Ohop Creek Stormwater Management Pilot Project

Water Year 2022 Monitoring

Prepared by Long Live the Kings
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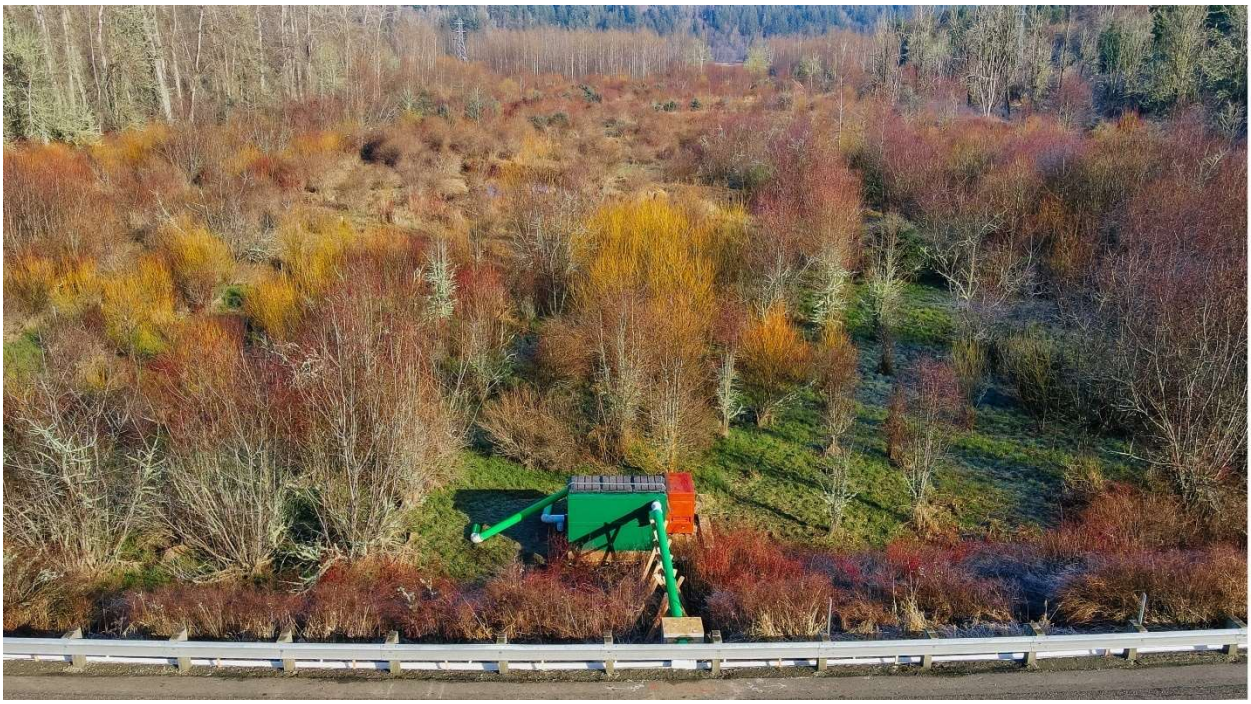

Figure 1. Aerial view of the project site looking north up the Ohop Valley from State Route 7.

Introduction

In 2022, Long Live the Kings and the Nisqually Indian Tribe partnered with Cedar Grove, Herrera Environmental Consultants (Herrera), Nisqually Land Trust, Washington State University Puyallup (WSU Puyallup), University of Washington Tacoma (UW Tacoma), Washington State Department of Transportation (WSDOT), and Fremont Analytical on the Ohop Creek Stormwater Management Pilot Project within the Nisqually watershed. This project is the first *in-situ* test of Cedar Grove's compost-based containerized mobile biofiltration system designed to capture and filter stormwater runoff from bridges, elevated roadways, and other structures. The system was installed along State Route 7 where it crosses Ohop Creek, a Nisqually River tributary, to filter vehicle-impacted stormwater from the adjacent roadway (Figure 1). The system is designed with a special "polishing layer" of media which captures excess phosphorus exported from the compost in the upstream primary media. The goals of the project were to:

- Test the effectiveness of Cedar Grove's biofiltration system at removing harmful contaminants.
- Evaluate the effectiveness of the secondary phosphorus polishing layer at removing excess phosphorus.
- Provide baseline data on whether Cedar Grove's biofiltration system with secondary phosphorus polishing layer could be a scalable, above-ground stormwater management option for other infrastructure projects in the region.
- Provide baseline data to assess whether the technology could serve as a regional stormwater management tool and would be recommended to move forwards through the Washington Department of Ecology's (Ecology) TAPE pilot implementation process.

Cedar Grove designed, built, and installed the stormwater treatment system used for this pilot project; Long Live the Kings served as project management and stormwater sampling lead; and Herrera was contracted to provide technical support and stormwater sampling installation services. The system was installed in January 2022 and samples were collected in April and May 2022.

This report provides a description of the biofiltration system and phosphorus polishing layer and then summarizes results from the water quality monitoring, toxicology screening, and 6PPD-Quinone testing.

Study Site: History

The project site is owned by the Nisqually Land Trust and is in the Nisqually Watershed, within Pierce County, along State Route 7 where it crosses over Ohop Creek. This project site is close to the town of Eatonville, Washington.

Ohop Creek is a major tributary to the Nisqually River and the third-largest tributary accessible to salmon in the watershed. In the late-1800s, European settlers converted the Ohop Valley to pastures and farm fields, turning Ohop Creek into a straight-flowing ditch to drain the valley for dairy farming, transforming the landscape, and devastating salmon and trout populations. Over the past 15 years, Ohop Creek and the Ohop Valley have undergone one of the largest stream restoration and salmon habitat recovery efforts in Washington State thanks to efforts by the Nisqually Land Trust and Nisqually Indian Tribe (NW Treaty Tribes 2006). During phase 1, completed in 2017, the Lower Ohop Creek Restoration Project re-meandered miles of creek, removed derelict structures and invasive plant species, installed large woody debris, and replanted the riparian area with 186,000 native trees and shrubs across 180 acres of floodplain. Phase 2 of the restoration project is ongoing. Currently, the Nisqually Indian Tribe and Nisqually Land Trust protect 947 acres of land in the valley and 10.75 miles of Ohop Creek shoreline (Nisqually Land Trust 2023).

Study Site: Road Conditions

For this pilot project, the stormwater management system was installed between two bridge crossings so that roadway runoff from approximately 530 linear feet or roughly 13,249 square feet of roadway surface was captured and directed to the stormwater management system (Figure 2). Currently, the study site does not have permanent stormwater best management practices in place resulting in roadway runoff seeping into the groundwater, and subsequently into Ohop Creek, threatening the health of the creek's local salmon populations.

Figure 2. Aerial view of vehicles headed eastbound on State Route 7 where it crosses over a side channel of Ohop Creek.

The Biofiltration System and Phosphorus Polishing Layer

Cedar Grove's modular vehicle-impacted stormwater technology (VIS System) is a containerized mobile system designed to filter stormwater pollution off vehicle impacted surfaces, including roads, bridges,

and parking structures. The VIS System is modeled around the proven success of in-ground bioretention systems but is designed to be mobile and used in-line with existing stormwater drainage infrastructure. This type of system is ideal when below ground systems are not suitable, such as the Ohop Valley. The VIS System has been approved by the Washington State Department of Ecology (Ecology) as functionally equivalent to a bioretention planter box. The pilot VIS System consisted of a primary media container followed by a phopshorus polishing layer container (Figure 3). It can be configured with the polishing layer integral to the primary container, but for the purposes of testing the polishing layer, it was located in a separate container. This configuration of compost-based bioretention media followed by a phosphorus polishing layer was originally used as a retrofit for the Swale on Yale Project by the City of Seattle and Herrera.

The box containing the bioretention soil media is non-pressurized and includes a secured lid to reduce exposure to the system being contaminated from outside sources. Inlet, outlet, and bypass pipes for the system are sized no smaller than the pipe being diverted into the system. A polypropylene mesh is used for false bottom media support as well as erosion minimization. The bioretention media porosity allows for water penetration without blinding out. Additionally, solids storage in the bottom of the system is a minimum of two inches to allow for media which has migrated through mesh to settle out without additional solids returning to the source storm drain.

The sizing calculations for the biofiltration and polishing layer containers were done by Landau Associates according to Ecology's 2019 Stormwater Management Manual for Western Washington and WSDOT's Highway Runoff Manual. Both containers have been sized to filter greater than 91.25% of the influent runoff. The biofiltration and polishing layer containers have a four-foot by eight-foot footprint; however, the biofiltration system container is 60 inches tall compared to the polishing layer container which is 12 inches tall (Figure 3).

The biofiltration system for this pilot project has a stormwater holding capacity of 3,840 cubic feet or 480 gallons. Even without taking filtration/infiltration into account, the holding capacity alone is capable of handling average daily stormwater runoff at the project site (based off Eatonville's average annual rainfall of 51.6 inches). If an excessive rain event were to occur and the media were to clog, the system contains an overflow bypass capable of allowing 100% of the inbound flow.

Figure 3. The complete biofiltration system setup facing south looking up at State Route 7.

The bioretention soil media used for this pilot project was provided by Cedar Grove and was

composed of roughly a 60/40 ratio of mineral aggregate to compost product. The compost meets the definition of "composted materials" in WAC 173-350-220 and is produced at a composting facility permitted by Ecology. The media used within this system has a saturated hydraulic conductivity of two to twelve inches per hour; based on laboratory testing, it typically performs at the higher side of the range. By using compost, this project aligns with Washington State House Bill 2713 which requires state agencies and local governments to consider whether compost products can be used in government-funded projects when planning or soliciting and reviewing bids. The secondary phosphorus polishing layer consisted of a mixture of sand (90-92%), alumina (6-7%), and iron (2-3%). This polishing layer formulation has been used in previous studies and has been shown to be effective (Herrera 2021).

Pilot Project Objectives

The project team had the following objectives to meet the pilot project goals:

- Collect flow-paced, automated water samples from three collection points (Figure 4) to perform water quality monitoring during three qualifying storm events.
- Compare influent concentrations and the midpoint concentrations across the three storm events for heavy metals, total suspended solids, nutrients, and 6PPD-quinone.
- Compare midpoint concentrations and effluent concentrations across the three storm events for total suspended solids, total phosphorus, and orthophosphate to assess the phosphorus polishing layer's effectiveness against the phosphorus treatment performance goals described in the 2018 TAPE guidance document.

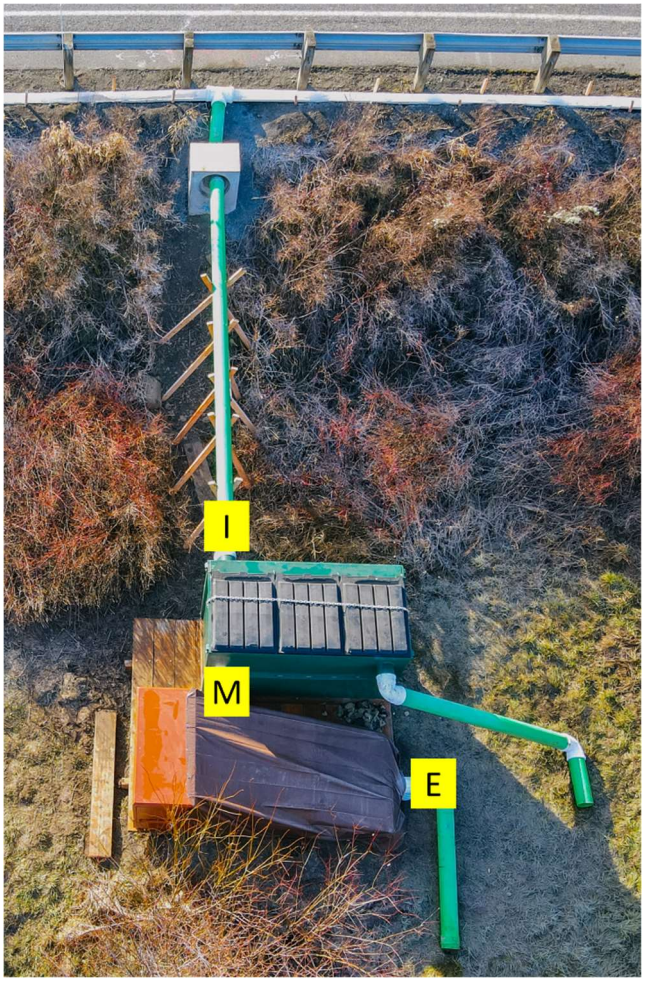

Figure 4. Aerial view of the full system before the stilling wells were installed illustrating the influent (I), midpoint (M), and effluent (E) sampling collection points.

Water Quality Monitoring

The Technology Assessment Protocol – Ecology (TAPE) program is a process established by Ecology to evaluate and certify emerging stormwater treatment technologies. Methods outlined in this investigation adhered to TAPE guidelines for sampling procedures as the established standard for testing a stormwater biofiltration device.

Ecology's TAPE program certifies a storm event as "qualified" to sample if rainfall exceeds 0.15 inches, lasts longer than 1 hour, and more than 10 aliquots, or subsamples, are collected per composite sample and those samples snap 75% or more of the storm hydrograph (Ecology 2018). Sampling events were selected to represent a range of conditions with respect to rainfall volume and intensity to ensure the representativeness of the data. Composite stormwater samples were collected from three qualifying storm events during the study period from April 5th, 2022, to May 7th, 2022. The total volume collected per storm event ranged from 20 aliquots, approximately 4 liters, to 101 aliquots, approximately 22 liters, per composite sample. Each aliquot was approximately 200mL. Automated flow-proportional composite sampling was employed to collect samples over the duration of a qualifying storm event and composite aliquots in proportion to flow (Ecology 2018). Stormwater was pumped from collection points along the system (Figure 4) to glass carboys seated within three ISCO automated sampling devices. The influent collection point was located after the roadway gutter and primary stilling well and prior to the biofiltration container. The middle collection point (midpoint) was located between the biofiltration container and prior to the external phosphorus polishing layer. The outlet collection point was downstream of the polishing layer and prior to the outflow weir.

On April 5th, 75 aliquots from the influent, 74 aliquots from the midpoint, and 74 aliquots from the effluent were collected during a storm totaling 1.19 inches of rain. On April 19th, 21 aliquots from the influent, 20 aliquots from the midpoint, and 20 aliquots from the effluent were collected during a storm totaling 0.26 inches of rain. On May 7th, 96 aliquots from the influent, 78 aliquots from the midpoint, and 79 aliquots from the effluent were collected during a storm totaling 0.78 inches of rain. The influent composite sample on May 7th collected 18 more aliquots than the midpoint and 17 more than the effluent due to rising water levels on the project site reaching the bypass weir and interfering with the calculation of influent stormwater volume. The water chemistry of each composite sample from May 7th was not compromised due to project site flooding. A summary of the three storm events is provided in Table 1. For additional information on the volumetric flow rate for each storm event, please review Appendix D.

Table 1. Sample collection information from the project's three qualifying storm events in 2022.

2022 Date	Rainfall (in)	Hydraulic Loading Rate (in/hr)	Influent Aliquots	Midpoint Aliquots	Effluent Aliquots
April 5	1.19	0.36	75	74	74
April 19	0.26	0.24	21	20	20
May 7	0.78	0.36	96	78	79

Pre-Storm Procedure

The biofiltration system and sampling equipment were primed in anticipation of a qualifying storm event to ensure the integrity of sample collection and water chemistry. Preparation involved both on-site inspection and calibration of equipment and remote programming of the datalogger. This project used a TE 525 rain gauge to monitor rainfall at the project site. The rain gauge provided estimates of storm duration along with the amount of rainfall to aid in remotely programming the samplers.

A field technician performed the following steps on-site in preparation for each storm:

1) Roadside gutter and primary stilling well inspected for debris or obstructions to flow.

2) External polishing layer inspected for debris or obstructions to flow.
3) Sample tubing intakes inspected, and influent, midpoint, and effluent collection wells cleared of sediment.
4) Influent, midpoint, and effluent sample tubing backflushed with 2 liters of deionized water.
5) Clean composite carboys labeled and inserted into each automated sampler.
6) Ice added to each automated sampler surrounding the composite carboy to preserve quality of water chemistry.
7) Automated samplers programed to sample upon pulse from datalogger.
8) Bypass and outflow weirs refilled and calibrated if needed.
9) Field form completed to document pre-storm conditions and procedure (Appendix A).

As a storm approached, the sample collection pacing was estimated based on the projected volume of water expected to pass through the biofiltration system. The first three storms after installation were not sampled and provided important data to calibrate the sampling equipment. A relationship between the rainfall depth and runoff volume was determined to estimate the total volume captured by the system of a forecasted storm event (Figure 5). Throughout the study period, additional rainfall and volume data was incorporated to improve the stormwater runoff volume projections. This regression enabled an estimation of the aliquot collection frequency as a function of volume passing through the system. The resulting pacing value (gallons per aliquot) was calculated based on dividing the total forecasted volume of filtered stormwater per storm event by 50 aliquots to be collected. The final number of collected aliquots for each composite sample varied from the targeted 50 due to discrepancies between forecasted rainfall and actual storm magnitude.

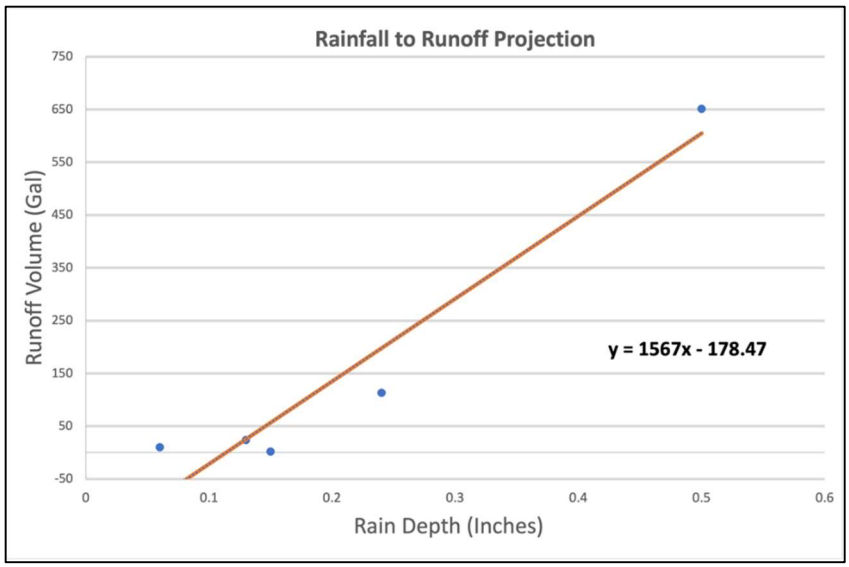

Figure 5. Regression generated to calculate total runoff volume through the biofiltration system based on rain depth at the project site.

Field staff measured flow rate from the bypass and outlet pipes for surface flow using two 8-inch Thel-mar volumetric pipe weirs, two Campbell Scientific CS-451L pressure transducers, a Campbell Scientific CR1000 datalogger, and a Campbell Scientific Cell-210 wireless modem. The datalogger was programmed to convert water level to flow using a weir equation. The datalogger also controlled the ISCO 6712 automated samplers. The effluent flow was used to pace the midpoint and outlet samplers, while a combination of the effluent and bypass flow was used to pace the inlet sampler.

During-Storm Procedure

After an aliquot pacing value was determined for an approaching storm event, the datalogger was programed to begin sampling once the water level behind the outlet weir rose above 0.05 feet. Upon

the onset of a storm event and rising outflow water level, the datalogger program would trigger the influent, midpoint, and effluent automated samplers once each time a volume of water equal to the pacing value passed through the biofiltration system. The field technician monitored the storm forecast and rate of aliquot collection during the beginning of each storm to adjust the pacing value if necessary. The storm event's sample collection would cease once fewer than 0.04 inches rainfall was recorded during a 6-hour interval or once 100 aliquots were collected. The datalogger program sent notifications upon sampling termination indicating a successful storm event and the composite samples were ready for pick-up.

Post-Storm Procedure

A field technician returned to the project site soon after each qualifying storm to collect the composite samples with consideration of the 48-hour hold time per the project guidelines. A field form was completed to document post-storm conditions and procedures (Appendix A). The composite sample carboys were transported in tote bins with ice to Fremont Analytical in Seattle, WA for processing and analysis. A chain of custody form was completed upon relinquishing the composite samples to the laboratory.

Laboratory Procedure

The three composite samples (influent, midpoint, effluent) were subdivided for water chemistry and toxicology analyses by two additional laboratories. Fremont Analytical split each composite sample based on instructions provided by Long Live the Kings (Appendix B). Fremont Analytical split two to three replicate samples (dependent upon available volume) of 125mL from the influent and outlet composite samples into separate 250 mL glass jars for WSU Puyallup to perform toxicology testing. Fremont Analytical split a single 1-2L sample from the influent, midpoint, and effluent composite samples into glass jars for analysis by UW Tacoma's research lab at the Center for Urban Waters to test for concentrations of 6PPD-quinone. Each laboratory was notified once the split samples were available for subsequent analyses.

Fremont Analytical Methods

Fremont Analytical performed the water chemistry analyses on the three composite stormwater samples for each of the storm events (Table 2). This company is an accredited laboratory that accepts commercial and public samples, and their accreditation number is C910-20b and their EPA ID number is WA01224.

