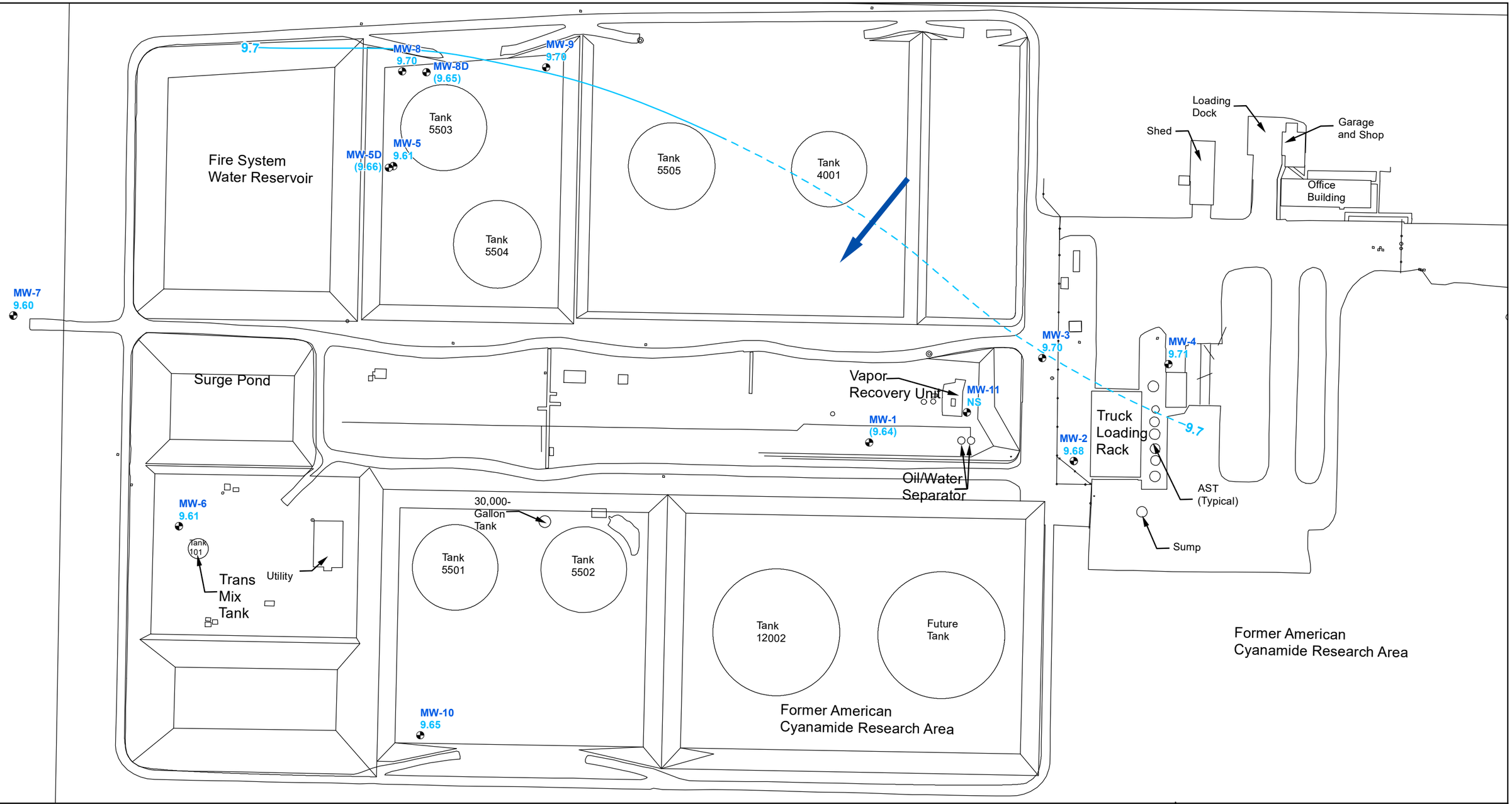
Groundwater Elevation Contour Map
February 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

GeoEngineers

Figure 3

1/10/2022		Drawn by: ES		



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MW-1 — Groundwater Monitoring Well Location

Groundwater Elevation Contour (Dashed Where Inferred)

9.65 — Groundwater Elevation in Feet Above Mean Sea Limit (MSL)

(9.66) — Well Groundwater Elevation in Feet MSL (Not Used for Contouring)

NS — Not Surveyed

Inferred Groundwater Flow Direction

Notes:
1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).

2. Locations of roads and containments are approximate.

3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

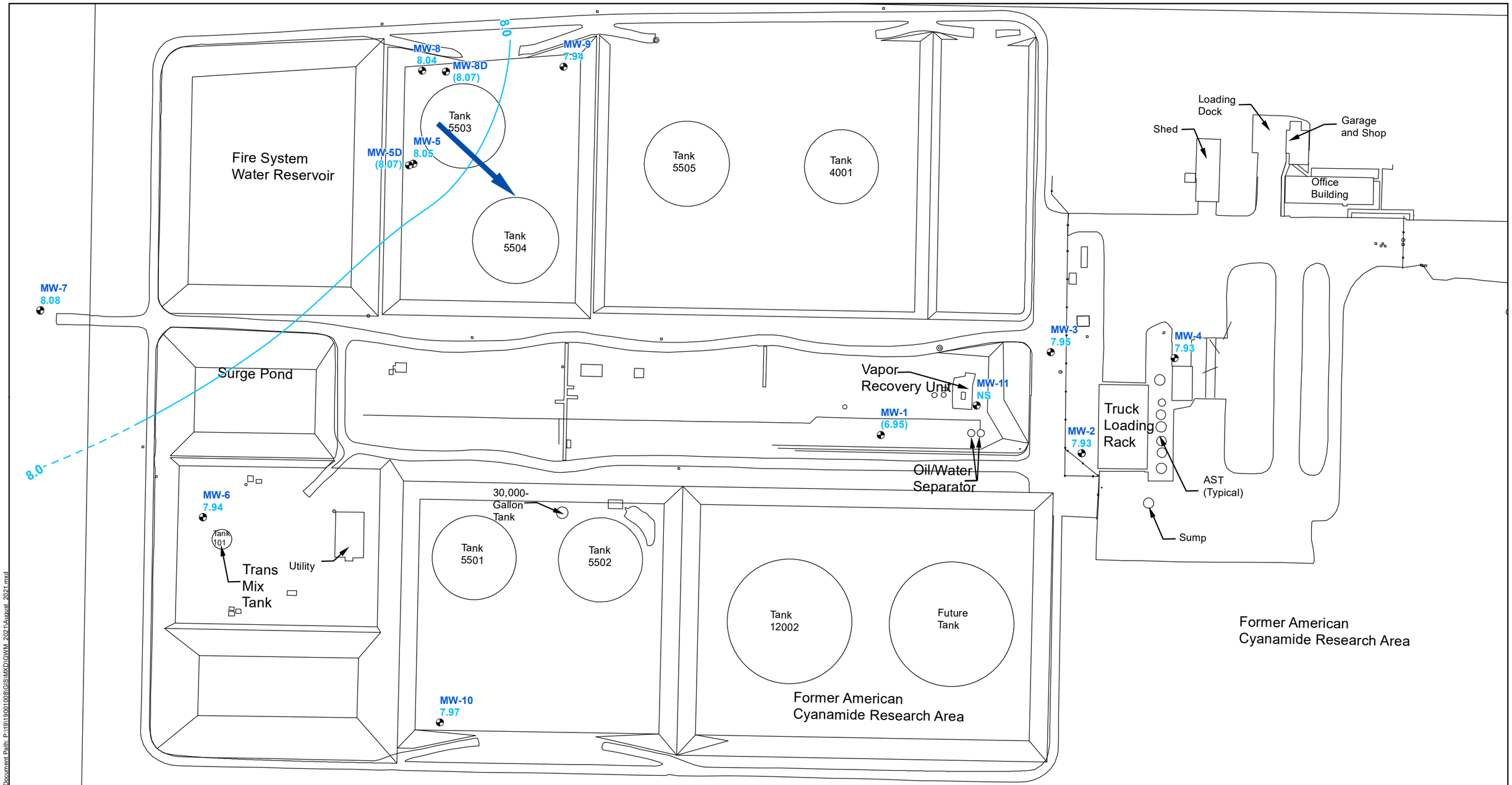
Groundwater Elevation Contour Map May 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

GeoEngineers

Figure 4

1/28/2022		Drawn by: ES		



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MW-1 — Groundwater Monitoring Well Location

Groundwater Elevation Contour (Dashed Where Inferred)

7.97 — Groundwater Elevation in Feet Above Mean Sea Limit (MSL)

(8.07) — Well Groundwater Elevation in Feet MSL (Not Used for Contouring)

NS — Not Surveyed

Inferred Groundwater Flow Direction

Notes:
1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).

2. Locations of roads and containments are approximate.

3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

Groundwater Elevation Contour Map August 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

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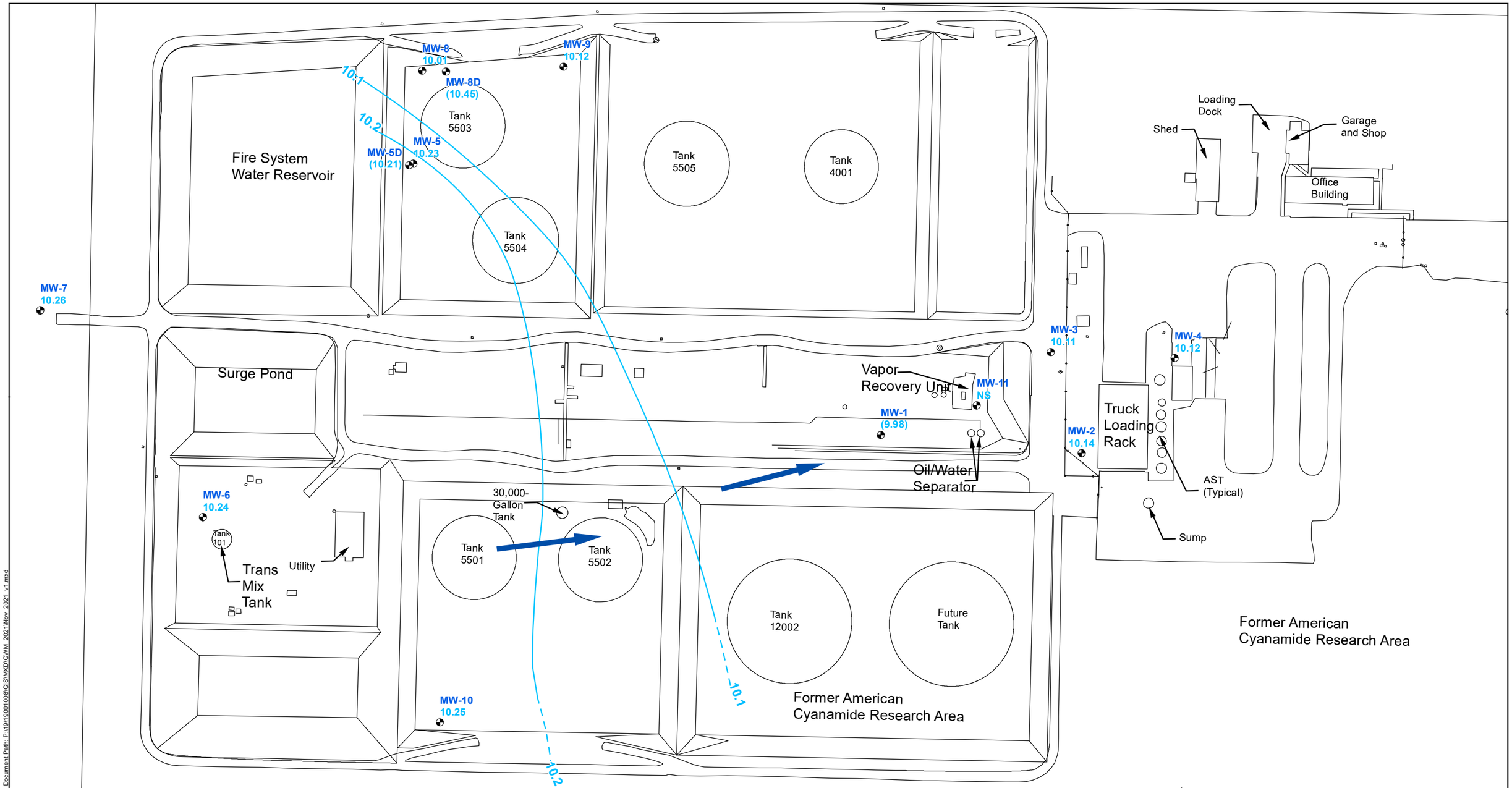
Figure 5

1/7/2022		Drawn by: ES		



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MW-1 — Groundwater Monitoring Well Location

Groundwater Elevation Contour (Dashed Where Inferred)

10.25 — Groundwater Elevation in Feet Above Mean Sea Limit (MSL)

(10.21) — Well Groundwater Elevation in Feet MSL (Not Used for Contouring)

NS — Not Surveyed

Inferred Groundwater Flow Direction

Notes:

1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).
2. Locations of roads and containments are approximate.
3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

Groundwater Elevation Contour Map November 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

GeoEngineers

Figure 6

1/28/2022		Drawn by: ES		

MW-8	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-9	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-8D	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-5	Q1	Q2	Q3	Q4
B	**0.0026**	<0.001	<0.00024	<0.000220
T	<0.01	<0.005	<0.0012	**0.00117**
E	**0.13**	**0.142**	**0.135**	**0.197**
X	**0.626**	**0.655**	**0.628**	**0.610**
N	**1.55**	**1.31**	**1.36**	**1.43**

MW-3	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-7	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-5D	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	**0.00093**	**0.00359**	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-4	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	**0.00073**	<0.0005	<0.0005
X	<0.0015	**0.00181**	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-1	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-11	Q1	Q2	Q3	Q4
B	**0.0044**	**0.025**	**0.00902**	**0.0218**
T	**0.00563**	**0.62**	**0.196**	**0.00502**
E	**0.37**	**4.54**	**2.58**	**0.544**
X	**0.594**	**10.8**	**8.6**	**0.0218**
N	**0.0575**	**0.287**	<0.2	<0.02

MW-2	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

MW-6	Q1	Q2	Q3	Q4
B	**0.23**	**0.152**	**0.175**	**0.181**
T	**0.0325**	<0.05	**0.0289**	**0.0223**
E	**1.86**	**1.75**	**1.89**	**1.50**
X	**0.263**	**0.186**	**0.327**	**0.208**
N	**0.371**	**0.248**	**0.386**	**0.281**

MW-10	Q1	Q2	Q3	Q4
B	<0.0002	<0.0002	<0.0002	<0.0002
T	<0.001	<0.001	<0.001	<0.001
E	<0.0005	<0.0005	<0.0005	<0.0005
X	<0.0015	<0.0015	<0.0015	<0.0015
N	<0.002	<0.004	<0.004	<0.002

Tank 5503
Tank 4001
Tank 5501
Tank 5502
Tank 12002
Loading Dock
Shed
Garage and Shop
Office Building
Vapor Recovery Unit
Truck Loading Rack
Oil/Water Separator
AST (Typical)
Former American Cyanamide Research Area

Abbreviations		MTCA Method A Cleanup Level (mg/L)
B	Benzene	0.005
T	Toluene	1.00
E	Ethylbenzene	0.70
X	Xylenes	1.00
N	Naphthalene	0.16

Groundwater Monitoring Well Location

Location Sampled — Analyte Sampled

MW-11	Q1	Q2	Q3	Q4
B	**0.0044**	**0.025**	**0.00902**	**0.0218**
T	**0.00563**	**0.62**	**0.196**	**0.00502**
E	**0.37**	**4.54**	**2.58**	**0.544**
X	**0.594**	**10.8**	**8.6**	**0.0218**
N	**0.0575**	**0.287**	<0.2	<0.02

Quarterly Period

Highlighted Concentration Exceeds MTCA Method A Cleanup Level Concentration in mg/L

< = Non-Detected

Notes:
1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).
2. Locations of roads and containments are approximate.
3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

BTEX and Naphthalene in Groundwater - 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

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Figure 7

1/17/2022 | Drawn by: ES | Checked by: JW

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MW-8	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0833	<0.0762	<0.190	<0.192

MW-8D	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0833	<0.0755	<0.189	<0.189

MW-9	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0777	<0.0755	<0.189	<0.189

MW-5	Q1	Q2	Q3	Q4
TPH-g	**27.5**	**15.8**	**15.2**	**13.9**
TPH-d	**2.14**	**2.09**	**2.59**	**2.15**

MW-5D	Q1	Q2	Q3	Q4
TPH-g	**0.126**	**0.208**	<0.100	<0.100
TPH-d	**0.24**	**0.158**	**0.470**	<0.190

MW-3	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0792	<0.0762	<0.187	<0.190

MW-7	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0769	<0.0755	<0.190	<0.189

MW-6	Q1	Q2	Q3	Q4
TPH-g	**15.2**	**11.2**	**14.0**	**11.1**
TPH-d	**5.66**	**5.83**	**6.36**	**8.27**

MW-1	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	**0.313**	**0.152**	**0.250**	<0.189

MW-11	Q1	Q2	Q3	Q4
TPH-g	**3.42**	**49.6**	**41.4**	**2.26**
TPH-d	**0.152**	**0.644**	**0.673**	<0.189

MW-10	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0792	<0.0755	<0.189	<0.189

MW-4	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.08	<0.0748	<0.189	<0.189

MW-2	Q1	Q2	Q3	Q4
TPH-g	<0.100	<0.100	<0.100	<0.100
TPH-d	<0.0792	<0.0748	<0.189	<0.189

Tank 5503
Tank 5505
Tank 4001
Tank 5504
Surge Pond
Vapor Recovery Unit
Oil/Water Separator
30,000-Gallon Tank
Tank 5501
Tank 5502
Tank 12002
Future Tank
Tank 101
Trans Mix Tank
Utility
Loading Dock
Shed
Garage and Shop
Office Building
Truck Loading Rack
AST (Typical)
Sump
Former American Cyanamide Research Area
Former American Cyanamide Research Area

Abbreviations		MTCA Method A Cleanup Level (mg/L)
TPH-g	Total Petroleum Hydrocarbons Gasoline-Range	**0.800**
TPH-d	Total Petroleum Hydrocarbons Diesel-Range	**0.500**

Groundwater Monitoring Well Location

Location Sampled — Quarterly Period

MW-11	Q1	Q2	Q3	Q4
TPH-g	**3.42**	**49.6**	**41.4**	**2.26**
TPH-d	**0.152**	**0.644**	**0.673**	<0.189

Analyte Sampled

Highlighted Concentration Exceeds MTCA Method A Cleanup Level
Concentration in mg/L
< = Non-Detected

1. Base map completed from a number of sources including but not limited to; Figure VAN1-21-002 provided by NuStar (1/8/2007) and a Monitoring Well Survey by Statewide Land Surveying, Inc (10/30/2007).

2. Locations of roads and containments are approximate.

3. Wells MW-1 through MW-11 are shallow wells screened across first encountered groundwater. Wells MW-5D and MW-8D are deeper monitoring well locations.

0 25 50 100 Feet

TPHg and TPHd in Groundwater - 2021

2021 Groundwater Monitoring Report
NuStar Terminals Operations Partnership L.P. - Annex Terminal
Vancouver, Washington

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Figure 8

1/7/2022 | Drawn by: ES

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APPENDICES

GeoEngineers

APPENDIX A
Standard Operating Procedures

FIELD NOTES AND DOCUMENTATION

1. PURPOSE AND SCOPE

This Standard Operating Procedure (SOP) describes the methods for documenting environmental field activities. The purpose of establishing SOPs for field notes and documentation is to establish a consistent method and format for the use and control of documentation generated during daily field activities. Field notes and records are intended to provide sufficient information that can be used to recreate the field activities, as well as, the collection of environmental data. Information placed in these documents and/or records shall be factual, detailed and objective.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Bound field books;
- Black waterproof and/or indelible ink pens; and
- Field forms.

3. METHODOLOGY

This SOP primarily includes the documentation procedures for the field logbooks. However, procedures discussed in this SOP are applicable to all other types of field documentation collected, and should be universal in application. Details of other field records and forms (e.g. boring logs, sample labels, chain of custody records, and waste containment labels are discussed in the specific SOP associated with that field activity (e.g. borehole drilling, sample handling, investigative derived waste), and not covered in detail in this SOP.

Field Logbooks:

Field personnel will keep accurate written records of their daily activities in a bound logbook that will be sufficient to recreate the project field activities without reliance on memory. This information will be recorded in chronological order. All entries will be legible, written in black waterproof or indelible ink, and contain accurate and inclusive documentation of field activities, including field data observations, deviations from project plans, problems encountered, and actions taken to solve the problem. Each page of the field logbook will be consecutively numbered, signed and dated by the field author(s). Pages should not be removed for any reason.

There should be no blank lines on a page. A single blank line or a partial blank line (such as at the end of a paragraph) should be lined to the end of the page. If only part of a page is used, the remainder of the page should have an "X" drawn across it.

In addition to documenting field activities, field logbooks will include the following:

- Date and time of activities,
- Site location,
- Purpose of site visit,
- Site and weather conditions,

- Personnel present, including sampling crew, facility/site personnel and representatives (including site arrival and departure times),
- Subcontractors present,
- Regulatory agencies and their representatives (including phone numbers, site arrival and departure times),
- Level of health and safety protection,
- Sampling methodology and information,
- Sample locations (sketches are helpful),
- Source of sample(s), sample identifications, sample container types and preservatives used, and lot numbers for bottles and preservatives (if applicable and if not recorded on other forms or in a sample control logbook),
- A chronological description of the field observations and events,
- Specific considerations associated with sample acquisition (e.g., field parameter measurements, field screening data, HASP monitoring data, etc.) (if not recorded on another form),
- Wastes generated, containment units (including volumes, matrix, etc), and storage location (if not recorded on another form),
- Field quality assurance/quality control samples collection, preparation, and origin (if not recorded on other forms or in a sample control logbook),
- The manufacturer, model and serial number of field instruments (e.g., PID, water quality, etc.) shall be recorded, if not using a calibration form. Also, source lot # and expiration date of standard shall be recorded if calibrated in the field.
- Well construction materials, water source(s), and other materials used on-site (if not recorded on another form).
- Sample conditions that could potentially affect the sample results,
- If deviating from plan, clearly state the reason(s) for deviation,
- Persons contacted and topics discussed,
- Documentation of exclusion zone set-up and location,
- Documentation of decontamination procedures, and
- Daily Summary.

Field situations vary widely. No general rules can specify the extent of information that must be entered in a logbook. However, records should contain sufficient information so that someone can reconstruct the field activity without relying on the collector's memory. Language used shall be objective, factual, and free of personal opinions. Hypothesis for observed phenomena may be

recorded, however, they must be clearly indicated as such and only relate to the subject observation.

Logbooks will be assigned to a specific sampling team. If it is necessary to transfer the log book to alternative team member during field work, the person relinquishing the log book will sign and date the log book at the time of transfer.

Field logbooks should consist of a bound book, in which the insertion or removal of pages will be visibly noticeable after the logbook has been assembled. Logbooks can be prepared by gluing or laminating pages together either at the left side or top of the page. If inclement weather is expected, logbooks may have plastic laminated front and back covers to protect the interior pages, and should not be broken apart for coping. Loose-leaf binding, such as comb binding is not considered hard binding. To maintain the integrity of the logbook, pages should be consecutively numbered prior to use. Logbook pages can be of any format, and may include blank pages for recording or field forms that are used for specific tasks. As an alternative, commercially bound and consecutive page numbered field logbooks may also be used.

Additional Field Forms/Records:

Additional field records may be required for each specific field event. The use of these records and examples are described in other SOPs specific for the activity (e.g. Borehole Logging SOP, Groundwater Sampling and Purging SOP, etc.). These other records may include:

- Borehole Logs during drilling,
- Well Construction and Development records,
- Groundwater Purge and Sample Collection Records,
- Water Level Monitoring,
- Investigation Derived Waste (IDW) Tracking Records,
- Instrument Calibration Records, and
- Health and Safety Monitoring Records and sign-off sheets.

Prior to field activities, the field sampling personnel will coordinate with the Project Manager, or designee, to determine which additional records will be required for the specific field task. These additional records will be maintained in a field file or a three-ring notebook throughout the duration of the field activities, or included in a specially prepared site-specific notebook. If the field notebook is being created, the forms may be part of the laminated book.

Corrections:

If an error is made in the field, logbook corrections will be made by drawing a single line through the error, entering the correct information, and initialing and dating the change. Materials that obliterate the original information, such as correction fluids and/or mark-out tapes, are prohibited. All corrections will be initialed and dated. Some projects require that a brief reason for the change must also be added where the correction was made. Ask the Project Manager, if this requirement is necessary.

Documentation Reviews:

Periodically, the Project Manager, or designee, will review the field logbooks pertaining to the activities under their supervision. The elements of this review will include technical content, consistency, and compliance with the project plans and SOPs. Discrepancies and errors identified during the review should be resolved between reviewer and author of the field documentation. Corrections and/or additions of information shall be initialed and dated by the field author or reviewer.

Low Flow Groundwater Sampling

1. PURPOSE AND SCOPE

The objective of this standard operating procedure (SOP) is to define the methods and requirements for collection of groundwater samples from monitoring wells applying low flow protocols. Low flow sampling is a technique for collecting samples that does not require the removal of large volumes of water and therefore does not overly agitate the water, suspend particles, or potentially aspirate VOCs. Typical flow rates for low flow sampling should range from 0.1 L/min to 0.5 L/min depending on site characteristics. The groundwater monitoring activities will consist of measuring water levels, purging and sampling groundwater, and measuring groundwater field parameters. This procedure is applicable during all Cascadia Associates, LLC low flow groundwater sampling activities.

2. EQUIPMENT AND MATERIALS

The following materials are necessary for this procedure:

- Traffic cones, tools, keys, and buckets/drums;
- Water quality meter with calibration solutions (record daily calibration/calibration check in field notes);
- Sampling equipment (water level indicator, pump, tubing);
- Laboratory-supplied sample containers (Consult the project-specific sampling and analysis plan (SAP) for sampling requirements);
- Field documentation materials;
- Decontamination materials; and
- Personal protective equipment (consult the site-specific Health and Safety Plan).

3. METHODOLOGY

Water Levels:

Water levels in the wells will be measured and recorded for the purpose of determining groundwater elevations and gradient. The wells will be opened and the water level allowed to equilibrate before the measurements are taken. Measurements of the depth to water will be made to the nearest 0.01 foot using an electronic water level indicator.

Purging:

Purge using low-flow sampling equipment (e.g., peristaltic or bladder pump) at a rate no greater than the recharge rate of the groundwater to prevent water table drawdown. Unless specified otherwise in the project-specific SAP the sample tubing/pump will be lowered to the middle of the screened interval. Groundwater field parameters (pH, electrical conductivity, and temperature) will be measured using a water quality meter and flow cell connected to the discharge tubing of the sample pump to assess the effectiveness of purging. Purging will be considered complete when the water quality parameters (i.e., pH, temperature, and specific conductance) stabilize within 10 percent for three consecutive 3-minute intervals. Consult the

project-specific SAP for additional parameters and stabilization criteria. Purge water will be placed in Department of Transportation (DOT) approved drums.

Sample Collection:

After the purging of each well is complete, collect groundwater samples for chemical analyses using the same pump used for the well purging.

Low Yield Sampling Procedure:

If a well pumps dry during purging discontinue measurement of water quality parameters. Collect groundwater samples once the water level recovers to 90 percent of the pre-purge water column. Contact project manager in the event of slow recharge conditions. Always collect samples for VOC analysis as soon after recharge as possible.

APPENDIX B
Historical Groundwater Elevation Data

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-1	05/14/02	NS	14.5 - 24.5	--	16.00	--	NS
	05/25/07	26.66		--	14.92	--	11.74
	08/24/07	26.66		--	18.67	--	7.99
	11/26/07	26.66		--	17.91	--	8.75
	02/27/08	26.66		--	16.92	--	9.74
	03/30/10	26.66		--	17.09	--	9.57
	09/01/10	26.66		--	19.19	--	7.47
	12/16/14	26.66		--	16.19	--	10.47
	03/25/15	26.66		--	15.25	--	11.41
	06/24/15	26.66		--	18.43	--	8.23
	09/15/15	26.66		--	19.05	--	7.61
	11/30/17	26.72		--	16.16	--	10.56
	02/28/18	26.72		--	15.07	--	11.65
	05/29/18	26.72		--	8.43	--	18.29
	08/30/18	26.72		--	18.37	--	8.35
	02/18/19	26.72		--	16.51	--	10.21
	05/20/19	26.72		--	13.22	--	13.50
	08/28/19	26.72		--	19.04	--	7.68
	11/18/19	26.72		--	18.64	--	8.08
	02/24/20	26.72		--	16.26	--	10.46
	06/01/20	26.72		--	12.97	--	13.75
	08/17/20	26.72		--	18.19	--	8.53
	11/16/20	26.72		--	17.59	--	9.13
	02/25/21	26.72		--	14.52	--	12.20
	05/04/21	26.72		--	17.08	--	9.64
	08/10/21	26.72		--	19.77	--	6.95
	11/16/21	26.72		--	16.74	--	9.98
MW-2	05/14/02	NS	20 - 35	--	27.46	--	NS
	05/25/07	38.21		--	26.46	--	11.75
	08/24/07	38.21		--	30.17	--	8.04
	11/26/07	38.21		--	29.42	--	8.79
	02/27/08	38.21		--	28.50	--	9.71
	03/30/10	38.21		--	28.66	--	9.55
	09/01/10	38.21		--	30.74	--	7.47
	12/16/14	38.21		--	27.77	--	10.44
	03/25/15	38.21		--	26.79	--	11.42
	06/24/15	38.21		--	30.05	--	8.16
	09/15/15	38.21		--	30.65	--	7.56
	11/30/17	38.27		--	27.66	--	10.61
	02/28/18	38.27		--	26.70	--	11.57
	05/29/18	38.27		--	19.96	--	18.31
	08/30/18	38.27		--	29.94	--	8.33
	02/18/19	38.27		--	28.04	--	10.23
	05/20/19	38.27		--	24.73	--	13.54
	08/28/19	38.27		--	30.63	--	7.64
	11/18/19	38.27		--	30.16	--	8.11
	02/24/20	38.27		--	27.91	--	10.36
	06/01/20	38.27		--	24.51	--	13.76
	08/17/20	38.27		--	29.81	--	8.46
	11/16/20	38.27		--	29.01	--	9.26
	02/25/21	38.27		--	27.11	--	11.16

Please refer to notes at end of table.

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-2 (cont'd)	05/04/21	38.27		--	28.59	--	9.68
	08/10/21	38.27		--	30.34	--	7.93
	11/16/21	38.27		--	28.13	--	10.14
MW-3	05/14/02	NS	24.5 - 34.5	--	28.15	--	NS
	05/25/07	39.11		--	27.17	--	11.94
	08/24/07	39.11		--	31.04	--	8.07
	11/06/07	39.11		--	30.36	--	8.75
	02/27/08	39.11		--	28.71	--	10.40
	03/30/10	39.11		--	29.55	--	9.56
	09/01/10	39.11		--	31.65	--	7.46
	12/16/14	39.11		--	28.54	--	10.57
	03/25/15	39.11		--	27.72	--	11.39
	06/24/15	39.11		--	30.85	--	8.26
	09/15/15	39.11		--	31.52	--	7.59
	11/30/17	39.17		--	28.61	--	10.56
	02/28/18	39.17		--	27.18	--	11.99
	05/29/18	39.17		--	20.91	--	18.26
	08/30/18	39.17		--	30.80	--	8.37
	02/18/19	39.17		--	28.94	--	10.23
	05/20/19	39.17		--	26.03	--	13.14
	08/28/19	39.17		--	31.51	--	7.66
	11/18/19	39.17		--	31.06	--	8.11
	02/24/20	39.17		--	28.76	--	10.41
	06/01/20	39.17		--	25.73	--	13.44
	08/17/20	39.17		--	30.53	--	8.64
	11/16/20	39.17		--	29.88	--	9.29
	02/25/21	39.17		--	27.91	--	11.26
	05/04/21	39.17		--	29.47	--	9.70
	08/10/21	39.17		--	31.22	--	7.95
	11/16/21	39.17		--	29.06	--	10.11

Please refer to notes at end of table.

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-4	05/14/02	NS	20 - 35	–	29.40	--	NS
	05/25/07	40.17		–	28.35	--	11.82
	08/24/07	40.17		–	32.12	--	8.05
	11/06/07	40.17		–	31.40	--	8.77
	02/27/08	40.17		–	30.40	--	9.77
	03/30/10	40.17		–	30.77	--	9.40
	09/01/10	40.17		–	32.62	--	7.55
	12/16/14	40.17		–	29.63	--	10.54
	03/25/15	40.17		–	28.76	--	11.41
	06/24/15	40.17		–	31.92	--	8.25
	09/15/15	40.17		–	32.61	--	7.56
	11/30/17	40.23		–	29.59	--	10.64
	02/28/18	40.23		–	28.60	--	11.63
	05/29/18	40.23		–	21.88	--	18.35
	08/30/18	40.23		–	31.86	--	8.37
	02/18/19	40.23		–	30.04	--	10.19
	05/20/19	40.23		–	26.74	--	13.49
	08/28/19	40.23		–	32.59	--	7.64
	11/18/19	40.23		–	32.09	--	8.14
	02/24/20	40.23		–	29.77	--	10.46
	06/01/20	40.23		–	26.46	--	13.77
	08/17/20	40.23		–	31.78	--	8.45
	11/16/20	40.23		–	31.09	--	9.14
	02/25/21	40.23		–	29.01	--	11.22
	05/04/21	40.23		–	30.52	--	9.71
	08/10/21	40.23		–	32.30	--	7.93
	11/16/21	40.23		–	30.11	--	10.12
MW-5	12/16/14	27.03	10 - 25	–	16.60	--	10.43
	03/25/15	27.03		–	15.37	--	11.66
	06/24/15	27.03		–	18.89	--	8.14
	09/15/15	27.03		–	19.35	--	7.68
	10/23/17	27.03		–	17.82	--	9.21
	11/30/17	27.03		–	16.39	--	10.64
	02/28/18	27.03		–	15.41	--	11.62
	05/29/18	27.03		–	8.68	--	18.35
	08/30/18	27.03		–	18.55	--	8.48
	02/18/19	27.03		–	16.70	--	10.33
	05/20/19	27.03		–	13.19	--	13.84
	08/28/19	27.03		–	19.31	--	7.72
	11/18/19	27.03		–	18.92	--	8.11
	02/24/20	27.03		–	17.00	--	10.03
	06/01/20	27.03		–	13.21	--	13.82
	08/17/20	27.03		–	18.39	--	8.64
	11/16/20	27.03		–	17.48	--	9.55
	02/25/21	27.03		–	15.83	--	11.20
	05/04/21	27.03		–	17.42	--	9.61
	08/10/21	27.03		–	18.98	--	8.05
	11/16/21	27.03		–	16.80	--	10.23

Please refer to notes at end of table.

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-5D	10/24/17	26.71	35 - 45	--	17.50	--	9.21
	11/30/17	26.71		--	16.21	--	10.50
	02/28/18	26.71		--	15.20	--	11.51
	05/29/18	26.71		--	8.37	--	18.34
	08/30/18	26.71		--	18.51	--	8.20
	02/18/19	26.71		--	16.43	--	10.28
	05/20/19	26.71		--	12.72	--	13.99
	08/28/19	26.71		--	19.01	--	7.70
	11/18/19	26.71		--	18.62	--	8.09
	02/24/20	26.71		--	16.62	--	10.09
	06/01/20	26.71		--	12.63	--	14.08
	08/17/20	26.71		--	18.13	--	8.58
	11/16/20	26.71		--	17.02	--	9.69
	02/25/21	26.71		--	15.63	--	11.08
	05/04/21	26.71		--	17.05	--	9.66
	08/10/21	26.71		--	18.64	--	8.07
	11/16/21	26.71		--	16.50	--	10.21
MW-6	12/16/14	27.33	10 - 25	--	16.93	--	10.40
	03/25/15	27.33		--	15.73	--	11.60
	06/24/15	27.33		--	19.34	--	7.99
	09/15/15	27.33		--	19.70	--	7.63
	10/24/17	27.33		--	18.12	--	9.21
	11/30/17	27.33		--	16.71	--	10.62
	02/28/18	27.33		--	15.77	--	11.56
	05/29/18	27.33		--	9.03	--	18.30
	08/30/18	27.33		--	18.99	--	8.34
	02/18/19	27.33		--	16.99	--	10.34
	05/20/19	27.33		--	13.56	--	13.77
	08/28/19	27.33		--	19.66	--	7.67
	11/18/19	27.33		--	19.31	--	8.02
	02/24/20	27.33		--	17.14	--	10.19
	06/01/20	27.33		--	13.45	--	13.88
	08/17/20	27.33		--	18.77	--	8.56
	11/16/20	27.33		--	17.78	--	9.55
	02/25/21	27.33		--	16.16	--	11.17
	05/04/21	27.33		--	17.72	--	9.61
	08/10/21	27.33		--	19.39	--	7.94
	11/16/21	27.33		--	17.09	--	10.24

Please refer to notes at end of table.

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-7	11/30/2017	21.67	10 - 25	--	11.12	--	10.55
	2/28/2018	21.67		--	10.19	--	11.48
	5/29/2018	21.67		--	3.4	--	18.27
	08/30/18	21.67		--	13.26	--	8.41
	02/18/19	21.67		--	11.41	--	10.26
	05/20/19	21.67		--	7.73	--	13.94
	08/28/19	21.67		--	13.99	--	7.68
	11/18/19	21.67		--	13.76	--	7.91
	02/24/20	21.67		--	11.49	--	10.18
	06/01/20	21.67		--	7.10	--	14.57
	08/17/20	21.67		--	13.11	--	8.56
	11/16/20	21.67		--	12.01	--	9.66
	02/25/21	21.67		--	10.53	--	11.14
	05/04/21	21.67		--	12.07	--	9.60
	08/10/21	21.67		--	13.59	--	8.08
	11/16/21	21.67		--	11.41	--	10.26
MW-8	11/30/2017	27.68	10 - 25	--	16.91	--	10.77
	2/28/2017	27.68		--	16.01	--	11.67
	5/29/2018	27.68		--	9.31	--	18.37
	08/30/18	27.68		--	19.22	--	8.46
	02/18/19	27.68		--	17.28	--	10.40
	05/20/19	27.68		--	13.93	--	13.75
	08/28/19	27.68		--	19.94	--	7.74
	11/18/19	27.68		--	19.57	--	8.11
	02/24/20	27.68		--	17.38	--	10.30
	06/01/20	27.68		--	13.82	--	13.86
	08/17/20	27.68		--	19.04	--	8.64
	11/16/20	27.68		--	18.11	--	9.57
	02/25/21	27.68		--	16.44	--	11.24
	05/04/21	27.68		--	17.98	--	9.70
	08/10/21	27.68		--	19.64	--	8.04
	11/16/21	27.68		--	17.67	--	10.01
MW-8D	11/30/2017	27.87	35 - 45	--	17.36	--	10.51
	2/28/2018	27.87		--	16.35	--	11.52
	5/29/2018	27.87		--	9.53	--	18.34
	08/30/18	27.87		--	19.41	--	8.46
	02/18/19	27.87		--	17.59	--	10.28
	05/20/19	27.87		--	13.9	--	13.97
	08/28/19	27.87		--	20.21	--	7.66
	11/18/19	27.87		--	19.80	--	8.07
	02/24/20	27.87		--	17.79	--	10.08
	06/01/20	27.87		--	13.80	--	14.07
	08/17/20	27.87		--	19.29	--	8.58
	11/16/20	27.87		--	18.22	--	9.65
	02/25/21	27.87		--	16.76	--	11.11
	05/04/21	27.87		--	18.24	--	9.63
	08/10/21	27.87		--	19.80	--	8.07
	11/16/21	27.87		--	17.42	--	10.45

Please refer to notes at end of table.

Appendix B

Groundwater Elevation Data

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Date of Measurement	Top of Casing Elevation (feet above MSL)	Screened Interval (feet bgs)	Depth To SPH (feet)	Depth to Groundwater (feet)	SPH Thickness (feet)	Groundwater Elevation (feet)
MW-9	11/30/2017	29.39	10 - 25	--	18.78	--	10.61
	2/28/2018	29.39		--	17.79	--	11.60
	5/29/2018	29.39		--	11.09	--	18.30
	08/30/18	29.39		--	21.04	--	8.35
	02/18/19	29.39		--	19.13	--	10.26
	05/20/19	29.39		--	14.63	--	14.76
	08/28/19	29.39		--	21.74	--	7.65
	11/18/19	29.39		--	21.28	--	8.11
	02/24/20	29.39		--	21.08	--	8.31
	06/01/20	29.39		--	15.53	--	13.86
	08/17/20	29.39		--	20.89	--	8.50
	11/16/20	29.39		--	20.07	--	9.32
	02/25/21	29.39		--	18.15	--	11.24
	05/04/21	29.39		--	19.69	--	9.70
	08/10/21	29.39		--	21.45	--	7.94
	11/16/21	29.39		--	19.27	--	10.12
MW-10	11/30/2017	28.71	10 - 25	--	18.16	--	10.55
	2/28/2018	28.71		--	17.19	--	11.52
	5/29/2018	28.71		--	10.38	--	18.33
	08/30/18	28.71		--	20.3	--	8.41
	02/18/19	28.71		--	18.42	--	10.29
	05/20/19	28.71		--	14.76	--	13.95
	08/28/19	28.71		--	21.02	--	7.69
	11/18/19	28.71		--	20.67	--	8.04
	02/24/20	28.71		--	18.57	--	10.14
	06/01/20	28.71		--	14.68	--	14.03
	08/17/20	28.71		--	20.17	--	8.54
	11/16/20	28.71		--	19.09	--	9.62
	02/25/21	28.71		--	17.8	--	10.91
	05/04/21	28.71		--	19.06	--	9.65
	08/10/21	28.71		--	20.74	--	7.97
	11/16/21	28.71		--	18.48	--	10.23
MW-11	02/18/19	NS	10 - 25	--	17.27	--	NS
	05/20/19	NS		--	14.32	--	NS
	08/28/19	NS		--	19.55	--	NS
	11/18/19	NS		--	19.36	--	NS
	02/24/20	NS		--	16.28	--	NS
	06/01/20	NS		--	13.95	--	NS
	08/17/20	NS		--	18.58	--	NS
	11/16/20	NS		--	18.70	--	NS
	02/25/21	NS		--	15.91	--	NS
	05/04/21	NS		--	17.79	--	NS
	08/10/21	NS		--	19.31	--	NS
	11/16/21	NS		--	17.75	--	NS

Notes:

1. Survey elevations determined by Bluedot Group surveying, November 2017.
2. Reference elevation (i.e., top of casing) relative to NAVD 88, feet above mean sea level.
3. feet above MSL = feet above mean sea level.
4. NS = Not surveyed
5. -- = SPH not measured/observed.
6. bgs = below ground surface.