For the water chemistry analyses, matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

Table 2. Summary of the measurement methods employed by Fremont Analytical.

Analyte	Reporting Limit	Analytical Method
Total Phosphorus	0.250 mg/L	EPA 365.3
Orthophosphate	0.525 mg/L	EPA 300.0

Analyte	Reporting Limit	Analytical Method
Total Phosphorus	0.250 mg/L	EPA 365.3
Nitrate + Nitrite	0.100 mg/L	EPA 300.0
Copper	2.00 µg/L	EPA 200.8
Zinc	2.50 µg/L	EPA 200.8
Ammonia	0.100 mg/L	SM 4500 NH3G
Dissolved Organic Carbon	0.500 mg/L	SM 5310C
Total Suspended Solids	3.00 mg/L	SM 2540D

Washington State University Methods

Dr. Jenifer McIntyre's aquatic toxicology laboratory at WSU's Puyallup Research & Extension Center (PREC) conducted zebrafish bioassays using project samples of roadway runoff influent to the VIS System and filtered runoff effluent. Zebrafish embryo testing is a rapid screening tool for assessing the 'biological effectiveness' of the biofiltration system. Prior research had documented the effect runoff can have on fish embryos—namely altering overall size, affecting eye development, and causing cardiovascular damage—and the toxicity reduction that bioretention treatment could provide to aquatic organisms. The goal of the current toxicology testing was to evaluate the VIS treatment system.

Once WSU PREC received the water samples from Fremont Analytical for the three dates, the samples were frozen (-20°C) in amber glass bottles until thawed for toxicology testing. Test solutions were influent, effluent, and a clean water (laboratory) control. Generated embryos from wild AB-type adult zebrafish (*Danio rerio*) were sorted for health and developmental stage within 4 hours of fertilization (hpf). Embryos used for morphometric assays were placed in individual wells of a glass-coated 96-well plate with 300 µL of solution. Individuals (n=32) were used as replicates. After 48 h at 28°C, embryos were manually dechorionated and embedded in 3% methylcellulose for digital imaging. Morphometrics were only conducted for one sampling date (Storm 2) whereas molecular assays were conducted for each of the three dates.

Healthy embryos (n=30 per replicate) for molecular assays were placed in glass petri dishes and exposed to 15 mL of test solution for 48 h at 28°C. Four replicates were used per test solution. Frozen zebrafish embryos from 48 h exposures were homogenized in TRIzol™ reagent (5% embryos in Trizol v/v; Invitrogen™) and BCP (1-Bromo-3-chloropropane, Sigma Aldrich) was added at a ratio of 1:10 BCP: TRIzol™ and samples were centrifuged (at 4°C) for 15 minutes at 12,000 rcf. The aqueous phase containing RNA was transferred to 95% ethanol for RNA purification using a Zymo Direct-zol RNA miniprep kit (Zymo Research), including a DNA treatment step with DNAase I. RNA concentration (ng/µg L) and quality was quantified using an N60 Implen NanoPhotometer®. First strand cDNA was synthesized via reverse transcription from 2 µg RNA using Superscript IV VILO Master Mix (Invitrogen™).

Quantitative Polymerase Chain Reaction (RT-qPCR) was carried out in duplicate 10 µL reactions using PowerTrack SYBR Green reagent (Applied Biosystems, Inc.), 10 ng of template cDNA, and 500 nM gene-specific primers on a QuantStudio5 Real-time PCR System (Applied Biosystems, Inc.) under fast cycling conditions. To verify single product amplification was verified with dissociation curves and standard curves for each primer estimated amplification efficiency. Expression of four stable references genes was used to normalize *cyp1a* expression.

University of Washington Tacoma Methods

Ed Kolodziej's laboratory at UW Tacoma performed 6PPD-quinone testing on samples from the inlet, midpoint, and outlet. Once Fremont Analytical split the composite samples, a laboratory technician from UW Tacoma picked up the samples. Typically, UW Tacoma follows a 24-hour hold time; however, for this project glass was used to hold samples instead of polyethylene and the hold time was between 48-72 hours. Below is a summary of their laboratory procedures.

1. Water samples from the inlet, midpoint, and outlet were split into 200 mL duplicates and were spiked with D_5-6PPD-quinone (50 µL of 100 ng/ml)
2. 200 mL duplicates of a Method Blank of Ultrapure DI Water were spiked with D_5-6PPD-quinone (50 µL of 100 ng/ml)
3. 200 mL Spike and Recovery were spiked with D_5-6PPD-quinone (50 µL of 100 ng/ml) and 6PPD (25µL of 1000 µg/L)
4. Conditioned a cartridge for each sample with 10 mL of methanol and 25 mL of DI water for a Solid Phase Extraction
5. Once samples were done being extracted, each cartridge was washed with 10 mL of DI water and then eluted with 10 mL methanol into TurboVap tubes
6. Each sample was blown down with nitrogen until 1 mL remained
7. Samples were transferred into 2 mL amber vials for QQQ analysis

Results

This section presents the results from the water quality monitoring, toxicology screening, and 6PPD-quinone testing. Supporting information is provided in the following appendices to this document:

- Appendix A: field forms
- Appendix B: laboratory splitting instructions
- Appendix C: laboratory reports

Water Quality Data

This section presents the results from the water quality monitoring at the project site during the three storm events that were sampled. Though results for all the monitored parameters are provided in the laboratory reports in Appendix C, the discussion is only focused on the following priority parameters: total suspended solids, total phosphorus, orthophosphate, nitrate plus nitrite, dissolved organic carbon, copper, and zinc.

The primary goal of this study was to test the effectiveness of Cedar Grove's biofiltration container at removing harmful contaminants that can impact salmon health, as well as test the effectiveness of the secondary phosphorus polishing layer at removing excess nutrients. Table 3 presents the average parameter concentrations from each sampling collection point as well as the percent reduction efficiencies for the three storm events.

Table 3. Average concentrations for select parameters at each sampling collection point as well as the reduction efficiency for the biofiltration container, phosphorus polishing layer, and the entire system.

Parameter [a]	Influent Average	Midpoint Average	Effluent Average	Biofiltration % Reduction Efficiency	Polishing % Reduction Efficiency	System % Reduction Efficiency
Zinc, Total	41.7	9.5	9.9	75%	-4.6%	73%

Copper, Total	5.4	5.9	5.5	-27%	6.9%	-17%
Dissolved Organic Carbon (DOC)	2.6	9.1	8.8	-313%	2.9%	-299%
Total Suspended Solids (TSS)	**20.3**	**14.3**	**11.7**	-1%	18.6%	22%
Phosphorus, Total (TP)	0.25 U	0.66	0.60	-162%	**8.0%**	-141%
Orthophosphate, Total	0.43	0.72	0.60	-113%	**15.8%**	-68%
Nitrate + Nitrite (N+N)	0.10 U	2.12	2.58	-2,022%	-21.4%	-2,475%

[a] Note all concentration units are in mg/L except for metals which are in µg/L.
U = value is at or below the laboratory reporting limit
Negative values indicate export rather than removal
Bold black text indicates performance meets TAPE standards (Ecology 2018).
Bold red text indicates performance does not meet TAPE standards (Ecology 2018).

Influent average concentrations represent the untreated stormwater, midpoint average concentrations represent the stormwater that has gone through the biofiltration container, and effluent average concentrations represent the stormwater that has gone through the biofiltration container and the secondary phosphorus polishing layer. Biofiltration percentage reduction efficiencies are based on the influent and midpoint concentrations, the polishing percentage reduction efficiencies are based on the midpoint and effluent concentrations, and the system percentage reduction efficiencies are based on the influent and effluent concentrations.

The biofiltration container displayed an average total zinc removal efficiency of 75% compared to the untreated stormwater, as well as an average increase in dissolved organic carbon by 313%. An increase in dissolved organic carbon (DOC) is beneficial because it decreases the toxicity of the water and is linked to an increase in copper export. Total copper increased by an average of 27%. This occurs because the dissolved organic carbon binds with the copper ions and the chelated compounds are subsequently flushed from the media. Fortunately, the exported copper is not bioavailable to aquatic species because it is bound to the DOC. Influent concentrations for total suspended solids were low but within the TAPE criteria (20-100 mg/L) with an effluent concentration of less than 20 mg/L. There was an anticipated increase in nutrient export coming from the biofiltration container. Flushing of nutrients from the compost-based media occurred during the first few months after the system was installed because we saw higher concentrations of nitrate and nitrite during the first rain event we sampled, compared to the latter two (Figure 6). The average total phosphorus concentration of the untreated stormwater was 0.25 mg/L compared to 0.66 mg/L after the biofiltration system. Additionally, the average nitrate+nitrite concentration of the untreated stormwater was 0.1 mg/L compared to 2.12 mg/L after the biofiltration system. Due to Fremont Analytical' s high detection limits, influent concentrations for nutrients may have been lower than what was reported (see Tables 2 and 3). This suggests that the biofiltration container may have released higher amounts of nutrients on a percentage basis than was reported by the laboratory.

An increase in phosphorus from the biofiltration container was anticipated and is the main reason we added the secondary phosphorus polishing layer. The increase in total phosphorus from the biofiltration container was reduced an average of 8% by the polishing layer, with an average effluent concentration 0.60 mg/L. Additionally, orthophosphate was reduced an average of 15.8% from the midpoint to the outlet. Even though total phosphorus and orthophosphate concentrations were reduced from the midpoint to the outlet, effluent concentrations were not low enough to meet TAPE standards when compared with the influent concentrations. By adjusting the ratios of sand, alumina, and iron as well as adding a lid to the polishing container, it is likely that the secondary system would be more effective at

reducing most if not all the phosphorus that is released from the compost-based media. Additionally, nitrate+nitrite concentrations increased after the polishing layer with an average effluent concentration of 2.58 mg/L. An increase in nitrate+nitrite has been observed in other studies that used the same ratios for the polishing layer (Herrera 2021).

Toxicology Screening

Project samples were analyzed by WSU PREC for toxicity to fish early life stages using embryos of zebrafish (*Danio rerio*). Gene expression of *cyp1a*—a biomarker of exposure to many aromatic chemicals—as well as embryo morphometrics were used to assess the biological effectiveness of treatment by the biofiltration system.

Figure 6 highlights the qualitative results garnered in the analysis. As you can see in the picture, the influent water contained small black particles—likely from tires—whereas the effluent samples had a faint brown color and contained small brown particles—likely organic matter.

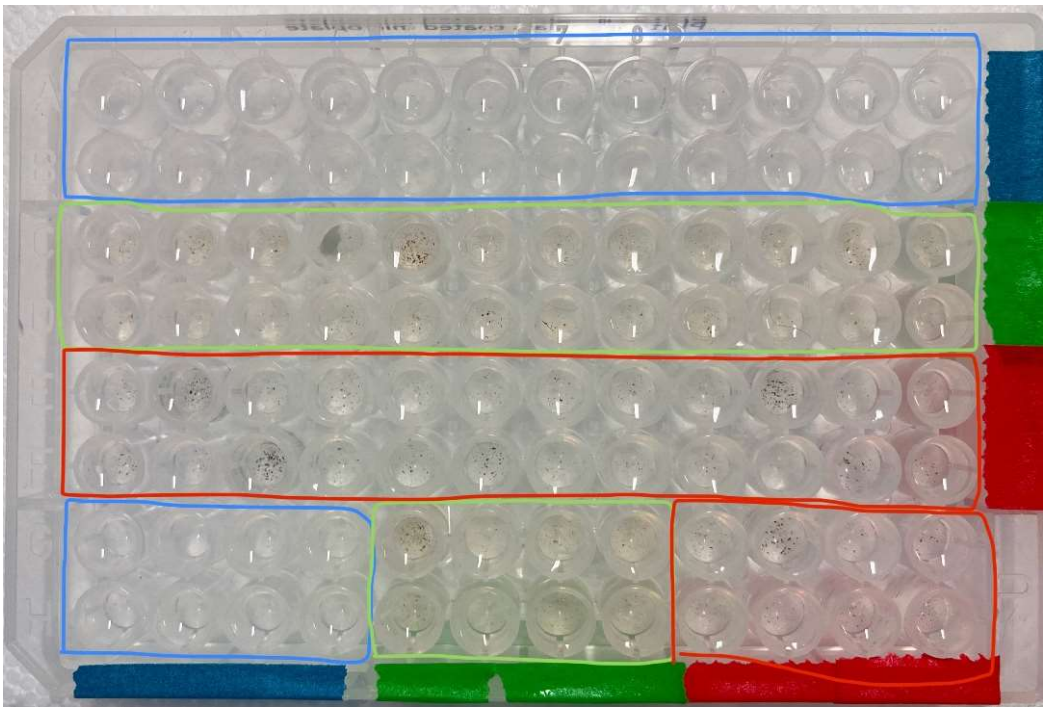

Figure 6. Photograph of the exposure plate for zebrafish embryos showing wells containing control water (blue), effluent (green), or influent runoff (red).

The survival and hatch rate of embryos showed minimal effects from the biofiltration treatment system when compared to the clean water control or runoff influent, as embryo survival was high in all treatments (>95%) although hatch rate was twice as high in the laboratory control treatment (25%) as in the influent and filtered effluent treatments (12.5%). Among the target parameters—relative embryo length, eye size, and pericardial area—the filtered effluent from the biofiltration system prevented an impact for two out of the three parameters. Whereas the influent project samples significantly impacted zebrafish embryo development causing longer embryos (2% longer than control and filtered samples), smaller eyes, and larger pericardial areas (Figure 7), the biofiltration system effluent produced embryos that were similar to the clean water control for length and enlargement of their pericardial area.

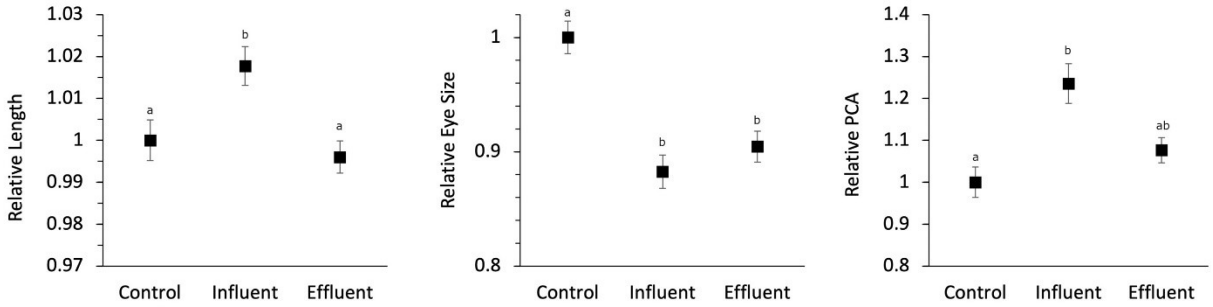

Figure 7. Zebrafish embryo morphometrics after 48-h of development in clean laboratory control water, roadway runoff (influent to VIS treatment system), or filtered effluent. Metrics are relative to the average of the control values ± SD. Treatments sharing a letter are not statistically different.

Additionally, when looking at the induction of *cyp1a*—a molecular indicator of exposure to aromatic contaminants in the bodies of most animals—the biofiltration system provided good reduction. The analysis saw a significant induction (upregulated gene expression) of *cyp1a* (> 6-fold) in runoff-exposed embryos compared with controls, highlighted in Figure 8. While effluent still caused induction, the degree (< 2-fold above controls) was very significantly reduced compared with influent runoff.

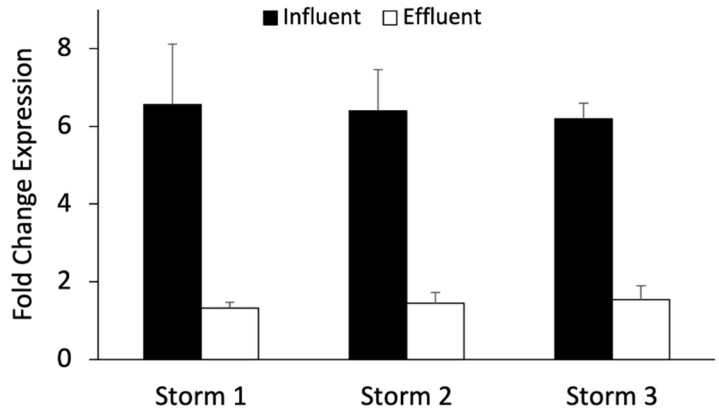

Figure 8. Expression of cyp1a relative to controls for runoff influent and filtered effluent of the VIS system from three storm events. Values are mean ± SD. Expression in effluent was significantly elevated above controls, although greatly reduced compared with influent.

6PPD-Quinone Testing

The University of Washington Tacoma (UW Tacoma) analyzed the project samples for 6PPD-quinone, an ozonated byproduct of a plasticizer used in automobile tires, from two of the three storm events. Due to a prolonged holding time for the May 7 storm event, UW Tacoma was not able to include it in their analyses. Preliminary results from the two events indicate that the biofiltration system has an average reduction efficiency of 92.5% for 6PPD-quinone (Figure 9, Table 4).

Table 4. Results for 6PPD-quinone testing from each sampling collection point.

2022 Date	Influent Concentration [a]	Midpoint Concentration	Effluent Concentration	% Reduction Efficiency
April 5	84	5.9	7.8	91%
April 19	159	10	10	94%
Average	**121.5**	**7.95**	**8.9**	**92.5%**

Note all concentration units are in ng/L.

[a] The LC50 acute toxicity level for coho salmon is currently estimated at 100 ng/L.

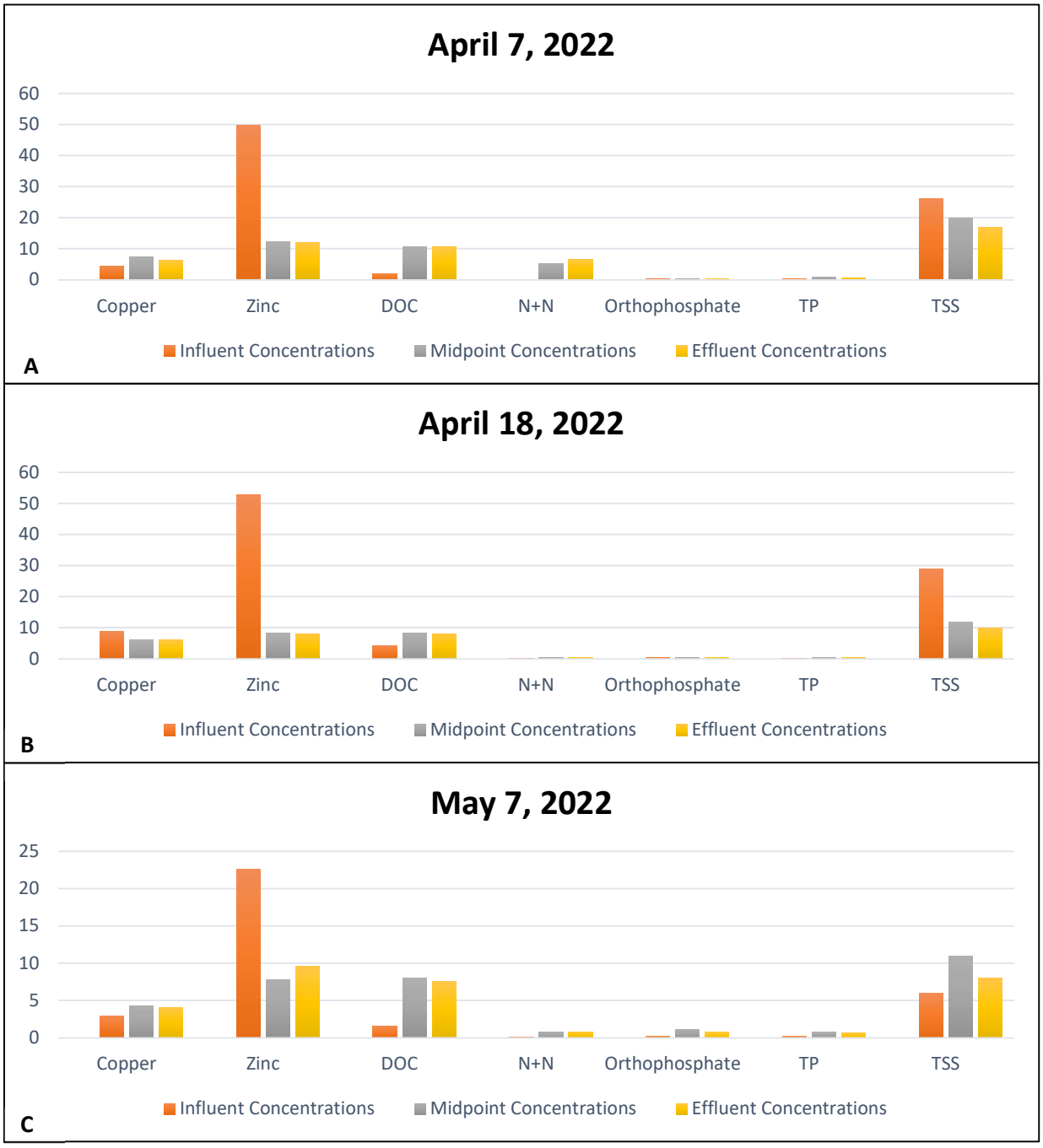

Figure 9. Water quality data results for the three storm events; all concentration units are in mg/L except for metals which are in µg/L.

Discussion

This pilot project highlighted that addressing stormwater runoff near coho bearing streams is essential in our region's efforts to recover salmon populations, especially in urban watersheds. Overall, we were successful in gathering baseline data, which suggests that additional water quality monitoring is needed to increase our sample size and improve our accuracy in assessing the biofiltration container and phosphorus polishing layer's effectiveness.

Despite the small sample size, preliminary results suggest this stormwater management system is a promising technology for the removal of 6PPD-quinone—with removal efficiencies that far exceed those seen for the other parameters tested. Based on the results of the water quality data, this stormwater biofiltration system has the potential to significantly reduce toxic stormwater runoff, and with a few adjustments, excess nutrients. In addition, the toxicology results support that the biofiltration treatment system shows promise as a solution for treating large quantities of roadway runoff before they enter receiving waters.

Moving forward, we will be using an accredited laboratory that has detection limits that align with the requirements in the TAPE guidance document. Additional water quality monitoring will provide the project team with enough data to determine whether this technology can move forward with the TAPE process at this project site. Additional testing with a reformulated polishing layer may produce results which indicate phosphorus removal instead of export. The project team that contributed to this project and its results look forward to expanding upon these findings once funding is secured for future sampling of qualifying storm events.

Acknowledgements

This project would not have been possible without the collaboration and support of all its project partners. We acknowledge the following individuals and organizations for their contributions to the success of this project:

Thank you to the Nisqually Land Trust for so generously agreeing to host the project on their property. From Cedar Grove, we thank Chris Cunningham and Karen Dawson (formerly Cedar Grove). From Herrera, we thank Dylan Ahearn. A special thank you to our volunteer engineer, Eric Abbott with MacKay Sposito. From the Nisqually Indian Tribe, we thank Chris Ellings and David Troutt. From WSDOT, we thank Robert Bailey, Andy Larson, Alex Nguyen, Jeff Sawyer, and Jana Crawford (formerly WSDOT). From WSU, we thank Jen McIntyre. From UW Tacoma, we thank Craig Rideout and Ed Kolodziej. From Long Live the Kings, we thank Ashley Bagley, Emily McCartan, and Jack McDermott.

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Appendix A

Field Forms

FIELD LOG SHEET

Project Name: **Ohop Stormwater Pilot Project**	**Project #:**
Site Location: Ohop Creek	**Sampling Event #: 1**
Site ID: OHOP	

Pre-Storm Visit

Date:	Time	Field Staff:	Weather:
4/01/2022	3:48PM	Jack McDermott – LLTK	80% Cloudy, no precip

Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Gutter system & weirs, inspected unobstructed?	☒	Polishing layer inspected and unobstructed?	☒		☐
		Bypass Level Calibrated?	☐	Outflow Level Calibrated?	☐
Intake Checked?	☒	Intake Checked?	☒	Intake Checked?	☒
Sample Line Rinsed?	☒	Sample Line Rinsed?	☒	Sample Line Rinsed?	☒
Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒
Tubing Connected?	☒	Tubing Connected?	☒	Tubing Connected?	☒
Ice in sampler?	☒	Ice in sampler?	☒	Ice in sampler?	☒
Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒
Sampler intakes inspected?	☒	*Sampler intakes inspected?*	☒	*Sampler intakes inspected?*	☒
Flow Conditions:	*Rise* ☐	Flow Conditions:	*Rise* ☐	Flow Conditions:	*Rise* ☐
	Peak ☐		*Peak* ☐		*Peak* ☐
	Fall ☐		*Fall* ☐		*Fall* ☐
	None ☒		*None* ☒		*None* ☒

Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)

Outfall intake filled with sediment, flushed line.

Station Name: OHOP-RG	
Rain Gauge Level?	☒
Rain Gauge Unobstructed?	☒

Post-Storm Visit					
Date: 4/5/2022	Time 9:35AM	Field Staff: Jack McDermott – LLTK		Weather: 20% cloudy, no precip	
Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Sample #	75	Sample #	74	Sample #	74
Date/Time End:	4/5 6:00 AM	Date/Time End:	4/5 6:00 AM	Date/Time End:	4/5 6:00 AM
Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*
Est. Sample Vol (L):	*4 gal (18.18L)*	Est. Sample Vol (L):	*4 gal (18.18L)*	Est. Sample Vol (L):	*4 gal (18.18L)*
Visual Condition:	*Clear (least turbid)*	Visual Condition:	*Brown (Turbid)*	Visual Condition:	*Brown (Turbid)*
Brought to Lab?	☒	Brought to Lab?	☒	Brought to Lab?	☒
Flow Conditions:	*Rise*	☐			
	Peak	☐			
	Fall	☒			
	None	☐			
Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)				**Station Name: OHOP -RG**	
				Rain Gauge Level?	☒
				Rain Gauge Unobstructed?	☒

Maintenance Visit					
Date: Click or tap here to enter text.	**Time** Click or tap here to enter text.	**Field Staff:** Click or tap here to enter text.	**Weather:** Click or tap here to enter text.		
Station Name: OHOP- In		**Station Name: OHOP-Mid**		**Station Name: OHOP- Out**	
Primary Device Level:	☐	Primary Device Level:	☐	Primary Device Level:	☐
Intake Checked?	☐	Intake Checked?	☐	Intake Checked?	☐
Desiccant Dry?	☐	Desiccant Dry?	☐	Desiccant Dry?	☐
Sample Line Rinsed?	☐	Sample Line Rinsed?	☐	Sample Line Rinsed?	☐

Flow Conditions:		
	Rise	☐
	Peak	☐
	Fall	☐
	None	☐

Inflow Valve Adjusted?
Click or tap here to enter text.

Notes/Visual: (if 'no' to any questions above, explain why and what remedial actions taken)
Click or tap here to enter text.

Station Name: OHOP-RG	
Rain Gauge Level?	☐
Rain Gauge Unobstructed?	☐
Rain Gauge Calibrated?	☐

FIELD LOG SHEET

Project Name: **Ohop Stormwater Pilot Project**	**Project #:**
Site Location: Ohop Creek	**Sampling Event #: 2**
Site ID: OHOP	

Pre-Storm Visit

Date:	Time	Field Staff:	Weather:
4/15/2022	5:58PM	Jack McDermott – LLTK	50% Sun – No precip

Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Gutter system & weirs, inspected unobstructed?	☒	Polishing layer inspected and unobstructed?	☒		☐
		Bypass Level Calibrated?	☒	Outflow Level Calibrated?	☐
Intake Checked?	☒	Intake Checked?	☒	Intake Checked?	☒
Sample Line Rinsed?	☒	Sample Line Rinsed?	☒	Sample Line Rinsed?	☒
Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒
Tubing Connected?	☒	Tubing Connected?	☒	Tubing Connected?	☒
Ice in sampler?	☒	Ice in sampler?	☒	Ice in sampler?	☒
Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒
Sampler intakes inspected?	☒	*Sampler intakes inspected?*	☒	*Sampler intakes inspected?*	☒
Flow Conditions:	*Rise* ☐	Flow Conditions:	*Rise* ☐	Flow Conditions: Very Low	*Rise* ☐
	Peak ☐		*Peak* ☐		*Peak* ☐
	Fall ☐		*Fall* ☐		*Fall* ☒
	None ☒		*None* ☒		*None* ☒

Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)

Refilled BP – no calibration needed.

Station Name: OHOP-RG	
Rain Gauge Level?	☒
Rain Gauge Unobstructed?	☒

Post-Storm Visit					
Date: 4/19/2022	Time 11:56AM	Field Staff: Jack McDermott – LLTK		Weather: 90% cloudy – 0 precip	
Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Sample #	21	Sample #	20	Sample #	20
Date/Time End:	4/19 1:07AM	Date/Time End:	4/19 1:07AM	Date/Time End:	4/19 1:07AM
Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*
Est. Sample Vol (L):	*4L*	Est. Sample Vol (L):	*4L*	Est. Sample Vol (L):	*4L*
Visual Condition:	*Lightly turbid*	Visual Condition:	*Turbid, brown*	Visual Condition:	*Turbid, brown*
Brought to Lab?	☒	Brought to Lab?	☒	Brought to Lab?	☒
Flow Conditions:	*Rise*	☐			
	Peak	☐			
	Fall	☒			
	None	☐			

Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)	**Station Name: OHOP -RG**	
Slim to no outflow.	Rain Gauge Level?	☒
	Rain Gauge Unobstructed?	☒

Maintenance Visit					
Date: Click or tap here to enter text.	**Time** Click or tap here to enter text.	**Field Staff:** Click or tap here to enter text.	**Weather:** Click or tap here to enter text.		
Station Name: OHOP- In		**Station Name: OHOP-Mid**		**Station Name: OHOP- Out**	
Primary Device Level:	☐	Primary Device Level:	☐	Primary Device Level:	☐
Intake Checked?	☐	Intake Checked?	☐	Intake Checked?	☐
Desiccant Dry?	☐	Desiccant Dry?	☐	Desiccant Dry?	☐
Sample Line Rinsed?	☐	Sample Line Rinsed?	☐	Sample Line Rinsed?	☐

Flow Conditions:		
	Rise	☐
	Peak	☐
	Fall	☐
	None	☐

Inflow Valve Adjusted?
Click or tap here to enter text.

Notes/Visual: (if 'no' to any questions above, explain why and what remedial actions taken)
Click or tap here to enter text.

Station Name: OHOP-RG	
Rain Gauge Level?	☐
Rain Gauge Unobstructed?	☐
Rain Gauge Calibrated?	☐

FIELD LOG SHEET

Project Name: **Ohop Stormwater Pilot Project**	**Project #:**
Site Location: Ohop Creek	**Sampling Event #: 3**
Site ID: OHOP	

Pre-Storm Visit

Date:	Time	Field Staff:	Weather:
5/4/2022	4:30PM	Jack McDermott – LLTK	60% Cloudy – No precip

Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Gutter system & weirs, inspected unobstructed?	☒	Polishing layer inspected and unobstructed?	☒		☐
		Bypass Level Calibrated?	☐	Outflow Level Calibrated?	☐
Intake Checked?	☒	Intake Checked?	☒	Intake Checked?	☒
Sample Line Rinsed?	☐	Sample Line Rinsed?	☐	Sample Line Rinsed?	☐
Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒	Clean Bottle? *(Tubes in bottle)*	☒
Tubing Connected?	☒	Tubing Connected?	☒	Tubing Connected?	☒
Ice in sampler?	☒	Ice in sampler?	☒	Ice in sampler?	☒
Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒	Program Started? *(Sample 1 after 1)*	☒
Sampler intakes inspected?	☒	*Sampler intakes inspected?*	☒	*Sampler intakes inspected?*	☒
Flow Conditions:	*Rise* ☐	Flow Conditions:	*Rise* ☐	Flow Conditions: Very Low	*Rise* ☐
	Peak ☐		*Peak* ☐		*Peak* ☐
	Fall ☐		*Fall* ☐		*Fall* ☒
	None ☒		*None* ☒		*None* ☒

Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)

Sample lines rinsed last week

Station Name: OHOP-RG	
Rain Gauge Level?	☒
Rain Gauge Unobstructed?	☒

Post-Storm Visit					
Date: 5/9/2022	Time 10:37AM	Field Staff: Jack McDermott – LLTK		Weather: 50% sun – 0% precip	
Station Name: OHOP-In		**Station Name: OHOP-Mid**		**Station Name: OHOP-Out**	
Sample #	101	Sample #	80	Sample #	81
Date/Time End:	5/7 10:50AM	Date/Time End:	5/7 10:50AM	Date/Time End:	5/7 10:50AM
Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*	Sampled Without Error?	*Yes*
Est. Sample Vol (L):	*22L*	Est. Sample Vol (L):	*14L*	Est. Sample Vol (L):	*15L*
Visual Condition:	*Clear*	Visual Condition:	*Opaque, turbid*	Visual Condition:	*Opaque, turbid*
Brought to Lab?	☒	Brought to Lab?	☒	Brought to Lab?	☒
Flow Conditions:	*Rise*	☐			
	Peak	☐			
	Fall	☒			
	None	☐			

Notes/Visual Conditions: (if 'no' to any questions above, explain why and remedial actions taken)	**Station Name: OHOP -RG**	
Site flooded (~6in water on ground), intake sampled more with bypass level increased from flooding.	Rain Gauge Level?	☒
	Rain Gauge Unobstructed?	☒

Maintenance Visit					
Date: Click or tap here to enter text.	**Time** Click or tap here to enter text.	**Field Staff:** Click or tap here to enter text.		**Weather:** Click or tap here to enter text.	
Station Name: OHOP- In		**Station Name: OHOP-Mid**		**Station Name: OHOP- Out**	
Primary Device Level:	☐	Primary Device Level:	☐	Primary Device Level:	☐
Intake Checked?	☐	Intake Checked?	☐	Intake Checked?	☐
Desiccant Dry?	☐	Desiccant Dry?	☐	Desiccant Dry?	☐
Sample Line Rinsed?	☐	Sample Line Rinsed?	☐	Sample Line Rinsed?	☐

Flow Conditions:		
	Rise	☐
	Peak	☐
	Fall	☐
	None	☐

Inflow Valve Adjusted?
Click or tap here to enter text.

Notes/Visual: (if 'no' to any questions above, explain why and what remedial actions taken)
Click or tap here to enter text.

Station Name: OHOP-RG	
Rain Gauge Level?	☐
Rain Gauge Unobstructed?	☐
Rain Gauge Calibrated?	☐

Appendix B

Laboratory Splitting Instructions

Instructions for Fremont Analytical

Long Live the Kings | Washington State University – Priority in conjunction with FA analyses

1. Whenever Long Live the Kings drops off three composite samples (Inlet, Mid, Outlet) with corresponding Chain of Custody form to be analyzed, **please pull ONLY from the Inlet and Outlet composite samples for WSU toxicology testing**.
2. Please transfer ~125 mL of the composite sample from the Inlet and Outlet into separate 250 mL glass jars provided (**please only fill the bottles about halfway – DO NOT FILL COMPLETELY**). Please make 2 or 3 replicates of each sample (Inlet and Outlet), volume allowing.
    a. Jars will be labeled and easy to identify (e.g., WSU Ohop Inlet, WSU Ohop Outlet)
    b. There should be at least 3 samples (1 sample and 2 replicates, volume allowing) from each composite sample (Inlet and Outlet) in the 250 mL jar, resulting in at least 6 total samples for WSU to process.
3. Please place samples in freezer and notify Long Live the Kings that that the samples are ready. Long Live the Kings will pick them up with the Chain of Custody form and deliver them to WSU.

Long Live the Kings | University of Washington Tacoma (Center for Urban Waters)

1. Whenever Long Live the Kings drops off three composite samples (Inlet, Mid, Outlet) with corresponding Chain of Custody form to be analyzed, **please pull samples from the Inlet, Midpoint, and Outlet composite samples for UWT**.
2. Please transfer at least 1L and no more than 2L of the composite sample from the Inlet, Midpoint, and Outlet into the corresponding glass jars provided.
    a. Jars will be labeled and easy to identify (e.g., Ohop Inf, Ohop Mid, Ohop Eff)
3. Please place samples in freezer and notify Long Live the Kings that that the samples are ready. Long Live the Kings will pick them up with the Chain of Custody form and deliver them to UWT.

Long Live the Kings' Contacts

- Jack McDermott: 425-922-6722
- Ashley Bagley: 415-342-0307

Appendix C

Laboratory Reports

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Long Live The Kings
Ashley Bagley
1326 5th Ave #450
Seattle, WA 98101

RE: Ohop Creek Stormwater Filtration
Work Order Number: 2204063

April 13, 2022

Attention Ashley Bagley:

Fremont Analytical, Inc. received 3 sample(s) on 4/5/2022 for the analyses presented in the following report.

Ammonia by SM 4500 NH3G
Dissolved Organic Carbon by SM 5310C
Ion Chromatography by EPA Method 300.0
Semi-Volatile Organic Compounds by EPA 8270 (SIM)
Total Metals by EPA Method 200.8
Total Phosphorous by EPA Method 365.3
Total Suspended Solids (TSS) by SM 2540D

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Brianna Barnes
Project Manager

Date: *04/13/2022*

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration
Work Order: 2204063

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2204063-001	Ohop in 4.1	04/05/2022 6:00 AM	04/05/2022 12:03 PM
2204063-002	Ohop mid 4.1	04/05/2022 6:00 AM	04/05/2022 12:03 PM
2204063-003	Ohop out 4.1	04/05/2022 6:00 AM	04/05/2022 12:03 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2204063**
Date: **4/13/2022**

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Long Live The Kings
Collection Date: 4/5/2022 6:00:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-001
Matrix: Stormwater
Client Sample ID: **Ohop in 4.1**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36045		Analyst: OK
Naphthalene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
2-Methylnaphthalene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
1-Methylnaphthalene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
2-Chloronaphthalene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Acenaphthene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Dimethyl phthalate	ND	1.98		µg/L	1	4/12/2022 1:47:23 AM
Acenaphthylene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Dibenzofuran	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Fluorene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Diethyl phthalate	ND	0.792		µg/L	1	4/12/2022 1:47:23 AM
Pentachlorophenol	ND	0.495		µg/L	1	4/12/2022 1:47:23 AM
Phenanthrene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Anthracene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Carbazole	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Di-n-butyl phthalate	ND	1.98		µg/L	1	4/12/2022 1:47:23 AM
Fluoranthene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Pyrene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Butyl benzyl phthalate	ND	1.98		µg/L	1	4/12/2022 1:47:23 AM
Benz(a)anthracene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Chrysene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Bis(2-ethylhexyl) phthalate	ND	1.98		µg/L	1	4/12/2022 1:47:23 AM
Di-n-octyl phthalate	ND	0.396		µg/L	1	4/12/2022 1:47:23 AM
Benzo(b)fluoranthene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Benzo(k)fluoranthene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Benzo(a)pyrene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Indeno(1,2,3-cd)pyrene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Dibenz(a,h)anthracene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Benzo(g,h,i)perylene	ND	0.0990		µg/L	1	4/12/2022 1:47:23 AM
Surr: 2,4,6-Tribromophenol	122	38.8 - 146		%Rec	1	4/12/2022 1:47:23 AM
Surr: 2-Fluorobiphenyl	91.5	38.8 - 131		%Rec	1	4/12/2022 1:47:23 AM
Surr: Terphenyl-d14	109	46 - 144		%Rec	1	4/12/2022 1:47:23 AM
Ion Chromatography by EPA Method 300.0				Batch ID: 36008		Analyst: SLL
Nitrite (as N)	ND	0.100	H	mg/L	1	4/7/2022 6:50:00 PM
Nitrite (as N)	ND	1.00	D	mg/L	10	4/6/2022 4:20:00 PM
Nitrate (as N)	ND	1.00	D	mg/L	10	4/6/2022 4:20:00 PM
Nitrate (as N)	ND	0.100	H	mg/L	1	4/7/2022 6:50:00 PM
Ortho-Phosphate (as P)	ND	0.525	H	mg/L	1	4/7/2022 6:50:00 PM

Analytical Report

Work Order: **2204063**
Date Reported: **4/13/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-001
Client Sample ID: **Ohop in 4.1**

Collection Date: 4/5/2022 6:00:00 AM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Ion Chromatography by EPA Method 300.0				Batch ID: 36008		Analyst: SLL
Ortho-Phosphate (as P)	ND	5.25	D	mg/L	10	4/6/2022 4:20:00 PM
Total Metals by EPA Method 200.8				Batch ID: 36023		Analyst: EH
Copper	4.46	2.00		µg/L	1	4/7/2022 6:32:07 PM
Zinc	49.7	2.50		µg/L	1	4/7/2022 6:32:07 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R74641		Analyst: SLL
Organic Carbon, Dissolved	2.03	0.500		mg/L	1	4/7/2022 10:06:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36046		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	4/8/2022 11:50:00 AM
Total Phosphorous by EPA Method 365.3				Batch ID: 36033		Analyst: SLL
Phosphorus, Total (As P)	ND	0.250		mg/L	1	4/11/2022 12:59:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74604		Analyst: ALT
Total Suspended Solids	26.0	3.00		mg/L	1	4/7/2022