APPENDIX C
Field Gauging and Sampling Forms

Project: 1Q21 GWM
Client: Nustar Vanny
Sampler: LW

Date: 2/25/21
Permit:

Well ID:	Time:	DTP:	DTW:	Product Thickness:	Notes:
MW-7	823	—	10.53	—	
MW-8D	829	—	16.76	—	
MW-8	831	—	16.44	—	
MW-5	833	—	15.83	—	
MW-5D	835	—	15.63	—	
MW-9	838	—	18.15	—	
MW-4	846	—	29.01	—	
MW-2	849	—	27.11	—	
MW-3	853	—	27.91	—	
MW-10	900	—	17.80	—	
MW-11	904	—	15.91	—	
MW-1	907	—	14.52	—	
MW-6	910	—	16.16	—	

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8D	Job Number:	
Client:	Nustar VANNEX	Date:	2/25/21
Project:	1Q21 GWM	Sampler:	LW
Weather:	Rain/Sun, 37°F	Time In/Out:	935 / 1015

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	16.81	Water Column Length:	—
Well Cap Lock Present:	Yes (No)	Screened Interval:	35-45	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri pump	Pump Intake Depth:	40 ft bgs (mid screen)
Sampling Method:	Low flow	Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
945			16.81	0.2	8.64	12.42	165	13.13	191	clear
948			16.81	"	8.25	12.20	163	6.74	193	
951					7.73	11.96	167	2.76	201	
954					7.63	11.93	169	2.37	203	
957					7.44	11.87	173	2.00	209	
1000					7.28	11.89	175	1.64	215	
1003					7.02	11.90	175	1.42	224	
1006					6.75	11.83	175	1.26	236	
1009					6.70	11.81	175	1.21	238	
1012					6.65	11.79	175	1.17	242	

PURGING DATA

Sample ID:	MW-8D	Sampling Flow Rate:	0.2	Analytical Laboratory:	Apex
Sample Time:	1000	Final Depth to Water:	16.81	Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOCs / GX	N	—			
2x1L	HCl	DX	N	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8	Job Number:	
Client:	Nustar Vanmex	Date:	2/25/21
Project:	1021 GWM	Sampler:	LW
Weather:	cloudy, 38°F	Time In/Out:	1015/1050

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	16.46	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	per. Pump Low Flow	Pump Intake Depth:	22.5 bgs
Sampling Method:		Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1027			16.46	0.2	6.93	11.20	177	1.30	219	clear
1030			↓	↓	6.40	11.65	118	3.15	237	↓
1033					5.94	11.76	105	4.46	242	
1036					6.01	11.79	101	4.62	237	
1039					6.04	11.80	96	4.80	231	
1042					5.97	11.84	95	4.74	234	

PURGING DATA

Sample ID:	MW-8	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	1040	Final Depth to Water:	16.46		Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOCs 1GX	—				
2x1L	HCl	DX	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5	Job Number:	
Client:	Nustar Vancouver	Date:	2/25/24
Project:	1221	Sampler:	LW
Weather:	pt sunny, 40F	Time In/Out:	1050 / 1120

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	15.89	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	peripump	Pump Intake Depth:	22.26 bgs
Sampling Method:	Low flow	Tubing Material & Type:	LDPE (NEW) DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1055			15.89	0.2	5.81	12.23	122	5.05	-28	clear
1058			15.92	↓	6.35	13.31	857	1.87	-117	↓
1101			16.01		6.55	13.43	882	1.72	-129	
1103			16.12		6.57	13.48	871	1.79	-129	
1105			16.45	↓	6.59	13.52	861	1.85	-130	
1107										

PURGING DATA

Sample ID:	MW-5	Sampling Flow Rate:	0.2			Analytical Laboratory:	Apex
Sample Time:	1110	Final Depth to Water:	16.89			Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOCs / GX		—	—	✓ MW-5 DUP	
2x1	HCl	TPH-D		—	—	✓ MW-5 DUP	

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5D	Job Number:	
Client:	Nustar Kinnex	Date:	2/25/21
Project:	1021 GWM	Sampler:	LW
Weather:	pt cloudy, 44°F	Time In/Out:	1120 / 1255

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	15.64	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	35-45	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic pump low flow	Pump Intake Depth:	40 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1127			15.64	0.2	6.52	12.81	844	2.40	-113	clear
1130					6.63	12.99	801	2.31	-105	
1133					6.78	13.27	737	2.20	-92	
1136					6.80	13.28	742	2.18	-89	
1139					6.82	13.30	749	2.01	-86	
1142					6.88	13.31	757	1.91	-81	
1145										

PURGING DATA

Sample ID:	MW-5D	Sampling Flow Rate:	0.2			Analytical Laboratory:	Apex
Sample Time:	1150	Final Depth to Water:	15.64			Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOCs 6X	—				
2x1L	HCl	TPH-D 6X	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-9	Job Number:	
Client:	NW Star Vanadium	Date:	2/25/24
Project:	1021 GWM	Sampler:	LW
Weather:	Sunny, 45°F	Time In/Out:	1200 / 1240

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.18	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	10-25	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic pump low flow	Pump Intake Depth:	23.4 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1206			18.18	0.2	7.32	13.04	330	16.23	-6	clear
1209			18.21	↓	6.86	13.16	164	6.30	78	↓
1212			18.21	↓	6.71	13.17	150	6.24	92	↓
1215			18.21	↓	6.52	13.18	135	6.20	111	↓
1218			↓	↓	6.48	13.21	130	6.17	120	↓
1221			↓	↓	6.43	13.22	125	6.12	131	↓
1224			↓	↓	6.43	13.19	129	5.82	132	↓

PURGING DATA

Sample ID:	MW-9	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	1220	Final Depth to Water:	18.21		Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	GX/VOCs				
2x1L	HCl	DX				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-7	Job Number:	
Client:	Nustar Vanner	Date:	2/25/21
Project:	1Q21	Sampler:	LW
Weather:	Cloudy/Rain, 45°F	Time In/Out:	1300 / 1335

WELL DATA

Monument Type:	Flush-mount / Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	10.70	Water Column Length:	—
Well Cap Lock Present:	Yes (No)	Screened Interval:	10-25	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri pump Low flow	Pump Intake Depth:	19.5 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
13:05			10.70	0.2	6.00	13.02	410	19.33	24	clear
1308			10.89		6.19	13.18	621	3.13	-9	
1311			10.92		6.21	13.18	639	2.14	-11	
1314			10.95		6.32	13.18	653	1.51	-17	
1317			10.98		6.31	13.19	655	1.34	-14	
1320			11.02		6.36	13.20	657	1.22	-18	

PURGING DATA

Sample ID:	MW-7	Sampling Flow Rate:	0.2			Analytical Laboratory:	Apex
Sample Time:	1320	Final Depth to Water:	11.21			Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	GX/VOCs					
2x1L	HCl	DX					

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-3	Job Number:	
Client:	Mutual Materials	Date:	2/25/21
Project:	1Q21	Sampler:	LW
Weather:	Cloudy, 45°F	Time In/Out:	1335 / 1410

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	27.95	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	24.5-34.5	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri pump low flow	Pump Intake Depth:	33.1 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1342			27.95	0.2	6.47	17.62	656	3.01	-7	clear
1345			28.10		6.32	13.52	292	2.15	51	
1348			28.25		6.20	13.67	239	2.18	82	
1351			28.40		6.13	13.65	227	2.01	102	
1354			28.55		6.11	13.65	224	1.87	108	
1357			28.70		6.10	13.45	221	1.52	112	

PURGING DATA

Sample ID:	MW-3	Sampling Flow Rate:	0.2			Analytical Laboratory:	Apex
Sample Time:	1400	Final Depth to Water:	29.0			Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3X40	HCl	VOCs 16x					
2X1L	HCl	DX					

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-6	Job Number:	
Client:	Nustar Jannex	Date:	2/25/21
Project:	1021	Sampler:	LW
Weather:	Rain, 40°F	Time In/Out:	1415 /

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	16.40	Water Column Length:	—
Well Cap Lock Present:	Yes (No)	Screened Interval:	10-25	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri pump	Pump Intake Depth:	22.3 bgs
Sampling Method:	Low flow	Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1420			16.40	0.25	6.68	12.68	491	4.65	-52	clear
1423			16.95	0.25	6.21	12.74	420	2.71	-70	↓
1426			17.05	0.20	6.37	12.91	963	1.74	-109	
1429			17.05	↓	6.38	12.89	981	1.55	-113	
1432			17.05		6.29	12.98	984	1.54	-106	

PURGING DATA

Sample ID:	MW-6	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex NS
Sample Time:		Final Depth to Water:	17.80		Did Well Dewater:	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	6x VOCs	—			
2x1L	HCl	Dx	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-1	Job Number:	
Client:	Nustar Jamaica	Date:	2/26/21
Project:	1Q21 GWM	Sampler:	LW
Weather:	Rain, 40°F	Time In/Out:	720 / 800

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good	Depth to Water:	15.53	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	14.5-24.5	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri Pump Low Flow	Pump Intake Depth:	21.9 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
735			15.53	0.2	6.96	13.67	585	13.36	93	clear
738			↓	↓	6.71	13.66	591	7.34	108	↓
741					6.15	13.74	583	3.78	136	
744					5.71	13.76	572	2.86	162	
747					5.64	13.78	568	2.61	167	
750					5.65	13.79	566	2.49	167	

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	750	Final Depth to Water:	15.53		Did Well Dewater:	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3X40	HCl	GX (VOCs				
2X1L	HCl	DX				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-11	Job Number:	
Client:	Nustar Vancouver	Date:	2/26/21
Project:	1021	Sampler:	LW
Weather:	Rain	Time In/Out:	800/840

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	16.68	Water Column Length:	—
Well Cap Lock Present:	Yes (No)	Screened Interval:	10-25	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri. pump low flow	Pump Intake Depth:	22.3 ft bgs
Sampling Method:		Tubing Material & Type:	NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
808			16.68	0.2	~~3.38~~ 8.00	13.38	413	6.99	118	clear
811			16.68		5.82	13.66	274	2.53	132	
814			16.68		5.51	13.67	246	1.85	111	
817			↓		5.34	13.71	245	1.64	033	
820			↓	↓	5.30	13.72	251	1.52	46	↓
823			↓	↓	5.28	13.75	256	1.41	62	↓

PURGING DATA

Sample ID:	MW-11	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	820	Final Depth to Water:	16.68		Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOCs/8x				
2x1L	HCl	PX				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-4	Job Number:	
Client:	Nustar Vannix	Date:	2/26/21
Project:	1Q21	Sampler:	LW
Weather:	Rain 40F	Time In/Out:	845 / 920

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:		Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	29.05	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	20-35	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri pump w/ flow	Pump Intake Depth:	33.8 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
854			29.05	0.2	5.93	12.40	275	6.97	31	cl aR
857					6.02	12.64	273	3.14	47	
900					6.09	12.62	272	2.84	71	
903					6.11	12.60	271	2.81	78	
906					6.16	12.61	272	2.69	87	
909										

PURGING DATA

Sample ID:	MW-4	Sampling Flow Rate:	29.05 / 0.2		Analytical Laboratory:	APEX
Sample Time:	910	Final Depth to Water:			Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	6PX (VOCs)				
2x1L	HCl	TPH				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-2	Job Number:	
Client:	Nhstra Yamhill	Date:	2/26/21
Project:	1021	Sampler:	LW
Weather:	Rain, 40F	Time In/Out:	920 // 1000

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	27.13	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	20-35	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peel pump Low flow	Pump Intake Depth:	32.9 Ft bgs
Sampling Method:		Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
924			27.13	0.2	6.02	12.68	3	1.64	107	clear
927			↓	↓	5.70	13.20	4	4.49	4	↓
930					5.71	13.33	180	4	13	
933					5.76	13.20	178	4		
936					5.88	13.24	175	3.44	140	
939					5.90	13.34	176	3.00	135	
942					5.88	13.66	177	2.66	141	
945					5.88	13.63	178	2.71	142	

PURGING DATA

Sample ID:	MW-2	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	940	Final Depth to Water:	27.3		Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40 mL	HCl	VOCs 6X	—	—	—	—
2x1L	HCl	DX	—	—	—	—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-10	Job Number:	
Client:	NuStar Vanmex	Date:	2/26/21
Project:	~~Portland Terminal 23A2020 GWM~~ 1Q21	Sampler:	LW
Weather:	Rain pt cloudy	Time In/Out:	1020 / 1100

WELL DATA

Monument Type:	Flush-mount / Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.70	Water Column Length:	—
Well Cap Lock Present:	Yes (No)	Screened Interval:	10-25	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri pump Low flow	Pump Intake Depth:	23.0 ft bgs
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1028			17.70	0.2	5.61	12.58	149	4.43	177	clear
1031					5.38	12.93	114	5.56	196	
1034					6.39	12.96	108	5.66	148	
1037					6.17	12.99	108	5.46	163	
1040					6.25	13.04	107	5.46	158	
1043					6.27	12.96	107	5.72	161	
1046					6.32	12.95	107	5.65	159	

PURGING DATA

Sample ID:	MW-10	Sampling Flow Rate:	0.2			Analytical Laboratory:	APEX
Sample Time:	1040	Final Depth to Water:	17.70			Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOCs/6x	—				
2x1L	HCl	DX	—				

NOTES/ADDITIONAL COMMENTS

Project: NuStar Vanner
Client:
Sampler: GW

Date: 5/4/21
Permit:

Well ID:	T				Not
MW-1	817		17.08		
MW-11	821		17.79		
MW-4	828		30.52		
MW-2	838		28.59		
MW-3	843		29.47		
MW-10	847		19.06		
MW-6	853		17.72		odor
MW-9	859		19.69		
MW-8D	903		18.24		
MW-8	906		17.98		
MW-5D	910		17.05		
MW-5	914		17.42		
MW-7	922		12.07		

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-7	Job Number:	
Client:	NuStar Vancouver	Date:	5/4
Project:	GWM 2021	Sampler:	GW
Weather:	Pt Sun 60°	Time In/Out:	915 / 1010

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	12.07	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	20'
Sampling Method:		Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
930			12.07	.25	7.46	14.09	624	12.32	-163.1	cloudy
933			12.21	↓	6.75	13.70	598	3.21	-277.7	clear
936			12.46	↓	6.64	13.63	587	2.98	-301.2	↓
939			12.49	↓	6.44	13.64	571	2.43	-321.7	↓
942			12.52	↓	6.42	13.60	568	2.21	-326.1	↓
945			12.52	↓	6.43	13.61	560	2.07	-328.0	↓

PURGING DATA

Sample ID:	MW-7	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	945	Final Depth to Water:	12.50		Did Well Dewater:		NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	N	—			
2x1L	HCl	TPH-D	N	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-9	Job Number:	
Client:	Nu Star Vanna	Date:	5/4
Project:	GWSM 2021	Sampler:	AW
Weather:	Sunny 65°	Time In/Out:	1015/1050

WELL DATA

Monument Type:	Flush-mount / Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:		Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	19.69	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	23'
Sampling Method:	low flow	Tubing Material & Type:	~~LDPE~~ NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1021			19.69	.25	6.59	15.67	572	3.67	-189.9	clear
1024			↓	↓	6.61	14.17	370	4.86	-163.1	↓
1027			↓	↓	6.54	14.07	290	5.10	-154.7	↓
1030			↓	↓	6.26	13.99	153	7.46	-150.1	↓
1033			↓	↓	6.24	13.80	145	7.60	-148.7	↓
1036			↓	↓	6.19	13.75	131	7.86	-143.0	↓

PURGING DATA

Sample ID:	MW-9	Sampling Flow Rate:	.25		Analytical Laboratory:	Apex
Sample Time:	1036	Final Depth to Water:	19.70		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	TPHD	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5D	Job Number:	
Client:	Nu Star Vanmex	Date:	5/4
Project:	GWM 2021	Sampler:	SG
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.03	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri flow flow	Pump Intake Depth:	40'
Sampling Method:		Tubing Material & Type:	LDPE (NEW / DEDICATED)

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/- 20 mV	
1120			17.03	.25	6.01	15.59	135	9.21	-162.0	clear
1123			↓	↓	6.48	14.51	241	4.26	-275.1	↓
1126					6.50	14.54	351	1.96	-269.2	
1129					6.52	14.47	369	1.89	-270.5	
1132					6.53	14.44	377	1.84	-267.1	

PURGING DATA

Sample ID:	MW-5D	Sampling Flow Rate:	.25			Analytical Laboratory:	Apex NJ
Sample Time:	1132	Final Depth to Water:	17.07			Did Well Dewater:	
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x1L	HCl	TPHD	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5	Job Number:	
Client:	Nu Star Vanna	Date:	5/4
Project:	GWM 2Q21	Sampler:	AW
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.46	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri / low flow	Pump Intake Depth:	22'
Sampling Method:		Tubing Material & Type:	HDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1148			17.46	.25	6.79	16.63	689	2.09	-233.6	clear
1151			17.75		6.70	15.97	703	1.56	-269.3	
1154			18.01		6.65	15.71	750	.91	285.6	
1157			18.26		6.64	15.20	765	.70	290.1	
1200			18.48		6.64	14.93	771	.63	-292.6	
1203			18.65		6.64	14.90	777	.61	-291.2	

PURGING DATA

Sample ID:	MW-5	Sampling Flow Rate:	.25			Analytical Laboratory:	Apex
Sample Time:	1200	Final Depth to Water:	19.01			Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x1L	HCl	+PHD	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8	Job Number:	
Client:	NuStar Vanno	Date:	5/4
Project:	GWM	Sampler:	KD
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good	Depth to Water:	18.00	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	22.5'
Sampling Method:	Low flow	Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1231			18.00	.25	6.81	18.61	770	1.15	-229.0	clear
1234			18.54	.2	6.85	14.58	312	2.58	-181.5	↓
1237			19.02	.15	6.48	13.98	179	3.89	-166.4	↓
1240			19.44	↓	6.45	13.80	146	4.15	-161.3	↓
1243			19.60	↓	6.44	13.74	132	4.21	-160.2	↓

PURGING DATA

Sample ID:	MW-8	Sampling Flow Rate:	.15		Analytical Laboratory:		Apex
Sample Time:	1243	Final Depth to Water:	20.76		Did Well Dewater:		NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x1L	HCl	TPH-D	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8D	Job Number:	
Client:	NuStar Vannes	Date:	5/4
Project:	GWM2021	Sampler:	KW
Weather:	Sun 70°	Time In/Out:	

WELL DATA

Monument Type:	(Flush-mount) Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.20	Water Column Length:	—
Well Cap Lock Present:	(Yes) No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method: peri

Sampling Method: low flow

Pump Intake Depth: 40'

Tubing Material & Type: LDPE

(NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1310			18.20	.25	6.13	16.79	86	7.92	-172.2	clear
1313			18.20	↓	6.48	13.16	125	4.96	-229.9	↓
1316			↓	↓	6.73	12.98	130	2.81	-262.2	↓
1319			↓	↓	6.75	12.96	131	1.54	-296.1	↓
1322			↓	↓	6.79	12.83	131	.80	-302.1	↓
1325			↓	↓	6.81	12.84	132	.69	-305.3	↓
1328			↓	↓	6.82	12.87	132	.61	-307.4	↓

PURGING DATA

Sample ID:	MW-8D	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	1328	Final Depth to Water:	18.20		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—	—	—	—	
2x1L	HCl	TPH-D	—	—	—	—	

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-1	Job Number:	
Client:	Nu Star Vanmar	Date:	5/5
Project:	GWM 2021	Sampler:	AW
Weather:	Sun 55°	Time In/Out:	730 - 815

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.02	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 4-inch = 0.653 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri	Pump Intake Depth:	22'
Sampling Method:	flow	Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
752			17.02	.25	7.20	14.10	439	17.90	-249.1	clear
755			↓	↓	6.19	14.18	454	3.77	-288.4	↓
758					6.04	14.22	454	2.02	-293.1	
801					5.97	14.23	443	1.90	-279.3	
804					5.96	14.20	441	1.87	-281.0	

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	804	Final Depth to Water:	17.02		Did Well Dewater:		NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x 1L	HCl	TPH-D	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-11	Job Number:	
Client:	NuStar Vancouver	Date:	5/5
Project:	GW M2Q21	Sampler:	AL
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.47	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	22'
Sampling Method:	Low flow	Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
844			18.47	.3	6.07	14.80	450	2.40	-276.1	clear
847			18.80	.2	6.44	14.49	521	1.22	-291.9	↓
850			18.99	↓	6.61	14.35	527	.84	-284.8	
853			19.08		6.68	14.70	535	.66	-284.4	
856			19.10		6.70	14.72	538	.64	-287.0	

PURGING DATA

Sample ID:	MW-11	Sampling Flow Rate:	2		Analytical Laboratory:	Apex
Sample Time:	856	Final Depth to Water:	19.14		Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x1L	↓	TPHD	—				
3x40		VOC	—			MW-11	Dup
2x1L		TPHD	—			MW-11	Dup

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-4	Job Number:	
Client:	Nu Star Vancouver	Date:	5/5
Project:	GWM 2021	Sampler:	AC
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	30.44	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Bladder Pump low flow	Pump Intake Depth:	34'
Sampling Method:		Tubing Material & Type:	SB

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
950			30.44	.3	6.82	16.54	391	6.94	-116.5	clear
953					6.61	15.72	328	4.21	-193.7	
956					6.40	15.24	281	3.59	-222.9	
959					6.35	15.05	275	2.96	-223.4	
1002					6.31	15.02	267	2.81	-225.3	
1005					6.29	14.99	253	2.77	-227.4	

PURGING DATA

Sample ID:	MW-4	Sampling Flow Rate:	.3		Analytical Laboratory:	Apex
Sample Time:	1005	Final Depth to Water:	30.44		Did Well Dewater:	NO
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	TPH-d	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-2	Job Number:	
Client:	NW Star Nannies	Date:	5/5
Project:	GWM2024	Sampler:	KW
Weather:	Sun 65°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	28.54	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri	Pump Intake Depth:	33'
Sampling Method:	flowthrough	Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1027			28.54	.25	6.15	15.69	252	3.11	-234.5	clear
1030			↓	↓	6.22	16.54	239	2.77	-219.9	↓
1033			↓	↓	6.21	15.78	207	1.90	-260.2	↓
1036			↓	↓	6.20	15.60	185	.93	-274.3	↓
1039			↓	↓	6.18	15.58	181	.80	-280.2	↓
1042			↓	↓	6.18	15.61	174	.72	-282.1	↓

PURGING DATA

Sample ID:	MW-2	Sampling Flow Rate:	.25		Analytical Laboratory:	Apex
Sample Time:	1042	Final Depth to Water:	28.54		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x 40	HCl	VOC	—			
2x 1L	HCl	TPH-d	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-3	Job Number:	—
Client:	NuStar Vancouver	Date:	5/5
Project:	GWM 2021	Sampler:	AC
Weather:	Sun 70°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other: good	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	29.67	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri	Pump Intake Depth:	33'
Sampling Method:	Low flow	Tubing Material & Type:	LDPE (NEW / DEDICATED)

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1103			29.67	.2	6.09	17.11	180	2.91	-257.0	clear
1106			↓	↓	6.05	19.25	191	2.73	-228.6	↓
1109					6.14	19.40	188	3.30	-221.8	
1112					6.13	18.36	176	2.85	-258.2	
1115					6.10	17.33	172	2.35	-284.7	
1118					6.08	16.50	171	2.22	-287.8	
1121					6.07	16.32	170	2.14	-290.1	
1124			↓	↓	6.07	16.25	170	2.09	-290.9	↓

PURGING DATA

Sample ID:	MW-3	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	1124	Final Depth to Water:			Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	TPHd	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-10	Job Number:	
Client:	NuStar Vanmar	Date:	5/5
Project:	GWM 2021	Sampler:	AW
Weather:	Sun 70°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.97	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri	Pump Intake Depth:	23'
Sampling Method:	low flow	Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1150			18.97	.25	6.19	17.07	133	3.20	-218.6	clear
1153			↓	↓	6.30	14.17	104	5.41	-169.7	
1156					6.28	14.12	101	6.91	-157.4	
1159					6.20	14.15	123	7.20	-146.1	
1202					6.07	14.07	123	7.41	-142.4	
1205					6.05	14.04	123	7.48	-140.0	↓

PURGING DATA

Sample ID:	MW-10	Sampling Flow Rate:	.25		Analytical Laboratory:	Apex
Sample Time:	1205	Final Depth to Water:	18.97		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOCs	—			
2x1L	HCl	TPH-D	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-6	Job Number:	
Client:	NuStar Vancouver	Date:	5/5
Project:	GWM 2021	Sampler:	AD
Weather:	Sun 70°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.30	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	23'
Sampling Method:	Low flow	Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1248			18.30	.25	5.93	17.17	445	11.66	-185.1	clear
1251			18.57	↓	6.23	14.79	787	9.90	-215.6	↓
1254			18.75		6.28	14.59	824	9.03	-249.1	
1257			18.90		6.25	14.44	831	8.18	-281.3	
1300			19.22		6.25	14.41	835	8.10	-275.5	
1303			19.31		6.24	14.39	836	8.06	-273.4	

PURGING DATA

Sample ID:	MW-6	Sampling Flow Rate:	.25		Analytical Laboratory:	Apex
Sample Time:	1306	Final Depth to Water:	19.60		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	TPH-d	—			

NOTES/ADDITIONAL COMMENTS

Project: ~~Vanguard~~ GWM 3Q21 Date: 8/10/21
Client:
Sampler: KW

Well ID:	Time:	DTP:	DTW:	Product Thickness:	Notes:
MW-6	748	—	19.39		
MW-10	755	—	20.74		
MW-3	801	—	31.22		
MW-4	806	—	32.30		
MW-2	810	—	30.34		
MW-1	815	—	19.77		
MW-11	818	—	19.31		
MW-9	824	—	21.45		
MW-5D	828	—	18.64		
MW-5	830	—	18.98		
MW-8	836	—	19.64		
MW-8D	840	—	19.80		
MW-7	849	—	13.59		

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-7	Job Number:	
Client:	NuStar Yarmea	Date:	8/10/21
Project:	GWM 3021	Sampler:	MW
Weather:	Sun 70°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount / Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	13.59	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri	Pump Intake Depth:	Mid Screen 19.5
Sampling Method:	Low flow	Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
903			13.59	.3	7.07	15.46	650	19.71	-35.2	clear
906			13.76	.2	6.90	15.19	614	7.81	-22.5	
909			13.95		6.80	15.12	620	3.52	-20.9	
912			14.06		6.82	15.11	609	1.71	-19.3	
915			14.10		6.82	15.13	609	1.53	-19.0	
918			14.13		6.82	15.14	603	1.48	-18.7	

PURGING DATA

Sample ID:	MW-7	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	918	Final Depth to Water:	14.15		Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2x 1L	HCl	DX	—			
3x 40	HCl	VOC 6x	—			

NOTES/ADDITIONAL COMMENTS

NOA no headspace @ 932

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5	Job Number:	
Client:	NuStar Vannet	Date:	8/10
Project:	GWSM 3Q2	Sampler:	AW
Weather:	Sun 75°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount / Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	18.99	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	MS 22'
Sampling Method:		Tubing Material & Type:	LDPE (NEW / DEDICATED)

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
950			18.99	.25	6.37	16.04	739	21.04	-70.5	clear
953			19.25	.15	6.53	15.75	693	9.91	-44.9	↓
956			19.70	↓	6.64	15.60	689	4.10	-40.4	
959			20.08		6.66	15.49	684	3.89	-39.9	
1002			20.10		6.67	15.51	680	3.71	-39.0	

PURGING DATA

Sample ID:	MW-5	Sampling Flow Rate:	.15		Analytical Laboratory:		Apex
Sample Time:	1002	Final Depth to Water:	21.08		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/GX	—				
2x1L	HCl	DX	—				

NOTES/ADDITIONAL COMMENTS

VOAs no headspace @ 1015

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-5D	Job Number:	
Client:	NuStar Vanner	Date:	8/10/21
Project:	GWSM 3Q21	Sampler:	TW
Weather:	Sun 75°	Time In/Out:	

WELL DATA

Monument Type:	(Flush-mount)/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good	Depth to Water:	18.66	Water Column Length:	—
Well Cap Lock Present:	(Yes) No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic low flow	Pump Intake Depth:	Mid Screen ~~4.0~~
Sampling Method:		Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1020			18.66	.25	6.96	18.72	499	18.14	24.0	clear
1023			18.69		7.11	16.02	462	10.22	19.9	
1026			↓		7.20	15.70	455	4.16	18.2	
1029					7.24	15.49	448	1.94	16.9	
1032					7.23	15.10	441	.98	17.0	
1035					7.23	15.02	445	.75	16.6	
1038			↓	↓	7.24	14.96	438	.70	16.4	↓

PURGING DATA

Sample ID:	MW-5D	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	1038	Final Depth to Water:	18.69		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	BTEX/Gx	~~—~~				
2x1L	HCl	Dx	~~—~~				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 1050

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8	Job Number:	
Client:	Nu Star Vanmee	Date:	8/10
Project:	GWM 3Q21	Sampler:	LD
Weather:	Sun 80	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	19.65	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	Mid Screen ~~22.5'~~
Sampling Method:	Low flow	Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1057			19.65	.25	7.10	19.56	303	20.06	-37.7	cloudy
1100			19.99	.15	6.68	16.47	193	7.15	-21.1	clear
1103			20.25	↓	6.41	15.65	164	2.87	-44.2	↓
1106			20.80		6.38	15.50	156	1.74	-50.1	
1109			21.04		6.35	15.43	149	1.52	-52.4	
1112			21.24		6.35	15.41	148	1.39	-53.6	

PURGING DATA

Sample ID:	MW-8	Sampling Flow Rate:	.15		Analytical Laboratory:		Apex
Sample Time:	1112	Final Depth to Water:	23.12		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	BTEX/Gx	→ HCl	—				
2x1L	Dx	→ HCl	—				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 1125

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-8D	Job Number:	
Client:	Nu Star Ventures	Date:	8/10
Project:	GWSM 3021	Sampler:	TC
Weather:	Sun 80°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	19.85	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	Mid Screen ~~40'~~
Sampling Method:	Low flow	Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1133			19.85	.25	6.40	16.91	209	23.45	35.8	clear
1136			19.92	↓	6.75	15.20	111	8.98	47.0	↓
1139			↓	↓	6.94	15.04	93	3.77	54.9	↓
1142			↓	↓	7.02	14.91	90	2.29	55.6	↓
1148			↓	↓	7.05	14.95	89	2.15	57.5	↓
1151			↓	↓	7.05	14.90	89	2.02	60.1	↓

PURGING DATA

Sample ID:	MW-8D	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex NS
Sample Time:	1151	Final Depth to Water:	19.92		Did Well Dewater:		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x 40	HCl	BTEX / Gx	—				
2x 1L	HCl	Dx	—				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 1205

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-3	Job Number:	
Client:	NuStar Vanner	Date:	8/10
Project:	GenM 3021	Sampler:	AW
Weather:	Sun 85°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	31.25	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Bladder P. Low flow	Pump Intake Depth:	Mid Screen 33'
Sampling Method:		Tubing Material & Type:	SS

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1215			31.25	.3	6.93	17.90	107	20.11	44.8	clear
1218			31.48	.2	6.53	15.49	458	13.75	36.3	↓
1221			32.03	.15	6.40	15.18	502	8.03	31.9	↓
1224			32.51	↓	6.36	15.10	550	5.19	30.5	↓
1227			32.60		6.35	15.13	541	3.07	28.8	↓
1230			32.71		6.34	15.11	539	1.96	28.5	↓
1233			32.78		6.36	15.15	545	1.70	27.9	↓
1236			32.85		6.38	15.19	540	1.58	27.3	↓

PURGING DATA

Sample ID:	MW-3	Sampling Flow Rate:	.15		Analytical Laboratory:	Apex
Sample Time:	1236	Final Depth to Water:	32.80		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	BTEX/GX				
2x1L	HCl	DX				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 1300

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-4	Job Number:	
Client:	NuStar Vanmee	Date:	8/10
Project:	GWM3Q21	Sampler:	AD
Weather:	Sun 85°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	32.32	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	BP Low flow	Pump Intake Depth:	Mid Screen 35'
Sampling Method:		Tubing Material & Type:	SB

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1310			32.32	.25	6.25	20.12	233	22.01	42.4	clear
1313			↓	↓	6.19	16.25	263	9.23	51.0	↓
1316					6.15	15.48	274	3.66	57.2	
1319					6.12	15.20	288	2.40	59.8	
1322					6.12	15.11	290	2.16	60.6	
1325					6.11	15.06	295	2.07	61.1	

PURGING DATA

Sample ID:	MW-4	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	1325	Final Depth to Water:	32.32		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	BTEX/Gx	—				
2x1L	HCl	Dx	—				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 1345

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-2	Job Number:	
Client:	NuStar Vanmar	Date:	8/10/21
Project:	GWM 3Q21	Sampler:	AW
Weather:	Sun 85	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	30.31	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	~

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	BP Low flow	Pump Intake Depth:	Midscreen 33'
Sampling Method:		Tubing Material & Type:	SB

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
				.3	+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1400			30.31	~~.3~~	6.57	23.26	261	16.35	39.2	clear
1403			30.40	~~30.40~~	6.34	16.70	233	9.19	55.1	
1406			30.44	.2	6.30	15.42	226	4.27	60.5	
1409			30.46	↓	6.23	15.30	210	2.58	63.7	
1412			30.46	↓	6.23	15.21	204	2.60	67.5	
1415			↓	↓	6.23	15.40	199	2.07	71.9	
1418			↓	↓	6.23	15.45	197	2.01	72.5	
1421			↓	↓	6.25	15.53	190	1.81	76.7	↓

PURGING DATA

Sample ID:	MW-2	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	1421	Final Depth to Water:	30.46		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	BTEX/Gx	—			
2x 1L	HCl	Dx	—			

NOTES/ADDITIONAL COMMENTS

VOA no headsp @ 1450

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-6	Job Number:	
Client:	NW Steel Wire	Date:	8/11/21
Project:	GWM 3Q21	Sampler:	KW
Weather:	Sun 70°	Time In/Out:	—

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	19.39	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	Midscreen 22'
Sampling Method:		Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
721			19.39	.3	6.94	16.91	562	19.41	-22.6	clear
724			19.90	.2	6.51	15.47	757	9.20	-53.6	↓
727			20.35	↓	6.36	15.30	896	4.19	-67.9	↓
730			20.57		6.28	15.22	913	2.07	-81.3	↓
733			20.92		6.26	15.19	961	1.83	-90.4	↓
736			21.15		6.28	15.14	969	1.70	-95.1	↓
739			21.26	↓	6.29	15.16	965	1.63	-97.0	↓

PURGING DATA

Sample ID:	MW-6	Sampling Flow Rate:	.2		Analytical Laboratory:		Apex
Sample Time:	739	Final Depth to Water:	21.98		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/Gx	—				
2x1L	HCl	Dx	—				
3x40	HCl	VOC/Gx	—			MW-6	Dup
2x1L	HCl	Dx	—				↓

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 805

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-1	Job Number:	
Client:	NuStar Yarmouth	Date:	8/11/21
Project:	GWM 3Q2	Sampler:	AMD
Weather:		Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	
Monument Condition:	good	Depth to Water:	18.74	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:		Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	Mid Screen 22'
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
826			18.74	.25	6.48	19.62	312	18.65	42.1	clear
829			↓	↓	6.11	16.13	501	8.72	86.5	↓
832			↓	↓	5.90	15.43	643	3.19	95.9	↓
835			↓	↓	5.85	15.30	702	2.06	101.0	↓
838			↓	↓	5.81	15.24	707	1.91	103.3	↓
841			↓	↓	5.79	15.22	710	1.88	104.6	↓

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	.25		Analytical Laboratory:		Apex
Sample Time:	841	Final Depth to Water:	18.74		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/Gx	—				
2x1L	HCl	Dx	—				

NOTES/ADDITIONAL COMMENTS

VOA no headsp @ 900

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-11	Job Number:	
Client:	~~GHD~~ - NuStar Vans	Date:	8/11
Project:	GWM 3Q21	Sampler:	AW
Weather:	Sun 85	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / ~~Other:~~	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	19.70	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method: peri low flow — Pump Intake Depth: Midscreen 22'

Sampling Method: — Tubing Material & Type: LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
902			19.70	.3	6.61	19.02	488	15.49	22.1	clear
905			20.05	.2	6.02	16.46	301	6.57	39.5	↓
908			20.23	↓	5.80	15.46	248	2.19	51.7	↓
911			20.31	↓	5.60	15.30	246	1.81	56.7	↓
914			20.36	↓	5.49	15.24	243	1.69	59.5	↓
917			20.39	↓	5.45	15.24	240	1.55	62.0	↓
920			20.40	↓	5.44	15.22	237	1.51	62.7	↓

PURGING DATA

Sample ID:	MW-11	Sampling Flow Rate:	.2		Analytical Laboratory:		Apex
Sample Time:	920	Final Depth to Water:	20.42		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/GX	—				
2x1L	HCl	DX	—				

NOTES/ADDITIONAL COMMENTS

VOA no headspace @ 935

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-10	Job Number:	
Client:	NuStar Vanwest	Date:	8/11/21
Project:	GWM 3Q21	Sampler:	JD
Weather:	Sun 90°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	20.65	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri Low Flow	Pump Intake Depth:	Middle screen 25'
Sampling Method:		Tubing Material & Type:	LDPE — NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
950			20.65	.25	6.24	19.72	261	24.03	71.0	clear
953			↓	↓	6.36	16.05	193	5.61	122.3	↓
956					6.40	15.21	167	2.10	130.7	
959					6.44	15.15	163	1.94	133.2	
1002					6.45	15.17	160	1.85	135.9	

PURGING DATA

Sample ID:	MW-10	Sampling Flow Rate:	.25		Analytical Laboratory:	Apex
Sample Time:	1002	Final Depth to Water:	20.65		Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/GX	—				
2x1L	HCl	DX	—				

NOTES/ADDITIONAL COMMENTS

TOA no reading @ 1030

WELL MONITORING DATA SHEET

Cascadia Associates, LLC

Well ID:	MW-9	Job Number:	
Client:	NuStar Vanmex	Date:	8/11/21
Project:	GWSM 3Q19	Sampler:	KW
Weather:	Sun 90°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up / Other:	Well Diameter:	2"	Depth to Free Product:	—
		Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	21.37	Water Column Length:	—
Well Cap Lock Present:	Yes / No	Screened Interval:	—	Purge Volume:	—
Comments:					

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic w/ new tubing head	Pump Intake Depth:	Midscreen 23.5'
Sampling Method:		Tubing Material & Type:	LDPE (NEW / DEDICATED)

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (ppm)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1042			21.37	.25	6.01	22.19	193	22.48	90.3	clear
1045			↓	↓	6.11	17.84	152	11.97	130.8	↓
1048			↓	↓	6.24	15.90	171	7.36	131.7	↓
1051			↓	↓	6.36	15.58	144	4.60	133.6	↓
1054			↓	↓	6.40	15.25	139	4.94	136.0	↓
1057			↓	↓	6.41	15.11	136	5.20	136.9	↓
1100			↓	↓	6.40	15.09	133	5.31	137.4	↓
1103			↓	↓	6.41	15.05	135	5.38	138.5	↓

PURGING DATA

Sample ID:	MW-9 1103	Sampling Flow Rate:	.25			Analytical Laboratory:	Apex
Sample Time:		Final Depth to Water:	21.37			Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC/GX	—				
2x1L	HCl	DRO	←				

NOTES/ADDITIONAL COMMENTS

Non no headsp @ 1130

Project: Vanaver GWM 4Q21
Client:
Sampler:

Date: 11/14
Permit:

Well ID	Time	DTP	DTW	Product Thickness	Notes
MW-4	930		30.11		
MW-2	940		28.13		
MW-3	945		29.06		
MW-10	951		18.48		
MW-6	958		17.09		
MW-1	1005		16.74		
MW-11	1012		17.75		
MW-5	1017		16.80		
MW-5D	1020		16.50		
MW-8	1024		17.67		
MW-8D	1026		17.42		
MW-9	1029		19.27		
MW-7	1035		11.41		

Daylight ST -1 hr.