Client: Long Live The Kings
Collection Date: 4/5/2022 6:00:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-002
Matrix: Stormwater
Client Sample ID: **Ohop mid 4.1**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36045		Analyst: OK
Naphthalene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
2-Methylnaphthalene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
1-Methylnaphthalene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
2-Chloronaphthalene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Acenaphthene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Dimethyl phthalate	ND	1.99		µg/L	1	4/12/2022 2:15:29 AM
Acenaphthylene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Dibenzofuran	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Fluorene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Diethyl phthalate	ND	0.794		µg/L	1	4/12/2022 2:15:29 AM
Pentachlorophenol	ND	0.496		µg/L	1	4/12/2022 2:15:29 AM
Phenanthrene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Anthracene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Carbazole	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Di-n-butyl phthalate	ND	1.99		µg/L	1	4/12/2022 2:15:29 AM
Fluoranthene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Pyrene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Butyl benzyl phthalate	ND	1.99		µg/L	1	4/12/2022 2:15:29 AM
Benz(a)anthracene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Chrysene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Bis(2-ethylhexyl) phthalate	ND	1.99		µg/L	1	4/12/2022 2:15:29 AM
Di-n-octyl phthalate	ND	0.397		µg/L	1	4/12/2022 2:15:29 AM
Benzo(b)fluoranthene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Benzo(k)fluoranthene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Benzo(a)pyrene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Indeno(1,2,3-cd)pyrene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Dibenz(a,h)anthracene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Benzo(g,h,i)perylene	ND	0.0993		µg/L	1	4/12/2022 2:15:29 AM
Surr: 2,4,6-Tribromophenol	132	38.8 - 146		%Rec	1	4/12/2022 2:15:29 AM
Surr: 2-Fluorobiphenyl	96.1	38.8 - 131		%Rec	1	4/12/2022 2:15:29 AM
Surr: Terphenyl-d14	94.0	46 - 144		%Rec	1	4/12/2022 2:15:29 AM
Ion Chromatography by EPA Method 300.0				Batch ID: 36008		Analyst: SLL
Nitrite (as N)	ND	0.100	H	mg/L	1	4/7/2022 7:13:00 PM
Nitrite (as N)	ND	1.00	D	mg/L	10	4/6/2022 4:43:00 PM
Nitrate (as N)	5.17	1.00	D	mg/L	10	4/6/2022 4:43:00 PM
Ortho-Phosphate (as P)	ND	0.525	H	mg/L	1	4/7/2022 7:13:00 PM
Ortho-Phosphate (as P)	ND	5.25	D	mg/L	10	4/6/2022 4:43:00 PM

Analytical Report

Work Order: **2204063**
Date Reported: **4/13/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-002
Client Sample ID: **Ohop mid 4.1**

Collection Date: 4/5/2022 6:00:00 AM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 36023		Analyst: EH
Copper	7.32	2.00		µg/L	1	4/7/2022 6:37:41 PM
Zinc	12.3	2.50		µg/L	1	4/7/2022 6:37:41 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R74641		Analyst: SLL
Organic Carbon, Dissolved	10.7	0.500		mg/L	1	4/7/2022 11:36:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36046		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	4/8/2022 11:55:00 AM
Total Phosphorous by EPA Method 365.3				Batch ID: 36033		Analyst: SLL
Phosphorus, Total (As P)	0.833	0.250		mg/L	1	4/11/2022 1:05:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74604		Analyst: ALT
Total Suspended Solids	20.0	3.00		mg/L	1	4/7/2022

Client: Long Live The Kings
Collection Date: 4/5/2022 6:00:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-003
Matrix: Stormwater
Client Sample ID: **Ohop out 4.1**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36045		Analyst: OK
Naphthalene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
2-Methylnaphthalene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
1-Methylnaphthalene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
2-Chloronaphthalene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Acenaphthene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Dimethyl phthalate	ND	1.98		µg/L	1	4/12/2022 2:43:40 AM
Acenaphthylene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Dibenzofuran	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Fluorene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Diethyl phthalate	ND	0.790		µg/L	1	4/12/2022 2:43:40 AM
Pentachlorophenol	ND	0.494		µg/L	1	4/12/2022 2:43:40 AM
Phenanthrene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Anthracene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Carbazole	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Di-n-butyl phthalate	ND	1.98		µg/L	1	4/12/2022 2:43:40 AM
Fluoranthene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Pyrene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Butyl benzyl phthalate	ND	1.98		µg/L	1	4/12/2022 2:43:40 AM
Benz(a)anthracene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Chrysene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Bis(2-ethylhexyl) phthalate	ND	1.98		µg/L	1	4/12/2022 2:43:40 AM
Di-n-octyl phthalate	ND	0.395		µg/L	1	4/12/2022 2:43:40 AM
Benzo(b)fluoranthene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Benzo(k)fluoranthene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Benzo(a)pyrene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Indeno(1,2,3-cd)pyrene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Dibenz(a,h)anthracene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Benzo(g,h,i)perylene	ND	0.0988		µg/L	1	4/12/2022 2:43:40 AM
Surr: 2,4,6-Tribromophenol	135	38.8 - 146		%Rec	1	4/12/2022 2:43:40 AM
Surr: 2-Fluorobiphenyl	98.4	38.8 - 131		%Rec	1	4/12/2022 2:43:40 AM
Surr: Terphenyl-d14	101	46 - 144		%Rec	1	4/12/2022 2:43:40 AM
Ion Chromatography by EPA Method 300.0				Batch ID: 36008		Analyst: SLL
Nitrite (as N)	ND	0.100	H	mg/L	1	4/7/2022 7:36:00 PM
Nitrite (as N)	ND	1.00	D	mg/L	10	4/6/2022 5:06:00 PM
Nitrate (as N)	5.60	1.00	D	mg/L	10	4/6/2022 5:06:00 PM
Ortho-Phosphate (as P)	ND	0.525	H	mg/L	1	4/7/2022 7:36:00 PM
Ortho-Phosphate (as P)	ND	5.25	D	mg/L	10	4/6/2022 5:06:00 PM

Analytical Report

Work Order: **2204063**
Date Reported: **4/13/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater Filtration
Lab ID: 2204063-003
Client Sample ID: **Ohop out 4.1**

Collection Date: 4/5/2022 6:00:00 AM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 36023		Analyst: EH
Copper	6.41	2.00		µg/L	1	4/7/2022 6:43:15 PM
Zinc	12.0	2.50		µg/L	1	4/7/2022 6:43:15 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R74641		Analyst: SLL
Organic Carbon, Dissolved	10.7	0.500		mg/L	1	4/7/2022 11:59:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36046		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	4/8/2022 12:00:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36033		Analyst: SLL
Phosphorus, Total (As P)	0.791	0.250		mg/L	1	4/11/2022 1:08:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74604		Analyst: ALT
Total Suspended Solids	17.0	3.00		mg/L	1	4/7/2022

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Ammonia by SM 4500 NH3G

Sample ID: **MB-36046** SampType: **MBLK** Units: **mg/L** Prep Date: **4/8/2022** RunNo: **74652**
Client ID: **MBLKW** Batch ID: **36046** Analysis Date: **4/8/2022** SeqNo: **1531767**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100									

Sample ID: **LCS-36046** SampType: **LCS** Units: **mg/L** Prep Date: **4/8/2022** RunNo: **74652**
Client ID: **LCSW** Batch ID: **36046** Analysis Date: **4/8/2022** SeqNo: **1531768**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.434	0.100	0.5000	0	86.8	80.1	103				

Sample ID: **2204063-003DDUP** SampType: **DUP** Units: **mg/L** Prep Date: **4/8/2022** RunNo: **74652**
Client ID: **Ohop out 4.1** Batch ID: **36046** Analysis Date: **4/8/2022** SeqNo: **1531772**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100						0		30	

Sample ID: **2204063-003DMS** SampType: **MS** Units: **mg/L** Prep Date: **4/8/2022** RunNo: **74652**
Client ID: **Ohop out 4.1** Batch ID: **36046** Analysis Date: **4/8/2022** SeqNo: **1531773**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100	0.5000	0	10.2	51.9	133				S

NOTES:
S - Spike recovery indicates a possible matrix effect.

Sample ID: **2204119-001EDUP** SampType: **DUP** Units: **mg/L** Prep Date: **4/8/2022** RunNo: **74652**
Client ID: **BATCH** Batch ID: **36046** Analysis Date: **4/8/2022** SeqNo: **1531775**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100						0		30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Ammonia by SM 4500 NH3G

Sample ID: **2204119-001EMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **4/8/2022**	RunNo: **74652**
Client ID: **BATCH**	Batch ID: **36046**		Analysis Date: **4/8/2022**	SeqNo: **1531776**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.380	0.100	0.5000	0	76.0	51.9	133				

Sample ID: **2204119-001EMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **4/8/2022**	RunNo: **74652**
Client ID: **BATCH**	Batch ID: **36046**		Analysis Date: **4/8/2022**	SeqNo: **1531777**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.376	0.100	0.5000	0	75.2	51.9	133	0.3800	1.06	30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Dissolved Organic Carbon by SM 5310C

Sample ID: **LCS-74641**	SampType: **LCS**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74641**	
Client ID: **LCSW**	Batch ID: **R74641**					Analysis Date: **4/7/2022**			SeqNo: **1531501**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	5.50	0.500	5.000	0	110	91.5	110				

Sample ID: **MB-74641**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74641**	
Client ID: **MBLKW**	Batch ID: **R74641**					Analysis Date: **4/7/2022**			SeqNo: **1531502**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	ND	0.500									

Sample ID: **2204063-001EDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74641**	
Client ID: **Ohop in 4.1**	Batch ID: **R74641**					Analysis Date: **4/7/2022**			SeqNo: **1531491**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	2.07	0.500						2.026	1.96	20	

Sample ID: **2204063-001EMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74641**	
Client ID: **Ohop in 4.1**	Batch ID: **R74641**					Analysis Date: **4/7/2022**			SeqNo: **1531492**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	7.39	0.500	5.000	2.026	107	80.9	124				

Sample ID: **2204063-001EMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74641**	
Client ID: **Ohop in 4.1**	Batch ID: **R74641**					Analysis Date: **4/7/2022**			SeqNo: **1531493**	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	7.48	0.500	5.000	2.026	109	80.9	124	7.392	1.25	30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **LCS-36008**	SampType: **LCS**	Units: **mg/L**	Prep Date: **4/6/2022**	RunNo: **74623**
Client ID: **LCSW**	Batch ID: **36008**		Analysis Date: **4/6/2022**	SeqNo: **1530955**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.717	0.100	0.7500	0	95.6	90	110				
Nitrate (as N)	0.721	0.100	0.7500	0	96.1	90	110				
Ortho-Phosphate (as P)	1.25	0.525	1.250	0	100	90	110				

Sample ID: **MB-36008**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **4/6/2022**	RunNo: **74623**
Client ID: **MBLKW**	Batch ID: **36008**		Analysis Date: **4/6/2022**	SeqNo: **1530957**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100									
Nitrate (as N)	ND	0.100									
Ortho-Phosphate (as P)	ND	0.525									

Sample ID: **2204002-001BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/6/2022**	RunNo: **74623**
Client ID: **BATCH**	Batch ID: **36008**		Analysis Date: **4/6/2022**	SeqNo: **1530970**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100						0		20	H
Nitrate (as N)	1.95	0.100						1.963	0.664	20	H
Ortho-Phosphate (as P)	ND	0.525						0		20	H

Sample ID: **2204002-001BMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **4/6/2022**	RunNo: **74623**
Client ID: **BATCH**	Batch ID: **36008**		Analysis Date: **4/6/2022**	SeqNo: **1530971**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.690	0.100	0.7500	0.08500	80.7	80	120				H
Nitrate (as N)	2.80	0.100	0.7500	1.963	111	80	120				EH
Ortho-Phosphate (as P)	1.33	0.525	1.250	0	107	80	120				H

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **2204002-001BMSD** SampType: **MSD** Units: **mg/L** Prep Date: **4/6/2022** RunNo: **74623**
Client ID: **BATCH** Batch ID: **36008** Analysis Date: **4/6/2022** SeqNo: **1530972**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.702	0.100	0.7500	0.08500	82.3	80	120	0.6900	1.72	20	H
Nitrate (as N)	2.80	0.100	0.7500	1.963	111	80	120	2.799	0	20	EH
Ortho-Phosphate (as P)	1.39	0.525	1.250	0	111	80	120	1.332	4.12	20	H

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Phosphorous by EPA Method 365.3

Sample ID: **MB-36033**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **4/7/2022**		RunNo: **74670**		
Client ID: **MBLKW**	Batch ID: **36033**					Analysis Date: **4/11/2022**		SeqNo: **1532185**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250									

Sample ID: **LCS-36033**	SampType: **LCS**			Units: **mg/L**		Prep Date: **4/7/2022**		RunNo: **74670**		
Client ID: **LCSW**	Batch ID: **36033**					Analysis Date: **4/11/2022**		SeqNo: **1532186**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.485	0.250	0.5000	0	96.9	65	135				

Sample ID: **2204063-001DDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **4/7/2022**		RunNo: **74670**		
Client ID: **Ohop in 4.1**	Batch ID: **36033**					Analysis Date: **4/11/2022**		SeqNo: **1532188**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250						0		30	

Sample ID: **2204063-001DMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **4/7/2022**		RunNo: **74670**		
Client ID: **Ohop in 4.1**	Batch ID: **36033**					Analysis Date: **4/11/2022**		SeqNo: **1532189**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.556	0.250	0.5000	0	111	65	135				

Sample ID: **2204119-001EDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **4/7/2022**		RunNo: **74670**		
Client ID: **BATCH**	Batch ID: **36033**					Analysis Date: **4/11/2022**		SeqNo: **1532193**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250						0		30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Phosphorous by EPA Method 365.3

Sample ID: **2204119-001EMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74670**		
Client ID: **BATCH**	Batch ID: **36033**					Analysis Date: **4/11/2022**			SeqNo: **1532194**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.522	0.250	0.5000	0	104	65	135				

Sample ID: **2204119-001EMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **4/7/2022**			RunNo: **74670**		
Client ID: **BATCH**	Batch ID: **36033**					Analysis Date: **4/11/2022**			SeqNo: **1532195**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.565	0.250	0.5000	0	113	65	135	0.5218	8.02	30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Suspended Solids (TSS) by SM 2540D

Sample ID: **MB-R74604**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **4/7/2022**	RunNo: **74604**
Client ID: **MBLKW**	Batch ID: **R74604**		Analysis Date: **4/7/2022**	SeqNo: **1530602**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	ND	3.00									

Sample ID: **LCS-R74604**	SampType: **LCS**	Units: **mg/L**	Prep Date: **4/7/2022**	RunNo: **74604**
Client ID: **LCSW**	Batch ID: **R74604**		Analysis Date: **4/7/2022**	SeqNo: **1530603**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	272	3.00	300.0	0	90.7	65	135				

Sample ID: **2204042-001BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/7/2022**	RunNo: **74604**
Client ID: **BATCH**	Batch ID: **R74604**		Analysis Date: **4/7/2022**	SeqNo: **1530605**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	142	3.00						147.0	3.46	30	

Sample ID: **2204070-002ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/7/2022**	RunNo: **74604**
Client ID: **BATCH**	Batch ID: **R74604**		Analysis Date: **4/7/2022**	SeqNo: **1530618**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	13.0	3.00						11.00	16.7	30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-36023** SampType: **MBLK** Units: **µg/L** Prep Date: **4/7/2022** RunNo: **74618**
Client ID: **MBLKW** Batch ID: **36023** Analysis Date: **4/7/2022** SeqNo: **1530825**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **LCS-36023** SampType: **LCS** Units: **µg/L** Prep Date: **4/7/2022** RunNo: **74618**
Client ID: **LCSW** Batch ID: **36023** Analysis Date: **4/7/2022** SeqNo: **1530826**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	101	2.00	100.0	0	101	85	115				
Zinc	109	2.50	100.0	0	109	85	115				

Sample ID: **2204081-006ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/7/2022** RunNo: **74618**
Client ID: **BATCH** Batch ID: **36023** Analysis Date: **4/7/2022** SeqNo: **1530828**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	5.09	2.00						4.801	5.81	30	
Zinc	4.50	2.50						3.956	12.8	30	

Sample ID: **2204081-006AMS** SampType: **MS** Units: **µg/L** Prep Date: **4/7/2022** RunNo: **74618**
Client ID: **BATCH** Batch ID: **36023** Analysis Date: **4/7/2022** SeqNo: **1530829**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	97.3	2.00	100.0	4.801	92.5	70	130				
Zinc	95.1	2.50	100.0	3.956	91.1	70	130				

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2204069-001AMS** SampType: **MS** Units: **µg/L** Prep Date: **4/7/2022** RunNo: **74618**
Client ID: **BATCH** Batch ID: **36023** Analysis Date: **4/7/2022** SeqNo: **1530853**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	99.4	2.00	100.0	3.771	95.6	70	130				
Zinc	121	2.50	100.0	20.82	101	70	130				

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36045** SampType: **MBLK** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **MBLKW** Batch ID: **36045** Analysis Date: **4/11/2022** SeqNo: **1532378**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.100									
2-Methylnaphthalene	ND	0.100									
1-Methylnaphthalene	ND	0.100									
2-Chloronaphthalene	ND	0.100									
Acenaphthene	ND	0.100									
Dimethyl phthalate	ND	2.00									
Acenaphthylene	ND	0.100									
Dibenzofuran	ND	0.100									
Fluorene	ND	0.100									
Diethyl phthalate	ND	0.800									
Pentachlorophenol	ND	0.500									
Phenanthrene	ND	0.100									
Anthracene	ND	0.100									
Carbazole	ND	0.100									
Di-n-butyl phthalate	ND	2.00									
Fluoranthene	ND	0.100									
Pyrene	ND	0.100									
Butyl benzyl phthalate	ND	2.00									
Benz(a)anthracene	ND	0.100									
Chrysene	ND	0.100									
Bis(2-ethylhexyl) phthalate	ND	2.00									
Di-n-octyl phthalate	ND	0.400									
Benzo(b)fluoranthene	ND	0.100									
Benzo(k)fluoranthene	ND	0.100									
Benzo(a)pyrene	ND	0.100									
Indeno(1,2,3-cd)pyrene	ND	0.100									
Dibenz(a,h)anthracene	ND	0.100									
Benzo(g,h,i)perylene	ND	0.100									
Surr: 2,4,6-Tribromophenol	4.71		4.000		118	38.8	146				
Surr: 2-Fluorobiphenyl	1.93		2.000		96.4	38.8	131				

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36045**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **4/8/2022**	RunNo: **74681**
Client ID: **MBLKW**	Batch ID: **36045**		Analysis Date: **4/11/2022**	SeqNo: **1532378**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Terphenyl-d14	2.25		2.000		112	46	144				

Sample ID: **LCS-36045**	SampType: **LCS**	Units: **µg/L**	Prep Date: **4/8/2022**	RunNo: **74681**
Client ID: **LCSW**	Batch ID: **36045**		Analysis Date: **4/11/2022**	SeqNo: **1532379**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	3.51	0.100	4.000	0	87.8	49.4	107				
2-Methylnaphthalene	3.33	0.100	4.000	0	83.2	50.9	107				
1-Methylnaphthalene	3.28	0.100	4.000	0	81.9	51.1	106				
2-Chloronaphthalene	3.44	0.100	4.000	0	86.0	55.6	106				
Acenaphthene	3.64	0.100	4.000	0	91.0	51.2	105				
Dimethyl phthalate	3.75	2.00	4.000	0	93.8	61.9	114				
Acenaphthylene	3.38	0.100	4.000	0	84.6	53.5	107				
Dibenzofuran	3.71	0.100	4.000	0	92.8	57.9	111				
Fluorene	3.82	0.100	4.000	0	95.5	56	114				
Diethyl phthalate	3.90	0.800	4.000	0	97.5	52.9	133				
Pentachlorophenol	4.72	0.500	4.000	0	118	45	138				
Phenanthrene	3.68	0.100	4.000	0	92.0	56.4	110				
Anthracene	3.38	0.100	4.000	0	84.4	53.2	107				
Carbazole	3.90	0.100	4.000	0	97.6	61.9	115				
Di-n-butyl phthalate	4.12	2.00	4.000	0	103	61.3	123				
Fluoranthene	3.79	0.100	4.000	0	94.7	60	115				
Pyrene	3.74	0.100	4.000	0	93.5	59	115				
Butyl benzyl phthalate	5.02	2.00	4.000	0	125	64	133				
Benz(a)anthracene	3.84	0.100	4.000	0	96.0	56.5	119				
Chrysene	3.68	0.100	4.000	0	92.0	56.7	108				
Bis(2-ethylhexyl) phthalate	4.56	2.00	4.000	0	114	47.8	127				
Di-n-octyl phthalate	5.02	0.400	4.000	0	126	38.4	126				
Benzo(b)fluoranthene	4.25	0.100	4.000	0	106	51.6	115				
Benzo(k)fluoranthene	3.80	0.100	4.000	0	95.1	52.1	125				

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **LCS-36045** SampType: **LCS** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **LCSW** Batch ID: **36045** Analysis Date: **4/11/2022** SeqNo: **1532379**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	3.50	0.100	4.000	0	87.6	51.6	120				
Indeno(1,2,3-cd)pyrene	4.17	0.100	4.000	0	104	46.4	111				
Dibenz(a,h)anthracene	4.19	0.100	4.000	0	105	47.7	116				
Benzo(g,h,i)perylene	3.81	0.100	4.000	0	95.2	46.1	117				
Surr: 2,4,6-Tribromophenol	4.76		4.000		119	38.8	146				
Surr: 2-Fluorobiphenyl	1.87		2.000		93.4	38.8	131				
Surr: Terphenyl-d14	2.16		2.000		108	46	144				