WELL MONITORING DATA SHEET

GEOENGINEERS

Well ID:	MW-7	Job Number:	
Client:	NuStar Vapor	Date:	11/16
Project:	GWM 4Q21	Sampler:	JW
Weather:	Pt. Sun 55°	Time In/Out:	945-1030

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	~~Other:~~ good	Well Depth:	—	Free Product Thickness:	—
Monument Condition:		Depth to Water:	11.41	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	Midscreen 19.5
Sampling Method:		Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
955			11.41	.25	6.51	14.1	720	1.77	102.7	clear
958			11.77	.2	6.54	14.2	710	.64	84.7	↓
1001			11.79	↓	6.54	14.2	710	.41	80.0	↓
1004			↓	↓	6.60	14.2	700	.30	74.5	↓
1007			↓	↓	6.61	14.2	700	.27	71.4	↓

PURGING DATA

Sample ID:	MW-7	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	1007	Final Depth to Water:	11.79		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	Dx	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-5D	Job Number:	
Client:	Nu Star Vanner	Date:	11/16
Project:	GWM 4Q24	Sampler:	gw
Weather:	Pt Sun 60°	Time In/Out:	1045 -

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	16.58	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri low flow	Pump Intake Depth:	Midscreen 40
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1054			16.58	.25	6.75	15.1	561	7.56	85.9	clear
1057			16.62	↓	6.77	14.0	395	5.57	94.5	↓
1100			16.63	↓	6.77	14.1	370	4.19	99.3	↓
1103			↓	↓	6.75	14.2	366	1.63	104.1	↓
1106				↓	6.76	14.2	365	.94	105.0	↓
1109					6.79	14.2	368	.79	105.2	↓
1112			↓		6.80	14.2	364	.70	105.1	↓

PURGING DATA

Sample ID:	MW-5D	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	1112	Final Depth to Water:	16.6		Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	VOC	—				
2x1L	HCl	~~Dx~~	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-5	Job Number:	
Client:	Nu Star Vancouver	Date:	11/19
Project:	GWM 4Q21	Sampler:	KW/JP
Weather:	Pt Sun 60°	Time In/Out:	1115-1200

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	16.95	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth.	midscreen ~22
Sampling Method:		Tubing Material & Type:	LDPE NEW X DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+ °C	+	+/-0.5 ppm	+/-20 mV	
1122			16.95	.25	6.69	15.7	690	2.15	-21.4	clear
1125			17.30	.15	6.73	14.4	706	1.00	-44.7	↓
1128			17.46	↓	6.74	14.5	712	.72	-56.8	↓
1131			17.60	↓	6.76	14.6	715	.51	-68.0	↓
1134			17.71	↓	6.78	14.5	716	.42	-73.1	↓

PURGING DATA

Sample ID:	MW-5	Sampling Flow Rate:	.15	Analytical Laboratory:	Apex
Sample Time:	1134	Final Depth to Water:	19.02	Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC				
2x1L	HCl	Dx				
3x40	HCl	VOC				MW-5 Dup
2x1L	HCl	Dx				MW-5 Dup

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-8	Job Number:	
Client:	Nu Star Vancouver	Date:	11/16
Project:	GWM 4Q21	Sampler:	AD
Weather:	Pt Sun 60°	Time In/Out:	1205 -

WELL DATA

Monument Type:	(Flush-mount)/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.76	Water Column Length:	—
Well Cap Lock Present:	(Yes) No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	peri low flow	Pump Intake Depth:	Midscreen 22.5'		
Sampling Method:		Tubing Material & Type:	LDPE	(NEW) / DEDICATED	

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1210			17.76	.2	6.79	13.7	650	4.26	-59.5	clear
1213			18.36	.15	4.52	13.4	311.6	4.79	-23.2	↓
1216			18.55	↓	6.23	13.4	227.5	5.47	11.1	↓
1219			18.74	↓	6.14	13.4	194.0	5.69	20.1	↓
1222			18.77	↓	6.05	13.4	181.3	6.40	54.9	↓
1225			18.81	↓	5.99	13.4	173.5	6.25	61.5	↓
1228			18.90	↓	5.98	13.2	169.7	6.19	70.1	↓

PURGING DATA

Sample ID:	MW-8	Sampling Flow Rate:	.15		Analytical Laboratory:		Apex
Sample Time:	1228	Final Depth to Water:	20.01		Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
3x 40	HCl	VOC	—				
2x 1L	HCl	Dx	—				

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-8D	Job Number:	
Client:	Nu Star Vancouver	Date:	11/16
Project:	GWM 4Q21	Sampler:	AD/JP
Weather:	Pt Sun 50°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good	Depth to Water:	17.80	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	40
Sampling Method:	low flow	Tubing Material & Type:	LDPE (NEW) / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	d µS/cm			Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1245			17.80	0.25	7.04	13.0	0.209	1.10	123.9	Clear
1249			17.80	0.2	7.22	13.0	0.237	0.50	116.2	↓
1253			↓	↓	7.26	12.9	0.243	0.39	116.6	↓
1257			↓	↓	7.23	12.9	0.243	0.41	107.3	↓

PURGING DATA

Sample ID:	MW-8D	Sampling Flow Rate:	0.2		Analytical Laboratory:	Apex
Sample Time:	1254	Final Depth to Water:	17.80		Did W ll Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
2) L amber	HCl	Dx	—	—		
3) 40mL VOA	HCl	VOCs	—	—		

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-9	Job Number:	
Client:	NuStar Vancouver		
Project:	GWM 4Q21	Sampler:	LB/SP
Weather:	Pt Sun 55°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	
	Other:	Well Depth:	25'		
Monument Condition:	GOOD	Depth to Water:	19.20	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal): 1-inch well = 0.041 | 2-inch = 0.162 | 1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri	Pump Intake Depth:	23.5' bgs
Sampling Method:	Low flow	Tubing Material & Type:	LDPE
			NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (ft)	Purge Rate (L/min)	pH +/-0.1	Temp +/-0.5 °C	Cond +/-5%	DO +/-0.5 ppm	ORP +/-20 mV	Turbidity (NTU)
1422 & 1322			19.20	0.2	6.23	13.41	0.205	6.8	92.3	Clear
1426 & 1926			19.32	0.2	6.17	13.4	0.195	7.12		↓
1430 & 1330			19.34	0.15	6.18	13.4	0.192	7.33		
1434 & 1334			19.34	0.15	6.19	13.5	0.191	7.43	124.4	
1438										

PURGING DATA

Sample ID:	MW-9	Sampling Flow Rate:	0.15	Analytical Laboratory:		Rex
Sample Time:	1324	Final Depth to Water:	1434	Did Well Dewater:		No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
(2) L amber	HCl	Dx	—	—	—	—
(3) 40mL VOA	HCl	VOAs	—	—	—	—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GEOENGINEERS

Well ID:	MW-4	Job Number:	
Client:	NuStar Vauxx	Date:	11/17
Project:	GWM 4Q21	Sampler:	AJW
Weather:	Pt Sun 40°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	30.24	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

Purge Method:	BP low flow	Pump Intake Depth:	Mid Scr	3'	
Sampling Method:		Tubing Material & Type:	B	NEW	DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)						Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
734			30.24	.25	7.19	8.6	200.3	12.36	63.5	c
737			↓	↓	6.14	11.0		1	85.3	↓
740			↓	↓	6.35	12.6	268.5	2.54	160.4	↓
743			↓	↓	6.34	12.9	264.5	1.33	169.5	↓
746			↓	↓	6.34	12.8	264.0	1.21	164.5	↓
749			↓	↓	6.33	12.7	263.0	1.28	168.3	↓

Sample ID:	MW-4		—		Analytical Laboratory:		Apex
Sample Time:	749		30.4		Did Well Dewater:		No
No. of Containers/Type	Preservative			Filter Size	MS/MSD	Duplicate ID	
3x40	HCl	c	—				—
2x1L	HCl	Dx	—				—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers			
Well ID:	MW-3	Job Number:	
Client:	Nu Star Vancouver	Date:	11/17
Project:	GWM 4Q	Sampler:	4W / P
Weather:	Pt Sun 4° W dy	Time In/Out:	

WELL DATA

Monument Type:	~~Flush-mount~~/Stick-up (Flush-mount circled)	Well Diameter:	2"	Depth to Free Product:	—
	Other:		~~29.23~~	Free Product Thickness:	—
Monument Condition:	G. O.	Depth to Water:	29.23	Water Column Length:	—
Well Cap Lock Present:	Yes (circled) No	Screened Interval:	24.5-34.5	Purge Volume:	—
Comments:					
Purge Volume					
Water height	al	1-inch well = 0.041	2-inch = 0.162		1 gal = 3.785 liters

Purge Method	PER	Pump Intake Depth:	3' bgs
Sampling Method	LOW F	Tubing Material & Type:	LDPE — NEW (circled) DEDICATED

Time		Cumulative Volume Purged (liters)	DTW	Purge Rate (L/min)	pH	Temp	Cond	DO	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1		+/-5%	+/-0.5 ppm	+/-20 mV	
0830			29.23	0.15	6.18	9.9	0.331		0	Clear
0834			29.65	.15	6.25	2	0.325	9	200.1	↓
0838			29.65	0.15	6.24	1	0.316	50	9.6	↓
0842			29.63	0.15	6				204.0	↓
0846			29.63	0.15	6.23	29	0.293	0.35	204.9	

Sample ID:	MW-3		0.15				Apex
Sample Time:	0846	Final Depth to Water:			Did Well Dewater:		No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
(3) 40mL VOA	HCl	VOCs	—	—	—	—	
(2) 1L amber	HCl	Dx	—	—	—	—	

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-1	Job Number:	
Client:	NuStar Vanmex	Date:	1/17/
Project:	GWM 4Q21	Sampler:	JP/ZW
Weather:	Clear, cold	Time In/Out:	

WELL DATA

Monument Type:	Flu mount Stick u	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—		
Monument Condition:	Good	Depth to Water:	16.86	Water Column Length:	
Well Cap Lock Present.	Yes No	Screened Interval:	—	Purge Volume:	

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	PERI	Pump Intake Depth:	22' bgs
Sampling Method:	LOWFLOW	Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	Water Level (ft)	Purge Rate (L/min)	pH	Temp	Cond (µS/cm)	DO	ORP (mV)	Turbidity (NTU)
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
~~1035~~ 0935			16.86	0.15	6.13	8.9	0.296	2.1	222.4	
0939			↓	↓	6.31	13.0	0.35	0.52	2	↓
0943					6.32	13.4	0.366	0.37	211.5	
0947					6.31	13.5	0.369	0.31	211.2	

PURGING DATA

Sample ID:	MW-1	Sampling Flow Rate:	0.15			Apex
Sample Time:	0947	Final Depth to Water:	16.9		Did Well Dewater:	N

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
(3) 40 mL VOAs	HCl	VOCs	—			
(2) 1 L amber	HCl	Dx	—	—		

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-11	Job Number:	
Client:	NuStar Kinney	Date:	11/17
Project:	GWM 4Q21	Sampler:	JP/TW
Weather:	Clear, cold	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount (3) Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—		—
Monument Condition:	Good	Depth to Water:	19.48	Water Column Length:	—
Well Cap Lock Present:	(Yes) No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	PERI Low Flow	Pump Intake Depth:	Midscreen 22'
Sampling Method:		Tubing Material & Type:	LDPE

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp	Cond (µS/cm)	DO	ORP	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1010			18.48	0.2	6.81	14.1	~~14.1~~ 0.486	0.45	-8.0	Cl
1014			18.96	0.15	6.99	14.4	0.501	0.34	-66.6	↓
1018			19.04	0.15	6.98	14.4	0.460	0.30	-86.2	
1022			19.09	0.15	6.98	14.4	0.457	0.28	-94.7	
1026			19.10	0.15	6.97	14.4	0.456	0.26	-98.6	

PURGING DATA

Sample ID:	MW-11	Sampling Flow Rate:	0.15		Analytical Laboratory:	Apex
Sample Time:	1026	Final Depth to Water:	19.10		Did Well Dewater:	No
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
(3) 40 mL VOA	HCl	VOCs	—	—	—	—
(2) 1 L amber	HCl	DRO	—	—	—	—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-2	Job Number:	
Client:	Nustar Vanmex	Date:	11/17/21
Project:	GWM 4Q21	Sampler:	JP/DW
Weather:	Clear, cold	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	Good	Depth to Water:	28.35	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic Pump Low Flow	Pump Intake Depth:	Mid screen 33'
Sampling Method:		Tubing Material & Type:	LDPE NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rate (L/min)	pH	Temp (°C)	Cond (µS/cm)	DO (mg/L)	ORP (mV)	Clarity/Color Other Remarks
						+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1052			28.35	.2	6.93	13.0	345.1	3.02	-66.2	clear
1055			↓	↓	6.38	14.1	276.3	.61	-8.2	↓
1058			↓	↓	6.34	14.2	267.1	.44	4.2	↓
1101			↓	↓	6.31	14.3	251.4	15	23.2	↓
1104			↓	↓	6.30	14.3	260.5	.10	26.5	↓
1107			↓	↓	6.29	14.3	263.3	.14	30.2	↓

PURGING DATA

Sample ID:	MW-2	Sampling Flow Rate:	.2				Apex No
Sample Time:	1107	Final Depth to Water:	28.35		Did Well Dewater:		
No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID	
(3) 40 mL VOA	HCl	VOCs	—	—	—		—
(2) 1L amber	HCl	Dx	✓		—		—

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-10	Job Number:	
Client:	NuStar Valley	Date:	11/17/21
Project:	GWM 4Q21	Sampler:	WSP
Weather:	Clear, cold	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	
Monument Condition:	Good		18.89	Water Column Length:	—
Well Cap Lock Present:	Yes No	Screened Interval:	—	Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)

Water height multipliers (gal):	1-inch well = 0.041	2-inch = 0.162	4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peristaltic pump low flow	Pump Intake Depth:	~18 2'
Sampling Method:		Tubing Material & Type:	LDP

NEW / DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (feet)	Purge Rate (L/min)	pH	Temp	Cond (µS/cm)	DO	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1142			18.89	.2	6.31	13.2	183.7	6.02	63.7	clear
1145			↓	↓	6.30	13.3	159.6	6.59	71.2	↓
1148					6.28	13.3	147.1	6.73	79.2	
1151					6.30	13.3	146.0	6.77	83.9	
1154			↓	↓	6.27	13.2	147.4	6.80	85.0	

PURGING DATA

Sample ID:	MW-10	Sampling Flow Rate:	.2		Analytical Laboratory:	Apex
Sample Time:	1154	Final Depth to Water:	18.89		Did Well Dewater:	No

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—			
2x1L	HCl	Dx	—			

NOTES/ADDITIONAL COMMENTS

WELL MONITORING DATA SHEET

GeoEngineers

Well ID:	MW-6	Job Number:	
Client:	Nu Star/Vanmex	Date:	11/17
Project:	GWM 4Q21	Sampler:	AD
Weather:	Pt Sun 50°	Time In/Out:	

WELL DATA

Monument Type:	Flush-mount/Stick-up	Well Diameter:	2"	Depth to Free Product:	—
	Other:	Well Depth:	—	Free Product Thickness:	—
Monument Condition:	good	Depth to Water:	17.76	Water Column Length:	
Well Cap Lock Present:	Yes No	Screened Interval:		Purge Volume:	—

Comments:

Purge Volume = (Water Height) X (Multiplier) X (# Casing Volumes)				
Water height multipliers (gal):	1-inch well = 0.041		4-inch = 0.653	1 gal = 3.785 liters

PURGING DATA

Purge Method:	Peri Low flow	Pump Intake Depth:	Mid screen 22		
Sampling Method:		Tubing Material & Type	LDPE	NEW	DEDICATED

Time	Volume Purged (liters)	Cumulative Volume Purged (liters)	DTW (btc)	Purge Rat (L/min)	pH	Temp	Cond	DO	ORP (mV)	Clarity/Color Other Remarks
					+/-0.1	+/-0.5 °C	+/-5%	+/-0.5 ppm	+/-20 mV	
1220			17.74	.2	6.34	13.7	640	2.12	29.9	
1223			18.10	.15	6.44	13.9	714	.92	-18.1	"
1226			18.20	"	6.62	14.0	731	.50	-39.3	"
1229			18.24	"	6.65	14.1	739	.40	-51.3	"
1232			18.38	"	6.64	14.2	742	.30	-58.5	"

PURGING DATA

Sample ID:	MW-6	Sampling Flow Rate:	.15		Analytical Laboratory:	Apex
Sample Time:	1232	Final Depth to Water:	18.38		Did Well Dewater:	NO

No. of Containers/Type	Preservative	Analysis/Method	Field Filtered	Filter Size	MS/MSD	Duplicate ID
3x40	HCl	VOC	—	—	—	—
2x1L	HCl	DX	—	—	—	—

NOTES/ADDITIONAL COMMENTS

APPENDIX D
Historical Groundwater Analytical Data

Appendix D

Summary of Analytical Results - Monitoring Wells

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-1	05/14/02	<0.080	0.455 [5.]	<0.500	<0.0005	<0.0005	<0.0005	<0.001	–	–
	05/19/03	–	–	–	<0.001	<0.001	<0.001	<0.002	–	–
	05/25/07	<0.080	<0.238	<0.476	<0.0002	<0.0005	<0.0005	<0.001	–	–
	08/24/07	<0.1	<0.238	<0.476	<0.001	<0.002	<0.002	<0.006	–	–
	11/26/07	<0.080	<0.236	<0.472	<0.001	<0.002	<0.002	<0.006	–	–
	02/27/08	<0.080	<0.294	<0.588	<0.0005	<0.0005	<0.0005	<0.001	–	–
	03/31/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	09/01/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	12/16/14	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0005	–	–
	03/25/15	<0.250	<0.046	<0.093	<0.0005	<0.0005	<0.0005	<0.001	–	–
	06/24/15	<0.250	<0.100	<0.250	<0.0005	<0.0005	<0.0005	<0.001	–	–
	09/15/15	<0.250	<0.130	<0.340	<0.0005	<0.0005	0.0015	0.0022	–	–
	02/19/19	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.00015	<0.001	–
	05/20/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	–
	08/29/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/19/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/25/2020	<0.100	0.201	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/2/2020	<0.100	0.212	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/19/2020	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/17/2020	<0.100	0.0998	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/26/2021	<0.100	0.313 F-11	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	0.152 F-11	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	0.250 F-11	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-2	05/14/02	**41.4**	<0.250	<0.500	**4.35**	**2.68**	**1.84**	**8.72**	–	–
	05/19/03	–	–	–	**0.534**	0.00975	0.194	0.876	–	–
	05/25/07	0.439	<0.238	<0.476	**0.071**	0.00114	0.0361	0.0453	–	–
	08/24/07	0.102	<0.238	<0.476	<0.001	<0.002	<0.002	<0.006	–	–
	11/26/07	<0.080	<0.236	<0.472	<0.001	<0.002	<0.002	<0.006	–	–
	02/27/08	0.0817	<0.294	<0.588	0.005	<0.0005	<0.0005	<0.001	–	–
	03/31/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	09/01/10	<0.250	<0.250	<0.500	0.0016	<0.0005	<0.0005	<0.0015	–	–
	12/16/14	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0005	–	–
	03/25/15	<0.250	<0.046	<0.091	<0.0005	<0.0005	<0.0005	<0.001	–	–
	06/24/15	<0.250	<0.100	<0.250	<0.0005	<0.0005	<0.0005	<0.001	–	–
	09/15/15	<0.250	0.17 D	0.37	<0.0005	<0.0005	<0.0005	<0.001	–	–
	02/19/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.00015	0.00121	–
	05/20/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	0.0031	–
	08/29/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	0.00069	<0.00075	0.00125	<0.002
	11/19/19	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/25/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/2/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	0.00774	<0.002
	8/18/2020	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	0.00521	<0.002
	11/17/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	0.00243	<0.004
	2/25/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0748	<0.15	<0.0002	<0.001	<0.0005	<0.0015	0.0053	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	0.0113	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	.00278	<0.002

Please refer to notes at end of table.

Appendix D

Summary of Analytical Results - Monitoring Wells
NuStar Terminals Operations Partnership, L.P. – Annex Terminal
Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-3	05/14/02	**4.5**	<0.250	<0.500	**0.0419**	0.0096	0.293	0.521	–	–
	05/19/03	–	–	–	**0.0908**	0.0097	0.338	0.5382	–	–
	05/25/07	0.361	<0.238	<0.476	<0.0005	<0.0005	0.0132	0.0145	–	–
	08/24/07	<0.1	<0.238	<0.476	<0.001	<0.002	<0.002	<0.006	–	–
	11/26/07	<0.080	<0.236	<0.472	0.0011	<0.002	0.0066	<0.006	–	–
	02/27/08	**2.14**	0.387 [6.]	<0.500	<0.0005	<0.0005	0.17	0.17	–	–
	2/27/2008 DUP	**1.85**	0.342	<0.485	0.0011	<0.0005	0.19	0.2	–	–
	03/31/10	**2.10**	<0.250	<0.500	<0.0005	<0.0005	0.018	0.021	–	–
	3/31/2010 DUP	**1.90**	<0.250	<0.500	<0.0015	<0.0015	0.018	0.020	–	–
	09/01/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	9/1/2010 DUP	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	12/16/14	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0005	–	–
	03/25/15	<0.418	<0.046	<0.092	<0.0005	<0.0005	<0.0005	<0.001	–	–
	06/24/15	<0.250	0.120	<0.026	<0.0005	<0.0005	<0.0005	<0.001	–	–
	09/15/15	<0.250	0.140	<0.250	<0.0008	<0.0008	<0.0008	<0.001	–	–
	02/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.00015	<0.001	–
	05/20/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	–
	08/29/19	–	–	–	–	–	–	–	–	–
	11/19/19	0.114	<0.0769	<0.154	<0.0002	<0.001	0.00661	0.0113	<0.001	<0.002
	2/25/2020	<0.100	0.0955	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/2/2020	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/18/2020	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/17/2020	<0.100	<0.0748	<0.15	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-4	05/14/02	<0.080	0.358 [5.]	<0.500	<0.0005	<0.0005	<0.0005	<0.001	–	–
	05/19/03	–	–	–	<0.001	<0.001	<0.001	<0.002	–	–
	05/25/07	<0.080	<0.238	<0.476	<0.0002	<0.0005	<0.0005	<0.001	–	–
	08/24/07	<0.1	<0.238	<0.476	<0.001	<0.002	<0.002	<0.006	–	–
	11/26/07	<0.080	<0.236	<0.472	<0.001	<0.002	<0.002	<0.006	–	–
	02/27/08	<0.080	<0.248	<0.495	<0.0005	<0.0005	<0.0005	<0.001	–	–
	03/31/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	09/01/10	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0015	–	–
	12/16/14	<0.250	<0.250	<0.500	<0.0005	<0.0005	<0.0005	<0.0005	–	–
	03/25/15	<0.250	0.074	<0.091	<0.0005	<0.0005	<0.0005	<0.001	–	–
	06/24/15	<0.250	<0.099	<0.250	<0.0005	<0.0005	<0.0005	<0.001	–	–
	09/15/15	<0.250	<0.130	<0.340	<0.0005	<0.0005	<0.0005	<0.001	–	–
	02/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.00150	<0.001	–
	05/20/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	–
	08/29/19	–	–	–	–	–	–	–	–	–
	11/19/19	<0.100	<0.0784	<0.157	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/25/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/2/2020	<0.100	0.0914	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/18/2020	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/17/2020	<0.100	0.0783	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/26/2021	<0.100	<0.08	<0.16	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0748	<0.15	<0.0002	<0.001	**0.00073**	**0.00181**	<0.001	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002

Please refer to notes at end of table.

Appendix D

Summary of Analytical Results - Monitoring Wells

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-5	12/16/14	**15**	0.350	<0.500	0.00070	0.00066	0.12	**1.2**	--	--
	12/16/2014 DUP	**15**	<0.250	<0.500	0.00088	0.00081	0.18	**1.3**	--	--
	03/25/15	**18.1**	<0.045	<0.091	<0.00050	0.00061	0.218	**1.45**	--	--
	3/25/2015 DUP	**17.2**	<0.046	<0.092	0.0005	0.00065	0.236	**1.22**	--	--
	06/24/15	**15**	0.33 D	<0.250	<0.0012	<0.0012	0.228	**1.51**	--	--
	6/24/2015 DUP	**16.8**	**0.560 D**	<0.250	<0.0012	<0.0012	0.232	**1.49**	--	--
	09/15/15	**17.3**	**0.82 D**	<0.34	<0.00050	0.00060	0.289	**1.92**	--	--
	07/11/16	**19.4**	**0.310**	<0.29	<0.00084	0.00100	0.215	**1.17**	--	--
	10/23/17	**7.93 J-**	**1.26**	<0.25	<0.0010	0.00117	0.174	0.99	--	--
	11/30/17	**11.3**	**1.63**	<0.25	<0.0250	<0.0250	0.187	**1.21**	--	--
	11/30/17 DUP	**10.9**	**1.75**	<0.25	<0.0010	0.00112	0.187	**1.48**	--	--
	02/28/18	**9.86**	**1.77**	<0.25	<0.0010	0.00115	0.145	0.877	--	--
	05/29/18	**13.2**	**2.20**	<0.25	<0.0010	0.00130	0.271	**1.15**	--	--
	08/30/18	**18.6**	**0.819 F-18**	<0.151	<0.00200	<0.0100	0.190	0.936	--	--
	8/30/2018 DUP	**20.8**	**0.631 F-18**	<0.151	<0.00200	<0.0100	0.212	**1.06**	--	--
	02/18/19	**29.2**	**1.06 F-18**	<0.151	<0.00200	<0.0100	0.187	**1.06**	<0.010	--
	05/21/19	**22**	**0.722**	<0.0784	<0.002	<0.01	0.252	**1.04**	<0.010	--
	08/28/19	**24.8**	**0.963**	<0.0769	<0.002	<0.01	0.239	**1.1**	<0.01	**2.07**
	8/28/2019 DUP	**21.7**	**0.879**	<0.0769	<0.002	<0.01	0.179	0.836	<0.01	**1.44**
	11/18/19	**23.5**	**0.771**	<0.152	<0.004	<0.02	0.257	**1.19**	<0.02	**1.62**
	11/18/2019 DUP	**20.0**	**0.696**	<0.152	<0.01	<0.05	0.284	**1.46**	<0.05	**1.51**
	2/24/2020	**23.4**	**2.40**	<0.154	<0.004	<0.02	0.176	**0.809**	<0.02	**1.52**
	6/1/2020	**12.7**	**2.04**	**0.193**	<0.004	<0.02	0.244	**0.844**	<0.02	**1.29**
	8/17/2020	**18.8**	**2.17 F-18**	<0.377	<0.002	<0.01	0.154	**0.704**	<0.01	**1.4**
	8/17/2020 DUP	**22.6**	**2.1 F-18**	<0.377	<0.002	<0.01	0.21	**0.94**	<0.01	**1.74**
	11/16/2020	**18.5**	**1.92 F-18**	<0.151	<0.004	<0.02	0.206	**1.05**	<0.02	**1.42**
	2/25/2021	**27.5**	**1.82 F-18**	<0.15	**0.0026 Q-42**	<0.01	0.13	**0.626**	<0.01	**1.55**
	2/25/2021 DUP	**27.2**	**2.14 F-18**	<0.163	<0.002	<0.01	0.127	**0.616**	<0.01	**1.55**
	5/4/2021	**15.8**	**2.09 F-20**	<0.151	<0.01	<0.05	0.108	**0.458**	<0.05	**1.31**
	8/10/2021	**15.2**	**2.59 F-13, F-20**	<0.381	<0.00024 R-06	<0.0012 R-06	0.135	**0.628**	<0.001	**1.36**
	11/16/2021	**13.9**	**2.15 F-18**	<0.381	<0.000220 R-06	**0.00116**	.197	**0.610**	<0.001	**1.43**
	11/16/2021 DUP	**11.5**	**1.84**	<0.381	<0.000220	**0.00117**	0.164	**0.468**	<0.001	**1.19**
MW-5D	10/24/17	0.42	0.147 J	<0.25	<0.0010	<0.0010	0.00138	0.00296 J	--	--
	11/30/17	0.41	0.49	<0.25	<0.0010	<0.0010	<0.0010	<0.0030	--	--
	02/28/18	0.589	0.249	<0.25	<0.0010	<0.0010	0.00508	0.00204	--	--
	05/29/18	0.68	<0.38	<0.38	<0.0010	<0.0010	0.00220	<0.0030	--	--
	08/30/18	0.673	<0.0755	<0.151	<0.000200	<0.00100	<0.00050	<0.00150	--	--
	02/18/19	0.165	<0.0748	<0.150	<0.000200	<0.00100	<0.00050	<0.00150	<0.001	--
	05/21/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	--
	08/28/19	**0.309**	<0.0374	<0.0748	<0.0001	<0.0005	0.00078	<0.00075	<0.0005	<0.002
	11/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	**0.109**	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/1/2020	<0.100	**0.0974**	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/17/2020	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	**0.200**	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	**0.126**	**0.24 F-11 F-20**	<0.154	<0.0002	<0.001	**0.00093**	<0.0015	<0.001	<0.002
	5/4/2021	**0.208**	**0.158 F-11F-20**	<0.152	<0.0002	<0.001	**0.00359**	<0.0015	<0.001	<0.002
	8/10/2021	<0.100	**0.470**	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	**1.84**	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002

Please refer to notes at end of table.

Appendix D

Summary of Analytical Results - Monitoring Wells

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-6	12/16/14	**15**	<0.250	<0.500	**0.47**	0.065	**1.3**	**2.6**	–	–
	03/25/15	**13.7**	0.047	<0.092	**0.516**	0.0756	**1.40**	**2.26**	–	–
	06/24/15	**17.7**	**1.2 D**	<0.250	**0.423**	0.0582	**1.58**	**1.92**	–	–
	09/15/15	**15.1**	**0.54 D**	<0.34	**0.306**	0.0672	**1.23**	**1.92**	–	–
	9/15/2015 DUP	**14**	0.44 D	<0.35	**0.328**	0.0684	**1.32**	**2.07**	–	–
	07/11/16	**15.5**	0.23	<0.28	**0.358**	0.0616	**1.63**	**1.82**	–	–
	10/24/17	**7.73**	**5.07**	0.111 J	**0.194**	0.051	**1.51**	**1.29**	–	–
	10/24/17 DUP	**4.19 J**	**8.96 QJ**	**1.19 QJ**	**0.153**	0.046	**1.18**	**1.04**	–	–
	11/30/17	**9.42**	**7.44**	**0.69**	**2.223**	0.053	**1.71**	**1.12**	–	–
	02/28/18	**7.72**	**3.57**	0.152	**0.256**	0.0423	**1.44**	0.735	–	–
	05/29/18	**1.5**	**9.30**	**0.570**	**0.23**	0.0444	**1.38**	0.891	–	–
	08/30/18	**20.1**	**1.24 F-18**	<0.151	**0.212**	0.0452	**1.59**	**1.15**	–	–
	02/18/19	**18.2**	**2.15 F-20**	<0.151	**0.249**	0.0408	**1.74**	0.577	<0.010	–
	05/20/19	**20**	**1.23**	<0.0755	**0.218**	0.0426	**1.86**	0.937	<0.010	–
	08/29/19	**16.8**	**1.64**	<0.0755	**0.177**	0.0394	**1.69**	0.585	<0.01	**0.561**
	11/19/19	**6.30**	**1.95**	<0.150	**0.0712**	<0.02	**0.709**	0.127	<0.02	**0.163**
	2/25/2020	**15.6**	**4.02**	<0.769	**0.19**	0.0308	**1.74**	0.420	<0.02	**0.340**
	2/25/2020 DUP	**14.8**	**4.35**	<0.769	**0.186**	0.0288	**1.68**	0.405	<0.02	**0.329**
	6/1/2020	**11.3**	**6.92**	<0.15	**0.163**	0.0286	**1.74**	0.363	<0.01	**0.433**
	8/17/2020	**14.9**	**2.66 F-20**	<0.377	**0.166**	0.0345	**1.79**	0.370	<0.01	**0.316**
	11/17/2020	**12.5**	**4.62 F-20**	<0.154	**0.149**	0.0248	**1.85**	0.207	<0.02	**0.279**
	11/17/2020 DUP	**13.7**	**6.93 F-20**	<0.157	**0.163**	0.032	**2.08**	0.398	<0.02	**0.315**
	2/25/2021	**15.2**	**5.66 F-11 F-20**	<0.154	**0.23**	0.0325	**1.86**	0.263	<0.01	**0.371**
	5/5/2021	**11.2**	**5.83 F-20**	<0.152	**0.152**	<0.05	**1.75**	0.186	<0.05	**0.248**
	8/11/2021	**14.0**	**6.07 F-20**	<0.377	**0.175**	0.0287	**1.88**	0.327	<0.001	**0.384**
	8/11/2021 DUP	**13.8**	**6.36 F-20**	<0.377	**0.174**	0.0289	**1.89**	0.312	<0.001	**0.386**
	11/17/2021	**11.1**	**8.27**	<0.388	**0.181**	0.0223	**1.50**	0.208	<0.001	**0.281**
MW-7	07/11/16	<0.250	<0.19	<0.29	<0.00050	<0.00050	<0.00050	<0.00015	–	–
	02/19/19	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.00015	<0.001	–
	05/20/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	–
	08/28/19	<0.05	<0.0388	<0.0777	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/18/19	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/1/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/17/2020	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-8	07/11/16	<0.250	<0.19	<0.29	<0.00050	<0.00050	<0.00050	<0.00015	–	–
	7/11/16 DUP	<0.250	<0.19	<0.29	<0.00050	<0.00050	<0.00050	<0.00015	–	–
	02/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.00015	<0.001	–
	05/21/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	–
	08/28/19	<0.05	<0.0412	<0.0825	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/1/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/17/2020	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	<0.100	<0.0833	<0.167	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.190	<0.381	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.192	<0.385	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002

Please refer to notes at end of table.

Appendix D

Summary of Analytical Results - Monitoring Wells
NuStar Terminals Operations Partnership, L.P. – Annex Terminal
Vancouver, Washington

Well Number	Sample Date	TPHg Gasoline (mg/L)	TPHd Diesel (mg/L)	TPHo Heavy Oil (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	MTBE (mg/L)	Naphthalene (mg/L)
MW-8D	02/18/19	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.00015	<0.001	--
	05/21/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	--
	08/28/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/18/19	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/1/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/17/2020	<0.100	<0.189	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	<0.100	<0.0833	<0.167	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/10/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-9	07/11/16	<0.250	<0.19	<0.29	<0.00050	<0.00050	<0.00050	<0.00015	--	--
	02/18/19	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	--
	05/21/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	--
	08/28/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/18/19	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/2/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/17/2020	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/25/2021	<0.100	<0.0777	<0.155	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/4/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/16/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-10	07/11/16	<0.250	<0.19	<0.29	<0.00050	<0.00050	<0.00050	<0.00015	--	--
	02/19/19	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.00015	<0.001	--
	05/21/19	<0.05	<0.0377	<0.0755	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	--
	08/29/19	<0.05	<0.0374	<0.0748	<0.0001	<0.0005	<0.00025	<0.00075	<0.0005	<0.002
	11/19/19	<0.100	<0.0762	<0.152	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	2/24/2020	<0.100	<0.0769	<0.154	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	6/1/2020	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	8/19/2020	<0.100	<0.187	<0.374	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	11/16/2020	<0.100	<0.0748	<0.150	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	2/26/2021	<0.100	<0.0792	<0.158	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
	5/5/2021	<0.100	<0.0755	<0.151	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	8/11/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.004
	11/17/2021	<0.100	<0.189	<0.377	<0.0002	<0.001	<0.0005	<0.0015	<0.001	<0.002
MW-11	02/19/19	0.727	<0.0748	<0.150	0.00162	0.00176	0.083	0.0652	<0.001	--
	05/21/19	**3.05**	<0.0374	<0.0748	**0.0643**	0.00843	0.359	0.0355	<0.0005	--
	08/29/19	**17.4**	0.094	<0.0748	0.0038	0.24	**1.18**	**2.52**	<0.005	0.121
	11/19/19	**45.0**	0.239	<0.151	**0.0526**	0.159	**4.33**	**7.73**	<0.02	**0.414**
	2/25/2020	**2.65**	0.341	<0.154	0.00397	<0.01	0.292	0.257	<0.01	0.0257
	6/2/2020	**1.59**	0.129	<0.15	**0.0232**	<0.0025	0.352	0.0812	<0.0025	0.0225
	6/2/2020 DUP	**1.62**	<0.0755	<0.151	**0.022**	<0.0025	0.353	0.083	<0.0025	0.022
	8/19/2020	**13.9 R**	<0.187	<0.374	0.00337	0.175 R	**0.817 R**	**2.93 R**	<0.001	0.0906 R
	8/19/2020 DUP	**22.9 R**	0.23 F-18	<0.377	**0.00541**	0.268 R	**1.36 R**	**4.81 R**	<0.001	0.145 R
	11/17/2020	**23.3**	0.298 F-20	<0.151	**0.0359**	0.0705	**2.18**	**3.31**	<0.001	**0.207**
	2/26/2021	**3.42**	0.152 F-11 F-20	<0.151	0.0044	0.00563	0.37	0.594	<0.001	0.0575
	5/5/2021	**49.4**	0.598 F-11F-20	<0.151	**0.025**	0.62	**4.54**	**10.8**	<0.05	0.287
	5/5/2021 DUP	**49.6**	0.644 F-11F-20	<0.151	**0.0245**	0.62	**4.53**	**10.6**	<0.05	0.284
	8/11/2021	**41.4**	0.673 F-11, F-20	<0.381	**0.00902**	0.196	**2.58**	**8.6**	<0.001	<0.2
	11/17/2021	**2.26**	<0.189	<0.377	**0.0218**	0.00502	0.544	0.0218	<0.001	<0.2
Washington DOE MTCA Method A Cleanup Level		0.8	0.5	0.5	0.005	1	0.7	1	0.02	0.16

Appendix D

Summary of Analytical Results - Monitoring Wells

NuStar Terminals Operations Partnership, L.P. – Annex Terminal

Vancouver, Washington

Notes:

1. TPHg = Total petroleum hydrocarbons in gasoline carbon range by NW-TPHgx method.
2. TPHd = Total petroleum hydrocarbons in diesel carbon range by NW-TPHdx method with silica gel cleanup.
3. TPHho = Total petroleum hydrocarbons ion heavy oil carbon range NW-TPHdx method with silica gel cleanup.
4. **Bold** values represent concentration that exceeds MTCA Method A cleanup level.
5. Analysis completed without silica gel cleanup. Lab detected hydrocarbons with non-petroleum peaks or elution pattern that suggests the presence of biogenic interference.
6. Hydrocarbon pattern most closely resembles a blend of heavy gas-/light diesel-range components.
7. mg/L (ppm) = Milligrams per liter (parts per million).
8. TPHg cleanup level dependent on presence of benzene in groundwater. Cleanup level = 0.800 mg/L if benzene is present and 1.00 mg/L if benzene is not present.
9. Washington DOE MTCA Method A cleanup level = Washington Department of Ecology Model Toxics Control Act Method A cleanup level.
10. < = Not detected at or above the specified laboratory method reporting limit (MRL).
11. bgs = below ground surface
12. -- = Sample not analyzed for constituent.

Quality Assurance/Quality Control Data Qualifiers

J = Reported result is an estimated value.

J- = Reported result is estimated and biased low.

Q = Sample prepared and/or analyzed outside of recommended holding time. Result is considered biased low.

F-11 = The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.

F-18 = Result for Diesel (Diesel Range Organics, C12-C24) is due to overlap from Gasoline or a Gasoline Range product.

F-20 = Result for Diesel is estimated due to overlap from Gasoline Range Organics or other VOCs.

D = Laboratory report noted discreet peaks that are not indicative of diesel. The laboratory chemist confirmed the peaks were from non-petroleum organic material.

R= The relative percent difference between the sample and duplicate sample is above 30%.

APPENDIX E
Laboratory Results and Data Quality Review

1.0 INTRODUCTION

This attachment documents the results of a quality assurance/quality control (QA/QC) review of the analytical data for the groundwater samples collected as part of the 2021 quarterly groundwater monitoring events at the NuStar Terminals Operations Partnership (NuStar) Annex Terminal in Vancouver, Washington (the Facility). Soil and groundwater sample analyses were performed by accredited environmental laboratories; laboratories used during the investigation are listed in the table below. Copies of the laboratory reports are included in this attachment.

Report	Sampling Date	Event	Laboratory
A1C004	2/25/21-2/26/21	Groundwater monitoring event	Apex Labs - Tigard, OR.
A1E0226	5/4/21-5/5/21	Groundwater monitoring event	Apex Labs - Tigard, OR.
A1H0365	8/10/21-8/11/21	Groundwater monitoring event	Apex Labs - Tigard, OR.
A1K0890	11/16/21-11/17/21	Groundwater monitoring event	Apex Labs - Tigard, OR.

2.0 DATA VALIDATION

The QA review included examination and validation of the laboratory data packages for the following:

- Analytical preparation and quantitation methods;
- Analytical method holding times;
- Sample handling;
- Chain-of-custody protocols;
- Detection and reporting limits;
- Method blank detections;
- Laboratory control samples, matrix spikes and surrogates to assess laboratory accuracy;
- Laboratory control sample duplicates and matrix spike duplicates to assess laboratory precision; and
- Field duplicates to assess sampling and laboratory precision

The QA/QC review did not include a review of raw data.

2.1 DATA QUALIFIERS

Any data that are found to have possible bias or error were qualified and flagged. The flags used in the data table are below.

F-11	The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
F-13, F-18 - F-20	Various laboratory notes regarding the hydrocarbon pattern on the NWTPH-Gx and NWTPH-Dx analysis; in general, the chromatograph patterns don't exactly match the standard and/or there is an overlap in hydrocarbon ranges in the samples. Note: while the hydrocarbon overlap was noted on the report tables, the data flags were not carried through to the tables as they don't indicate a quality issue for sample results.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-17	Relative percent difference (RPD) between original and duplicate is outside control limits.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-42	Matrix spike/matrix spike duplicate (MS/MSD) analysis was performed on sample and percent recovery or RPD was outside control limits.
Q-55	Daily CCV/LCS recovery for the analyte was below the +/-20% criteria listed in EPA 8620, however there is adequate sensitivity for analysis.
R	The relative percent difference between the sample and duplicate sample is above 30%.
R-06	Reporting level raised due to possible carryover from a previous sample.

3.0 ANALYTICAL METHODS

Groundwater analyses included the following:

- Gasoline-range petroleum hydrocarbons (TPHg) by Method NWTPH-Gx;
- Diesel-range petroleum hydrocarbons (TPHd) and oil-range petroleum hydrocarbons (TPHo) by Method NWTPH-Dx; and
- Benzene, toluene, ethylbenzene, and xylenes (collectively BTEX) and Naphthalene by U.S. Environmental Protection Agency (EPA) Method 8260C.

4.0 QUALITY ASSURANCE OBJECTIVES AND REVIEW

The general QA objectives for this project were to develop and implement procedures for obtaining, evaluating, and confirming the usability of data of a specified quality for soil and groundwater concentration monitoring at the Facility. To collect such information, analytical data must have an appropriate degree of accuracy and reproducibility, samples collected must be representative of actual field conditions, and samples must be collected and analyzed using unbroken chain-of-custody procedures.

Reporting limits and analytical results for the samples were compared to Washington Department of Ecology MTCA Method A Cleanup Levels for each parameter. Precision, accuracy, representativeness, completeness, and comparability parameters used to indicate data quality are defined below.

4.1 HOLDING TIMES AND SAMPLE RECEIPT

The holding time is the minimum amount of time the sample can be stored before analytes start to degrade and are not representative of initial sampling concentrations. Holding times are defined by analytical methods. The groundwater samples included in this QA/QC review were analyzed within the method recommended holding time.

Method	Matrix	Analyte	Preservative	Hold Time
EPA 8260C	Water	BTEX, MTBE and naphthalene	Hydrochloric Acid (HCl) to pH<2; No headspace; Glass VOA	14 days
NWTPH-Gx	Water	Gasoline Range Organics	Hydrochloric Acid (HCl) to pH<2; No headspace; Glass	14 days
NWTPH-Dx	Water	Diesel Range Organics	Hydrochloric Acid (HCl) to pH<2; Amber glass container	14 days

Samples were received on ice below 4°C by the analytical laboratory. Sampling containers arrived intact and unbroken to the laboratories. Groundwater samples to be analyzed for volatile organic compounds (VOCs) were received without headspace in volatile organic analysis (VOA) sampling containers. All chain-of-custody procedures were appropriately relinquished by the GeoEngineers sampler and received by the analytical laboratory. There were no major discrepancies found between the bottles and the chain-of-custody procedures received.