Sample ID: **2204059-001DMS** SampType: **MS** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **BATCH** Batch ID: **36045** Analysis Date: **4/12/2022** SeqNo: **1532381**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	3.74	0.0996	3.986	0	93.8	56.4	103				
2-Methylnaphthalene	3.53	0.0996	3.986	0	88.4	55.9	104				
1-Methylnaphthalene	3.47	0.0996	3.986	0	87.0	57.4	102				
2-Chloronaphthalene	3.65	0.0996	3.986	0	91.7	55.2	109				
Acenaphthene	3.85	0.0996	3.986	0	96.5	53.3	105				
Dimethyl phthalate	3.96	1.99	3.986	0	99.3	9.76	144				
Acenaphthylene	3.58	0.0996	3.986	0	89.9	54.6	106				
Dibenzofuran	3.95	0.0996	3.986	0	99.2	61.5	109				
Fluorene	4.08	0.0996	3.986	0	102	58.3	112				
Diethyl phthalate	4.13	0.797	3.986	0	104	13.2	139				
Pentachlorophenol	5.01	0.498	3.986	0	126	5	178				
Phenanthrene	3.87	0.0996	3.986	0	97.0	58	107				
Anthracene	3.49	0.0996	3.986	0	87.4	51.6	108				
Carbazole	4.11	0.0996	3.986	0	103	65.5	111				
Di-n-butyl phthalate	4.34	1.99	3.986	0	109	7.08	146				
Fluoranthene	4.00	0.0996	3.986	0	100	57.2	115				
Pyrene	3.90	0.0996	3.986	0	98.0	53.9	115				
Butyl benzyl phthalate	5.22	1.99	3.986	0	131	11.1	156				

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2204059-001DMS** SampType: **MS** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **BATCH** Batch ID: **36045** Analysis Date: **4/12/2022** SeqNo: **1532381**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	4.04	0.0996	3.986	0	101	49.4	120				
Chrysene	3.92	0.0996	3.986	0	98.3	51.9	106				
Bis(2-ethylhexyl) phthalate	4.83	1.99	3.986	0	121	5	137				
Di-n-octyl phthalate	5.31	0.399	3.986	0	133	5	134				
Benzo(b)fluoranthene	4.49	0.0996	3.986	0	113	44.4	114				
Benzo(k)fluoranthene	3.95	0.0996	3.986	0	99.1	41.8	121				
Benzo(a)pyrene	3.77	0.0996	3.986	0	94.6	37.2	123				
Indeno(1,2,3-cd)pyrene	4.19	0.0996	3.986	0	105	28.9	112				
Dibenz(a,h)anthracene	4.28	0.0996	3.986	0	107	31.1	116				
Benzo(g,h,i)perylene	3.87	0.0996	3.986	0.05876	95.6	29.3	116				
Surr: 2,4,6-Tribromophenol	5.16		3.986		130	38.8	146				
Surr: 2-Fluorobiphenyl	2.00		1.993		100	38.8	131				
Surr: Terphenyl-d14	2.29		1.993		115	46	144				

Sample ID: **2204060-001CDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **BATCH** Batch ID: **36045** Analysis Date: **4/12/2022** SeqNo: **1532383**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.100						0		30	
2-Methylnaphthalene	ND	0.100						0		30	
1-Methylnaphthalene	ND	0.100						0		30	
2-Chloronaphthalene	ND	0.100						0		30	
Acenaphthene	ND	0.100						0		30	
Dimethyl phthalate	ND	2.00						0		30	
Acenaphthylene	ND	0.100						0		30	
Dibenzofuran	ND	0.100						0		30	
Fluorene	ND	0.100						0		30	
Diethyl phthalate	ND	0.800						0		30	
Pentachlorophenol	ND	0.500						0		30	
Phenanthrene	ND	0.100						0		30	

Work Order: 2204063
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2204060-001CDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/8/2022** RunNo: **74681**
Client ID: **BATCH** Batch ID: **36045** Analysis Date: **4/12/2022** SeqNo: **1532383**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Anthracene	ND	0.100						0		30	
Carbazole	ND	0.100						0		30	
Di-n-butyl phthalate	ND	2.00						0		30	
Fluoranthene	ND	0.100						0		30	
Pyrene	ND	0.100						0		30	
Butyl benzyl phthalate	ND	2.00						0		30	
Benz(a)anthracene	ND	0.100						0		30	
Chrysene	ND	0.100						0		30	
Bis(2-ethylhexyl) phthalate	ND	2.00						0		30	
Di-n-octyl phthalate	ND	0.400						0		30	
Benzo(b)fluoranthene	ND	0.100						0		30	
Benzo(k)fluoranthene	ND	0.100						0		30	
Benzo(a)pyrene	ND	0.100						0		30	
Indeno(1,2,3-cd)pyrene	ND	0.100						0		30	
Dibenz(a,h)anthracene	ND	0.100						0		30	
Benzo(g,h,i)perylene	ND	0.100						0		30	
Surr: 2,4,6-Tribromophenol	4.60		3.999		115	38.8	146		0	30	
Surr: 2-Fluorobiphenyl	1.95		2.000		97.5	38.8	131		0		
Surr: Terphenyl-d14	2.29		2.000		115	46	144		0		

Sample Log-In Check List

Client Name:	**LLTK**	Work Order Number:	**2204063**
Logged by:	**Brianna Barnes**	Date Received:	**4/5/2022 12:03:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☐	No	☑	NA ☐
		No cooler present.				
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes	☐	No	☑	NA ☐
		Unknown prior to receipt.				
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☐	No	☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	6.3

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 4/5/22 Page: 1 of: 1

Laboratory Project No (internal): 2204063

Project Name: Ohop Creek Stormwater Filtration

Special Remarks:
- See email for instructions
- Contact LLTK (Ashley) when samples are ready for pickup

Client: Long Live the Kings

Project No:

Address: 1326 5th ave #450

Collected by: LLTK

City, State, Zip: Seattle, WA, 98101

Location: Ohop Creek

Telephone: [redacted]

Report To (PM): Ashley Bagley (Abagley@llltk.org)

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax: 415-342-0307

PM Email: abagley@llltk.org

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	Ohop int.1	4/4-5	6:00AM	SW													
2	Ohop mid 4.1	4/4-5	6:00AM	SW													
3	Ohop out 4.1	4/4-5	6:00AM	SW													
4																	
5																	
6																	
7																	
8																	
9																	
10																	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	4/5/2022 12:03PM	x Alex Jtop	4/5/22 12:03
Relinquished	Date/Time	Received	Date/Time
x		x	

Turn-around Time:
- ☑ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day _____ (specify)

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 4/5/22 Page: 1 of: 1

Laboratory Project No (internal): 2204063

Project Name: Ohop Creek Stormwater Filtration

Special Remarks:
- See email for instructions
- Contact LLTK (Ashley) when samples are ready for pickup

Edits per emailed instructions, BB 4/5/2022

Client: Long Live the Kings

Project No:

Address: 1326 5th ave #450

Collected by: LLTK

City, State, Zip: Seattle, WA, 98101

Location: Ohop Creek

Telephone: [redacted]

Report To (PM): Ashley Bagley (Abagley@llltk.org)

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Fax: 415-342-0307

PM Email: abagley@llltk.org

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	VOCs (EPA 8260 / 624)	GX/BTEX	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	Ohop int.1	4/4-5	6:00AM	SW							X		X	X			Ammonia, DOC, TSS, Total Phosphorus
2	Ohop mid 4.1	4/4-5	6:00Am	SW							X		X	X			Ammonia, DOC, TSS, Total Phosphorus
3	Ohop out 4.1	4/4-5	6:00AM	SW							X		X	X			Ammonia, DOC, TSS, Total Phosphorus
4																	
5																	Split volume for WSU and UWT testing
6																	
7																	
8																	
9																	
10																	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr (Cu) Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl U V (Zn)

***Anions (Circle): (Nitrate) (Nitrite) Chloride Sulfate Bromide (O-Phosphate) Fluoride Nitrate+Nitrite

Turn-around Time:
- ☑ Standard
- ☐ 3 Day
- ☐ 2 Day
- ☐ Next Day
- Same Day ____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
x [signature]	4/5/2022 12:03PM	x Alex Tsoy	4/5/22 12:03
Relinquished	Date/Time	Received	Date/Time
x		x	

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Long Live The Kings
Ashley Bagley
1326 5th Ave #450
Seattle, WA 98101

RE: Ohop Creek Stormwater
Work Order Number: 2204315

April 26, 2022

Attention Ashley Bagley:

Fremont Analytical, Inc. received 3 sample(s) on 4/19/2022 for the analyses presented in the following report.

Ammonia by SM 4500 NH3G
Dissolved Organic Carbon by SM 5310C
Ion Chromatography by EPA Method 300.0
Semi-Volatile Organic Compounds by EPA 8270 (SIM)
Total Metals by EPA Method 200.8
Total Phosphorous by EPA Method 365.3
Total Suspended Solids (TSS) by SM 2540D

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original

Date: *04/26/2022*

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater
Work Order: 2204315

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2204315-001	Ohop - in 41922	04/18/2022 5:00 PM	04/19/2022 2:30 PM
2204315-002	Ohop - mid 41922	04/18/2022 5:00 PM	04/19/2022 2:30 PM
2204315-003	Ohop - out 41922	04/18/2022 5:00 PM	04/19/2022 2:30 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

Case Narrative

WO#: **2204315**
Date: **4/26/2022**

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Long Live The Kings
Collection Date: 4/18/2022 5:00:00 PM
Project: Ohop Creek Stormwater
Lab ID: 2204315-001
Matrix: Stormwater
Client Sample ID: Ohop - in 41922

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36191		Analyst: OK
Naphthalene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
2-Methylnaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
1-Methylnaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
2-Chloronaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Acenaphthene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Dimethyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:19:50 PM
Acenaphthylene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Dibenzofuran	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Fluorene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Diethyl phthalate	ND	0.787		µg/L	1	4/22/2022 6:19:50 PM
Pentachlorophenol	ND	0.492		µg/L	1	4/22/2022 6:19:50 PM
Phenanthrene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Anthracene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Carbazole	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Di-n-butyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:19:50 PM
Fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Pyrene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Butyl benzyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:19:50 PM
Benz(a)anthracene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Chrysene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Bis(2-ethylhexyl) phthalate	ND	1.97		µg/L	1	4/22/2022 6:19:50 PM
Di-n-octyl phthalate	ND	0.393		µg/L	1	4/22/2022 6:19:50 PM
Benzo(b)fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Benzo(k)fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Benzo(a)pyrene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Indeno(1,2,3-cd)pyrene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Dibenz(a,h)anthracene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Benzo(g,h,i)perylene	ND	0.0983		µg/L	1	4/22/2022 6:19:50 PM
Surr: 2,4,6-Tribromophenol	68.8	38.8 - 146		%Rec	1	4/22/2022 6:19:50 PM
Surr: 2-Fluorobiphenyl	69.6	38.8 - 131		%Rec	1	4/22/2022 6:19:50 PM
Surr: Terphenyl-d14	60.4	46 - 144		%Rec	1	4/22/2022 6:19:50 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 36162		Analyst: SLL
Nitrite (as N)	ND	0.100		mg/L	1	4/19/2022 9:57:00 PM
Nitrate (as N)	ND	0.100		mg/L	1	4/19/2022 9:57:00 PM
Ortho-Phosphate (as P)	ND	0.525		mg/L	1	4/19/2022 9:57:00 PM

Analytical Report

Work Order: **2204315**
Date Reported: **4/26/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater
Lab ID: 2204315-001
Client Sample ID: Ohop - in 41922

Collection Date: 4/18/2022 5:00:00 PM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 36175		Analyst: EH
Copper	8.77	2.00		µg/L	1	4/21/2022 7:05:59 PM
Zinc	52.8	2.50		µg/L	1	4/21/2022 7:05:59 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R75007		Analyst: SLL
Organic Carbon, Dissolved	4.29	0.500		mg/L	1	4/25/2022 10:53:00 PM
Ammonia by SM 4500 NH3G				Batch ID: 36198		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	4/22/2022 12:41:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36192		Analyst: SLL
Phosphorus, Total (As P)	ND	0.250		mg/L	1	4/26/2022 12:50:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74924		Analyst: SLL
Total Suspended Solids	29.0	3.00		mg/L	1	4/22/2022 10:02:35 AM

Client: Long Live The Kings
Collection Date: 4/18/2022 5:00:00 PM
Project: Ohop Creek Stormwater
Lab ID: 2204315-002
Matrix: Stormwater
Client Sample ID: Ohop - mid 41922

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36191		Analyst: OK
Naphthalene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
2-Methylnaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
1-Methylnaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
2-Chloronaphthalene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Acenaphthene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Dimethyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:42:26 PM
Acenaphthylene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Dibenzofuran	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Fluorene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Diethyl phthalate	ND	0.787		µg/L	1	4/22/2022 6:42:26 PM
Pentachlorophenol	ND	0.492		µg/L	1	4/22/2022 6:42:26 PM
Phenanthrene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Anthracene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Carbazole	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Di-n-butyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:42:26 PM
Fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Pyrene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Butyl benzyl phthalate	ND	1.97		µg/L	1	4/22/2022 6:42:26 PM
Benz(a)anthracene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Chrysene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Bis(2-ethylhexyl) phthalate	ND	1.97		µg/L	1	4/22/2022 6:42:26 PM
Di-n-octyl phthalate	ND	0.393		µg/L	1	4/22/2022 6:42:26 PM
Benzo(b)fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Benzo(k)fluoranthene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Benzo(a)pyrene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Indeno(1,2,3-cd)pyrene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Dibenz(a,h)anthracene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Benzo(g,h,i)perylene	ND	0.0983		µg/L	1	4/22/2022 6:42:26 PM
Surr: 2,4,6-Tribromophenol	72.2	38.8 - 146		%Rec	1	4/22/2022 6:42:26 PM
Surr: 2-Fluorobiphenyl	69.8	38.8 - 131		%Rec	1	4/22/2022 6:42:26 PM
Surr: Terphenyl-d14	70.7	46 - 144		%Rec	1	4/22/2022 6:42:26 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 36162		Analyst: SLL
Nitrite (as N)	ND	0.100		mg/L	1	4/19/2022 11:06:00 PM
Nitrate (as N)	0.215	0.100		mg/L	1	4/19/2022 11:06:00 PM
Ortho-Phosphate (as P)	ND	0.525		mg/L	1	4/19/2022 11:06:00 PM

Analytical Report

Work Order: **2204315**
Date Reported: **4/26/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater
Lab ID: 2204315-002
Client Sample ID: Ohop - mid 41922

Collection Date: 4/18/2022 5:00:00 PM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 36175		Analyst: EH
Copper	6.09	2.00		µg/L	1	4/21/2022 7:11:33 PM
Zinc	8.34	2.50		µg/L	1	4/21/2022 7:11:33 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R75007		Analyst: SLL
Organic Carbon, Dissolved	8.39	0.500		mg/L	1	4/25/2022 11:16:00 PM
Ammonia by SM 4500 NH3G				Batch ID: 36198		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	4/22/2022 12:47:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36192		Analyst: SLL
Phosphorus, Total (As P)	0.383	0.250		mg/L	1	4/26/2022 12:53:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74924		Analyst: SLL
Total Suspended Solids	12.0	3.00		mg/L	1	4/22/2022 10:02:35 AM

Client: Long Live The Kings
Collection Date: 4/18/2022 5:00:00 PM
Project: Ohop Creek Stormwater
Lab ID: 2204315-003
Matrix: Stormwater
Client Sample ID: Ohop - out 41922

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36191		Analyst: OK
Naphthalene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
2-Methylnaphthalene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
1-Methylnaphthalene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
2-Chloronaphthalene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Acenaphthene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Dimethyl phthalate	ND	2.00		µg/L	1	4/22/2022 7:05:01 PM
Acenaphthylene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Dibenzofuran	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Fluorene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Diethyl phthalate	ND	0.800		µg/L	1	4/22/2022 7:05:01 PM
Pentachlorophenol	ND	0.500		µg/L	1	4/22/2022 7:05:01 PM
Phenanthrene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Anthracene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Carbazole	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Di-n-butyl phthalate	ND	2.00		µg/L	1	4/22/2022 7:05:01 PM
Fluoranthene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Pyrene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Butyl benzyl phthalate	ND	2.00		µg/L	1	4/22/2022 7:05:01 PM
Benz(a)anthracene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Chrysene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Bis(2-ethylhexyl) phthalate	ND	2.00		µg/L	1	4/22/2022 7:05:01 PM
Di-n-octyl phthalate	ND	0.400		µg/L	1	4/22/2022 7:05:01 PM
Benzo(b)fluoranthene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Benzo(k)fluoranthene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Benzo(a)pyrene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Indeno(1,2,3-cd)pyrene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Dibenz(a,h)anthracene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Benzo(g,h,i)perylene	ND	0.100		µg/L	1	4/22/2022 7:05:01 PM
Surr: 2,4,6-Tribromophenol	69.0	38.8 - 146		%Rec	1	4/22/2022 7:05:01 PM
Surr: 2-Fluorobiphenyl	65.9	38.8 - 131		%Rec	1	4/22/2022 7:05:01 PM
Surr: Terphenyl-d14	66.1	46 - 144		%Rec	1	4/22/2022 7:05:01 PM
Ion Chromatography by EPA Method 300.0				Batch ID: 36162		Analyst: SLL
Nitrite (as N)	ND	0.100		mg/L	1	4/19/2022 11:29:00 PM
Nitrate (as N)	0.236	0.100		mg/L	1	4/19/2022 11:29:00 PM
Ortho-Phosphate (as P)	ND	0.525		mg/L	1	4/19/2022 11:29:00 PM

Analytical Report

Work Order: **2204315**
Date Reported: **4/26/2022**

Client: Long Live The Kings
Project: Ohop Creek Stormwater
Lab ID: 2204315-003
Client Sample ID: Ohop - out 41922

Collection Date: 4/18/2022 5:00:00 PM
Matrix: Stormwater

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Total Metals by EPA Method 200.8				Batch ID: 36175		Analyst: EH
Copper	6.06	2.00		µg/L	1	4/21/2022 7:17:06 PM
Zinc	8.19	2.50		µg/L	1	4/21/2022 7:17:06 PM
Dissolved Organic Carbon by SM 5310C				Batch ID: R75007		Analyst: SLL
Organic Carbon, Dissolved	8.17	0.500		mg/L	1	4/26/2022 12:46:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36198		Analyst: SLL
Nitrogen, Ammonia	0.129	0.100		mg/L	1	4/22/2022 12:51:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36192		Analyst: SLL
Phosphorus, Total (As P)	0.368	0.250		mg/L	1	4/26/2022 12:56:00 PM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R74924		Analyst: SLL
Total Suspended Solids	10.0	3.00		mg/L	1	4/22/2022 10:02:35 AM

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Ammonia by SM 4500 NH3G

Sample ID: **MB-36198**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74987**
Client ID: **MBLKW**	Batch ID: **36198**		Analysis Date: **4/22/2022**	SeqNo: **1538365**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100									

Sample ID: **LCS-36198**	SampType: **LCS**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74987**
Client ID: **LCSW**	Batch ID: **36198**		Analysis Date: **4/22/2022**	SeqNo: **1538366**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.496	0.100	0.5000	0	99.2	80.1	103				

Sample ID: **2204315-003DDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74987**
Client ID: **Ohop - out 41922**	Batch ID: **36198**		Analysis Date: **4/22/2022**	SeqNo: **1538370**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.141	0.100						0.1290	8.89	30	

Sample ID: **2204315-003DMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74987**
Client ID: **Ohop - out 41922**	Batch ID: **36198**		Analysis Date: **4/22/2022**	SeqNo: **1538371**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.668	0.100	0.5000	0.1290	108	51.9	133				

Sample ID: **2204315-003DMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74987**
Client ID: **Ohop - out 41922**	Batch ID: **36198**		Analysis Date: **4/22/2022**	SeqNo: **1538372**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.667	0.100	0.5000	0.1290	108	51.9	133	0.6680	0.150	30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Dissolved Organic Carbon by SM 5310C

Sample ID: **MB-75007**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **4/25/2022**	RunNo: **75007**
Client ID: **MBLKW**	Batch ID: **R75007**		Analysis Date: **4/25/2022**	SeqNo: **1538723**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	ND	0.500									

Sample ID: **LCS-75007**	SampType: **LCS**	Units: **mg/L**	Prep Date: **4/25/2022**	RunNo: **75007**
Client ID: **LCSW**	Batch ID: **R75007**		Analysis Date: **4/25/2022**	SeqNo: **1538724**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	5.35	0.500	5.000	0	107	91.5	110				

Sample ID: **2204315-002EDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/25/2022**	RunNo: **75007**
Client ID: **Ohop - mid 41922**	Batch ID: **R75007**		Analysis Date: **4/25/2022**	SeqNo: **1538727**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	8.42	0.500						8.392	0.274	20	

Sample ID: **2204315-002EMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **4/26/2022**	RunNo: **75007**
Client ID: **Ohop - mid 41922**	Batch ID: **R75007**		Analysis Date: **4/26/2022**	SeqNo: **1538728**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	13.6	0.500	5.000	8.392	103	80.9	124				

Sample ID: **2204315-002EMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **4/26/2022**	RunNo: **75007**
Client ID: **Ohop - mid 41922**	Batch ID: **R75007**		Analysis Date: **4/26/2022**	SeqNo: **1538729**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	13.7	0.500	5.000	8.392	105	80.9	124	13.55	0.779	30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **MB-36162** SampType: **MBLK** Units: **mg/L** Prep Date: **4/19/2022** RunNo: **74880**
Client ID: **MBLKW** Batch ID: **36162** Analysis Date: **4/19/2022** SeqNo: **1536126**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100									
Nitrate (as N)	ND	0.100									
Ortho-Phosphate (as P)	ND	0.525									

Sample ID: **LCS-36162** SampType: **LCS** Units: **mg/L** Prep Date: **4/19/2022** RunNo: **74880**
Client ID: **LCSW** Batch ID: **36162** Analysis Date: **4/19/2022** SeqNo: **1536127**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.763	0.100	0.7500	0	102	90	110				
Nitrate (as N)	0.777	0.100	0.7500	0	104	90	110				
Ortho-Phosphate (as P)	1.45	0.525	1.250	0	116	90	110				S

Sample ID: **2204275-001CDUP** SampType: **DUP** Units: **mg/L** Prep Date: **4/19/2022** RunNo: **74880**
Client ID: **BATCH** Batch ID: **36162** Analysis Date: **4/19/2022** SeqNo: **1536129**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	ND	0.100						0		20	
Nitrate (as N)	0.108	0.100						0.1100	1.83	20	
Ortho-Phosphate (as P)	ND	0.525						0		20	

Sample ID: **2204275-001CMS** SampType: **MS** Units: **mg/L** Prep Date: **4/19/2022** RunNo: **74880**
Client ID: **BATCH** Batch ID: **36162** Analysis Date: **4/19/2022** SeqNo: **1536130**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.776	0.100	0.7500	0	103	80	120				
Nitrate (as N)	0.853	0.100	0.7500	0.1100	99.1	80	120				
Ortho-Phosphate (as P)	1.49	0.525	1.250	0	119	80	120				

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Ion Chromatography by EPA Method 300.0

Sample ID: **2204275-001CMSD** SampType: **MSD** Units: **mg/L** Prep Date: **4/19/2022** RunNo: **74880**
Client ID: **BATCH** Batch ID: **36162** Analysis Date: **4/19/2022** SeqNo: **1536131**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrite (as N)	0.800	0.100	0.7500	0	107	80	120	0.7760	3.05	20	
Nitrate (as N)	0.869	0.100	0.7500	0.1100	101	80	120	0.8530	1.86	20	
Ortho-Phosphate (as P)	1.54	0.525	1.250	0	123	80	120	1.492	2.84	20	S

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Total Phosphorous by EPA Method 365.3

Sample ID: **MB-36192**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **4/21/2022**		RunNo: **75005**		
Client ID: **MBLKW**	Batch ID: **36192**					Analysis Date: **4/26/2022**		SeqNo: **1538634**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250									

Sample ID: **LCS-36192**	SampType: **LCS**			Units: **mg/L**		Prep Date: **4/21/2022**		RunNo: **75005**		
Client ID: **LCSW**	Batch ID: **36192**					Analysis Date: **4/26/2022**		SeqNo: **1538636**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.559	0.250	0.5000	0	112	65	135				

Sample ID: **2204302-001ADUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **4/21/2022**		RunNo: **75005**		
Client ID: **BATCH**	Batch ID: **36192**					Analysis Date: **4/26/2022**		SeqNo: **1538638**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250						0		30	

Sample ID: **2204302-001AMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **4/21/2022**		RunNo: **75005**		
Client ID: **BATCH**	Batch ID: **36192**					Analysis Date: **4/26/2022**		SeqNo: **1538639**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.687	0.250	0.5000	0.2046	96.4	65	135				

Sample ID: **2204302-001AMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **4/21/2022**		RunNo: **75005**		
Client ID: **BATCH**	Batch ID: **36192**					Analysis Date: **4/26/2022**		SeqNo: **1538640**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.723	0.250	0.5000	0.2046	104	65	135	0.6868	5.16	30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Total Suspended Solids (TSS) by SM 2540D

Sample ID: **MB-R74924**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74924**
Client ID: **MBLKW**	Batch ID: **R74924**		Analysis Date: **4/22/2022**	SeqNo: **1537330**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	ND	3.00									

Sample ID: **LCS-R74924**	SampType: **LCS**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74924**
Client ID: **LCSW**	Batch ID: **R74924**		Analysis Date: **4/22/2022**	SeqNo: **1537331**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	260	3.00	300.0	0	86.7	65	135				

Sample ID: **2204288-001BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74924**
Client ID: **BATCH**	Batch ID: **R74924**		Analysis Date: **4/22/2022**	SeqNo: **1537334**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	10.0	3.00						22.00	75.0	30	R

NOTES:
R - High RPD observed.

Sample ID: **2204334-003ADUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **4/22/2022**	RunNo: **74924**
Client ID: **BATCH**	Batch ID: **R74924**		Analysis Date: **4/22/2022**	SeqNo: **1537340**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	ND	3.00						0		30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-36175** SampType: **MBLK** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **MBLKW** Batch ID: **36175** Analysis Date: **4/21/2022** SeqNo: **1537227**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **LCS-36175** SampType: **LCS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **LCSW** Batch ID: **36175** Analysis Date: **4/21/2022** SeqNo: **1537228**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	106	2.00	100.0	0	106	85	115				
Zinc	111	2.50	100.0	0	111	85	115				

Sample ID: **2204289-001AMS** SampType: **MS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **BATCH** Batch ID: **36175** Analysis Date: **4/21/2022** SeqNo: **1537231**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	112	2.00	100.0	2.198	110	70	130				
Zinc	212	2.50	100.0	101.2	110	70	130				

Sample ID: **2204307-001AMS** SampType: **MS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **BATCH** Batch ID: **36175** Analysis Date: **4/21/2022** SeqNo: **1537240**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	191	2.00	100.0	93.14	98.2	70	130				
Zinc	363	2.50	100.0	273.5	89.8	70	130				

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-36175** SampType: **MBLK** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **MBLKW** Batch ID: **36175** Analysis Date: **4/22/2022** SeqNo: **1537578**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **2204289-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74917**
Client ID: **BATCH** Batch ID: **36175** Analysis Date: **4/22/2022** SeqNo: **1537580**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	3.13	2.00						2.198	35.1	30	
Zinc	96.0	2.50						101.2	5.32	30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36191** SampType: **MBLK** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **MBLKW** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538253**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.100									
2-Methylnaphthalene	ND	0.100									
1-Methylnaphthalene	ND	0.100									
2-Chloronaphthalene	ND	0.100									
Acenaphthene	ND	0.100									
Dimethyl phthalate	ND	2.00									
Acenaphthylene	ND	0.100									
Dibenzofuran	ND	0.100									
Fluorene	ND	0.100									
Diethyl phthalate	ND	0.800									
Pentachlorophenol	ND	0.500									
Phenanthrene	ND	0.100									
Anthracene	ND	0.100									
Carbazole	ND	0.100									
Di-n-butyl phthalate	ND	2.00									
Fluoranthene	ND	0.100									
Pyrene	ND	0.100									
Butyl benzyl phthalate	ND	2.00									
Benz(a)anthracene	ND	0.100									
Chrysene	ND	0.100									
Bis(2-ethylhexyl) phthalate	ND	2.00									
Di-n-octyl phthalate	ND	0.400									
Benzo(b)fluoranthene	ND	0.100									
Benzo(k)fluoranthene	ND	0.100									
Benzo(a)pyrene	ND	0.100									
Indeno(1,2,3-cd)pyrene	ND	0.100									
Dibenz(a,h)anthracene	ND	0.100									
Benzo(g,h,i)perylene	ND	0.100									
Surr: 2,4,6-Tribromophenol	2.68		4.000		66.9	38.8	146				
Surr: 2-Fluorobiphenyl	1.29		2.000		64.4	38.8	131				

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36191**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **4/21/2022**	RunNo: **74974**
Client ID: **MBLKW**	Batch ID: **36191**		Analysis Date: **4/22/2022**	SeqNo: **1538253**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Terphenyl-d14	1.50		2.000		75.1	46	144				

Sample ID: **LCS-36191**	SampType: **LCS**	Units: **µg/L**	Prep Date: **4/21/2022**	RunNo: **74974**
Client ID: **LCSW**	Batch ID: **36191**		Analysis Date: **4/22/2022**	SeqNo: **1538254**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2.61	0.100	4.000	0	65.1	49.4	107				
2-Methylnaphthalene	2.59	0.100	4.000	0	64.7	50.9	107				
1-Methylnaphthalene	2.48	0.100	4.000	0	62.0	51.1	106				
2-Chloronaphthalene	2.53	0.100	4.000	0	63.2	55.6	106				
Acenaphthene	2.67	0.100	4.000	0	66.7	51.2	105				
Dimethyl phthalate	3.07	2.00	4.000	0	76.7	61.9	114				
Acenaphthylene	2.51	0.100	4.000	0	62.8	53.5	107				
Dibenzofuran	2.77	0.100	4.000	0	69.1	57.9	111				
Fluorene	2.87	0.100	4.000	0	71.7	56	114				
Diethyl phthalate	3.17	0.800	4.000	0	79.2	52.9	133				
Pentachlorophenol	2.71	0.500	4.000	0	67.6	45	138				
Phenanthrene	2.70	0.100	4.000	0	67.6	56.4	110				
Anthracene	2.53	0.100	4.000	0	63.3	53.2	107				
Carbazole	2.95	0.100	4.000	0	73.8	61.9	115				
Di-n-butyl phthalate	3.05	2.00	4.000	0	76.4	61.3	123				
Fluoranthene	2.75	0.100	4.000	0	68.7	60	115				
Pyrene	2.80	0.100	4.000	0	70.1	59	115				
Butyl benzyl phthalate	3.30	2.00	4.000	0	82.6	64	133				
Benz(a)anthracene	2.77	0.100	4.000	0	69.4	56.5	119				
Chrysene	2.67	0.100	4.000	0	66.7	56.7	108				
Bis(2-ethylhexyl) phthalate	3.21	2.00	4.000	0	80.2	47.8	127				
Di-n-octyl phthalate	3.03	0.400	4.000	0	75.7	38.4	126				
Benzo(b)fluoranthene	2.52	0.100	4.000	0	63.0	51.6	115				
Benzo(k)fluoranthene	2.99	0.100	4.000	0	74.7	52.1	125				

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **LCS-36191** SampType: **LCS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **LCSW** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538254**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	2.57	0.100	4.000	0	64.2	51.6	120				
Indeno(1,2,3-cd)pyrene	2.90	0.100	4.000	0	72.5	46.4	111				
Dibenz(a,h)anthracene	2.85	0.100	4.000	0	71.3	47.7	116				
Benzo(g,h,i)perylene	2.83	0.100	4.000	0	70.8	46.1	117				
Surr: 2,4,6-Tribromophenol	2.61		4.000		65.2	38.8	146				
Surr: 2-Fluorobiphenyl	1.10		2.000		55.0	38.8	131				
Surr: Terphenyl-d14	1.30		2.000		65.0	46	144				

Sample ID: **2204305-001CMS** SampType: **MS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **BATCH** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538257**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2.77	0.0995	3.979	0	69.6	56.4	103				
2-Methylnaphthalene	2.81	0.0995	3.979	0	70.7	55.9	104				
1-Methylnaphthalene	2.65	0.0995	3.979	0	66.5	57.4	102				
2-Chloronaphthalene	2.73	0.0995	3.979	0	68.5	55.2	109				
Acenaphthene	2.67	0.0995	3.979	0	67.2	53.3	105				
Dimethyl phthalate	3.12	1.99	3.979	0	78.4	9.76	144				
Acenaphthylene	2.65	0.0995	3.979	0	66.6	54.6	106				
Dibenzofuran	3.03	0.0995	3.979	0	76.2	61.5	109				
Fluorene	3.11	0.0995	3.979	0	78.1	58.3	112				
Diethyl phthalate	3.43	0.796	3.979	0	86.3	13.2	139				
Pentachlorophenol	2.98	0.497	3.979	0	74.9	5	178				
Phenanthrene	3.00	0.0995	3.979	0	75.3	58	107				
Anthracene	2.22	0.0995	3.979	0	55.9	51.6	108				
Carbazole	2.97	0.0995	3.979	0	74.6	65.5	111				
Di-n-butyl phthalate	3.39	1.99	3.979	0	85.3	7.08	146				
Fluoranthene	3.03	0.0995	3.979	0	76.1	57.2	115				
Pyrene	2.84	0.0995	3.979	0	71.3	53.9	115				
Butyl benzyl phthalate	3.54	1.99	3.979	0	88.9	11.1	156				

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2204305-001CMS** SampType: **MS** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **BATCH** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538257**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	2.90	0.0995	3.979	0	72.9	49.4	120				
Chrysene	2.82	0.0995	3.979	0	70.9	51.9	106				
Bis(2-ethylhexyl) phthalate	3.33	1.99	3.979	0	83.7	5	137				
Di-n-octyl phthalate	3.20	0.398	3.979	0	80.4	5	134				
Benzo(b)fluoranthene	2.65	0.0995	3.979	0	66.6	44.4	114				
Benzo(k)fluoranthene	2.97	0.0995	3.979	0	74.6	41.8	121				
Benzo(a)pyrene	2.20	0.0995	3.979	0	55.3	37.2	123				
Indeno(1,2,3-cd)pyrene	2.89	0.0995	3.979	0.04418	71.5	28.9	112				
Dibenz(a,h)anthracene	2.87	0.0995	3.979	0.05582	70.8	31.1	116				
Benzo(g,h,i)perylene	2.77	0.0995	3.979	0.04131	68.6	29.3	116				
Surr: 2,4,6-Tribromophenol	2.66		3.979		66.8	38.8	146				
Surr: 2-Fluorobiphenyl	1.21		1.989		61.1	38.8	131				
Surr: Terphenyl-d14	1.41		1.989		70.6	46	144				

Sample ID: **2204316-001DDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **BATCH** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538262**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.109						0		30	
2-Methylnaphthalene	ND	0.109						0		30	
1-Methylnaphthalene	ND	0.109						0		30	
2-Chloronaphthalene	ND	0.109						0		30	
Acenaphthene	ND	0.109						0		30	
Dimethyl phthalate	ND	2.17						0		30	
Acenaphthylene	ND	0.109						0		30	
Dibenzofuran	ND	0.109						0		30	
Fluorene	ND	0.109						0		30	
Diethyl phthalate	ND	0.869						0		30	
Pentachlorophenol	ND	0.543						0		30	
Phenanthrene	ND	0.109						0		30	

Work Order: 2204315
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2204316-001DDUP** SampType: **DUP** Units: **µg/L** Prep Date: **4/21/2022** RunNo: **74974**
Client ID: **BATCH** Batch ID: **36191** Analysis Date: **4/22/2022** SeqNo: **1538262**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Anthracene	ND	0.109						0		30	
Carbazole	ND	0.109						0		30	
Di-n-butyl phthalate	ND	2.17						0		30	
Fluoranthene	ND	0.109						0		30	
Pyrene	ND	0.109						0		30	
Butyl benzyl phthalate	ND	2.17						0		30	
Benz(a)anthracene	ND	0.109						0		30	
Chrysene	ND	0.109						0		30	
Bis(2-ethylhexyl) phthalate	ND	2.17						0		30	
Di-n-octyl phthalate	ND	0.435						0		30	
Benzo(b)fluoranthene	ND	0.109						0		30	
Benzo(k)fluoranthene	ND	0.109						0		30	
Benzo(a)pyrene	ND	0.109						0		30	
Indeno(1,2,3-cd)pyrene	ND	0.109						0		30	
Dibenz(a,h)anthracene	ND	0.109						0		30	
Benzo(g,h,i)perylene	ND	0.109						0		30	
Surr: 2,4,6-Tribromophenol	3.05		4.346		70.1	38.8	146		0	30	
Surr: 2-Fluorobiphenyl	1.20		2.173		55.0	38.8	131		0		
Surr: Terphenyl-d14	1.53		2.173		70.5	46	144		0		

Sample Log-In Check List

Client Name:	LLTK	Work Order Number:	2204315
Logged by:	Matt Langston	Date Received:	4/19/2022 2:30:00 PM

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	No	☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes	☑	No	☐	NA ☐
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☑	No	☐	NA ☐
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	13.8

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 4/19/22 Page: 1 of: 1

Laboratory Project No (internal): 2204315

Project Name: Ohop Creek Stormwater

Special Remarks:
- See emailed instructions for pulling WSU & UWT grab samples.
- Contact PM for pickup.

Project No:

Client: Long Live the Kings

Collected by: LLTK

Address: 1326 5th ave #450

Location: Ohop Creek

City, State, Zip: Seattle, WA, 98101

Report To (PM): Ashley Bagley ~~Fabyley~~

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

Telephone: 425-342-0307

PM Email: abagley@11thkiorg

Fax:

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	Ohop-in41922	4/18	5PM	SW							x		x		x			Ammonia, DOC, TSS, Total Phosphorus
2	Ohop-mid41922	4/18	5PM	SW							x		x		x			Ammonia, DOC, TSS, Total Phosphorus
3	Ohop-out41922	4/18	5PM	SW							x		x		x			Ammonia, DOC, TSS, Total phosphorus
4																		
5																		• Split volume for WSU & UWT for testing
6																		↳ volume dependant Contact PM w/ concerns.
7																		
8																		
9																		
10																		

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:
☑ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day _____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x	Jack McDermott	4/19/22 2:00PM	x	Elisabeth Saucray	4/19/22 14:30
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Long Live The Kings
Ashley Bagley
1326 5th Ave #450
Seattle, WA 98101

RE: Ohop Creek Stormwater Filtration
Work Order Number: 2205190

May 17, 2022

Attention Ashley Bagley:

Fremont Analytical, Inc. received 3 sample(s) on 5/9/2022 for the analyses presented in the following report.

Ammonia by SM 4500 NH3G
Dissolved Organic Carbon by SM 5310C
Ion Chromatography by EPA Method 300.0
Semi-Volatile Organic Compounds by EPA 8270 (SIM)
Total Metals by EPA Method 200.8
Total Phosphorous by EPA Method 365.3
Total Suspended Solids (TSS) by SM 2540D

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Brianna Barnes
Project Manager

Date: *05/17/2022*

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration
Work Order: 2205190

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2205190-001	Ohop-in50922	05/07/2022 10:50 AM	05/09/2022 1:29 PM
2205190-002	Ohop-mid50922	05/07/2022 10:50 AM	05/09/2022 1:29 PM
2205190-003	Ohop-out50922	05/07/2022 10:50 AM	05/09/2022 1:29 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Case Narrative

WO#: **2205190**
Date: **5/17/2022**

CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

I. SAMPLE RECEIPT:
Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:
Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:
Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.
2205190-001C
C-IC-ANIONS has been Sub Contracted.
2205190-001C
PREP-IC-ANIONS has been Sub Contracted.
2205190-002C
C-IC-ANIONS has been Sub Contracted.
2205190-002C
PREP-IC-ANIONS has been Sub Contracted.
2205190-003C
C-IC-ANIONS has been Sub Contracted.
2205190-003C
PREP-IC-ANIONS has been Sub Contracted.