4.2 REPORTING LIMITS

Reporting limits are the lowest concentration an instrument is capable of accurately detecting an analyte. They are determined by the laboratory and are based on instrumentation capabilities, the matrix of field samples, sample preparation procedures and suggested reporting limits by the EPA or the Washington Department of Ecology. In some cases, the reporting limits may be raised due to high concentrations of analytes or matrix interferences. Detection limits were generally consistent

with industry standards and regulatory standards. Reporting limits for individual samples varied based on the magnitude of the chemical impact.

4.3 METHOD BLANKS

A method—or laboratory—blank is a QC sample prepared by the laboratory from an analyte-free matrix that is analyzed in an analytical batch along with environmental and other QC samples. It is used to assess laboratory contamination or background interferences. Analytes were not detected in the method blanks during the above-referenced analyses.

4.4 ACCURACY

Accuracy compares the accepted reference concentration of an analyte to the concentration determined analytically. Accuracy is measured as a percent recovery. This recovery must be within a certain range or control limit for the data in an analytical batch to be considered acceptable. The analytical laboratory provides QC samples and surrogates to help determine the accuracy and acceptability of the data reported. These QC samples and surrogates are discussed below.

4.4.1 Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control duplicate samples (LCSD) were analyzed by the laboratory to assess the accuracy of the analytical methods. A minimum of one set of LCS and LCSD was analyzed per analytical batch. The LCS and LCSD are prepared from an analyte-free matrix that is spiked with known levels of compounds of concern. The concentrations are measured and compared to the known spiked levels. This comparison is expressed as percent recovery. The percent recoveries for LCS and LCSD quality control samples were within method control limits with the following exceptions:

> From report A1E0226, an LCS analysis was performed on a blank (batch 1050234) and percent recovery for xylenes was outside of control limits. Because a duplicate LCS analysis had percent recovery within method control limits for the same batch, no data were flagged.

4.4.2 Matrix Spikes

A matrix spike QC sample is used to assess the performance of the analytical method by determining potential matrix interferences. MS and MSD analyses are performed on one environmental sample per analytical batch. An MS sample uses an environmental sample that is spiked with known concentrations of analytes of interest. The MS is then prepared and analyzed with the same analytical procedures as environmental samples in the analytical batch. The resulting concentration of the MS is then compared to the known or true values plus the non-spiked environmental sample concentration. This comparison is expressed as a percent recovery. The percent recoveries for MS and MSD QC samples were within method control limits with the following exceptions:

From report A1E0226, a matrix spike analysis was performed on a blank (batch 1050334) and percent recovery for naphthalene was outside of EPA criteria for method 8260D. Because there was adequate sensitivity for analysis, no data were flagged.
From report A1K0890, a matrix spike analysis was performed on a blank (batch 21K0914) and percent recovery was outside of control limits. Because a duplicate matrix spike analysis had percent recovery within method control limits for the same batch, no data were flagged.

4.4.3 Surrogates

Surrogates are organic compounds that are similar in chemical composition to the analytes of interest but are not likely to be found in the environment. They are spiked at a known concentration into environmental and batch QC samples prior to sample preparation and analysis. Surrogate recoveries for environmental samples are used to evaluate matrix interference, sample preparation efficiency and analysis performance on a sample-specific basis. In some cases, the surrogate recovery was either estimated or not available due to sample dilution required for high analyte concentration and/or matrix interference. Surrogate recoveries were within control limits.

4.5 PRECISION

Precision is measured by how close values of duplicate analyses are to each other. These duplicate analyses are prepared from separate aliquots of the same sample and are analyzed at the same (or similar) time. Precision in the field ensures that samples taken are representative of field concentrations; this is demonstrated by field duplicates. Analytical precision is the ability of the laboratory to reproduce results that are similar to each other; this is measured through duplicate analysis of environmental and batch QC samples. Precision is estimated by the RPD between the original analysis and the duplicate analysis.

4.5.1 Laboratory Control Sample Duplicates

The analytical batch LCS concentration of an analyte is compared to the LCSD concentration of the same analyte. The RPD is calculated from these two concentrations, which must be below a certain percentage to be considered acceptable. The RPD values for the laboratory control samples of the same batch were within the method control limits.

4.5.2 Matrix Spikes

Like the LCS/LCSD, the MS/MSD analyte concentrations are also compared to each other and expressed as an RPD. The RPD values for analytical batch MS/MSD were within the control limits.

4.5.3 Field Duplicate

A field duplicate is a second field sample collected from a selected sample location. Field duplicate samples serve as a check on laboratory precision, sampling quality, as well as potential variability

of the sample matrix. The field duplicate is analyzed and compared to the original sample to assess precision. This comparison can be expressed by the RPD between the original and duplicate samples. Application of RPD values is appropriate when the analyte result is five times greater than the reporting limit. Laboratory precision decreases as the analytical result approaches the reporting limit. One field duplicate was analyzed during each quarterly monitoring event. RPD values for the field duplicates were within control limits with the following exception:

From report A1C0004, the RPD between the sample and the duplicate from well MW-5 was greater than 30% for benzene. The associated data were flagged Q-42.

5.0 CONCLUSION

The overall QA objectives have been met and the data are of adequate quality for use in this project.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Tuesday, March 9, 2021

Stephanie Salisbury
Cascadia Associates
5820 SW Kelly Ave Unit B
Portland, OR 97239

RE: A1C0004 - Nustar Vannex - 1Q21

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1C0004, which was received by the laboratory on 2/26/2021 at 1:32:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample reciept, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	5.9 degC	Cooler #2	4.4 degC
Cooler #3	4.1 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Apex Laboratories, LLC
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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-8D	A1C0004-01	Water	02/25/21 10:00	02/26/21 13:32
MW-8	A1C0004-02	Water	02/25/21 10:40	02/26/21 13:32
MW-5	A1C0004-03	Water	02/25/21 11:10	02/26/21 13:32
MW-5 Dup	A1C0004-04	Water	02/25/21 11:10	02/26/21 13:32
MW-5D	A1C0004-05	Water	02/25/21 11:50	02/26/21 13:32
MW-9	A1C0004-06	Water	02/25/21 12:20	02/26/21 13:32
MW-7	A1C0004-07	Water	02/25/21 13:20	02/26/21 13:32
MW-3	A1C0004-08	Water	02/25/21 14:00	02/26/21 13:32
MW-6	A1C0004-09	Water	02/25/21 14:30	02/26/21 13:32
MW-1	A1C0004-10	Water	02/26/21 07:50	02/26/21 13:32
MW-11	A1C0004-11	Water	02/26/21 08:20	02/26/21 13:32
MW-4	A1C0004-12	Water	02/26/21 09:10	02/26/21 13:32
MW-2	A1C0004-13	Water	02/26/21 09:40	02/26/21 13:32
MW-10	A1C0004-14	Water	02/26/21 10:40	02/26/21 13:32

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-8D (A1C0004-01)				**Matrix: Water**		**Batch: 1030077**		
Diesel	ND	---	0.0833	mg/L	1	03/02/21 22:55	NWTPH-Dx LL	
Oil	ND	---	0.167	mg/L	1	03/02/21 22:55	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*03/02/21 22:55*	*NWTPH-Dx LL*	
MW-8 (A1C0004-02)				**Matrix: Water**		**Batch: 1030077**		
Diesel	ND	---	0.0833	mg/L	1	03/02/21 23:15	NWTPH-Dx LL	
Oil	ND	---	0.167	mg/L	1	03/02/21 23:15	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 85 %*		*Limits: 50-150 %*	*1*	*03/02/21 23:15*	*NWTPH-Dx LL*	
MW-5 (A1C0004-03)				**Matrix: Water**		**Batch: 1030077**		
Diesel	**1.82**	---	0.0748	mg/L	1	03/02/21 23:36	NWTPH-Dx LL	**F-18**
Oil	ND	---	0.150	mg/L	1	03/02/21 23:36	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 81 %*		*Limits: 50-150 %*	*1*	*03/02/21 23:36*	*NWTPH-Dx LL*	
MW-5 Dup (A1C0004-04)				**Matrix: Water**		**Batch: 1030077**		
Diesel	**2.14**	---	0.0816	mg/L	1	03/02/21 23:56	NWTPH-Dx LL	**F-18**
Oil	ND	---	0.163	mg/L	1	03/02/21 23:56	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 87 %*		*Limits: 50-150 %*	*1*	*03/02/21 23:56*	*NWTPH-Dx LL*	
MW-5D (A1C0004-05)				**Matrix: Water**		**Batch: 1030077**		
Diesel	**0.240**	---	0.0769	mg/L	1	03/03/21 00:17	NWTPH-Dx LL	**F-11, F-20**
Oil	ND	---	0.154	mg/L	1	03/03/21 00:17	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 94 %*		*Limits: 50-150 %*	*1*	*03/03/21 00:17*	*NWTPH-Dx LL*	
MW-9 (A1C0004-06)				**Matrix: Water**		**Batch: 1030077**		
Diesel	ND	---	0.0777	mg/L	1	03/03/21 00:37	NWTPH-Dx LL	
Oil	ND	---	0.155	mg/L	1	03/03/21 00:37	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*03/03/21 00:37*	*NWTPH-Dx LL*	
MW-7 (A1C0004-07)				**Matrix: Water**		**Batch: 1030077**		
Diesel	ND	---	0.0769	mg/L	1	03/03/21 00:58	NWTPH-Dx LL	
Oil	ND	---	0.154	mg/L	1	03/03/21 00:58	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*03/03/21 00:58*	*NWTPH-Dx LL*	
MW-3 (A1C0004-08)				**Matrix: Water**		**Batch: 1030077**		
Diesel	ND	---	0.0792	mg/L	1	03/03/21 01:18	NWTPH-Dx LL	

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Lisa Domenighini, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-3 (A1C0004-08)				**Matrix: Water**		**Batch: 1030077**		
Oil	ND	---	0.158	mg/L	1	03/03/21 01:18	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 81 %*		*Limits: 50-150 %*	*1*	*03/03/21 01:18*	*NWTPH-Dx LL*	
MW-6 (A1C0004-09)				**Matrix: Water**		**Batch: 1030077**		
Diesel	**5.66**	---	0.0769	mg/L	1	03/03/21 01:39	NWTPH-Dx LL	**F-11, F-20**
Oil	ND	---	0.154	mg/L	1	03/03/21 01:39	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 76 %*		*Limits: 50-150 %*	*1*	*03/03/21 01:39*	*NWTPH-Dx LL*	
MW-1 (A1C0004-10)				**Matrix: Water**		**Batch: 1030077**		
Diesel	**0.313**	---	0.0762	mg/L	1	03/03/21 01:59	NWTPH-Dx LL	**F-11**
Oil	ND	---	0.152	mg/L	1	03/03/21 01:59	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 95 %*		*Limits: 50-150 %*	*1*	*03/03/21 01:59*	*NWTPH-Dx LL*	
MW-11 (A1C0004-11)				**Matrix: Water**		**Batch: 1030150**		
Diesel	**0.152**	---	0.0755	mg/L	1	03/05/21 02:57	NWTPH-Dx LL	**F-11, F-20**
Oil	ND	---	0.151	mg/L	1	03/05/21 02:57	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 68 %*		*Limits: 50-150 %*	*1*	*03/05/21 02:57*	*NWTPH-Dx LL*	
MW-4 (A1C0004-12)				**Matrix: Water**		**Batch: 1030150**		
Diesel	ND	---	0.0800	mg/L	1	03/05/21 03:17	NWTPH-Dx LL	
Oil	ND	---	0.160	mg/L	1	03/05/21 03:17	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*03/05/21 03:17*	*NWTPH-Dx LL*	
MW-2 (A1C0004-13)				**Matrix: Water**		**Batch: 1030150**		
Diesel	ND	---	0.0792	mg/L	1	03/05/21 03:38	NWTPH-Dx LL	
Oil	ND	---	0.158	mg/L	1	03/05/21 03:38	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 84 %*		*Limits: 50-150 %*	*1*	*03/05/21 03:38*	*NWTPH-Dx LL*	
MW-10 (A1C0004-14)				**Matrix: Water**		**Batch: 1030150**		
Diesel	ND	---	0.0792	mg/L	1	03/05/21 03:59	NWTPH-Dx LL	
Oil	ND	---	0.158	mg/L	1	03/05/21 03:59	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 88 %*		*Limits: 50-150 %*	*1*	*03/05/21 03:59*	*NWTPH-Dx LL*	

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-8D (A1C0004-01)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/03/21 08:52	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/03/21 08:52*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/03/21 08:52*	*NWTPH-Gx (MS)*	
MW-8 (A1C0004-02)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/03/21 09:19	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/03/21 09:19*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/03/21 09:19*	*NWTPH-Gx (MS)*	
MW-5 (A1C0004-03)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	**27.5**	---	1.00	mg/L	10	03/03/21 11:35	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*03/03/21 11:35*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*03/03/21 11:35*	*NWTPH-Gx (MS)*	
MW-5 Dup (A1C0004-04)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	**27.2**	---	1.00	mg/L	10	03/03/21 12:29	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*105 %*	*Limits: 50-150 %*	*1*	*03/03/21 12:29*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*03/03/21 12:29*	*NWTPH-Gx (MS)*	
MW-5D (A1C0004-05)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	**0.126**	---	0.100	mg/L	1	03/03/21 09:46	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits: 50-150 %*	*1*	*03/03/21 09:46*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*03/03/21 09:46*	*NWTPH-Gx (MS)*	
MW-9 (A1C0004-06)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/03/21 10:13	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/03/21 10:13*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/03/21 10:13*	*NWTPH-Gx (MS)*	
MW-7 (A1C0004-07)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/03/21 10:41	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits: 50-150 %*	*1*	*03/03/21 10:41*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/03/21 10:41*	*NWTPH-Gx (MS)*	
MW-3 (A1C0004-08)				**Matrix: Water**		**Batch: 1030095**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/03/21 11:08	NWTPH-Gx (MS)	

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Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-3 (A1C0004-08)				**Matrix: Water**		**Batch: 1030095**		
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*102 %*	*Limits: 50-150 %*	*1*	*03/03/21 11:08*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/03/21 11:08*	*NWTPH-Gx (MS)*	
MW-6 (A1C0004-09)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	**15.2**	---	1.00	mg/L	10	03/04/21 05:32	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*03/04/21 05:32*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*03/04/21 05:32*	*NWTPH-Gx (MS)*	
MW-1 (A1C0004-10)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/04/21 00:35	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*100 %*	*Limits: 50-150 %*	*1*	*03/04/21 00:35*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/04/21 00:35*	*NWTPH-Gx (MS)*	
MW-11 (A1C0004-11)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	**3.42**	---	0.100	mg/L	1	03/04/21 01:29	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*108 %*	*Limits: 50-150 %*	*1*	*03/04/21 01:29*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*03/04/21 01:29*	*NWTPH-Gx (MS)*	
MW-4 (A1C0004-12)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/04/21 02:23	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/04/21 02:23*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*03/04/21 02:23*	*NWTPH-Gx (MS)*	
MW-2 (A1C0004-13)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/04/21 03:17	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits: 50-150 %*	*1*	*03/04/21 03:17*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*03/04/21 03:17*	*NWTPH-Gx (MS)*	
MW-10 (A1C0004-14)				**Matrix: Water**		**Batch: 1030133**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	03/04/21 03:44	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*100 %*	*Limits: 50-150 %*	*1*	*03/04/21 03:44*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*03/04/21 03:44*	*NWTPH-Gx (MS)*	

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Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-8D (A1C0004-01)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 08:52	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 08:52	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/03/21 08:52	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 08:52	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 08:52	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 08:52	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*03/03/21 08:52*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*03/03/21 08:52*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*03/03/21 08:52*	*EPA 8260D*	
MW-8 (A1C0004-02)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 09:19	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 09:19	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/03/21 09:19	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 09:19	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 09:19	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 09:19	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits: 80-120 %*	*1*	*03/03/21 09:19*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/03/21 09:19*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*03/03/21 09:19*	*EPA 8260D*	
MW-5 (A1C0004-03)				**Matrix: Water**		**Batch: 1030095**		
Benzene	**2.60**	---	2.00	ug/L	10	03/03/21 11:35	EPA 8260D	**Q-42**
Toluene	ND	---	10.0	ug/L	10	03/03/21 11:35	EPA 8260D	
Ethylbenzene	**130**	---	5.00	ug/L	10	03/03/21 11:35	EPA 8260D	
Xylenes, total	**626**	---	15.0	ug/L	10	03/03/21 11:35	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	10.0	ug/L	10	03/03/21 11:35	EPA 8260D	
Naphthalene	**1550**	---	20.0	ug/L	10	03/03/21 11:35	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits: 80-120 %*	*1*	*03/03/21 11:35*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/03/21 11:35*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*80-120 %*	*1*	*03/03/21 11:35*	*EPA 8260D*	
MW-5 Dup (A1C0004-04)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	2.00	ug/L	10	03/03/21 12:29	EPA 8260D	
Toluene	ND	---	10.0	ug/L	10	03/03/21 12:29	EPA 8260D	
Ethylbenzene	**127**	---	5.00	ug/L	10	03/03/21 12:29	EPA 8260D	
Xylenes, total	**616**	---	15.0	ug/L	10	03/03/21 12:29	EPA 8260D	

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Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-5 Dup (A1C0004-04)				**Matrix: Water**		**Batch: 1030095**		
Methyl tert-butyl ether (MTBE)	ND	---	10.0	ug/L	10	03/03/21 12:29	EPA 8260D	
Naphthalene	**1550**	---	20.0	ug/L	10	03/03/21 12:29	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits: 80-120 %*	*1*	*03/03/21 12:29*	*EPA 8260D*	
Toluene-d8 (Surr)			*98 %*	*80-120 %*	*1*	*03/03/21 12:29*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*03/03/21 12:29*	*EPA 8260D*	
MW-5D (A1C0004-05)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 09:46	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 09:46	EPA 8260D	
Ethylbenzene	**0.930**	---	0.500	ug/L	1	03/03/21 09:46	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 09:46	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 09:46	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 09:46	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*03/03/21 09:46*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/03/21 09:46*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*03/03/21 09:46*	*EPA 8260D*	
MW-9 (A1C0004-06)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 10:13	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 10:13	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/03/21 10:13	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 10:13	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 10:13	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 10:13	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*03/03/21 10:13*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/03/21 10:13*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*03/03/21 10:13*	*EPA 8260D*	
MW-7 (A1C0004-07)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 10:41	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 10:41	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/03/21 10:41	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 10:41	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 10:41	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 10:41	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*03/03/21 10:41*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/03/21 10:41*	*EPA 8260D*	

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Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1C0004-07)				**Matrix: Water**		**Batch: 1030095**		
Surrogate: 4-Bromofluorobenzene (Surr)		*Recovery: 101 %*	*Limits: 80-120 %*		*1*	*03/03/21 10:41*	*EPA 8260D*	
MW-3 (A1C0004-08)				**Matrix: Water**		**Batch: 1030095**		
Benzene	ND	---	0.200	ug/L	1	03/03/21 11:08	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/03/21 11:08	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/03/21 11:08	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/03/21 11:08	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/03/21 11:08	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/03/21 11:08	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 103 %*	*Limits: 80-120 %*		*1*	*03/03/21 11:08*	*EPA 8260D*	
Toluene-d8 (Surr)		*99 %*	*80-120 %*		*1*	*03/03/21 11:08*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*99 %*	*80-120 %*		*1*	*03/03/21 11:08*	*EPA 8260D*	
MW-6 (A1C0004-09)				**Matrix: Water**		**Batch: 1030133**		
Benzene	**230**	---	2.00	ug/L	10	03/04/21 05:32	EPA 8260D	
Toluene	**32.5**	---	10.0	ug/L	10	03/04/21 05:32	EPA 8260D	
Ethylbenzene	**1860**	---	5.00	ug/L	10	03/04/21 05:32	EPA 8260D	
Xylenes, total	**263**	---	15.0	ug/L	10	03/04/21 05:32	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	10.0	ug/L	10	03/04/21 05:32	EPA 8260D	
Naphthalene	**371**	---	20.0	ug/L	10	03/04/21 05:32	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 101 %*	*Limits: 80-120 %*		*1*	*03/04/21 05:32*	*EPA 8260D*	
Toluene-d8 (Surr)		*98 %*	*80-120 %*		*1*	*03/04/21 05:32*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*94 %*	*80-120 %*		*1*	*03/04/21 05:32*	*EPA 8260D*	
MW-1 (A1C0004-10)				**Matrix: Water**		**Batch: 1030133**		
Benzene	ND	---	0.200	ug/L	1	03/04/21 00:35	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/04/21 00:35	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/04/21 00:35	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/04/21 00:35	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/04/21 00:35	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/04/21 00:35	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 103 %*	*Limits: 80-120 %*		*1*	*03/04/21 00:35*	*EPA 8260D*	
Toluene-d8 (Surr)		*99 %*	*80-120 %*		*1*	*03/04/21 00:35*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*102 %*	*80-120 %*		*1*	*03/04/21 00:35*	*EPA 8260D*	
MW-11 (A1C0004-11)				**Matrix: Water**		**Batch: 1030133**		
Benzene	**4.40**	---	0.200	ug/L	1	03/04/21 01:29	EPA 8260D	

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Apex Laboratories, LLC
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-11 (A1C0004-11)				**Matrix: Water**		**Batch: 1030133**		
Toluene	**5.63**	---	1.00	ug/L	1	03/04/21 01:29	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/04/21 01:29	EPA 8260D	
Naphthalene	**57.5**	---	2.00	ug/L	1	03/04/21 01:29	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits: 80-120 %*	*1*	*03/04/21 01:29*	*EPA 8260D*	
Toluene-d8 (Surr)			*98 %*	*80-120 %*	*1*	*03/04/21 01:29*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*03/04/21 01:29*	*EPA 8260D*	
MW-11 (A1C0004-11RE1)				**Matrix: Water**		**Batch: 1030157**		
Ethylbenzene	**370**	---	5.00	ug/L	10	03/04/21 17:24	EPA 8260D	
Xylenes, total	**594**	---	15.0	ug/L	10	03/04/21 17:24	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits: 80-120 %*	*1*	*03/04/21 17:24*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/04/21 17:24*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*03/04/21 17:24*	*EPA 8260D*	
MW-4 (A1C0004-12)				**Matrix: Water**		**Batch: 1030133**		
Benzene	ND	---	0.200	ug/L	1	03/04/21 02:23	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/04/21 02:23	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/04/21 02:23	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/04/21 02:23	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/04/21 02:23	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/04/21 02:23	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*03/04/21 02:23*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*03/04/21 02:23*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*03/04/21 02:23*	*EPA 8260D*	
MW-2 (A1C0004-13)				**Matrix: Water**		**Batch: 1030133**		
Benzene	ND	---	0.200	ug/L	1	03/04/21 03:17	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/04/21 03:17	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/04/21 03:17	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/04/21 03:17	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/04/21 03:17	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/04/21 03:17	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits: 80-120 %*	*1*	*03/04/21 03:17*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*03/04/21 03:17*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*103 %*	*80-120 %*	*1*	*03/04/21 03:17*	*EPA 8260D*	
MW-10 (A1C0004-14)				**Matrix: Water**		**Batch: 1030133**		

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-10 (A1C0004-14)				**Matrix: Water**		**Batch: 1030133**		
Benzene	ND	---	0.200	ug/L	1	03/04/21 03:44	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	03/04/21 03:44	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	03/04/21 03:44	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	03/04/21 03:44	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	03/04/21 03:44	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	03/04/21 03:44	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits: 80-120 %*	*1*	*03/04/21 03:44*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*03/04/21 03:44*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*03/04/21 03:44*	*EPA 8260D*	

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030077 - EPA 3510C (Fuels/Acid Ext.)												**Water**
Blank (1030077-BLK1)			Prepared: 03/02/21 10:35		Analyzed: 03/02/21 22:34							
NWTPH-Dx LL												
Diesel	ND	---	0.0727	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.145	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 88 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (1030077-BS1)			Prepared: 03/02/21 10:35		Analyzed: 03/02/21 22:55							
NWTPH-Dx LL												
Diesel	0.398	---	0.0800	mg/L	1	0.500	---	80	59 - 115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 87 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (1030077-BSD1)			Prepared: 03/02/21 10:35		Analyzed: 03/02/21 23:15							**Q-19**
NWTPH-Dx LL												
Diesel	0.415	---	0.0800	mg/L	1	0.500	---	83	59 - 115%	4	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 89 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Batch 1030150 - EPA 3510C (Fuels/Acid Ext.)												**Water**
Blank (1030150-BLK1)			Prepared: 03/04/21 07:11		Analyzed: 03/05/21 00:33							
NWTPH-Dx LL												
Diesel	ND	---	0.0727	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.145	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 82 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (1030150-BS1)			Prepared: 03/04/21 07:11		Analyzed: 03/05/21 00:54							
NWTPH-Dx LL												
Diesel	0.412	---	0.0800	mg/L	1	0.500	---	82	59 - 115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 88 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (1030150-BSD1)			Prepared: 03/04/21 07:11		Analyzed: 03/05/21 01:14							**Q-19**
NWTPH-Dx LL												
Diesel	0.415	---	0.0800	mg/L	1	0.500	---	83	59 - 115%	0.7	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 85 %*		*Limits: 50-150 %*		*Dilution: 1x*					

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ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030095 - EPA 5030B									Water			
Blank (1030095-BLK1)		Prepared: 03/02/21 17:06		Analyzed: 03/03/21 03:01								
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*102 %*		*50-150 %*			*"*					
LCS (1030095-BS2)		Prepared: 03/02/21 17:06		Analyzed: 03/03/21 02:34								
NWTPH-Gx (MS)												
Gasoline Range Organics	0.443	---	0.100	mg/L	1	0.500	---	89	80 - 120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*100 %*		*50-150 %*			*"*					
Duplicate (1030095-DUP2)		Prepared: 03/02/21 17:06		Analyzed: 03/03/21 12:02								
QC Source Sample: MW-5 (A1C0004-03)												
NWTPH-Gx (MS)												
Gasoline Range Organics	**27.2**	---	1.00	mg/L	10	---	27.5	---	---	1	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 106 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*103 %*		*50-150 %*			*"*					

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ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030133 - EPA 5030B									Water			
Blank (1030133-BLK1)		Prepared: 03/03/21 13:55		Analyzed: 03/03/21 20:21								
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*103 %*		*50-150 %*			*"*					
LCS (1030133-BS2)		Prepared: 03/03/21 13:55		Analyzed: 03/03/21 19:54								
NWTPH-Gx (MS)												
Gasoline Range Organics	0.501	---	0.100	mg/L	1	0.500	---	100	80 - 120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*102 %*		*50-150 %*			*"*					
Duplicate (1030133-DUP1)		Prepared: 03/03/21 13:56		Analyzed: 03/04/21 05:59								
QC Source Sample: MW-6 (A1C0004-09)												
NWTPH-Gx (MS)												
Gasoline Range Organics	**15.2**	---	1.00	mg/L	10	---	15.2	---	---	0.03	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 105 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)		*102 %*		*50-150 %*			*"*					

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030095 - EPA 5030B												**Water**
Blank (1030095-BLK1)			Prepared: 03/02/21 17:06 Analyzed: 03/03/21 03:01									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*			*"*				
LCS (1030095-BS1)			Prepared: 03/02/21 17:06 Analyzed: 03/03/21 02:07									
EPA 8260D												
Benzene	20.8	---	0.200	ug/L	1	20.0	---	104	80 - 120%	---	---	
Toluene	19.1	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Ethylbenzene	20.7	---	0.500	ug/L	1	20.0	---	103	80 - 120%	---	---	
Xylenes, total	62.5	---	1.50	ug/L	1	60.0	---	104	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	19.2	---	1.00	ug/L	1	20.0	---	96	80 - 120%	---	---	
Naphthalene	21.0	---	2.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 102 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*95 %*		*80-120 %*			*"*				
Duplicate (1030095-DUP2)			Prepared: 03/02/21 17:06 Analyzed: 03/03/21 12:02									
QC Source Sample: MW-5 (A1C0004-03)												
EPA 8260D												
Benzene	ND	---	2.00	ug/L	10	---	2.60	---	---	***	**30%**	Q-17
Toluene	ND	---	10.0	ug/L	10	---	ND	---	---	---	30%	
Ethylbenzene	**125**	---	5.00	ug/L	10	---	130	---	---	4	30%	
Xylenes, total	**602**	---	15.0	ug/L	10	---	626	---	---	4	30%	
Methyl tert-butyl ether (MTBE)	ND	---	10.0	ug/L	10	---	ND	---	---	---	30%	
Naphthalene	**1510**	---	20.0	ug/L	10	---	1550	---	---	3	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 101 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030095 - EPA 5030B												**Water**
Duplicate (1030095-DUP2)			Prepared: 03/02/21 17:06 Analyzed: 03/03/21 12:02									
QC Source Sample: MW-5 (A1C0004-03)												
Surr: 4-Bromofluorobenzene (Surr)			*Recovery: 93 %*	*Limits: 80-120 %*					*Dilution: 1x*			

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030133 - EPA 5030B									Water			
Blank (1030133-BLK1)			Prepared: 03/03/21 13:55		Analyzed: 03/03/21 20:21							
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 102 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*100 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*			*"*				
LCS (1030133-BS1)			Prepared: 03/03/21 13:55		Analyzed: 03/03/21 19:27							
EPA 8260D												
Benzene	20.8	---	0.200	ug/L	1	20.0	---	104	80 - 120%	---	---	
Toluene	18.9	---	1.00	ug/L	1	20.0	---	94	80 - 120%	---	---	
Ethylbenzene	20.4	---	0.500	ug/L	1	20.0	---	102	80 - 120%	---	---	
Xylenes, total	60.9	---	1.50	ug/L	1	60.0	---	102	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Naphthalene	20.1	---	2.00	ug/L	1	20.0	---	100	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	21.5	---	0.500	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	22.6	---	0.500	ug/L	1	20.0	---	113	80 - 120%	---	---	
Isopropylbenzene	21.0	---	1.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,2,4-Trimethylbenzene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
1,3,5-Trimethylbenzene	20.2	---	1.00	ug/L	1	20.0	---	101	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*95 %*		*80-120 %*			*"*				
Duplicate (1030133-DUP1)			Prepared: 03/03/21 13:56		Analyzed: 03/04/21 05:59							

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030133 - EPA 5030B							Water					
Duplicate (1030133-DUP1)		Prepared: 03/03/21 13:56 Analyzed: 03/04/21 05:59										
QC Source Sample: MW-6 (A1C0004-09)												
EPA 8260D												
Benzene	**235**	---	2.00	ug/L	10	---	230	---	---	2	30%	
Toluene	**33.2**	---	10.0	ug/L	10	---	32.5	---	---	2	30%	
Ethylbenzene	**1890**	---	5.00	ug/L	10	---	1860	---	---	1	30%	
Xylenes, total	**266**	---	15.0	ug/L	10	---	263	---	---	1	30%	
Methyl tert-butyl ether (MTBE)	ND	---	10.0	ug/L	10	---	ND	---	---	---	30%	
Naphthalene	**382**	---	20.0	ug/L	10	---	371	---	---	3	30%	
1,2-Dibromoethane (EDB)	ND	---	5.00	ug/L	10	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	5.00	ug/L	10	---	ND	---	---	---	30%	
Isopropylbenzene	**73.4**	---	10.0	ug/L	10	---	71.3	---	---	3	30%	
1,2,4-Trimethylbenzene	**85.4**	---	10.0	ug/L	10	---	81.8	---	---	4	30%	
1,3,5-Trimethylbenzene	**25.2**	---	10.0	ug/L	10	---	23.6	---	---	7	30%	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery: 102 %*		*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*99 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*96 %*		*80-120 %*		*"*					

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ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1030157 - EPA 5030B							Water					
Blank (1030157-BLK1)		Prepared: 03/04/21 08:00		Analyzed: 03/04/21 10:34								
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*99 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*			*"*				
LCS (1030157-BS1)		Prepared: 03/04/21 08:00		Analyzed: 03/04/21 09:35								
EPA 8260D												
Benzene	21.6	---	0.200	ug/L	1	20.0	---	108	80 - 120%	---	---	
Toluene	19.7	---	1.00	ug/L	1	20.0	---	98	80 - 120%	---	---	
Ethylbenzene	21.2	---	0.500	ug/L	1	20.0	---	106	80 - 120%	---	---	
Xylenes, total	63.2	---	1.50	ug/L	1	60.0	---	105	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	---	1.00	ug/L	1	20.0	---	92	80 - 120%	---	---	
Naphthalene	20.9	---	2.00	ug/L	1	20.0	---	105	80 - 120%	---	---	
1,2-Dibromoethane (EDB)	22.0	---	0.500	ug/L	1	20.0	---	110	80 - 120%	---	---	
1,2-Dichloroethane (EDC)	22.8	---	0.500	ug/L	1	20.0	---	114	80 - 120%	---	---	
Isopropylbenzene	21.9	---	1.00	ug/L	1	20.0	---	109	80 - 120%	---	---	
1,2,4-Trimethylbenzene	21.4	---	1.00	ug/L	1	20.0	---	107	80 - 120%	---	---	
1,3,5-Trimethylbenzene	21.1	---	1.00	ug/L	1	20.0	---	106	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*102 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*95 %*		*80-120 %*			*"*				

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Lisa Domenighini, Client Services Manager

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1030077							
A1C0004-01	Water	NWTPH-Dx LL	02/25/21 10:00	03/02/21 15:29	960mL/2mL	1000mL/2mL	1.04
A1C0004-02	Water	NWTPH-Dx LL	02/25/21 10:40	03/02/21 15:29	960mL/2mL	1000mL/2mL	1.04
A1C0004-03	Water	NWTPH-Dx LL	02/25/21 11:10	03/02/21 15:29	1070mL/2mL	1000mL/2mL	0.94
A1C0004-04	Water	NWTPH-Dx LL	02/25/21 11:10	03/02/21 15:29	980mL/2mL	1000mL/2mL	1.02
A1C0004-05	Water	NWTPH-Dx LL	02/25/21 11:50	03/02/21 15:29	1040mL/2mL	1000mL/2mL	0.96
A1C0004-06	Water	NWTPH-Dx LL	02/25/21 12:20	03/02/21 15:29	1030mL/2mL	1000mL/2mL	0.97
A1C0004-07	Water	NWTPH-Dx LL	02/25/21 13:20	03/02/21 15:29	1040mL/2mL	1000mL/2mL	0.96
A1C0004-08	Water	NWTPH-Dx LL	02/25/21 14:00	03/02/21 15:29	1010mL/2mL	1000mL/2mL	0.99
A1C0004-09	Water	NWTPH-Dx LL	02/25/21 14:30	03/02/21 15:29	1040mL/2mL	1000mL/2mL	0.96
A1C0004-10	Water	NWTPH-Dx LL	02/26/21 07:50	03/02/21 15:29	1050mL/2mL	1000mL/2mL	0.95
Batch: 1030150							
A1C0004-11	Water	NWTPH-Dx LL	02/26/21 08:20	03/04/21 07:11	1060mL/2mL	1000mL/2mL	0.94
A1C0004-12	Water	NWTPH-Dx LL	02/26/21 09:10	03/04/21 10:21	1000mL/2mL	1000mL/2mL	1.00
A1C0004-13	Water	NWTPH-Dx LL	02/26/21 09:40	03/04/21 10:21	1010mL/2mL	1000mL/2mL	0.99
A1C0004-14	Water	NWTPH-Dx LL	02/26/21 10:40	03/04/21 10:21	1010mL/2mL	1000mL/2mL	0.99

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1030095							
A1C0004-01	Water	NWTPH-Gx (MS)	02/25/21 10:00	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-02	Water	NWTPH-Gx (MS)	02/25/21 10:40	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-03	Water	NWTPH-Gx (MS)	02/25/21 11:10	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-04	Water	NWTPH-Gx (MS)	02/25/21 11:10	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-05	Water	NWTPH-Gx (MS)	02/25/21 11:50	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-06	Water	NWTPH-Gx (MS)	02/25/21 12:20	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-07	Water	NWTPH-Gx (MS)	02/25/21 13:20	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-08	Water	NWTPH-Gx (MS)	02/25/21 14:00	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
Batch: 1030133							
A1C0004-09	Water	NWTPH-Gx (MS)	02/25/21 14:30	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-10	Water	NWTPH-Gx (MS)	02/26/21 07:50	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-11	Water	NWTPH-Gx (MS)	02/26/21 08:20	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-12	Water	NWTPH-Gx (MS)	02/26/21 09:10	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-13	Water	NWTPH-Gx (MS)	02/26/21 09:40	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00

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ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 1Q21	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1C0004 - 03 09 21 1122

SAMPLE PREPARATION INFORMATION

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A1C0004-14	Water	NWTPH-Gx (MS)	02/26/21 10:40	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00

Selected Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1030095							
A1C0004-01	Water	EPA 8260D	02/25/21 10:00	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-02	Water	EPA 8260D	02/25/21 10:40	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-03	Water	EPA 8260D	02/25/21 11:10	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-04	Water	EPA 8260D	02/25/21 11:10	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-05	Water	EPA 8260D	02/25/21 11:50	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-06	Water	EPA 8260D	02/25/21 12:20	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-07	Water	EPA 8260D	02/25/21 13:20	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
A1C0004-08	Water	EPA 8260D	02/25/21 14:00	03/02/21 17:06	5mL/5mL	5mL/5mL	1.00
Batch: 1030133							
A1C0004-09	Water	EPA 8260D	02/25/21 14:30	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-10	Water	EPA 8260D	02/26/21 07:50	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-11	Water	EPA 8260D	02/26/21 08:20	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-12	Water	EPA 8260D	02/26/21 09:10	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-13	Water	EPA 8260D	02/26/21 09:40	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
A1C0004-14	Water	EPA 8260D	02/26/21 10:40	03/03/21 13:56	5mL/5mL	5mL/5mL	1.00
Batch: 1030157							
A1C0004-11RE1	Water	EPA 8260D	02/26/21 08:20	03/04/21 09:40	5mL/5mL	5mL/5mL	1.00

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

F-11	The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
F-18	Result for Diesel (Diesel Range Organics, C12-C24) is due to overlap from Gasoline or a Gasoline Range product.
F-20	Result for Diesel is Estimated due to overlap from Gasoline Range Organics or other VOCs.
Q-17	RPD between original and duplicate sample is outside of established control limits.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-42	Matrix Spike and/or Duplicate analysis was performed on this sample. % Recovery or RPD for this analyte is outside laboratory control limits. (Refer to the QC Section of Analytical Report.)

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported.

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation)
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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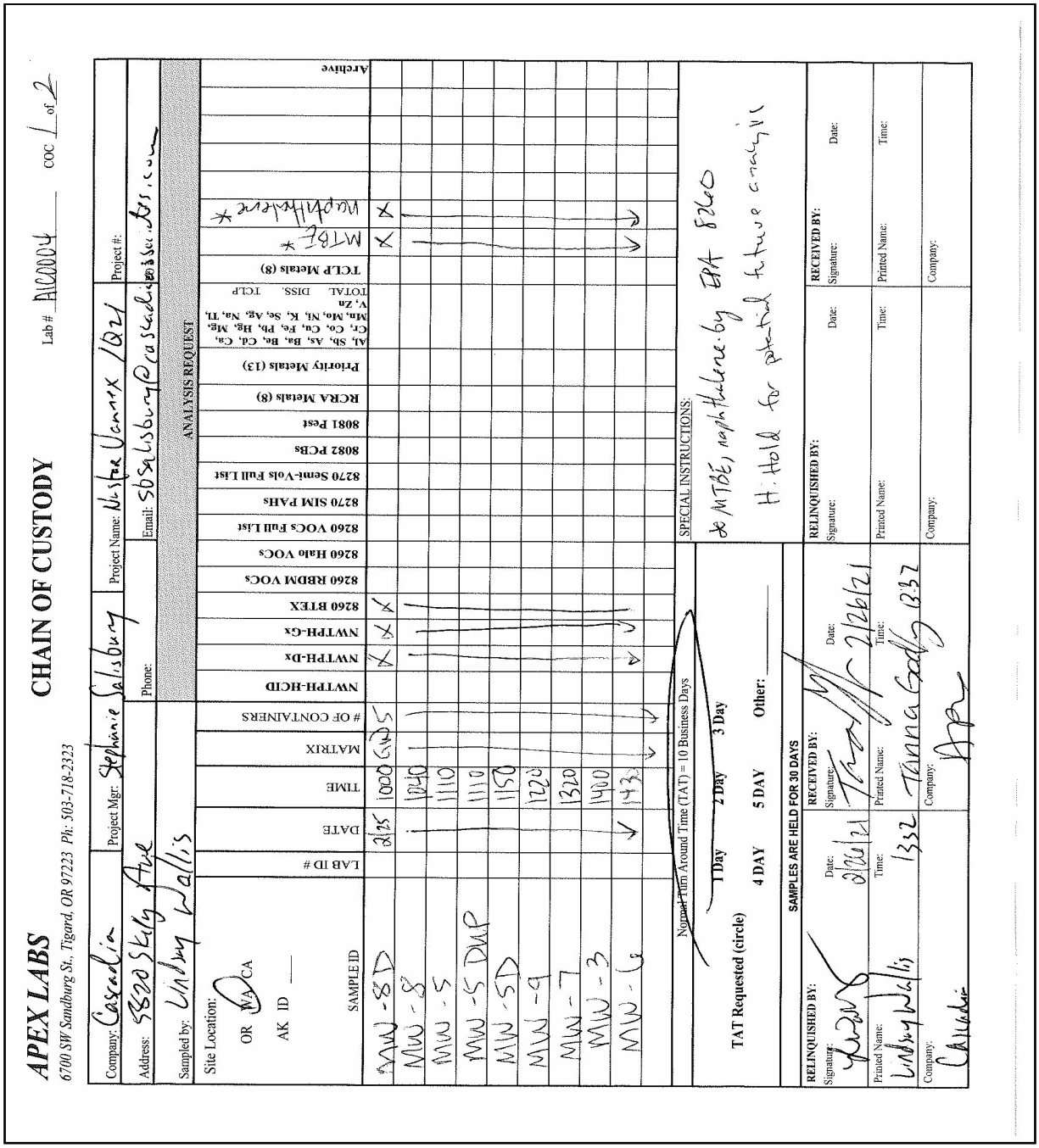
Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**



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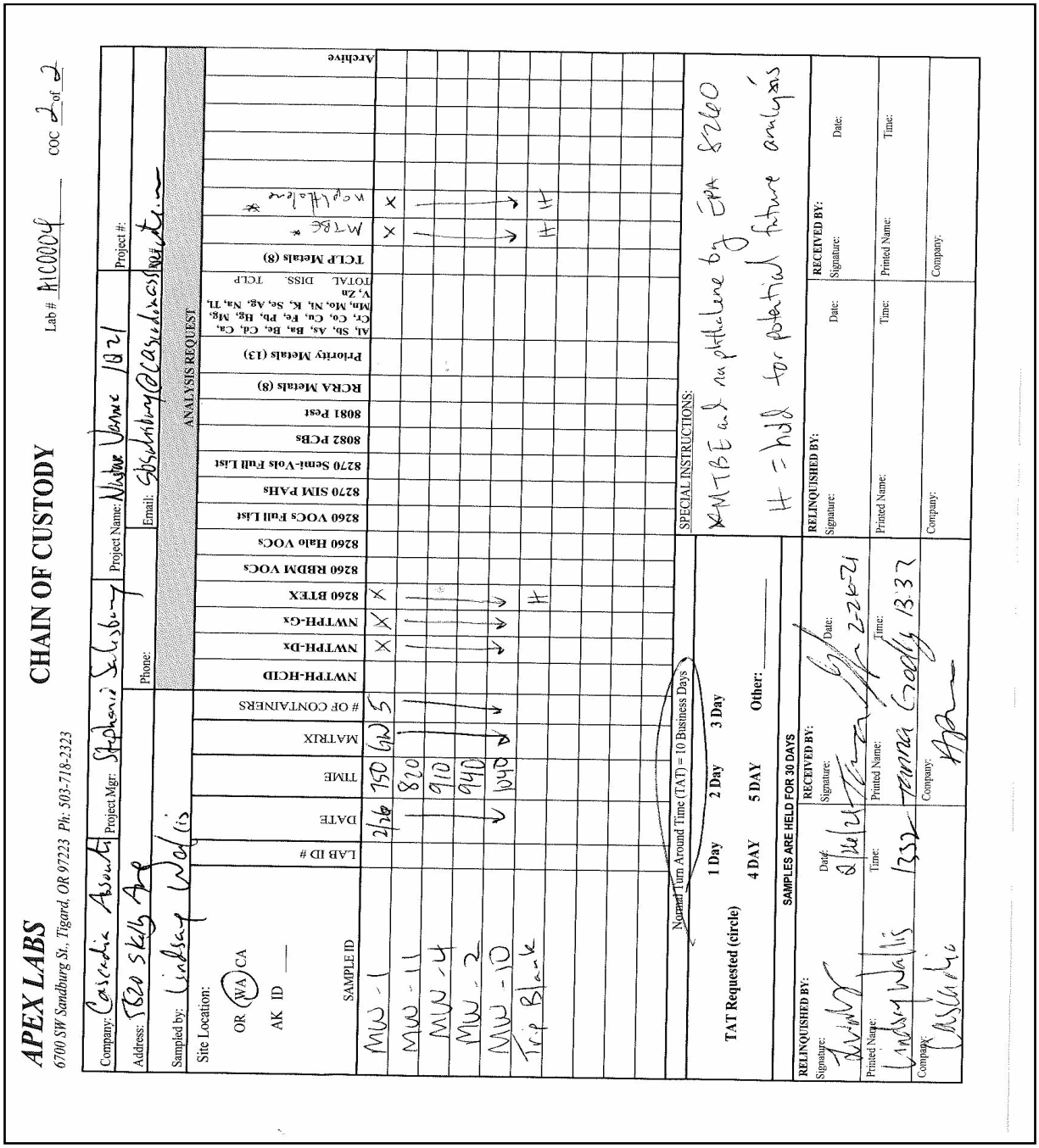
ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**



Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **1Q21**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1C0004 - 03 09 21 1122**

APEX LABS COOLER RECEIPT FORM

Client: Cascadia Element WO#: A1C0004

Project/Project #: Nustar Vannex 1021

Delivery Info:

Date/time received: 2/26/21 @ 13:32 By: TAM

Delivered by: Apex____Client__X__ESS____FedEx____UPS____Swift____Senvoy____SDS____Other_____

Cooler Inspection Date/time inspected: 2/26/21 @ 13:32 By: TAM

Chain of Custody included? Yes __X__ No _____ Custody seals? Yes_____ No __X__

Signed/dated by client? Yes __X__ No _____

Signed/dated by Apex? Yes __X__ No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	5.9	4.4	4.1				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	N	N	N				
Ice type: (Gel/Real/Other)	Real	Real	Real				
Condition:	good	good	good				

Cooler out of temp? (Y/N) Possible reason why:

Green dots applied to out of temperature samples? Yes/No

Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 3/11/21 @ 8:55 By: JS

All samples intact? Yes __X__ No ___ Comments:

Bottle labels/COCs agree? Yes ~~__X__~~ No __X__ Comments: COC lists trip blank, never received trip blank V 3/11

COC/container discrepancies form initiated? Yes ___ No __X__

Containers/volumes received appropriate for analysis? Yes __X__ No ___ Comments:

Do VOA vials have visible headspace? Yes ___ No __X__ NA ___

Comments

Water samples: pH checked: Yes __X__ No___NA___ pH appropriate? Yes __X__ No___NA____

Comments:

Additional information:

Labeled by: ST Witness: JS Cooler Inspected by: ST

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Thursday, May 13, 2021

Stephanie Salisbury
Cascadia Associates
5820 SW Kelly Ave Unit B
Portland, OR 97239

RE: A1E0226 - Nustar Vannex - 0060-001-001

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1E0226, which was received by the laboratory on 5/5/2021 at 3:50:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: ldomenighini@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample reciept, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1	4.8 degC	Cooler#2	4.4 degC
Cooler#3	0.4 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-7	A1E0226-01	Water	05/04/21 09:45	05/05/21 15:50
MW-9	A1E0226-02	Water	05/04/21 10:36	05/05/21 15:50
MW-5D	A1E0226-03	Water	05/04/21 11:32	05/05/21 15:50
MW-5	A1E0226-04	Water	05/04/21 12:00	05/05/21 15:50
MW-8	A1E0226-05	Water	05/04/21 12:43	05/05/21 15:50
MW-8D	A1E0226-06	Water	05/04/21 13:28	05/05/21 15:50
MW-1	A1E0226-07	Water	05/05/21 08:04	05/05/21 15:50
MW-11	A1E0226-08	Water	05/05/21 08:56	05/05/21 15:50
MW-11 DUP	A1E0226-09	Water	05/05/21 08:56	05/05/21 15:50
MW-4	A1E0226-10	Water	05/05/21 10:05	05/05/21 15:50
MW-2	A1E0226-11	Water	05/05/21 10:42	05/05/21 15:50
MW-3	A1E0226-12	Water	05/05/21 11:24	05/05/21 15:50
MW-10	A1E0226-13	Water	05/05/21 12:05	05/05/21 15:50
MW-6	A1E0226-14	Water	05/05/21 13:06	05/05/21 15:50

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1E0226-01RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0755	mg/L	1	05/13/21 01:07	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	05/13/21 01:07	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 78 %*		*Limits: 50-150 %*	*1*	*05/13/21 01:07*	*NWTPH-Dx LL*	
MW-9 (A1E0226-02RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0755	mg/L	1	05/13/21 01:30	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	05/13/21 01:30	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 77 %*		*Limits: 50-150 %*	*1*	*05/13/21 01:30*	*NWTPH-Dx LL*	
MW-5D (A1E0226-03RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**0.158**	---	0.0762	mg/L	1	05/13/21 01:52	NWTPH-Dx LL	**F-11, F-20**
Oil	ND	---	0.152	mg/L	1	05/13/21 01:52	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 83 %*		*Limits: 50-150 %*	*1*	*05/13/21 01:52*	*NWTPH-Dx LL*	
MW-5 (A1E0226-04RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**2.09**	---	0.0755	mg/L	1	05/13/21 02:15	NWTPH-Dx LL	**F-20**
Oil	ND	---	0.151	mg/L	1	05/13/21 02:15	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 80 %*		*Limits: 50-150 %*	*1*	*05/13/21 02:15*	*NWTPH-Dx LL*	
MW-8 (A1E0226-05RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0762	mg/L	1	05/13/21 02:37	NWTPH-Dx LL	
Oil	ND	---	0.152	mg/L	1	05/13/21 02:37	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 86 %*		*Limits: 50-150 %*	*1*	*05/13/21 02:37*	*NWTPH-Dx LL*	
MW-8D (A1E0226-06RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0755	mg/L	1	05/13/21 02:59	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	05/13/21 02:59	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 74 %*		*Limits: 50-150 %*	*1*	*05/13/21 02:59*	*NWTPH-Dx LL*	
MW-1 (A1E0226-07RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**0.152**	---	0.0755	mg/L	1	05/13/21 03:22	NWTPH-Dx LL	**F-11**
Oil	ND	---	0.151	mg/L	1	05/13/21 03:22	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 80 %*		*Limits: 50-150 %*	*1*	*05/13/21 03:22*	*NWTPH-Dx LL*	
MW-11 (A1E0226-08RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**0.598**	---	0.0755	mg/L	1	05/13/21 03:44	NWTPH-Dx LL	**F-11, F-20**

Apex Laboratories

Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-11 (A1E0226-08RE1)				**Matrix: Water**		**Batch: 1050410**		
Oil	ND	---	0.151	mg/L	1	05/13/21 03:44	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 89 %*		*Limits: 50-150 %*	*1*	*05/13/21 03:44*	*NWTPH-Dx LL*	
MW-11 DUP (A1E0226-09RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**0.644**	---	0.0755	mg/L	1	05/13/21 04:07	NWTPH-Dx LL	**F-11, F-20**
Oil	ND	---	0.151	mg/L	1	05/13/21 04:07	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 86 %*		*Limits: 50-150 %*	*1*	*05/13/21 04:07*	*NWTPH-Dx LL*	
MW-4 (A1E0226-10RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0748	mg/L	1	05/13/21 06:00	NWTPH-Dx LL	
Oil	ND	---	0.150	mg/L	1	05/13/21 06:00	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 89 %*		*Limits: 50-150 %*	*1*	*05/13/21 06:00*	*NWTPH-Dx LL*	
MW-2 (A1E0226-11RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0748	mg/L	1	05/13/21 06:22	NWTPH-Dx LL	
Oil	ND	---	0.150	mg/L	1	05/13/21 06:22	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 89 %*		*Limits: 50-150 %*	*1*	*05/13/21 06:22*	*NWTPH-Dx LL*	
MW-3 (A1E0226-12RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0762	mg/L	1	05/13/21 06:45	NWTPH-Dx LL	
Oil	ND	---	0.152	mg/L	1	05/13/21 06:45	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*05/13/21 06:45*	*NWTPH-Dx LL*	
MW-10 (A1E0226-13RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	ND	---	0.0755	mg/L	1	05/13/21 07:08	NWTPH-Dx LL	
Oil	ND	---	0.151	mg/L	1	05/13/21 07:08	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 83 %*		*Limits: 50-150 %*	*1*	*05/13/21 07:08*	*NWTPH-Dx LL*	
MW-6 (A1E0226-14RE1)				**Matrix: Water**		**Batch: 1050410**		
Diesel	**5.83**	---	0.0762	mg/L	1	05/13/21 07:30	NWTPH-Dx LL	**F-20**
Oil	ND	---	0.152	mg/L	1	05/13/21 07:30	NWTPH-Dx LL	
Surrogate: o-Terphenyl (Surr)		*Recovery: 69 %*		*Limits: 50-150 %*	*1*	*05/13/21 07:30*	*NWTPH-Dx LL*	

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ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 0060-001-001	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1E0226 - 05 13 21 1531

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1E0226-01)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 14:41	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits: 50-150 %*	*1*	*05/07/21 14:41*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*	*1*	*05/07/21 14:41*	*NWTPH-Gx (MS)*	
MW-9 (A1E0226-02)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 15:39	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*96 %*	*Limits: 50-150 %*	*1*	*05/07/21 15:39*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*	*1*	*05/07/21 15:39*	*NWTPH-Gx (MS)*	
MW-5D (A1E0226-03RE1)				**Matrix: Water**		**Batch: 1050334**		
Gasoline Range Organics	**0.208**	---	0.100	mg/L	1	05/11/21 12:48	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*96 %*	*Limits: 50-150 %*	*1*	*05/11/21 12:48*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*	*1*	*05/11/21 12:48*	*NWTPH-Gx (MS)*	
MW-5 (A1E0226-04)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	**15.8**	---	5.00	mg/L	50	05/07/21 21:29	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*96 %*	*Limits: 50-150 %*	*1*	*05/07/21 21:29*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*	*1*	*05/07/21 21:29*	*NWTPH-Gx (MS)*	
MW-8 (A1E0226-05)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 16:08	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*102 %*	*Limits: 50-150 %*	*1*	*05/07/21 16:08*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*	*1*	*05/07/21 16:08*	*NWTPH-Gx (MS)*	
MW-8D (A1E0226-06)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 16:37	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*103 %*	*Limits: 50-150 %*	*1*	*05/07/21 16:37*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*	*1*	*05/07/21 16:37*	*NWTPH-Gx (MS)*	
MW-1 (A1E0226-07)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 17:07	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*100 %*	*Limits: 50-150 %*	*1*	*05/07/21 17:07*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*99 %*	*50-150 %*	*1*	*05/07/21 17:07*	*NWTPH-Gx (MS)*	
MW-11 (A1E0226-08)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	**49.4**	---	5.00	mg/L	50	05/07/21 21:59	NWTPH-Gx (MS)	

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-11 (A1E0226-08)				**Matrix: Water**		**Batch: 1050234**		
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 112 %*	*Limits: 50-150 %*		*1*	*05/07/21 21:59*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*	*1*	*05/07/21 21:59*	*NWTPH-Gx (MS)*	
MW-11 DUP (A1E0226-09)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	**49.6**	---	5.00	mg/L	50	05/07/21 22:28	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 113 %*	*Limits: 50-150 %*		*1*	*05/07/21 22:28*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*	*1*	*05/07/21 22:28*	*NWTPH-Gx (MS)*	
MW-4 (A1E0226-10)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 17:36	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 107 %*	*Limits: 50-150 %*		*1*	*05/07/21 17:36*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*103 %*	*50-150 %*	*1*	*05/07/21 17:36*	*NWTPH-Gx (MS)*	
MW-2 (A1E0226-11)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 18:05	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 99 %*	*Limits: 50-150 %*		*1*	*05/07/21 18:05*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*100 %*	*50-150 %*	*1*	*05/07/21 18:05*	*NWTPH-Gx (MS)*	
MW-3 (A1E0226-12)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 18:34	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 98 %*	*Limits: 50-150 %*		*1*	*05/07/21 18:34*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*05/07/21 18:34*	*NWTPH-Gx (MS)*	
MW-10 (A1E0226-13)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	05/07/21 19:33	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 103 %*	*Limits: 50-150 %*		*1*	*05/07/21 19:33*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*	*1*	*05/07/21 19:33*	*NWTPH-Gx (MS)*	
MW-6 (A1E0226-14)				**Matrix: Water**		**Batch: 1050234**		
Gasoline Range Organics	**11.2**	---	5.00	mg/L	50	05/07/21 22:57	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 103 %*	*Limits: 50-150 %*		*1*	*05/07/21 22:57*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*95 %*	*50-150 %*	*1*	*05/07/21 22:57*	*NWTPH-Gx (MS)*	

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Lisa Domenighini, Client Services Manager

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1E0226-01)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 14:41	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 14:41	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 14:41	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 14:41	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 14:41	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 14:41	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*107 %*	*Limits: 80-120 %*	*1*	*05/07/21 14:41*	*EPA 8260D*	
Toluene-d8 (Surr)			*97 %*	*80-120 %*	*1*	*05/07/21 14:41*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*05/07/21 14:41*	*EPA 8260D*	
MW-9 (A1E0226-02)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 15:39	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 15:39	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 15:39	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 15:39	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 15:39	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 15:39	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*106 %*	*Limits: 80-120 %*	*1*	*05/07/21 15:39*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*05/07/21 15:39*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*105 %*	*80-120 %*	*1*	*05/07/21 15:39*	*EPA 8260D*	
MW-5D (A1E0226-03RE1)				**Matrix: Water**		**Batch: 1050334**		
Benzene	ND	---	0.200	ug/L	1	05/11/21 12:48	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/11/21 12:48	EPA 8260D	
Ethylbenzene	**3.59**	---	0.500	ug/L	1	05/11/21 12:48	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/11/21 12:48	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/11/21 12:48	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	05/11/21 12:48	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*110 %*	*Limits: 80-120 %*	*1*	*05/11/21 12:48*	*EPA 8260D*	
Toluene-d8 (Surr)			*103 %*	*80-120 %*	*1*	*05/11/21 12:48*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*	*1*	*05/11/21 12:48*	*EPA 8260D*	
MW-5 (A1E0226-04)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	10.0	ug/L	50	05/07/21 21:29	EPA 8260D	
Toluene	ND	---	50.0	ug/L	50	05/07/21 21:29	EPA 8260D	
Ethylbenzene	**108**	---	25.0	ug/L	50	05/07/21 21:29	EPA 8260D	
Xylenes, total	**458**	---	75.0	ug/L	50	05/07/21 21:29	EPA 8260D	

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-5 (A1E0226-04)				**Matrix: Water**		**Batch: 1050234**		
Methyl tert-butyl ether (MTBE)	ND	---	50.0	ug/L	50	05/07/21 21:29	EPA 8260D	
Naphthalene	**1310**	---	200	ug/L	50	05/07/21 21:29	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 103 %*		*Limits: 80-120 %*	*1*	*05/07/21 21:29*	*EPA 8260D*	
Toluene-d8 (Surr)			*98 %*	*80-120 %*	*1*	*05/07/21 21:29*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*91 %*	*80-120 %*	*1*	*05/07/21 21:29*	*EPA 8260D*	
MW-8 (A1E0226-05)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 16:08	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 16:08	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 16:08	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 16:08	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 16:08	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 16:08	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 108 %*		*Limits: 80-120 %*	*1*	*05/07/21 16:08*	*EPA 8260D*	
Toluene-d8 (Surr)			*97 %*	*80-120 %*	*1*	*05/07/21 16:08*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*05/07/21 16:08*	*EPA 8260D*	
MW-8D (A1E0226-06)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 16:37	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 16:37	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 16:37	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 16:37	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 16:37	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 16:37	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 108 %*		*Limits: 80-120 %*	*1*	*05/07/21 16:37*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 16:37*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*05/07/21 16:37*	*EPA 8260D*	
MW-1 (A1E0226-07)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 17:07	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 17:07	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 17:07	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 17:07	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 17:07	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 17:07	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 105 %*		*Limits: 80-120 %*	*1*	*05/07/21 17:07*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 17:07*	*EPA 8260D*	

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Lisa Domenighini, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-1 (A1E0226-07)				**Matrix: Water**		**Batch: 1050234**		
Surrogate: 4-Bromofluorobenzene (Surr)		*Recovery: 104 %*	*Limits: 80-120 %*		*1*	*05/07/21 17:07*	*EPA 8260D*	
MW-11 (A1E0226-08)				**Matrix: Water**		**Batch: 1050234**		
Benzene	**25.0**	---	10.0	ug/L	50	05/07/21 21:59	EPA 8260D	
Toluene	**620**	---	50.0	ug/L	50	05/07/21 21:59	EPA 8260D	
Ethylbenzene	**4540**	---	25.0	ug/L	50	05/07/21 21:59	EPA 8260D	
Xylenes, total	**10800**	---	75.0	ug/L	50	05/07/21 21:59	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	50.0	ug/L	50	05/07/21 21:59	EPA 8260D	
Naphthalene	**287**	---	200	ug/L	50	05/07/21 21:59	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 102 %*	*Limits: 80-120 %*		*1*	*05/07/21 21:59*	*EPA 8260D*	
Toluene-d8 (Surr)		*97 %*	*80-120 %*		*1*	*05/07/21 21:59*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*101 %*	*80-120 %*		*1*	*05/07/21 21:59*	*EPA 8260D*	
MW-11 DUP (A1E0226-09)				**Matrix: Water**		**Batch: 1050234**		
Benzene	**24.5**	---	10.0	ug/L	50	05/07/21 22:28	EPA 8260D	
Toluene	**620**	---	50.0	ug/L	50	05/07/21 22:28	EPA 8260D	
Ethylbenzene	**4530**	---	25.0	ug/L	50	05/07/21 22:28	EPA 8260D	
Xylenes, total	**10600**	---	75.0	ug/L	50	05/07/21 22:28	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	50.0	ug/L	50	05/07/21 22:28	EPA 8260D	
Naphthalene	**284**	---	200	ug/L	50	05/07/21 22:28	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 101 %*	*Limits: 80-120 %*		*1*	*05/07/21 22:28*	*EPA 8260D*	
Toluene-d8 (Surr)		*97 %*	*80-120 %*		*1*	*05/07/21 22:28*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*103 %*	*80-120 %*		*1*	*05/07/21 22:28*	*EPA 8260D*	
MW-4 (A1E0226-10)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 17:36	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 17:36	EPA 8260D	
Ethylbenzene	**0.730**	---	0.500	ug/L	1	05/07/21 17:36	EPA 8260D	
Xylenes, total	**1.81**	---	1.50	ug/L	1	05/07/21 17:36	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 17:36	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 17:36	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 108 %*	*Limits: 80-120 %*		*1*	*05/07/21 17:36*	*EPA 8260D*	
Toluene-d8 (Surr)		*96 %*	*80-120 %*		*1*	*05/07/21 17:36*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*106 %*	*80-120 %*		*1*	*05/07/21 17:36*	*EPA 8260D*	
MW-2 (A1E0226-11)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 18:05	EPA 8260D	

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 0060-001-001	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1E0226 - 05 13 21 1531

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-2 (A1E0226-11)				**Matrix: Water**		**Batch: 1050234**		
Toluene	ND	---	1.00	ug/L	1	05/07/21 18:05	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 18:05	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 18:05	EPA 8260D	
Methyl tert-butyl ether (MTBE)	**5.30**	---	1.00	ug/L	1	05/07/21 18:05	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 18:05	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*107 %*	*Limits: 80-120 %*	*1*	*05/07/21 18:05*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 18:05*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*05/07/21 18:05*	*EPA 8260D*	
MW-3 (A1E0226-12)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 18:34	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 18:34	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 18:34	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 18:34	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 18:34	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 18:34	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*108 %*	*Limits: 80-120 %*	*1*	*05/07/21 18:34*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 18:34*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*103 %*	*80-120 %*	*1*	*05/07/21 18:34*	*EPA 8260D*	
MW-10 (A1E0226-13)				**Matrix: Water**		**Batch: 1050234**		
Benzene	ND	---	0.200	ug/L	1	05/07/21 19:33	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	05/07/21 19:33	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	05/07/21 19:33	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	05/07/21 19:33	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	05/07/21 19:33	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	05/07/21 19:33	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*110 %*	*Limits: 80-120 %*	*1*	*05/07/21 19:33*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 19:33*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*103 %*	*80-120 %*	*1*	*05/07/21 19:33*	*EPA 8260D*	
MW-6 (A1E0226-14)				**Matrix: Water**		**Batch: 1050234**		
Benzene	**152**	---	10.0	ug/L	50	05/07/21 22:57	EPA 8260D	
Toluene	ND	---	50.0	ug/L	50	05/07/21 22:57	EPA 8260D	
Ethylbenzene	**1750**	---	25.0	ug/L	50	05/07/21 22:57	EPA 8260D	
Xylenes, total	**186**	---	75.0	ug/L	50	05/07/21 22:57	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	50.0	ug/L	50	05/07/21 22:57	EPA 8260D	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-6 (A1E0226-14)				**Matrix: Water**		**Batch: 1050234**		
Naphthalene	**248**	---	200	ug/L	50	05/07/21 22:57	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*103 %*	*Limits: 80-120 %*	*1*	*05/07/21 22:57*	*EPA 8260D*	
Toluene-d8 (Surr)			*96 %*	*80-120 %*	*1*	*05/07/21 22:57*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*107 %*	*80-120 %*	*1*	*05/07/21 22:57*	*EPA 8260D*	

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Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050410 - EPA 3510C (Fuels/Acid Ext.)												**Water**
Blank (1050410-BLK1)			Prepared: 05/12/21 13:17		Analyzed: 05/12/21 22:52							
NWTPH-Dx LL												
Diesel	ND	---	0.0727	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.145	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 87 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (1050410-BS1)			Prepared: 05/12/21 13:17		Analyzed: 05/12/21 23:15							
NWTPH-Dx LL												
Diesel	0.430	---	0.0800	mg/L	1	0.500	---	86	59 - 115%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 98 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (1050410-BSD1)			Prepared: 05/12/21 13:17		Analyzed: 05/12/21 23:37							**Q-19**
NWTPH-Dx LL												
Diesel	0.404	---	0.0800	mg/L	1	0.500	---	81	59 - 115%	6	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 94 %*		*Limits: 50-150 %*		*Dilution: 1x*					

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050234 - EPA 5030B									Water			
Blank (1050234-BLK1)		Prepared: 05/07/21 08:00		Analyzed: 05/07/21 14:11								
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*99 %*		*50-150 %*		*"*					
LCS (1050234-BS2)		Prepared: 05/07/21 08:00		Analyzed: 05/07/21 13:20								
NWTPH-Gx (MS)												
Gasoline Range Organics	0.467	---	0.100	mg/L	1	0.500	---	93	80 - 120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 99 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*92 %*		*50-150 %*		*"*					
Duplicate (1050234-DUP1)		Prepared: 05/07/21 14:00		Analyzed: 05/07/21 15:10								
QC Source Sample: MW-7 (A1E0226-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*99 %*		*50-150 %*		*"*					
Duplicate (1050234-DUP2)		Prepared: 05/07/21 14:00		Analyzed: 05/07/21 19:03								
QC Source Sample: MW-3 (A1E0226-12)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*103 %*		*50-150 %*		*"*					

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050334 - EPA 5030B									Water			
Blank (1050334-BLK1)		Prepared: 05/11/21 08:30		Analyzed: 05/11/21 11:27								
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 98 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*110 %*		*50-150 %*			*"*				
LCS (1050334-BS2)		Prepared: 05/11/21 08:30		Analyzed: 05/11/21 11:00								
NWTPH-Gx (MS)												
Gasoline Range Organics	0.466	---	0.100	mg/L	1	0.500	---	93	80 - 120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*		*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*		*50-150 %*			*"*				

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050234 - EPA 5030B												**Water**
Blank (1050234-BLK1)		Prepared: 05/07/21 08:00		Analyzed: 05/07/21 14:11								
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*106 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*97 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*104 %*		*80-120 %*			*"*				
LCS (1050234-BS1)		Prepared: 05/07/21 08:00		Analyzed: 05/07/21 12:51								
EPA 8260D												
Benzene	17.2	---	0.200	ug/L	1	20.0	---	86	80 - 120%	---	---	
Toluene	16.7	---	1.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
Ethylbenzene	19.9	---	0.500	ug/L	1	20.0	---	100	80 - 120%	---	---	
Xylenes, total	53.9	---	1.50	ug/L	1	60.0	---	90	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	16.5	---	1.00	ug/L	1	20.0	---	82	80 - 120%	---	---	
Naphthalene	16.7	---	4.00	ug/L	1	20.0	---	84	80 - 120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*98 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*94 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*100 %*		*80-120 %*			*"*				
Duplicate (1050234-DUP1)		Prepared: 05/07/21 14:00		Analyzed: 05/07/21 15:10								
QC Source Sample: MW-7 (A1E0226-01)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*104 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*97 %*		*80-120 %*			*"*				

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050234 - EPA 5030B												**Water**
Duplicate (1050234-DUP1)			Prepared: 05/07/21 14:00		Analyzed: 05/07/21 15:10							
QC Source Sample: MW-7 (A1E0226-01)												
Surr: 4-Bromofluorobenzene (Surr)			*Recovery: 105 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Duplicate (1050234-DUP2)			Prepared: 05/07/21 14:00		Analyzed: 05/07/21 19:03							
QC Source Sample: MW-3 (A1E0226-12)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	0.820	---	---	***	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 109 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*98 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*		*"*					
Matrix Spike (1050234-MS1)			Prepared: 05/07/21 14:00		Analyzed: 05/07/21 20:02							
QC Source Sample: MW-10 (A1E0226-13)												
EPA 8260D												
Benzene	19.9	---	0.200	ug/L	1	20.0	ND	99	79 - 120%	---	---	
Toluene	18.8	---	1.00	ug/L	1	20.0	ND	94	80 - 121%	---	---	
Ethylbenzene	22.4	---	0.500	ug/L	1	20.0	ND	112	79 - 121%	---	---	
Xylenes, total	60.6	---	1.50	ug/L	1	60.0	ND	101	79 - 121%	---	---	
Methyl tert-butyl ether (MTBE)	18.0	---	1.00	ug/L	1	20.0	ND	90	71 - 124%	---	---	
Naphthalene	16.8	---	4.00	ug/L	1	20.0	ND	84	61 - 128%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*90 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*		*"*					

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1050334 - EPA 5030B									Water			
Blank (1050334-BLK1)		Prepared: 05/11/21 08:30		Analyzed: 05/11/21 11:27								
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*118 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*103 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*103 %*		*80-120 %*			*"*				
LCS (1050334-BS1)		Prepared: 05/11/21 08:30		Analyzed: 05/11/21 10:25								
EPA 8260D												
Benzene	20.6	---	0.200	ug/L	1	20.0	---	103	80 - 120%	---	---	
Toluene	18.6	---	1.00	ug/L	1	20.0	---	93	80 - 120%	---	---	
Ethylbenzene	19.6	---	0.500	ug/L	1	20.0	---	98	80 - 120%	---	---	
Xylenes, total	59.2	---	1.50	ug/L	1	60.0	---	99	80 - 120%	---	---	
Methyl tert-butyl ether (MTBE)	22.6	---	1.00	ug/L	1	20.0	---	113	80 - 120%	---	---	
Naphthalene	14.0	---	2.00	ug/L	1	20.0	---	**70**	**80 - 120%**	---	---	Q-55
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*108 %*	*Limits:*	*80-120 %*		*Dilution:*	*1x*				
Toluene-d8 (Surr)			*96 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*87 %*		*80-120 %*			*"*				

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1050410							
A1E0226-01RE1	Water	NWTPH-Dx LL	05/04/21 09:45	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-02RE1	Water	NWTPH-Dx LL	05/04/21 10:36	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-03RE1	Water	NWTPH-Dx LL	05/04/21 11:32	05/12/21 13:17	1050mL/2mL	1000mL/2mL	0.95
A1E0226-04RE1	Water	NWTPH-Dx LL	05/04/21 12:00	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-05RE1	Water	NWTPH-Dx LL	05/04/21 12:43	05/12/21 13:17	1050mL/2mL	1000mL/2mL	0.95
A1E0226-06RE1	Water	NWTPH-Dx LL	05/04/21 13:28	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-07RE1	Water	NWTPH-Dx LL	05/05/21 08:04	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-08RE1	Water	NWTPH-Dx LL	05/05/21 08:56	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-09RE1	Water	NWTPH-Dx LL	05/05/21 08:56	05/12/21 13:17	1060mL/2mL	1000mL/2mL	0.94
A1E0226-10RE1	Water	NWTPH-Dx LL	05/05/21 10:05	05/12/21 13:49	1070mL/2mL	1000mL/2mL	0.94
A1E0226-11RE1	Water	NWTPH-Dx LL	05/05/21 10:42	05/12/21 13:49	1070mL/2mL	1000mL/2mL	0.94
A1E0226-12RE1	Water	NWTPH-Dx LL	05/05/21 11:24	05/12/21 13:49	1050mL/2mL	1000mL/2mL	0.95
A1E0226-13RE1	Water	NWTPH-Dx LL	05/05/21 12:05	05/12/21 13:49	1060mL/2mL	1000mL/2mL	0.94
A1E0226-14RE1	Water	NWTPH-Dx LL	05/05/21 13:06	05/12/21 13:49	1050mL/2mL	1000mL/2mL	0.95

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1050234							
A1E0226-01	Water	NWTPH-Gx (MS)	05/04/21 09:45	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-02	Water	NWTPH-Gx (MS)	05/04/21 10:36	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-04	Water	NWTPH-Gx (MS)	05/04/21 12:00	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-05	Water	NWTPH-Gx (MS)	05/04/21 12:43	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-06	Water	NWTPH-Gx (MS)	05/04/21 13:28	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-07	Water	NWTPH-Gx (MS)	05/05/21 08:04	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-08	Water	NWTPH-Gx (MS)	05/05/21 08:56	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-09	Water	NWTPH-Gx (MS)	05/05/21 08:56	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-10	Water	NWTPH-Gx (MS)	05/05/21 10:05	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-11	Water	NWTPH-Gx (MS)	05/05/21 10:42	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-12	Water	NWTPH-Gx (MS)	05/05/21 11:24	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-13	Water	NWTPH-Gx (MS)	05/05/21 12:05	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-14	Water	NWTPH-Gx (MS)	05/05/21 13:06	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
Batch: 1050334							
A1E0226-03RE1	Water	NWTPH-Gx (MS)	05/04/21 11:32	05/11/21 11:21	5mL/5mL	5mL/5mL	1.00

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ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: 0060-001-001	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1E0226 - 05 13 21 1531

SAMPLE PREPARATION INFORMATION

Selected Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1050234							
A1E0226-01	Water	EPA 8260D	05/04/21 09:45	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-02	Water	EPA 8260D	05/04/21 10:36	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-04	Water	EPA 8260D	05/04/21 12:00	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-05	Water	EPA 8260D	05/04/21 12:43	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-06	Water	EPA 8260D	05/04/21 13:28	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-07	Water	EPA 8260D	05/05/21 08:04	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-08	Water	EPA 8260D	05/05/21 08:56	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-09	Water	EPA 8260D	05/05/21 08:56	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-10	Water	EPA 8260D	05/05/21 10:05	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-11	Water	EPA 8260D	05/05/21 10:42	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-12	Water	EPA 8260D	05/05/21 11:24	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-13	Water	EPA 8260D	05/05/21 12:05	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
A1E0226-14	Water	EPA 8260D	05/05/21 13:06	05/07/21 14:00	5mL/5mL	5mL/5mL	1.00
Batch: 1050334							
A1E0226-03RE1	Water	EPA 8260D	05/04/21 11:32	05/11/21 11:21	5mL/5mL	5mL/5mL	1.00

Apex Laboratories

Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

F-11	The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
F-20	Result for Diesel is Estimated due to overlap from Gasoline Range Organics or other VOCs.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
Q-55	Daily CCV/LCS recovery for this analyte was below the +/-20% criteria listed in EPA 8260, however there is adequate sensitivity to ensure detection at the reporting level.

Apex Laboratories

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ANALYTICAL REPORT

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Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported.

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) are not included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation)
EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Lisa Domenighini, Client Services Manager

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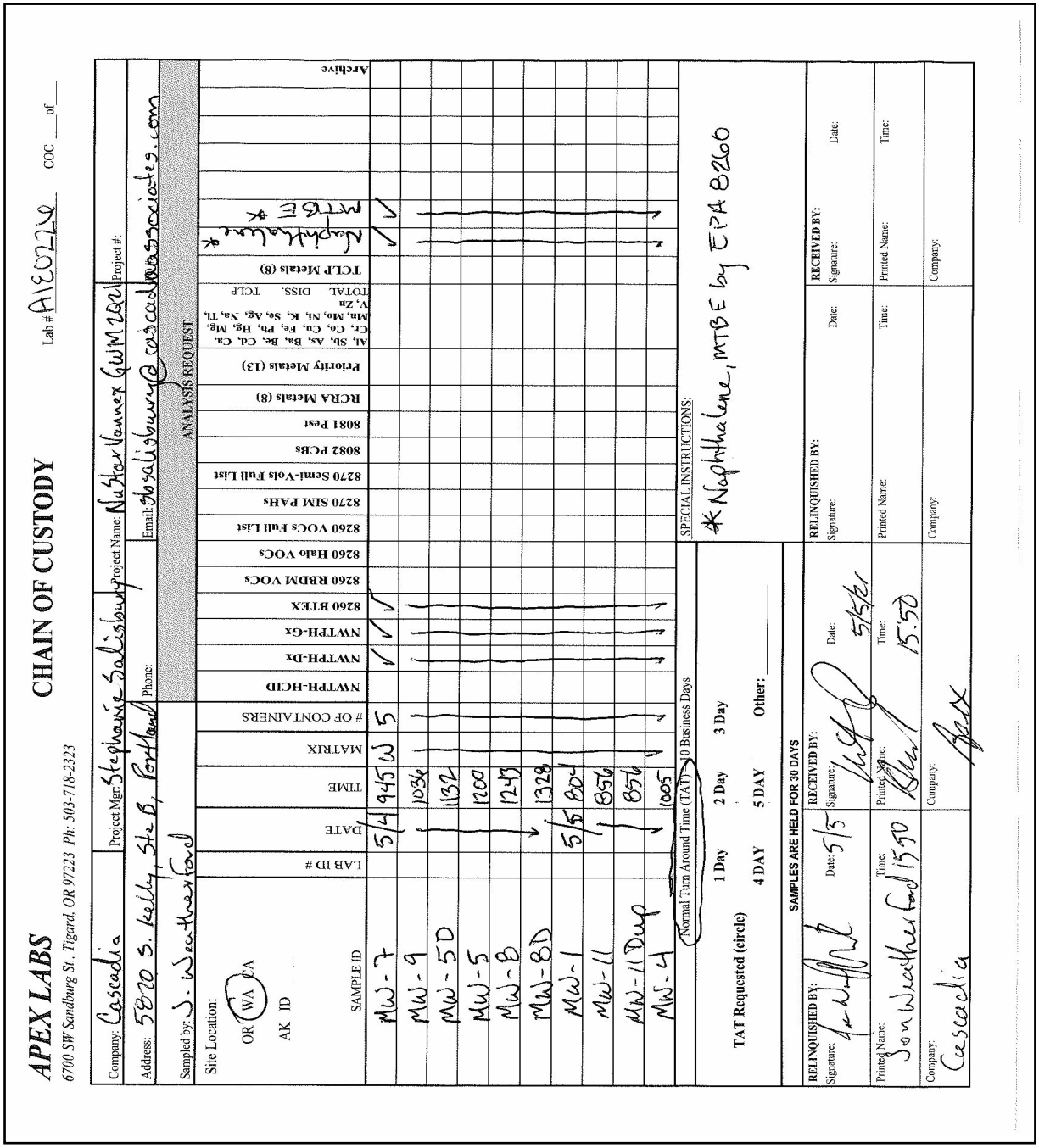
ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**



APEX LABS — **CHAIN OF CUSTODY** — Lab # A1E0226 — COC ___ of ___
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

Company: Cascadia — Project Mgr: Stephanie Salisbury — Project Name: Nustar Vannex GWM 2021 — Project #:
Address: 5820 S. Kelly, Ste B, Portland — Phone: — Email: ssalisbury@cascadiaassociates.com
Sampled by: J. Weatherford

Site Location: OR (WA) CA — AK ID ___

ANALYSIS REQUEST

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Methane, Ethane, Ethene * MTBE	Archive
MW-7		5/4	945	W	5		✓		✓											✓	
MW-9			1034																		
MW-5D			1132																		
MW-5			1200																		
MW-8			1247																		
MW-8D			1328																		
MW-1		5/5	804																		
MW-11			856																		
MW-11Dup			856																		
MW-4			1005																		

(Normal Turn Around Time (TAT) is 10 Business Days)

TAT Requested (circle): 1 Day — 2 Day — 3 Day — 4 DAY — 5 DAY — Other: ___

SPECIAL INSTRUCTIONS: * Naphthalene, MTBE by EPA 8260

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature:	Signature:
Date: 5/5	Date: 5/5/21	Date:	Date:
Time: 1550	Time: 15:50	Time:	Time:
Printed Name: Jon Weatherford	Printed Name:	Printed Name:	Printed Name:
Company: Cascadia	Company:	Company:	Company:

Apex Laboratories

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Lisa Domenighini, Client Services Manager

Apex Laboratories, LLC
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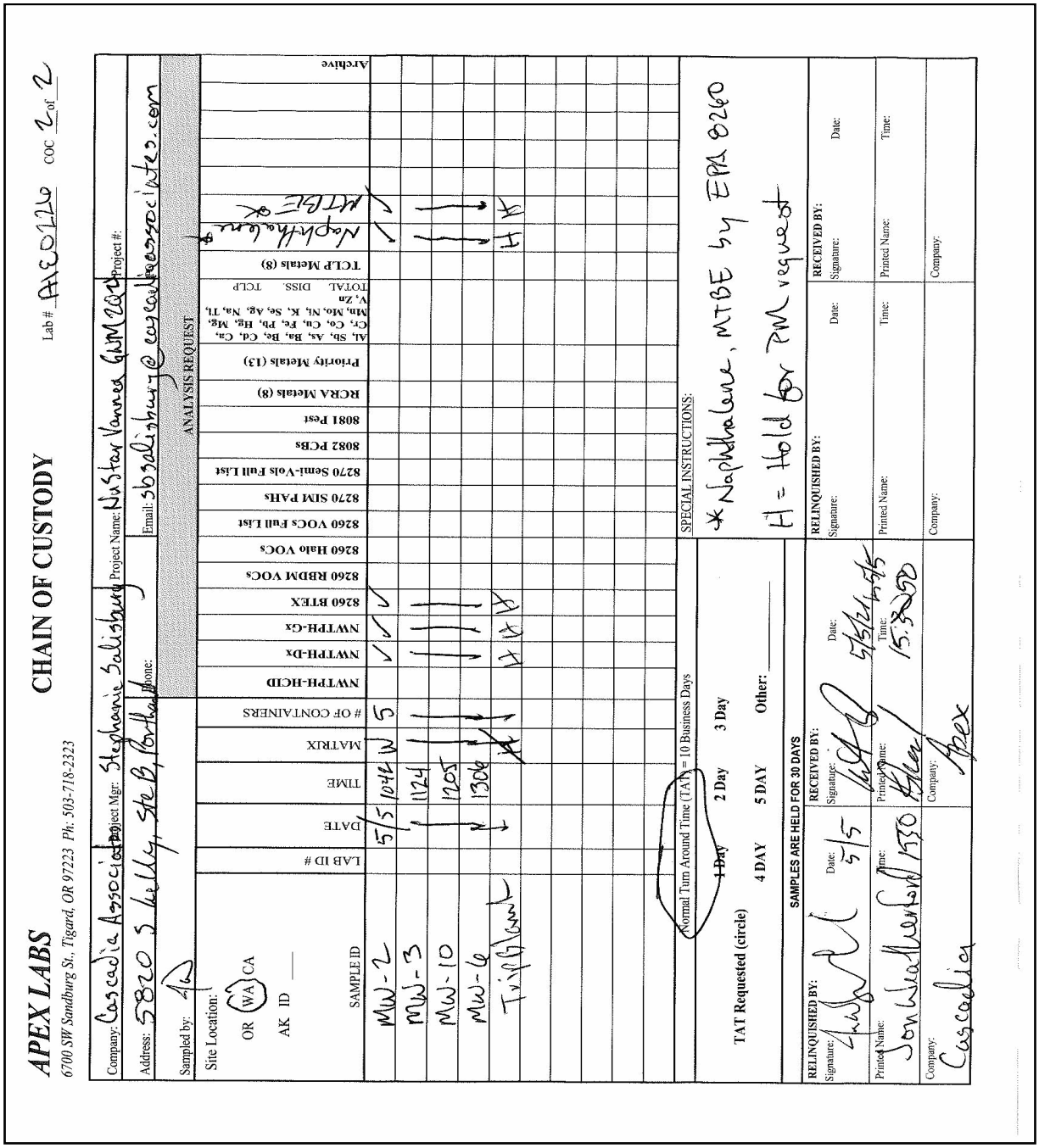
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**



APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A1E0226 COC 1 of 1

Company: Cascadia Associates Project Mgr: Stephanie Salisbury Project Name: Nustar Vannes GWM 2020 Project #:
Address: 5820 S Kelly, Ste B, Portland Phone: Email: ssalisbury@cascadiaassociates.com
Sampled by: AD

Site Location: OR (WA) CA AK ID ___

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Naphthalene, MTBE ✱	Archive
MW-2		5/5	1048	W	5	✓	✓	✓	✓											✓	
MW-3			1124			✓	✓	✓	✓											✓	
MW-10			1205			✓	✓	✓	✓											✓	
MW-6			1306			✓	✓	✓	✓											✓	
Trip Blank				W	2	H	H	H	H											H	

SPECIAL INSTRUCTIONS:
✱ Naphthalene, MTBE by EPA 8260
H = Hold for PM request

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle)
1 Day 2 Day 3 Day
4 DAY 5 DAY Other: ___

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	RECEIVED BY:	Date:	RELINQUISHED BY:	Date:	RECEIVED BY:	Date:
Signature:	5/5	Signature:		Signature:		Signature:	
Printed Name:	Time: 1330	Printed Name:	Time:	Printed Name:	Time:	Printed Name:	Time:
Company: Cascadia		Company: Apex		Company:		Company:	

Apex Laboratories

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Lisa Domenighini, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **0060-001-001**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1E0226 - 05 13 21 1531**

APEX LABS COOLER RECEIPT FORM

Client: Cascadia Element WO#: A1E0226

Project/Project #: Nustar Vannex GWM 2021

Delivery Info:

Date/time received: 5/5/21 @ 15:50 By: MM

Delivered by: Apex___ Client X ESS___ FedEx___ UPS___ Swift___ Senvoy___ SDS___ Other_____

Cooler Inspection Date/time inspected: 5/5/21 @ 15:50 By: MM

Chain of Custody included? Yes X No _____ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No _____

Signed/dated by Apex? Yes X No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.8	4.4	0.4				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	Y	Y	Y				
Ice type: (Gel/Real/Other)	Real	Real	Real				
Condition:	Good	Good	Good				

Cooler out of temp? (Y/N) Possible reason why: _____

Green dots applied to out of temperature samples? Yes No

Out of temperature samples form initiated? Yes No

Sample Inspection: Date/time inspected: 5/6/21 @ 13:25 By: TMM

All samples intact? Yes X No ___ Comments: _____

Bottle labels/COCs agree? Yes X No ___ Comments: TB# 2747

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: _____

Do VOA vials have visible headspace? Yes X No ___ NA ___

Comments 1/3 MW-5 and Trip blank have HS

Water samples: pH checked: Yes X No ___ NA ___ pH appropriate? Yes X No ___ NA ___

Comments: _____

Additional information: _____

Labeled by: TMM Witness: MM Cooler Inspected by: MM

Apex Laboratories

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Lisa A Domenighini

Lisa Domenighini, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Wednesday, June 23, 2021

Stephanie Salisbury
Cascadia Associates
5820 SW Kelly Ave Unit B
Portland, OR 97239

RE: A1F0697 - Nustar Vannex - [none]

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1F0697, which was received by the laboratory on 6/15/2021 at 5:05:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: DAuvil@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	2.5 degC

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC

6700 S.W. Sandburg Street
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-5	A1F0697-01	Water	06/15/21 09:00	06/15/21 17:05

Apex Laboratories

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

ANALYTICAL SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-5 (A1F0697-01RE1)				**Matrix: Water**		**Batch: 1060848**		
Benzene	ND	0.500	1.00	ug/L	5	06/21/21 19:37	EPA 8260D	
Toluene	ND	2.50	5.00	ug/L	5	06/21/21 19:37	EPA 8260D	
Ethylbenzene	**142**	1.25	2.50	ug/L	5	06/21/21 19:37	EPA 8260D	
Xylenes, total	**655**	3.75	7.50	ug/L	5	06/21/21 19:37	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*99 %*	*Limits: 80-120 %*	*1*	*06/21/21 19:37*	*EPA 8260D*	
Toluene-d8 (Surr)			*103 %*	*80-120 %*	*1*	*06/21/21 19:37*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*06/21/21 19:37*	*EPA 8260D*	

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1060658 - EPA 5030B							**Water**					
Blank (1060658-BLK1)			Prepared: 06/18/21 08:00 Analyzed: 06/18/21 09:57									
EPA 8260D												
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	0.750	1.50	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 103 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*102 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*107 %*	*80-120 %*			*"*					
LCS (1060658-BS1)			Prepared: 06/18/21 08:00 Analyzed: 06/18/21 08:58									
EPA 8260D												
Benzene	19.4	0.100	0.200	ug/L	1	20.0	---	97	80-120%	---	---	
Toluene	19.0	0.500	1.00	ug/L	1	20.0	---	95	80-120%	---	---	
Ethylbenzene	20.5	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Xylenes, total	59.6	0.750	1.50	ug/L	1	60.0	---	99	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*100 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*98 %*	*80-120 %*			*"*					
Duplicate (1060658-DUP1)			Prepared: 06/16/21 08:00 Analyzed: 06/18/21 14:01									
QC Source Sample: Non-SDG (A1F0628-01)												
Benzene	**106**	0.100	0.200	ug/L	1	---	101	---	---	4	30%	
Toluene	**5.05**	0.500	1.00	ug/L	1	---	4.91	---	---	3	30%	
Ethylbenzene	**11.9**	0.250	0.500	ug/L	1	---	11.1	---	---	7	30%	
Xylenes, total	**15.2**	0.750	1.50	ug/L	1	---	14.1	---	---	7	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*102 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*			*"*					
Duplicate (1060658-DUP2)			Prepared: 06/16/21 08:00 Analyzed: 06/18/21 18:59									
QC Source Sample: Non-SDG (A1F0692-01)												
Benzene	**0.300**	0.100	0.200	ug/L	1	---	ND	---	---		**30%**	R-06
Toluene	ND	0.500	1.00	ug/L	1	---	ND	---	---	---	30%	

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: Nustar Vannex	
5820 SW Kelly Ave Unit B	Project Number: [none]	Report ID:
Portland, OR 97239	Project Manager: Stephanie Salisbury	A1F0697 - 06 23 21 1449

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1060658 - EPA 5030B												**Water**
Duplicate (1060658-DUP2)				Prepared: 06/16/21 08:00 Analyzed: 06/18/21 18:59								
QC Source Sample: Non-SDG (A1F0692-01)												
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	0.750	1.50	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 104 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*101 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*105 %*		*80-120 %*			*"*				
Matrix Spike (1060658-MS1)				Prepared: 06/16/21 08:00 Analyzed: 06/18/21 11:19								
QC Source Sample: Non-SDG (A1F0690-01)												
EPA 8260D												
Benzene	21.0	0.100	0.200	ug/L	1	20.0	ND	105	79-120%	---	---	
Toluene	20.1	0.500	1.00	ug/L	1	20.0	ND	100	80-121%	---	---	
Ethylbenzene	21.9	0.250	0.500	ug/L	1	20.0	ND	109	79-121%	---	---	
Xylenes, total	63.8	0.750	1.50	ug/L	1	60.0	ND	106	79-121%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*98 %*		*80-120 %*			*"*				

Apex Laboratories

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1060848 - EPA 5030B												**Water**
Blank (1060848-BLK1)			Prepared: 06/21/21 09:00 Analyzed: 06/21/21 12:24									
EPA 8260D												
Benzene	ND	0.100	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	0.500	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	0.250	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	0.750	1.50	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*108 %*	*80-120 %*			*"*					
LCS (1060848-BS1)			Prepared: 06/21/21 09:00 Analyzed: 06/21/21 11:21									
EPA 8260D												
Benzene	19.8	0.100	0.200	ug/L	1	20.0	---	99	80-120%	---	---	
Toluene	18.8	0.500	1.00	ug/L	1	20.0	---	94	80-120%	---	---	
Ethylbenzene	20.6	0.250	0.500	ug/L	1	20.0	---	103	80-120%	---	---	
Xylenes, total	60.6	0.750	1.50	ug/L	1	60.0	---	101	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*98 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*			*"*					
Duplicate (1060848-DUP1)			Prepared: 06/21/21 11:41 Analyzed: 06/21/21 15:33									
QC Source Sample: Non-SDG (A1F0804-06)												
Benzene	ND	0.500	1.00	ug/L	5	---	ND	---	---	---	30%	
Toluene	ND	2.50	5.00	ug/L	5	---	ND	---	---	---	30%	
Ethylbenzene	ND	1.25	2.50	ug/L	5	---	ND	---	---	---	30%	
Xylenes, total	ND	3.75	7.50	ug/L	5	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 107 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*			*"*					
Duplicate (1060848-DUP2)			Prepared: 06/21/21 11:41 Analyzed: 06/21/21 21:26									
QC Source Sample: Non-SDG (A1F0780-03)												
Benzene	ND	2.50	5.00	ug/L	25	---	ND	---	---	---	30%	
Toluene	ND	12.5	25.0	ug/L	25	---	ND	---	---	---	30%	

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

QUALITY CONTROL (QC) SAMPLE RESULTS

BTEX Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1060848 - EPA 5030B												**Water**
Duplicate (1060848-DUP2)				Prepared: 06/21/21 11:41 Analyzed: 06/21/21 21:26								
QC Source Sample: Non-SDG (A1F0780-03)												
Ethylbenzene	ND	6.25	12.5	ug/L	25	---	ND	---	---	---	30%	
Xylenes, total	ND	18.8	37.5	ug/L	25	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 106 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*105 %*	*80-120 %*			*"*					
Matrix Spike (1060848-MS1)				Prepared: 06/21/21 11:41 Analyzed: 06/21/21 22:47								
QC Source Sample: Non-SDG (A1F0780-11)												
EPA 8260D												
Benzene	21.1	0.100	0.200	ug/L	1	20.0	ND	105	79-120%	---	---	
Toluene	20.1	0.500	1.00	ug/L	1	20.0	0.680	97	80-121%	---	---	
Ethylbenzene	22.3	0.250	0.500	ug/L	1	20.0	ND	112	79-121%	---	---	
Xylenes, total	65.5	0.750	1.50	ug/L	1	60.0	0.880	108	79-121%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*97 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*92 %*	*80-120 %*			*"*					

Apex Laboratories

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

SAMPLE PREPARATION INFORMATION

BTEX Compounds by EPA 8260D

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1060848							
A1F0697-01RE1	Water	EPA 8260D	06/15/21 09:00	06/21/21 11:41	5mL/5mL	5mL/5mL	1.00

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Apex Laboratories, LLC

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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

R-06 Reporting level raised due to possible carryover from a previous sample.

Apex Laboratories

Darrell Auvil, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

Darrell Auvil, Client Services Manager

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Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
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ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Darrell Auvil, Client Services Manager

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APEX LABORATORIES

ANALYTICAL REPORT

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

Cascadia Associates	Project:	**Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number:	**[none]**	**Report ID:**
Portland, OR 97239	Project Manager:	**Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A1F0697 COC 1 of 1

Company: Cascadia Associates Project Mgr: Stephanie Salisbury Project Name: Nustar Vannex Project #:
Address: 5820 S Kelly Ave Phone: 503-349-8464 Email: ssalisbury@cascadiaassoc PO#:
Sampled by: Lindsay Wallis

ANALYSIS REQUEST

Site Location: OR (WA) CA AK ID ___

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)							Archive
MW-5		6/15	900	GW	3				X																		

Normal Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 6/15	Signature: [signature] Date: 6/15/21	Signature: Date:	Signature: Date:
Printed Name: Jon Weatherford Time: 1705	Printed Name: Tanna Gorby Time: 17:05	Printed Name: Time:	Printed Name: Time:
Company: Cascadia	Company: Apex	Company:	Company:

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Cascadia Associates	Project: **Nustar Vannex**	
5820 SW Kelly Ave Unit B	Project Number: **[none]**	**Report ID:**
Portland, OR 97239	Project Manager: **Stephanie Salisbury**	**A1F0697 - 06 23 21 1449**

APEX LABS COOLER RECEIPT FORM

Client: Cascadia Associates Element WO#: A1F0697

Project/Project #: Nustar Vannex

Delivery Info:

Date/time received: 6/15/21 @ 17:05 By: TAM

Delivered by: Apex___ Client X ESS___ FedEx___ UPS___ Swift___ Senvoy___ SDS___ Other___

Cooler Inspection Date/time inspected: 6/15/21 @ 17:05 By: TAM

Chain of Custody included? Yes X No___ Custody seals? Yes___ No X

Signed/dated by client? Yes X No___

Signed/dated by Apex? Yes X No___

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	0.9						
Received on ice? (Y/N)	Y						
Temp. blanks? (Y/N)	~~Real N~~ TMP 6/17/21						
Ice type: (Gel/Real/Other)	Real						
Condition:	good						

Cooler out of temp? (Y/N) Possible reason why:

Green dots applied to out of temperature samples? Yes (No)

Out of temperature samples form initiated? Yes/No @ 6/17/21

Sample Inspection: Date/time inspected: 6/17/21 @ 1234 By: SD

All samples intact? Yes X No___ Comments:

Bottle labels/COCs agree? Yes X No___ Comments:

COC/container discrepancies form initiated? Yes___ No X

Containers/volumes received appropriate for analysis? Yes X No___ Comments:

Do VOA vials have visible headspace? Yes___ No X NA___

Comments

Water samples: pH checked: Yes___ No___ NA X pH appropriate? Yes___ No___ NA X

Comments:

Additional information:

Labeled by: SD Witness: TAM Cooler Inspected by: AKK

Apex Laboratories

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

Thursday, August 19, 2021

Stephanie Bosze-Salisbury
GeoEngineers
4000 Kruse Way Place, Bldg 3 Suite 200
Lake Oswego, OR 97035

RE: A1H0365 - Nustar-Vancouver Annex - GWM 3Q21

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1H0365, which was received by the laboratory on 8/11/2021 at 1:45:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: DAuvil@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler#1	4.0 degC	Cooler#2	1.8 degC
Cooler#3	2.3 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Darrell Auvil, Client Services Manager

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-7	A1H0365-01	Water	08/10/21 09:18	08/11/21 13:45
MW-5	A1H0365-02	Water	08/10/21 10:02	08/11/21 13:45
MW-5D	A1H0365-03	Water	08/10/21 10:38	08/11/21 13:45
MW-8	A1H0365-04	Water	08/10/21 11:12	08/11/21 13:45
MW-8D	A1H0365-05	Water	08/10/21 11:51	08/11/21 13:45
MW-3	A1H0365-06	Water	08/10/21 12:36	08/11/21 13:45
MW-4	A1H0365-07	Water	08/10/21 13:35	08/11/21 13:45
MW-2	A1H0365-08	Water	08/10/21 14:21	08/11/21 13:45
MW-6	A1H0365-09	Water	08/11/21 07:39	08/11/21 13:45
MW-6 Dup	A1H0365-10	Water	08/11/21 07:39	08/11/21 13:45
MW-1	A1H0365-11	Water	08/11/21 08:41	08/11/21 13:45
MW-11	A1H0365-12	Water	08/11/21 09:20	08/11/21 13:45
MW-10	A1H0365-13	Water	08/11/21 10:02	08/11/21 13:45
MW-9	A1H0365-14	Water	08/11/21 11:03	08/11/21 13:45

Apex Laboratories

Darrell Auvil, Client Services Manager

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APEX LABORATORIES

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1H0365-01)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.190	mg/L	1	08/12/21 22:56	NWTPH-Dx	
Oil	ND	---	0.381	mg/L	1	08/12/21 22:56	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 106 %*		*Limits: 50-150 %*	*1*	*08/12/21 22:56*	*NWTPH-Dx*	
MW-5 (A1H0365-02)				**Matrix: Water**		**Batch: 1080376**		
Diesel	**2.59**	---	0.190	mg/L	1	08/12/21 23:19	NWTPH-Dx	**F-13, F-20**
Oil	ND	---	0.381	mg/L	1	08/12/21 23:19	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 118 %*		*Limits: 50-150 %*	*1*	*08/12/21 23:19*	*NWTPH-Dx*	
MW-5D (A1H0365-03)				**Matrix: Water**		**Batch: 1080376**		
Diesel	**0.470**	---	0.189	mg/L	1	08/12/21 23:43	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/12/21 23:43	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 121 %*		*Limits: 50-150 %*	*1*	*08/12/21 23:43*	*NWTPH-Dx*	
MW-8 (A1H0365-04)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.190	mg/L	1	08/13/21 00:06	NWTPH-Dx	
Oil	ND	---	0.381	mg/L	1	08/13/21 00:06	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 106 %*		*Limits: 50-150 %*	*1*	*08/13/21 00:06*	*NWTPH-Dx*	
MW-8D (A1H0365-05)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.189	mg/L	1	08/13/21 00:29	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/13/21 00:29	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 125 %*		*Limits: 50-150 %*	*1*	*08/13/21 00:29*	*NWTPH-Dx*	
MW-3 (A1H0365-06)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.187	mg/L	1	08/13/21 02:26	NWTPH-Dx	
Oil	ND	---	0.374	mg/L	1	08/13/21 02:26	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 101 %*		*Limits: 50-150 %*	*1*	*08/13/21 02:26*	*NWTPH-Dx*	
MW-4 (A1H0365-07)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.189	mg/L	1	08/13/21 02:49	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/13/21 02:49	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 107 %*		*Limits: 50-150 %*	*1*	*08/13/21 02:49*	*NWTPH-Dx*	

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-2 (A1H0365-08)				**Matrix: Water**		**Batch: 1080376**		
Diesel	ND	---	0.189	mg/L	1	08/13/21 03:12	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/13/21 03:12	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 116 %*		*Limits: 50-150 %*	*1*	*08/13/21 03:12*	*NWTPH-Dx*	
MW-6 (A1H0365-09)				**Matrix: Water**		**Batch: 1080376**		
Diesel	**6.07**	---	0.189	mg/L	1	08/13/21 03:35	NWTPH-Dx	**F-20**
Oil	ND	---	0.377	mg/L	1	08/13/21 03:35	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 102 %*		*Limits: 50-150 %*	*1*	*08/13/21 03:35*	*NWTPH-Dx*	
MW-6 Dup (A1H0365-10)				**Matrix: Water**		**Batch: 1080376**		
Diesel	**6.36**	---	0.189	mg/L	1	08/13/21 03:58	NWTPH-Dx	**F-20**
Oil	ND	---	0.377	mg/L	1	08/13/21 03:58	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 108 %*		*Limits: 50-150 %*	*1*	*08/13/21 03:58*	*NWTPH-Dx*	
MW-1 (A1H0365-11)				**Matrix: Water**		**Batch: 1080558**		
Diesel	**0.250**	---	0.190	mg/L	1	08/17/21 19:47	NWTPH-Dx	**F-11**
Oil	ND	---	0.381	mg/L	1	08/17/21 19:47	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 121 %*		*Limits: 50-150 %*	*1*	*08/17/21 19:47*	*NWTPH-Dx*	
MW-11 (A1H0365-12)				**Matrix: Water**		**Batch: 1080558**		
Diesel	**0.673**	---	0.190	mg/L	1	08/17/21 20:08	NWTPH-Dx	**F-11, F-20**
Oil	ND	---	0.381	mg/L	1	08/17/21 20:08	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 123 %*		*Limits: 50-150 %*	*1*	*08/17/21 20:08*	*NWTPH-Dx*	
MW-10 (A1H0365-13)				**Matrix: Water**		**Batch: 1080558**		
Diesel	ND	---	0.189	mg/L	1	08/17/21 20:28	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/17/21 20:28	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 115 %*		*Limits: 50-150 %*	*1*	*08/17/21 20:28*	*NWTPH-Dx*	
MW-9 (A1H0365-14)				**Matrix: Water**		**Batch: 1080558**		
Diesel	ND	---	0.189	mg/L	1	08/17/21 20:49	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	08/17/21 20:49	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 108 %*		*Limits: 50-150 %*	*1*	*08/17/21 20:49*	*NWTPH-Dx*	

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1H0365-01)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 17:12	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits: 50-150 %*	*1*	*08/12/21 17:12*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*110 %*	*50-150 %*	*1*	*08/12/21 17:12*	*NWTPH-Gx (MS)*	
MW-5 (A1H0365-02RE1)				**Matrix: Water**		**Batch: 1080474**		
Gasoline Range Organics	**15.2**	---	0.500	mg/L	5	08/16/21 11:58	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*108 %*	*Limits: 50-150 %*	*1*	*08/16/21 11:58*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*08/16/21 11:58*	*NWTPH-Gx (MS)*	
MW-5D (A1H0365-03RE1)				**Matrix: Water**		**Batch: 1080426**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/13/21 10:48	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*106 %*	*Limits: 50-150 %*	*1*	*08/13/21 10:48*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*107 %*	*50-150 %*	*1*	*08/13/21 10:48*	*NWTPH-Gx (MS)*	
MW-8 (A1H0365-04)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 18:06	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*105 %*	*Limits: 50-150 %*	*1*	*08/12/21 18:06*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*113 %*	*50-150 %*	*1*	*08/12/21 18:06*	*NWTPH-Gx (MS)*	
MW-8D (A1H0365-05)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 18:33	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*105 %*	*Limits: 50-150 %*	*1*	*08/12/21 18:33*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*112 %*	*50-150 %*	*1*	*08/12/21 18:33*	*NWTPH-Gx (MS)*	
MW-3 (A1H0365-06RE1)				**Matrix: Water**		**Batch: 1080426**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/13/21 11:15	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*102 %*	*Limits: 50-150 %*	*1*	*08/13/21 11:15*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*108 %*	*50-150 %*	*1*	*08/13/21 11:15*	*NWTPH-Gx (MS)*	
MW-4 (A1H0365-07)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 19:00	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*08/12/21 19:00*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*113 %*	*50-150 %*	*1*	*08/12/21 19:00*	*NWTPH-Gx (MS)*	
MW-2 (A1H0365-08)				**Matrix: Water**		**Batch: 1080374**		

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Darrell Auvil, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-2 (A1H0365-08)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 19:28	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*08/12/21 19:28*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*113 %*	*50-150 %*	*1*	*08/12/21 19:28*	*NWTPH-Gx (MS)*	
MW-6 (A1H0365-09RE1)				**Matrix: Water**		**Batch: 1080426**		
Gasoline Range Organics	**14.0**	---	1.00	mg/L	10	08/13/21 19:24	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*111 %*	*Limits: 50-150 %*	*1*	*08/13/21 19:24*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*105 %*	*50-150 %*	*1*	*08/13/21 19:24*	*NWTPH-Gx (MS)*	
MW-6 Dup (A1H0365-10RE1)				**Matrix: Water**		**Batch: 1080426**		
Gasoline Range Organics	**13.8**	---	1.00	mg/L	10	08/13/21 19:51	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*109 %*	*Limits: 50-150 %*	*1*	*08/13/21 19:51*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*08/13/21 19:51*	*NWTPH-Gx (MS)*	
MW-1 (A1H0365-11)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 19:55	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*08/12/21 19:55*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*113 %*	*50-150 %*	*1*	*08/12/21 19:55*	*NWTPH-Gx (MS)*	
MW-11 (A1H0365-12RE1)				**Matrix: Water**		**Batch: 1080474**		
Gasoline Range Organics	**41.4**	---	5.00	mg/L	50	08/16/21 12:52	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*109 %*	*Limits: 50-150 %*	*1*	*08/16/21 12:52*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*104 %*	*50-150 %*	*1*	*08/16/21 12:52*	*NWTPH-Gx (MS)*	
MW-10 (A1H0365-13)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 20:22	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*08/12/21 20:22*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*115 %*	*50-150 %*	*1*	*08/12/21 20:22*	*NWTPH-Gx (MS)*	
MW-9 (A1H0365-14)				**Matrix: Water**		**Batch: 1080374**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	08/12/21 20:49	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits: 50-150 %*	*1*	*08/12/21 20:49*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)			*114 %*	*50-150 %*	*1*	*08/12/21 20:49*	*NWTPH-Gx (MS)*	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1H0365-01)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 17:12	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 17:12	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 17:12	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 17:12	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 17:12	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 17:12	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*114 %*	*Limits: 80-120 %*	*1*	*08/12/21 17:12*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 17:12*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*08/12/21 17:12*	*EPA 8260D*	
MW-5 (A1H0365-02)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.240	ug/L	1	08/12/21 23:32	EPA 8260D	R-06
Toluene	ND	---	1.20	ug/L	1	08/12/21 23:32	EPA 8260D	R-06
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 23:32	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*108 %*	*Limits: 80-120 %*	*1*	*08/12/21 23:32*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/12/21 23:32*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*97 %*	*80-120 %*	*1*	*08/12/21 23:32*	*EPA 8260D*	
MW-5 (A1H0365-02RE1)				**Matrix: Water**		**Batch: 1080474**		
Ethylbenzene	**135**	---	2.50	ug/L	5	08/16/21 11:58	EPA 8260D	
Xylenes, total	**628**	---	7.50	ug/L	5	08/16/21 11:58	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*108 %*	*Limits: 80-120 %*	*1*	*08/16/21 11:58*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/16/21 11:58*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*90 %*	*80-120 %*	*1*	*08/16/21 11:58*	*EPA 8260D*	
MW-5 (A1H0365-02RE2)				**Matrix: Water**		**Batch: 1080474**		
Naphthalene	**1360**	---	200	ug/L	50	08/16/21 21:01	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*110 %*	*Limits: 80-120 %*	*1*	*08/16/21 21:01*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/16/21 21:01*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*80-120 %*	*1*	*08/16/21 21:01*	*EPA 8260D*	
MW-5D (A1H0365-03RE1)				**Matrix: Water**		**Batch: 1080426**		
Benzene	ND	---	0.200	ug/L	1	08/13/21 10:48	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/13/21 10:48	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/13/21 10:48	EPA 8260D	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-5D (A1H0365-03RE1)				**Matrix: Water**		**Batch: 1080426**		
Xylenes, total	ND	---	1.50	ug/L	1	08/13/21 10:48	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/13/21 10:48	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/13/21 10:48	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*113 %*	*Limits: 80-120 %*	*1*	*08/13/21 10:48*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*08/13/21 10:48*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*08/13/21 10:48*	*EPA 8260D*	
MW-8 (A1H0365-04)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 18:06	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 18:06	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 18:06	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 18:06	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 18:06	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 18:06	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*116 %*	*Limits: 80-120 %*	*1*	*08/12/21 18:06*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 18:06*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*08/12/21 18:06*	*EPA 8260D*	
MW-8D (A1H0365-05)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 18:33	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 18:33	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 18:33	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 18:33	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 18:33	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 18:33	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*114 %*	*Limits: 80-120 %*	*1*	*08/12/21 18:33*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/12/21 18:33*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*08/12/21 18:33*	*EPA 8260D*	
MW-3 (A1H0365-06RE1)				**Matrix: Water**		**Batch: 1080426**		
Benzene	ND	---	0.200	ug/L	1	08/13/21 11:15	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/13/21 11:15	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/13/21 11:15	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/13/21 11:15	EPA 8260D	

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-3 (A1H0365-06RE1)				**Matrix: Water**		**Batch: 1080426**		
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/13/21 11:15	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/13/21 11:15	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*113 %*	*Limits: 80-120 %*	*1*	*08/13/21 11:15*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*	*80-120 %*	*1*	*08/13/21 11:15*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*103 %*	*80-120 %*	*1*	*08/13/21 11:15*	*EPA 8260D*	
MW-4 (A1H0365-07)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 19:00	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 19:00	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 19:00	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 19:00	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 19:00	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 19:00	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*115 %*	*Limits: 80-120 %*	*1*	*08/12/21 19:00*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 19:00*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*08/12/21 19:00*	*EPA 8260D*	
MW-2 (A1H0365-08)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 19:28	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 19:28	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 19:28	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 19:28	EPA 8260D	
Methyl tert-butyl ether (MTBE)	**11.3**	---	1.00	ug/L	1	08/12/21 19:28	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 19:28	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*116 %*	*Limits: 80-120 %*	*1*	*08/12/21 19:28*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/12/21 19:28*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 19:28*	*EPA 8260D*	
MW-6 (A1H0365-09)				**Matrix: Water**		**Batch: 1080374**		
Benzene	**175**	---	0.200	ug/L	1	08/12/21 22:38	EPA 8260D	
Toluene	**28.7**	---	1.00	ug/L	1	08/12/21 22:38	EPA 8260D	
Xylenes, total	**327**	---	1.50	ug/L	1	08/12/21 22:38	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 22:38	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*106 %*	*Limits: 80-120 %*	*1*	*08/12/21 22:38*	*EPA 8260D*	

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-6 (A1H0365-09)				**Matrix: Water**		**Batch: 1080374**		
Surrogate: Toluene-d8 (Surr)			*Recovery: 98 %*	*Limits: 80-120 %*	*1*	*08/12/21 22:38*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*91 %*	*80-120 %*	*1*	*08/12/21 22:38*	*EPA 8260D*	
MW-6 (A1H0365-09RE1)				**Matrix: Water**		**Batch: 1080426**		
Ethylbenzene	**1880**	---	5.00	ug/L	10	08/13/21 19:24	EPA 8260D	
Naphthalene	**384**	---	40.0	ug/L	10	08/13/21 19:24	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 108 %*	*Limits: 80-120 %*	*1*	*08/13/21 19:24*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*08/13/21 19:24*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*92 %*	*80-120 %*	*1*	*08/13/21 19:24*	*EPA 8260D*	
MW-6 Dup (A1H0365-10)				**Matrix: Water**		**Batch: 1080374**		
Benzene	**174**	---	0.200	ug/L	1	08/12/21 23:05	EPA 8260D	
Toluene	**28.9**	---	1.00	ug/L	1	08/12/21 23:05	EPA 8260D	
Xylenes, total	**312**	---	1.50	ug/L	1	08/12/21 23:05	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 23:05	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 105 %*	*Limits: 80-120 %*	*1*	*08/12/21 23:05*	*EPA 8260D*	
Toluene-d8 (Surr)			*98 %*	*80-120 %*	*1*	*08/12/21 23:05*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*93 %*	*80-120 %*	*1*	*08/12/21 23:05*	*EPA 8260D*	
MW-6 Dup (A1H0365-10RE1)				**Matrix: Water**		**Batch: 1080426**		
Ethylbenzene	**1890**	---	5.00	ug/L	10	08/13/21 19:51	EPA 8260D	
Naphthalene	**386**	---	40.0	ug/L	10	08/13/21 19:51	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 106 %*	*Limits: 80-120 %*	*1*	*08/13/21 19:51*	*EPA 8260D*	
Toluene-d8 (Surr)			*99 %*	*80-120 %*	*1*	*08/13/21 19:51*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*93 %*	*80-120 %*	*1*	*08/13/21 19:51*	*EPA 8260D*	
MW-1 (A1H0365-11)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 19:55	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 19:55	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 19:55	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 19:55	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 19:55	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 19:55	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 115 %*	*Limits: 80-120 %*	*1*	*08/12/21 19:55*	*EPA 8260D*	
Toluene-d8 (Surr)			*100 %*	*80-120 %*	*1*	*08/12/21 19:55*	*EPA 8260D*	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-1 (A1H0365-11)				**Matrix: Water**		**Batch: 1080374**		
Surrogate: 4-Bromofluorobenzene (Surr)		*Recovery: 101 %*	*Limits: 80-120 %*		*1*	*08/12/21 19:55*	*EPA 8260D*	
MW-11 (A1H0365-12)				**Matrix: Water**		**Batch: 1080374**		
Benzene	**9.02**	---	0.200	ug/L	1	08/12/21 21:16	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 21:16	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 107 %*	*Limits: 80-120 %*		*1*	*08/12/21 21:16*	*EPA 8260D*	
Toluene-d8 (Surr)		*102 %*	*80-120 %*		*1*	*08/12/21 21:16*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*89 %*	*80-120 %*		*1*	*08/12/21 21:16*	*EPA 8260D*	
MW-11 (A1H0365-12RE1)				**Matrix: Water**		**Batch: 1080474**		
Toluene	**196**	---	50.0	ug/L	50	08/16/21 12:52	EPA 8260D	
Ethylbenzene	**2580**	---	25.0	ug/L	50	08/16/21 12:52	EPA 8260D	
Xylenes, total	**8600**	---	75.0	ug/L	50	08/16/21 12:52	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 110 %*	*Limits: 80-120 %*		*1*	*08/16/21 12:52*	*EPA 8260D*	
Toluene-d8 (Surr)		*100 %*	*80-120 %*		*1*	*08/16/21 12:52*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*99 %*	*80-120 %*		*1*	*08/16/21 12:52*	*EPA 8260D*	
MW-11 (A1H0365-12RE2)				**Matrix: Water**		**Batch: 1080474**		
Naphthalene	ND	---	200	ug/L	50	08/16/21 20:34	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 112 %*	*Limits: 80-120 %*		*1*	*08/16/21 20:34*	*EPA 8260D*	
Toluene-d8 (Surr)		*99 %*	*80-120 %*		*1*	*08/16/21 20:34*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*98 %*	*80-120 %*		*1*	*08/16/21 20:34*	*EPA 8260D*	
MW-10 (A1H0365-13)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 20:22	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 20:22	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 20:22	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 20:22	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 20:22	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 20:22	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery: 119 %*	*Limits: 80-120 %*		*1*	*08/12/21 20:22*	*EPA 8260D*	
Toluene-d8 (Surr)		*101 %*	*80-120 %*		*1*	*08/12/21 20:22*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)		*102 %*	*80-120 %*		*1*	*08/12/21 20:22*	*EPA 8260D*	
MW-9 (A1H0365-14)				**Matrix: Water**		**Batch: 1080374**		

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ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-9 (A1H0365-14)				**Matrix: Water**		**Batch: 1080374**		
Benzene	ND	---	0.200	ug/L	1	08/12/21 20:49	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	08/12/21 20:49	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	08/12/21 20:49	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	08/12/21 20:49	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	08/12/21 20:49	EPA 8260D	
Naphthalene	ND	---	4.00	ug/L	1	08/12/21 20:49	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*117 %*	*Limits: 80-120 %*	*1*	*08/12/21 20:49*	*EPA 8260D*	
Toluene-d8 (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 20:49*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*08/12/21 20:49*	*EPA 8260D*	

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080376 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (1080376-BLK2)			Prepared: 08/12/21 07:30		Analyzed: 08/13/21 09:20							
NWTPH-Dx												
Diesel	ND	---	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.364	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 136 %*	*Limits: 50-150 %*		*Dilution: 1x*							
LCS (1080376-BS1)			Prepared: 08/12/21 07:30		Analyzed: 08/12/21 20:58							
NWTPH-Dx												
Diesel	0.980	---	0.200	mg/L	1	1.25	---	78	36-132%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 114 %*	*Limits: 50-150 %*		*Dilution: 1x*							
LCS Dup (1080376-BSD1)			Prepared: 08/12/21 07:30		Analyzed: 08/12/21 21:22							Q-19
NWTPH-Dx												
Diesel	1.13	---	0.200	mg/L	1	1.25	---	91	36-132%	14	30%	
Surr: o-Terphenyl (Surr)		*Recovery: 121 %*	*Limits: 50-150 %*		*Dilution: 1x*							
Batch 1080558 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (1080558-BLK1)			Prepared: 08/17/21 12:22		Analyzed: 08/17/21 18:44							
NWTPH-Dx												
Diesel	ND	---	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.364	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 112 %*	*Limits: 50-150 %*		*Dilution: 1x*							
LCS (1080558-BS1)			Prepared: 08/17/21 12:22		Analyzed: 08/17/21 19:05							
NWTPH-Dx												
Diesel	1.04	---	0.200	mg/L	1	1.25	---	83	36-132%	---	---	
Surr: o-Terphenyl (Surr)		*Recovery: 128 %*	*Limits: 50-150 %*		*Dilution: 1x*							
LCS Dup (1080558-BSD1)			Prepared: 08/17/21 12:22		Analyzed: 08/17/21 19:26							Q-19
NWTPH-Dx												
Diesel	1.05	---	0.200	mg/L	1	1.25	---	84	36-132%	0.9	30%	
Surr: o-Terphenyl (Surr)		*Recovery: 131 %*	*Limits: 50-150 %*		*Dilution: 1x*							

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080374 - EPA 5030B									Water			
Blank (1080374-BLK1)			Prepared: 08/12/21 07:30 Analyzed: 08/12/21 12:40									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*100 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*110 %*		*50-150 %*			*"*				
LCS (1080374-BS2)			Prepared: 08/12/21 07:30 Analyzed: 08/12/21 12:13									
NWTPH-Gx (MS)												
Gasoline Range Organics	0.510	---	0.100	mg/L	1	0.500	---	102	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*104 %*		*50-150 %*			*"*				
Duplicate (1080374-DUP1)			Prepared: 08/12/21 08:48 Analyzed: 08/12/21 13:34									
QC Source Sample: Non-SDG (A1H0348-01)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*105 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*111 %*		*50-150 %*			*"*				
Duplicate (1080374-DUP2)			Prepared: 08/12/21 08:48 Analyzed: 08/12/21 17:39									
QC Source Sample: MW-7 (A1H0365-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*107 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*112 %*		*50-150 %*			*"*				

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Darrell Auvil, Client Services Manager

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Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080426 - EPA 5030B									Water			
Blank (1080426-BLK1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 10:21									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*	*Limits: 50-150 %*		*Dilution: 1x*							
1,4-Difluorobenzene (Sur)		*108 %*	*50-150 %*		*"*							
LCS (1080426-BS2)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 09:54									
NWTPH-Gx (MS)												
Gasoline Range Organics	0.525	---	0.100	mg/L	1	0.500	---	105	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 102 %*	*Limits: 50-150 %*		*Dilution: 1x*							
1,4-Difluorobenzene (Sur)		*101 %*	*50-150 %*		*"*							
Duplicate (1080426-DUP1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 12:09									
QC Source Sample: Non-SDG (A1H0387-01)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	0.0567	---	---	***	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*	*Limits: 50-150 %*		*Dilution: 1x*							
1,4-Difluorobenzene (Sur)		*105 %*	*50-150 %*		*"*							
Duplicate (1080426-DUP2)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 16:13									
QC Source Sample: Non-SDG (A1H0392-01)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery: 107 %*	*Limits: 50-150 %*		*Dilution: 1x*							
1,4-Difluorobenzene (Sur)		*110 %*	*50-150 %*		*"*							

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080474 - EPA 5030B									Water			
Blank (1080474-BLK1)			Prepared: 08/16/21 08:00		Analyzed: 08/16/21 11:04							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*109 %*		*50-150 %*			*"*				
LCS (1080474-BS2)			Prepared: 08/16/21 08:00		Analyzed: 08/16/21 10:36							
NWTPH-Gx (MS)												
Gasoline Range Organics	0.589	---	0.100	mg/L	1	0.500	---	118	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*104 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*102 %*		*50-150 %*			*"*				
Duplicate (1080474-DUP1)			Prepared: 08/16/21 10:23		Analyzed: 08/16/21 14:14							
QC Source Sample: Non-SDG (A1H0448-11)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*101 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*110 %*		*50-150 %*			*"*				
Duplicate (1080474-DUP2)			Prepared: 08/16/21 10:23		Analyzed: 08/16/21 19:13							
QC Source Sample: Non-SDG (A1H0451-16)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)		*Recovery:*	*108 %*	*Limits:*	*50-150 %*		*Dilution:*	*1x*				
1,4-Difluorobenzene (Sur)			*114 %*		*50-150 %*			*"*				

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080374 - EPA 5030B												**Water**
Blank (1080374-BLK1)			Prepared: 08/12/21 07:30 Analyzed: 08/12/21 12:40									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 113 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*102 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*105 %*		*80-120 %*			*"*				
LCS (1080374-BS1)			Prepared: 08/12/21 07:30 Analyzed: 08/12/21 11:41									
EPA 8260D												
Benzene	22.5	---	0.200	ug/L	1	20.0	---	112	80-120%	---	---	
Toluene	19.2	---	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Ethylbenzene	20.4	---	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Xylenes, total	61.8	---	1.50	ug/L	1	60.0	---	103	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	23.6	---	1.00	ug/L	1	20.0	---	118	80-120%	---	---	
Naphthalene	16.9	---	4.00	ug/L	1	20.0	---	84	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 108 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*98 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*			*"*				
Duplicate (1080374-DUP1)			Prepared: 08/12/21 08:48 Analyzed: 08/12/21 13:34									
QC Source Sample: Non-SDG (A1H0348-01)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 114 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*101 %*		*80-120 %*			*"*				