Qualifiers:

* - Flagged value is not within established control limits
B - Analyte detected in the associated Method Blank
D - Dilution was required
E - Value above quantitation range
H - Holding times for preparation or analysis exceeded
I - Analyte with an internal standard that does not meet established acceptance criteria
J - Analyte detected below Reporting Limit
N - Tentatively Identified Compound (TIC)
Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
S - Spike recovery outside accepted recovery limits
ND - Not detected at the Reporting Limit
R - High relative percent difference observed

Acronyms:

%Rec - Percent Recovery
CCB - Continued Calibration Blank
CCV - Continued Calibration Verification
DF - Dilution Factor
DUP - Sample Duplicate
HEM - Hexane Extractable Material
ICV - Initial Calibration Verification
LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
MCL - Maximum Contaminant Level
MB or MBLANK - Method Blank
MDL - Method Detection Limit
MS/MSD - Matrix Spike / Matrix Spike Duplicate
PDS - Post Digestion Spike
Ref Val - Reference Value
REP - Sample Replicate
RL - Reporting Limit
RPD - Relative Percent Difference
SD - Serial Dilution
SGT - Silica Gel Treatment
SPK - Spike
Surr - Surrogate

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-001
Matrix: Stormwater
Client Sample ID: **Ohop-in50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36379		Analyst: OK
Naphthalene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
2-Methylnaphthalene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
1-Methylnaphthalene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
2-Chloronaphthalene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Acenaphthene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Dimethyl phthalate	ND	1.97		µg/L	1	5/11/2022 12:43:18 PM
Acenaphthylene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Dibenzofuran	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Fluorene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Diethyl phthalate	ND	0.787		µg/L	1	5/11/2022 12:43:18 PM
Pentachlorophenol	ND	0.492		µg/L	1	5/11/2022 12:43:18 PM
Phenanthrene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Anthracene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Carbazole	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Di-n-butyl phthalate	ND	1.97		µg/L	1	5/11/2022 12:43:18 PM
Fluoranthene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Pyrene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Butyl benzyl phthalate	ND	1.97		µg/L	1	5/11/2022 12:43:18 PM
Benz(a)anthracene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Chrysene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Bis(2-ethylhexyl) phthalate	ND	1.97		µg/L	1	5/11/2022 12:43:18 PM
Di-n-octyl phthalate	ND	0.393		µg/L	1	5/11/2022 12:43:18 PM
Benzo(b)fluoranthene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Benzo(k)fluoranthene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Benzo(a)pyrene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Indeno(1,2,3-cd)pyrene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Dibenz(a,h)anthracene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Benzo(g,h,i)perylene	ND	0.0983		µg/L	1	5/11/2022 12:43:18 PM
Surr: 2,4,6-Tribromophenol	93.9	38.8 - 146		%Rec	1	5/11/2022 12:43:18 PM
Surr: 2-Fluorobiphenyl	86.0	38.8 - 131		%Rec	1	5/11/2022 12:43:18 PM
Surr: Terphenyl-d14	73.5	46 - 144		%Rec	1	5/11/2022 12:43:18 PM
Total Metals by EPA Method 200.8				Batch ID: 36409		Analyst: EH
Copper	2.96	2.00		µg/L	1	5/12/2022 3:31:48 PM
Zinc	22.6	2.50		µg/L	1	5/12/2022 3:31:48 PM

Analytical Report

Work Order: **2205190**
Date Reported: **5/17/2022**

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-001
Matrix: Stormwater
Client Sample ID: **Ohop-in50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Organic Carbon by SM 5310C				Batch ID: R75437		Analyst: SLL
Organic Carbon, Dissolved	1.57	0.500		mg/L	1	5/14/2022 12:30:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36381		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	5/10/2022 2:28:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36432		Analyst: SLL
Phosphorus, Total (As P)	ND	0.250		mg/L	1	5/16/2022 11:31:00 AM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R75261		Analyst: ALT
Total Suspended Solids	6.00	3.00		mg/L	1	5/9/2022 9:07:19 AM

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-002
Matrix: Stormwater
Client Sample ID: **Ohop-mid50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36379		Analyst: OK
Naphthalene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
2-Methylnaphthalene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
1-Methylnaphthalene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
2-Chloronaphthalene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Acenaphthene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Dimethyl phthalate	ND	1.99		µg/L	1	5/11/2022 1:40:24 PM
Acenaphthylene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Dibenzofuran	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Fluorene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Diethyl phthalate	ND	0.796		µg/L	1	5/11/2022 1:40:24 PM
Pentachlorophenol	ND	0.497		µg/L	1	5/11/2022 1:40:24 PM
Phenanthrene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Anthracene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Carbazole	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Di-n-butyl phthalate	ND	1.99		µg/L	1	5/11/2022 1:40:24 PM
Fluoranthene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Pyrene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Butyl benzyl phthalate	ND	1.99		µg/L	1	5/11/2022 1:40:24 PM
Benz(a)anthracene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Chrysene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Bis(2-ethylhexyl) phthalate	ND	1.99		µg/L	1	5/11/2022 1:40:24 PM
Di-n-octyl phthalate	ND	0.398		µg/L	1	5/11/2022 1:40:24 PM
Benzo(b)fluoranthene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Benzo(k)fluoranthene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Benzo(a)pyrene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Indeno(1,2,3-cd)pyrene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Dibenz(a,h)anthracene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Benzo(g,h,i)perylene	ND	0.0995		µg/L	1	5/11/2022 1:40:24 PM
Surr: 2,4,6-Tribromophenol	88.5	38.8 - 146		%Rec	1	5/11/2022 1:40:24 PM
Surr: 2-Fluorobiphenyl	78.3	38.8 - 131		%Rec	1	5/11/2022 1:40:24 PM
Surr: Terphenyl-d14	57.9	46 - 144		%Rec	1	5/11/2022 1:40:24 PM
Total Metals by EPA Method 200.8				Batch ID: 36409		Analyst: EH
Copper	4.34	2.00		µg/L	1	5/12/2022 3:37:27 PM
Zinc	7.81	2.50		µg/L	1	5/12/2022 3:37:27 PM

Analytical Report

Work Order: **2205190**
Date Reported: **5/17/2022**

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-002
Matrix: Stormwater
Client Sample ID: **Ohop-mid50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Organic Carbon by SM 5310C				Batch ID: R75437		Analyst: SLL
Organic Carbon, Dissolved	8.09	0.500		mg/L	1	5/14/2022 1:59:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36381		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	5/10/2022 2:49:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36432		Analyst: SLL
Phosphorus, Total (As P)	0.750	0.250		mg/L	1	5/16/2022 11:40:00 AM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R75261		Analyst: ALT
Total Suspended Solids	11.0	3.00		mg/L	1	5/9/2022 9:07:19 AM

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-003
Matrix: Stormwater
Client Sample ID: **Ohop-out50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Semi-Volatile Organic Compounds by EPA 8270 (SIM)				Batch ID: 36379		Analyst: OK
Naphthalene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
2-Methylnaphthalene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
1-Methylnaphthalene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
2-Chloronaphthalene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Acenaphthene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Dimethyl phthalate	ND	1.97		µg/L	1	5/11/2022 2:08:38 PM
Acenaphthylene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Dibenzofuran	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Fluorene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Diethyl phthalate	ND	0.788		µg/L	1	5/11/2022 2:08:38 PM
Pentachlorophenol	ND	0.493		µg/L	1	5/11/2022 2:08:38 PM
Phenanthrene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Anthracene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Carbazole	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Di-n-butyl phthalate	ND	1.97		µg/L	1	5/11/2022 2:08:38 PM
Fluoranthene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Pyrene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Butyl benzyl phthalate	ND	1.97		µg/L	1	5/11/2022 2:08:38 PM
Benz(a)anthracene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Chrysene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Bis(2-ethylhexyl) phthalate	ND	1.97		µg/L	1	5/11/2022 2:08:38 PM
Di-n-octyl phthalate	ND	0.394		µg/L	1	5/11/2022 2:08:38 PM
Benzo(b)fluoranthene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Benzo(k)fluoranthene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Benzo(a)pyrene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Indeno(1,2,3-cd)pyrene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Dibenz(a,h)anthracene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Benzo(g,h,i)perylene	ND	0.0985		µg/L	1	5/11/2022 2:08:38 PM
Surr: 2,4,6-Tribromophenol	95.6	38.8 - 146		%Rec	1	5/11/2022 2:08:38 PM
Surr: 2-Fluorobiphenyl	85.5	38.8 - 131		%Rec	1	5/11/2022 2:08:38 PM
Surr: Terphenyl-d14	60.3	46 - 144		%Rec	1	5/11/2022 2:08:38 PM
Total Metals by EPA Method 200.8				Batch ID: 36409		Analyst: EH
Copper	4.06	2.00		µg/L	1	5/12/2022 3:40:16 PM
Zinc	9.58	2.50		µg/L	1	5/12/2022 3:40:16 PM

Analytical Report

Work Order: **2205190**
Date Reported: **5/17/2022**

Client: Long Live The Kings
Collection Date: 5/7/2022 10:50:00 AM
Project: Ohop Creek Stormwater Filtration
Lab ID: 2205190-003
Matrix: Stormwater
Client Sample ID: **Ohop-out50922**

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Dissolved Organic Carbon by SM 5310C				Batch ID: R75437		Analyst: SLL
Organic Carbon, Dissolved	7.53	0.500		mg/L	1	5/14/2022 2:21:00 AM
Ammonia by SM 4500 NH3G				Batch ID: 36381		Analyst: SLL
Nitrogen, Ammonia	ND	0.100		mg/L	1	5/10/2022 2:54:00 PM
Total Phosphorous by EPA Method 365.3				Batch ID: 36432		Analyst: SLL
Phosphorus, Total (As P)	0.649	0.250		mg/L	1	5/16/2022 11:43:00 AM
Total Suspended Solids (TSS) by SM 2540D				Batch ID: R75261		Analyst: ALT
Total Suspended Solids	8.00	3.00		mg/L	1	5/9/2022 9:07:19 AM

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Ammonia by SM 4500 NH3G

Sample ID: **MB-36381**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **5/10/2022**			RunNo: **75375**		
Client ID: **MBLKW**	Batch ID: **36381**					Analysis Date: **5/10/2022**			SeqNo: **1546859**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100									

Sample ID: **LCS-36381**	SampType: **LCS**			Units: **mg/L**		Prep Date: **5/10/2022**			RunNo: **75375**		
Client ID: **LCSW**	Batch ID: **36381**					Analysis Date: **5/10/2022**			SeqNo: **1546860**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.522	0.100	0.5000	0	104	80.1	103				S

NOTES:
S - Outlying spike recovery observed (high bias). Detections will be qualified with a *.

Sample ID: **2205190-001DDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **5/10/2022**			RunNo: **75375**		
Client ID: **Ohop-in50922**	Batch ID: **36381**					Analysis Date: **5/10/2022**			SeqNo: **1546862**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	ND	0.100						0		30	

Sample ID: **2205190-001DMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **5/10/2022**			RunNo: **75375**		
Client ID: **Ohop-in50922**	Batch ID: **36381**					Analysis Date: **5/10/2022**			SeqNo: **1546863**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.444	0.100	0.5000	0	88.8	51.9	133				

Sample ID: **2205190-001DMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **5/10/2022**			RunNo: **75375**		
Client ID: **Ohop-in50922**	Batch ID: **36381**					Analysis Date: **5/10/2022**			SeqNo: **1546864**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Nitrogen, Ammonia	0.445	0.100	0.5000	0	89.0	51.9	133	0.4440	0.225	30	

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Dissolved Organic Carbon by SM 5310C

Sample ID: **MB-75437**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **5/13/2022**	RunNo: **75437**
Client ID: **MBLKW**	Batch ID: **R75437**		Analysis Date: **5/13/2022**	SeqNo: **1548027**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	ND	0.500									

Sample ID: **LCS-75437**	SampType: **LCS**	Units: **mg/L**	Prep Date: **5/14/2022**	RunNo: **75437**
Client ID: **LCSW**	Batch ID: **R75437**		Analysis Date: **5/14/2022**	SeqNo: **1548028**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	4.92	0.500	5.000	0	98.4	91.5	110				

Sample ID: **2205190-001EDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **5/14/2022**	RunNo: **75437**
Client ID: **Ohop-in50922**	Batch ID: **R75437**		Analysis Date: **5/14/2022**	SeqNo: **1548030**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	1.57	0.500						1.568	0.191	20	

Sample ID: **2205190-001EMS**	SampType: **MS**	Units: **mg/L**	Prep Date: **5/14/2022**	RunNo: **75437**
Client ID: **Ohop-in50922**	Batch ID: **R75437**		Analysis Date: **5/14/2022**	SeqNo: **1548031**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	6.62	0.500	5.000	1.568	101	80.9	124				

Sample ID: **2205190-001EMSD**	SampType: **MSD**	Units: **mg/L**	Prep Date: **5/14/2022**	RunNo: **75437**
Client ID: **Ohop-in50922**	Batch ID: **R75437**		Analysis Date: **5/14/2022**	SeqNo: **1548032**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Organic Carbon, Dissolved	6.48	0.500	5.000	1.568	98.3	80.9	124	6.625	2.17	30	

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Phosphorous by EPA Method 365.3

Sample ID: **MB-36432**	SampType: **MBLK**			Units: **mg/L**		Prep Date: **5/13/2022**			RunNo: **75434**		
Client ID: **MBLKW**	Batch ID: **36432**					Analysis Date: **5/16/2022**			SeqNo: **1547965**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250									

Sample ID: **LCS-36432**	SampType: **LCS**			Units: **mg/L**		Prep Date: **5/13/2022**			RunNo: **75434**		
Client ID: **LCSW**	Batch ID: **36432**					Analysis Date: **5/16/2022**			SeqNo: **1547967**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.500	0.250	0.5000	0	100	65	135				

Sample ID: **2205190-001DDUP**	SampType: **DUP**			Units: **mg/L**		Prep Date: **5/13/2022**			RunNo: **75434**		
Client ID: **Ohop-in50922**	Batch ID: **36432**					Analysis Date: **5/16/2022**			SeqNo: **1547971**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	ND	0.250						0		30	

Sample ID: **2205190-001DMS**	SampType: **MS**			Units: **mg/L**		Prep Date: **5/13/2022**			RunNo: **75434**		
Client ID: **Ohop-in50922**	Batch ID: **36432**					Analysis Date: **5/16/2022**			SeqNo: **1547973**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.495	0.250	0.5000	0	99.0	65	135				

Sample ID: **2205190-001DMSD**	SampType: **MSD**			Units: **mg/L**		Prep Date: **5/13/2022**			RunNo: **75434**		
Client ID: **Ohop-in50922**	Batch ID: **36432**					Analysis Date: **5/16/2022**			SeqNo: **1547975**		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phosphorus, Total (As P)	0.531	0.250	0.5000	0	106	65	135	0.4952	6.98	30	

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Suspended Solids (TSS) by SM 2540D

Sample ID: **MB-R75261**	SampType: **MBLK**	Units: **mg/L**	Prep Date: **5/9/2022**	RunNo: **75261**
Client ID: **MBLKW**	Batch ID: **R75261**		Analysis Date: **5/9/2022**	SeqNo: **1543987**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	ND	3.00									

Sample ID: **LCS-R75261**	SampType: **LCS**	Units: **mg/L**	Prep Date: **5/9/2022**	RunNo: **75261**
Client ID: **LCSW**	Batch ID: **R75261**		Analysis Date: **5/9/2022**	SeqNo: **1543988**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	288	3.00	300.0	0	96.0	65	135				

Sample ID: **2205075-007BDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **5/9/2022**	RunNo: **75261**
Client ID: **BATCH**	Batch ID: **R75261**		Analysis Date: **5/9/2022**	SeqNo: **1543990**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	6.00	3.00						5.000	18.2	30	

Sample ID: **2205144-001CDUP**	SampType: **DUP**	Units: **mg/L**	Prep Date: **5/9/2022**	RunNo: **75261**
Client ID: **BATCH**	Batch ID: **R75261**		Analysis Date: **5/9/2022**	SeqNo: **1543997**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Suspended Solids	124	3.00						128.0	3.17	30	

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **MB-36409** SampType: **MBLK** Units: **µg/L** Prep Date: **5/12/2022** RunNo: **75374**
Client ID: **MBLKW** Batch ID: **36409** Analysis Date: **5/12/2022** SeqNo: **1546827**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00									
Zinc	ND	2.50									

Sample ID: **LCS-36409** SampType: **LCS** Units: **µg/L** Prep Date: **5/12/2022** RunNo: **75374**
Client ID: **LCSW** Batch ID: **36409** Analysis Date: **5/12/2022** SeqNo: **1546828**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	100	2.00	100.0	0	100	85	115				
Zinc	108	2.50	100.0	0	108	85	115				

Sample ID: **2205177-001BDUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/12/2022** RunNo: **75374**
Client ID: **BATCH** Batch ID: **36409** Analysis Date: **5/12/2022** SeqNo: **1546830**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	ND	2.00						0		30	
Zinc	5.66	2.50						5.331	6.00	30	

Sample ID: **2205177-001BMS** SampType: **MS** Units: **µg/L** Prep Date: **5/12/2022** RunNo: **75374**
Client ID: **BATCH** Batch ID: **36409** Analysis Date: **5/12/2022** SeqNo: **1546831**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	91.9	2.00	100.0	1.412	90.5	70	130				
Zinc	102	2.50	100.0	5.331	96.8	70	130				

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Total Metals by EPA Method 200.8

Sample ID: **2205190-001BMS** SampType: **MS** Units: **µg/L** Prep Date: **5/12/2022** RunNo: **75374**
Client ID: **Ohop-in50922** Batch ID: **36409** Analysis Date: **5/12/2022** SeqNo: **1546836**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	98.4	2.00	100.0	2.965	95.4	70	130				
Zinc	122	2.50	100.0	22.63	98.9	70	130				

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36379** SampType: **MBLK** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **MBLKW** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546033**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.100									
2-Methylnaphthalene	ND	0.100									
1-Methylnaphthalene	ND	0.100									
2-Chloronaphthalene	ND	0.100									
Acenaphthene	ND	0.100									
Dimethyl phthalate	ND	2.00									
Acenaphthylene	ND	0.100									
Dibenzofuran	ND	0.100									
Fluorene	ND	0.100									
Diethyl phthalate	ND	0.800									
Pentachlorophenol	ND	0.500									
Phenanthrene	ND	0.100									
Anthracene	ND	0.100									
Carbazole	ND	0.100									
Di-n-butyl phthalate	ND	2.00									
Fluoranthene	ND	0.100									
Pyrene	ND	0.100									
Butyl benzyl phthalate	ND	2.00									
Benz(a)anthracene	ND	0.100									
Chrysene	ND	0.100									
Bis(2-ethylhexyl) phthalate	ND	2.00									
Di-n-octyl phthalate	ND	0.400									
Benzo(b)fluoranthene	ND	0.100									
Benzo(k)fluoranthene	ND	0.100									
Benzo(a)pyrene	ND	0.100									
Indeno(1,2,3-cd)pyrene	ND	0.100									
Dibenz(a,h)anthracene	ND	0.100									
Benzo(g,h,i)perylene	ND	0.100									
Surr: 2,4,6-Tribromophenol	2.76		4.000		69.0	38.8	146				
Surr: 2-Fluorobiphenyl	1.28		2.000		64.1	38.8	131				

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **MB-36379**	SampType: **MBLK**	Units: **µg/L**	Prep Date: **5/10/2022**	RunNo: **75348**
Client ID: **MBLKW**	Batch ID: **36379**		Analysis Date: **5/11/2022**	SeqNo: **1546033**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: Terphenyl-d14	1.45		2.000		72.4	46	144				

Sample ID: **LCS-36379**	SampType: **LCS**	Units: **µg/L**	Prep Date: **5/10/2022**	RunNo: **75348**
Client ID: **LCSW**	Batch ID: **36379**		Analysis Date: **5/11/2022**	SeqNo: **1546034**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	3.64	0.100	4.000	0	90.9	49.4	107				
2-Methylnaphthalene	4.08	0.100	4.000	0	102	50.9	107				
1-Methylnaphthalene	4.05	0.100	4.000	0	101	51.1	106				
2-Chloronaphthalene	4.14	0.100	4.000	0	104	55.6	106				
Acenaphthene	3.93	0.100	4.000	0	98.3	51.2	105				
Dimethyl phthalate	4.37	2.00	4.000	0	109	61.9	114				
Acenaphthylene	4.07	0.100	4.000	0	102	53.5	107				
Dibenzofuran	3.86	0.100	4.000	0	96.5	57.9	111				
Fluorene	3.97	0.100	4.000	0	99.3	56	114				
Diethyl phthalate	4.08	0.800	4.000	0	102	52.9	133				
Pentachlorophenol	3.63	0.500	4.000	0	90.9	45	138				
Phenanthrene	3.99	0.100	4.000	0	99.7	56.4	110				
Anthracene	4.05	0.100	4.000	0	101	53.2	107				
Carbazole	4.17	0.100	4.000	0	104	61.9	115				
Di-n-butyl phthalate	4.24	2.00	4.000	0	106	61.3	123				
Fluoranthene	4.01	0.100	4.000	0	100	60	115				
Pyrene	3.98	0.100	4.000	0	99.6	59	115				
Butyl benzyl phthalate	4.41	2.00	4.000	0	110	64	133				
Benz(a)anthracene	4.22	0.100	4.000	0	106	56.5	119				
Chrysene	3.96	0.100	4.000	0	98.9	56.7	108				
Bis(2-ethylhexyl) phthalate	3.61	2.00	4.000	0	90.2	47.8	127				
Di-n-octyl phthalate	3.51	0.400	4.000	0	87.8	38.4	126				
Benzo(b)fluoranthene	3.78	0.100	4.000	0	94.6	51.6	115				
Benzo(k)fluoranthene	3.65	0.100	4.000	0	91.3	52.1	125				

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **LCS-36379** SampType: **LCS** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **LCSW** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546034**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzo(a)pyrene	3.39	0.100	4.000	0	84.8	51.6	120				
Indeno(1,2,3-cd)pyrene	3.37	0.100	4.000	0	84.2	46.4	111				
Dibenz(a,h)anthracene	3.31	0.100	4.000	0	82.7	47.7	116				
Benzo(g,h,i)perylene	3.32	0.100	4.000	0	83.0	46.1	117				
Surr: 2,4,6-Tribromophenol	3.58		4.000		89.6	38.8	146				
Surr: 2-Fluorobiphenyl	1.68		2.000		84.0	38.8	131				
Surr: Terphenyl-d14	1.64		2.000		82.0	46	144				

Sample ID: **2205113-001CMS** SampType: **MS** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **BATCH** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546036**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	3.64	0.100	4.011	0	90.7	56.4	103				
2-Methylnaphthalene	4.12	0.100	4.011	0	103	55.9	104				
1-Methylnaphthalene	4.10	0.100	4.011	0	102	57.4	102				
2-Chloronaphthalene	4.18	0.100	4.011	0	104	55.2	109				
Acenaphthene	3.91	0.100	4.011	0	97.5	53.3	105				
Dimethyl phthalate	4.44	2.01	4.011	0	111	9.76	144				
Acenaphthylene	4.04	0.100	4.011	0	101	54.6	106				
Dibenzofuran	3.90	0.100	4.011	0	97.2	61.5	109				
Fluorene	3.99	0.100	4.011	0	99.5	58.3	112				
Diethyl phthalate	4.12	0.802	4.011	0	103	13.2	139				
Pentachlorophenol	3.58	0.501	4.011	0	89.2	5	178				
Phenanthrene	3.99	0.100	4.011	0	99.5	58	107				
Anthracene	3.69	0.100	4.011	0	92.0	51.6	108				
Carbazole	4.16	0.100	4.011	0	104	65.5	111				
Di-n-butyl phthalate	4.15	2.01	4.011	0	103	7.08	146				
Fluoranthene	4.01	0.100	4.011	0	99.9	57.2	115				
Pyrene	3.92	0.100	4.011	0	97.7	53.9	115				
Butyl benzyl phthalate	4.31	2.01	4.011	0	108	11.1	156				