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080374 - EPA 5030B											**Water**	
Duplicate (1080374-DUP1)				Prepared: 08/12/21 08:48 Analyzed: 08/12/21 13:34								
QC Source Sample: Non-SDG (A1H0348-01)												
Surr: 4-Bromofluorobenzene (Surr)			*Recovery: 102 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Duplicate (1080374-DUP2)				Prepared: 08/12/21 08:48 Analyzed: 08/12/21 17:39								
QC Source Sample: MW-7 (A1H0365-01)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 116 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*101 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*103 %*	*80-120 %*			*"*					
Matrix Spike (1080374-MS1)				Prepared: 08/12/21 08:48 Analyzed: 08/12/21 14:56								
QC Source Sample: Non-SDG (A1H0348-03)												
EPA 8260D												
Benzene	23.6	---	0.200	ug/L	1	20.0	ND	118	79-120%	---	---	
Toluene	20.0	---	1.00	ug/L	1	20.0	ND	100	80-121%	---	---	
Ethylbenzene	21.2	---	0.500	ug/L	1	20.0	ND	106	79-121%	---	---	
Xylenes, total	63.1	---	1.50	ug/L	1	60.0	ND	105	79-121%	---	---	
Methyl tert-butyl ether (MTBE)	23.5	---	1.00	ug/L	1	20.0	ND	117	71-124%	---	---	
Naphthalene	15.9	---	4.00	ug/L	1	20.0	ND	79	61-128%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 108 %*	*Limits: 80-120 %*			*Dilution: 1x*					
Toluene-d8 (Surr)			*96 %*	*80-120 %*			*"*					
4-Bromofluorobenzene (Surr)			*89 %*	*80-120 %*			*"*					

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080426 - EPA 5030B												**Water**
Blank (1080426-BLK1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 10:21									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 110 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*102 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*105 %*		*80-120 %*			*"*				
LCS (1080426-BS1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 09:22									
EPA 8260D												
Benzene	21.7	---	0.200	ug/L	1	20.0	---	108	80-120%	---	---	
Toluene	19.2	---	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Ethylbenzene	20.3	---	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Xylenes, total	61.3	---	1.50	ug/L	1	60.0	---	102	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	23.8	---	1.00	ug/L	1	20.0	---	119	80-120%	---	---	
Naphthalene	16.6	---	4.00	ug/L	1	20.0	---	83	80-120%	---	---	
1,2-Dibromoethane (EDB)	20.8	---	0.500	ug/L	1	20.0	---	104	80-120%	---	---	
1,2-Dichloroethane (EDC)	20.3	---	0.500	ug/L	1	20.0	---	102	80-120%	---	---	
Isopropylbenzene	21.7	---	1.00	ug/L	1	20.0	---	108	80-120%	---	---	
1,2,4-Trimethylbenzene	22.0	---	1.00	ug/L	1	20.0	---	110	80-120%	---	---	
1,3,5-Trimethylbenzene	20.9	---	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 106 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*97 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*			*"*				
Duplicate (1080426-DUP1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 12:09									

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080426 - EPA 5030B											Water	
Duplicate (1080426-DUP1)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 12:09									
QC Source Sample: Non-SDG (A1H0387-01)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 108 %*			*Limits: 80-120 %*				*Dilution: 1x*		
Toluene-d8 (Surr)			*102 %*			*80-120 %*				*"*		
4-Bromofluorobenzene (Surr)			*100 %*			*80-120 %*				*"*		
Duplicate (1080426-DUP2)			Prepared: 08/13/21 07:30 Analyzed: 08/13/21 16:13									
QC Source Sample: Non-SDG (A1H0392-01)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 112 %*			*Limits: 80-120 %*				*Dilution: 1x*		
Toluene-d8 (Surr)			*100 %*			*80-120 %*				*"*		
4-Bromofluorobenzene (Surr)			*99 %*			*80-120 %*				*"*		

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GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080426 - EPA 5030B							**Water**					
Matrix Spike (1080426-MS1)			Prepared: 08/13/21 07:30		Analyzed: 08/13/21 14:52							
QC Source Sample: Non-SDG (A1H0387-06)												
EPA 8260D												
Benzene	23.1	---	0.200	ug/L	1	20.0	ND	116	79-120%	---	---	
Toluene	20.0	---	1.00	ug/L	1	20.0	ND	100	80-121%	---	---	
Ethylbenzene	21.3	---	0.500	ug/L	1	20.0	ND	106	79-121%	---	---	
Xylenes, total	63.5	---	1.50	ug/L	1	60.0	ND	106	79-121%	---	---	
Methyl tert-butyl ether (MTBE)	23.8	---	1.00	ug/L	1	20.0	ND	119	71-124%	---	---	
Naphthalene	17.9	---	4.00	ug/L	1	20.0	ND	89	61-128%	---	---	
1,2-Dibromoethane (EDB)	21.8	---	0.500	ug/L	1	20.0	ND	109	77-121%	---	---	
1,2-Dichloroethane (EDC)	21.6	---	0.500	ug/L	1	20.0	ND	108	73-128%	---	---	
Isopropylbenzene	22.1	---	1.00	ug/L	1	20.0	ND	110	72-131%	---	---	
1,2,4-Trimethylbenzene	22.0	---	1.00	ug/L	1	20.0	ND	110	76-124%	---	---	
1,3,5-Trimethylbenzene	20.8	---	1.00	ug/L	1	20.0	ND	104	75-124%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 108 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*96 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*90 %*		*80-120 %*			*"*				

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080474 - EPA 5030B												**Water**
Blank (1080474-BLK1)			Prepared: 08/16/21 08:00 Analyzed: 08/16/21 11:04									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	4.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 113 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*102 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*104 %*		*80-120 %*				*"*			
LCS (1080474-BS1)			Prepared: 08/16/21 08:00 Analyzed: 08/16/21 09:56									
EPA 8260D												
Benzene	21.6	---	0.200	ug/L	1	20.0	---	108	80-120%	---	---	
Toluene	19.1	---	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Ethylbenzene	20.2	---	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Xylenes, total	60.6	---	1.50	ug/L	1	60.0	---	101	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	24.0	---	1.00	ug/L	1	20.0	---	120	80-120%	---	---	
Naphthalene	16.0	---	4.00	ug/L	1	20.0	---	80	80-120%	---	---	
1,2-Dibromoethane (EDB)	21.0	---	0.500	ug/L	1	20.0	---	105	80-120%	---	---	
1,2-Dichloroethane (EDC)	20.2	---	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Isopropylbenzene	21.2	---	1.00	ug/L	1	20.0	---	106	80-120%	---	---	
1,2,4-Trimethylbenzene	22.1	---	1.00	ug/L	1	20.0	---	111	80-120%	---	---	
1,3,5-Trimethylbenzene	20.8	---	1.00	ug/L	1	20.0	---	104	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 106 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*97 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*				*"*			
Duplicate (1080474-DUP1)			Prepared: 08/16/21 10:23 Analyzed: 08/16/21 14:14									

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080474 - EPA 5030B											Water	
Duplicate (1080474-DUP1)			Prepared: 08/16/21 10:23 Analyzed: 08/16/21 14:14									
QC Source Sample: Non-SDG (A1H0448-11)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 116 %*			*Limits: 80-120 %*					*Dilution: 1x*	
Toluene-d8 (Surr)			*101 %*			*80-120 %*					*"*	
4-Bromofluorobenzene (Surr)			*102 %*			*80-120 %*					*"*	
Duplicate (1080474-DUP2)			Prepared: 08/16/21 10:23 Analyzed: 08/16/21 19:13									
QC Source Sample: Non-SDG (A1H0451-16)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	4.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 117 %*			*Limits: 80-120 %*					*Dilution: 1x*	
Toluene-d8 (Surr)			*100 %*			*80-120 %*					*"*	
4-Bromofluorobenzene (Surr)			*104 %*			*80-120 %*					*"*	

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ORELAP ID: **OR100062**

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 1080474 - EPA 5030B							**Water**					
Matrix Spike (1080474-MS1)			Prepared: 08/16/21 10:23		Analyzed: 08/16/21 16:30							
QC Source Sample: Non-SDG (A1H0448-18)												
EPA 8260D												
Benzene	22.4	---	0.200	ug/L	1	20.0	ND	112	79-120%	---	---	
Toluene	19.2	---	1.00	ug/L	1	20.0	ND	96	80-121%	---	---	
Ethylbenzene	20.4	---	0.500	ug/L	1	20.0	ND	102	79-121%	---	---	
Xylenes, total	60.0	---	1.50	ug/L	1	60.0	ND	100	79-121%	---	---	
Methyl tert-butyl ether (MTBE)	22.8	---	1.00	ug/L	1	20.0	ND	114	71-124%	---	---	
Naphthalene	15.4	---	4.00	ug/L	1	20.0	ND	77	61-128%	---	---	
1,2-Dibromoethane (EDB)	20.9	---	0.500	ug/L	1	20.0	ND	105	77-121%	---	---	
1,2-Dichloroethane (EDC)	20.7	---	0.500	ug/L	1	20.0	ND	103	73-128%	---	---	
Isopropylbenzene	20.8	---	1.00	ug/L	1	20.0	ND	104	72-131%	---	---	
1,2,4-Trimethylbenzene	20.7	---	1.00	ug/L	1	20.0	ND	103	76-124%	---	---	
1,3,5-Trimethylbenzene	19.7	---	1.00	ug/L	1	20.0	ND	98	75-124%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 109 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*95 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*90 %*		*80-120 %*			*"*				

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1080376							
A1H0365-01	Water	NWTPH-Dx	08/10/21 09:18	08/12/21 11:00	1050mL/5mL	1000mL/5mL	0.95
A1H0365-02	Water	NWTPH-Dx	08/10/21 10:02	08/12/21 11:00	1050mL/5mL	1000mL/5mL	0.95
A1H0365-03	Water	NWTPH-Dx	08/10/21 10:38	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
A1H0365-04	Water	NWTPH-Dx	08/10/21 11:12	08/12/21 11:00	1050mL/5mL	1000mL/5mL	0.95
A1H0365-05	Water	NWTPH-Dx	08/10/21 11:51	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
A1H0365-06	Water	NWTPH-Dx	08/10/21 12:36	08/12/21 11:00	1070mL/5mL	1000mL/5mL	0.94
A1H0365-07	Water	NWTPH-Dx	08/10/21 13:35	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
A1H0365-08	Water	NWTPH-Dx	08/10/21 14:21	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
A1H0365-09	Water	NWTPH-Dx	08/11/21 07:39	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
A1H0365-10	Water	NWTPH-Dx	08/11/21 07:39	08/12/21 11:00	1060mL/5mL	1000mL/5mL	0.94
Batch: 1080558							
A1H0365-11	Water	NWTPH-Dx	08/11/21 08:41	08/17/21 12:22	1050mL/5mL	1000mL/5mL	0.95
A1H0365-12	Water	NWTPH-Dx	08/11/21 09:20	08/17/21 12:22	1050mL/5mL	1000mL/5mL	0.95
A1H0365-13	Water	NWTPH-Dx	08/11/21 10:02	08/17/21 12:22	1060mL/5mL	1000mL/5mL	0.94
A1H0365-14	Water	NWTPH-Dx	08/11/21 11:03	08/17/21 12:22	1060mL/5mL	1000mL/5mL	0.94

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1080374							
A1H0365-01	Water	NWTPH-Gx (MS)	08/10/21 09:18	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-04	Water	NWTPH-Gx (MS)	08/10/21 11:12	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-05	Water	NWTPH-Gx (MS)	08/10/21 11:51	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-07	Water	NWTPH-Gx (MS)	08/10/21 13:35	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-08	Water	NWTPH-Gx (MS)	08/10/21 14:21	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-11	Water	NWTPH-Gx (MS)	08/11/21 08:41	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-13	Water	NWTPH-Gx (MS)	08/11/21 10:02	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-14	Water	NWTPH-Gx (MS)	08/11/21 11:03	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
Batch: 1080426							
A1H0365-03RE1	Water	NWTPH-Gx (MS)	08/10/21 10:38	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-06RE1	Water	NWTPH-Gx (MS)	08/10/21 12:36	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-09RE1	Water	NWTPH-Gx (MS)	08/11/21 07:39	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-10RE1	Water	NWTPH-Gx (MS)	08/11/21 07:39	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
Batch: 1080474							

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: GWM 3Q21	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1H0365 - 08 19 21 0939

SAMPLE PREPARATION INFORMATION

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A1H0365-02RE1	Water	NWTPH-Gx (MS)	08/10/21 10:02	08/16/21 10:23	5mL/5mL	5mL/5mL	1.00
A1H0365-12RE1	Water	NWTPH-Gx (MS)	08/11/21 09:20	08/16/21 10:23	5mL/5mL	5mL/5mL	1.00

Selected Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 1080374							
A1H0365-01	Water	EPA 8260D	08/10/21 09:18	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-02	Water	EPA 8260D	08/10/21 10:02	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-04	Water	EPA 8260D	08/10/21 11:12	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-05	Water	EPA 8260D	08/10/21 11:51	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-07	Water	EPA 8260D	08/10/21 13:35	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-08	Water	EPA 8260D	08/10/21 14:21	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-09	Water	EPA 8260D	08/11/21 07:39	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-10	Water	EPA 8260D	08/11/21 07:39	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-11	Water	EPA 8260D	08/11/21 08:41	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-12	Water	EPA 8260D	08/11/21 09:20	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-13	Water	EPA 8260D	08/11/21 10:02	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
A1H0365-14	Water	EPA 8260D	08/11/21 11:03	08/12/21 08:48	5mL/5mL	5mL/5mL	1.00
Batch: 1080426							
A1H0365-03RE1	Water	EPA 8260D	08/10/21 10:38	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-06RE1	Water	EPA 8260D	08/10/21 12:36	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-09RE1	Water	EPA 8260D	08/11/21 07:39	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
A1H0365-10RE1	Water	EPA 8260D	08/11/21 07:39	08/13/21 10:00	5mL/5mL	5mL/5mL	1.00
Batch: 1080474							
A1H0365-02RE1	Water	EPA 8260D	08/10/21 10:02	08/16/21 10:23	5mL/5mL	5mL/5mL	1.00
A1H0365-02RE2	Water	EPA 8260D	08/10/21 10:02	08/16/21 17:00	5mL/5mL	5mL/5mL	1.00
A1H0365-12RE1	Water	EPA 8260D	08/11/21 09:20	08/16/21 10:23	5mL/5mL	5mL/5mL	1.00
A1H0365-12RE2	Water	EPA 8260D	08/11/21 09:20	08/16/21 17:00	5mL/5mL	5mL/5mL	1.00

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Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

F-11	The hydrocarbon pattern indicates possible weathered diesel, mineral oil, or a contribution from a related component.
F-13	The chromatographic pattern does not resemble the fuel standard used for quantitation
F-20	Result for Diesel is Estimated due to overlap from Gasoline Range Organics or other VOCs.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
R-06	Reporting level raised due to possible carryover from a previous sample.

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ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

Apex Laboratories

Darrell Auvil, Client Services Manager

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

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LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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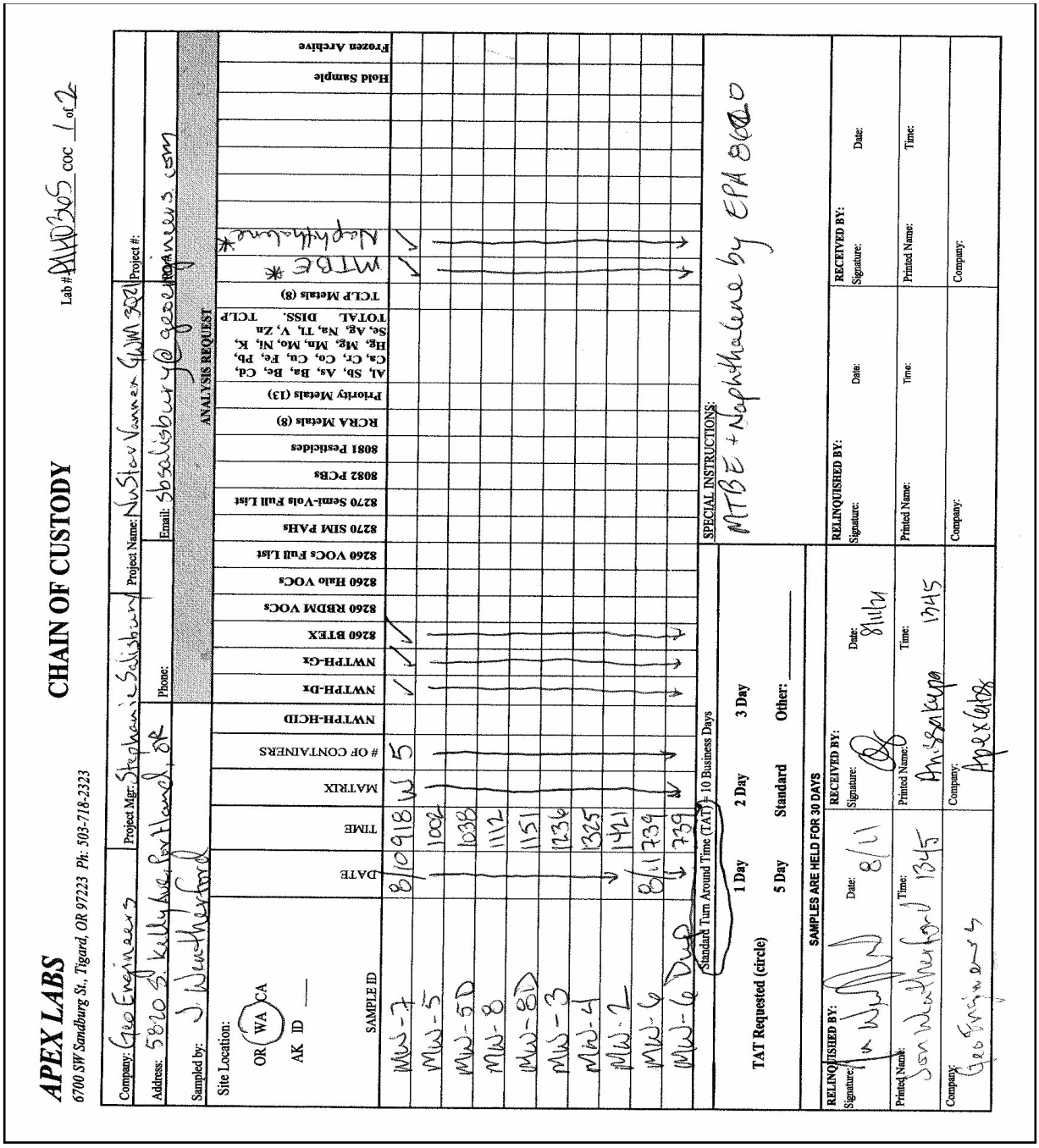

APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 PH: 503-718-2323

CHAIN OF CUSTODY

Lab # A1H0365 COC 1 of 2

Company: Geo Engineers | Project Mgr: Stephanie Salisbury | Project Name: NuStar Vancouver GWM 3Q21 | Project #:
Address: 5820 S Kelly Ave, Portland, OR | Phone: | Email: sbosze@geoengineers.com
Sampled by: J Weatherford

Site Location: OR (WA) CA AK ID ___

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	MTBE *	Naphthalene *	Hold Sample	Frozen Archive
MW-7	8/10	0918	W	5		✓	✓	✓												✓	✓	
MW-5		1002																				
MW-5D		1038																				
MW-8		1112																				
MW-8D		1151																				
MW-3		1236																				
MW-4		1325																				
MW-2		1421																				
MW-6	8/11	0739																				
MW-6 Dup		0739																				

Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day 2 Day 3 Day 5 Day Standard Other: ___

SPECIAL INSTRUCTIONS: MTBE + Naphthalene by EPA 8260

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:	8/11		Signature:	8/11/21	
Printed Name:		1345	Printed Name:		1345
Company:			Company:		

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:			Signature:		
Printed Name:			Printed Name:		
Company:			Company:		

GeoEngineers	Project:	**Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number:	**GWM 3Q21**	**Report ID:**
Lake Oswego, OR 97035	Project Manager:	**Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**

APEX LABS

6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A1H0365 COC 2 of 2
Revised

Company: GeoEngineers Project Mgr: S. Salisbury Project Name: NuStar Vannex GWM 3Q21 Project #:
Address: Phone: Email: sbsalisbury@geoengineers.com
Sampled by: AW
Site Location: OR (WA) CA AK ID

SAMPLE ID	LAB ID #	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pest	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	MTBE +	Naphthalene*				Archive
MW-1		8/11	841	W	5		✓	✓	✓												✓	✓				
MW-11		↓	920	↓	↓		↓	↓	↓												↓	↓				
MW-10		↓	1002	↓	↓		↓	↓	↓												↓	↓				
MW-9		↓	1103	↓	↓		↓	↓	↓												↓	↓				
~~Trip Blank~~							~~H~~	~~H~~	~~H~~												~~H~~	~~H~~	JW			

Normal Turn Around Time (TAT) = 10 Business Days (circled)

TAT Requested (circle): 1 Day 2 Day 3 Day 4 DAY 5 DAY Other: ______

SAMPLES ARE HELD FOR 30 DAYS

SPECIAL INSTRUCTIONS:
MTBE + Naphthalene by EPA 8260
H = hold

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 8/11/21	Signature: [signature] Date: 8/11/21	Signature: Date:	Signature: Date:
Printed Name: Jon Weatherford Time: 1345	Printed Name: An Sgarbepa Time: 1345	Printed Name: Time:	Printed Name: Time:
Company: GeoEngineers	Company: Apex Labs	Company:	Company:

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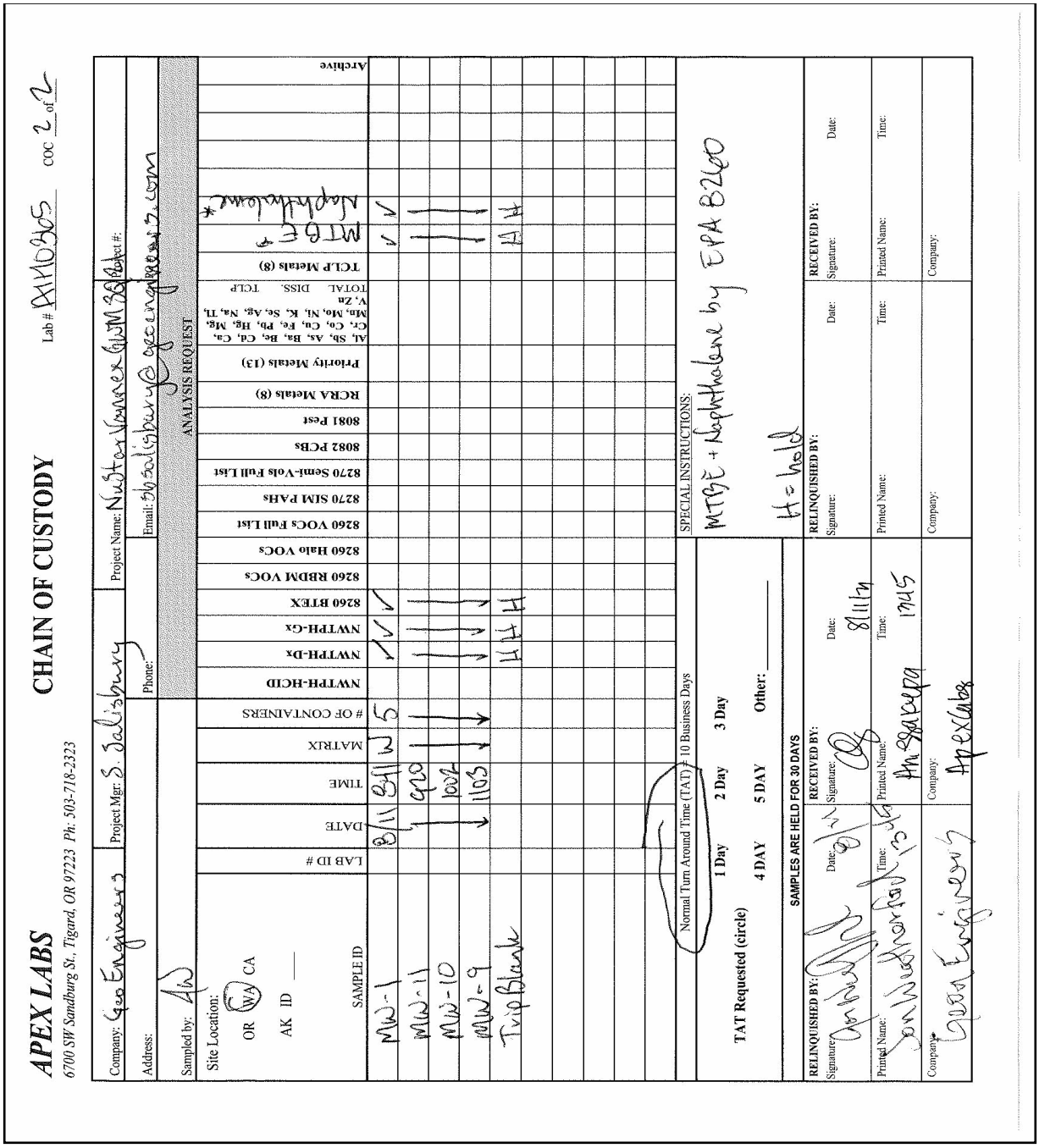
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1H0365 - 08 19 21 0939**



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APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A1H0365

Project/Project #: Nustar Vanrex GWM 3Q21

Delivery Info:

Date/time received: 8/11/21 @ 1345 By: AKK

Delivered by: Apex____Client X ESS____FedEx____UPS____Swift____Senvoy____SDS____Other____

Cooler Inspection Date/time inspected: 8/11/21 @ 1350 By: AKK

Chain of Custody included? Yes X No _____ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No _____

Signed/dated by Apex? Yes X No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.0	1.8	2.3				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	Y	Y	Y				
Ice type: (Gel/Real/Other)	Gel&Real	Real	Real				
Condition:	Good	Melty	Melty				

Cooler out of temp? (Y/N) Possible reason why:_____

Green dots applied to out of temperature samples? Yes/No

Out of temperature samples form initiated? Yes/No

Sample Inspection: Date/time inspected: 8/11/21 @ 1850 By: MAS

All samples intact? Yes X No ___ Comments:_____

Bottle labels/COCs agree? Yes X No ___ Comments: _____

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: _____

Do VOA vials have visible headspace? Yes X No ___ NA ____

Comments MW-6 DUP 3/3 VOAs have headspace

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA____

Comments: _____

Additional information: No TB provided

Labeled by: Witness: Cooler Inspected by:

MAS MAS

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ANALYTICAL REPORT

Wednesday, December 1, 2021

Stephanie Bosze-Salisbury
GeoEngineers
4000 Kruse Way Place, Bldg 3 Suite 200
Lake Oswego, OR 97035

RE: A1K0890 - Nustar-Vancouver Annex - 19001-008-03

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A1K0890, which was received by the laboratory on 11/17/2021 at 2:55:00PM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: DAuvil@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of sample receipt, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	4.0 degC	Cooler #2	1.1 degC
Cooler #3	4.8 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

Darrell Auvil, Client Services Manager

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-7	A1K0890-01	Water	11/16/21 10:07	11/17/21 14:55
MW-5D	A1K0890-02	Water	11/16/21 11:12	11/17/21 14:55
MW-5	A1K0890-03	Water	11/16/21 11:34	11/17/21 14:55
MW-5 Dup	A1K0890-04	Water	11/16/21 11:34	11/17/21 14:55
MW-8	A1K0890-05	Water	11/16/21 12:28	11/17/21 14:55
MW-8D	A1K0890-06	Water	11/16/21 12:57	11/17/21 14:55
MW-9	A1K0890-07	Water	11/16/21 13:34	11/17/21 14:55
MW-4	A1K0890-08	Water	11/17/21 07:49	11/17/21 14:55
MW-3	A1K0890-09	Water	11/17/21 08:46	11/17/21 14:55
MW-1	A1K0890-10	Water	11/17/21 09:47	11/17/21 14:55
MW-11	A1K0890-11	Water	11/17/21 10:26	11/17/21 14:55
MW-10	A1K0890-12	Water	11/17/21 11:54	11/17/21 14:55
MW-6	A1K0890-13	Water	11/17/21 12:32	11/17/21 14:55
MW-2	A1K0890-14	Water	11/17/21 11:07	11/17/21 14:55

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ANALYTICAL REPORT

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4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1K0890-01)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	ND	---	0.189	mg/L	1	11/23/21 00:33	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/23/21 00:33	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 64 %*		*Limits: 50-150 %*	*1*	*11/23/21 00:33*	*NWTPH-Dx*	
MW-5D (A1K0890-02)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	ND	---	0.190	mg/L	1	11/23/21 00:54	NWTPH-Dx	
Oil	ND	---	0.381	mg/L	1	11/23/21 00:54	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 92 %*		*Limits: 50-150 %*	*1*	*11/23/21 00:54*	*NWTPH-Dx*	
MW-5 (A1K0890-03)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	**2.15**	---	0.190	mg/L	1	11/23/21 01:14	NWTPH-Dx	**F-18**
Oil	ND	---	0.381	mg/L	1	11/23/21 01:14	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 86 %*		*Limits: 50-150 %*	*1*	*11/23/21 01:14*	*NWTPH-Dx*	
MW-5 Dup (A1K0890-04)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	**1.84**	---	0.190	mg/L	1	11/23/21 01:34	NWTPH-Dx	**F-18**
Oil	ND	---	0.381	mg/L	1	11/23/21 01:34	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 79 %*		*Limits: 50-150 %*	*1*	*11/23/21 01:34*	*NWTPH-Dx*	
MW-8 (A1K0890-05)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	ND	---	0.192	mg/L	1	11/23/21 01:55	NWTPH-Dx	
Oil	ND	---	0.385	mg/L	1	11/23/21 01:55	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 79 %*		*Limits: 50-150 %*	*1*	*11/23/21 01:55*	*NWTPH-Dx*	
MW-8D (A1K0890-06)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	ND	---	0.189	mg/L	1	11/23/21 02:15	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/23/21 02:15	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 84 %*		*Limits: 50-150 %*	*1*	*11/23/21 02:15*	*NWTPH-Dx*	
MW-9 (A1K0890-07)				**Matrix: Water**		**Batch: 21K0946**		
Diesel	ND	---	0.189	mg/L	1	11/23/21 02:36	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/23/21 02:36	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 80 %*		*Limits: 50-150 %*	*1*	*11/23/21 02:36*	*NWTPH-Dx*	

Apex Laboratories

Darrell Auvil, Client Services Manager

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-4 (A1K0890-08)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.189	mg/L	1	11/25/21 00:30	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/25/21 00:30	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 96 %*		*Limits: 50-150 %*	*1*	*11/25/21 00:30*	*NWTPH-Dx*	
MW-3 (A1K0890-09)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.190	mg/L	1	11/25/21 00:50	NWTPH-Dx	
Oil	ND	---	0.381	mg/L	1	11/25/21 00:50	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 94 %*		*Limits: 50-150 %*	*1*	*11/25/21 00:50*	*NWTPH-Dx*	
MW-1 (A1K0890-10)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.189	mg/L	1	11/25/21 01:11	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/25/21 01:11	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 86 %*		*Limits: 50-150 %*	*1*	*11/25/21 01:11*	*NWTPH-Dx*	
MW-11 (A1K0890-11)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.189	mg/L	1	11/25/21 01:31	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/25/21 01:31	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 79 %*		*Limits: 50-150 %*	*1*	*11/25/21 01:31*	*NWTPH-Dx*	
MW-10 (A1K0890-12)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.189	mg/L	1	11/25/21 01:51	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/25/21 01:51	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 85 %*		*Limits: 50-150 %*	*1*	*11/25/21 01:51*	*NWTPH-Dx*	
MW-6 (A1K0890-13)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	**8.27**	---	0.194	mg/L	1	11/25/21 02:12	NWTPH-Dx	
Oil	ND	---	0.388	mg/L	1	11/25/21 02:12	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 91 %*		*Limits: 50-150 %*	*1*	*11/25/21 02:12*	*NWTPH-Dx*	
MW-2 (A1K0890-14)				**Matrix: Water**		**Batch: 21K1079**		
Diesel	ND	---	0.189	mg/L	1	11/25/21 02:32	NWTPH-Dx	
Oil	ND	---	0.377	mg/L	1	11/25/21 02:32	NWTPH-Dx	
Surrogate: o-Terphenyl (Surr)		*Recovery: 86 %*		*Limits: 50-150 %*	*1*	*11/25/21 02:32*	*NWTPH-Dx*	

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6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1K0890-01)				**Matrix: Water**		**Batch: 21K0896**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/21/21 16:23	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 99 %*	*Limits: 50-150 %*		*1*	*11/21/21 16:23*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*101 %*	*50-150 %*		*1*	*11/21/21 16:23*	*NWTPH-Gx (MS)*	
MW-5D (A1K0890-02)				**Matrix: Water**		**Batch: 21K0896**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/21/21 17:16	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 100 %*	*Limits: 50-150 %*		*1*	*11/21/21 17:16*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*102 %*	*50-150 %*		*1*	*11/21/21 17:16*	*NWTPH-Gx (MS)*	
MW-5 (A1K0890-03RE1)				**Matrix: Water**		**Batch: 21K0914**		
Gasoline Range Organics	**13.9**	---	2.00	mg/L	20	11/22/21 13:09	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 99 %*	*Limits: 50-150 %*		*1*	*11/22/21 13:09*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*111 %*	*50-150 %*		*1*	*11/22/21 13:09*	*NWTPH-Gx (MS)*	
MW-5 Dup (A1K0890-04RE1)				**Matrix: Water**		**Batch: 21K0914**		
Gasoline Range Organics	**11.5**	---	2.00	mg/L	20	11/22/21 13:36	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 98 %*	*Limits: 50-150 %*		*1*	*11/22/21 13:36*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*111 %*	*50-150 %*		*1*	*11/22/21 13:36*	*NWTPH-Gx (MS)*	
MW-8 (A1K0890-05)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 14:25	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 94 %*	*Limits: 50-150 %*		*1*	*11/19/21 14:25*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*114 %*	*50-150 %*		*1*	*11/19/21 14:25*	*NWTPH-Gx (MS)*	
MW-8D (A1K0890-06)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 14:52	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 94 %*	*Limits: 50-150 %*		*1*	*11/19/21 14:52*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*114 %*	*50-150 %*		*1*	*11/19/21 14:52*	*NWTPH-Gx (MS)*	
MW-9 (A1K0890-07)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 15:20	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 96 %*	*Limits: 50-150 %*		*1*	*11/19/21 15:20*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*114 %*	*50-150 %*		*1*	*11/19/21 15:20*	*NWTPH-Gx (MS)*	
MW-4 (A1K0890-08)				**Matrix: Water**		**Batch: 21K0848**		

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-4 (A1K0890-08)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 15:47	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 96 %*	*Limits: 50-150 %*		*1*	*11/19/21 15:47*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*114 %*	*50-150 %*		*1*	*11/19/21 15:47*	*NWTPH-Gx (MS)*	
MW-3 (A1K0890-09)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 16:14	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 95 %*	*Limits: 50-150 %*		*1*	*11/19/21 16:14*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*113 %*	*50-150 %*		*1*	*11/19/21 16:14*	*NWTPH-Gx (MS)*	
MW-1 (A1K0890-10)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 16:41	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 95 %*	*Limits: 50-150 %*		*1*	*11/19/21 16:41*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*115 %*	*50-150 %*		*1*	*11/19/21 16:41*	*NWTPH-Gx (MS)*	
MW-11 (A1K0890-11RE1)				**Matrix: Water**		**Batch: 21K0914**		
Gasoline Range Organics	**2.26**	---	1.00	mg/L	10	11/22/21 14:03	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 94 %*	*Limits: 50-150 %*		*1*	*11/22/21 14:03*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*110 %*	*50-150 %*		*1*	*11/22/21 14:03*	*NWTPH-Gx (MS)*	
MW-10 (A1K0890-12)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 17:08	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 95 %*	*Limits: 50-150 %*		*1*	*11/19/21 17:08*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*115 %*	*50-150 %*		*1*	*11/19/21 17:08*	*NWTPH-Gx (MS)*	
MW-6 (A1K0890-13RE1)				**Matrix: Water**		**Batch: 21K0914**		
Gasoline Range Organics	**11.1**	---	2.50	mg/L	25	11/22/21 14:30	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 97 %*	*Limits: 50-150 %*		*1*	*11/22/21 14:30*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*110 %*	*50-150 %*		*1*	*11/22/21 14:30*	*NWTPH-Gx (MS)*	
MW-2 (A1K0890-14)				**Matrix: Water**		**Batch: 21K0848**		
Gasoline Range Organics	ND	---	0.100	mg/L	1	11/19/21 17:36	NWTPH-Gx (MS)	
Surrogate: 4-Bromofluorobenzene (Sur)		*Recovery: 92 %*	*Limits: 50-150 %*		*1*	*11/19/21 17:36*	*NWTPH-Gx (MS)*	
1,4-Difluorobenzene (Sur)		*110 %*	*50-150 %*		*1*	*11/19/21 17:36*	*NWTPH-Gx (MS)*	

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-7 (A1K0890-01)				**Matrix: Water**		**Batch: 21K0896**		
Benzene	ND	---	0.200	ug/L	1	11/21/21 16:23	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/21/21 16:23	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/21/21 16:23	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/21/21 16:23	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/21/21 16:23	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/21/21 16:23	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/21/21 16:23*	*EPA 8260D*	
Toluene-d8 (Surr)			*97 %*	*80-120 %*	*1*	*11/21/21 16:23*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*107 %*	*80-120 %*	*1*	*11/21/21 16:23*	*EPA 8260D*	
MW-5D (A1K0890-02)				**Matrix: Water**		**Batch: 21K0896**		
Benzene	ND	---	0.200	ug/L	1	11/21/21 17:16	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/21/21 17:16	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/21/21 17:16	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/21/21 17:16	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/21/21 17:16	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/21/21 17:16	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*99 %*	*Limits: 80-120 %*	*1*	*11/21/21 17:16*	*EPA 8260D*	
Toluene-d8 (Surr)			*97 %*	*80-120 %*	*1*	*11/21/21 17:16*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*107 %*	*80-120 %*	*1*	*11/21/21 17:16*	*EPA 8260D*	
MW-5 (A1K0890-03)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.220	ug/L	1	11/19/21 18:57	EPA 8260D	R-06
Toluene	**1.16**	---	1.00	ug/L	1	11/19/21 18:57	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 18:57	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 18:57*	*EPA 8260D*	
Toluene-d8 (Surr)			*106 %*	*80-120 %*	*1*	*11/19/21 18:57*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*80-120 %*	*1*	*11/19/21 18:57*	*EPA 8260D*	
MW-5 (A1K0890-03RE1)				**Matrix: Water**		**Batch: 21K0914**		
Ethylbenzene	**197**	---	10.0	ug/L	20	11/22/21 13:09	EPA 8260D	
Xylenes, total	**610**	---	30.0	ug/L	20	11/22/21 13:09	EPA 8260D	
Naphthalene	**1430**	---	40.0	ug/L	20	11/22/21 13:09	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*11/22/21 13:09*	*EPA 8260D*	

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ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-5 (A1K0890-03RE1)				**Matrix: Water**		**Batch: 21K0914**		
Surrogate: Toluene-d8 (Surr)			*Recovery: 106 %*	*Limits: 80-120 %*	*1*	*11/22/21 13:09*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*11/22/21 13:09*	*EPA 8260D*	
MW-5 Dup (A1K0890-04)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 19:24	EPA 8260D	
Toluene	**1.17**	---	1.00	ug/L	1	11/19/21 19:24	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 19:24	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*	*Limits: 80-120 %*	*1*	*11/19/21 19:24*	*EPA 8260D*	
Toluene-d8 (Surr)			*107 %*	*80-120 %*	*1*	*11/19/21 19:24*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*80-120 %*	*1*	*11/19/21 19:24*	*EPA 8260D*	
MW-5 Dup (A1K0890-04RE1)				**Matrix: Water**		**Batch: 21K0914**		
Ethylbenzene	**164**	---	10.0	ug/L	20	11/22/21 13:36	EPA 8260D	
Xylenes, total	**468**	---	30.0	ug/L	20	11/22/21 13:36	EPA 8260D	
Naphthalene	**1190**	---	40.0	ug/L	20	11/22/21 13:36	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*	*Limits: 80-120 %*	*1*	*11/22/21 13:36*	*EPA 8260D*	
Toluene-d8 (Surr)			*107 %*	*80-120 %*	*1*	*11/22/21 13:36*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*11/22/21 13:36*	*EPA 8260D*	
MW-8 (A1K0890-05)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 14:25	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 14:25	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 14:25	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 14:25	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 14:25	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 14:25	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*	*Limits: 80-120 %*	*1*	*11/19/21 14:25*	*EPA 8260D*	
Toluene-d8 (Surr)			*109 %*	*80-120 %*	*1*	*11/19/21 14:25*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*11/19/21 14:25*	*EPA 8260D*	
MW-8D (A1K0890-06)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 14:52	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 14:52	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 14:52	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 14:52	EPA 8260D	

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ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-8D (A1K0890-06)				**Matrix: Water**		**Batch: 21K0848**		
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 14:52	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 14:52	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*101 %*	*Limits: 80-120 %*	*1*	*11/19/21 14:52*	*EPA 8260D*	
Toluene-d8 (Surr)			*108 %*	*80-120 %*	*1*	*11/19/21 14:52*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*99 %*	*80-120 %*	*1*	*11/19/21 14:52*	*EPA 8260D*	
MW-9 (A1K0890-07)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 15:20	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 15:20	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 15:20	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 15:20	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 15:20	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 15:20	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 15:20*	*EPA 8260D*	
Toluene-d8 (Surr)			*108 %*	*80-120 %*	*1*	*11/19/21 15:20*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*11/19/21 15:20*	*EPA 8260D*	
MW-4 (A1K0890-08)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 15:47	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 15:47	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 15:47	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 15:47	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 15:47	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 15:47	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 15:47*	*EPA 8260D*	
Toluene-d8 (Surr)			*109 %*	*80-120 %*	*1*	*11/19/21 15:47*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*11/19/21 15:47*	*EPA 8260D*	
MW-3 (A1K0890-09)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 16:14	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 16:14	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 16:14	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 16:14	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 16:14	EPA 8260D	

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Darrell Auvil, Client Services Manager

APEX LABORATORIES

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-3 (A1K0890-09)				**Matrix: Water**		**Batch: 21K0848**		
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 16:14	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 16:14*	*EPA 8260D*	
Toluene-d8 (Surr)			*109 %*	*80-120 %*	*1*	*11/19/21 16:14*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*11/19/21 16:14*	*EPA 8260D*	
MW-1 (A1K0890-10)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 16:41	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 16:41	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 16:41	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 16:41	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 16:41	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 16:41	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 16:41*	*EPA 8260D*	
Toluene-d8 (Surr)			*109 %*	*80-120 %*	*1*	*11/19/21 16:41*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*11/19/21 16:41*	*EPA 8260D*	
MW-11 (A1K0890-11)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	**21.8**	---	0.200	ug/L	1	11/19/21 19:52	EPA 8260D	
Toluene	**5.02**	---	1.00	ug/L	1	11/19/21 19:52	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 19:52	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*99 %*	*Limits: 80-120 %*	*1*	*11/19/21 19:52*	*EPA 8260D*	
Toluene-d8 (Surr)			*105 %*	*80-120 %*	*1*	*11/19/21 19:52*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*94 %*	*80-120 %*	*1*	*11/19/21 19:52*	*EPA 8260D*	
MW-11 (A1K0890-11RE1)				**Matrix: Water**		**Batch: 21K0914**		
Ethylbenzene	**544**	---	5.00	ug/L	10	11/22/21 14:03	EPA 8260D	
Xylenes, total	**21.8**	---	15.0	ug/L	10	11/22/21 14:03	EPA 8260D	
Naphthalene	ND	---	20.0	ug/L	10	11/22/21 14:03	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*98 %*	*Limits: 80-120 %*	*1*	*11/22/21 14:03*	*EPA 8260D*	
Toluene-d8 (Surr)			*107 %*	*80-120 %*	*1*	*11/22/21 14:03*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*102 %*	*80-120 %*	*1*	*11/22/21 14:03*	*EPA 8260D*	
MW-10 (A1K0890-12)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 17:08	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 17:08	EPA 8260D	

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
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503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

ANALYTICAL SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
MW-10 (A1K0890-12)				**Matrix: Water**		**Batch: 21K0848**		
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 17:08	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 17:08	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 17:08	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 17:08	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*100 %*	*Limits: 80-120 %*	*1*	*11/19/21 17:08*	*EPA 8260D*	
Toluene-d8 (Surr)			*109 %*	*80-120 %*	*1*	*11/19/21 17:08*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*101 %*	*80-120 %*	*1*	*11/19/21 17:08*	*EPA 8260D*	
MW-6 (A1K0890-13)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	**181**	---	0.200	ug/L	1	11/19/21 18:30	EPA 8260D	
Toluene	**22.3**	---	1.00	ug/L	1	11/19/21 18:30	EPA 8260D	
Xylenes, total	**208**	---	1.50	ug/L	1	11/19/21 18:30	EPA 8260D	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	11/19/21 18:30	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*11/19/21 18:30*	*EPA 8260D*	
Toluene-d8 (Surr)			*104 %*	*80-120 %*	*1*	*11/19/21 18:30*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*87 %*	*80-120 %*	*1*	*11/19/21 18:30*	*EPA 8260D*	
MW-6 (A1K0890-13RE1)				**Matrix: Water**		**Batch: 21K0914**		
Ethylbenzene	**1500**	---	12.5	ug/L	25	11/22/21 14:30	EPA 8260D	
Naphthalene	**281**	---	50.0	ug/L	25	11/22/21 14:30	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*96 %*	*Limits: 80-120 %*	*1*	*11/22/21 14:30*	*EPA 8260D*	
Toluene-d8 (Surr)			*106 %*	*80-120 %*	*1*	*11/22/21 14:30*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*95 %*	*80-120 %*	*1*	*11/22/21 14:30*	*EPA 8260D*	
MW-2 (A1K0890-14)				**Matrix: Water**		**Batch: 21K0848**		
Benzene	ND	---	0.200	ug/L	1	11/19/21 17:36	EPA 8260D	
Toluene	ND	---	1.00	ug/L	1	11/19/21 17:36	EPA 8260D	
Ethylbenzene	ND	---	0.500	ug/L	1	11/19/21 17:36	EPA 8260D	
Xylenes, total	ND	---	1.50	ug/L	1	11/19/21 17:36	EPA 8260D	
Methyl tert-butyl ether (MTBE)	**2.78**	---	1.00	ug/L	1	11/19/21 17:36	EPA 8260D	
Naphthalene	ND	---	2.00	ug/L	1	11/19/21 17:36	EPA 8260D	
Surrogate: 1,4-Difluorobenzene (Surr)		*Recovery:*	*97 %*	*Limits: 80-120 %*	*1*	*11/19/21 17:36*	*EPA 8260D*	
Toluene-d8 (Surr)			*110 %*	*80-120 %*	*1*	*11/19/21 17:36*	*EPA 8260D*	
4-Bromofluorobenzene (Surr)			*100 %*	*80-120 %*	*1*	*11/19/21 17:36*	*EPA 8260D*	

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0946 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (21K0946-BLK1)			Prepared: 11/22/21 13:09		Analyzed: 11/22/21 22:51							
NWTPH-Dx												
Diesel	ND	---	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.364	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 83 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (21K0946-BS1)			Prepared: 11/22/21 13:09		Analyzed: 11/22/21 23:12							
NWTPH-Dx												
Diesel	0.982	---	0.200	mg/L	1	1.25	---	79	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 97 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (21K0946-BSD1)			Prepared: 11/22/21 13:09		Analyzed: 11/22/21 23:32							Q-19
NWTPH-Dx												
Diesel	1.10	---	0.200	mg/L	1	1.25	---	88	36-132%	11	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 95 %*		*Limits: 50-150 %*		*Dilution: 1x*					
Batch 21K1079 - EPA 3510C (Fuels/Acid Ext.)									Water			
Blank (21K1079-BLK1)			Prepared: 11/24/21 12:29		Analyzed: 11/24/21 23:09							
NWTPH-Dx												
Diesel	ND	---	0.182	mg/L	1	---	---	---	---	---	---	
Oil	ND	---	0.364	mg/L	1	---	---	---	---	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 94 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS (21K1079-BS1)			Prepared: 11/24/21 12:29		Analyzed: 11/24/21 23:29							
NWTPH-Dx												
Diesel	1.03	---	0.200	mg/L	1	1.25	---	82	36-132%	---	---	
Surr: o-Terphenyl (Surr)			*Recovery: 93 %*		*Limits: 50-150 %*		*Dilution: 1x*					
LCS Dup (21K1079-BSD1)			Prepared: 11/24/21 12:29		Analyzed: 11/24/21 23:49							Q-19
NWTPH-Dx												
Diesel	1.10	---	0.200	mg/L	1	1.25	---	88	36-132%	7	30%	
Surr: o-Terphenyl (Surr)			*Recovery: 98 %*		*Limits: 50-150 %*		*Dilution: 1x*					

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0848 - EPA 5030B									Water			
Blank (21K0848-BLK1)			Prepared: 11/19/21 07:30 Analyzed: 11/19/21 09:53									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 93 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*113 %*	*50-150 %*			*"*					
LCS (21K0848-BS2)			Prepared: 11/19/21 07:30 Analyzed: 11/19/21 09:26									
NWTPH-Gx (MS)												
Gasoline Range Organics	0.518	---	0.100	mg/L	1	0.500	---	104	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 94 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*108 %*	*50-150 %*			*"*					
Duplicate (21K0848-DUP1)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 10:48									
QC Source Sample: Non-SDG (A1K0912-01)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 93 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*111 %*	*50-150 %*			*"*					
Duplicate (21K0848-DUP2)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 18:03									
QC Source Sample: MW-2 (A1K0890-14)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	0.0722	---	---	***	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 93 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*110 %*	*50-150 %*			*"*					

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0896 - EPA 5030B												**Water**
Blank (21K0896-BLK1)			Prepared: 11/21/21 12:30 Analyzed: 11/21/21 15:03									
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*101 %*	*50-150 %*			*"*					
LCS (21K0896-BS2)			Prepared: 11/21/21 12:30 Analyzed: 11/21/21 14:09									
NWTPH-Gx (MS)												
Gasoline Range Organics	0.427	---	0.100	mg/L	1	0.500	---	85	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 98 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*96 %*	*50-150 %*			*"*					
Duplicate (21K0896-DUP1)			Prepared: 11/21/21 14:00 Analyzed: 11/21/21 16:50									
QC Source Sample: MW-7 (A1K0890-01)												
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 99 %*	*Limits: 50-150 %*			*Dilution: 1x*					
1,4-Difluorobenzene (Sur)			*102 %*	*50-150 %*			*"*					

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0914 - EPA 5030B									Water			
Blank (21K0914-BLK1)			Prepared: 11/22/21 08:00		Analyzed: 11/22/21 12:42							
NWTPH-Gx (MS)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	---	---	---	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 94 %*		*Limits: 50-150 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Sur)			*112 %*		*50-150 %*			*"*				
LCS (21K0914-BS2)			Prepared: 11/22/21 08:00		Analyzed: 11/22/21 12:14							
NWTPH-Gx (MS)												
Gasoline Range Organics	0.531	---	0.100	mg/L	1	0.500	---	106	80-120%	---	---	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 97 %*		*Limits: 50-150 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Sur)			*109 %*		*50-150 %*			*"*				
Duplicate (21K0914-DUP1)			Prepared: 11/22/21 10:56		Analyzed: 11/22/21 15:52							
QC Source Sample: Non-SDG (A1K0959-02)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 94 %*		*Limits: 50-150 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Sur)			*110 %*		*50-150 %*			*"*				
Duplicate (21K0914-DUP2)			Prepared: 11/22/21 10:56		Analyzed: 11/22/21 19:56							
QC Source Sample: Non-SDG (A1K0993-01)												
Gasoline Range Organics	ND	---	0.100	mg/L	1	---	ND	---	---	---	30%	
Surr: 4-Bromofluorobenzene (Sur)			*Recovery: 92 %*		*Limits: 50-150 %*			*Dilution: 1x*				
1,4-Difluorobenzene (Sur)			*112 %*		*50-150 %*			*"*				

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ORELAP ID: **OR100062**

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0848 - EPA 5030B							**Water**					
Blank (21K0848-BLK1)			Prepared: 11/19/21 07:30 Analyzed: 11/19/21 09:53									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 101 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*109 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*101 %*		*80-120 %*			*"*				
LCS (21K0848-BS1)			Prepared: 11/19/21 07:30 Analyzed: 11/19/21 08:53									
EPA 8260D												
Benzene	21.2	---	0.200	ug/L	1	20.0	---	106	80-120%	---	---	
Toluene	20.2	---	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
Ethylbenzene	22.2	---	0.500	ug/L	1	20.0	---	111	80-120%	---	---	
Xylenes, total	63.2	---	1.50	ug/L	1	60.0	---	105	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	19.2	---	1.00	ug/L	1	20.0	---	96	80-120%	---	---	
Naphthalene	17.7	---	2.00	ug/L	1	20.0	---	88	80-120%	---	---	
1,2-Dibromoethane (EDB)	21.8	---	0.500	ug/L	1	20.0	---	109	80-120%	---	---	
1,2-Dichloroethane (EDC)	23.0	---	0.500	ug/L	1	20.0	---	115	80-120%	---	---	
Isopropylbenzene	20.2	---	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
1,2,4-Trimethylbenzene	21.9	---	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,3,5-Trimethylbenzene	21.7	---	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*104 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*90 %*		*80-120 %*			*"*				
Duplicate (21K0848-DUP1)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 10:48									

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0848 - EPA 5030B							Water					
Duplicate (21K0848-DUP1)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 10:48									
QC Source Sample: Non-SDG (A1K0912-01)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 100 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*108 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*				*"*			
Duplicate (21K0848-DUP2)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 18:03									
QC Source Sample: MW-2 (A1K0890-14)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	**2.65**	---	1.00	ug/L	1	---	2.78	---	---	5	30%	
Naphthalene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*109 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*99 %*		*80-120 %*				*"*			

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Darrell Auvil, Client Services Manager

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0848 - EPA 5030B									Water			
Matrix Spike (21K0848-MS1)			Prepared: 11/19/21 09:55 Analyzed: 11/19/21 13:31									
QC Source Sample: Non-SDG (A1K0936-12)												
EPA 8260D												
Benzene	22.9	---	0.200	ug/L	1	20.0	ND	114	79-120%	---	---	
Toluene	21.2	---	1.00	ug/L	1	20.0	ND	106	80-121%	---	---	
Ethylbenzene	23.6	---	0.500	ug/L	1	20.0	ND	118	79-121%	---	---	
Xylenes, total	67.5	---	1.50	ug/L	1	60.0	ND	112	79-121%	---	---	
Methyl tert-butyl ether (MTBE)	19.6	---	1.00	ug/L	1	20.0	ND	98	71-124%	---	---	
Naphthalene	19.6	---	2.00	ug/L	1	20.0	ND	98	61-128%	---	---	
1,2-Dibromoethane (EDB)	23.2	---	0.500	ug/L	1	20.0	ND	116	77-121%	---	---	
1,2-Dichloroethane (EDC)	23.7	---	0.500	ug/L	1	20.0	ND	118	73-128%	---	---	
Isopropylbenzene	22.0	---	1.00	ug/L	1	20.0	ND	110	72-131%	---	---	
1,2,4-Trimethylbenzene	22.5	---	1.00	ug/L	1	20.0	ND	113	76-124%	---	---	
1,3,5-Trimethylbenzene	22.8	---	1.00	ug/L	1	20.0	ND	114	75-124%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*103 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*88 %*		*80-120 %*				*"*			

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ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0896 - EPA 5030B												**Water**
Blank (21K0896-BLK1)			Prepared: 11/21/21 12:30 Analyzed: 11/21/21 15:03									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 101 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*98 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*107 %*			*80-120 %*			*"*			
LCS (21K0896-BS1)			Prepared: 11/21/21 12:30 Analyzed: 11/21/21 13:36									
EPA 8260D												
Benzene	18.4	---	0.200	ug/L	1	20.0	---	92	80-120%	---	---	
Toluene	19.4	---	1.00	ug/L	1	20.0	---	97	80-120%	---	---	
Ethylbenzene	20.3	---	0.500	ug/L	1	20.0	---	101	80-120%	---	---	
Xylenes, total	64.2	---	1.50	ug/L	1	60.0	---	107	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	19.6	---	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
Naphthalene	16.1	---	2.00	ug/L	1	20.0	---	81	80-120%	---	---	
1,2-Dibromoethane (EDB)	21.5	---	0.500	ug/L	1	20.0	---	107	80-120%	---	---	
1,2-Dichloroethane (EDC)	22.2	---	0.500	ug/L	1	20.0	---	111	80-120%	---	---	
Isopropylbenzene	21.7	---	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,2,4-Trimethylbenzene	23.0	---	1.00	ug/L	1	20.0	---	115	80-120%	---	---	
1,3,5-Trimethylbenzene	22.6	---	1.00	ug/L	1	20.0	---	113	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*			*Limits: 80-120 %*			*Dilution: 1x*			
Toluene-d8 (Surr)			*96 %*			*80-120 %*			*"*			
4-Bromofluorobenzene (Surr)			*97 %*			*80-120 %*			*"*			
Duplicate (21K0896-DUP1)			Prepared: 11/21/21 14:00 Analyzed: 11/21/21 16:50									

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: OR100062

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0896 - EPA 5030B							**Water**					
Duplicate (21K0896-DUP1)			Prepared: 11/21/21 14:00 Analyzed: 11/21/21 16:50									
QC Source Sample: MW-7 (A1K0890-01)												
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*101 %*	*Limits:*	*80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*98 %*		*80-120 %*		*"*					
4-Bromofluorobenzene (Surr)			*106 %*		*80-120 %*		*"*					
Matrix Spike (21K0896-MS1)			Prepared: 11/21/21 14:00 Analyzed: 11/21/21 19:56									
QC Source Sample: Non-SDG (A1K0961-01)												
EPA 8260D												
Benzene	19.5	---	0.200	ug/L	1	20.0	ND	98	79-120%	---	---	
Toluene	20.4	---	1.00	ug/L	1	20.0	ND	102	80-121%	---	---	
Ethylbenzene	21.3	---	0.500	ug/L	1	20.0	ND	106	79-121%	---	---	
Xylenes, total	67.3	---	1.50	ug/L	1	60.0	ND	112	79-121%	---	---	
Methyl tert-butyl ether (MTBE)	19.7	---	1.00	ug/L	1	20.0	ND	99	71-124%	---	---	
Naphthalene	14.7	---	2.00	ug/L	1	20.0	ND	74	61-128%	---	---	
1,2-Dibromoethane (EDB)	21.4	---	0.500	ug/L	1	20.0	ND	107	77-121%	---	---	
1,2-Dichloroethane (EDC)	23.2	---	0.500	ug/L	1	20.0	ND	116	73-128%	---	---	
Isopropylbenzene	22.9	---	1.00	ug/L	1	20.0	ND	114	72-131%	---	---	
1,2,4-Trimethylbenzene	23.6	---	1.00	ug/L	1	20.0	ND	118	76-124%	---	---	
1,3,5-Trimethylbenzene	23.7	---	1.00	ug/L	1	20.0	ND	118	75-124%	---	---	
Surr: 1,4-Difluorobenzene (Surr)		*Recovery:*	*95 %*	*Limits:*	*80-120 %*		*Dilution: 1x*					
Toluene-d8 (Surr)			*93 %*		*80-120 %*		*"*					

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ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0896 - EPA 5030B												**Water**
Matrix Spike (21K0896-MS1)					Prepared: 11/21/21 14:00		Analyzed: 11/21/21 19:56					
QC Source Sample: Non-SDG (A1K0961-01)												
Surr: 4-Bromofluorobenzene (Surr)				*Recovery: 96 %*	*Limits: 80-120 %*		*Dilution: 1x*					

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0914 - EPA 5030B												**Water**
Blank (21K0914-BLK1)			Prepared: 11/22/21 08:00 Analyzed: 11/22/21 12:42									
EPA 8260D												
Benzene	ND	---	0.200	ug/L	1	---	---	---	---	---	---	
Toluene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Ethylbenzene	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Xylenes, total	ND	---	1.50	ug/L	1	---	---	---	---	---	---	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Naphthalene	ND	---	2.00	ug/L	1	---	---	---	---	---	---	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	---	---	---	---	---	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	---	---	---	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 98 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*109 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*103 %*		*80-120 %*			*"*				
LCS (21K0914-BS1)			Prepared: 11/22/21 08:00 Analyzed: 11/22/21 11:38									
EPA 8260D												
Benzene	20.3	---	0.200	ug/L	1	20.0	---	102	80-120%	---	---	
Toluene	19.6	---	1.00	ug/L	1	20.0	---	98	80-120%	---	---	
Ethylbenzene	21.8	---	0.500	ug/L	1	20.0	---	109	80-120%	---	---	
Xylenes, total	62.5	---	1.50	ug/L	1	60.0	---	104	80-120%	---	---	
Methyl tert-butyl ether (MTBE)	18.4	---	1.00	ug/L	1	20.0	---	92	80-120%	---	---	
Naphthalene	18.8	---	2.00	ug/L	1	20.0	---	94	80-120%	---	---	
1,2-Dibromoethane (EDB)	22.2	---	0.500	ug/L	1	20.0	---	111	80-120%	---	---	
1,2-Dichloroethane (EDC)	21.7	---	0.500	ug/L	1	20.0	---	109	80-120%	---	---	
Isopropylbenzene	20.2	---	1.00	ug/L	1	20.0	---	101	80-120%	---	---	
1,2,4-Trimethylbenzene	21.8	---	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
1,3,5-Trimethylbenzene	21.8	---	1.00	ug/L	1	20.0	---	109	80-120%	---	---	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 95 %*		*Limits: 80-120 %*			*Dilution: 1x*				
Toluene-d8 (Surr)			*104 %*		*80-120 %*			*"*				
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*			*"*				
Duplicate (21K0914-DUP1)			Prepared: 11/22/21 10:56 Analyzed: 11/22/21 15:52									

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Darrell Auvil, Client Services Manager

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Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0914 - EPA 5030B											Water	
Duplicate (21K0914-DUP1)			Prepared: 11/22/21 10:56 Analyzed: 11/22/21 15:52									
QC Source Sample: Non-SDG (A1K0959-02)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 99 %*		*Limits: 80-120 %*						*Dilution: 1x*	
Toluene-d8 (Surr)			*107 %*		*80-120 %*						*"*	
4-Bromofluorobenzene (Surr)			*102 %*		*80-120 %*						*"*	
Duplicate (21K0914-DUP2)			Prepared: 11/22/21 10:56 Analyzed: 11/22/21 19:56									
QC Source Sample: Non-SDG (A1K0993-01)												
Benzene	ND	---	0.200	ug/L	1	---	ND	---	---	---	30%	
Toluene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Ethylbenzene	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Xylenes, total	ND	---	1.50	ug/L	1	---	ND	---	---	---	30%	
Methyl tert-butyl ether (MTBE)	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Naphthalene	ND	---	2.00	ug/L	1	---	ND	---	---	---	30%	
1,2-Dibromoethane (EDB)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
1,2-Dichloroethane (EDC)	ND	---	0.500	ug/L	1	---	ND	---	---	---	30%	
Isopropylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,2,4-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
1,3,5-Trimethylbenzene	ND	---	1.00	ug/L	1	---	ND	---	---	---	30%	
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 100 %*		*Limits: 80-120 %*						*Dilution: 1x*	
Toluene-d8 (Surr)			*108 %*		*80-120 %*						*"*	
4-Bromofluorobenzene (Surr)			*101 %*		*80-120 %*						*"*	

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Darrell Auvil, Client Services Manager

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503-718-2323
ORELAP ID: OR100062

ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

QUALITY CONTROL (QC) SAMPLE RESULTS

Selected Volatile Organic Compounds by EPA 8260D

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 21K0914 - EPA 5030B									Water			
Matrix Spike (21K0914-MS1)			Prepared: 11/22/21 10:56 Analyzed: 11/22/21 17:40									
QC Source Sample: Non-SDG (A1K0959-05)												
EPA 8260D												
Benzene	26.4	---	0.200	ug/L	1	20.0	ND	**132**	**79-120%**	---	---	Q-01
Toluene	25.2	---	1.00	ug/L	1	20.0	ND	**126**	**80-121%**	---	---	Q-01
Ethylbenzene	28.3	---	0.500	ug/L	1	20.0	ND	**142**	**79-121%**	---	---	Q-01
Xylenes, total	81.8	---	1.50	ug/L	1	60.0	ND	**136**	**79-121%**	---	---	Q-01
Methyl tert-butyl ether (MTBE)	23.4	---	1.00	ug/L	1	20.0	ND	117	71-124%	---	---	
Naphthalene	24.6	---	2.00	ug/L	1	20.0	ND	123	61-128%	---	---	
1,2-Dibromoethane (EDB)	27.8	---	0.500	ug/L	1	20.0	ND	**139**	**77-121%**	---	---	Q-01
1,2-Dichloroethane (EDC)	27.3	---	0.500	ug/L	1	20.0	ND	**137**	**73-128%**	---	---	Q-01
Isopropylbenzene	26.7	---	1.00	ug/L	1	20.0	ND	**133**	**72-131%**	---	---	Q-01
1,2,4-Trimethylbenzene	28.1	---	1.00	ug/L	1	20.0	ND	**141**	**76-124%**	---	---	Q-01
1,3,5-Trimethylbenzene	28.0	---	1.00	ug/L	1	20.0	ND	**140**	**75-124%**	---	---	Q-01
Surr: 1,4-Difluorobenzene (Surr)			*Recovery: 97 %*		*Limits: 80-120 %*				*Dilution: 1x*			
Toluene-d8 (Surr)			*104 %*		*80-120 %*				*"*			
4-Bromofluorobenzene (Surr)			*91 %*		*80-120 %*				*"*			

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

SAMPLE PREPARATION INFORMATION

Diesel and/or Oil Hydrocarbons by NWTPH-Dx

Prep: EPA 3510C (Fuels/Acid Ext.)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 21K0946							
A1K0890-01	Water	NWTPH-Dx	11/16/21 10:07	11/22/21 13:09	1060mL/5mL	1000mL/5mL	0.94
A1K0890-02	Water	NWTPH-Dx	11/16/21 11:12	11/22/21 13:09	1050mL/5mL	1000mL/5mL	0.95
A1K0890-03	Water	NWTPH-Dx	11/16/21 11:34	11/22/21 13:09	1050mL/5mL	1000mL/5mL	0.95
A1K0890-04	Water	NWTPH-Dx	11/16/21 11:34	11/22/21 13:09	1050mL/5mL	1000mL/5mL	0.95
A1K0890-05	Water	NWTPH-Dx	11/16/21 12:28	11/22/21 13:09	1040mL/5mL	1000mL/5mL	0.96
A1K0890-06	Water	NWTPH-Dx	11/16/21 12:57	11/22/21 13:09	1060mL/5mL	1000mL/5mL	0.94
A1K0890-07	Water	NWTPH-Dx	11/16/21 13:34	11/22/21 13:09	1060mL/5mL	1000mL/5mL	0.94
Batch: 21K1079							
A1K0890-08	Water	NWTPH-Dx	11/17/21 07:49	11/24/21 13:17	1060mL/5mL	1000mL/5mL	0.94
A1K0890-09	Water	NWTPH-Dx	11/17/21 08:46	11/24/21 13:17	1050mL/5mL	1000mL/5mL	0.95
A1K0890-10	Water	NWTPH-Dx	11/17/21 09:47	11/24/21 13:17	1060mL/5mL	1000mL/5mL	0.94
A1K0890-11	Water	NWTPH-Dx	11/17/21 10:26	11/24/21 13:17	1060mL/5mL	1000mL/5mL	0.94
A1K0890-12	Water	NWTPH-Dx	11/17/21 11:54	11/24/21 13:17	1060mL/5mL	1000mL/5mL	0.94
A1K0890-13	Water	NWTPH-Dx	11/17/21 12:32	11/24/21 13:17	1030mL/5mL	1000mL/5mL	0.97
A1K0890-14	Water	NWTPH-Dx	11/17/21 11:07	11/24/21 13:17	1060mL/5mL	1000mL/5mL	0.94

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 21K0848							
A1K0890-05	Water	NWTPH-Gx (MS)	11/16/21 12:28	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-06	Water	NWTPH-Gx (MS)	11/16/21 12:57	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-07	Water	NWTPH-Gx (MS)	11/16/21 13:34	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-08	Water	NWTPH-Gx (MS)	11/17/21 07:49	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-09	Water	NWTPH-Gx (MS)	11/17/21 08:46	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-10	Water	NWTPH-Gx (MS)	11/17/21 09:47	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-12	Water	NWTPH-Gx (MS)	11/17/21 11:54	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-14	Water	NWTPH-Gx (MS)	11/17/21 11:07	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
Batch: 21K0896							
A1K0890-01	Water	NWTPH-Gx (MS)	11/16/21 10:07	11/21/21 14:00	5mL/5mL	5mL/5mL	1.00
A1K0890-02	Water	NWTPH-Gx (MS)	11/16/21 11:12	11/21/21 14:00	5mL/5mL	5mL/5mL	1.00
Batch: 21K0914							
A1K0890-03RE1	Water	NWTPH-Gx (MS)	11/16/21 11:34	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00
A1K0890-04RE1	Water	NWTPH-Gx (MS)	11/16/21 11:34	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00

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ANALYTICAL REPORT

GeoEngineers	Project: Nustar-Vancouver Annex	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: 19001-008-03	Report ID:
Lake Oswego, OR 97035	Project Manager: Stephanie Bosze-Salisbury	A1K0890 - 12 01 21 1726

SAMPLE PREPARATION INFORMATION

Gasoline Range Hydrocarbons (Benzene through Naphthalene) by NWTPH-Gx

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
A1K0890-11RE1	Water	NWTPH-Gx (MS)	11/17/21 10:26	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00
A1K0890-13RE1	Water	NWTPH-Gx (MS)	11/17/21 12:32	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00

Selected Volatile Organic Compounds by EPA 8260D

Prep: EPA 5030B

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 21K0848							
A1K0890-03	Water	EPA 8260D	11/16/21 11:34	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-04	Water	EPA 8260D	11/16/21 11:34	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-05	Water	EPA 8260D	11/16/21 12:28	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-06	Water	EPA 8260D	11/16/21 12:57	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-07	Water	EPA 8260D	11/16/21 13:34	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-08	Water	EPA 8260D	11/17/21 07:49	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-09	Water	EPA 8260D	11/17/21 08:46	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-10	Water	EPA 8260D	11/17/21 09:47	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-11	Water	EPA 8260D	11/17/21 10:26	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-12	Water	EPA 8260D	11/17/21 11:54	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-13	Water	EPA 8260D	11/17/21 12:32	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
A1K0890-14	Water	EPA 8260D	11/17/21 11:07	11/19/21 09:55	5mL/5mL	5mL/5mL	1.00
Batch: 21K0896							
A1K0890-01	Water	EPA 8260D	11/16/21 10:07	11/21/21 14:00	5mL/5mL	5mL/5mL	1.00
A1K0890-02	Water	EPA 8260D	11/16/21 11:12	11/21/21 14:00	5mL/5mL	5mL/5mL	1.00
Batch: 21K0914							
A1K0890-03RE1	Water	EPA 8260D	11/16/21 11:34	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00
A1K0890-04RE1	Water	EPA 8260D	11/16/21 11:34	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00
A1K0890-11RE1	Water	EPA 8260D	11/17/21 10:26	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00
A1K0890-13RE1	Water	EPA 8260D	11/17/21 12:32	11/22/21 10:56	5mL/5mL	5mL/5mL	1.00

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ORELAP ID: **OR100062**

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

F-18	Result for Diesel (Diesel Range Organics, C12-C24) is due to overlap from Gasoline or a Gasoline Range product.
Q-01	Spike recovery and/or RPD is outside acceptance limits.
Q-19	Blank Spike Duplicate (BSD) sample analyzed in place of Matrix Spike/Duplicate samples due to limited sample amount available for analysis.
R-06	Reporting level raised due to possible carryover from a previous sample.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**

LABORATORY ACCREDITATION INFORMATION

ORELAP Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

Apex Laboratories

Darrell Auvil, Client Services Manager

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ANALYTICAL REPORT

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APEX LABS
6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

A1K0890
Lab # ~~A1K~~ HAS 11/18/21 COC 1 of 2

Company: Geo Engineers | Project Mgr: Stephanie Salisbury | Project Name: NuStar Vannex GWM 4Q21 | Project #: 19001-008-03
Address: | Phone: | Email: ssalisbury@geoengineers.com
Sampled by: A Weatherford
Site Location: OR (WA) CA AK ID ___

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TOTAL DISS. TCLP	TCLP Metals (8)	Naphthalene	MTBE						Hold Sample	Frozen Archive
MW-7	11/16	1007	W	5		✓	✓	✓												✓	✓							
MW-5D	↓	1112	↓	↓		↓	↓	↓												↓	↓							
MW-5		1134																										
MW-5 Dup		1134																										
MW-8		1228																										
MW-8D		1257																										
MW-9	↓	1334																										
MW-4	11/17	749																										
MW-3	↓	846																										
MW-1		947	↓	↓		↓	↓	↓												↓	↓							

(Standard Turn Around Time (TAT) = 10 Business Days) — circled

TAT Requested (circle): 1 Day 2 Day 3 Day 5 Day Standard Other: ______

SPECIAL INSTRUCTIONS:

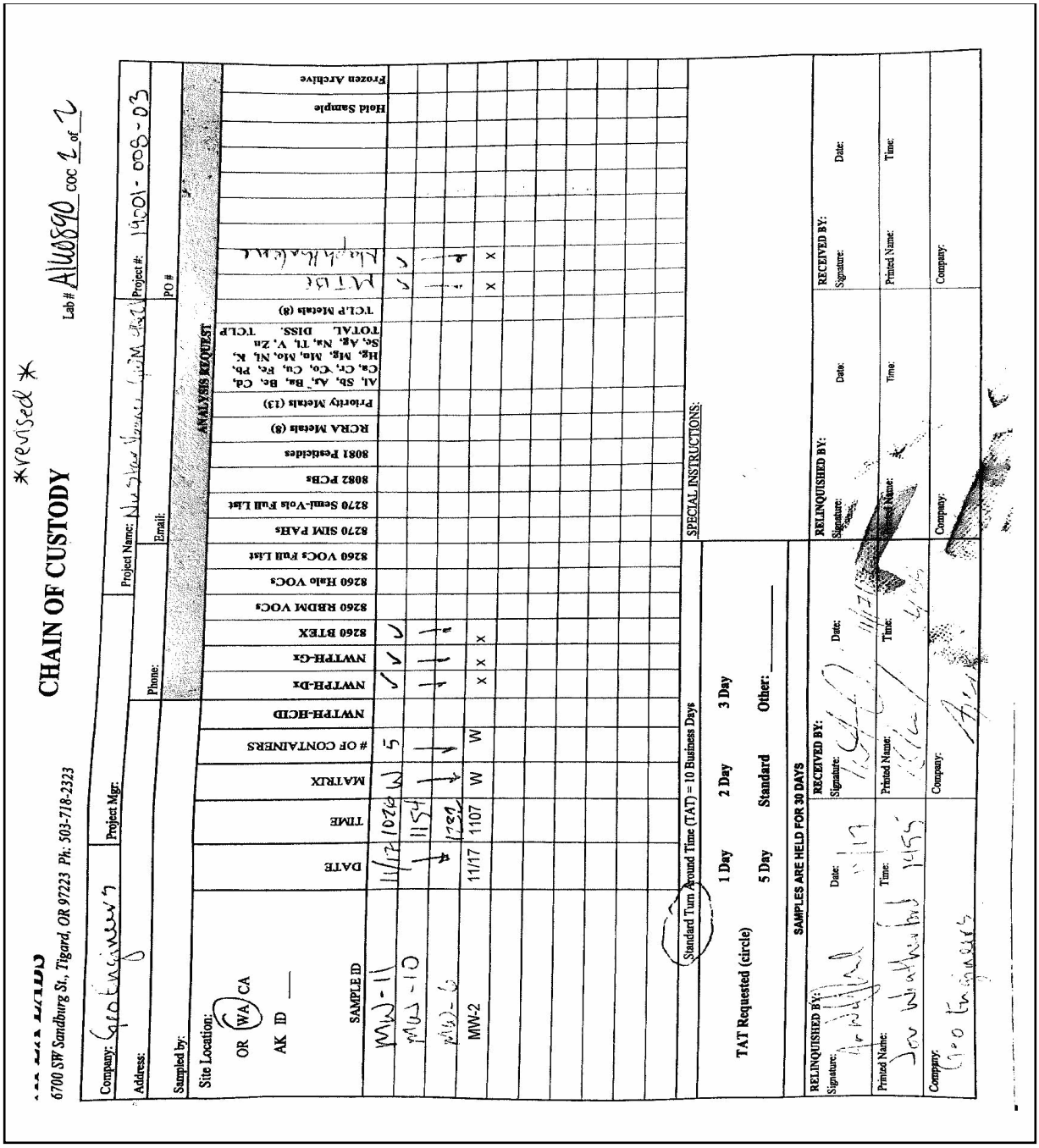
SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: [signature] Date: 11/17	Signature: [signature] Date: 11/17/21	Signature: Date:	Signature: Date:
Printed Name: Jon Weatherford Time: 1455	Printed Name: [signature] Time: 14:55	Printed Name: Time:	Printed Name: Time:
Company: Geo Engineers	Company: Apex	Company:	Company:

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
ORELAP ID: **OR100062**

ANALYTICAL REPORT

GeoEngineers	Project: **Nustar-Vancouver Annex**	
4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
Lake Oswego, OR 97035	Project Manager: **Stephanie Bosze-Salisbury**	**A1K0890 - 12 01 21 1726**



Apex Laboratories

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Darrell Auvil, Client Services Manager

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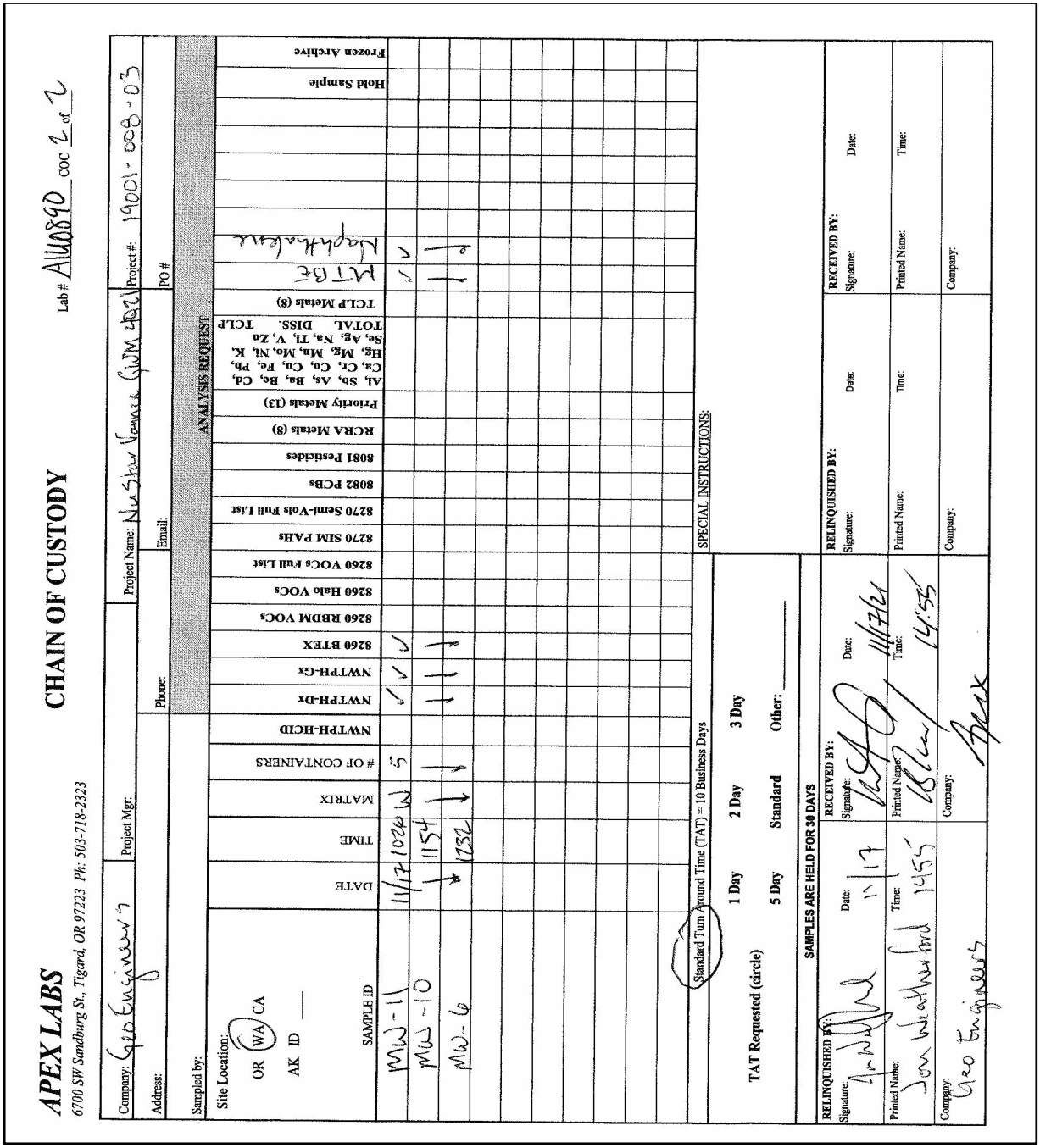

APEX LABS — 6700 SW Sandburg St., Tigard, OR 97223 Ph: 503-718-2323

CHAIN OF CUSTODY

Lab # A1K0890 COC 1 of 1

Company: GeoEngineers | Project Mgr: | Project Name: Nustar Vancouver CWM 2021 | Project #: 19001-008-03 | PO #

Address: | Phone: | Email:

Sampled by:

Site Location: OR (WA) CA AK ID ___

SAMPLE ID	DATE	TIME	MATRIX	# OF CONTAINERS	NWTPH-HCID	NWTPH-Dx	NWTPH-Gx	8260 BTEX	8260 RBDM VOCs	8260 Halo VOCs	8260 VOCs Full List	8270 SIM PAHs	8270 Semi-Vols Full List	8082 PCBs	8081 Pesticides	RCRA Metals (8)	Priority Metals (13)	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Hg, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Tl, V, Zn TCLP TOTAL DISS.	TCLP Metals (8)	MTBE	Naphthalene	Hold Sample	Frozen Archive
MW-11	11/17/2021	1024	W	5		✓	✓	✓												✓		
MW-10		1154		1		1	1	1												1		
MW-6		1332		1		1	1	1												1		

Standard Turn Around Time (TAT) = 10 Business Days

TAT Requested (circle): 1 Day | 2 Day | 3 Day | 5 Day | Standard | Other: ___

SPECIAL INSTRUCTIONS:

SAMPLES ARE HELD FOR 30 DAYS

RELINQUISHED BY:	Date:	Time:	RECEIVED BY:	Date:	Time:
Signature:			Signature:		
Printed Name:			Printed Name:		
Company:			Company:		
RELINQUISHED BY:	11/17	1455	RECEIVED BY:	11/17/21	14:55
Signature:			Signature:		
Printed Name:			Printed Name:		
Company:			Company:		

Apex Laboratories

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ANALYTICAL REPORT

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4000 Kruse Way Place, Bldg 3 Suite 200	Project Number: **19001-008-03**	**Report ID:**
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APEX LABS COOLER RECEIPT FORM

Client: GeoEngineers Element WO#: A1 K0890

Project/Project #: Nustar Vannex GWM 4Q21 | 19001-008-03

Delivery Info:

Date/time received: 11/17/21 @ 1455 By: URS

Delivered by: Apex____Client X ESS____FedEx____UPS____Swift____Senvoy____SDS____Other_____

Cooler Inspection Date/time inspected: 11/17/21 @ 1455 By: URS

Chain of Custody included? Yes X No _____ Custody seals? Yes_____ No X

Signed/dated by client? Yes X No _____

Signed/dated by Apex? Yes X No _____

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	4.0	1.1	4.8				
Received on ice? (Y/N)	Y	→	→				
Temp. blanks? (Y/N)	Y	→	→				
Ice type: (Gel/Real/Other)	real	→	→				
Condition:	good	→	→				

Cooler out of temp? (Y/(N)) Possible reason why:_____

Green dots applied to out of temperature samples? Yes/(No)

Out of temperature samples form initiated? Yes/(No)

Sample Inspection: Date/time inspected: 11/18/21 @ 1127 By: WAM

All samples intact? Yes X No ___ Comments:_____

Bottle labels/COCs agree? Yes ___ No X Comments: 3 Trip blanks provided but not listed on COC. TB #2981.

COC/container discrepancies form initiated? Yes ___ No X

Containers/volumes received appropriate for analysis? Yes X No ___ Comments: _____

Do VOA vials have visible headspace? Yes ___ No X NA ____

Comments_____

Water samples: pH checked: Yes X No___NA___ pH appropriate? Yes X No___NA____

Comments: _____

Additional information:_____

Labeled by: MAS Witness: [signature] Cooler Inspected by: WAM

GeoEngineers