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2205113-001CMS** SampType: **MS** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **BATCH** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546036**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	3.89	0.100	4.011	0	97.1	49.4	120				
Chrysene	3.69	0.100	4.011	0	91.9	51.9	106				
Bis(2-ethylhexyl) phthalate	2.48	2.01	4.011	0	61.7	5	137				
Di-n-octyl phthalate	2.41	0.401	4.011	0	60.1	5	134				
Benzo(b)fluoranthene	3.31	0.100	4.011	0	82.5	44.4	114				
Benzo(k)fluoranthene	3.00	0.100	4.011	0	74.7	41.8	121				
Benzo(a)pyrene	2.41	0.100	4.011	0	60.1	37.2	123				
Indeno(1,2,3-cd)pyrene	2.66	0.100	4.011	0	66.2	28.9	112				
Dibenz(a,h)anthracene	2.60	0.100	4.011	0	64.8	31.1	116				
Benzo(g,h,i)perylene	2.63	0.100	4.011	0	65.5	29.3	116				
Surr: 2,4,6-Tribromophenol	3.40		4.011		84.8	38.8	146				
Surr: 2-Fluorobiphenyl	1.68		2.005		84.0	38.8	131				
Surr: Terphenyl-d14	1.48		2.005		74.0	46	144				

Sample ID: **2205190-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **Ohop-in50922** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546038**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	ND	0.0979						0		30	
2-Methylnaphthalene	ND	0.0979						0		30	
1-Methylnaphthalene	ND	0.0979						0		30	
2-Chloronaphthalene	ND	0.0979						0		30	
Acenaphthene	ND	0.0979						0		30	
Dimethyl phthalate	ND	1.96						0		30	
Acenaphthylene	ND	0.0979						0		30	
Dibenzofuran	ND	0.0979						0		30	
Fluorene	ND	0.0979						0		30	
Diethyl phthalate	ND	0.783						0		30	
Pentachlorophenol	ND	0.490						0		30	
Phenanthrene	ND	0.0979						0		30	

Work Order: 2205190
CLIENT: Long Live The Kings
Project: Ohop Creek Stormwater Filtration

QC SUMMARY REPORT

Semi-Volatile Organic Compounds by EPA 8270 (SIM)

Sample ID: **2205190-001ADUP** SampType: **DUP** Units: **µg/L** Prep Date: **5/10/2022** RunNo: **75348**
Client ID: **Ohop-in50922** Batch ID: **36379** Analysis Date: **5/11/2022** SeqNo: **1546038**

Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Anthracene	ND	0.0979						0		30	
Carbazole	ND	0.0979						0		30	
Di-n-butyl phthalate	ND	1.96						0		30	
Fluoranthene	ND	0.0979						0		30	
Pyrene	ND	0.0979						0		30	
Butyl benzyl phthalate	ND	1.96						0		30	
Benz(a)anthracene	ND	0.0979						0		30	
Chrysene	ND	0.0979						0		30	
Bis(2-ethylhexyl) phthalate	ND	1.96						0		30	
Di-n-octyl phthalate	ND	0.392						0		30	
Benzo(b)fluoranthene	ND	0.0979						0		30	
Benzo(k)fluoranthene	ND	0.0979						0		30	
Benzo(a)pyrene	ND	0.0979						0		30	
Indeno(1,2,3-cd)pyrene	ND	0.0979						0		30	
Dibenz(a,h)anthracene	ND	0.0979						0		30	
Benzo(g,h,i)perylene	ND	0.0979						0		30	
Surr: 2,4,6-Tribromophenol	3.60		3.917		91.9	38.8	146		0	30	
Surr: 2-Fluorobiphenyl	1.64		1.959		83.9	38.8	131		0		
Surr: Terphenyl-d14	1.51		1.959		77.2	46	144		0		

Sample Log-In Check List

Client Name:	**LLTK**	Work Order Number:	**2205190**
Logged by:	**Matt Langston**	Date Received:	**5/9/2022 1:29:00 PM**

Chain of Custody

1.	Is Chain of Custody complete?	Yes	☑	No	☐	Not Present ☐
2.	How was the sample delivered?	Client				

Log In

3.	Coolers are present?	Yes	☑	No	☐	NA ☐
4.	Shipping container/cooler in good condition?	Yes	☑	No	☐	
5.	Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact)	Yes	☐	No	☐	Not Present ☑
6.	Was an attempt made to cool the samples?	Yes	☐	No	☑	NA ☐
		Unknown prior to receipt				
7.	Were all items received at a temperature of >2°C to 6°C *	Yes	☐	No	☐	NA ☑
8.	Sample(s) in proper container(s)?	Yes	☑	No	☐	
9.	Sufficient sample volume for indicated test(s)?	Yes	☑	No	☐	
10.	Are samples properly preserved?	Yes	☑	No	☐	
11.	Was preservative added to bottles?	Yes	☐	No	☑	NA ☐
12.	Is there headspace in the VOA vials?	Yes	☐	No	☐	NA ☑
13.	Did all samples containers arrive in good condition(unbroken)?	Yes	☑	No	☐	
14.	Does paperwork match bottle labels?	Yes	☑	No	☐	
15.	Are matrices correctly identified on Chain of Custody?	Yes	☑	No	☐	
16.	Is it clear what analyses were requested?	Yes	☑	No	☐	
17.	Were all holding times able to be met?	Yes	☑	No	☐	

Special Handling (if applicable)

18.	Was client notified of all discrepancies with this order?	Yes	☐	No	☐	NA ☑

Person Notified: _____ Date: _____

By Whom: _____ Via: ☐ eMail ☐ Phone ☐ Fax ☐ In Person

Regarding: _____

Client Instructions: _____

19. Additional remarks:

Item Information

Item #	Temp ºC
Sample	10.0

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Chain of Custody Record & Laboratory Services Agreement

Fremont Analytical
3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Date: 5/9/22 Page: 1 of: 1

Laboratory Project No (internal): 2205140

Project Name: Ohop Creek Stormwater

Special Remarks:
- see emailed instructions for pulling UWTD WSV grab samples.
- Contact pm for pickup

Project No:

Client: Long Live the Kings

Address: 1326 5th ave #450

City, State, Zip: Seattle, WA, 98101

Telephone: 415-342-0307

Fax:

Collected by: LLTK

Location: Ohop Creek

Report To (PM): Ashley Bagley

PM Email: abagley@lltk.org

Sample Disposal: ☐ Return to client ☐ Disposal by lab (after 30 days)

	Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8) Total (T) | Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1	Ohop-in50922	5/07	10:30AM	SW							X		X		X		Ammonia, TSS, DOC, Total Phosphorus
2	Ohop-mid50922	5/07	10:50am	SW							X		X		X		Ammonia, TSS, DOC, Total Phosphorus
3	Ohop-at50922	5/07	10:50AM	SW							X		X		X		Ammonia, TSS, DOC, Total Phosphorus
4																	
5																	
6																	
7																	
8																	
9																	
10																	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL *Individual:* Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide Phosphate Fluoride Nitrate+Nitrite

Turn-around Time:
☑ Standard ☐ Next Day
☐ 3 Day ☐ Same Day
☐ 2 Day _____ (specify)

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x	Jack McDermott	5/7/22 1:07PM	x Elisabeth Sawaya	Elisabeth Sawaya	5/9/22 13:29
Relinquished (Signature)	Print Name	Date/Time	Received (Signature)	Print Name	Date/Time
x			x		

May 12, 2022

Ms. Brianna Barnes
Fremont Analytical, Inc.
3600 Fremont Ave N.
Seattle, WA 98103

Dear Ms. Barnes,

On May 10th, 3 samples were received by our laboratory and assigned our laboratory project number EV22050046. The project was identified as your 2205190. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Glen Perry
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Fremont Analytical, Inc. 3600 Fremont Ave N. Seattle, WA 98103	DATE:	5/12/2022
		ALS JOB#:	EV22050046
		ALS SAMPLE#:	EV22050046-01
CLIENT CONTACT:	Brianna Barnes	DATE RECEIVED:	05/10/2022
CLIENT PROJECT:	2205190	COLLECTION DATE:	5/7/2022 10:50:00 AM
CLIENT SAMPLE ID	Ohop-in50922	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate	EPA-300.0	U, HT05	0.15	1	MG/L	05/10/2022	EBS
Nitrite	EPA-300.0	U	0.14	1	MG/L	05/10/2022	EBS
Phosphate	EPA-300.0	U	0.29	1	MG/L	05/10/2022	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
HT05 -Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Fremont Analytical, Inc. 3600 Fremont Ave N. Seattle, WA 98103	DATE:	5/12/2022
		ALS JOB#:	EV22050046
		ALS SAMPLE#:	EV22050046-02
CLIENT CONTACT:	Brianna Barnes	DATE RECEIVED:	05/10/2022
CLIENT PROJECT:	2205190	COLLECTION DATE:	5/7/2022 10:50:00 AM
CLIENT SAMPLE ID	Ohop-mid50922	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate	EPA-300.0	**0.68 HT05**	0.15	1	MG/L	05/10/2022	EBS
Nitrite	EPA-300.0	U	0.14	1	MG/L	05/10/2022	EBS
Phosphate	EPA-300.0	**1.1**	0.29	1	MG/L	05/10/2022	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
HT05 -Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Fremont Analytical, Inc. 3600 Fremont Ave N. Seattle, WA 98103	DATE:	5/12/2022
		ALS JOB#:	EV22050046
		ALS SAMPLE#:	EV22050046-03
CLIENT CONTACT:	Brianna Barnes	DATE RECEIVED:	05/10/2022
CLIENT PROJECT:	2205190	COLLECTION DATE:	5/7/2022 10:50:00 AM
CLIENT SAMPLE ID	Ohop-out50922	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Nitrate	EPA-300.0	**0.69 HT05**	0.15	1	MG/L	05/10/2022	EBS
Nitrite	EPA-300.0	U	0.14	1	MG/L	05/10/2022	EBS
Phosphate	EPA-300.0	**0.76**	0.29	1	MG/L	05/10/2022	EBS

U - Analyte analyzed for but not detected at level above reporting limit.
HT05 -Sample was analyzed outside of the holding time at the request of the client. Results should be considered estimated.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Fremont Analytical, Inc. 3600 Fremont Ave N. Seattle, WA 98103	DATE:	5/12/2022
		ALS SDG#:	EV22050046
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Brianna Barnes		
CLIENT PROJECT:	2205190		

LABORATORY BLANK RESULTS

MBLK-R408443 - Batch R408443 - Water by EPA-300.0

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Nitrate	EPA-300.0	U	MG/L	0.15	05/10/2022	EBS
Nitrite	EPA-300.0	U	MG/L	0.14	05/10/2022	EBS
Phosphate	EPA-300.0	U	MG/L	0.29	05/10/2022	EBS

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Fremont Analytical, Inc. 3600 Fremont Ave N. Seattle, WA 98103	DATE:	5/12/2022
		ALS SDG#:	EV22050046
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Brianna Barnes		
CLIENT PROJECT:	2205190		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: R408443 - Water by EPA-300.0

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
Nitrate - BS	EPA-300.0	**100**			80	120	05/10/2022	EBS
Nitrate - BSD	EPA-300.0	**100**	**0**		80	120	05/10/2022	EBS
Nitrite - BS	EPA-300.0	**100**			80	120	05/10/2022	EBS
Nitrite - BSD	EPA-300.0	**102**	**1**		80	120	05/10/2022	EBS
Phosphate - BS	EPA-300.0	**91.5**			80	120	05/10/2022	EBS
Phosphate - BSD	EPA-300.0	**92.0**	**1**		80	120	05/10/2022	EBS

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CHAIN OF CUSTODY RECORD

Omega COCID 1363 PAGE: 1 OF: 1

EV2205046

ADDRESS
Fremont Analytical, Inc.
3600 Fremont Ave. N.
Seattle, WA 98103
TEL: 206-352-3790
FAX: 206-352-7178
Website: www.fremontanalytical.com

SUB CONTRATOR: ALSE COMPANY: ALS Environmental

ADDRESS: 8620 Holly Dr. Ste 100

CITY, STATE, ZIP: Everett, WA 98208

PHONE: (425) 356-2600 FAX: EMAIL:

ACCOUNT #:

SPECIAL INSTRUCTIONS / COMMENTS:

Standard TAT. Please email results to Brianna Barnes at bbarnes@fremontanalytical.com and Matt Langston at mlangston@fremontanalytical.com.

OK to proceed out of hold

ITEM #	SAMPLE ID	CLIENT SAMPLE ID	BOTTLE TYPE	MATRIX	DATE COLLECTED	NUMBER OF CONTAINERS	COMMENTS: Methanol Preserved Weights HOT Sample Notation, Additional Sample Description.
1	2205190-001C	Ohop-in50922	250 HDPE NON	Stormwater	5/7/2022 10:50:00 AM	1	Anions: Nitrate, nitrite, and ortho-phosphate
	C-IC-ANIONS, PREP-IC-ANIONS						
2	2205190-002C	Ohop-mid50922	250 HDPE NON	Stormwater	5/7/2022 10:50:00 AM	1	Anions: Nitrate, nitrite, and ortho-phosphate
	C-IC-ANIONS, PREP-IC-ANIONS						
3	2205190-003C	Ohop-out50922	250 HDPE NON	Stormwater	5/7/2022 10:50:00 AM	1	Anions: Nitrate, nitrite, and ortho-phosphate
	C-IC-ANIONS, PREP-IC-ANIONS						

Relinquished By: Alex Szep	Date: 5/10/22	Time: 8:55	Received By: John Penn	Date: 5/10/22	Time: 12:10PM
Relinquished By:	Date:	Time:	Received By:	Date:	Time:
Relinquished By:	Date:	Time:	Received By:	Date:	Time:

TAT: Standard X RUSH Next BD 2nd BD 3rd BD

Note: RUSH requests will incur surcharges!

REPORT TRANSMITTAL DESIRED:

HARDCOPY (extra cost) FAX EMAIL ONLINE

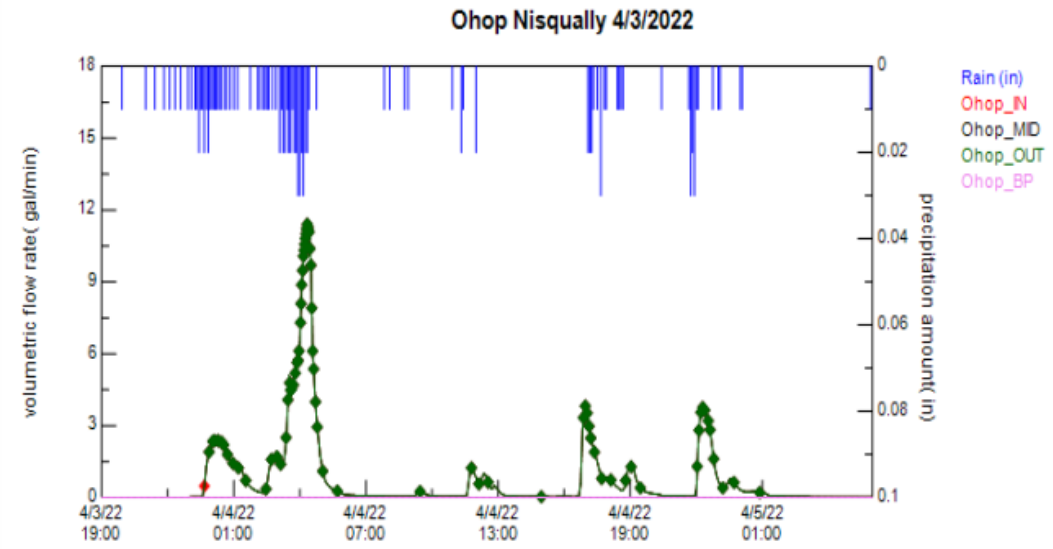
FOR LAB USE ONLY

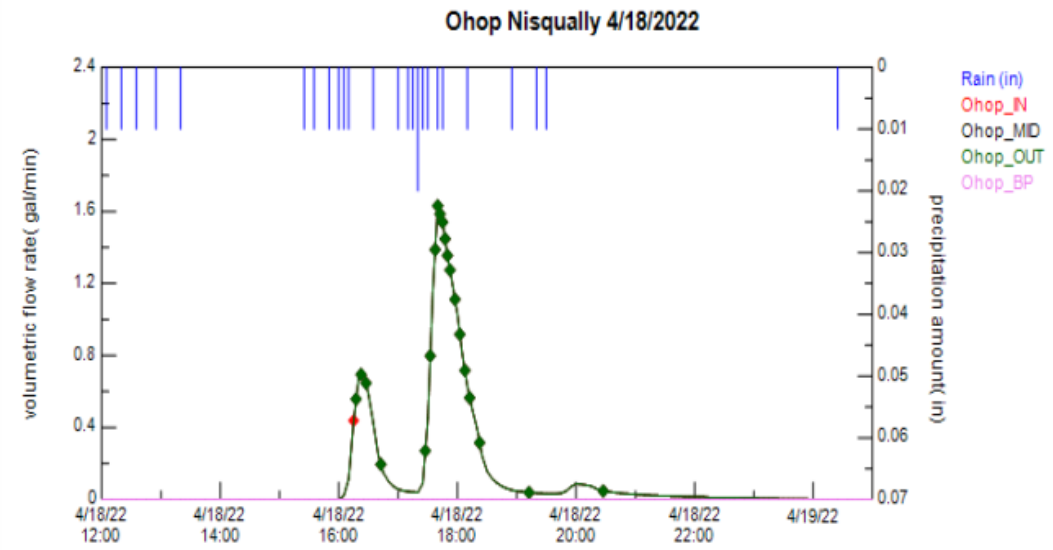
Temp of samples °C Attempt to Cool ?

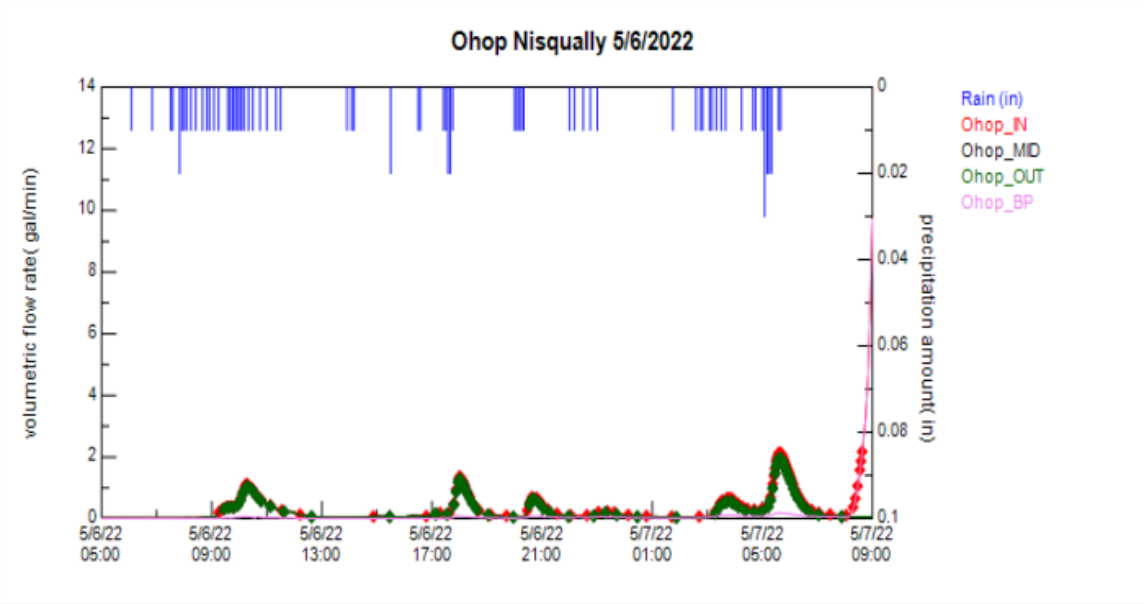
Comments:

Appendix D

Volumetric Flow Rate


Ohop Nisqually 4/3/2022
volumetric flow rate(gal/min)
precipitation amount(in)
Rain (in)
Ohop_IN
Ohop_MID
Ohop_OUT
Ohop_BP
18
15
12
9
6
3
0
0
0.02
0.04
0.06
0.08
0.1
4/3/22 19:00
4/4/22 01:00
4/4/22 07:00
4/4/22 13:00
4/4/22 19:00
4/5/22 01:00


Ohop Nisqually 4/18/2022
volumetric flow rate(gal/min)
precipitation amount(in)
Rain (in)
Ohop_IN
Ohop_MID
Ohop_OUT
Ohop_BP
2.4
2
1.6
1.2
0.8
0.4
0
0
0.01
0.02
0.03
0.04
0.05
0.06
0.07
4/18/22 12:00
4/18/22 14:00
4/18/22 16:00
4/18/22 18:00
4/18/22 20:00
4/18/22 22:00
4/19/22


Ohop Nisqually 5/6/2022
volumetric flow rate(gal/min)
precipitation amount(in)
Rain (in)
Ohop_IN
Ohop_MID
Ohop_OUT
Ohop_BP
14
12
10
8
6
4
2
0
0
0.02
0.04
0.06
0.08
0.1
5/6/22 05:00
5/6/22 09:00
5/6/22 13:00
5/6/22 17:00
5/6/22 21:00
5/7/22 01:00
5/7/22 05:00
5/7/22 09:00